APPENDIX C
ENVIRONMENTAL AND CULTURAL RESOURCES

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APPENDIX C.1
EXISTING AND FUTURE WITHOUT PROJECT CONDITIONS

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C.1 EXISTING AND FUTURE WITHOUT PROJECT CONDITIONS

C.1.1 EXISTING CONDITIONS OF RESOURCES

The study area for the Central Everglades Planning Project (CEPP) encompassed the Northern Estuaries (St. Lucie River and Estuary, Southern Indian River Lagoon, and Caloosahatchee River and Estuary), Lake Okeechobee, a portion of the Everglades Agricultural Area (EAA), the water conservation areas (WCAs), Everglades National Park (ENP), the Southern Estuaries (Florida Bay and Biscayne Bay), and the Lower East Coast (LEC). The proposed modifications to the CEPP within the EAA considered in this CEPP Post Authorization Change Report (PACR) could have potential effects throughout most of the CEPP study area. Therefore, the entire CEPP study area was retained as a "region of influence" for purposes of the analysis of potential effects of the CEPP PACR, even though the incremental effects of the CEPP PACR alternatives in the EAA may have marginal to negligible effects on some resources in portions of the region of influence furthest away from the proposed modifications. This section describes the existing physical, ecological, and socioeconomic conditions within this large study area. The existing conditions are presented in a regional or area-specific context depending on the nature of the resource or the anticipated effect of that resource. These descriptions are essentially the same as those used in the CEPP planning process, except that they have been updated as appropriate with any pertinent information new since 2014. Existing conditions are summarized in **Section 2.0** of the main report.

C.1.1.1 Vegetative Communities

C.1.1.1.1 Lake Okeechobee

The vegetation and cover types within the Lake Okeechobee region have been greatly altered during the last century. Historically, the natural vegetation was a mix of freshwater marshes, hardwood swamps, cypress swamps, pond apple forests, and pine flatwoods. The freshwater marshes were the predominant cover type throughout, especially along the southern portion of Lake Okeechobee where it flowed into the Everglades. These marshes were vegetated primarily with sawgrass (*Cladium jamaicense*) and scattered clumps of Carolina willow (*Salix caroliniana*), sweetbay (*Magnolia virginiana*), and cypress (*Taxodium* spp.). Hardwood swamps dominated by red maple (*Acer rubrum*), sweetbay, and sweet gum (*Liquidambar styraciflua*) occurred in riverine areas feeding Lake Okeechobee, while cypress swamps were found in depressional areas throughout the region. Pine flatwoods composed of slash pine (*Pinus elliottii*), cabbage palm (*Sabal palmetto*), and saw palmetto (*Serenoa repens*) were prevalent in upland areas, especially to the north.

The majority of the surface of Lake Okeechobee is not vegetated and provides open-water (pelagic) habitat. Open-water habitat within Lake Okeechobee covers about 75% of the lake's surface area.

Lake Okeechobee currently has an extensive littoral zone that occupies approximately 150 square miles (about 25%) of the lake's surface (SFER 2017). Littoral vegetation occurs along much of Lake Okeechobee's perimeter, but is most extensive along the southern and western borders (SFER 2017). The littoral zone plant community is composed of a mosaic of native and exotic emergent and submergent plant species. Emergent vegetation within the littoral zone is dominated by herbaceous species such as cattail (*Typha* spp.), spike rush (*Eleocharis cellulosa*), and the invasive exotic torpedo grass (*Panicum repens*). Other emergent vegetation includes giant bulrush (*Schoenoplectus californicus*), sawgrass, pickerelweed

(*Pontedaria cordata*), arrowheads (*Sagittaria* spp.), smartweed (*Polygonum* spp.), beakrushes (*Rhynochospora* spp.), wild rice (*Zizania aquatic*), sand cordgrass (*Spartina bakeri*), umbrella sedges (*Fuirena* spp.), southern cutgrass (*Leersia hexandra*), maidencane (*Panicum hemitomon*), white vine (*Sarcostemma clausum*), dogfennel (*Eupatorium capillifolium*), mikania (*Mikania scandens*), and the invasive exotic Cuban bulrush (*Oxycaryum cubense*). Woody vegetation consists of primrose willow (*Ludwigia* spp.), Carolina willow, buttonbush (*Cephalanthus occidentalis*), and the invasive exotic melaleuca (*Melaleuca quinquenervia*). Over the years, there has been an on-going effort to eradicate melaleuca in the Lake Okeechobee region. The eradication effort has been extremely effective.

Submerged vegetation within Lake Okeechobee is composed primarily of hydrilla (*Hydrilla verticillata*), an invasive exotic species, pondweed (*Potomogeton illinoensis*), bladderwort (*Utricularia* spp.), Chara (*Chara* spp.), coontail (*Ceratophyllum demersum*), and tape grass (*Vallisneria americana*).

The floating or floating leaf vegetation component of the littoral zone consists of lotus lily (*Nelumbo lutea*), fragrant water lily (*Nymphaea odorata* and *N. mexicana*), the invasive exotics water hyacinth (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes*), duckweed (*Lemna* spp.), pennywort (*Hydrocotyle* spp.), and primrose (*Ludwigia* spp.).

C.1.1.1.2 Northern Estuaries

Submerged aquatic vegetation (SAV), which collectively includes seagrass and macroalgae, and oyster beds are the most important resources in the St. Lucie River, South Indian River Lagoon, and Caloosahatchee River and Estuary (IRL CCMP 1996). These communities are highly productive and provide food and shelter for fish, sea turtles, manatees, a myriad of invertebrates, and other species. Seagrass meadows improve water quality by removing nutrients, dissipating the effects of waves and currents, and stabilizing bottom habitats, thereby reducing suspended solids, while oysters filter large volumes of water daily, also helping to improve water quality. Seagrass beds support some of the most abundant and diverse fish populations in the Indian River Lagoon. Many commercial and recreational fisheries (e.g., clam, shrimp, lobster, and fish) are associated with healthy seagrass beds (USFWS 1999). Currently, many SAV beds are stressed and have been reduced or eliminated from their former areas by extreme salinity fluctuations, nutrient enrichment, increased turbidity, decreased light attenuation, sedimentation, dredging, and damage from boats. Impacts from recent extreme events, the wet summers of 2013 and 2016 and especially Hurricane Irma in 2017, created a particularly damaging scenario with heavy and sustained freshwater runoff from both the watersheds and Lake Okeechobee. Oysters that occur in the more upstream locations in the estuaries have been literally wiped out by these same events. In a more natural predrainage condition, the estuaries also experienced extreme events such as El Niño "wet" dry seasons and hurricanes, but the frequency and severity of the large freshwater releases into the estuaries would have been much reduced in both magnitude, duration, and frequency. Currently even in non-hurricane years, a wet summer can produce damaging discharges. When this occurs in most years, as it does currently, the resilience of these systems is reduced, making them very vulnerable to ecological collapse.

Regulatory discharges from Lake Okeechobee to the Northern Estuaries over the last several years have been exacerbated by extreme weather events that have resulted in undesirable discharges. These undesirable discharges are high-volume flows that are necessary over extended periods for maintaining lake levels consistent with the current operating regime. The discharges have resulted in extreme adverse conditions, including poor water quality and altered salinity, in both the St. Lucie River and Estuary and the Caloosahatchee River and Estuary in recent years.

C.1.1.1.2.1 Upper Caloosahatchee River and Estuary

In terms of distribution and abundance, tape grass has been the dominant vegetation species in the upper Caloosahatchee River Estuary, colonizing littoral zones in water of less than 1 meter (Chamberlain and Doering 1998a). In the early 1990s, tape grass covered approximately 1,000 acres and about 60% of the coverage occurred within an 8-kilometer (km) stretch between Beautiful Island and the Fort Myers Bridge (Hoffacker 1994). Total longitudinal cover ranged from 14 to 32 km upstream from Shell Point (Chamberlain and Doering 1998b). Tape grass can typically tolerate salinities of 3 to 5 practical salinity units (psu) with few long-term effects if light conditions are sufficient (Haller 1974, French and Moore 2003, Jarvis and Moore 2008). Dramatic declines in tape grass were observed beginning in 2000-2001 due to an extreme drought and remained almost non-existent until 2004-2005. The species declined again beginning in late 2006 and through the drought of 2007-2008 as a result of salinities exceeding the species' tolerance (Haller 1974, Doering et al. 1999, Kraemer et al. 1999, Doering et al. 2001). During this period, widgeon grass (*Ruppia maritime*) was the dominant species although it never achieved even the minimum abundance recorded for tape grass (Burns et al. 2007).

The effects of hurricane water releases in 2005 resulted in decreased plant cover and density in the latter half of 2005. Compounding the high turbidity effects from freshwater releases in 2005, drought conditions caused precipitous increases in salinities beginning in October 2006 raising salinity levels from 10 to 25 psu from November 2006 through April 2008. During the December 2005 to April 2006 period, lower water clarity due to high turbidity was associated with lower shoot density and cover. The loss of plants was quite rapid with a significant end-of-year dieback in 2006 followed by no regrowth in spring 2007. Salinities finally declined between April and October 2008, but tape grass recovery has been slow and the species remained absent in the estuary from 2007 to 2009 with a minimal recurrence in 2010, which was eliminated by high salinities in 2011. As of 2017, very little regrowth has occurred, which might be related to a lack of propagules as nearly all the tape grass was lost during the late 2006-2008 high-salinity period. It may also be related to herbivory or other impacts on the initial recolonization of recruits into the area as leaves were sometimes noted as missing their tips (RECOVER 2009).

C.1.1.1.2.2 Lower Caloosahatchee River Estuary

Historically, two species of SAV have been routinely reported during surveys in the lower Caloosahatchee River and Estuary upstream of Shell Point: shoal grass (*Halodule wrightii*) and turtle grass (*Thalassia testudinum*) (Chamberlain and Doering 1998a, Wilzbach et al. 2000, Burns et al. 2007). In more recent reports, manatee grass (*Syringodium filiforme*) has been reported in San Carlos and Tarpon Bays (Wilzbach et al. 2000, Burns et al. 2007). Shoal grass coverage, described as abundant, has been at 300 acres; about 75% of this occurred between 2 and 8 km upstream of Shell Point (Chamberlain and Doering 1998b).

From 2004 to 2008, the lower estuary was dominated by shoal grass. Although widgeon grass was observed occasionally (Burns et al. 2007), only very low densities of the species were found in the lower estuary when surveys were searching specifically for it. High-salinity fluctuations with tides and shading by shoal grass may limit its growth. Low salinities during higher rainfall periods and discharge events observed since 2004 likely prevented the survival of seagrass species such as turtle grass (Burns et al.

2007). Water clarity was poor in 2004 and 2005 preventing SAV growth in waters greater than 0.7 meter deep. Water clarity conditions improved in 2007 and were sufficient for growth down to 1.2 meters.

Hurricane effects lowering SAV abundance in 2005 and 2006 and subsequent shoal grass recovery in 2007 are evident with cover in 2007 exceeding 2004 levels. Salinities of 1 psu or less occurred each year from 2004 to 2006 due to high rainfall within the watershed.

Monitoring over the past 15 years has shown that SAV in all regions of the Caloosahatchee River and Estuary responds to variations in salinity related to S-79 flows. Although each SAV species occurring in the Caloosahatchee River and Estuary has its own optimal level of salinity, data indicate that all species respond positively to reduced temporal variation in salinity, which is achieved when S-79 flows are maintained within the preferred 450-2,800-cubic feet per second (cfs) envelope. Comprehensive Everglades Restoration Plan (CERP) projects allowing consistent within-envelope flows at S-79 should, therefore, reduce temporal variation in salinity and increase SAV coverage and density in all regions of the estuary.

Oyster reefs have been identified as essential fish habitat (EFH) for resident and transient species (Breitburg 1999, Coen et al. 1999, Tolley and Volety 2005, Tolley et al. 2005, Tolley et al. 2006). According to the Magnuson-Stevens Fishery Conservation and Management Act, EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” and fish is defined as “finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds” (USDOC 1997). In general, oyster reefs provide habitat and shelter for many estuarine species (Zimmerman et al. 1989, Myers and Ewel 1990, Breitburg 1999, Tolley and Volety 2005, Tolley et al. 2005, Tolley et al. 2006), especially during periods of hypoxia (Lenihan et al. 2001). Harding and Mann (2001) suggested that oyster reefs might provide higher diversity and availability of food or a greater amount of higher quality food than other habitats. The reefs can also be called EFH for oysters themselves, especially when reef height and quality and quantity of interstitial spaces for recruiting oysters are considered (Coen et al. 1999). Oyster reefs provide habitat for a variety of species. Wells (1961) collected 303 different species that utilized oyster reefs, segregating species that use the reef primarily as shelter from those that depend on the reef for food. Oyster reefs found in salt marshes, mudflats, and seagrasses have higher densities of organisms (both infauna and epifauna) when oyster reefs are present than when they are not present (Grabowski et al. 2005, Zimmerman et al. 1989). These organisms are then consumed by finfish and crustacean species that might be recreationally or commercially valuable (Grabowski et al. 2005, Grabowski and Peterson 2007). At least 72 facultative resident and transient fish species have been observed in close proximity to oyster reefs in several studies in Maryland, Virginia, North Carolina, South Carolina, and Texas (Coen et al. 1999).

Water quality in the Caloosahatchee River and Estuary is dependent on surface water inputs, especially from the S-79 water control structure, which supplies water from the eastern watershed and Lake Okeechobee. Since the historical watershed area was smaller and the river was not connected to Lake Okeechobee and its watershed, the maximum flow was significantly smaller. Now, flows at S-79 reach over 20,000 cfs. At 5,000 cfs, the estuary is completely fresh down to the mouth of the river. When flows from S-79 are below 300 cfs, salt water extends up river and the water clarity is better, principally due to reductions in colored dissolved organic matter.

C.1.1.1.2.3 St. Lucie Estuary

The St. Lucie River and Estuary and Southern Indian River Lagoon support six species of seagrass, including shoal grass, manatee grass, turtle grass, paddle grass (*Halophila decipiens*), star grass *(Halophila engelmannii*), and the threatened Johnson's seagrass (*Halophila johnsonii*). Johnson's seagrass was listed as threatened under the Endangered Species Act in 1998, and critical habitat was designated in 2000. The species has a very limited distribution along the east coast of Florida from central Biscayne Bay to Sebastian Inlet. Major threats include propeller scarring, dredging, sedimentation, and degraded water quality. Shoal grass and manatee grass are the dominant canopy species in the lagoon (Thompson 1978, Dawes et al. 1995, Morris et al. 2000). While all of these species are most successful in salinities greater than 20 psu, *s*hoal grass can tolerate a wide range of salinity and salinity variations. However, manatee grass is not as tolerant of low salinities or widely varying salinities (Irlandi 2006).

The SAV distribution has been mapped in the outer St. Lucie River and Estuary and the Southern Indian River Lagoon every 2-3 years since 1986, including annual mapping from 2005 through 2007 to help assess hurricane impacts. Historical SAV maps show SAV extending throughout the estuary. In 2007, very sparse SAV (less than 10% cover in most areas) was present in the lower and middle estuary. Three seagrass species occurred within the estuary: shoal grass, Johnson's seagrass, and paddle grass. Most of the SAV occurred in small isolated patches. The dominant SAV species in 2007 was Johnson's seagrass. It also extended farther upstream than any other SAV species.

This region was impacted by hurricanes and associated freshwater discharges in 2004 and 2005. Following the hurricanes, observed impacts to Southern Indian River Lagoon SAV communities included large coverage and density declines and smaller direct impacts due to burial by shifting bottom sediments. Lush manatee grass beds were documented through 2004; however, low salinities and associated poor water quality following the 2004 and 2005 hurricanes greatly impacted manatee grass in the area. The hurricanes also altered bathymetry on the east and west edges of the estuary, covering seagrasses. The steepest decline in percent occurrence of manatee grass occurred in 2005 after Hurricane Wilma. Johnson's seagrass followed by shoal grass colonized the former manatee grass habitat and recruited throughout the site. Available data indicates a clear trend toward recovery of the manatee grass beds.

Oyster populations in the St. Lucie River and Estuary have been negatively impacted by the highly variable freshwater inflows that are a result of the altered local hydrology. Periods of extremely high flow result in acute damage to oyster populations. Extended periods of reduced flow result in gradual increases in disease and predation rates that result in compromised oyster health and survivorship. The variability in and of itself can compound the problem because rapid shifts between dry and wet regimes reduce the opportunity for acclimation by the oyster and other estuarine inhabitants. In the St. Lucie River and Estuary, low salinity events have had the most devastating impact on oysters but, in recent years, prolonged high salinity events have also occurred.

C.1.1.1.3 Everglades Agricultural Area

Currently, much of the native south Florida landscape has been destroyed or substantially reduced by development, hydrologic change, increased nutrients, and the invasion of exotic plants. South of Lake Okeechobee, the historic pond apple swamps and sawgrass marshes have been converted to agriculture. Habitat types within the EAA are divided into five general groups: aquatic, wetland, upland, disturbed (mostly agricultural), and urban/extractive.

The aquatic communities within the EAA include both natural and man-made areas of open water such as canals, ditches, and ponds. The primary canals include Bolles, Cross, Hillsboro, Miami, North New River, and West Palm Beach Canals. The storage and treatment management measures for CEPP PACR south of Lake Okeechobee are recommended to be located on and maximize the usage of the previously purchased A-1 and A-2 Compartments of the EAA land south of Lake Okeechobee that are owned by the State of Florida (see **Section 3.0**). All of the A-1 parcel, A-2 parcel, and A-2 Expansion area is considered to be atypical jurisdictional wetlands based on hydric soils and hydrology. Wetland vegetation is anticipated to return to the site should agricultural practices cease. Upland land cover classes include dry prairie, hardwood hammock and forests, pinelands, and mixed hardwood pine forests. Disturbed communities consist of mostly agricultural lands including pasture (improved and unimproved), row crops, sugarcane, citrus, and other agricultural lands. Most of the urban and extractive lands are concentrated around the Belle Glade area. Low impact urban areas consist of either vegetated or nonvegetated lands within areas such as lawns, golf courses, road shoulders, and grassy areas surrounding development. High-impact urban areas are nonvegetated sites such as buildings, roads, and parking lots. Extractive cover areas consist of surface mining operations such as limestone quarries, phosphate mines, and sand pits as well as the associated industrial complexes.

C.1.1.1.4 Greater Everglades

The Everglades landscape is dominated by a complex of freshwater wetland communities that includes open-water sloughs and marshes, dense grass and sedge dominated marshes, forested islands, and wet marl prairies. The primary factors influencing the distribution of dominant freshwater wetland plant species of the Everglades are soil type, soil depth, and hydrological regime (USFWS 1999). These communities generally occur along a hydrological gradient with the slough/open-water marsh communities occupying the wettest areas (flooded more than nine months per year), followed by sawgrass marshes (flooded six to nine months per year), and wet marl prairie communities (flooded less than six months per year) (USFWS 1999). The Everglades freshwater wetlands eventually grade into intertidal mangrove wetlands and sub tidal seagrass beds in the estuarine waters of Florida Bay.

Development and drainage over the last century have dramatically reduced the overall spatial extent of freshwater wetlands within the Everglades, with approximately half of the predrainage 2.96 million acres of wetlands being converted for development and agriculture (Davis and Ogden 1994). Alteration of the normal flow of freshwater through the Everglades has also contributed to conversions between community types, invasion by exotic species, and a general loss of community diversity and heterogeneity.

Many areas of WCA 3A still contain relatively good wetland habitat consisting of a complex of tree islands, sawgrass marshes, wet prairies, and aquatic sloughs. Water lilies (*Nymphaea alba*) were originally widespread in sloughs throughout many areas of WCA 3A (McVoy et al. 2011). Reduced freshwater inflow and drainage by the Miami Canal have overdrained the northern portion of WCA 3A, resulting in increased fire frequency and the associated loss of tree islands, wet prairie, and aquatic slough habitat. Northern WCA 3A is currently dominated largely by mono-specific sawgrass stands with large areas of shrubs and monotypic cattail. Northern WCA 3A lacks the diversity of communities that exists in southern WCA 3A. In southern WCA 3A, Woods and Tanner (1990) documented the trend toward deep water lily dominated sloughs due to impoundment. In approximately 1991, the hydrology of southern WCA 3A shifted to the deeper water and extended hydroperiods of the new, wet hydrologic era resulting in a northward shift in slough vegetation communities within the WCA 3A impoundment (Zweig and Kitchens 2008). Typical

Everglades vegetation, including tree islands, wet prairies, sawgrass marshes, and aquatic sloughs also occur throughout WCA 3B. However, within WCA 3B, the ridge and slough landscape has been severely degraded by the virtual elimination of overland sheetflow due to the L-67 canal and levee system. WCA 3B experiences very little overland flow and has become primarily a rain-fed system predominated by shorter hydroperiod sawgrass marshes with relatively few sloughs or tree islands remaining. Water levels in WCA 3B are also too low and do not vary seasonally, contributing to poor ridge and slough patterning. Loss of sheetflow to WCA 3B has also accelerated soil loss reducing elevations of the remaining tree islands in WCA 3B and making them vulnerable to high water stages.

Vegetative trends in ENP have included a substantial shift from the longer hydroperiod slough/open-water marsh communities to shorter hydroperiod sawgrass marshes (Davis and Ogden 1994, Armentano et al. 2006). Flows through Shark River Slough (SRS) under current system compartmentalization and water management practices are greatly reduced when compared with predrainage conditions. The result has been lower wet season depths and more frequent and severe dry downs in sloughs and reduction in extent of shallow water edges (McVoy et al. 2011). Over-drainage in the peripheral wetlands along the eastern flank of Northeast Shark River Slough (NESRS) has resulted in shifts in community composition, invasion by exotic woody species and increased susceptibility to fire. Areas within the eastern marl prairies along the boundary of ENP suffer from over-drainage, reduced water flow, exotic tree invasion and frequent human-induced fires (Ross et al. 2006, Virzi et al. 2010). In addition, invasion of sawgrass marshes and wet prairies by exotic woody species has led to the conversion of some marsh communities to forested wetlands (Gunderson et al. 1997).

The estuarine communities of Florida Bay have also been affected by upstream changes in freshwater flows through the Everglades. A reduction in freshwater inflows into Florida Bay and alterations of the normal salinity balance have affected mangrove community composition and may have contributed to a large-scale die-off of seagrass beds (USFWS 1999).

In contrast to the vast extent of wetland communities, upland communities comprise a relatively small component of the Everglades landscape and are largely restricted to Long Pine Key, the northern shores of Florida Bay, and the many tree islands scattered throughout the region. Vegetative communities of Long Pine Key include rockland pine forest and tropical hardwood forest.

In addition, substantial areas of tropical hardwood hammock occur along the northern shores of Florida Bay and on elevated portions of some forested islands.

C.1.1.1.4.1 Slough/Open-Water Marsh

The slough/open-water marsh community occurs in the lowest, wettest areas of the Everglades. This community is a complex of open-water marshes containing emergent, floating aquatic, and SAV components. The emergent marsh vegetation is typically dominated by spike rushes (*Eleocharis cellulosa* and *E. elongata*), beakrushes, and maidencane. Common floating aquatic dominants include fragrant water lily, floating hearts (*Nymphoides aquatica*), and spatterdock (*Nuphar lutea*); and the submerged aquatic community is typically dominated by bladderwort (*Utricularia foliosa*) and periphyton. As shown by Davis et al. (1994), vegetative trends in ENP have included the conversion of slough/open-water marsh communities to shorter hydroperiod sawgrass marshes.

C.1.1.1.4.2 Sawgrass Marsh

Sawgrass marshes are dominated by dense to sparse stands of *Cladium jamaicense*. Sawgrass marshes occurring on deep organic soils (more than 1 meter) form tall, dense, nearly monospecific stands. Sawgrass marshes occurring on shallow organic soils (less than 1 meter) form sparse, short stands that contain additional herbaceous species such as spike rush, water hyssop (*Bacopa caroliniana*), and marsh mermaid weed (*Proserpinaca palustris*) (Gunderson et al. 1997). The adaptations of sawgrass to flooding, burning, and oligotrophic conditions contribute to its dominance of the Everglades vegetation. Sawgrass-dominated marshes once covered an estimated 300,000 acres of the Everglades. Approximately 70,000 acres of tall, monospecific sawgrass marshes have been converted to agriculture in the EAA. Urban encroachment from the east and development within other portions of the Everglades has consumed an additional 79,000 acres of sawgrass-dominated communities (Davis and Ogden 1994).

C.1.1.1.4.3 Wet Marl Prairies

Wet marl prairies occur on marl soils and exposed limestone and experience the shortest hydroperiods of the slough/marsh/prairie wetland complex. Marl prairie is a sparsely vegetated community that is typically dominated by muhly grass (*Muhlenbergia capillaris*) and short-stature sawgrass. Additional important constituents include black sedge (*Schoenus nigricans*), arrowfeather (*Aristida purpurascens*), Florida little bluestem (*Schizachyrium rhizomatum*), and Elliot's lovegrass (*Eragrostis elliottii*). Periphyton mats that grow loosely attached to the vegetation and exposed limestone also form an important component of this community. Marl prairies occur in the southern Everglades along the eastern and western periphery of SRS. Approximately 146,000 acres of the eastern marl prairie have been lost to urban and agricultural encroachment (Davis and Ogden 1994). Pollen data indicate that the marl prairies west of SRS are not a natural feature of the Everglades landscape but developed after twentieth century hydrologic modification of the system reduced flow to the region (Bernhardt and Willard 2006). Prior to the modifications, plant communities at the sites analyzed by Bernhardt and Willard (2006) in the Western Shark River Slough (WSRS) consisted of sawgrass marshes. Based on their analysis of pollen records, the authors concluded that “the current spatial distribution and community composition of marl prairies are a response to water management and land cover changes of the twentieth century; and further sampling of modern marl prairie communities and adjacent communities is necessary to document the predrainage and postdrainage distribution of marl prairie” (Bernhardt and Willard 2006).

C.1.1.1.4.4 Tree Islands

Tree islands occur within the freshwater marshes in areas of slightly higher elevation relative to the surrounding marsh. The lower portions of tree islands are dominated by hydrophytic, evergreen, broad-leaved hardwoods such as red bay (*Persea palustris*), sweetbay, dahoon holly (*Ilex cassine*), and pond apple (*Annona glabra*). Tree islands typically have a dense shrub layer that is dominated by coco-plum (*Chrysobalanus icaco*). Additional constituents of the shrub layer commonly include buttonbush and large leather fern (*Acrostichum danaeifolium*). Elevated areas on the upstream side of some tree islands may contain an upland tropical hardwood hammock community dominated by species of West Indian origin (Gunderson et al. 1997), with species composition shifting toward the north toward more temperate hardwood hammock species. Extended periods of flooding may result in tree mortality and conversion to a non-forested community. In the over-drained areas of WCA 3A, historic wildfires have consumed tree island vegetation and soils. Overall, the spatial extent of tree islands in WCA 3 declined by 61% between 1940 and 1995 (Patterson and Finck 1999). Portions of the WCAs have been flooded to the extent that many forested islands have lost all tropical hardwood hammock trees. Tree islands are considered an extremely important contributor to habitat heterogeneity and overall species diversity within the Everglades ecosystem because they provide nesting habitat and refugia for birds and upland species and serve as hotspots of plant species diversity within the Greater Everglades (Sklar and van der Valk 2002, USFWS 1999). Tree islands also contain extraordinarily high levels of total phosphorus (TP) in their soil suggesting that they may play a major role in the biogeochemical cycles of nutrients in the Everglades (Troxler and Childers 2010, Wetzel et al. 2009, 2011). Wetzel et al. (2011) found that soil TP levels within WCA 3A and WCA 3B tree islands were approximately 4 times higher than the surrounding marsh TP levels. Tree islands within WCA 3B may help to capture and focus nutrients, assisting to minimize potential effects on sawgrass and wet prairie communities within this region (Wetzel et al. 2011).

C.1.1.1.4.5 Mangroves

Mangrove communities are forested wetlands occurring in intertidal, low-wave-energy, estuarine and marine environments. Extensive mangrove communities occur in the intertidal zone of Florida Bay. Mangrove forests have a dense canopy dominated by four species: red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). Mangrove communities occur within a range of salinities from 0 to 40 psu. Florida Bay experiences salinities in excess of 40 psu on a seasonal basis. Declines in freshwater flow through the Everglades have altered the salinity balance and species composition of mangrove communities within Florida Bay, favoring more salt tolerant species. Changes in freshwater flow can lead to an invasion by exotic species such as Australian pine (*Casuarina equisetifoli*a) and Brazilian pepper (*Schinus terebinthifolius*).

C.1.1.1.4.6 Seagrass Beds

Seagrasses are submerged vascular plants that form dense rooted beds in shallow estuarine and marine environments. This community occurs in sub tidal areas that experience moderate wave energy. Within the affected area, extensive seagrass beds occur in Florida Bay. The most abundant seagrasses in south Florida are turtle grass, manatee grass, and shoal grass. Additional species include star grass, paddle grass, and Johnson's seagrass. Widgeon grass may also occur in seagrass beds in areas of low salinity. Seagrasses have an optimum salinity range of 24 to 35 psu, but can tolerate considerable short-term salinity fluctuations. Large-scale seagrass die-off has occurred in Florida Bay since 1987, with over 18% of the total bay area affected. Suspected causes of seagrass mortality include high salinities and temperatures during the 1980s and long-term reductions of freshwater inflow to Florida Bay (RECOVER 2009).

C.1.1.1.4.7 Rockland Pine Forest

Pine rocklands within the affected area occur on the Miami Rock Ridge and extend into the Everglades as Long Pine Key. Pine rocklands occur on relatively flat terrain with moderate to well-drained soils. Most sites are wet for only short periods following heavy rains (Florida Natural Areas Inventory 1990). Limestone bedrock is close to the surface and the soils are typically shallow accumulations of sand, marl, and organic material. Pine rockland is an open, savannah-like community with a canopy of scattered south Florida slash pine and an open, low-stature understory. This is a fire-maintained community that requires regular burns to maintain the open shrub/herbaceous stratum and to control hardwood encroachment (Gunderson et al. 1997). The overstory is comprised of scattered south Florida slash pines. The shrub layer is comprised of a diverse assemblage of tropical and temperate species. Common shrubs include cabbage palm, coco-plum, myrsine (*Rapanea punctata*), saw palmetto, southern sumac (*Rhus copallinum*), strangler fig (*Ficus aurea*), swamp bay (*Persea palustris*), wax myrtle (*Myrica cerifera*), white indigo berry (*Randia aculeata*), and willow-bustic (*Sideroxylon salicifolium*). The herbaceous stratum is comprised of a very diverse assemblage of grasses, sedges, and forbs. Common herbaceous species include crimson bluestem (*Schizachyrium sanguineum*), wire bluestem (*S. gracile*), hairy bluestem (*Andropogon longiberbis*), bushy bluestem (*A. glomeratus* var. *pumilis*), candyweed (*Polygala grandiflora*), creeping morning-glory (*Evolvulus sericeus*), pineland heliotrope (*Heliotropium polyphyllum*), rabbit bells (*Crotolaria rotundifolia*), and thistle (*Cirsium horridulum*) (USFWS 1999). Pineland croton (*Croton linearis*) is indigenous to this ecosystem and is the only known host plant for the endangered Bartram's scrub hairstreak (*Strymon acis bartrami*) (USFWS 2015). This community occurs on areas of relatively high elevation and consequently, has been subject to intense development pressure. In addition, fragmentation, fire suppression, invasion by exotic species, and a lowered water table have negatively affected the remaining tracts of pine rockland (USFWS 1999).

C.1.1.1.4.8 Tropical Hardwood Hammock

Tropical hardwood hammocks occur on upland sites where limestone is near the surface. Tropical hardwood hammocks within the affected area occur on the Miami Rock Ridge, along the northern shores of Florida Bay, and on elevated outcrops on the upstream side of tree islands. This community consists of a closed canopy forest dominated by a diverse assemblage of hardwood tree species, a relatively open shrub layer, and a sparse herbaceous stratum. This community is dominated by native south Florida species that represent the northern extension of the ranges of species that occur throughout the West Indies, but nowhere else in the continental United States. Common canopy species include gumbo limbo (*Bursera simaruba*), paradise tree (*Simarouba glauca*), pigeon-plum (*Coccoloba diversifolia*), strangler fig, wild mastic (*Sideroxylon foetidissimum*), willow-bustic, live oak (*Quercus virginiana*), short-leaf fig (*Ficus citrifolia*), and wild tamarind (*Lysiloma bahamense*). Common understory species include black ironwood (*Krugiodendron ferreum*), inkwood (*Exothea paniculata*), lancewood (*Ocotea coriacea*), marlberry (*Ardisia escallonoides*), poisonwood (*Metopium toxiferum*), satinleaf (*Chrysophyllum oliviforme*), and white stopper (*Eugenia axillaris*). Common species of the sparse shrub/herbaceous layer include shiny-leaf wild-coffee (*Psychotria nervosa*), rouge plant (*Rivinal humilis*), false mint (*Dicliptera sexangularis*), bamboo grass (*Lasciacis divaricata*), and woods grass (*Oplismenus hirtellus*). This community occurs on areas of relatively high elevation and consequently, has been subject to intense development pressure. Fragmentation of remaining tracts, invasion by exotic species, and alterations of water table elevations have also had negative impacts on this community. Tropical hardwood hammocks on the Miami Rock Ridge have been affected by a lowered water table associated with the reduction of freshwater flow through the Everglades. In contrast, tree islands in the WCAs have been flooded to the extent that many have lost all tropical hardwood hammock trees.

C.1.1.2 Fish and Wildlife Resources

A great diversity of fish and wildlife species occur throughout south Florida, including freshwater and saltwater species. Fish and wildlife resources include aquatic macroinvertebrates, small freshwater marsh fishes, larger predatory sport fishes, amphibians and reptiles, colonial wading birds, and mammals. While these resources are present in the study area, including the Northern Estuaries and central Everglades, conditions suitable to sustain them have declined dramatically over the years, with population growth and development in south Florida and the associated construction and operation of the C&SF Project.

Aquatic macroinvertebrates form a vital link between the algal and detrital food web base of freshwater wetlands and the fishes, amphibians, reptiles, and wading birds that feed upon them. Important macroinvertebrates of the freshwater aquatic community include crayfish (*Procambarus alleni*), riverine grass shrimp (*Palaemonetes paludosus*), amphipods (*Hyallela aztecus*), Florida apple snail (*Pomacea paludosa*), Seminole ramshorn (*Planorbella duryi*), and numerous species of aquatic insects (USACE 1999).

Small freshwater marsh fishes are also important processors of algae, plankton, macrophytes, and macroinvertebrates. Marsh fishes provide an important food source for wading birds, amphibians, and reptiles. Common small freshwater marsh species include the native and introduced golden topminnow (*Fundulus chrysotus*), least killifish (*Heterandria formosa*), Florida flagfish (*Jordenella floridae*), golden shiner (*Notemigonus crysoleucas*), sailfin molly (*Poecilia latipinna*), bluefin killifish (*Lucania goodei*), oscar (*Astronotus ocellatus*), eastern mosquitofish (*Gambusia holbrookii*), and small sunfishes (*Lepomis* spp.) (USACE 1999). The density and distribution of marsh fish populations fluctuate with seasonal changes in water levels. Populations of marsh fishes increase during extended periods of continuous flooding during the wet season. As marsh surface waters recede during the dry season, marsh fishes become concentrated in areas that hold water through the dry season. Concentrated dry season assemblages of marsh fishes are more susceptible to predation and provide an important food source for wading birds (USACE 1999).

Within the Greater Everglades, numerous sport and larger predatory fishes occur in deeper canals and sloughs. Common species include largemouth bass (LMB) (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), redear sunfish (*Lepomis microlophus*), black crappie (*Pomoxis nigromaculatus*), Florida gar (*Lepisosteus platyrhincus*), threadfin shad (*Dorosoma petenense*), gizzard shad (*Dorosoma cepedianum*), yellow bullhead (*Ameiurus natilis*), white catfish (*Ameiurus catus*), bowfin (*Amia calva*), and tilapia (*Tilapia* spp.) (USACE 1999). Larger fishes are an important food source for wading birds, alligators, otters, raccoons, and mink.

The freshwater wetland complex supports a diverse assemblage of reptiles and amphibians. Common amphibians include the greater siren (*Siren lacertina*), Everglades dwarf siren (*Pseudobranchus striatus*), two-toed amphiuma (*Amphiuma means*), pig frog (*Lithobates grylio*), southern leopard frog (*Lithobates sphenocephala*), Florida cricket frog (*Acris gryllus*), southern chorus frog (*Pseudacris nigrita*), squirrel tree frog (*Hyla squirela*), and green tree frog (*Hyla cinerea*) (USACE 1999). Amphibians represent an important forage base for wading birds, alligators, and larger predatory fishes (USACE 1999).

Common reptiles of freshwater wetlands include the American alligator (*Alligator mississippiensis*), snapping turtle (*Chelydra serpentina*), striped mud turtle (*Kinosternon bauri*), mud turtle (*Kinosternon subrubrum*), cooter (*Chrysemys floridana*), Florida chicken turtle (*Deirochelys reticularia*), Florida softshell turtle (*Apalone ferox*), Southern banded water snake (*Nerodia facisata*), Florida green water snake (*Nerodia floridian*), mud snake (*Francia abacura*), and Florida cottonmouth (*Agkistrodon piscivorus*) (USACE 1999).

The alligator was historically most abundant in the peripheral Everglades marshes and freshwater mangrove habitats, but is now most abundant in canals and the deeper slough habitats of the central Everglades. Drainage of peripheral wetlands and increasing salinity in mangrove wetlands as a result of decreased freshwater flows has limited the occurrence of alligators in these habitats (Mazzotti and Brandt 1994).

The freshwater wetlands of the Everglades are noted for their abundance and diversity of colonial wading birds. Common wading birds include the white ibis (*Eudocimus albus*), glossy ibis (*Plegadis falcenellus*), great egret (*Ardea albus*), great blue heron (*Ardea herodius*), little blue heron (*Egretta* *caerulea*), tricolored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), green heron (*Butorides striatus*), cattle egret (*Bubulcus ibis*), black-crowned night heron (*Nycticorax nycticorax*), yellow-crowned night heron (*Nyctanassa violacea*), roseate spoonbill (*Platalea ajaja*), and wood stork (*Mycteria americana*) (USACE 1999). The number of wading birds nesting in the Everglades has decreased by approximately 90%, and the distribution of breeding birds has shifted away from ENP into the WCAs (Bancroft et al. 1994). The WCAs support fewer numbers of breeding pairs with relatively lower reproductive success (USACE 1999). Water management practices and wetland losses are believed to be the primary cause of the declines (Bancroft et al. 1994).

Mammals that are well-adapted to the aquatic and wetland conditions of the freshwater marsh complex include the rice rat (*Oryzomys palustris natator*), round-tailed muskrat (*Neofiber alleni*), and river otter (*Lutra canadensis*). Additional mammals that may utilize freshwater wetlands on a temporary basis include the white-tailed deer (*Odocoileus virginianus*), Florida panther (*Puma concolor coryi*), bobcat (*Lynx rufus*), and raccoon (*Procyon lotor*).

Many of the fish and wildlife resources that inhabit the freshwater aquatic community of the Everglades are also common to Lake Okeechobee and the EAA. Native habitat for fish and wildlife does not comprise a significant amount of the EAA as the alteration of the landscape for agricultural uses has resulted in the removal of nearly all historically occurring native vegetation. Although abundant wetland habitat has been replaced by agriculture, the creation of stormwater treatment areas (STAs), ditches, canals, and the flooding of fallow agricultural fields provides some habitat for fish and wildlife, particularly during the rainy season.

The Northern Estuaries are also home to fish and wildlife species found in estuarine and marine habitats. Sea grasses and other SAV as well as oyster beds, saltwater marsh, and mangroves within the Northern Estuaries provide important habitat and nursery grounds for several fish species. Many fish species spend part or all their life in the estuary. Common recreational and commercial fish species include mutton snapper (*Lutjanus analis*), yellowtail snapper (*Ocyurus chrysurus*), lane snapper (*Lutjanus synagris*), yellowtail parrot fish (*Sparisoma rubripinne*), gag grouper (*Mycteroperca microlepis*), pinfish (*Lagodon rhomboids*), tarpon (*Megalops atlanticus*), common snook (*Centropomus undecimalus*), crevalle jack (*Cranx hippos*), spotted sea trout (*Cynoscion nebulosus*), redfish (*Sciaenops ocellatus*), mullet (*Mugil spp*.), and sheepshead (*Archosargus probatocephalus*). In addition to finfish, the estuaries support a variety of shellfish. Blue crabs (*Callinectes sapidus*), stone crabs (*Menippe mercenaria*), hard clams (*Mercenaria mercenaria*), and oysters (*Crassostrea virginica*) are important estuarine commercial species. SAV and algal communities are also common foraging areas for the green sea turtle (*Chelonia mydas*). The Northern Estuaries provide forage for sea birds (gulls, terns, pelicans, and others) in addition to many wading birds. The Northern Estuaries are also home to marine mammals such as the Atlantic bottlenose dolphin (*Tursiops truncatus*) and West Indian manatee (*Trichechus manatus*).

C.1.1.3 Invasive and Exotic Species

Executive Order (EO) 13112, *Invasive Species*, states an "invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Alien species (exotic) means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species and is not native to that ecosystem. Invasive species are broadly defined and can be a plant, animal, fungus, plant disease, livestock disease, or other organism. A native species is defined as a species that historically occurred or currently occurs in a particular ecosystem and is not the result of an introduction.

Significant scientific evidence and research document that invasive non-native plants are degrading and damaging south Florida natural ecosystems (Doren et al. 2001). Many species are causing significant ecological impacts by crowding out and displacing native plants, altering soil types and soil/water chemistry, altering ecosystem functions such as carbon sequestration, nutrient cycling and fire regimes, and reducing gene pools and genetic diversity. Non-native invasive animal distribution, extent, and impacts are not well understood; however, implications of invasive animals are apparent in south Florida. In addition to environmental impacts, invasive species impact human health, reduce agricultural production and property values, degrade aesthetic quality, decrease recreational opportunities, and threaten the integrity of human infrastructure such as waterways/navigation channels, locks, levees, dams, and water control structures.

Florida is particularly vulnerable to the introduction, invasion, and naturalization of non-native species. This is due to several factors including a subtropical climate, dense human population centers, major ports of entry, and the pet, aquarium, and ornamental plant industries. Major disturbance to the landscape has also increased Florida's vulnerability to invasive species. Alteration of the landscape for urban development, flood control, and agricultural uses has exacerbated non-native plant and animal invasions. Stein et al. (2000) estimated that over 32,000 exotic species (25,000 plants and 7,000 animals) have been introduced into Florida. There are approximately 4,000-5000 native species of plants and animals in Florida. The number of non-native species that have been introduced is eight times the total number of native species in the entire state. The Atlas of Florida Vascular Plants (Wunderlin and Hansen 2008) documented 4,289 plant species in Florida. Of the 4,289 plant species, 1,419 were considered non-native and were naturalized (freely reproducing) populations. The Florida Exotic Pest Plant Council (FLEPPC) identifies 76 of the 1,419 species of non-native plants as Category I species in the 2011 Invasive Plant List. Searches through existing data and resources indicate 156 non-native plant species have been documented to occur within the project area. Other non-native species are probably present; however, documented citations could not be located. Of the 156 species of plants documented to occur within the project area, there are 76 FLEPPC Category I species, 38 FLEPPC Category II species, and 28 Florida Noxious Weed species.

According to the 2013 South Florida Environmental Report, there are four species of non-native invasive plants infesting more than 144,770 acres within the Everglades Protection Area (EPA). These species include the Australian pine (*Casuarina equisetifolia*), Old World climbing fern (*Lygodium microphyllum*), melaleuca, and Brazilian pepper. The acreage of these plants was estimated by the South Florida Water Management District (SFWMD) and the National Park Service (NPS) through regional invasive plant surveys utilizing digital aerial sketch mapping. There were 224 surveys completed within the EPA, which is approximately 2.8 million acres in size, between March 2010 and February 2012. Management areas surveyed included Holeyland, Rotenberger, and Southern Glades. Other areas surveyed included the Seminole Tribe of Florida's Big Cypress Reservation, Arthur B. Marshall Loxahatchee National Wildlife Refuge (LNWR), Everglades Wildlife Management Area (WMA) (WCAs 2 and 3), the Miccosukee Tribe of Indian's Alligator Alley Reservation, Big Cypress National Preserve (BCNP), ENP, East Coast Buffer Lands, South Dade Wetlands, and several other areas (SFWMD 2013). Other non-native plant species of concern within the project area include torpedo grass, tropical American water grass (*Luziola subintegra*), roundleaf toothcup (*Rotala rotundifolia*), and cogon grass (*Imperata cylindrical*).

A primary native nuisance species within the project area is cattail. Many areas within the project area have been invaded by cattails. This is attributed to water with increased phosphorus being delivered to these areas beginning in the late 1950s. Areas where water control structures, conveyance features, and levees exist provide a suitable habitat for invasion and expansion of cattail. Examples of areas that have been impacted include WCA 2, WCA 3A, and canal and levee banks adjacent to ENP.

Searches through existing data and resources indicate 89 non-native animal species have been documented to occur within the project area. Other non-native animal species are probably present; however, documented citations could not be located. Information regarding species presence and distribution is largely incomplete for most taxonomic groups of animals. Not all of the 89 non-native animal species identified and documented to occur in the CEPP area will have a significant impact on the ecosystem.

Key species of carnivorous reptiles such as the Argentine black and white tegu (*Tupinambis merianae*), Burmese python (*Python molurus bivittatus*), and Nile monitor (*Varanus niloticus*) are currently present within the project area and have potential to cause significant impacts to the ecosystem. These species are among south Florida's most threatening invasive animals and are considered top predators and increase pressures on native wildlife populations, particularly threatened and endangered species (SFWMD 2013). Other species of concern include the island apple snail (*Pomacea maculata*), purple swamphen (*Porphyrio porphyrio*), Asian swamp eel (*Monopterus albus*), monk parakeet (*Myiopsitta monachus*), feral pig (*Sus scrofa*), and redbay ambrosia beetle (*Xyleborus glabratus*) and associated fungus (*Raffaelea lauricola*). The redbay ambrosia beetle and fungus are of special concern since they are killing bay species on tree islands in ENP and the WCAs.

C.1.1.4 Threatened and Endangered Species

C.1.1.4.1 Federally Protected Species

Federally listed threatened and endangered species are known to either exist or potentially exist within the project area and, subsequently, might be affected by the proposed project. Many of these species have been previously affected by habitat impacts resulting from wetland drainage, alteration of hydroperiods, wildfire, and water quality degradation. For a complete list of Federally threatened and endangered species and their critical habitat, refer to the Biological Assessment (BA) included in **Annex A**. The BA also includes descriptions for each species.

C.1.1.4.2 State-Listed Species

The CEPP PACR project area contains habitat suitable for the presence, nesting, and/or foraging for 16 State-listed threatened and endangered animal species and two state species of special concern. Threatened and endangered animal species include the Big Cypress fox squirrel (*Sciurus niger avicennia*), Everglades mink (*Mustela vison evergladensis*), American oystercatcher (*Haematopus palliates*), black skimmer (*Rynchops niger*), Florida burrowing owl (*Athene cunicularia floridana*), reddish egret (*Egretta rufescens*), little blue heron, tricolored heron, roseate spoonbill, Florida sandhill crane (*Grus canadensis pratensis*), snowy plover (*Charadrius nivosus*), southeastern American kestrel (*Falco sparverius paulus*), least tern (*Sternula antillarum*), white-crowned pigeon (*Patagioenas leucocephalus*), gopher tortoise (*Gopherus polyphemus)*, and rim rock crowned snake (*Tantilla oolitica*). Species of special concern include

Sherman's fox squirrel (*Sciurus niger shermani*), and osprey (*Pandion haliaetus*) (Monroe county population only).

Threatened and endangered plant species include the pine-pink orchid (*Bletia purpurea*), which frequents the edges of the farm roads just above wetland elevation; the lattice-vein fern (*Thelypteris reticulate*), which is found occasionally in forested wetlands; Eaton's spikemoss (*Selaginella eatonii*) and Wright's flowering fern (*Anemia wrightii*), both found in the Frog Pond natural area; and the Mexican vanilla plant (*Vanilla mexicana*) and Schizaea tropical fern (*Schizaea pennula*) located on tree islands in the upper Southern Glades region.

C.1.1.5 Essential Fish Habitat

The project is located in areas designated as essential fish habitat for corals and live bottom habitat that are habitat for numerous species of fish and invertebrates. The absence of freshwater flows and/or the release of high-level freshwater discharges into estuarine systems and coastal areas currently promote unfavorable conditions.

EFH located within the area affected by CEPP PACR occurs within both the Northern Estuaries (St. Lucie River and Estuary, Southern Indian River Lagoon, and Caloosahatchee River Estuary) and the Southern Estuaries (Biscayne Bay and Florida Bay) (NMFS 2000).

C.1.1.5.1 St. Lucie River and Indian River Lagoon

This portion of the study area is within the jurisdiction of the South Atlantic Fishery Management Council (SAFMC) and is located in areas designated as EFH for wormrock, live bottom habitat for the American oyster, pink shrimp (*Penaeus duorarum*), white shrimp (*Penaeus* sp.), brown shrimp (*Penaeus aztecus*), redfish, grouper (*Epinephelus* spp.), gray snapper (*Lutjanus griseus*), white grunt (*Haemulon plumieri*), red porgy (*Pagrus pagrus*), spiny lobster (*Panulirus argus*), and the snapper-grouper complex. In addition, the nearshore hardbottom habitat outside of the St. Lucie River and Estuary is designated as Essential Fish Habitat-Habitat Areas of Special Concern (EFH-HAPC) for the snapper-grouper complex.

C.1.1.5.2 Caloosahatchee River and Estuary

This portion of the study area is within the jurisdiction of the Gulf of Mexico Fishery Management Council and is located in areas designated as EFH for juvenile brown shrimp, juvenile gray snapper, small tooth sawfish (*Pristis pectinate*), juvenile pink shrimp, adult and juvenile redfish, adult and juvenile Spanish mackerel (*Scomberomorus maculatus*), and juvenile stone crab. Downstream habitats include oyster reefs and seagrass.

C.1.1.5.3 Biscayne Bay and Florida Bay

This portion of the study area is within the jurisdiction of the SAFMC and is located in areas designated as EFH for corals, coral reef and live bottom habitat, red drum, penaeid shrimps, spiny lobster, and other coastal migratory pelagic species and the snapper-grouper complex. Species generally present in the Southern Estuaries region include brown shrimp, pink shrimp, white shrimp, spiny lobster, stone crab, gulf stone crab (*Menippe adina*), redfish, Spanish mackerel, and gray snapper. EFH in the Southern Estuaries is comprised of seagrasses, estuarine mangroves, intertidal flats, the estuarine water column, live/hard bottoms, and coral reefs.

C.1.1.6 Climate

The subtropical climate of south Florida, with its distinct wet and dry seasons, high rate of evapotranspiration, and climatic extremes of floods, droughts, and hurricanes, represents a major physical driving force that sustains the Everglades while creating water supply and flood control issues in the agricultural and urban segments.

Seasonal rainfall patterns in south Florida resemble the wet and dry season patterns of the humid tropics more than the winter and summer patterns of temperate latitudes. Of the 53 inches of rain that south Florida receives on average annually, 75% falls during the wet season months of May through October. During the wet season, thunderstorms that result from easterly trade winds and land-sea convection patterns occur almost daily. Wet season rainfall in many locations of south Florida follows a bimodal pattern with peaks during May through June and September through October. In some years, tropical storms and hurricanes also contribute significantly to wet season rainfall with a high level of interannual variability and low level of predictability. During the dry season (November through April), rainfall is governed by large-scale winter weather fronts that pass through the region approximately weekly. However, due to the variability of climate patterns (due to teleconnections with phenomena such as La Niña and El Niño), dry periods may occur during the wet season and wet periods may occur during the dry season. Multiyear high and low rainfall periods often alternate on a time scale approximately on the order of decades (USACE 1999).

High evapotranspiration rates in south Florida roughly equal annual precipitation. Evapotranspiration removes between 70% and 90% of the rainfall in undisturbed south Florida wetlands (Duever et al. 1994). Evaporation from open-water surfaces peak annually in the late spring when temperatures and wind speeds are high and relative humidity is low. Evaporation is lowest during the winter when the temperatures and wind speeds are low (Duever et al. 1994). Recorded annual rainfall averaging 53 inches in south Florida has varied from 37 to 106 inches, and interannual extremes in rainfall result in frequent years of flood and drought. Mean sea level is increasing an average of 2.2 millimeters per year or approximately nine inches over the last 100 years in Florida (NOAA 2001).

Mean annual temperature for the south Florida ecosystem ranges from 72 degrees Fahrenheit (°F) (22 degrees Celsius [°C]) in the northern Everglades to 76 °F (24 °C) in the southern Everglades (Duever et al. 1994). Mean monthly temperatures range from a low of 63 °F (17 °C) in January to a high of 85 °F (29 °C) in August (Duever et al. 1994). Infrequently, freezing temperatures and frost occur when arctic air masses follow winter cold fronts into the area.

C.1.1.7 Physical Landscape: Regional Soils and Geology

The regional geology of EAA, WCA 3, and ENP consists of (from youngest to oldest) fill material, undifferentiated sandy, clay materials, and limestone. Recent fill material consists of poorly graded gravel, sand, silt, and minor shell. Layers of peat are embedded within the clay layers. Miami limestone represents the upper portion of the Biscayne aquifer. South Florida is underlain by Cenozoic age rocks to a depth of approximately 5,000 ft below land surface with various percentages of sand, limestone, clay, and dolomite. The marl soils are typically characterized as silts with high concentrations of lime. Marl soils form under shallow water conditions and are an important constituent of the whole ecosystem, typically having standing water for short periods of time, and are associated with thick algal mats and periphyton.

This section presents the subsurface data necessary to direct the most practicable and efficient construction of works within the area of investigation. Some geologic data have been obtained from previous core borings and probings along all levee alignments in the agricultural and conservation areas south and east of Lake Okeechobee. Specific areas of focus in this report are study areas north of the EAA, between the Red, Blue, and Yellow lines, and slightly south of the Blue line. Levee L-28 will serve as the western boundary of the project features. Soil types and their locations within the project area were determined from laboratory-tested samples. These data, along with descriptions and recommendations to the geologic feasibility of construction in these areas, are presented in this section. Geotechnical investigations in the vicinity of current features are sparse, with nothing more recent than information gained from the A-1 Reservoir Area studies performed in 2006. The design values are tentative, and characterization of the subsurface materials is valid only for preliminary estimation and analysis purposes. A complete and thorough analysis of the subsurface conditions during the preconstruction, engineering, and design (PED) phase will be required based on the results of a new, design-level, geotechnical exploration program.

C.1.1.7.1 Soil Types

The soils in the Everglades are primarily composed of peats and mucks. Deep, clean sands characterize the area east of the Everglades and to the south of Lake Okeechobee, with wet, gray or grayish-brown, sandy soils underlain by sandy clay covering the area west of the Everglades. The peat and muck soils, which are dark brown to nearly black, cover approximately 90% of the area being considered in the study area. They were formed in marshes or swamps by the partial decay of plant materials, with some mixture of mineral soil in the case of muck. Peat, by definition, consists of 65% or more organic material with relatively little mineral matter. Muck on the other hand, consists of 25 to 65% plant material mixed with sand, silt, and clay. The peat and muck soils may differ from each other in the kind of plant material that they contain, in the corresponding depths, and/or in the nature of the underlying material. The peat and muck may rest directly on limestone or on an intermediate layer of sand or marl.

The highly organic soils have been divided into four types: Okeechobee muck, Okeelanta peaty muck, Everglades peaty muck, and Everglades peat. Okeechobee muck is a nearly black mixture of organic material and fine mineral soil. The organic portion of the soil is formed from the remains of water plants, while the mineral content probably results from the deposition of fine sediment during overflows from Lake Okeechobee. Okeelanta peaty muck consists of finely fibrous, well-decomposed organic matter over a layer of black plastic muck; it usually overlies hard limestone. Everglades peaty muck contains somewhat less mineral matter than Okeelanta peaty muck. The surface layer rests on brown, fibrous peat, and it usually lacks the subsurface layer of black plastic muck. Everglades peat, the most extensive of the organic soils, is formed mostly from partially decayed sawgrass. The upper 12 inches is a nearly black, finely fibrous peat which contains approximately 10% mineral soil. The subsoil is brown, fibrous peat which rests on the underlying rock, sand, or marl. A fifth type of organic soil, which is not extensive in the area, is Loxahatchee peat. It is a brown, spongy peat, composed of the remains of water lilies, water grasses, and other aquatic plants. Ordinarily, the area occupied by Loxahatchee peat is covered by water most of the year.

Most of the characteristics, properties, and composition of the muck and peat soils depend on the fact that those types of soils are essentially mixtures of water and partly decomposed plant materials. When saturated, the soil is a little heavier than water. One of the outstanding characteristics of the peat soil is its light weight when dry. The oven-dry weight of peat is about 7 pounds per cubic foot, and the mineral content is about 10 to 15% by weight of the dry material. Another important property is the high shrinkage value. Peat soils will shrink as much as 75% of their original volume when dried, and will not expand to their original volume when water is added.

Another important property is their high propensity for water retention. Peats vary considerably in that respect, depending on their origin, degree of decomposition, and chemical composition. While a dry mineral soil will absorb and hold from one-fifth to two-fifths its weight of water, a peat soil will retain many times its dry weight of moisture, depending on conditions. On an oven-dry weight basis, some of the peats have as much as 1,200% water when saturated, with the average having about 750%.

Laboratory permeability tests and field pumping tests indicate that seepage through peat soil is much greater vertically than horizontally. That can reasonably be attributed to the fibrous nature of the soil and its characteristic vertical root channels. Peat and muck material presented in less recent geotechnical exploration reports provide a general idea of the thickness of organic surface materials in the region. However, there are selected areas where the organic soil has been reduced due to recent construction, development, fire, erosion, compression, or removal. In other areas, there may be accretion of organic materials.

Where peat is encountered in a borrow area within the project area, it would be removed and not used as construction material. The available geotechnical information indicate suitable materials for embankment construction and other fills, mainly interbedded sands and/or marls with limestone, are available throughout the project area. In some areas, in-situ materials may have to be processed to achieve feature performance requirements.

Seepage movement in the Everglades is largely through the porous rock and sands beneath the peat. The sands, in general, are fine-grained and poorly graded having intermediate coefficients of permeability. The marl soils are widely distributed under the organic soils, and in places are consolidated into a hard limestone just under the peat. Usually, however, the marl is a soft, grayish-white, calcareous silt of fresh-water origin. Other marls, with inclusions of sand, silt, clay, and shell, appear within the area. The marl is not uniformly distributed and it often pinches out into the peat and muck. Generally it is quite impermeable, acting as a seal that retards movement of water.

C.1.1.7.1.1 Field Explorations

Previous field explorations of soils in the vicinity of the study area consisted of undisturbed sample borings, drive sample borings, auger borings, disturbed sampling of blasted limestone, and general reconnaissance along levee alignments in the area of investigation. Field exploration core logs, field and laboratory test results, and geotechnical information available at this time include:

1. EAA Reservoir A-1 Geotechnical Data Report of March 2006
2. C&SF Part I Agricultural and Conservation Areas
3. Supplement 1 – Geology and Soils, December 1951
4. C&SF Part I Agricultural and Conservation Areas, Supplement 7 – Permeability Investigations by Well Pumping Tests, February 1953
5. Report of Investigations No. 13 (RI-13), Water Resources of Palm Beach County, Florida, 1954
6. USACE, WCA 3 DECOMP Status Report, Appendix A, February 2012
7. USACE, L-31N (L-30) Pilot Project Design Report, May 2009

8. Wolf WPC, 2009, Draft Conceptual Geotechnical Data Report, Miami Canal Decompartmentalization, Contract W912EP-05-D-0009, Miami-Dade County, Florida
9. Nodarse and Associates, 2000, Stormwater Treatment Area No. 3 and 4 East WCA-3A Hydropattern Restoration L-5 Canal, Boring Profiles
10. USACE, 2011b, Core Borings along L-5/L-4/L-23 Waterway
11. Water Conservation Area 3 Decompartmentalization (DECOMP) and Hydrologic Sheet Flow Enhancement Part 1 Broward County, FL

A geotechnical exploration specific to this CEPP PACR has not yet been initiated, but will be required and conducted during the PED phase. The data contained in previous reports, although dated, are useful for preliminary planning purposes.

C.1.1.7.1.2 Laboratory Investigations

Samples of typical materials, obtained during the field exploration program, were tested by the USACE, South Atlantic Division laboratory and private architect/engineer laboratories for classification and determination of physical properties. Unit weight, specific gravity, ignition loss and mineral content, grain-size distribution, and maximum density and optimum moisture are available in Central and Southern Florida (C&SF) Part I Supplement 1.

C.1.1.7.1.3 Office Analysis

Previous analyses of existing conditions are available in the C&SF Part I Agricultural and Conservation Areas, Supplement 1 – Geology and Soils, December 1951. A seepage analysis for the Flow Easement Basin (FEB) is contained in this section.

C.1.1.7.1.4 Everglades Agricultural Area

The subsurface soil conditions at the A-2 parcel and A-2 Expansion area lands and nearby areas are most closely approximated by the subsurface conditions in the adjacent A-1 FEB, formerly the EAA A-1 Reservoir Project site. The A-1 Project site has been investigated in a progressive sequence of borings spaced throughout the site area. One hundred forty-five borings were completed for the SFWMD around the reservoir perimeter in 2003 and early 2004. Twenty borings to a depth from 50 to 100 feet (ft) below ground surface were completed at the EAA Reservoir A-1 Project Test Cell site for the Test Cell Project design in December 2004, and an additional eight borings were completed during the Test Cell construction in early 2005. The borings generally penetrated through about 1/2 to 2 ft of surficial peat/muck and marl, then through 22 to 26 ft of primarily carbonate sand and limestone, and then into primarily shelly quartz sand with sparse limestone to their completed depths. The upper carbonate sand and limestone constitutes the Fort Thompson Formation at the site. Below this, the shelly sand and sparse limestone constitutes the Caloosahatchee Formation and possibly part of the Tamiami formation. The top of the Fort Thompson Formation consists of a limestone layer about 4.5 to 5 ft thick, which is locally called caprock. The caprock is generally white, light gray, tan, or yellowish brown with variable amounts of weathering; it is occasionally fractured and contains voids and inconsistencies. The caprock is underlain by a silty carbonate sand extending to about 23.5 to 24.5 ft deep, where another hard limestone layer 1.5 to 3 ft thick is encountered. A thinner, hard limestone layer about 1/2 to 1 ft thick is often encountered at around 16 to 17 ft deep. The sand and lower limestone layers are generally white to very pale brown. Laboratory testing of the sand sampled in the borings averaged 84.2% calcium carbonate content with an average of 22% passing the #200 sieve in gradation tests. Visual inspection of the sand samples from the borings reveals that they include shell fragments, and tend to be angular and platy. The sands of the Fort Thompson Formation exposed in the seepage collection canals and dewatering sumps is abundantly fossiliferous with gastropods, pelecypods, corals, and echinoderms.

The top of the Caloosahatchee Formation is composed of fine grained, subrounded, shelly quartz sand that is mixed with shelly carbonate sand similar to that in the Fort Thompson Formation. The Caloosahatchee Formation at the site is 30 to 60 ft thick; however, the interface between this formation and the underlying Tamiami Formation is difficult to define. The proportions of carbonate to quartz sand vary. Laboratory testing on the sampled sand indicated an average calcium carbonate content of 30.1%, and an average 12.1% of material passing the #200 sieve. The primary color of the geologic material in the Caloosahatchee Formation is light greenish gray.

Preliminary estimates of soils engineering properties of materials in the A-2 parcel and A-2 Expansion area are derived from previously referenced documents and are summarized in **Table C.1-1**.

Table C.1-1. Preliminary Soil Properties for the CEPP PACR

Region: A-2 parcel and A-2 Expansion area									
	Organic Materials					Sands**			
Location	Specific Gravity	Unit Weight (lb/ft³)	Natural Moisture (%)	Organic Matter (%)	Mineral Content (%)	Moist Weight (lb/ft³)	Buoyant Weight (lb/ft³)	Effective Friction Angle (degrees)	Cohesion (lb/ft²)
Levees L-4 and L-5	1.54	58	779	89	11	109.5	62.9	35	0
Levees Southeast of Lake Okeechobee (near Levee L-8)	1.46	60	436	91	9	-	-	-	-
Levees L-6 and L-7	1.5	61	920	93	7	-	-	-	-
Region: DECOMP – L-67A/C, L-5 Areas – Central Everglades									
Levees L-28 and L-29	1.94	62	479	52	48	109.5	62.9	35	0
Area of Levee L-30-	1.5	60	686	75	25	110	62.8	38	-
Areas Near Levees L-33 and L-37	1.58	62	430	85	15	110	62.8	38	-
Limestone Tested in the Vicinity of L-30 and L-37**	-	-	-	-	-	122.3	-	38	980

Notes:
*Values are averages from results of laboratory tests from the 1951 Supplement 1 Report.
**All material properties are for sands except for limestone as noted.

C.1.1.7.2 Geology

Surficial geology of the CEPP PACR area of investigation consists of fossiliferous limestones interlayered with siliciclastic sediments that were deposited and reworked during Quaternary sea level fluctuations. Rocks formed in a shallow marine depositional environment under tropical and subtropical environmental conditions. Four geological formations comprise this sedimentary package: (1) the Pamlico Sand, (2) the Miami (Oolite) Limestone, (3) the Fort Thompson Formation, and (4) the Caloosahatchee Marl. This sedimentary package rests unconformably on quartz sands of the Pliocene Tamiami Formation, which serves as basement for this study. The thickness of the sediment package increases north to south from approximately 40 ft at the boundary between the EAA and WCA 3A to approximately 100 ft at Tamiami Trail. This unit also forms an eastward thickening wedge toward the Atlantic Coast (Reese and Cunningham 2000, Reese and Wacker 2009). The Pamlico Sand forms a linear geomorphic feature called the Atlantic Coastal Ridge that extends from Palm Beach County to southern Miami-Dade County. However, the western margin of this feature generally follows the Florida Turnpike, and is not within the CEPP PACR area of investigation.

The character of the marginal marine sediments changes from north to south. Near the boundary between the EAA and WCA 3A, the sediment thickness consists of poorly consolidated marine limestone, quartz sandstone, and sandy limestone with abundant mollusk fossils (Reese and Wacker 2009), and is known as the Fort Thompson Formation. South of central Broward County to Tamiami Trail, the composition of the Fort Thompson Formation changes to predominantly marine limestones that were deposited in marine platform margin and open marine tropical conditions similar to those observed in the present-day southern Florida Keys. The oolitic Miami Limestone often outcrops at the surface near Tamiami Trail and forms approximately 10 to 15 ft of caprock overlying the Fort Thompson Formation. The Fort Thompson Formation is a karstic limestone in southern Broward and Miami-Dade Counties and has been characterized by Cunningham et al. (2006) into 16 distinct lithofacies representing freshwater, platform margin, ramp, and open marine carbonate depositional environments. Subsequent dissolution of these limestones during low sea levels resulted in the development of karst, with extensive vugs and conduits throughout the vertical sequence of rock. The gradation of lithologies, from mixed clastic-carbonate near the boundary between the EAA and WCA 3A to karstic marine carbonates at Tamiami Trail, affects the porosity and permeability of the sedimentary package.

C.1.1.7.3 Hydrogeologic Setting

The Fort Thompson Formation changes in texture and composition from north to south, with quartz sand and sandy carbonate more abundant in the boundary between the EAA and WCA 3A, and marine carbonates dominating toward Tamiami Trail. The transition from sands to carbonate affects the permeability characteristics of the surficial aquifer system (SAS) that is included within these sediments.

Near the boundary between the EAA and WCA 3A, Reese and Wacker (2009) recognize a major permeable zone within the Fort Thompson Formation (permeable zone 2), at depths less than 80 ft below land surface. This permeable zone is the upper portion of the SAS of south Florida. Very large pore spaces are common, characterized by interconnected vugs or cavities. Estimated transmissivity from aquifer performance tests conducted in southwest Palm Beach County varies widely, between 30,000 and 60,000 square feet per day (Reese and Wacker 2009). Hydrologic data (estimates of transmissivity, storage coefficient and leakance) are sparse near the boundary between the EAA and WCA 3A. Permeable zones in this area are not typically defined as the Biscayne aquifer.

The Biscayne aquifer is recognized as “the contiguous, highly permeable section of the Pliocene (Tamiami Formation) and Pleistocene age from land surface downward, where at least 10 ft of the section has a hydraulic conductivity of 1,000 ft/day or more” (Fish and Stewart 1991). This aquifer underlies most of the CEPP PACR area of investigation south of northern Broward County. The Biscayne aquifer is interpreted as a dual-porosity pore system, with matrix porosity providing water storage, and “touching vug” porosity forming preferential flow zones (Cunningham et al. 2006, Renken et al. 2008). Measured permeability values from rock samples vary over 13 orders of magnitude (Cunningham and Sukop 2011). The heterogeneous nature of permeability in the Biscayne aquifer makes characterization of aquifer parameters difficult. Site-specific test borings and aquifer characterization are required to evaluate hydrologic characteristics.]

C.1.1.8 Hydrology

The major characteristics of south Florida’s hydrology are (1) local rainfall, (2) evapotranspiration, (3) canals and water control structures, (4) flat topography, and (5) the highly permeable surficial aquifer along a 30- to 40-mile-wide coastal strip. Local rainfall is the source of all south Florida’s fresh water. The surface water that is not removed from the land by evapotranspiration and seepage to the underlying aquifer is drained to the Atlantic Ocean, Florida Bay, or the Gulf of Mexico by very slow, shallow sheetflow through wetlands or relatively quickly through man-made canals.

Levees and canals constructed during the last 60 years under the C&SF Project have divided the former Everglades into areas designated for development and areas for fish and wildlife benefits, natural system preservation, and water storage. The natural areas consist of the three WCAs located north of Tamiami

Trail ENP to the south. The WCAs provide detention storage for water from Lake Okeechobee, the EAA, and parts of the east coast region. Detention of water helps prevent floodwaters from inundating the east coast urban areas; provides water supply and detention for east coast urban and agricultural areas and ENP; improves the water supply for east coast communities by recharging underground freshwater reservoirs; reduces seepage; and provides control for saltwater intrusion in coastal aquifers. While the WCAs may reduce the severity of the drainage of the Everglades caused by the major canal systems, thus reducing impacts to fish and wildlife caused by the major drainage systems, the levees surrounding the WCAs still function to impound the Everglades, precluding the historic flow patterns. The C&SF Project infrastructure makes it difficult to provide natural timing, volume and distribution. In wet periods, water is impounded in the WCAs and then discharged to ENP or coastal canals for eventual release to tide. During dry periods, water can flow through the canals to coastal areas and bypass the ENP wetlands.

Throughout CEPP PACR formulation, C&SF infrastructure modifications to achieve CEPP PACR project objectives have been primarily focused within WCA 3, and the hydrology of this area is discussed in greater detail than other areas more peripheral to CEPP PACR formulation efforts.

C.1.1.8.1 Lake Okeechobee and the Northern Estuaries

Lake Okeechobee is a subtropical lake in south central Florida with a surface area of 730 square miles and an average depth of 9 ft. Lake Okeechobee is a major feature of the Kissimmee-Okeechobee-Everglades system, which is a continuous hydrologic system extending from central Florida south to Florida Bay. Lake Okeechobee provides several values to society and nature that include water supply for agriculture, urban, and environmental use; flood protection; a multimillion-dollar sport fishery; and habitat for many birds and animals, including endangered and threatened species.

Lake Okeechobee is managed as part of the C&SF Project for water supply and flood protection. The Herbert Hoover Dike (HHD) and several water control structures allow management of Lake Okeechobee to meet project purposes which include flood control, water supply, navigation, recreation, and environmental enhancement. Inflows to Lake Okeechobee average 2.1 million acre-feet (ac-ft) per year. Nearly half the inflow to Lake Okeechobee is through the Kissimmee River. The Upper and Lower Kissimmee River watersheds cover more than 2,300 square miles of central Florida. The remaining inflow to Lake Okeechobee is received from Lake Istokpoga, Fisheating Creek, the Taylor Creek-Nubbin Slough Basin, and reverse flows from the Caloosahatchee River, the St. Lucie Canal, and the EAA.

The primary outflows from Lake Okeechobee are east through the St. Lucie Canal (C-44), which enters the St. Lucie River and Estuary, and west through the C-43 into the Caloosahatchee River Estuary. The main outflows south is through the Miami Canal, North New River Canal, Hillsborough Canal, and West Palm Beach Canal. Inflows to Lake Okeechobee frequently exceed total outflow capacity. In several instances, flows from the lake into the L-8 Canal through Culvert C-10A have been used to help control lake stages. The approximately 35-mile St. Lucie Canal, part of the Okeechobee Waterway, is the main eastern flood control outlet for Lake Okeechobee. The St. Lucie River and Estuary is located within portions of both Martin and St. Lucie counties on the southeast coast of Florida. The two forks of the St. Lucie River and Estuary, the North Fork and South Fork, flow together near the Roosevelt Bridge at the City of Stuart, and then flow eastward approximately 6 miles to the Southern Indian River Lagoon and Atlantic Ocean at the St. Lucie Inlet. The Caloosahatchee River, part of the Okeechobee Waterway, is the only flood control outlet leading west from Lake Okeechobee. Combined with the St. Lucie Canal and Lake Okeechobee, the Caloosahatchee River completes the only navigable passage between the Gulf of Mexico and the Atlantic

Ocean. The river extends approximately 70 miles from Lake Okeechobee, through the Caloosahatchee River Estuary, to the lower Charlotte Harbor Basin at San Carlos Bay. The Caloosahatchee River passes through parts of Glades, Hendry, and Lee counties.

Water management decisions regarding Lake Okeechobee are highly dependent upon the HHD. The HHD is an approximately 70-year-old earthen levee that was constructed around the southern portion of Lake Okeechobee for flood control purposes. Heightened concern with the structural integrity of the HHD was emphasized after several hurricanes passed through south Florida during 2004 and 2005, as well as consideration of the levee damage around New Orleans caused by Hurricane Katrina in 2005. Prior to these devastating hurricanes, the USACE conducted a lengthy study of the HHD condition, which resulted in a 1999 report titled "Major Rehabilitation Evaluation Report" (MRR). This report documented the condition of the dike and identified needed repairs. In response to the findings in the MRR and associated Reach 1 Environmental Impact Statement (EIS) (USACE 2005), a Major Rehabilitation Project was approved. The HHD Dam Safety Modification Study (DSMS) Final EIS (USACE 2016) from 2016 divided the 143-mile dike into 32 segments for analysis. In April 2008, the 2008 Lake Okeechobee Regulation Schedule (2008 LORS) was implemented in response to high lake levels that resulted in integrity issues and concerns with the HHD, high volume releases to the estuaries, and impacts to Lake Okeechobee littoral zones. The 2008 LORS attempts to manage Lake Okeechobee water levels between 12.5 and 15.5 ft National Geodetic Vertical Datum 1929 (NGVD) throughout the year in an effort to balance competing objectives including flood control, water supply, navigation, and enhancement of fish and wildlife resources. The 2008 LORS was determined to represent the best operational compromise at the time to improve the environmental health of certain major ecosystems, while providing for public health and safety as it pertains to the HHD.

During drought periods experienced since the years 2000-2001, the SFWMD has resorted to installing temporary forward pumps at the gated spillways controlling releases from the lake into the major EAA canals (S-351, S-352, and S-354) to supplement gravity releases for water supply for the agricultural areas and the LEC urban areas.

C.1.1.8.2 Everglades Agricultural Area

The EAA is located south of Lake Okeechobee primarily in western Palm Beach County, extending south to WCA 3A. It is bounded on the east by the WCA 1, WCA 2A, the Western C-51 Basin, the L-8 Basin, and on the west by the C-139 Basin. Historically, the EAA was swampland before it was drained and put into agricultural production. The former swampland produced the rich organic peat and muck soils that today make it a highly productive agricultural area, with approximately 620,000 acres of agricultural land. The agricultural area designation was formally established in the 1950s and associated water management infrastructure had been substantially completed in 1962.

Water in the EAA is managed to provide flood protection, irrigation, and fresh water for the EAA and surrounding environmentally sensitive areas through a series of canals, levees, culverts, gates, pumps, STAs, and the A-1 FEB. The EAA is bounded on the north by Lake Okeechobee; on the west by the L-1, L-2, and L-3 canals (which serve the C-139 Basin); on the south and southeast by the WCAs; and on the east by the L-8 Canal. The larger primary canals within the EAA—the Miami Canal, North New River Canal, Hillsboro Canal, and West Palm Beach Canal—are managed by the SFWMD and convey water from Lake Okeechobee and the EAA to the STAs and then to the WCAs and other downstream areas/users and/or to nearby coastal waters. Smaller secondary canals are managed by the SFWMD or by 298 local drainage districts and connect or discharge into the primary canals. The connections may be open or may have water control structures. SFWMD secondary canals in the project area include the Bolles (L-21), Cross (L-16), Ocean (L-13), and L-1 East canals. Smaller, but numerous agricultural canals (usually unnamed) are the responsibility of the local drainage districts and individual landowners and are used to provide water management (flood control and water supply) for adjacent farming operations.

Stormwater runoff from the EAA, which contains relatively high levels of nutrients (mainly phosphorus and nitrogen from particulate matter and fertilizers), drains from the agricultural canals to the secondary canals and into the main primary canals, and is eventually discharged into the EPA or to tide. In addition to flood protection for and water supply to the EAA, the canals and water control structures convey regulatory releases from Lake Okeechobee to the STAs/WCAs; water supply releases to the EAA and eastern Palm Beach, Broward, and Miami-Dade counties for municipal water supply and to prevent saltwater intrusion; and water supply releases to ENP. There are five existing STAs: STA 1E, STA 1W, STA 2, STA 3/4, and STA 5/6 (STA 5 and STA 6 were expanded using land in the Compartment C parcel). STAs capture most of the water in the primary canals for biological water quality treatment prior to discharge into the WCAs. For additional information regarding the hydrology of the STAs, refer to the Final EIS to Construct Stormwater Treatment Areas on compartments B and C of the EAA (USACE 2009).

In July 2015, as part of the Restoration Strategies Regional Water Quality Plan, the SFWMD achieved substantial completion of the A-1 FEB. The operational testing and initial filling period started in August 2015. The A-1 FEB Project increases the water quality improvement capabilities of STA 2 and STA 3/4, expands water storage south of Lake Okeechobee, and offers additional flexibility related to flood protection and water supply operations. The main purpose of the A-1 FEB is to attenuate peak stormwater runoff flows, temporarily store stormwater runoff, and improve the delivery to STA 3/4 and STA 2. The A-1 FEB can receive runoff from the Miami Canal via the G-372 pump station and the G-720 gated spillway. Runoff from the North New River Canal enters the A-1 FEB through the G-370 pump station and the G-721 gated spillway. Releases from the A-1 FEB can be directed to STA 3/4, and STA-2.

C.1.1.8.3 Water Conservation Area 1

WCA 1, also known as the Arthur B. Marshall Loxahatchee National Wildlife Refuge (LNWR), is approximately 21 miles long from north to south and comprises an area of approximately 221 square miles. The West Palm Beach Canal lies at the extreme northern boundary, and on the south, the Hillsboro Canal separates WCA 1 from WCA 2A. Ground elevations slope approximately 5 ft in 10 miles, both to the north and to the south from the west center of the area, varying from over 16 ft in the northwest to less than 12 ft NGVD in the south. The area, which is enclosed by approximately 58 miles of levee, approximately 13 miles of which are common to WCA 2A, provides storage for excess rainfall runoff from areas that drain to EAA canals, the West Palm Beach Canal (230 square miles) and the Hillsboro Canal (146 square miles). WCA 1 also receives runoff, through STA 1E, from the urban areas that discharge into the C-51 W canal. In addition, WCA 1 may receive water from Lake Okeechobee under certain conditions. Discharges from WCA 1 to meet water supply demands can occur to the West Palm Beach Canal, Hillsboro Canal, and the canal infrastructure east of WCA 1, in accordance with the WCA 1 Regulation Schedule (USACE 1996). The WCA 1 Regulation Schedule also defines when excess water in WCA 1 can be discharged to WCA 2A and to tide via the Hillsboro Canal. Due to its limited discharge capacity and its relatively small size compared to the watershed from which it receives water, consecutive rainfall events have the potential to quickly utilize storage within WCA 1, resulting in discharges from WCA 1 to WCA 2A via the S-10 structures.

C.1.1.8.4 Water Conservation Areas 2A and 2B

Covering an area of 210 square miles, WCA 2 is comprised of two areas, 2A and 2B, and measures approximately 25 miles from north to south. WCA 2A is separated from the other WCAs by the Hillsboro Canal to the north and the North New River Canal to the south. Ground elevations slope southward approximately 1-2 ft in 10 miles, ranging from over 13 ft NGVD in northwest WCA 2A to less than 7 ft NGVD in southeast WCA 2B. The area is enclosed by approximately 61 miles of levees, of which approximately 13 miles are common to WCA 1 and 15 miles to WCA 3.

The upper pool, WCA 2A, provides an area of approximately 173 square miles for storage of excess water from WCA 1 and a portion of the EAA (125 square miles) which drains to the North New River Canal. Water supply to the east coast urban areas of Broward County is provided by WCA 2A, in accordance with the WCA 2A Regulation Schedule (USACE 1996). Due to its limited discharge capacity and its relatively small size compared to the watershed from which it receives water, consecutive rainfall events have the potential to quickly utilize storage within WCA 2, resulting in discharges from WCA 2A to WCA 3A via the S-11 structures.

Ground elevations in WCA 2B range from 9.5 ft NGVD in the northern portions to 7 ft NGVD in the southern portions of the area. The area experiences a high seepage rate, which does not allow for the long-term storage of water, and as a result, water is not typically released from WCA 2B.

C.1.1.8.5 L-28 Triangle

The L-28 Triangle (Triangle) area is located entirely within the boundaries of the Miccosukee Tribe of Indians of Florida's Alligator Alley Reservation and encompasses 7,830 acres of Tribal lands and approximately 230 acres of BCNP. The L-28 Triangle area is confined on north by Interstate 75, the west by L-28 Interceptor Canal (L-28I) and the BCNP, and the east by the L-28 Canal.

The L-28 Interceptor Canal is bound by levees on both sides and maintains no direct connection to wetlands in the Triangle. Within the L-28 Triangle Area, the L-28 Canal is bound on the east side by a confining levee separating the wetlands of the L-28 Triangle from WCA 3A. Wetlands interior to the L-28 Triangle do maintain a connection to the L-28 canal along the west side of the L-28 canal. The L-28 canal terminates at the southern tip and is not connected to the L-28 canal. Historically the S-140 pump station maintained flood protection within the Triangle. A weir was installed in 2009 within the L-28 Canal and immediately south of Interstate 75 to restrict regional pumping and maintain water levels within the Triangle.

C.1.1.8.6 Big Cypress National Preserve

The BCNP spans approximately 1,205 square miles from southwest of Lake Okeechobee to the Ten Thousand Islands in the Gulf of Mexico. The 1,125 square miles of the BCNP was originally created in 1974 by Public Law (P.L.) 93-440 and subsequently expanded in 1988 by the Big Cypress National Preserve Addition Act. BCNP was established to protect natural and recreational values of the Big Cypress watershed to allow for continued traditional uses, such as hunting, fishing, and oil and gas production, and to provide an ecological buffer zone and protect the water supply to ENP. BCNP is a large, flat area with maximum elevations of 22 ft NGVD in the northern region which gradually slope south to sea level in the BCNP coastal region along the Gulf of Mexico.

The L-28 Levee presently separates WCA 3A and the BCNP. Surface water flows from BCNP are introduced to WCA 3A from Mullet Slough; WCA 3A is also hydrologically connected to BCNP through three degraded gaps along the northern tie-back of the L-28 Levee and seasonally through water management operations of S-343A, S-343B, and S-344 along the southern L-28 Levee. Surface water flows introduced to the L-28 Canal from these three structures and upstream inflows to BCNP from the L-28 gaps may additionally contribute to deeper water depths and prolonged hydroperiods within the western portion of the Cape Sable seaside sparrow Subpopulation-A (CSSS-A) habitat, as this water is directed south to the Tamiami Trail section between the Forty-mile bend (located west of S-12A) and Fifty-mile bend. Tamiami Trail and Loop Road, which include bridges and culvert connections to allow southerly flow west of Forty-mile bend, also affect hydropatterns within southern BCNP.

C.1.1.8.7 Water Conservation Areas 3A and 3B

The largest WCA is WCA 3, which is divided into two parts, 3A and 3B. It is approximately 40 miles long from north to south and covers approximately 915 square miles. Ground elevations slope southeasterly 1-3 ft in 10 miles ranging from 13 ft NGVD in northwest WCA 3A to 6 ft NGVD in southeast WCA 3B. The area is enclosed by approximately 111 miles of levees, of which 15 miles are common to WCA 2. An interior levee system across the southeastern corner of the area reduces seepage into an extremely pervious aquifer.

The upper pool, WCA 3A, provides an area of approximately 752 square miles for storage of excess water from WCA 2A; rainfall excess from approximately 750 square miles in Collier and Hendry counties (through Mullet Slough), and from 71 square miles of the former Davie agricultural area lying east of Pump Station S-9 in Broward County; and excess water from a 208-square-mile agricultural drainage area of the Miami Canal and other adjacent areas to the north. WCA 3A provides water supply to the LEC as well as the South Dade Conveyance System (SDCS) in accordance with the WCA 3A Regulation Schedule and provides water supply to ENP in accordance with the Rainfall Plan and the WCA 3A Regulation Schedule (USACE 2012a). Due to its limited discharge capacity compared to the watershed from which it receives water, consecutive rainfall events have the potential to quickly utilize potential storage within WCA 3A resulting in discharges from WCA 3A to SRS and/or the SDCS via the S-12 structures and/or S-333 and S-334.

The outer perimeter levees of WCA 3 are the L-4, L-5, L-38 (separating WCA 3 from WCA 2A and WCA 2B), L-37, L-33, L-30, L-29, and L-28 (southern L-28, south of Mullet Slough, contains three gaps to allow for natural drainage from Collier County to the west). Interior parallel levees, L-67A and L-67C, along with their associated borrow canals subdivide WCA 3 into two parts: WCA 3A and WCA 3B. The L-67A and L-67C levees were originally constructed (completed in 1962 and 1966, respectively) for several reasons, including as a step-down system to reduce seepage to the east to allow for urban and agricultural developments in Miami-Dade County, and to increase storage of water in WCA 3A to provide water supply to an expanding urban population to the east. The construction of Tamiami Trail and WCA 3 impounded and altered the historic SRS, effectively creating a barrier through the Everglades, between the northern Everglades (the WCAs) and ENP. The Miami Canal extends from Lake Okeechobee to the Atlantic Ocean and crosses WCA 3 from northwest to southeast. To remedy excessive drainage caused by the Miami Canal, two structures, S-339 and S-340, were built across the C-123 Canal to block water from flowing directly down the canal, except at times of extreme high water or when increased conveyance capacity is needed to deliver water for the ENP and/or the LEC. Upstream from each structure, water was expected to flow laterally from the canal into the marsh through 100-ft gaps that had been left at 500-ft intervals in the canal's spoil piles. South of WCA 3 and within ENP, the northern portion of SRS is also partially divided by the remaining 5.5 miles of the L-67 Extension Levee, which extends south from the southern terminus of L-67A at Tamiami Trail. Outflows from WCA 3A to ENP are regulated according to the WCA 3A Regulation Schedule, with some additional WCA 3A outflows to ENP from groundwater seepage across Tamiami Trail and seasonal surface water flows through the L-28 gaps, which then continue south along the L-28 borrow canal.

Stage variability within WCA 3 typically follows an annual cycle; the levels vary from high stages in the late fall and early winter to low stages at the beginning of the wet season (typically late May or early June). The cycle is primarily driven by rainfall, though it is also heavily influenced by water management operations designed to maintain congressionally authorized project purposes, including water supply to the LEC and ENP and flood protection to the adjacent EAA and LEC, as well as protection for tropical cyclone events and other extreme storm events. The annual cycle permits the storage of runoff during the wet season and the release of stored water to ENP during the dry season and maintains elements of the habitat essential to fish and wildlife. The distribution of water for flood control and water supply varies seasonally. The regulation schedules for the WCAs include a minimum water level, below which water releases are not permitted unless water is supplied from another source.

Overall, water stage decreases from northwest to southeast within WCA 3, consistent with the general direction of surface water flow and prevailing topography within WCA 3. Water depth is typically between 1 and 2½ ft, with the shallower waters in the higher elevation northwestern portion of WCA 3. Water stages and depths in WCA 3B are typically much lower than water stages and depths in WCA 3A, due to limited surface water inflows into WCA 3B and the reduction of seepage from WCA 3A to WCA 3B due to the design of L-67A and L-67C levees. Water levels in WCA 3B are affected by seepage losses to the east towards the L-30 borrow canal and to the south towards the L-29 Canal.

Water supply deliveries from the C&SF Project (also known as the Regional system) to coastal canals are utilized to recharge coastal well fields. When canal levels drop below adequate recharge levels due to a combination of wellfield drawdowns, evaporation, and lack of rainfall, water supply deliveries are typically made from the Regional system. When canal levels drop in Miami-Dade County, regional water supply is delivered from WCA 3A through one of two delivery routes. Depending on system conditions, both routes may be utilized concurrently. For the northern delivery route from WCA 3A, water supply deliveries are either released from S-151 to the Miami Canal within WCA 3B (C-304), followed by downstream releases to either Miami-Dade County's SDCS by utilizing S-337 and/or by utilizing S-31 to release into the C-6 Canal. For the southern delivery route from WCA 3A, water supply deliveries are released from S-333 (from the upstream L-67A Canal), pass through the L-29 Canal, and are released to the SDCS by utilizing S-334.

If WCA 3A levels are at or below the 7.5 ft NGVD minimum, or WCA 3A floor level, then water supply releases from WCA 3A must be offset by equivalent inflows to WCA 3A from another source, typically Lake Okeechobee (USACE 2006a). The L-67 Borrow Canal is specified in the WCA 3A Regulation Schedule, though the WCA 3A floor elevation is traditionally measured at the S-333 headwater gage; there is no requirement to maintain the L-67A Borrow Canal at or above the WCA 3A floor elevation during water supply deliveries. The SFWMD has indicated that drought year water supply deliveries from Lake Okeechobee can be problematic or extremely difficult if the lake stages are below the level at which pumping, rather than gravity, is needed to pass the water supply releases (typically at a lake stage of approximately 10.5 ft NGVD). If Lake Okeechobee is at levels where water cannot physically be delivered south, then no deliveries will be made from Lake Okeechobee, and no water supply releases from WCA 3A below the floor elevation will be made. If water is available from Lake Okeechobee, then water may be delivered to WCA 3A using one of two routes (which may be utilized used concurrently, depending on conditions within the system): (1) the western route through the S-354 Structure, along the Miami Canal (within the EAA), and utilizing the S-8 Pump Station into WCA 3A to provide replacement water for the water supply delivery volume that will be delivered to C-6 and/or the SDCS once the replacement water at the north end of WCA 3A is provided; or (2) the eastern route through the S-351 Structure and along the North New River Canal (within the EAA), followed by utilizing either (a) the S-150 gated culvert structure to pass water into WCA 3A (into the L-38W Canal) or (b) the S-7 Pump Station to release into the L-38E Canal (within WCA 2A) for downstream release through the S-11 structures into WCA 3A (into a more southerly portion of the L-38W Canal than the S-150 outlet). The eastern water supply deliveries route is directly connected to the S-151 structure in the Miami Canal by the L-38W Canal and the L-68A Borrow Canal, with the L-68 Borrow Canal tying into the L-67A Canal (slightly west of the S-9 Pump Station). These deliveries offset saltwater intrusion into the Biscayne aquifer system.

The most important component of the groundwater system within the study area is the Biscayne aquifer, an unconfined aquifer unit underlying an area of approximately 3,000 square miles in southeast Florida, from southern Palm Beach County southward through Broward County to south Miami-Dade County. This huge, freshwater, underground water body is highly productive along the coastal ridge and for a considerable distance to the west. Groundwater in WCA 3 generally flows from the northwest to the southeast, with extensive seepage across the eastern and southern levees, L-30 (southeast corner of WCA 3B) in particular. However, the direction of flow may be influenced by rainfall, drainage canals, or well fields. Fluctuations in groundwater levels are seasonal. Groundwater levels within WCA 3 are influenced by water levels in adjacent canals. Where there is no impermeable formation above the aquifer, surface water recharges the system and the groundwater level can rise freely. In times of heavy rainfall, the aquifer fills and the water table rises above the land surface, contributing to seasonal inundation patterns throughout the area. Over much of its extent, the aquifer is covered by only a few inches of soil. The permeable limestone of the aquifer is shielded against upward intrusion of saline water from the Floridan aquifer by relatively impermeable beds of clay and marl.

The timing and distribution of water within WCA 3A, WCA 3B, and ENP are affected by direct rainfall, evapotranspiration, and regional water management operations. Other specific areas within the CEPP PACR project boundaries have distinct hydrologic conditions that could be affected by changes contemplated with CEPP PACR for C&SF infrastructure and/or water management operations. These areas are addressed in the ensuing text.

C.1.1.8.8 Northeast Shark River Slough

NESRS is a complex area located in the northeast corner of ENP. It is currently the northern terminus of SRS, which is aligned from the northeast to southwest across ENP. Tamiami Trail is the northern boundary, the L-31N Canal the eastern boundary, and the L-67 Extension Canal the western boundary of the area. Historically, the area would be characterized as wet most of the year, but regional developments have impacted historic freshwater routes into the area. In addition, if historic levels are not maintained through the end of the wet season, significant reductions in surface water can occur during the dry season below historic dry season levels.

Water enters NESRS primarily from WCA 3A via S-333, passes to the L-29 borrow canal, and subsequently passes through the One-Mile bridge and uncontrolled culverts under Tamiami Trail. In addition, pending approval of an operational permit, S-355A and S-355B may also be used to deliver water from WCA 3B to the L-29 Canal for subsequent passage through the culverts to NESRS. The discharges made from WCA 3A through the S-12 structures and S-333 are target flows determined from the Rainfall Plan (USACE 2006a). Under the Rainfall Plan, water deliveries would be computed and operations adjusted weekly, if necessary based on the sum of two components: a rainfall response component and a WCA 3A regulatory component. The normal operational target flow distribution is 55% through the S-333 into NESRS and 45% through the S-12 structures into ENP west of the L-67 Extension. Eastern portions of the ENP are also influenced by the system of canals and structures that provide flood control and water supply for the LEC urban and agricultural areas.

C.1.1.8.9 Western Shark River Slough

WSRS, located to the west of L-67 Extension Levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C, and D). Under Everglades Restoration Transition Plan (ERTP),[1] the utilization of the S-12 structures and the seasonal sequential closure periods beginning from the west at S-12A (November 1 – July 15), S-12B (January 1 – July 15), and S-12C and S-12D (no closure period), respectively, is meant to move water from WCA 3A into SRS while providing conditions for CSSS-A nesting and breeding. Although not required in water management operations, there is a rule-of-thumb that is often utilized that includes delivering the Rainfall Plan S-12 structure target flows from east to west with 40%, 30%, 20%, and 10% being discharged at S-12D, S-12C, S-12B, and S-12A, respectively. Releases from WCA 3A are part of a regulation schedule for WCA 3A and are typically dependent on a Rainfall-Based Management Plan. This Rainfall-Based Management Plan consists of a rainfall-based delivery formula that specifies the amount of water to be delivered to ENP in weekly volumes through the S-333 and S-12 structures. Under ERTP, the actual conditions existing in WCA 3A and/or ENP will determine the distribution of flow through S-333 into NESRS and through the S-12 structures into ENP west of the L-67 Extension. Higher distribution to the east generally occurs during periods of moderate-to-low flows.

C.1.1.8.10 Taylor Slough

Taylor Slough is in the southeast quadrant of ENP. The area through the Rocky Glades and Taylor Slough is higher in elevation compared to ground levels north, south, or west. Because of this characteristic, the area is normally drier than other areas in the ENP. The Rocky Glades and Taylor Slough are somewhat like an island or a peninsula extending from the canals into the ENP. Under Interim Operations Plan (IOP) 2006, specified C-111 basin canal water levels/ranges and S-332D pump station operations resulted in Taylor Slough being provided water from C-111 mainly during the wet season. During the dry season, under IOP 2006, water deliveries to Taylor Slough were limited to provide conditions conducive to CSSS nesting (325 cfs from December 1 – January 31; 165 cfs from February 1 – July 15). Under ERTP, water deliveries through S-332D are allowed throughout the entire year, with flows up to 500 cfs for the period of July 15 to November 30, 325 cfs from December 1 to January 31, and 250 cfs from February 1 to July 14.

[1] IOP was the governing regulation schedule for the project area at the start of the CEPP planning process. In addition, existing hydrologic conditions within the project area at that time were a result of IOP operations from 2002-2012. ERTP was approved and implemented for operations beginning in October 2012, and ERTP operational assumptions are used in the existing condition baseline for the CEPP PACR project analysis.

C.1.1.8.11 Lower East Coast Area

The LEC area is located to the east of the L-31N, L-31W, and C-111 canals. Under ERTP, specified canal water levels/ranges are meant to provide flood protection, water supply, and prevention of saltwater intrusion for the LEC. The LEC can be provided water supply from WCA 3A and Lake Okeechobee according to their respective regulation schedules. In wet conditions, the excess water from the LEC is discharged to tide.

C.1.1.8.12 8.5 Square Mile Area

The 8.5 Square Mile Area (8.5 SMA) is a primarily residential area adjacent to, but west of, the L-31N Canal. The 8.5 SMA, which is also known as the Las Palmas community, is bordered on both the west and north by NESRS. The community has water management infrastructure consisting of a perimeter levee, a seepage collection canal, a pump station (S-357), and a southern detention cell meant to collectively provide flood mitigation as part of the MWD Project (USACE 2000).

C.1.1.8.13 Biscayne Bay

Biscayne Bay is a shallow, tidal sound located near the extreme southeastern part of Florida. Biscayne Bay, its tributaries, and Card Sound are designated by the State of Florida as aquatic preserves, while Card and Barnes Sounds are part of the Florida Keys National Marine Sanctuary. A significant portion of the central and southern portions of Biscayne Bay comprise Biscayne National Park. Under ERTP, specified canal water levels/ranges are meant to provide flood protection for the portions of the LEC and Miami-Dade County, which may result in discharges to Biscayne Bay.

C.1.1.8.14 Florida Bay

Florida Bay and the Ten Thousand Islands comprise approximately 1,500 square miles of ENP. The bay is shallow, with an average depth of less than 3 ft. To the north is the Florida mainland and to the south lie the Florida Keys. Sheetflow across the marl prairies of the southern Everglades and 20 creek systems fed by Taylor Slough and the C-111 Canal provide direct inflow of freshwater to the bay. Surface water from SRS flows into Whitewater Bay and may also provide essential recharge for central and western Florida Bay. Exchange with Florida Bay occurs when this lower salinity water mass flows around Cape Sable into the western sub-region of the bay.

C.1.1.9 Regional Water Management (Operations)

C.1.1.9.1 Lake Okeechobee

The USACE is responsible for management of the water resources contained within HHD and for the development of regulations for operation of Lake Okeechobee's outlet structures. Water management operations at Lake Okeechobee are performed to ensure that congressionally authorized project purposes are met. The congressionally authorized project purposes for Lake Okeechobee include flood control; navigation; water supply for ENP, salinity control, regional groundwater control, agricultural irrigation, municipalities and industry; enhancement of fish and wildlife; and recreation. Since April 2008, Lake Okeechobee has been operated in accordance with the 2008 LORS (refer to **Figure C.1-1** through **Figure C.1-5**); for additional details and complete documentation, refer to the Lake Okeechobee Final Supplemental EIS (USACE 2007). Changes to the Lake Okeechobee Regulation Schedule with the 2008 LORS are included in the revised March 2008 USACE Lake Okeechobee and Everglades Agricultural Area Water Control Plan (WCP) (USACE 2008). The WCP, which codifies the water management operational guidance included in the November 2007 Final Supplemental EIS, defines allowable releases to the WCAs and to tide (estuaries). Prior to the 2008 LORS, Lake Okeechobee operations were managed under the "Water Supply and Environment (WSE) Regulation Schedule" since July 2000.

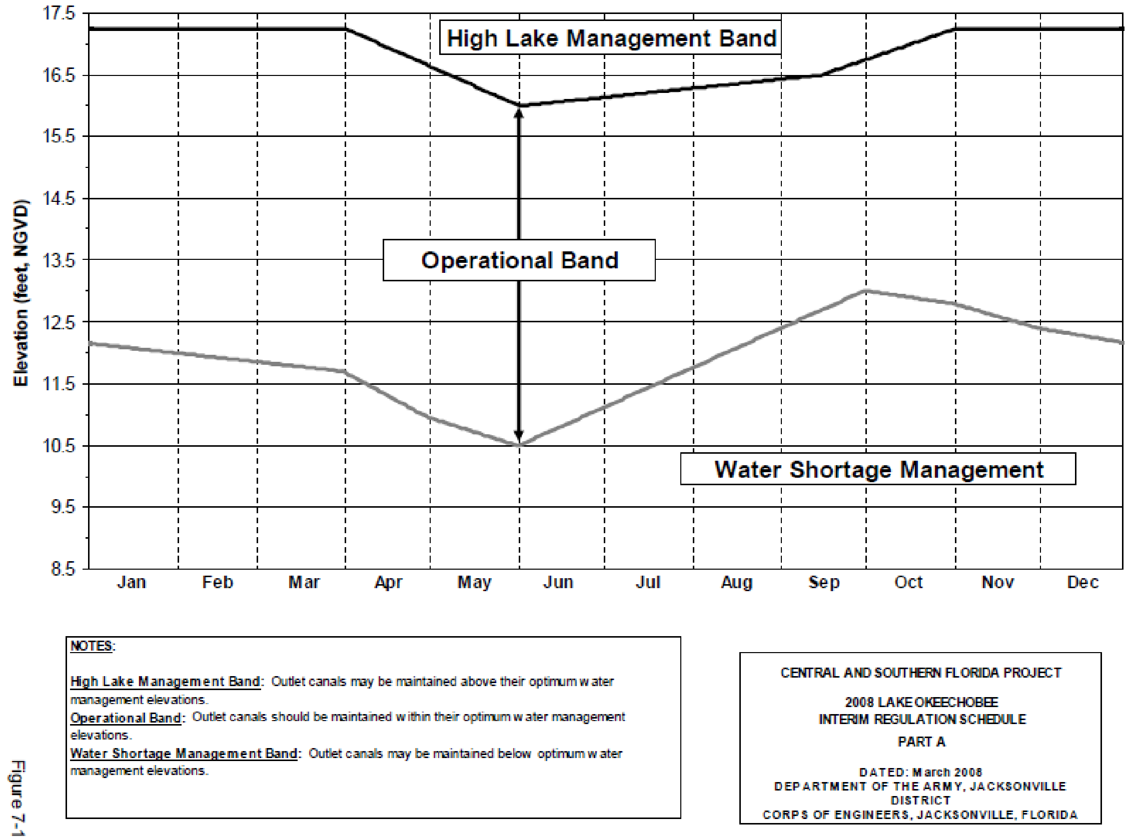

Figure C.1-1. 2008 Lake Okeechobee Regulation Schedule Part A

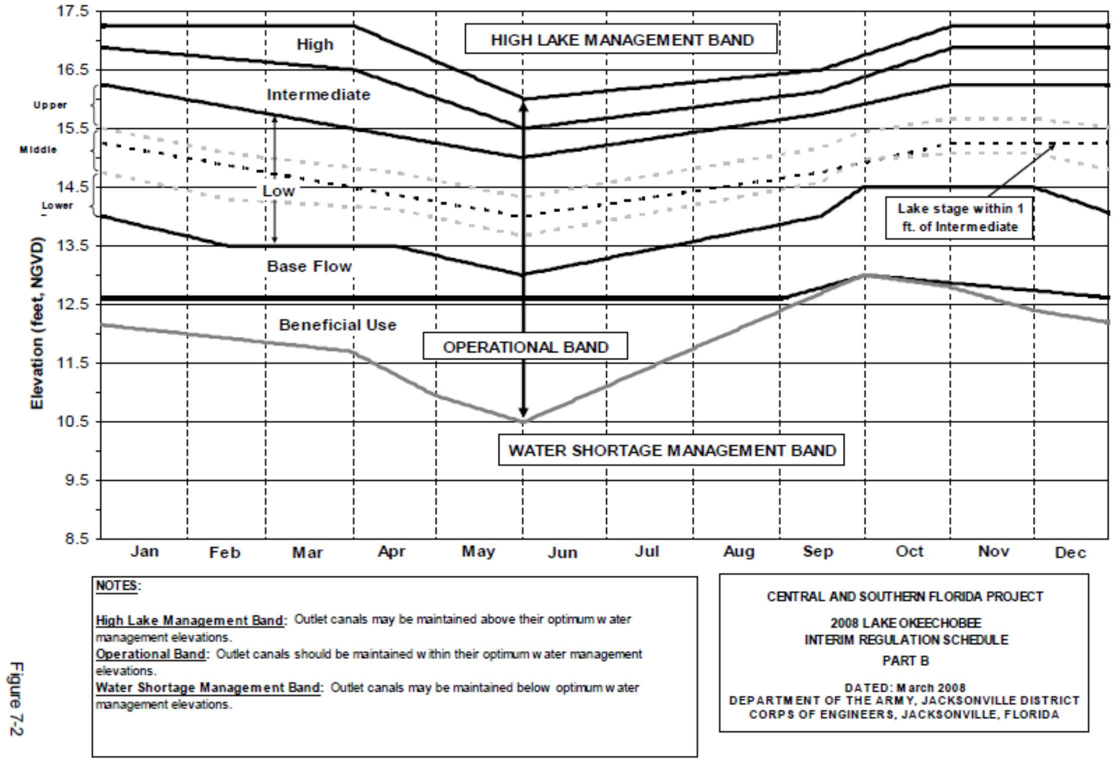

Figure C.1-2. 2008 Lake Okeechobee Regulation Schedule Part B

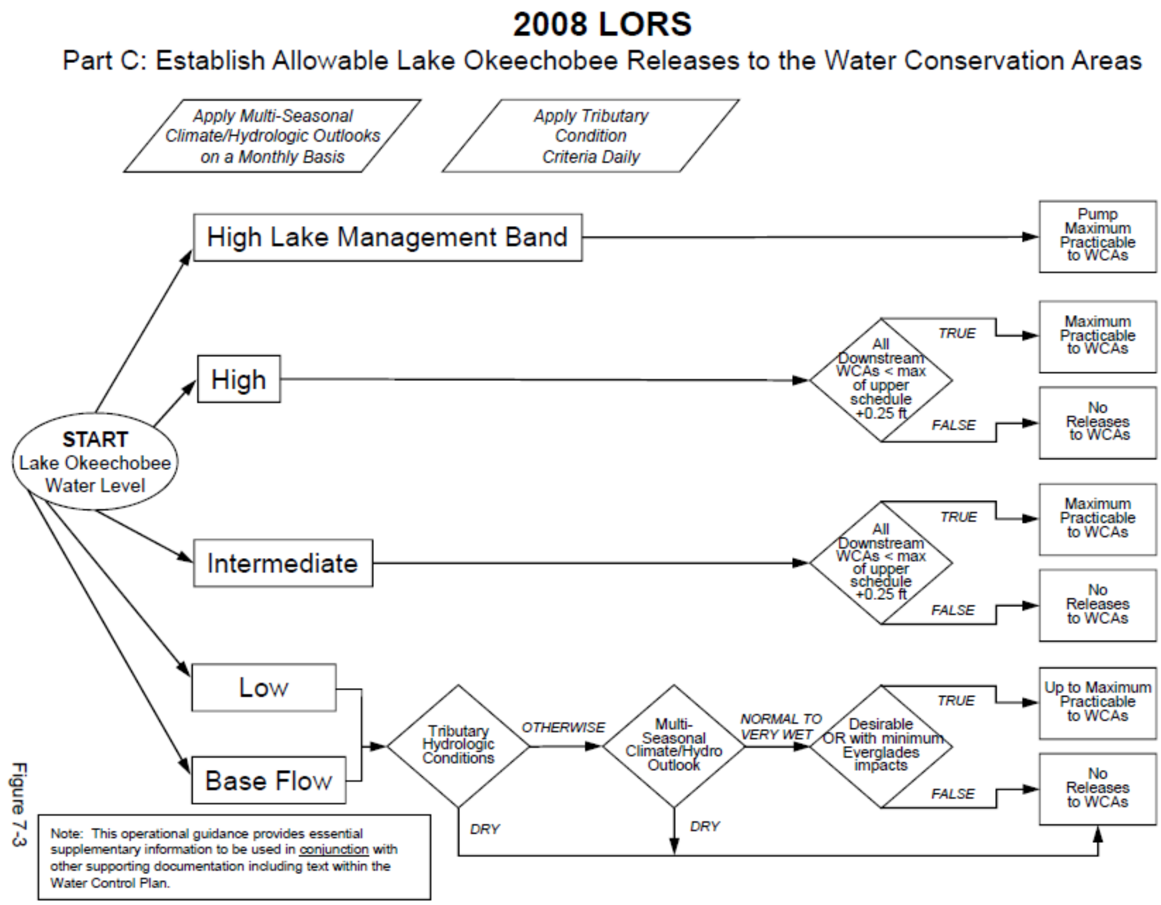

Figure C.1-3. 2008 Lake Okeechobee Regulation Schedule Part C

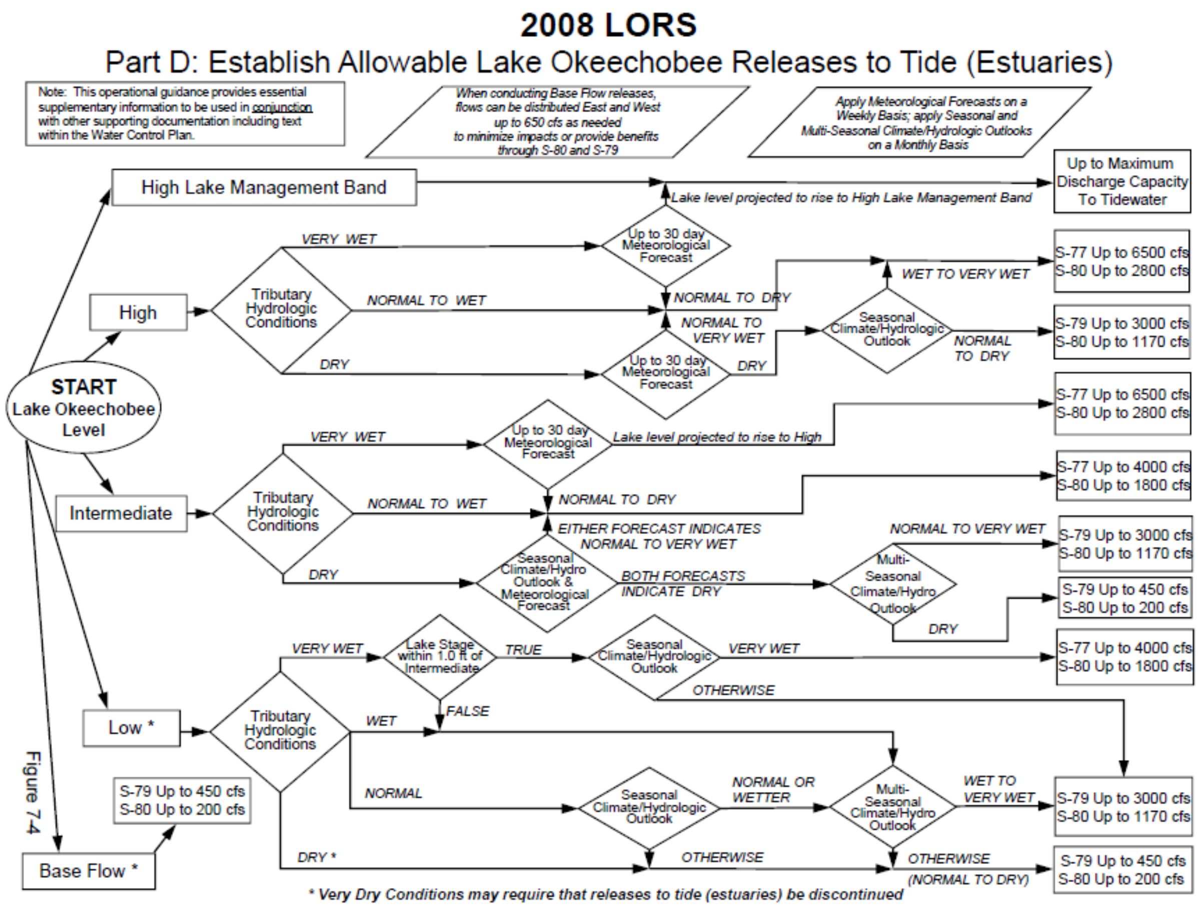

Figure C.1-4. 2008 Lake Okeechobee Regulation Schedule Part D

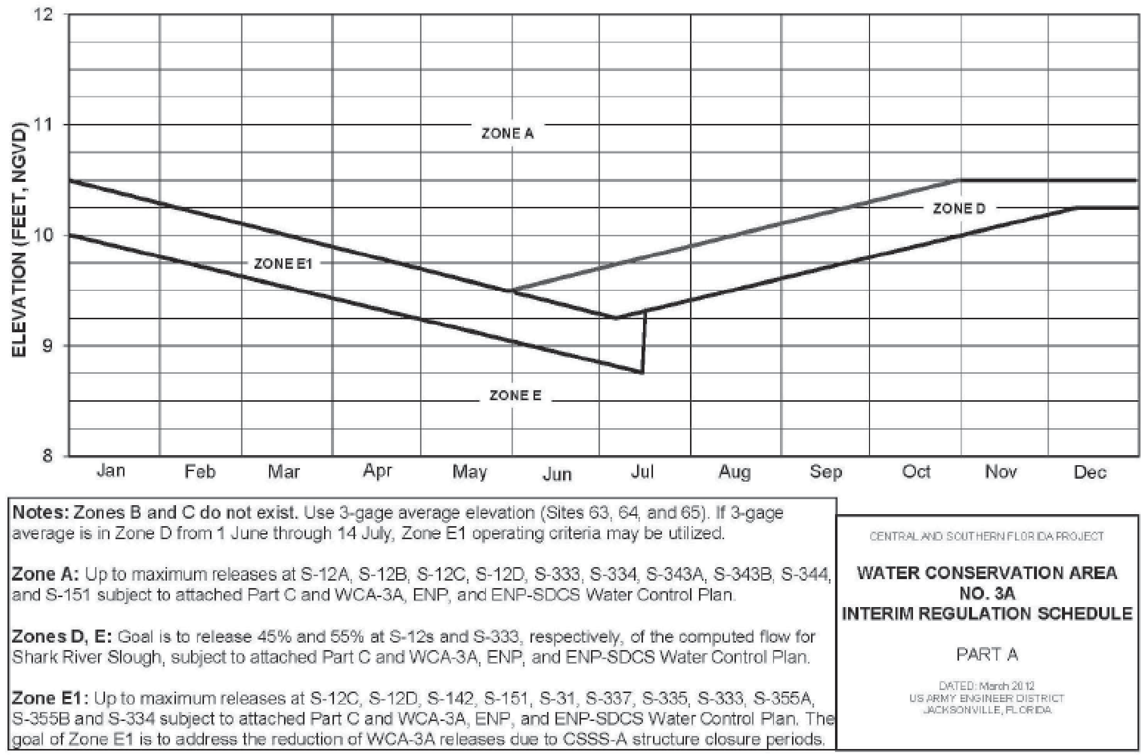

Figure C.1-5. ERTP WCA 3A Interim Regulation Schedule Part A

The regulation schedule is a tool used by water managers to meet congressionally authorized project purposes. A regulation schedule attempts to meet all functional objectives of the particular project, acting separately or in combination with other projects in a system. The regulation schedule has been, and will continue to be, designed to balance multiple, and often competing, project purposes and objectives. Managing for better performance of one objective often lessens the effectiveness of performance of competing objectives. For example, higher regulation schedules tend to benefit water supply, but may increase the risk to public health and safety, and can harm the ecology of the lake. Lower lake schedules may produce lake levels more desirable for the lake ecology and improved flood protection, but reduce water supply potential. Lower lake schedules may also harm the ecology of the lake during extended dry periods and downstream estuaries during extended wet periods. Therefore, the 2008 LORS was not developed to optimize performance of any single project purpose, but rather balances the performance of the multiple project purposes. The regulation schedule contains bands which vary with the time of year. Releases are outlined by flowcharts that define the allowable releases by structure within each band.

Though water supply is a project purpose, water supply release volumes are not prescribed by this regulation schedule. However, water supply releases are made to meet downstream demands that can include agricultural irrigation, municipal and industrial needs, estuary, and other environmental water supply needs.

The 2008 LORS operational study was initiated to address high lake levels, high estuarine discharges, estuary ecosystem conditions, and lake ecology conditions that occurred during the 2003 to 2005 time period. The study considered the back-to-back historically significant 2004 and 2005 hurricane seasons' effects on the recognized structural integrity issues of HHD along with effects to other project purposes. The 2008 LORS was identified to be effective at decreasing the risk to public health and safety, reducing the number of high-volume discharges to the estuaries, and providing critical flexibility to perform water management operations (November 2007 Final Supplemental EIS).

Under the 2008 LORS, management of Lake Okeechobee water levels and determination of Lake Okeechobee releases to the WCAs and to tide (estuaries) is based on seasonally varying lake elevations divided into three bands as shown on the proposed 2007 Lake Okeechobee Interim Regulation Schedule Part A. These bands include "High Lake Management," "Operational," and "Water Shortage Management." The High Lake Management Band is meant to address public health and safety, especially related to the structural integrity of HHD by providing the ability to make releases up to the maximum capacity lake outlets will allow; Lake Okeechobee outlet canals may be maintained above their optimum water management elevations. The Operational Band is meant to facilitate authorized project purposes by providing the ability to make releases of various volumes, including no release; Lake Okeechobee outlet canals should be maintained within their optimum water management elevations. The Water Shortage Management Band pertains to low lake levels which necessitate rationing water supplies; Lake Okeechobee outlet canals may be maintained below their optimum water management elevations. The water supply releases made within this band are made according to the SFWMD's Lake Okeechobee Water Shortage Management (LOWSM) Plan. The 2008 Lake Okeechobee Interim Regulation Schedule Part B further defines the bands of the regulation schedule. In Part B, the Operational Band is further subdivided into sub-bands that are directly related to defining allowable Lake Okeechobee releases to the WCAs and to tide (estuaries). In general, as lake levels rise through the higher sub-bands, the allowable release rates increase.

The 2008 LORS EIS analysis demonstrated that the then-proposed regulation schedule releases to the WCAs and to the estuaries would reduce the likelihood of lake levels that both increase the probability of a breach of the HHD and also contribute to poor ecological conditions within Lake Okeechobee. For Lake Okeechobee, a high lake level can lead to the decline of emergent and submerged vegetation which is essential habitat for the lake's fish and wildlife populations. The 2008 LORS provides the ability to make long-term, low-volume releases to the Caloosahatchee River Estuary, St. Lucie River and Estuary, and WCAs. These releases include low-volume pulse releases and base flow releases to the Caloosahatchee River and Estuary and St. Lucie River and Estuary that allow Lake Okeechobee to be maintained at more desirable levels throughout the year. A pulse release attempts to simulate a natural rainstorm event within the basins. The receiving body would respond to the pulse release in a similar fashion as if a rainstorm had occurred in the upstream watershed. Although an average flow rate is targeted for the duration of the pulse release, daily releases vary. The pulse releases and base flow releases are intended to regulate lake levels and reduce the potential for future prolonged high-volume releases to the estuaries. The base flow releases also provide a benefit of maintaining desirable salinity levels in the estuaries. By regulating lake levels, these low volume releases improve public health and safety performance by reducing risk to the HHD and provide improved benefits for the health of Lake Okeechobee and the estuaries.

C.1.1.9.2 Greater Everglades

The C&SF Project has numerous water management structures consisting of culverts, spillways, and pump stations that have specified operating criteria for managing or regulating water levels for congressionally authorized project purposes. The C&SF Project contains multiple water bodies created by the existing C&SF levee infrastructure and implementation of the water management operating criteria, including WCA 1, WCA 2, and WCA 3. Associated with the inflow to and discharge from the water bodies is an infrastructure of structures and canals that are managed by the implementation of water management operating criteria that can include specified water levels or ranges. The WCA 3A Interim Regulation Schedule is a compilation of water management operating criteria, guidelines, rule curves, and specifications that govern storage and release functions. Typically, a regulation schedule has water level thresholds which vary with the time of year and result in discharges. The threshold lines of regulation schedules define the discharge zones and are traditionally displayed graphically. Additionally, a corresponding table is typically used to identify the structure discharge rules for the zones. As with most regulation schedules, the WCA 1, WCA 2, and WCA 3A regulation schedules must take into account various, and often conflicting, project purposes.

The WCAs are regulated for the congressionally authorized C&SF Project purposes to provide: flood control; water supply for agricultural irrigation, municipalities and industry, and ENP; regional groundwater control and prevention of saltwater intrusion; enhancement of fish and wildlife; and recreation. An important component of flood control is the maintenance of marsh vegetation in the WCAs, which provide a dampening effect on hurricane-induced wind tides that have the potential to affect residential areas to the east of the WCAs. The marsh vegetation, along with the east coast protection levee, also prevents floodwaters that historically flowed eastward from the Everglades from flowing into the developed areas along the southeast coast of Florida. Modifications to the WCA 1 and WCA 2 Regulation Schedules are not under consideration with the CEPP PACR, and the following description of existing water management operations will only include WCA 3A, WCA 3B, and ENP.

Besides releases from WCA 2A via the S-11 structures, WCA 3A receives inflow from pumping stations S-8, S-9, and S-140. The S-9 pump station removes runoff in the area west of Ft. Lauderdale known as Western C-11. The S-9A pump station, located adjacent to the S-9 pump station, returns seepage water from WCA 3A and WCA-3B collected in the L-37, L-33 and the US 27 borrow canals. The S-140 pump station serves the 110 square mile area north and east of the interceptor canal and west of L-28. This station is used to maintain canal levels below 10.5 ft NGVD unless gravity flow into WCA 3A is possible at an adequate rate. Water also enters northeastern WCA 3A by gravity through S-150. Discharges at S-142 are made from WCA 3A into the North New River Canal.

Water levels in WCA 3A are managed primarily by five gated spillways: the S-12 structures (S-12A, S-12B, S-12C, and S-12D) and S-333. Additionally, S-151, S-343A, S-343B, and S-344 can also be utilized to discharge from WCA 3A. The S-12 structures and S-333 are utilized to provide water deliveries to ENP in accordance with the WCA 3A Regulation Schedule. From July 2002 through October 2012, WCA 3A was regulated according to a seasonally varying 8.75 to 10.75 ft NGVD regulation schedule and the Rainfall Plan (initiated in 1985), as per the 2006 IOP Supplemental EIS (USACE 2006b). The existing conditions baseline (ECB) assumptions represent the system-wide infrastructure and operations that were in place at the time the CEPP PACR was initiated by the SFWMD in 2017. One of the modifications in the ECB assumptions is the introduction of the ERTP regulation schedule for WCA 3A, approved by USACE and implemented on October 19, 2012. ERTP is intended to be a transitional temporary plan to be used until completion of the final Operational Plan that was to be developed as part of the MWD project. Under the ERTP, WCA 3A is regulated according to a seasonally varying 8.75 to 10.50 ft NGVD regulation schedule. The goal of ERTP is to improve conditions in WCA 3A for the endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus)*, wood stork, wading bird species, and tree islands, while maintaining protection for the endangered CSSS and congressionally authorized purposes of the C&SF Project. ERTP is a modification of IOP, based on a Multi-Species Transition Strategy (MSTS) recommended by the USFWS, with operational flexibilities to provide further hydrological improvements amenable to multiple species. The MSTS guides operations, throughout the 12-month period September to November, to achieve stages that will optimize habitat suitability for species in WCA 3A, while also providing appropriate inter-annual variability in stages. The following elements are applied to recommend WCA 3A operations under ERTP:

1. Part A: WCA 3A Interim Regulation Schedule utilizes a 3-gage average elevation of sites 63, 64, and 65 in the management of WCA 3A water levels (also known as 3A-3, 3A-4, and 3A-28, respectively) to determine the stage location at different operational zones (**Figure C.1-5**).
2. Part B: Establish Ecological Goals for WCA 3A in terms of desired 3-gage average stage and recession.
3. Part C: Establish Allowable Water Management Operations for WCA 3A by recommending outflow structures and discharge magnitudes, which could be maximum releases or the releases derived from the Rainfall Plan.

The discharges made from WCA 3A through the S-12 structures and S-333 are target flows determined from the Rainfall Plan; when WCA 3A is in Zone A, these target flows are the maximum flow possible. Under the Rainfall Plan, water deliveries are computed and operations adjusted, weekly, if necessary based on the sum of two components: a rainfall response component and a WCA 3A regulatory component. The Rainfall Plan provides for the rainfall response component within all zones of the WCA 3A Regulation Schedule, with the additional regulatory release requirement added when the WCA 3A water levels fall within the higher regulation schedule zones above Zone E, including Zone E1. ERTP specifies seasonal closure of the S-12 structures, with the following closure periods: November 1 – July 14 for S-12A; January 1 – July 14 for S-12B; and no closures for S-12C and S-12D.

The most notable changes in the WCA 3A Interim Regulation Schedule under ERTP, as compared to IOP, are (1) the top of the WCA 3A Interim Regulation Schedule (Zone A) being lowered seasonally by between 0.25 and 0.50 ft; (2) the IOP Regulation Schedule transition zones (zones B and C) being eliminated; (3) the bottom zones (Zone D and Zone E1) being extended; (4) the S-12C seasonal closure under IOP (February 1 through July 14) being removed; and (5) ERTP operations utilizing the USFWS MSTS and Periodic Scientists Calls to provide input to assist the USACE with operational decision-making. Under the ERTP, consistent with IOP, the WCA 3A Interim Regulation Schedule utilizes a 3-gage average elevation of sites 63, 64, and 65 in the management of WCA 3A water levels (also known as 3A-3, 3A-4, and 3A-28, respectively). Consistent with the IOP, the goal of the rainfall and regulatory components is to split the flows between the S-12 structures and S-333, with 45% of the total flow from WCA 3A passing through the S-12 structures to WSRS and the remaining 55% to discharge through S-333 to NESRS, establishing the target flows for both the S12 structures and S-333. However, the ERTP additionally includes provisions for dry season conditions or unseasonably dry conditions when ENP recommends that the percent distribution is not limited to 55% to NESRS.

Water deliveries to eastern ENP are controlled by the stage in L-29 Canal as pressure from the water within the canal (hydraulic head) is required to force water through the Tamiami Trail culverts and into ENP. As canal stage increases, more water is forced beneath the road through the One-Mile bridge and existing culverts. The L-29 Canal stage is currently limited due to concerns regarding potential flooding and seepage effects within residential or agricultural areas of Miami-Dade County and potential damage to the Tamiami Trail roadway subbase. The water management operating criteria for the L-29 borrow canal between S-333 and S-334 is meant to limit the L-29 borrow canal stage to no more than 7.5 ft NGVD in response to roadway sub-base concerns identified by the Florida Department of Transportation (FDOT), although short-term deviations have been previously implemented in response to specific hydrologic conditions. Higher water levels within the canal may erode the roadway sub-base and create a potential safety hazard, until completion of the Modified Water Deliveries (MWDs) Tamiami Trail Modifications project in 2018. In addition, the L-29 borrow canal water level has an additional constraint related to potential flooding and seepage effects within residential and/or agricultural areas of Miami-Dade County. When the G-3273 water level within NESRS reaches 6.8 ft NGVD, S-333 discharges to NESRS will be discontinued until G-3273 falls below 6.8 ft NGVD. Tamiami Trail roadway modifications, to accommodate potential maximum L-29 borrow canal water levels up to 8.5 ft NGVD are currently in progress with the ongoing MWD Project. Additionally, a multiyear field test to incrementally relax the G-3273 operational constraint was initiated in 2015.

When WCA 3A water levels are in Zone A of the WCA 3A Regulation Schedule (USACE 2012a), S-343A, S-343B, and S-344 can be utilized to discharge from WCA 3A into BCNP. Discharges can also be made through S-343A, S-343B, and S-344 when agreed to by SFWMD, USACE, and NPS to extend hydroperiods within BCNP. The S-151 gated culvert structure, which is located along the Miami Canal and operated according to the WCA 3A Regulation Schedule (USACE 2012a), is the only existing surface water connection between WCA 3A and WCA 3B. S-151 discharges into C-304 in WCA 3B for flood diversion and for the purpose of providing water supply to LEC canals and the ENP SDCS. Under existing conditions, water does not flow directly from WCA 3B into the L-29 Canal. There are two discharge structures, S-355A and S-355B, along L-29 south of WCA 3B that are designed to move water from WCA 3B into the canal, although the operation of these structures has not been previously authorized for more than short-term, temporary operations. The S-355 structures are completed components of the MWD Project, intended to function in concert with the proposed MWD S-345 structures along L-67A/L-67C to address the MWD Project objective of restoring WCA 3B as a functioning component of the Everglades hydrologic system and restoration of water deliveries to NESRS.

There are three distinct modes of water management operations for ERTP: Column 1, Column 2, and water supply (USACE 2012a). Water management operating criteria within Column 1 occurs when WCA 3A discharges can be achieved by releases through the S-12 structures, S-333, S-151, S-343A, S-343B, and/or S-344. Water management operating criteria within Column 2 occurs when WCA 3A discharges are made via S-333 to the L-29 Canal and L-31N Canal, and the ENP SDCS; Column 2 generally requires the use of pump stations S-331, S-332B, S-332C, and S-332D. Column 2 is used to offset or mitigate for adverse effects on WCA 3A related to closure periods at water management structures to protect CSSS-A. Column 2 generally is used when any S-12 structure is closed to protect the CSSS (November 1 through July 15, under ERTP), although use of Column 1 may continue until the capacity of the S-12 structures that remain open is insufficient to handle the discharge from WCA 3A. If necessary, Column 2 may continue to be used past reopening of the S-12 structures (July 16) to mitigate for adverse effects on WCA 3A resulting from the ERTP closures of S-12A, S-12B, S-343A, S-343B, and S-344. Water supply discharges from WCA 3A occur when water levels in the ENP SDCS fall to a level that indicates additional water is required. During droughts, a minimum elevation in the borrow canals of 7.5 ft NGVD is established in the WCA 3A Interim Regulation Schedule (USACE 2012a). Below this elevation no further releases will be permitted from WCA 3A unless an equal supply of water from another storage area is transferred to WCA 3A.

Additional information on the effects of water management within the Greater Everglades environment may be found within the South Florida Environmental Reports, which are published annually by the SFWMD and are available at
http://my.sfwmd.gov/portal/page/portal/xweb%20about%20us/agency%20reports#previous reports.

C.1.1.10 Flood Control

Areas may become flooded during heavy rainfall events due to antecedent conditions that cause saturation and high runoff from developed areas.

Water management and flood control is achieved in south Florida through a variety of canals, levees, pumping stations, and control structures within the WCAs, the east coast urban areas, ENP, and SDCS. The WCAs provide a detention reservoir for excess water from the EAA and parts of the east coast region, and for flood discharge from Lake Okeechobee to tide. The WCAs provide levees to prevent the Everglades floodwaters from inundating the east coast urban areas; provide a water supply for the east coast areas and ENP; improve water supply for east coast communities by recharging underground freshwater reservoirs; reduce seepage; ameliorate salt-water intrusion in coastal well fields; and provide mixed quality habitat for fish and wildlife in the Everglades.

The regulation schedules for the WCAs contain instructions and guidance on how project spillways are to be operated to maintain water levels in the WCAs. The regulation schedules represent the seasonal and monthly limits of storage which guides project regulation for the authorized purposes. In general, the schedules vary from high stages in the late fall and winter (the end of wet season and close to the end of tropical season) to low stages at the beginning of the wet season. These regulation schedules must take into account various, and often conflicting, project purposes.

The East Coast Canals are flood control and outlet works that extend from St. Lucie County southward through Martin, Palm Beach, and Broward counties to Miami-Dade County. The East Coast Canal watersheds encompass the primary canals and water control structures located along the LEC and their hydrologic basins. The main design functions of the project canals and structures in the East Coast Canal area are to protect the adjacent coastal areas against flooding; store water in conservation areas west of the levees; control water elevations in adjacent areas; prevent salt-water intrusion and over-drainage; provide freshwater to Biscayne Bay; and provide for water conservation and public consumption. The project operates to prevent major flood damage; however, due to urbanization, the existing surface water management system now has to handle greater peak flows than in the past. The ENP SDCS provides a way to deliver water to areas of south Miami-Dade County. This canal system was overlaid on the existing flood control system. Many of these canals are used to remove water from interior areas to tide in times of excess water.

C.1.1.11 Water Supply

Wellfields in the surficial aquifer are the primary source of municipal water supplies and are recharged by surface water, rainfall, and the WCAs. The WCAs maintain groundwater levels and canal stages in the coastal area for purposes of public water supply (PWS), irrigation (i.e., agricultural, industrial, and landscape), and maintaining a freshwater head along the Lower East Coast (LEC) to slow saltwater intrusion. The SFWMD adopted a restricted allocation area rule for the Everglades and Loxahatchee River water bodies in 2007. The rule, in general, caps consumptive use withdrawals that induce drawdowns from the Everglades system to actual use as of April 1, 2006. The actual demand as of 2016 was 817 million gallons per day (MGD) for PWS from all sources. Like public water supplies, industrial demands dependent on the surficial aquifer system are constrained to usage that does not induce drawdowns from the Everglades system.

C.1.1.11.1 Lake Okeechobee

As one of the Federally authorized project purposes, Lake Okeechobee supplies water for agricultural irrigation, municipalities, industry, the ENP, and regional groundwater and salinity control. The primary water supply uses of Lake Okeechobee are to provide water supply for adjacent agricultural lands and to serve as a backup water supply for the Lower East Coast Service Area (LECSA) and west coast Florida counties when rainfall is insufficient and during dry periods.

Lake Okeechobee and its connected conveyance system are the most significant surface water sources for the Lake Okeechobee Service Area (LOSA), which includes the EAA. Surface water from the lake and runoff from the EAA supply water to the regional system via canals and provide recharge to the SAS. Agriculture in the LOSA covered approximately 255,500 acres outside of the EAA and the 460,000 acres within EAA in 2010 (most recent data available) and is the predominant user of lake water. Agricultural water supply demands equate to approximately 480,000 ac-ft per year for LOSA, which includes 303,000 ac-ft per year for just the EAA.

In 2008, the USACE implemented the 2008 LORS. The 2008 LORS provides operational flexibility to make Lake Okeechobee releases to meet project purposes as specified in the WCP. SFWMD also provides recommendations for USACE consideration regarding releases to the Everglades or the Northern Estuaries for Lake Okeechobee regulatory releases within the low, base-flow or beneficial use sub-bands of the 2008 LORS schedule.

The right to use water within the CEPP PACR project area is authorized by a permit issued by the SFWMD. The conditions of permit issuance are more specifically enumerated in Chapters 40E-2 of the Florida Administrative Code (F.A.C.), which also incorporate by reference the current SFWMD Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District (Applicant's Handbook) (SFWMD 2015) Basis of Review. In order to provide reasonable assurances that the conditions of permit issuance are met, applicants must meet consumptive use permitting criteria. The technical criteria used to evaluate the purpose, quantity, and source of proposed water to be used include the following: (1) saltwater intrusion, (2) wetland and other surface water body impacts, (3) pollution, (4) impacts to off-site land uses, (5) interference with existing legal users, and (6) minimum flows and minimum water levels.

Water supplies allocated from Lake Okeechobee and its connected conveyance systems are primarily for supplemental irrigation to the LOSA agricultural areas. In the LOSA, the Okeechobee Utility Authority is the only remaining PWS utility using water directly from Lake Okeechobee.

Clewiston, South Bay, Belle Glade, and Pahokee have discontinued the use of Lake Okeechobee as their supply source and now use Floridan aquifer water treated by reverse osmosis for all of their PWS demand since 2005.

Water shortages are declared by the SFWMD Governing Board when available groundwater or surface water is not sufficient to meet users' needs or when conditions require temporary reduction in total use within the area to protect water resources from serious harm. The SFWMD's Water Shortage Plans are contained in Chapters 40E-21 and 40E-22, F.A.C. The purposes of the plans are to protect the water resources of the SFWMD from serious harm; assure equitable distribution of available water resources among all water users during times of shortage, consistent with the goals of minimizing adverse economic, social, and health related impacts; provide advance knowledge of the means by which water apportionments and reductions will be made during times of shortage; and promote greater security for consumptive use permittees. The current SFWMD water shortage management plan for Lake Okeechobee, known as the LOWSM Plan (implemented in November 2007), requires various actions to be taken according to the severity of the actual and projected lake water levels. The basis of this plan is an allocation scheme that parcels out lake water based on a percentage of the 1-in-10 water demand. If the lake level continues to fall, the percentage of water restrictions increases. If the water level at the beginning of the dry season is low, then the likelihood of water restrictions is greater.

In October 2008, the SFWMD adopted Restricted Allocation Area criteria for the LOSA as part of the Minimum Flow and Minimum Water Level (MFL) recovery strategy for Lake Okeechobee following an extended drought and USACE implementation of the 2008 LORS, which generally lowered the water levels in Lake Okeechobee. According to the SFWMD, without modification to the current LOWSM Plan, the frequency of water shortage restrictions is expected to increase from 1-in-10 years to experiencing restrictions 1-in-6 years while the lake is being operated under the 2008 LORS. As a result of the potential impacts to water supply, the SFWMD enacted rules to limit future additional withdrawals from Lake Okeechobee in order to prevent further degradation of the level of certainty for existing legal users and to avoid exceeding the MFL criteria. The SFWMD rules also ensure that water necessary for Everglades restoration is not allocated for consumptive use. The regulatory criteria limit allocations from Lake Okeechobee and connected surface waters, including the Caloosahatchee River and the St. Lucie River, to base condition water uses as defined within the SFWMD Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District (SFWMD 2015).

C.1.1.11.2 Seminole Tribe of Florida

The Seminole Tribe of Florida has six reservations located in Florida. The reservations include Brighton, Tampa, Fort Pierce, Immokalee, Hollywood, and Big Cypress. Hollywood is the headquarters location for the Seminole Tribe of Florida.

Two reservations of the Seminole Tribe of Florida rely on Lake Okeechobee as a secondary supplemental irrigation supply source for their surface water. The Seminole Tribe of Florida's Big Cypress Reservation has specific volumes of water identified for this purpose. The Brighton Reservation has an operational plan addressing water shortage conditions.

The Seminole Tribe of Florida has surface water entitlement rights pursuant to the 1987 Water Rights Compact between the Seminole Tribe of Florida, the State of Florida, and the SFWMD (P.L. No. 100-228, 101 Stat. 1566 and Chapter 87-292 Laws of Florida as codified in Section 285.165, Florida Statutes [F.S.]). Additional documents addressing the Water Rights Compact entitlement provisions have since been executed. These documents include Agreements between the Tribe and SFWMD and a SFWMD Final Order. Of interest in this regard is the 1996 Agreement, which commits the SFWMD to mitigate impacts to the Tribe's ability to obtain surface water supplies at both the Brighton and Big Cypress Reservations, which may be diminished as a result of various activities. The Seminole Tribe of Florida has surface water entitlement rights pursuant to the 1987 Water Rights Compact and subsequent entitlement provisions executed between the Seminole Tribe of Florida, the State of Florida, and the SFWMD. Impacts are not expected for the CEPP PACR alternatives based on the hydrologic modeling.

For the Big Cypress Reservation, SFWMD has installed forward pumps to deliver water from Lake Okeechobee at lower stages to the Miami Canal. This option remains a part of drought management alternatives. Also, real-time operational decisions made during a declared drought event include recognition of the Tribe's water rights. These decisions remain a part of the SFWMD drought management operations.

For the Brighton Reservation, various options of securing both short and long-term water supply deliveries to agricultural operations in the Southern Indian Prairie Basin are being evaluated extensively and implemented where possible. For example, other water source and conveyance options, including deviations to the Lake Istokpoga Regulation Schedule (USACE 1994) to provide for additional water supply and modifications to the C-40 canal to augment the pump station G-208 capability, continue to be explored. Preliminary discussions remain ongoing with the USACE and the USFWS in respect to deviations of the Lake Istokpoga Regulation Schedule.

C.1.1.11.3 Lower East Coast Service Areas

Fresh groundwater is the primary source of supply for potable water consumption, landscape irrigation, and industrial and commercial uses in the LECSA. The LECSA includes Northern Palm Beach County, LECSA 1 (Palm Beach), LECSA 2 (Broward County/Fort Lauderdale), and LECSA 3 (Miami-Dade). Irrigated agricultural acreage for the LECSA is shown in **Table C.1-2.** In the urban areas, PWS relies heavily on the SAS, including the Biscayne aquifer. The SAS produces good quality, fresh water from relatively shallow wells. In many cases, the ambient water quality meets primary and secondary drinking water quality standards. These aquifers are recharged by local rainfall, groundwater seepage from the WCAs and ENP, and surface water deliveries from the WCAs. When sufficient water is available, surface water from Lake Okeechobee can also be routed to the WCAs, then to regional canals to maintain water levels and recharge the aquifer.

Table C.1-2. Irrigated Agricultural Acreage for LECSA (2015/2016)

Category	2015/2016 Acreage			
	Palm Beach (EAA not included)	Broward	Miami-Dade	Total
Irrigated Lands				
Urban Irrigated	111,331	82,161	106,947	300,439
Transportation, Communication, & Utilities	2,201	1,212	2,052	5,465
Golf Course	13,801	7,947	4,426	26,174
Mixed Crops	0	0	7	7
Row Crops	11,269	829	17,936	30,034
Field Crops	107	0	930	1,037
Sugarcane	761	0	0	761
Citrus	276	0	729	1,005
Other Fruit & Nuts	36	15	5,998	6,049
Greenhouse/Nursery	3,758	585	10,963	15,306

Table C.1-2. Irrigated Agricultural Acreage for LECSA (2015/2016) (continued)

Category	2015/2016 Acreage			
	Palm Beach (EAA not included)	Broward	Miami-Dade	Total
Sod	407	0	215	622
Specialty Farms	5867	387	362	6,616
Cattle Feeding Operations	0	0	0	0
Irrigated Lands Total	**149,814**	**93,136**	**150,565**	**393,515**
Wastewater Reuse				
Urban	7,769	2104	40	9,913
Golf Course	6,515	1046	0	7,561
Transportation, Communication, & Utilities	645	159	0	804
Wastewater Reuse Total	**14,929**	**3,309**	**40**	**18,278**
Floridan Aquifer				
Golf Course	631	0	120	**751**
Urban	23.4	42	0	**65**
Floridan Aquifer Total	**654**	**42**	**120**	**816**
Non-Irrigated Lands				
Urban Non-Irrigated	103,155	74,424	101,934	**279,512**
Urban Under Construction	34,710	43,252	31,561	**109,523**
Transportation, Communication, & Utilities	15,974	19,799	28,235	**64,008**
Pasture	5,455	1,290	1,403	**8,148**
Abandoned Groves	1953	460	190	**2,603**
Fallow Crop Land	3,376	18	6,839	**10,233**
Upland Non-Forested	7,986	1,371	5,009	**14,366**
Upland Forested	50,109	3,600	4,763	**58,472**
Open Water	35,393	26,600	46,270	**108,263**
Wetlands	105,621	15,277	133,656	**254,554**
Barren Land	4324	794	6,319	**11,437**
Non-Irrigated Lands Total	**368,056**	**186,885**	**366,179**	**921,119**
Grand Total	**533,453**	**283,372**	**516,903**	**1,333,728**

Methodology:

Irrigated Urban	Use LU Category 1000 (to level 4, to calculate percent irrigated)
Trans/Comm/Util	Use LU Categories 8000-8999, irrigated = 8113, 8115, 8340, 8350, subtract irrigated from total to get non-irrigated
Irrigated Golf	Use LU Category, subtract reclaimed and Floridan acreages
Irrigated Agriculture	Use FSAID-IV county roll-ups from FDACS website Row Crops: vegetables (fresh market) Field Crops: corn, hay, and potatoes Other Fruit & Nuts: fruit (non-citrus)
Specialty Farms	Use LU Category 2500: horse farms and dairy
Cattle Feeding Operations	Use LU Category 2310
Wastewater Reuse	Use SFWMD reclaimed area coverage; for M-D Used FDEP annual report
Floridan Golf	Use SFWMD water use permitting coverage
Non-Irrigated	Use SFWMD LU Categories (updated in 2015/2016)

During the wet season, well fields are recharged by local rainfall and by the regional system that provides continuous seepage from the WCAs to the regional aquifer and the canals. During the wet season, "excess" stormwater is also passed through the canals and out to tide due to the limited storage capability within the LEC coastal canal system. Without sufficient storage, it has been difficult to have water available during the dry season without causing flooding during the wet season. Another concern is that, at present, the flow of water along the eastern protective levee is from the Everglades' wetlands to the coast; keeping the water levels high west of the Atlantic Coastal Ridge, and managing levels low to the east of it, results in large groundwater losses from the remnant Everglades throughout the year. This situation has reduced the coastal groundwater flows into estuaries like Biscayne Bay and has made it necessary to import regional water to the LEC to maintain adequate coastal groundwater levels to prevent saltwater intrusion.

During extremely dry years, no water reaches the coast and the urban well fields depend heavily on deliveries from the WCAs (including the ongoing seepage from these areas) and Lake Okeechobee via the primary canals for water supplies. During droughts, lower regional groundwater levels may cause inland movement of saline water at the interface of the aquifer with seawater. Minimum stages are maintained in LEC canals principally to protect the Biscayne aquifer from saltwater intrusion, a major threat to this water resource. Maintaining canal stages during dry conditions serves to raise local and regional groundwater levels to recharge the aquifer, which, in turn, supplies the urban well fields. Even during normal dry seasons when flood releases are minimal, the high demands on the system from urban water supply may be withdrawing water from the natural environment that could alternatively be kept in the system for late winter and spring biological rejuvenation. In addition, during drought years, the urban and agricultural areas create additional demands on the regional water supply as the need for irrigation increases, with a significant percentage of this irrigation water consumed for landscape maintenance (sourced primarily from shallow wells and surface waters). Under drought conditions, water shortage restrictions within the LEC Service Areas may be declared by the SFWMD Governing Board to conserve freshwater supplies.

The amount of water needed to recharge urban well fields is small compared to the tremendous volumes needed to prevent saltwater intrusion. Preventing saltwater intrusion is important to maintain the long-term viability of the primary ground water supply for the LECSA. For example, if significant saltwater intrusion occurred even once, the easternmost well fields would be contaminated indefinitely and would need to be replaced with wells further west. This situation has already occurred in portions of eastern Miami-Dade County, and in Broward and Palm Beach counties.

The distribution of SFWMD-permitted SAS wells for PWS utilities produce over 0.1 MGD. The map reveals that well capacities generally increase from Palm Beach County to the south towards Miami-Dade County as a result of the presence of the Biscayne aquifer within SAS. The transmissivity of the Biscayne aquifer increases from north to south. In 2016 (latest information available), PWS utilities utilized 756 MGD of fresh groundwater and 52 MGD of brackish water from the Floridan aquifer, to supply 96% of their total potable water demand. In addition to PWS, agriculture in Broward and Miami-Dade counties is primarily dependent upon withdrawals from the Biscayne aquifer to supply supplemental irrigation for crops, livestock, and other purposes.

The SAS, including the Biscayne aquifer, is a source of limited availability to the extent that withdrawals result in induced seepage from the C&SF Project, except when stormwater discharge or wet season discharge occurs, as defined by Section 1.5.2B.2 of the Applicant's Handbook for Water Use Permit Applications within the South Florida Water Management District (Applicant's Handbook), commonly referred as the SFWMD Applicant's Handbook (SFWMD 2015). The SFWMD adopted the Everglades and

Loxahatchee River Watershed Restricted Allocation Area criteria (Section 3.2.1.E, Applicant's Handbook) (SFWMD 2015) in 2007 as part of the MFL recovery strategies. If a utility pursues increased withdrawals from the SAS, this source is generally limited due to potential impacts on wetlands and existing legal water users, including Domestic Self-Supply and the potential for saltwater intrusion. New or increased allocations are evaluated by the SFWMD on an application-by-application basis to determine if the project meets consumptive use permitting criteria.

In addition to the regulatory limitation on water availability, there is also physical limit of water available due to regulation schedules for the WCA's. Water supply deliveries from the WCAs to coastal canals are utilized to maintain coastal canals and to recharge coastal well fields during dry hydrologic conditions. When canal levels drop below adequate recharge levels due to a combination of wellfield drawdowns, evaporation, and lack of rainfall, water supply deliveries are typically made from the regional C&SF system. When canal levels drop in Miami-Dade County, regional water supply is delivered from WCA 3A through one of two delivery routes, as previously described.

C.1.1.12 Water Quality

Existing water quality conditions within most of the study area (Lake Okeechobee, coastal estuaries, EAA, WCAs, and ENP) are impaired mostly as a result of nutrient concentrations. The Florida Department of Environmental Protection (FDEP) is in the process of implementing numeric nutrient criteria. Where water bodies are impaired, FDEP develops total maximum daily load (TMDL) limits. Total phosphorus (TP) concentrations in discharges from Everglades STAs have been the subject of ongoing litigation between State, Federal, and tribal parties. Consent Orders issued to the SFWMD by FDEP in 2012 associated with National Pollutant Discharge Elimination System (NPDES) and Everglades Forever Act (EFA) permits require the SFWMD to construct additional water quality improvement projects to assist the existing Everglades STAs in achieving a water quality-based effluent limit (WQBEL) for TP. Additional discussion of TMDLs and water quality is included in **Appendix C.1** and **Annex F**.

Water quality in the study area is significantly influenced by development. The C&SF Project led to significant changes in the landscape by opening large land tracts for urban development and agricultural uses, and by the construction of extensive drainage networks. Natural drainage patterns in the region have been disrupted by the extensive array of levees and canals which has resulted in further water quality degradation. The water quality of the study area is largely controlled by Lake Okeechobee and the EAA. Lake Okeechobee feeds downstream sub-basins such as the Caloosahatchee River and Estuary and the St. Lucie River and Estuary, including Indian River Lagoon and Charlotte Harbor. The northern WCAs are fed from EAA runoff as well as the lake. Water quality impairment within the study area can generally be attributed to nutrients and bioavailable forms of mercury. The disruptions to the natural drainage patterns complicates improvements to water quality. A short discussion of each of these water pollutants is provided below followed by a geographically referenced review of water quality within the study area.

C.1.1.12.1 Nutrients

Nutrients such as phosphorus and nitrogen compounds are a concern in the estuaries, WCAs, ENP, and Lake Okeechobee since in excess they result in an imbalance of flora and fauna. To address excessive nutrient discharges, the FDEP has recently established surface water quality numeric nutrient criteria for all Florida water bodies and developed NPDES TMDLs for many watersheds with excessive nutrient pollution. TMDLs for phosphorus and/or nitrogen currently exist for Lake Okeechobee, the St. Lucie River and Estuary, and the Caloosahatchee River Estuary. Within the EPA, phosphorus concentrations are regulated by the Phosphorus Rule (62-302.540, F.A.C.) as well as addressed through legal agreements such as the 1991 Consent Decree and the 2012 Consent Order. Additional detail on these two legal agreements is included in **Annex F**. Additional information on the status and implementation of TMDLs within the study area is available at http://www.dep.state.fl.us/water/tmdl/.

Excess nutrients come primarily from agricultural fertilizers; the decomposition of the peat soils in the area and urban runoff also contribute to excess phosphorus in the system. Phosphorus is the limiting nutrient for Lake Okeechobee, the WCAs, and ENP; nitrogen is generally considered to be the limiting nutrient for the marine waters of south Florida. Prior to 1970, the background TP concentration in Lake Okeechobee was less than 0.040 milligrams per liter (mg/L) (Haven and James 1997) while at present it exceeds 0.090 mg/L. Within the remnant Everglades, the background phosphorus concentration in surface waters has been quantified as 0.006 mg/L TP or less, with natural spatial and temporal variability. At the northern end of WCA 3, inflow TP concentrations exceed 0.020 mg/L, resulting in undesirable changes to soil composition and vegetation coverage. Soil phosphorus concentrations in pristine areas of ENP are on the order of 100 to 200 milligrams per kilogram (mg/kg), while in impacted areas of the WCAs near canals, soil phosphorus concentrations exceed 500 mg/kg (Craft et al. 1995). Elevated concentrations of TP in discharges to the WCAs have resulted in sufficient content of soil phosphorus (< 650 mg/kg) to support cattail invasion in areas formerly dominated by sawgrass and bulrush. An example of the impact of nutrient discharges is the expansion of cattails south of the S-10 inflow gates to WCA 2A.

Nitrogen is generally not considered to be a problem within the Everglades landscape. The concentration of total nitrogen (TN) varies from about 2.2 mg/L in WCA 1 to around 0.85 mg/L in pristine areas of ENP. Lake Okeechobee TN concentration is presently around 1.7 mg/L. In the Caloosahatchee River and Estuary, the St. Lucie River and Estuary, and portions of Florida Bay, excess nutrients associated with damaging discharges contribute to depressed oxygen conditions. The Caloosahatchee River and Estuary and St. Lucie River and Estuary and portions of Florida Bay, are generally considered to be nitrogen-limited with inorganic forms of nitrogen such as nitrate+nitrite having an impact on the ecosystem. The concentration of nitrogen in discharges from the C-43 and C-44 canals into the Northern Estuaries is approximately 1.5 mg/L with approximately 0.5 mg/L provided by the highly bioavailable inorganic forms such as nitrate+nitrite and ammonia. The average concentration of TN into Florida Bay is around 1.0 mg/L with a very small fraction of inorganic nitrogen.

C.1.1.12.2 Mercury

Mercury (Hg) is widely distributed in the environment and originates primarily from volcanoes and human-induced (anthropogenic) sources such as wildfires (Pirrone et al. 2010) and combustion (Krabbenhoft and Sunderland 2013). Hg is deposited from the atmosphere primarily as inorganic Hg. Approximately 55% of atmospheric Hg in the United States is sourced internationally with the balance coming from local anthropogenic sources.

Significant local sources include coal-burning power plants, cement kilns, and incinerators (FDEP 2013). In the Everglades, the conversion of inorganic Hg to organic methylmercury (MeHg) is facilitated by naturally occurring reducing bacteria. This conversion of inorganic Hg to MeHg is one of the important steps in the bioaccumulation of Hg as it greatly increases toxicity and potential for accumulation in aquatic biota. Nearly all of the Hg found in fish and shellfish tissue is MeHg (Grieb et al. 1990, Bloom 1992).

Human exposure to Hg is primarily through the consumption of fish and shellfish containing MeHg. Exposure to Hg causes neurodevelopmental delays in children. Wildlife exposure to MeHg through the consumption of fish results in reproductive, neurological, and immune system problems (Fleming et al. 1995, Tchounwou et al. 2003). However, consuming contaminated fish is not the only pathway for bioaccumulation of Hg.

The United States Environmental Protection Agency (USEPA) has established that a concentration of Hg in fish tissue in excess of 0.3 mg/kg is detrimental to human health. Water quality impairment for Hg is also measured by the incidence of gamefish tissue with Hg in excess of 0.3 mg/kg. Twenty species of Florida freshwater fish and over 60 species of marine fish are under consumptive advisory (FDOH 2012). These advisories apply to the EPA, including all of the CEPP study area—WCAs and ENP (see **Figure C.1-6**) (SFWMD 2009). In the WCAs, total mercury (THg) concentrations in LMB declined sharply in the 1990s, but have changed little since 2000. Significantly, in ENP, LMB THg concentrations have not changed in the last 28 years, from 1989 to 2012. For the 2000-2011 period, about 70% of LMB sampled from 49 locations within the EPA exceeded 0.3 mg/kg and 75% of sunfish (several species) sampled from 25 locations in the EPA exceeded the USEPA trophic level 3 MeHg wildlife protection guidance target of 0.077 mg/kg. The frequent exceedance of USEPA THg guidance levels in LMB is evident in **Figure C.1-7** (USEPA 2010)**.**

MeHg also poses a threat to fish-eating wildlife and species that prey on them such as wading birds, ospreys, eagles, otters and panthers. The elevated concentrations of MeHg in fish have been correlated with elevated concentrations in wildlife, including State and Federally listed endangered species. THg concentrations in panther hair ranged from 0.092 to 67 mg/kg; in wood stork chicks ranged from 5.2 to 10.8 mg/kg, at coastal ENP colonies; in great egrets ranged from 2.5 to 20 mg/kg, from several colonies in the EPA (SFWMD 2013, 2014).

In 2013, Florida adopted a statewide TMDL for Hg to protect public health with respect to fish consumption. This State program proposes achieving Hg target levels in fish tissue by reducing atmospheric Hg emissions by 86%, which may encompass reduction in emissions from sources in south Florida, statewide, other U.S. states, and other countries.

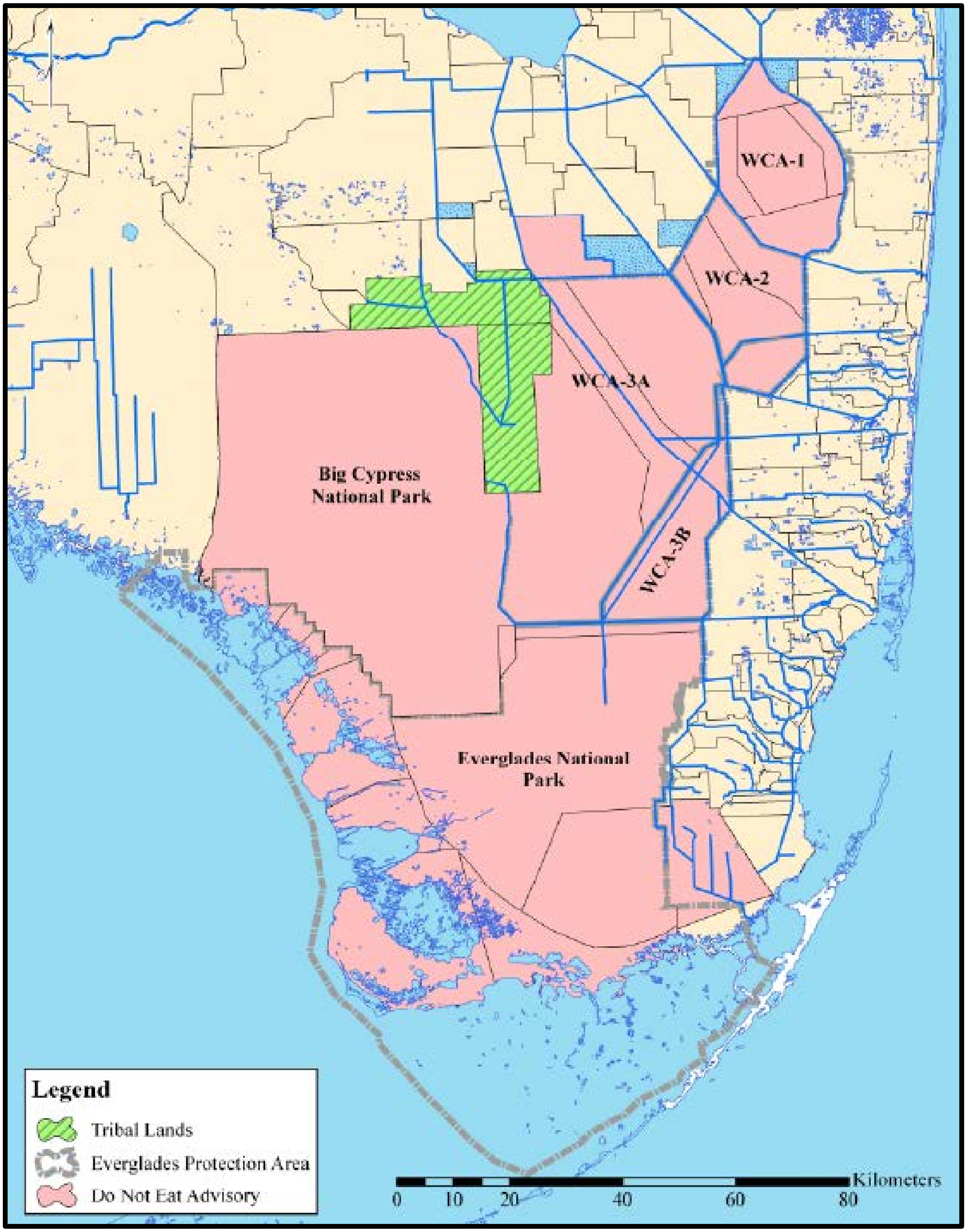

Figure C.1-6. Areas of the EPA Where the Florida Department of Health has issued "Do Not Eat" Advisories for Largemouth Bass (SFWMD 2009)

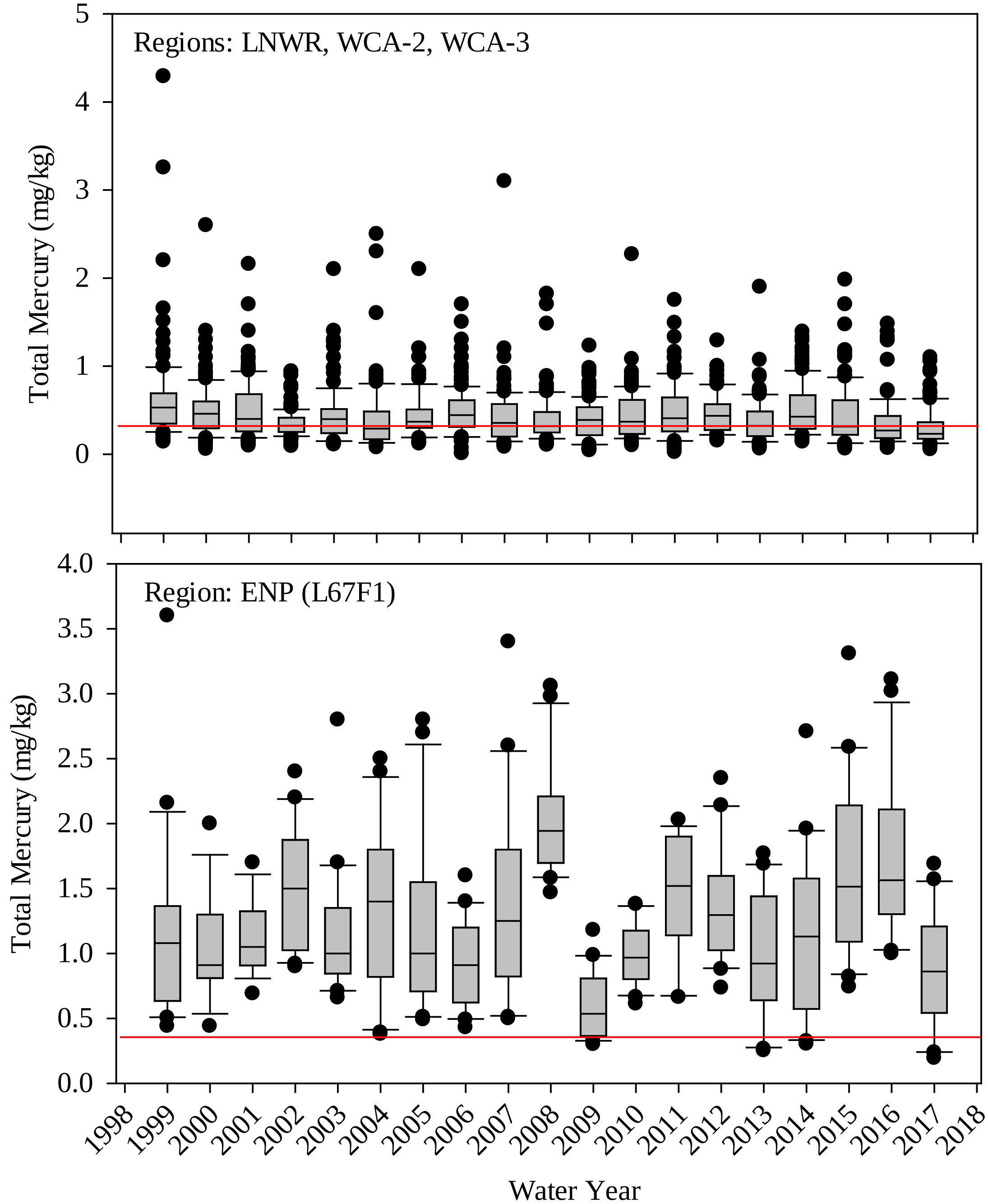

Figure C.1-7. THg Concentrations in Largemouth Bass from the EPA, Water Year 1989-2018 in the WCAs (*top*) and ENP (*bottom*). Redlines (0.3 mg/kg) are USEPA-recommended MeHg levels for the protection of human health. Modified from the 2014 South Florida Environmental Report (SFWMD 2014).

Over the past 15+ years, several agencies, educational institutions, and organizations have conducted research to identify key chemical characteristics that play major roles in Hg methylation and have investigated trends in MeHg bioaccumulation within the Everglades freshwater ecosystems as well. Sulfur, Hg, and dissolved organic carbon have been identified as significant drivers of Hg methylation (Ekstrom et al. 2003, Gilmour et al. 1998). It has been suggested that sulfate-reducing bacteria (SRB) are the dominant producers of MeHg in the Everglades aquatic ecosystems; however, other groups of bacteria such as iron-reducing bacteria and methanogens also have the ability to methylate mercury (Gilmour 2012).

Previous studies on mercury methylation have indicated that SRB may produce MeHg within a range of sulfate levels. Some research and field observations in the Everglades marshes suggested that at or below 1 mg/L sulfate, microbial sulfate reduction and MeHg production rates would be low due to sulfate limitation (Gilmour et al. 2007). By contrast, above 2 mg/L sulfate, the ecological risk to the ecosystem increases because at intermediate levels of sulfate the Hg methylation is optimized. Some recent studies further suggest that mercury methylation rates are optimum (higher) at sulfate concentrations ranging from 10–20 mg/L in the WCAs and 2–4 mg/L in ENP; these methylation rates, however, become depressed when sulfide levels increase (300 micrograms per liter [µg/L]) above the normal range (5–150 µg/L) (Gilmour et al. 1998, Benoit et al. 2003).

However, there is evidence that high MeHg concentrations in surface water or fish could occur at very low sulfate levels. For example, a mesocosm study conducted in a north-central Minnesota peatland showed that MeHg production increased by over two-fold when the porewater sulfate level was raised from 0.06 mg/L to 1.3 mg/L (Mitchell et al. 2008a). A field investigation on the same study area revealed that MeHg hotspots typically formed at the median SO_4 concentrations between 0.1 and 3.0 mg/L (Mitchell et al. 2008b). Similar results can also be found in the Florida's Everglades. A recent Hg and sulfate enrichment incubation with slurry collected from WCA 3A showed significantly elevated MeHg production at the sulfate level below 1 mg/L (DBE 2013). In addition, consistently high THg levels in fish and low surface water sulfate levels (at or below 1 mg/L) were observed in a long-term Hg monitoring site (3A15) within the WCA-3A (Julian et al. 2014). By contrast, high MeHg concentrations in the surface water or fish are also found at sulfate level well above the "optimal" range (i.e., 20 mg/L) in south Florida wetlands. Rumbold and Fink (2006) reported extremely high MeHg concentration (20 ng/L) in the surface water of Cell 1 of STA-2 after a period of dryout. During this time period (CY2002), sulfate concentration at inflow varied from 40.5 to 95.2 mg/L (SFWMD DBHYDRO Database). Another example of long-term Hg hotspot in LMB which consistently exceeded USEPA trophic level 4 fish criterion (0.346 mg/kg) is found at U3 of WCA 2A where annual average sulfate concentration remained at or above 20 mg/L except WY2007 and 2008 (Julian et al. 2014). These findings suggest that mercury methylation and bioaccumulation in Everglades fish involve complex biogeochemical and ecological processes that are affected by factors other than sulfur. Additional research and monitoring are needed to provide a better understanding of the mechanisms influencing mercury methylation under the varying biogeochemical and ecological conditions found in the Everglades.

The historical background sulfate level in the Everglades may be lower than 1 mg/L in some locations (≤ 0.1 mg/L) (Scheidt and Kalla 2007). At present time, major sources of sulfate to the EPA include EAA runoff and Lake Okeechobee discharge. Sulfate concentrations within Lake Okeechobee, the EAA, and portions of the WCAs and ENP are well above the natural background levels (Julian et al. 2014). On the basis of recently developed sulfur budgets, Lake Okeechobee contributes from 16 to 30% of the sulfur loading to the EAA (Corrales et al. 2011, James and McCormick 2012) and farmers' applications and soil oxidation contribute an additional 11% and 45%, respectively (Corrales et al. 2011). Other discharges that contribute to the EPA sulfate loading come from basins to the east as well as agricultural lands to the west. In the early 1990s, the lake average sulfate level was estimated at around 60 mg/L; estimates of current lake sulfate levels range from 41–50 mg/L (James and McCormick 2012). By comparison, Julian et al. (2014) reported that sulfate in discharges into WCA 1 was 51 mg/L, 34 mg/L in WCA 2, 22 mg/L in WCA-3, and 4 mg/L in ENP during the WY2013. Other sources of sulfate to the EPA include atmospheric deposition, groundwater, connate seawater and soil oxidation. Atmospheric deposition alone accounts for about 1 mg/L sulfate load to the surface water of EPA. Another factor that may lead to increased sulfate concentration in the EPA marshes without additional loading is surface water evaporation and evapotranspiration by aquatic plants. The evaporation process contributes to the outflow sulfate concentration from Lake Okeechobee being higher than the inflow concentration (James and McCormick 2012). The contributions of evaporation/evapotranspiration, connate seawater, soil oxidation and groundwater to the Everglades' sulfur budget need further quantification. These sources of sulfate, which are largely uncontrollable, could contribute to enhanced mercury methylation in portions of the Everglades.

There are no numeric State water quality criteria for sulfur that are applicable to the Everglades. The USEPA has a nationally recommended surface water quality criterion for sulfide (2 µg/L) but not for sulfate, and the State of Florida has neither a sulfate nor a sulfide numeric water quality. Both sulfate and sulfide are relevant forms of sulfur because they can act as agents stimulating and inhibiting, respectively, Hg methylation in some locations of the Everglades ecosystem.

Several studies have focused on a hypothetical S-MeHg unimodal relationship between surface water sulfate and biota MeHg in the Everglades. The relationship, originally developed based on sediment MeHg and surface water sulfate concentrations, indicates that MeHg production strikes a balance between sulfate limiting and sulfide inhibiting the methylation of mercury (Gilmour and Henry 1991). Although some Everglades data support this relationship (Axelrad et al. 2013), ambient data from the Everglades ecosystem also cover wide variations and do not follow this relationship in a predictable manner (Julian et al. 2014).

Water quality conditions across the EPA vary greatly, primarily due to differences in water quality conditions of surface water inflow (Julian et al. 2013, Scheidt and Kalla 2007). Areas within WCA 3 and ENP with low to moderate sulfate concentrations can have a highly variable concentrations of fish tissue Hg within the three indicator fish species (i.e., mosquitofish, sunfish, LMB) (Julian et al. 2014). This trend is consistent with trends present within the USEPA R-EMAP dataset associated with mosquitofish Hg concentrations as presented by Julian (2013). Sulfur is one of many factors that can affect mercury methylation and bioaccumulation in the Everglades.

C.1.1.12.3 Lake Okeechobee

Lake Okeechobee is considered to be the hydrologic heart of south Florida. Water quality in the lake has been greatly impacted over the long-term by agricultural operations in the Kissimmee Basin to the north and the EAA to the south. Hurricane events adversely affect the lake water quality. After the hurricanes of 2004 and 2005, which passed directly over the lake, and the hurricane that passed just to the west of the lake in 2017, the average TP concentration increased to more than 200 parts per billion (ppb). This was due to resuspension of some of the 30,000 tons of TP stored in the lake sediments. The FDEP has determined that the lake is impaired for nutrients and Hg in fish tissue. To date, the FDEP has established a TP loading TMDL for Lake Okeechobee with a target annual load of 140 tons per year and a target in-lake TP concentration of 40 ppb. The 40-ppb TP target was established as the level of phosphorus necessary to reduce damaging discharges to less than 10% of the time (Havens and Walker 2002). The current 5-year moving average phosphorus loading to the lake is 531 tons per year, or 391 tons higher than the TMDL, and the 5-year moving average TP concentration for the lake is 129 ppb, which is near the upper value of the prehurricane (pre-2004) range of 57 to 127 ppb (SFWMD 2018). The 5-year moving average TN concentration in the lake is 1.41 mg/L (SFWMD 2018). Control of nitrogen inputs has not been the focus in the Lake Okeechobee basin to date. The FDEP, in conjunction with the other two Coordinating Agencies for the Northern Everglades and Estuaries Protection Program (SFWMD and Florida Department of Agriculture & Consumer Services [FDACS]), have developed the Lake Okeechobee Basin Management Action Plan (BMAP). The BMAP is the watershed phosphorus control component for Lake Okeechobee, designed to achieve the total maximum daily load by improving the management of phosphorus sources within the Lake Okeechobee watershed through implementation of regulations and best management practices, continued development and continued implementation of improved best management practices, improvement and restoration of the hydrologic function of natural and managed systems, and use of alternative technologies for nutrient reduction (373.4595 (3)(b) F.S., 2016). Since the Lake Okeechobee Protection Act was enacted in 2000, over $1 billion of State and Federal contributions have been invested in the Lake Okeechobee watershed to implement nutrient removal, water storage/retention, and restoration activities in the Lake Okeechobee watershed including, but not limited to, the following:

- Landowners enrolled approximately 1.6 million acres (77% of agricultural land in the Lake Okeechobee watershed) in the FDACS adopted agricultural best management practices (BMPs) program. Agricultural BMPs are practical, cost-effective actions that agricultural businesses can use to reduce pesticides, fertilizers, animal waste, and other pollutants entering our water resources.
- FDEP adopted amendments to Chapter 62-640, F.A.C., to improve statewide application site accountability and management of Class B biosolids. The rule changes included requirements for site permitting, nutrient management plans, and the biosolids provisions of the 2007 legislation for Section 373.4595, F.S., which have resulted in a shift away from biosolids land application in the Okeechobee watershed. Since 2007, the number of active biosolids sites has decreased from 22 to 0. There are currently no permitted biosolids sites in the northern Everglades.
- Construction of three regional STAs designed to reduce phosphorus loading to Lake Okeechobee. These STAs are also expected to remove TN from the system.
- Implementation of six Hybrid Wetland Treatment Technology (HWTT) projects. HWTT combines the strength of both wetland and chemical treatments to maximize nutrient removal while minimizing chemical use. Based on monitoring results of the six operational HWTT projects in the northern Everglades, this effort is proving to be a promising technology. During the entire study period, results showed flow-weighted mean (FWM) TP concentrations reductions of approximately 70-90% and TN reductions of approximately 20-60% (SFWMD 2011b).
- Approximately 138,000 ac-ft of water storage/retention has been achieved in the northern Everglades and connected watersheds since 2005 through partnerships that have provided water management alternatives and regional and sub-regional projects. Of that, approximately 91,700 ac-ft is located within the Lake Okeechobee watershed. Additional water storage sites are currently being developed as part of the Dispersed Water Management program.

- The Northern Everglades-Payment for Environmental Services (NE-PES) program is part of the Dispersed Water Management program. The goal of the NE-PES is to establish creative collaborations via contracts with private landowners to obtain the water management services of water and nutrient retention which will reduce excess flows and nutrient loads to Lake Okeechobee and the estuaries. Payment for documented services is an innovative approach to achieve water resource improvements while providing a business opportunity for landowners to participate.
- Construction of more than 30 phosphorus reduction projects including isolated wetland restorations, Dairy Best Available Technology projects, former dairy remediation projects, evaluation of new technologies, and public-private partnership projects.
- Removal of approximately 1.9 million cubic yards of muck from Lake Okeechobee, in conjunction with the Florida Fish and Wildlife Conservation Commission (FWC), exposing thousands of acres of natural lake bottom sand and promoting the return of native plant species. These efforts were estimated to remove approximately 142 metric tons of phosphorus from the lake.
- Acquisition of more than 100,000 acres of land needed for Kissimmee River Restoration and Headwaters Revitalization is substantially complete. Three phases of the Kissimmee River Restoration Project have been completed. The remaining phases are scheduled to be complete in 2020. Once restoration construction is complete, 40 square miles of Kissimmee River and floodplain ecosystem will be restored including almost 25,000 acres of wetlands and 40 miles of historic river channel.

The State of Florida's current Basin Management Action Plan (FDEP 2016), includes completed, underway, and planned source control efforts, subregional and regional treatment works, and storage implementation projects by local entities and state agencies. These efforts are estimated to reduce TP loads to the lake by approximately 121 metric tons per year (mTons/year). Long-term planning is in progress for additional management measures (excluding the CERP Lake Okeechobee Watershed Restoration Project) needed to achieve the remaining 222 mtTons/year phosphorus reductions required to meet Lake Okeechobee TMDL.

Like many of Florida's freshwater lakes, Lake Okeechobee is impaired for Hg due to elevated levels of Hg found in fish. The Florida Department of Health (FDOH) advises limiting the consumption of fish caught from the lake

C.1.1.12.4 Caloosahatchee River and Estuary

The Caloosahatchee River watershed is a highly altered system due to anthropogenic impacts associated with agricultural and urban development since the 1880s. Water control structures S-77, S-78, and S-79 have been constructed. Multiple dredging events have also occurred within the watershed. These alterations significantly reduced the storage capacity within the watershed and changed the timing, distribution, and delivery of fresh water to the Caloosahatchee River Estuary. Currently, there is high seasonal variation in freshwater inflow. In the wet season, high freshwater inflow results in low salinity conditions throughout most of the Caloosahatchee River Estuary. During the dry season, inflows can be very low to non-existent, resulting in saline intrusion that can extend upstream to the S-79 structure. On average 32% of freshwater inflow originates from Lake Okeechobee, while 47% and 21% originate from the watershed and tidal basin, respectively. With freshwater inflow comes nutrient loading. On average, the lake contributes 34% to TN loading and 23% of TP loading to the estuary (Buzzelli et al. 2015).

The FDEP has identified the tidal Caloosahatchee as impaired for low dissolved oxygen, with TN, TP, and biological oxygen demand as the causative agents based on high chlorophyll *a* concentrations. As such, they have implemented a 23% reduction in TN loading to the estuary as part of their TMDL program. They also found the estuary impaired for fecal coliforms.

Water from the lake and watershed also contains high color dissolved organic matter (CDOM) making the water very dark, reducing light penetration. This may have implications for SAV in the upper portion of the estuary where there is less mixing with tidal water from the Gulf of Mexico. Photosynthesis in deeper waters may be inhibited, resulting in decreased SAV productivity and habitat.

C.1.1.12.5 St Lucie River and Estuary

The St. Lucie River watershed has been highly altered from natural sloughs and wetlands into a system of sub-basins, which make up its eight sub-watersheds. The St. Lucie River and Estuary receives drainage from a comparatively large area, as the ratio between watershed area and St. Lucie River and Estuary surface area is approximately 150:1 (Tampa Bay has a ratio of 5.5:1). Changes in flow and resultant variations in salinity and water quality are associated with habitat loss, decreased biodiversity, and increased prevalence of marine diseases within the estuary (Sime 2005, SFWMD 2012a). Connections to and drainage from the watershed and Lake Okeechobee have led to extreme freshwater inflow during the wet season, phytoplankton blooms, accumulation of flocculent muck-like sediments, severe loss of seagrass habitat, and a dramatic decline in the extent of oyster beds within the St. Lucie River and Estuary (Wilson et al. 2005).

The long-term average contributions of freshwater inflow from Lake Okeechobee, the St. Lucie Basin, and the Tidal Basin were 23.3, 44.5, and 32.2 %, respectively. Lake Okeechobee, the St. Lucie Basin, and the Tidal Basin accounted for 31.7, 42.8, and 25.5 % of the long-term average TN loading, respectively, and for 17.8, 53.8, and 28.4 % of the long-term average TP load, respectively (Buzzelli et al. 2015).

C.1.1.12.6 Everglades Agricultural Area

Sugarcane is grown on approximately 85% of the approximately 450,000-acre EAA with the balance planted in turf grass, rice, citrus, and truck crops. The L-8, West Palm Beach, Hillsboro, North New River, and Miami canals from Lake Okeechobee to the L-4, L-5, L-6, and L-7 canals, which roughly define the EAA, have poor water quality with extremely high nutrient and low dissolved oxygen levels. Other problems include pesticides, biological oxygen demand, bacteria, suspended solids, and Hg bioaccumulation. FDEP has defined most of the primary and secondary canals within the EAA (the Miami, Hillsboro, North New River, West Palm Beach, Bolles, and Cross canals) as Class III Waters with a designated use of "recreation propagation and maintenance of healthy, well-balanced population of fish and wildlife. FDEP has identified fecal coliform, ammonia, and nutrients as impaired within portions of the EAA." No draft or final TMDLs have been established for the EAA; however, as a result of extensive litigation over the last 20 years between the State of Florida and Federal agencies (the Department of the Interior [DOI] and USEPA) and other parties, the State has been required to establish numeric criteria for TP, implement agricultural BMPs to control phosphorus in discharges through a regulatory source control program with phosphorus reduction requirements as established in Chapter 40E-63 F.A.C., and build stormwater treatment systems to ensure that water leaving the EAA and entering the WCAs meets the criteria. Over the past 12 years, SFWMD has constructed approximately 60,000 acres of stormwater treatment areas to reduce TP concentration in water entering the WCAs. While the construction and operation of the STAs have significantly improved the quality of water discharged to the WCAs, the Federal parties (DOI and USEPA) filed a brief with the Court for additional relief given continued exceedances of the original 1991 Settlement Agreement (SA) water quality limits. In 2011, the presiding judge ordered the parties to come to terms or have a settlement imposed upon them. The September 2012 Consent Order issued to the SFWMD by FDEP is the result of extensive negotiations between the State and Federal parties. The Order requires that the FWM TP concentration be no higher than 19 ppb on an annual basis and a long-term limit of 13 ppb not be exceeded in more than 3 out of 5 years. To date, the outflow TP concentration in the best performing STA (STA 3/4) was equal to or below 13 ppb in two of the last 5 years, which meets the long-term limit of 13 ppb (SFWMD 2018). As part of the 2012 Consent Order, the SFWMD has agreed to construct 6,500 acres of additional STA capacity and 110,000 ac-ft of FEB storage. In addition, the SFWMD has to implement measures to improve the performance of the existing STA facilities. The SFWMD's plan for complying with the 2012 Consent Order is outlined in their Restoration Strategies plan (SFWMD 2012b).

SFWMD maintains a water quality monitoring network for surface waters within and at the boundaries of the EAA. These water quality data are compiled in SFWMD's database DBHYDRO and available through Internet search (http://www.sfwmd.gov/org/ema/dbhydro/). The SFWMD and FDEP jointly publish the South Florida Environmental Report (SFER), which includes a summary of water quality conditions in south Florida (http://my.sfwmd.gov/portal/page/portal/xweb%20about%20us/agency%20reports). Additional data sources include USEPA, United States Geological Survey, FDEP, and numerous public and private research and monitoring efforts.

C.1.1.12.7 Greater Everglades

Water from Lake Okeechobee and the EAA flows through the WCAs to ENP and eventually into the coastal bays and estuaries. The 2018 SFWMD SFER reported water quality exceedances for dissolved oxygen, alkalinity, pH, and specific conductance in WY2010 (SFWMD 2018). Ten pesticides were detected in samples; however, only atrazine was detected at a concentration exceeding its toxicity based guideline at locations within WCA 1 and WCA 2. Hg in fish tissue is a concern for all of the WCAs. Fish tissue levels of MeHg in the WCAs have been above the USEPA human health criterion of 0.3 mg/kg for 50% of bass collected since 1998. Hg levels in fish have fallen significantly over the past 15 to 20 years in the WCAs (58% relative to 1991) and ENP (43% relative to 1997) (SFWMD 2018). The FDOH has published a "no consumption" advisory for portions of the Greater Everglades due to elevated fish tissue Hg concentrations.

Nutrient loading to the WCAs and ENP have resulted in significant degradation of the Everglades landscape by converting thousands of acres of sawgrass prairie into lesser quality habitat such as cattail marsh. The 1991 Everglades SA ended a 1988 Everglades lawsuit (Case No. 88-1886-CIV-Hoeveler) that was brought forward by the Federal government against the State of Florida for failing to regulate discharges into ENP and the LNWR. The subsequent 1992 Consent Decree, as modified in 1995, specified interim and long-term phosphorus concentration levels for the LNWR, SRS, Taylor Slough, and coastal basins in ENP. The SFWMD collects the required water quality data and publishes a Settlement Agreement Report on a quarterly basis as part of complying with the terms of the 1992 Consent Decree. For the last several years, discharges into the EPA have mostly complied with the requirements of the SA with the following exceptions: (1) exceedance of the Loxahatchee Refuge limit as a result of October 2014 and January 2015 excursions, and (2) exceedance of the long-term limit at SRS for both WY2012 and WY2014.

The Refuge excursions averaged less than 0.5 ppb over their respective computed limits, and the two SRS exceedances averaged less than 0.8 ppb over their respective limits.

Compliance with the SA criteria at SRS is one of the most contentious issues for the State, Federal, and Tribal parties. Recent water quality trends in WCA 3A indicate that FWM TP concentrations and SRS loads are decreasing (as shown in **Figure C.1-8**). **Figure C.1-8** shows that over the past 26 years, the annual FWM TP concentrations entering WCA 3A have fallen from 55 ppb to 14 ppb while the annual FWM TP concentration measured at SRS has fallen from approximately 17 ppb to approximately 7 ppb. The reduction in inflow FWM and outflow FWM for WCA 3A is likely the result of the construction and operation of the STAs in the EAA. The slow declining trend in outflow FWM for WCA3A may be influenced by periodic reversals due to weather conditions (e.g., droughts resulting in WCA dry downs and low canal stages, followed by wet periods flushing the mobilized nutrients). In portions of the WCAs that have historically received direct untreated discharges from the EAA, there is a large internal phosphorus load contained in the sediments. This large internal load, along with soil oxidation during low water-level events, may become a source of water column TP, especially for ENP SRS inflows, as inflow TP concentrations from the STAs are reduced below 13 ppb and the sediment/pore water TP equilibrates with the water column TP or sediments are resuspended.

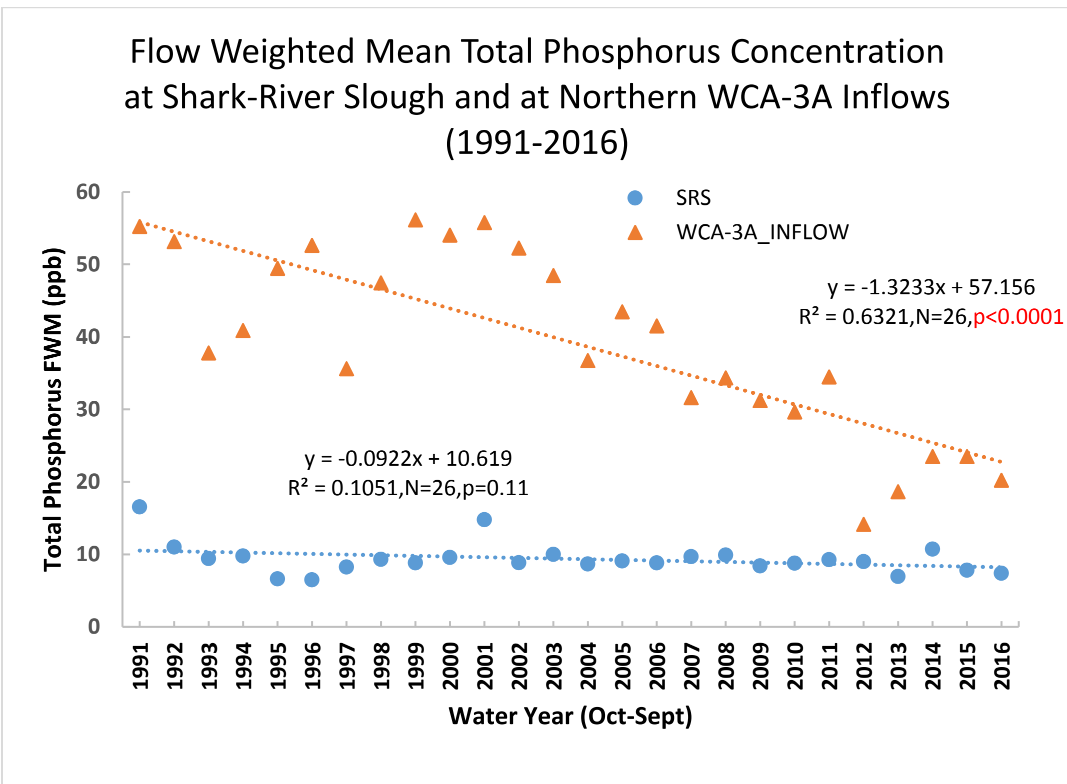

Figure C.1-8. Flow-Weighted Mean TP Concentration at SRS and Northern WCA 3A Inflows

C.1.1.13 Groundwater Resources

Groundwater in south Florida consists of the undifferentiated SAS, the Biscayne aquifer, and the Floridan aquifer. All are critical to the ecology and economy of south Florida. The SAS is 190 to 220 ft thick in western Palm Beach County (Swayze and Miller 1984). The limestone beds of the Fort Thompson and

Tamiami formations in Collier and Hendry counties are the most productive parts of the SAS, especially where dissolution has created large openings in the rock; whereas the Caloosahatchee Formation provides only small volumes of water. The Biscayne aquifer is highly permeable and is at or near the land surface in many locations and therefore readily susceptible to groundwater contamination. The Biscayne aquifer has been classified as a Sole Source Aquifer for Broward and Miami-Dade counties under the Federal Safe Drinking Water Act based on the aquifer's susceptibility to contamination and the fact that it is a principal source of drinking water. The Floridan aquifer system is one of the most productive aquifers in the world and is a multi-use aquifer system. North of Moore Haven and Port Mayaca, where it contains freshwater, the Floridan aquifer is the principal source of groundwater supply. South of Lake Okeechobee, the Floridan aquifer is generally brackish and historically has not been used as a primary source of drinking water although this may change in the future as fresh water supplies become scarcer.

C.1.1.14 Air Quality

Legal limitations on pollutant concentration levels allowed to occur in the ambient air, or air quality standards, have been established by the USEPA and the FDEP for five criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particle pollution (10 microns or less in diameter [PM_{10}] and 2.5 microns or less in diameter [$PM_{2.5}$]), and sulfur dioxide (SO_2). Primary sources of air pollution in south Florida are related to transportation, stationary fuel combustion sources, and solid waste disposal. The existing air quality within south Florida is considered good, with moderate reported particle pollution ($PM_{2.5}$) on November 10, 2017. The Air Quality Index is reported and updated hourly on DEP's website at www.dep.state.fl.us/air/air_quality/airdata.htm. It is available in both graphical and text versions. The data to support this website are collected from all continuous monitors in the state. These data are also shared on USEPA's AIRNOW site at www.airnow.gov. The website summarizes the results of monitoring that has been conducted to measure outdoor concentrations of those pollutants for which the USEPA and the State of Florida's Environmental Protection program have established ambient air quality standards. All areas within the State are designated with respect to each of the five pollutants as attainment (i.e., in compliance with the standards); nonattainment (i.e., not in compliance with the standards); or unclassifiable (i.e., insufficient data to classify). Attainment areas can be further classified as maintenance areas. Maintenance areas are areas previously classified as nonattainment that have successfully reduced air pollutant concentrations to below the standard. Maintenance areas must maintain some of the nonattainment area plans to stay in compliance with the standards.

Southeast Florida including Miami-Dade, Broward, and Palm Beach counties continue to be classified by the USEPA as attainment/maintenance areas for ozone. Florida remains designated as unclassifiable for PM_{10}. Although sufficient data have been collected for attainment determinations, USEPA has not considered PM_{10} for attainment determinations in Florida.

C.1.1.15 Hazardous, Toxic or Radioactive Wastes

Engineering Regulation (ER) 1165-2-132 states that "construction of civil works projects in HTRW contaminated areas should be avoided where practicable." Compliance with the requirements of ER 1165-2-132 for the planning phase is demonstrated in this report. The USACE and SFWMD will continue to document HTRW conditions on the project lands such that the project will be in compliance with the ER and other applicable HTRW policies. In order to comply with the requirements of ER 1165-2-132, human health risks are typically evaluated by comparing chemical concentrations in all media (e.g., soil, groundwater, surface water, sediment) to human health-based cleanup target levels (CTLs) promulgated by FDEP in Chapter 62-777, F.A.C. Ecological risks are typically evaluated by comparing chemical concentrations to the Sediment Quality Assessment Guidelines (SQAGs) developed by FDEP for inland waters and to ecological restoration targets established by the USFWS. If warranted, lands within the project boundary are investigated in accordance with the protocol jointly developed by FDEP, USFWS, and SFWMD titled "Protocol for Assessment, Remediation and Post-remediation Monitoring for Environmental Contaminants on Everglades Restoration Projects" (SFWMD 2008). The protocol, which is commonly referred to as the Ecological Risk Assessment (ERA) Protocol, is intended to provide guidance on conducting Environmental Site Assessments (ESAs) on agricultural lands proposed for use in projects to be inundated with water, such as for conversion to stormwater treatment areas, wetlands, reservoirs, and other aquatic features.

The ERA Protocol requires that relevant data collected during the Phase II ESA initially be compared to the human health Soil Cleanup Target Levels (SCTLs) from 62-777 F.A.C. and the ecological risk SQAG thresholds. While the SCTL's are promulgated standards under Florida law, the SQAG guidelines are not standards as defined in Section 403.803, F.S. where the results exceed the SCTLs, a risk-based approach is used by the regulator to determine if corrective action is required or if an alternative target level is appropriate based on projected exposure. Where the results exceed the SQAG screening criteria, a Screening Level Ecological Risk Assessment (SLERA) is performed as part of the Phase II ESA. The purpose of the SLERA is to evaluate potential ecological risks to benthic invertebrates and higher trophic species, particularly USFWS trust species protected under the Endangered Species Act or the Migratory Bird Treaty Act, associated with exposure to the chemicals present in the soils, after the project is constructed and the property is inundated.

A summary of the HTRW conditions in the three major areas of the project footprint are provided below.

C.1.1.15.1 A-2 Parcel and Proposed A-2 Expansion Area Lands

The A-2 parcel is located between the North New River and the Miami Canal, west of the A-1 FEB in unincorporated Palm Beach County, and encompasses approximately 14,408 acres. The land for the proposed A-2 Expansion area is located immediately west and abuts the A-2 tracts in unincorporated Palm Beach County and encompasses approximately 4,155 acres. The project lands consist of 10 separate parcels currently owned by the State of Florida and two separate parcels that are privately owned. The tract numbers, prior ownership, and acreage are shown in **Table C.1-3**.

Table C.1-3. Prior Ownership for A-2 Parcel and Proposed A-2 Expansion Area

A-2 Parcel		
Tract No.	**Former Owner**	**Acreage**
D7100-044	TALISMAN SUGAR CORPORATION	2
D7100-047	TALISMAN SUGAR CORPORATION	10
D7100-066	TALISMAN SUGAR CORPORATION	12
D7100-067	TALISMAN SUGAR CORPORATION	1
D7100-104	TALISMAN SUGAR CORPORATION	14,371.53[1]
D7100-139	TALISMAN SUGAR CORPORATION	1
D7100-141	WEINLEIN, JOAN	10
D7200-005	TALISMAN SUGAR CORPORATION	1
A-2 Total		**14,408.53**

Table C.1-3. Prior Ownership for A-2 Parcel and Proposed A-2 Expansion Area (continued)

Proposed A-2 Expansion Area Lands		
Tract No.	**Current / Former Owner**	**Acreage**
D7100-152	Okeelanta Corp (Parker Family Trust)	773.17
D7100-103	Okeelanta Corp (Farm 15)	855.85
D7100-143	Gillespie	9.97
D7100-104	TALISMAN SUGAR CORPORATION	754.17[1]
D7100-085	TIIF Lands	638.45
D7100-142	TIIF Lands	9.97
D7100-086	TIIF Lands	541.60
D7100-145	TIIF Lands	9.97
D7100-087	TIIF Lands	50.80
D7100-147	TIIF Lands	12.08
D7100-109	New Hope Sugar (Seventh Day Adventist)	489.00
D7100-144	Susan Goggin	9.97
Expansion Area Total		**4,155**

[1] Acreages shown include only the portion of the tract that is within the proposed limits of construction for the Expansion area project. The total acreage of Tract D7100-104 is 20,525 acres and includes lands outside the current project footprint.

C.1.1.15.1.1 A-2 Expansion Area

The A-2 Expansion area is comprised of SFWMD owned lands, State-owned TIFF lands, and privately owned lands immediately west of the A-2 parcel. Most of the A-2 Expansion area has been historically cultivated in sugarcane, with occasional rotational crops of rice or corn and is currently under lease for sugarcane cultivation. Approximately 50% of the total acreage within the A-2 Expansion area has been assessed in a Phase I ESA (see **Annex H**) with the remaining areas requiring Phase II investigations. Following the A-2 Expansion area regulatory database review, review of historical reports, and site inspections, Phase II assessments per the SFWMD protocol for environmental assessments will be required for properties that have not been assessed and exit audits per the FDEP guidelines will be required on the previously assessed properties.

C.1.1.15.1.2 A-1 FEB

Note that the previous sampling assessments indicated that the former Woerner Turf Farm No. 3 property, an estimated 900-acre tract located on the northeast section of the EAA Storage Reservoir, is impacted with OCPs above the SQAG and would require the development and implementation of a Soil Management Plan (SMP) to mitigate risk to protect resources. Prior to implementing construction plan activities, a corrective action plan will be developed and submitted to the USFWS and FDEP for review and concurrence. Additional assessment would not be required if this property is not included in any of the CEPP PACR alternatives.

Table C.1-5 includes a list of the HTRW sites found on the subject property and the disposition of the remedial actions taken at each of these sites since 1999. **Figure C.1-9** shows the locations of each of these sites within the A-2 parcel. The borrow pit was used in the past for disposal of solid wastes. Arsenic, lead, phenols, and petroleum hydrocarbons were found at the borrow pit. Approximately 8,100 tons of solid waste and contaminated soil was removed from this site. A groundwater treatment system was installed to remove lead but it was not fully successful. The FDEP issued a Conditional Site Rehabilitation

Completion Order (CSRCO) in July of 2012. This Order included a non-residential deed restriction. **Figure C.1-10** shows the location of this deed restriction. The borrow pit is designated as "T2" on this figure.

Arsenic, petroleum hydrocarbons, and pesticides were found at the labor camp, which included a pesticide mix/load site. Approximately 3,600 tons of soil was removed from the labor camp. Petroleum contamination of the groundwater was naturally attenuated and pesticide impacts to groundwater were addressed through soil removal. The FDEP issued a CSRCO in July 2006 that includes a non-residential deed restriction. **Figure C.1-10** shows the location of this deed restriction. The labor camp is designated as T-3" on the figure.

Five of the identified HTRW sites are former pump station locations. Approximately 300 tons of petroleum-contaminated soils was removed from these sites. Soil samples collected at two of these pump stations were tested for the presence of organo-chlorine pesticides and no exceedances were found. The FDEP issued Site Rehabilitation Completion Orders (SRCO) at these pump stations in December 1999.

A pesticide mix/load area was investigated and arsenic contamination was detected in the soils. Approximately 700 tons of arsenic impacted soils was removed from the site and a groundwater pump/treat system was operated for three months at which point the groundwater arsenic concentration was below the applicable groundwater concentration target level (GCTL). The FDEP issued a CSRCO in July of 2006 and included a non-residential deed restriction. The location of the site is shown in **Figure C.1-10**. The pesticide mix/load area is designated as "T-21" on the figure.

C.1.1.15.1.3 A-2 Parcel

The primary parcel (Tract D7100-104) was acquired from Talisman Sugar Company in 1999 by the SFWMD. Several of the smaller parcels listed above were also owned and operated by Talisman Sugar Corporation, but these parcels were deferred from transfer during the original transaction until environmental concerns on these small areas could be addressed. The Weinlein parcel (Tract D7100141) was leased to Talisman Sugar at the time of the 1999 acquisition and was evaluated with the remainder of Tract D7100-104. Most of the project area has been historically cultivated in sugarcane, with occasional rotational crops of rice or corn. The property is currently under lease to New Hope Sugar Corporation for sugarcane cultivation.

The September 2012 Summary Environmental Report (PSI 2012), the March 2013 Phase II Environmental Assessment Report (PSI 2013a), and the May 2013 Phase II Environmental Site Assessment Report-Addendum #1 (PSI 2013b) provide a review of the past audits and closure reports as well as the results of the cultivated soil sampling that was conducted in January of 2013. The reports cited above is the source for all of the tables and figures included within this section. Copies of these reports as well as related correspondence are found in **Annex H** (**Hazardous Toxic and Radioactive Wastes**).

Table C.1-4 includes a list of the HTRW sites found on the subject property and the disposition of the remedial actions taken at each of these sites since 1999. One mix/load area detected petroleum hydrocarbons in the soils above the residential SCTL. Barium was exhibited at the mix/load areas above the SQAG-Threshold Effect Concentration (TEC) as well as the SQAG-PEC in a limited number of soil samples. Barium was also detected at the irrigation pump station.

Table C.1-4. Summary of Assessment and Corrective Actions, A-2 Lands, Palm Beach County (Adapted from PSI 2012)

Tract Nos.	Point Source RECs Identified in Phase I	Soil / GW Exceedances Identified in Phase II	Corrective Action Summary	Regulatory Concurrence
A2				
D7100-104, -044, -047, -066, -067, -139, -141, -005	Borrow Pit (T-2)	Arsenic and petroleum hydrocarbons detected above SCTLs, phenols and m & p cresol detected above GCTLs	Excavated: 1,009 tons of steel, 473 tons of tires, 3,895 tons of C & D debris, 3,735 tons of soil. Also installed GW treatment system (operation was abandoned due to inability to filter out lead)	CSRCO, 7-21-06, Soil above SCTL, with Non-residential Deed Restriction
	Labor Camp (T-3)	Arsenic and petroleum hydrocarbons detected above SCTLs at burn pit area and drum storage area within labor camp. Petroleum hydrocarbons / solvents and atrazine detected in GW above GCTLs at pesticide mix / load area and refueling area / runway within labor camp.	Excavated approximately 3,590 tons of soil from 5 areas within labor camp. Petroleum impacts in GW naturally attenuated below GCTLs. Source removal reduced atrazine GW concentrations below GCTL.	CSRCO, 7-21-06, Soil above SCTL, with Non-residential Deed Restriction
	Pump Station (T-6)	OCPs detected above SQAGs	20 soil samples collected around pump station; no OCPs detected above SQAGs of SCTLs	SRCO, 12-21-99
	Pump Station (T-7)	No soil or groundwater samples collected; Visual evidence of soil staining	14 surficial soil samples collected around pump station; no exceedances above SQAGs or SCTLs	SRCO, 12-21-99
	Point Source RECs Identified in Phase I	Soil / GW Exceedances Identified in Phase II	Corrective Action Summary	Regulatory Concurrence
	Pump Station (T-8)	No soil or groundwater samples collected; No visual evidence of soil staining; Still included as Exclusion Area	Excavated approximately 6.36 tons of petroleum-impacted soil	SRCO, 12-21-99
	Pump Station (T-10)	Petroleum hydrocarbons (TRPH) above SCTLs. No GW impacts	Excavated approximately 293 tons of petroleum-impacted soil	SRCO, 3-15-00
	Pump Station (T-24)	No soil or groundwater samples collected; No visual evidence of soil staining; Still included as Exclusion Area	Excavated approximately 0.68 tons of soil	SRCO, 12-29-99

Table C.1-4. Summary of Assessment and Corrective Actions, A-2 Lands, Palm Beach County (Adapted from PSI 2012) (continued)

Tract Nos.	Point Source RECs Identified in Phase I	Soil / GW Exceedances Identified in Phase II	Corrective Action Summary	Regulatory Concurrence
	Pesticide Mix/Load Area (T-21)	Arsenic detected above SCTL and GCTL	Excavated approximately 692 tons of arsenic impacted soil. Installed GW pump and treat system, operated for 3 months, effectively lowered the arsenic concentrations below the GCTL	CSRCO, 7-21-06, Soil above SCTL, with Non-residential Deed Restriction
Expansion Area				
D7100-152	Mix/Load/Staging Areas	Petroleum hydrocarbons (TRPH) above Residential SCTL at one of the five Mix/Load Areas identified in the Phase II / Barium above the SQAG-TEC or SQAG-PEC identified in the Phase II	No corrective actions documented to date	
	Irrigation Canal Pump Station	Barium above the SQAG-TEC or SQAG-PEC identified in the Phase II	No corrective actions documented to date	
D7100-103	Pump Station	Petroleum hydrocarbons (TRPH) above SCTL / No GW Impacts	Excavated approximately 278.36 tons of soil	PSI Recommended SRCO
	Equipment Staging Area	No soil or GW exceedances		
D7100-143	No Point Sources			

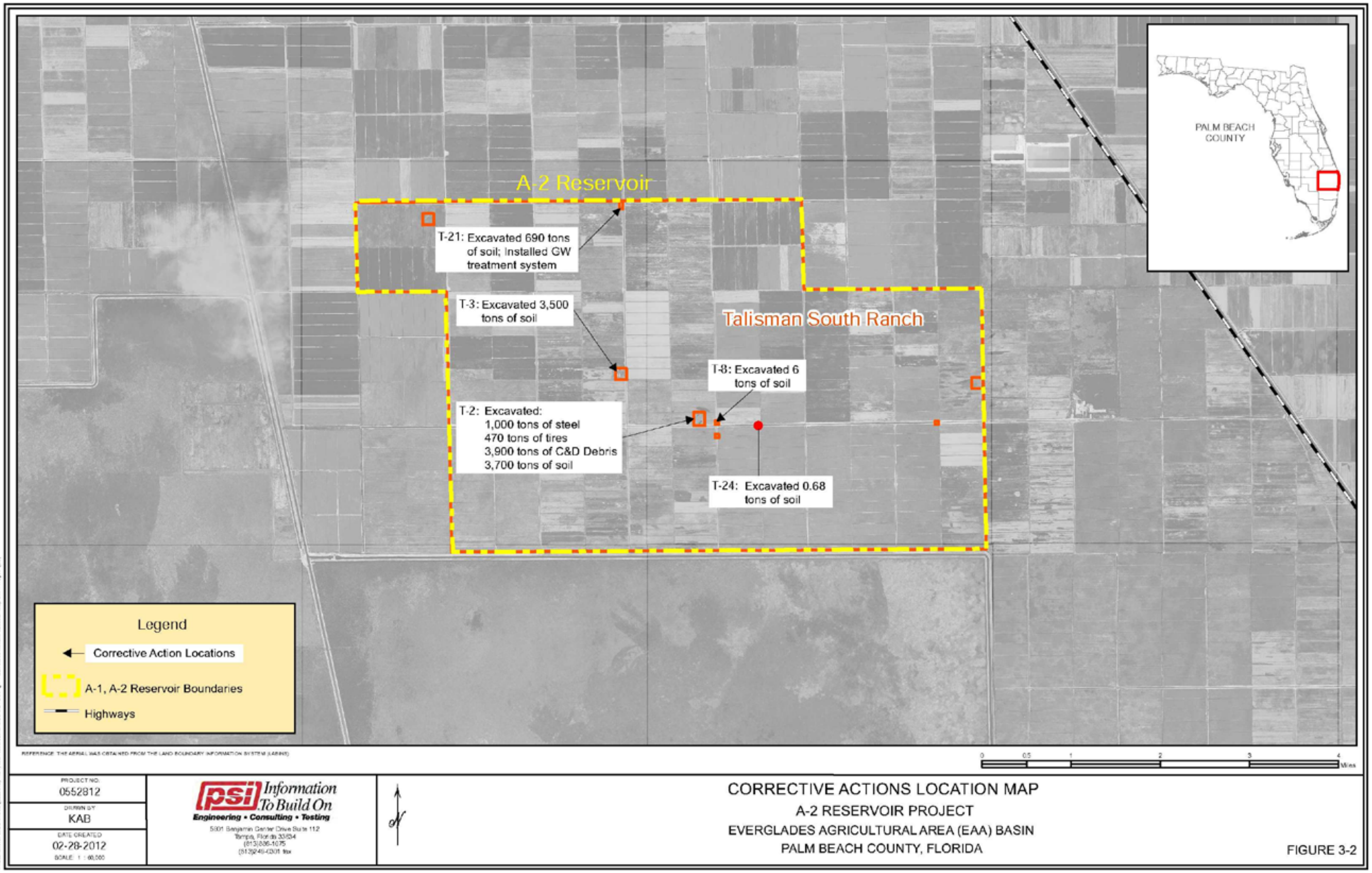

Figure C.1-9. Corrective Actions Map, A-2 Footprint (PSI 2012)

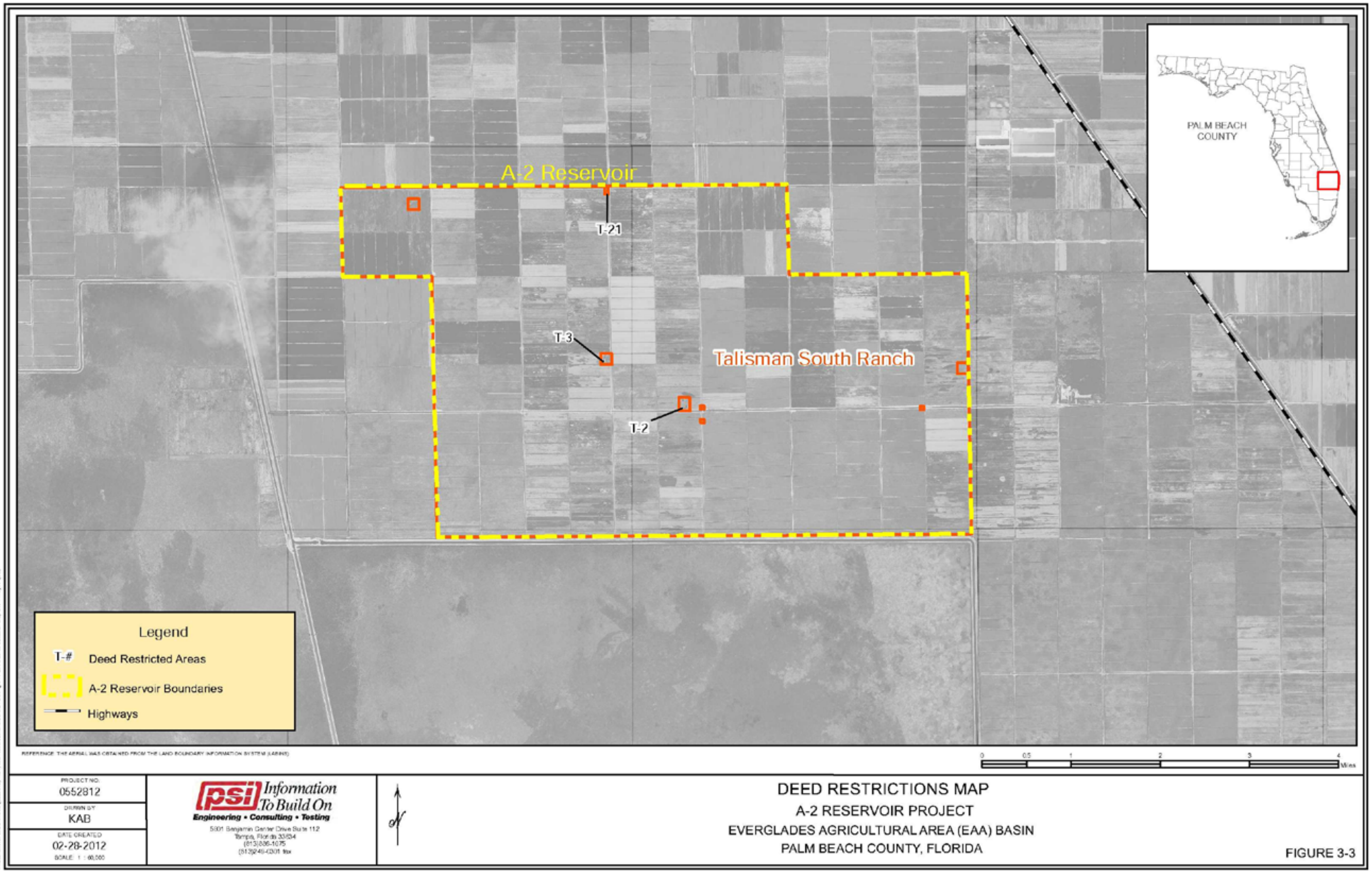

Figure C.1-10. Deed Restrictions Map A-2 Footprint (PSI 2012)

Petroleum hydrocarbons were identified at the pump station located at Farm 15 (Tract D7100-103). Approximately 278 tons of petroleum hydrocarbon-impacted soils was removed from the site. The regulatory database did not have an available SRCO for this location following the corrective actions.

Table C.1-6 shows a list of environmental audits conducted since 1998 on the A-2 lands. The environmental audits and correspondence between the SFWMD and the FDEP show that several HTRW sites have been found and remediated on the subject property. Four of the sites have SRCOs which means that no further action, monitoring, or prohibitions on future use are necessary. In August of 2012, the SFWMD prepared a draft summary report of the investigations and HTRW site remediation efforts on the property. This report recommended that soil samples be collected in the cultivated areas on the subject property to see if residual agricultural chemical concentrations exceeded any human health or environmental criteria applicable to the planned future land use. The Phase II Environmental Site Assessment Report and its addendum (PSI 2013a, 2013b) found in **Annex H** (**Hazardous, Toxic and Radioactive Wastes**) is summarized below.

Table C.1-5. Summary of Environmental Reports, A-2 Lands

Consultant	Report Type	Report Title	Report Date	Tract Nos.
URS/Dames & Moore	Phase I / II	Talisman Sugar Corp.- Vol. 1 - Acquisition Properties	November- 98	100- 104*
PSI	SRCR	Talisman Sugar Corp. - T-2 Borrow Pit	February-02	100- 104*
PSI	Tank Closure Report	Talisman Sugar Corp. - Labor Camp (Abel's Flying Service)	April-01	100- 104*
PSI	SRCR	Talisman Sugar Corp. - T-3 (Labor Camp)	March-03	100- 104*
PSI	LCAR / NFA Request	Talisman Sugar Corp. - T-6 (Electric Pump Station)	August-99	100- 104*
PSI	LCAR / NFA Request	Talisman Sugar Corp. - T-7 (Pump Station)	September- 99	100- 104*
PSI	SRCR	Talisman Sugar Corp. - T-8 (Pump Station)	September- 99	100- 104*
PSI	SRCR	Talisman Sugar Corp. - T-24 (Pump Station)	October-99	100- 104*
PSI	SRCR	Talisman Sugar Corp. - T-21 Pesticide Mix/Load Area	May-02	100- 104*
URS	Site Inspections/ Environmental Assessment	Deferred Parcels - Former Talisman Property	July-07	100- 104*
URS	Final Site Inspections/ Environmental Assessment	Eight Deferred Parcels - Former Talisman Ranch Property	January-09	100- 104*
URS	Environmental Assessment Summary Document	Everglades Agricultural Area Basin Reservoir Project	March-03	--
PSI	Summary Environmental Report	Central Everglades Study, A-2 Reservoir, Palm Beach County FL	August 23, 2012	100- 104*
PSI	Phase II Environmental Site Assessment	A-2 Flow Equalization Basin, Palm Beach County, FL	March 25, 2013	100- 104*
PSI	Phase II Environmental Site Assessment, Addendum	A-2 Flow Equalization Basin, Palm Beach County, FL	May 3, 2013	100- 104*

SRCR = Site Rehabilitation Completion Report
LCAR = Limited Contamination Assessment Report
* = Tract Nos. 100-149, 100-044, 100-047, 100-066, 100-067, 100-139, 100-141, 200005, 100-143

In January of 2013, the SFWMD's contractor, PSI, Inc., collected 30 samples from randomly selected 50 acre grids located on the A-2 FEB lands. The samples were analyzed for a comprehensive list of pesticides and the results of the analysis were compared against human health and ecological screening criteria.

Copper was detected in approximately 27% of the composite samples at concentrations exceeding the USFWS Interim Screening Level (ISL) of 85 mg/kg for the protection of the endangered snail kite. The detected copper concentrations ranged as high as 110 mg/kg and exhibited a normal data distribution with a mean concentration of 77.2 mg/kg and a 95% upper confidence limit (UCL) of 81.3 mg/kg. Spatially, the data present a random pattern, and no discernible areas of higher concentrations could be interpreted from the maps. PSI determined that based upon the relatively low level of exceeding 85 mg/kg copper and the high organic content of the soils which would tend to reduce the bioavailability of copper, that the risk to the endangered snail kite is minimal and that no remedial action to address copper was warranted.

PSI determined that arsenic concentrations across the majority of the A-2 footprint are likely to exceed the FDEP SCTL for Residential Direct exposure, but the detected concentrations are all below the SQAG-TEC criterion. Arsenic concentrations are not likely to represent a human health or ecological risk, as long as the soil is managed on-site and is not disposed off-site at an uncontrolled site. The FDEP reviewed the arsenic data and recommended that a SMP be prepared as part of the construction plans to track the fate of arsenic impacted soils.

PSI detected a number of chemicals, including 2,4-D, atrazine, metribuzin, phorate, dieldrin, chromium, mercury, selenium, and silver in one or more of the composite soil samples at concentrations exceeding the SCTLs for leaching to surface water (SCTL-LSW). Follow-up Synthetic Precipitation Leachate Procedure (SPLP) testing was performed to determine the potential for exceeding surface and groundwater quality criteria. An evaluation of the chemical data indicated that exceedances of the Class III surface water at the discharge of the A-2 lands are very unlikely due to the following factors:

- A number of the chemicals such as 2,4-D, atrazine, metribuzin, and phorate are relatively short-lived in the environment and were recently applied during active crop management. These chemicals are not likely to be present in the soil at significant concentrations once agricultural operations cease and the reservoir is constructed.
- Dieldrin is biologically persistent, but was detected only sporadically in the A-2 parcel. The effect of dilution from incoming surface water and water overlying clean areas of the A-2 parcel are likely to dilute any leaching of these chemicals within these limited areas.
- Chromium, mercury, and selenium were consistently detected and silver was detected at a few locations at concentrations exceeding the SCTL-LSW criteria. However, these metals all absorb strongly to organic matter in the soil and are not likely to leach to a significant degree from the highly organic soils in the A-2. Default SCTL-LSW criteria are based on soils with a much lower organic content than the soils on the subject property.

Overall, no evidence of elevated agrochemical contamination within the soils was found that would cause concern related to the construction of any future storage and treatment measures on the A-2 parcel based on risk to the future aquatic community or to USFWS trust species that may utilize the future habitat provided by its construction. The USFWS and FDEP reviewed the PSI report, effectively concurred that no remedial action was warranted at this time, and recommended monitoring of copper and other contaminants during initiation of any future storage and treatment measures on the A-2 parcel. The Agricultural-Chemical section of the Project Implementation Report (PIR) (**Annex H**) addresses the findings of the cultivated soil sampling and how the USACE September 2011 Agricultural Chemical Policy for CERP projects applies.

Table C.1-6 shows a list of environmental audits conducted since 1998 on the A-2 Expansion area. There have been limited environmental audits within the Expansion area; however, HTRW sites have been identified. In December 2017, the SFWMD prepared a draft memorandum report of the investigations and HTRW site remediation efforts on the Expansion area properties. This memorandum recommended that soil samples be collected in the cultivated areas on the tracts to evaluate if residual agricultural chemical concentrations exceeded any human health or environmental criteria applicable to the planned future land use (shallow or deep reservoir). **Table C.1-7** summarizes the draft memorandum provided in **Annex H** (**Hazardous, Toxic and Radioactive Wastes**).

Table C.1-6. Summary of Environmental Reports, A-2 Expansion Area

Consultant	Report Type	Report Title	Report Date	Tract Nos.
Tetra Tech	Phase I / II	Parker Family Trust Property – Tract Nos. D7-100-152 and CG-T4535	August 2007	D7100-152
URS	Phase I / II	Florida Crystals Corporation	March 1999	D7100-103
URS	Contamination Assessment	Ecological Risk Assessment & Corrective Action for STA 3/4	January 2002	D7100-103 (Various other tracts included)
URS	Environmental Assessment Summary Document	Everglades Agricultural Area Basin Reservoir Project	March 2003	--
PSI	Summary Environmental Report	Central Everglades Study, A-1 / A-2 Reservoir, Palm Beach County, FL	April 6, 2012 (Draft Report)	100- 104*
URS	Phase I / II	Gillespie Property, 10-Acre Parcel	March 2008	100-143

* = Tract Nos. 100-029, 100-105, 100-039, 100-103, 100-152, 100-143

In December 2017, the SFWMD's contractor, AECOM, conducted a site inspection in the A-2 Expansion area. A regulatory database search was also reviewed for the - that included the A-1 parcel, A-2 parcel, and Expansion area. Available reports completed within the A-2 Expansion area were reviewed and summarized below.

Based on the December 2017 site inspection, the A-2 Expansion area is being actively cultivated with sugarcane. Several pump stations and mix/load/staging areas were identified during the site inspection. The regulatory database search identified multiple point source areas (i.e., pump station, mix load areas that have received SRCO). One pump station located on Farm 15 D7100-103 where corrective actions were implemented has not received a SRCO. Follow-up with FDEP is required.

Review of the Phase I/II Tract D7100-152 (Parker Family Trust) property completed by Tetra Tech in 2007 identified four areas of potential concern. The areas of concern included the cultivated area, mix/load/staging areas, irrigation canal pump station, and the irrigation/drainage canals. Phase II activities in the cultivated area of concern included composite soil sampling in fifteen, 50-acre grids and the three point sources included discrete soil sampling and groundwater sampling. The composite soil samples were analyzed for OCPs, OPPs (including Atrazine), carbamates, chlorinated herbicides, RCRA 8 Metals, copper, and TOC. The results of the composite samples from the cultivated areas indicated elevated levels of atrazine, barium, and copper throughout much of the site. TPH was detected at one of the mix/load areas exceeding the SCTL-RDE and barium in the soil at the three-point source locations exceeding the SQAG-TEC and occasionally the SQAG-PEC.

Based on the atrazine, barium, and copper exceedances throughout the cultivated areas, a SLERA was performed by NewFields, Inc. The SLERA had the following conclusions:

- Atrazine and barium pose a low-risk to aquatic receptors.
- Copper exceedances may cause toxicity to benthic invertebrates to occur at the site following flooding; however, it is not expected to cause widespread effects that could limit the function of the newly created ecosystem.
- Risks to USFWS trust species are expected to be low for all species with the exception of the Everglades snail kite. Copper concentrations exceeded the interim benchmark of 85 mg/kg in several of the 5-acre discrete samples; however, the benchmark was not exceeded in any of the composite samples. Therefore, the copper concentrations appeared to be heterogeneous in nature and the average concentrations predicted by the composite samples may provide a more accurate estimation of exposure for the snail kite.

Based on the Phase II results and subsequent SLERA, Tetra Tech concluded that corrective action is necessary in fifteen 5-acre grids located within the cultivated area to address the copper exceedances of the interim benchmark for protection of the Everglades snail kite. Corrective action was also recommended to address the TPH exceedance in one of the mix/load staging areas. Regarding atrazine, Tetra Tech recommended no further corrective action based on the findings of SLERA. Regarding barium, Tetra Tech also recommended no further action based on the SLERA. However, Tetra Tech did recommend additional sampling and ecological risk evaluation to verify that barium is present in an insoluble form and does not pose a risk under future intended land use.

Review of the Phase I/II Tract D7100-103 (Farm 15) property completed by Dames & Moore in 1999 identified three areas of potential concern: the cultivated area, the equipment staging area, and the permanent pump station. Phase II activities in the cultivated area of concern included analyzing one soil sample for OCPs, OPPs (including atrazine), RCRA 8 metals, copper, and zinc. The results of the analysis of the soil sample from the cultivated area and equipment staging area indicated elevated levels of zinc. Atrazine was detected in the groundwater sample above the GCTL. TPH was detected at the pump station.

Following the Phase I / II, URS conducted a contamination assessment in 2002. URS conducted grid sampling in the cultivated area. During the assessment nine composite soil and two groundwater samples were collected from the cultivated area. The samples were analyzed for OCPs, OPPs, and for select RCRA metals, copper and zinc. Soil samples exhibited copper concentrations ranging from 8.59 mg/kg to 22.4 mg/kg, which is below all applicable regulatory criteria. Zinc concentrations ranged from 2.42 mg/kg to 8.62 mg/kg, which is below all applicable regulatory criteria. OCP concentrations were below laboratory detection limits for the samples collected.

URS collected eight soil samples and two groundwater samples from the equipment staging area. The samples were analyzed for OPPs and zinc. The OPP and zinc concentrations were bellow applicable guidance concentrations. The pump station detected petroleum hydrocarbons; however, additional sampling was not conducted.

In 2002 PSI completed a site rehabilitation completion report for the Farm 15 pump station. The pump station is identified as Pump Station F15-2 and included a 500-gallon AST within an enclosed steel containment and two diesel powered pumps/engines. PSI excavated approximately 278.36 tons of petroleum impacted soils. Confirmation soil samples and one groundwater sample did not detect petroleum constituents above applicable guidance concentrations. PSI recommended that the FDEP issue a SRCO for the site. PSI stated that a SRCO was issued; however, neither the government database nor the FDEP database searches included a date in which a SRCO was issued.

Review of the Phase I/II Tract D7100-143 (Gillespie Property) property completed by URS in 2008 identified the cultivated area as an area of potential concern. No other areas of concern were identified. Phase II activities in the cultivated area of concern included four close composite discrete soil samples that were analyzed for OCPs, OPPs, herbicides, and the 8 RCRA metals and for copper and zinc. The results of the soil sample from the cultivated area indicated elevated levels of arsenic above the SQAG-TEC. Barium and copper were detected in one sample exceeding the SQAG-PEC or Service interim value of 85 mg/kg, respectively. The groundwater samples were either below laboratory detection limits or below applicable guidance concentrations.

Based on the initial soil results, an additional six close composite locations were advanced and 12 soil samples were collected and analyzed for OCPs, barium and copper. Analytical results of the additional soil samples indicated low levels of DDE below the SGAG-TEC. Barium was detected in the additional soil samples at concentrations exceeding the SQAG-PEC. Copper concentrations ranged from 46.7 mg/kg to 80.4 mg/kg, which is below the interim benchmark of 85 mg/kg. URS recommended copper impacted soils be excavated and relocated outside the EAA Storage Reservoir footprint.

C.1.1.15.2 Water Conservation Area 3A and 3B

The WCAs were created in 1945 by C&SF Flood Control District (predecessor to the SFWMD). These lands have been operated since 1945 for water supply, flood protection, and recreation and generally are inaccessible by terrestrial vehicles. Along the boundary of WCA 3A/B there are levees and canals constructed in the 1950s and 1960s that further limit vehicle access to the interior. Activity within the WCA is generally limited to fishing, hunting, and birding though there may be some illegal dumping of solid wastes along the perimeter. No soil testing for residual contaminants has been conducted within the WCA 3A/B as part of this project since the lands have no history of prior agricultural or industrial use that would cause such contamination.

There are 75 private hunting camps that are accessed primarily by boat. The Miccosukee Tribe of Indians of Florida uses leased land within the area for hunting and cultural activities. None of these activities are likely to result in significant HTRW contamination. Alligator Alley (Interstate 75) runs across the northern portion of WCA 3A. An abandoned crude oil pipeline runs east-to-west across WCA 3A from Immokalee to Port Everglades in Fort Lauderdale. The pipeline was installed in the 1960s. In 1986, a spill of approximately 6,000 gallons of crude oil occurred. This spill was cleaned up by collecting free product and burning contaminated vegetation. The pipeline has not operated since 1986 and is considered to be abandoned.

During the 2nd World War, portions of WCA 3A and 3B were used as bombing ranges. Two bombing range sites are located within WCA 3A. Fort Lauderdale Bombing Target #1 is located on the L-68A canal approximately two miles south of Interstate 75. Evidence of bombing debris was found at this site during a phase I survey in 2005. Further investigation has not occurred to date because of the low probability that this site presents a human health risk given the isolated location. Fort Lauderdale Bombing Target #5 is located at the confluence of the L-68A and L-37 borrow canals. This site was investigated as part of the Formerly Used Defense Site (FUDS) program in 2005. No evidence of contamination was found during this survey and the site was closed for further investigation.

Table C.1-7 includes 14 sites within or in the vicinity of WCA 3A/B as identified from a database search of the FDEP Waste Cleanup record system performed in January 2013. Ten of the sites are listed as having petroleum contamination, while the remaining sites are listed as having other contaminants. Four of the sites are listed as pending and the remaining are listed as active. Six of the sites are roadway spills of petroleum product that occurred on Highway 27 or Interstate 75. Project features within these two highway right-of-ways are not contemplated as part of CEPP PACR. Several of the identified locations are potentially adjacent to CEPP project features. Specifically, the petroleum cleanup site identified as "Everglades Safari" is located just south of Highway 41 (Tamiami Trail) very near the Blue Shanty Canal. The two HTRW sites identified as "Hadley Farms" are located at the northern boundary of WCA 3A and may be adjacent to CEPP PACR hydrologic features yet to be sited and designed. Appropriate HTRW testing would be completed during the PED phase.

Canals and levees on the perimeter and interior of the WCAs have generally been constructed by excavating native soils that have not previously been used for agriculture. Given this history, sampling spoil mounds is not necessary during the planning phase of the project since the results would reflect concentrations that are at or near background conditions. It is possible that localized contamination might exist at locations where project features such as pump stations, levees, canals, and culverts will be built. Testing would be completed during the PED phase and remediation or re-siting of features would occur as required.

Table C.1-7. Identified HTRW Sites within or Near WCA 3A and 3B per FDEP Waste Cleanup Database

Site ID	Cleanup Category	Status	Business Name, Address	Latitude			Longitude		
263685 43	PETRO	ACTIVE	ABC TRANSPORT USA INC BER 10-2I-43871Z 6138 CLEAVLAND ST, MIAMI	26	19	24.7	80	31	45.7
263648 23	OTHCU	PENDIN G	BIRD DRIVE TR 308-347 BRID DRIVE, MIAMI	25	43	8.584	80	28	13.563
263681 54	PETRO	ACTIVE	EVERGLADES SAFARI 26700 SW 8TH ST, MIAMI	25	45	38.1924	80	37	33.0888
263642 66	OTHCU	PENDIN G	FL CRYSTALS HADLEY FARMS PS H 1-1 SOUTH BAY	26	20	3.3481	80	36	43.9144
263642 69	OTHCU	PENDIN G	FL CRYSTALS HADLEY FARMS PS H 1-2 SOUTH BAY	26	20	3.7139	80	35	45.6307
263767 47	PETRO	PENDIN G	FL DEPT OF TRANSPORTATION US HWY 27, SOUTH BAY	26	20	16.74	80	32	27.06

Table C.1-7. Identified HTRW Sites within or Near WCA 3A and 3B per FDEP Waste Cleanup Database (continued)

Site ID	Cleanup Category	Status	Business Name, Address	Latitude			Longitude		
263779 45	PETRO	PENDIN G	FL DEPT OF TRANSPORTATION ROW US HWY 27, SOUTH BAY	26	20	10.22	80	32	21.17
263641 07	OTHCU	PENDIN G	FLORIDA CRYSTALS FARM 21 & HADLEY FARM US HWY 27, SOUTH BAY	26	20	9.1597	80	37	43.2883
263774 57	PETRO	PENDIN G	GENERAL PORTLAND-DADE CNTY PLT 5800 N KROME AVE, MIAMI	25	42	29.429	80	29	11.3536
263774 13	PETRO	PENDIN G	PEMBROKE PINES CITY-HOLLY LAKE PUMP ST 21800 N 7TH MANOR, PEMBROKE PINES	26	0	51.8846	80	26	20.9125
263746 06	PETRO	PENDIN G	SOUTH FL WATER MGMT DIST S-140 57005 ALLIGATOR ALLY, FORT LAUDERDALE	26	10	15.35	80	49	38.72
263785 16	PETRO	PENDIN G	SOUTH FLORIDA TRUCK LINES SPILL-ALLIGATOR ALLEY I-75 150 YDS W OF E TOLL PLAZA, WESTON	26	8	45.4812	80	28	5.3904
263670 61	PETRO	ACTIVE	SSL CARGO EXPRESS 04-2I-0248 I-595 @ US 27 OFFRAMP, WESTON	26	8	35.2434	80	26	20.4174
263695 43	PETRO	ACTIVE	T STOP SERVICES INC 4690 US HWY 27, FT LAUDERDALE	26	3	47.5347	80	25	58.4817

C.1.1.15.3 Northern Everglades National Park

Highway 41 (Tamiami Trail) runs just south of the L-29 Levee/Canal and the northern ENP boundary is south of the highway. The L-29 levee was constructed in 1928 using native soils and limerock excavated from the adjacent borrow canal. The “Everglades Safari” petroleum spill site, the Bird Drive Basin HTRW site, and the General Portland site listed in **Table C.1-8** are adjacent to the northeastern boundary of ENP.

Given that the road and levee were constructed across an area that was undeveloped in 1928, the levee spoil material is considered to be free of anthropogenic contamination with the exception of isolated undiscovered spill sites. However, during construction of the first Tamiami Bridge just south of the eastern portion of WCA 3B, some of the topsoil within the highway right-of-way was determined to have elevated arsenic concentrations that are likely representative of background concentrations.

C.1.1.16 Cultural Resources

A review of the Florida State archives indicates that there are 23,499 recorded cultural resource sites and resource groups within the CEPP PACR study area that have a survey determination and/or Florida State Historic Preservation Office (SHPO) evaluation of other than “ineligible” for listing on the National Register of Historic Places or “significant” under the National Environmental Policy Act (NEPA). The area of potential effect (APE) on cultural resources for the project is markedly smaller than the study area. The APE is approximately 34,500 acres comprised of the A-1 and A-2 parcels, portion of the A-2 Expansion area, portions of the Miami Canal, and portions of the North New River Canal.

Cultural resources within those areas that remain to be assessed will be managed in accordance with State and Federal laws and preestablished management plans.

A total of 43 cultural resources surveys and/or assessments have been conducted within the CEPP APE, 14 of which included structural surveys. **Table C.1-8** lists all currently known cultural resources within the CEPP APE that are or have the potential to be significant under NEPA.

Table C.1-8. Significant Cultural Resources within the CEPP Area of Potential Effect

Type of Site	Significant	Unknown Significance*	Date Range	Notes
Archeological Site	47	296	2500 B.C – A.D. 1950	73 remote sensing sites**
Structure	1	5	A.D. 1947–1958	
Historical District	5	0	2500 B.C – A.D. 1950	All NRHP Listed
Linear Resource***	12	13	A.D. 1880 – 1950	1 NRHP Listed
Traditional Cultural Property	2	0	A.D. 1950 –present	Associated with the Modern Gladesman
World Heritage Site	1	0	-	Everglades National Park
Culturally Significant Site	34			

*SHPO determination listed as "not evaluated" by SHPO or Insufficient Information.
** Sites recorded using aerial photography. Presence or absence of material has not been field verified.
***Canals, roadways, or linear earthworks.

The earliest known habitation sites within the CEPP APE date to the Late Archaic period (2,500 B.C.) when the Everglades were much drier. However, within the larger area of south Florida, evidence of Paleo-Indian (12,000 to 7500 B.C.) habitation has also been recorded (i.e., Warm Mineral Springs [8SO18] and Little Salt Spring [8SO79]). Some of the Late Archaic habitation sites have only recently been rediscovered as the result of managed drainage programs in south Florida.

As the climate warmed and sea level rose, many Native Americans abandoned the lowest of the tree islands as they became submerged. This process continued through what is known as the Middle Archaic, until climate conditions stabilized around 300 B.C. at the start of the Late Archaic. Today many sites from both the Early and Middle Archaic periods are no longer submerged and may have more modern Native American use (Milanich 1994).

After the Archaic period, the region became incorporated into what is known as the Glades region and remained inhabited until European contact, when Old World diseases and slave raiding heavily reduced the Native populations during the late 1500s-1700s. Many of the tree islands through this portion of the CEPP APE have sites associated to the Glades period. This period has been broken down into successive stages starting with Glades I, which dates from 500 B.C .to 750 A.D., Glades Period II dating from 750 to 1200 A.D., and Glades Period III dating from 1200 A.D. to European contact in the 1500s. Typical habitation sites through this region are commonly referred to as middens, which are the accumulation of daily life activities on these tree islands. Material remains can stretch from the surface to well over one meter below the surface on certain islands. Native American burials can also be found among these habitation sites (Milanich 1994).

After European contact, Native American populations in the region continuously declined and remained at low levels until groups relocated into southern Florida while fleeing the U.S. Army and U.S.

Government's forced relocation program. Today, many sites associated with the Miccosukee Tribe of Indians of Florida and Seminole Tribe of Florida are known to exist throughout the region. Refer to **Section 2.6** and **Appendix C.1.2** for more information.

C.1.1.17 Socioeconomics

Lee, St. Lucie, Martin, Hendry, Palm Beach, Broward, Miami-Dade, and Monroe counties and their economic activity are most likely to experience any impact from the CEPP PACR. They are, therefore, the focus of this and other sections directly addressing socioeconomic conditions and impacts.

The 2016 population estimates for each of the LEC Planning Area counties are as follows: Lee – 680,539 residents; St. Lucie – 292,826 residents; Martin – 150,870; Hendry – 38,370; Palm Beach – 1,391,741 residents; Broward – 1,854,513 residents; Miami-Dade – 2,700,794 residents; and Monroe – 76,047 residents. Together, these selected counties represent 5,331,187 permanent residents or approximately one-fourth of Florida's population.

The Okeechobee Intercoastal Waterway (OIWW) provides economically and politically important commerce between the eastern and western coasts of Florida. The waterway connects the Atlantic Intracoastal Waterway to the Gulf Intracoastal Waterway and is a congressionally authorized project, with depths and operations required for efficient navigation on the system. The authorized C&SF project depths for Lake Okeechobee navigation are based on 12.56 ft NGVD.

C.1.1.18 Study Area Land Use

The existing land use within the study area varies widely from agricultural to high-density multi-family and industrial urban uses. Much of the land use/cover change occurring in south Florida over the past several years can be categorized as either the creation of new developments in previously natural or agricultural areas, or the change in the types of agriculture practiced. Much of the land used for agriculture is likely categorized as unique farmland based upon its location, growing season, and high value crops.

An estimated 742,668 acres of irrigated agricultural lands are located in the LOSA. Agricultural lands adjacent to the St. Lucie River and Indian River Lagoon and Caloosahatchee River and Estuary are cultivated for citrus, sugarcane, vegetables, sod, and greenhouse/nursery. Growth in citrus acreage is usually on land that was formerly pastureland. Vegetable crops include cucumbers, peppers, tomatoes, squash, eggplant, watermelons, snap beans, and potatoes. Wetlands, uplands, and urban uses comprise the remaining land area within LOSA and Northern Estuaries.

An estimated 447,000 acres of agricultural lands are located in the EAA. Currently, land in the EAA is primarily in agricultural production, with sugarcane being the primary crop. There are six sugar mills and one refinery (South Bay) currently operating in the EAA, with an additional mill and refinery in Clewiston also serving the area. Three major entities—U.S. Sugar Corporation, Florida Crystals Corporation, and Sugarcane Growers Cooperative—provide the majority of the sugarcane production in the EAA. Secondary agricultural uses include vegetables, rice, sod, and improved pasture. Wetlands, uplands, urban and extractive uses comprise the remaining land area within the EAA.

The main populated areas of the LEC extend approximately 100 miles through the coastal portions of Palm Beach, Broward, and Miami-Dade counties. As the most densely populated sub-region in the State, the LEC is home to approximately 30% of the State's population, more than six million people. The sub-region is primarily an urban megalopolis, but it also contains substantial agricultural acreage, particularly in southwestern Miami-Dade County (90,000 acres). Rapid population growth and land development practices have resulted in notable western urban sprawl; the predominant land use is single-family residential. The once significant rural population in the western areas of Broward County has practically disappeared, resulting in an urbanized makeup in population.

A large portion of south Florida remains natural, although much of it is disturbed land. The dominant natural features within the study area include two major management areas located south of Lake Okeechobee. These include the Everglades Complex of Wildlife Management Areas (ECWMA) and ENP. The ECWMA includes three adjacent WMAs: Rotenberger WMA, Holey Land WMA, and Everglades (WCA 3A) and Francis S. Taylor (WCA 3B) WMAs. The ECWMA is described in the next section. The Rotenberger and Holey Land WMAs are located north of WCA 3A and south of Lake Okeechobee between the Miami and North New River canals.

C.1.1.19 Public Land Management

Lands in the ECWMA are managed by the FWC under 2 leases from the State of Florida and through a 1952 cooperative management agreement with the SFWMD. An agreement was also formed among the State of Florida, the FWC, the SFWMD, and the Miccosukee Tribe of Indians of Florida in 1982 granting a perpetual lease to the Miccosukee Tribe of Indians of Florida for approximately 189,000 acres of WCA 3A.

The FWC has outlined a conceptual management plan for the ECWMA (FWC 2015) providing general information on resource management goals and objectives. Management activities within the ECWMA include the maintenance and restoration of plant and animal communities, public education, recreation, and habitat protection. Management emphases by the FWC consists of the development and recommendation of water regulation schedules to address hydrological restoration, improvement of the quality of existing habitats to benefit native fish and wildlife species through prescribed burns, control of exotic species, and plantings of native trees and shrubs. Recreational hunting is used as the primary management tool to maintain resident game populations in the ECWMA. The FWC also manages the sport fishery within the ECWMA by providing regulations pertaining to size and possession limits. The FWC also coordinates with cooperating agencies to maintain access to the canal system and public use areas to maximize boat and bank fishing opportunities.

ENP spans nearly 1.5 million acres of wetlands, uplands, and submerged lands at the southern end of the Florida peninsula. ENP, authorized by Congress in 1934 and established in 1947, was established to protect the unique tropical biological resources of the southern Everglades system. It was the first national park to be established to preserve purely biological (versus geological) resources. The Park's authorizing legislation mandated that it be managed as "wilderness, [where] no development ... or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural condition now prevailing in this area." This mandate to preserve wilderness is one of the strongest in the legislative history of the National Park System. ENP has been designated a World Heritage Site, an International Biosphere Reserve, and a Wetland of National Significance. In addition, 86 % of ENP is designated wilderness under the Wilderness Act of 1964. ENP is managed by the NPS.

C.1.1.20 Recreation

There are many recreational opportunities throughout south Florida; however, with the dense urban surroundings demand often exceeds availability. Recreational resources in the Lake Okeechobee region are primarily water based. Lake Okeechobee and the Okeechobee Waterway provide approximately 154 miles of navigable waterway for commercial navigation and many more for recreational boating. Lake Okeechobee is recognized as supporting one of the best recreational fisheries in the nation. Several major sport fishing tournaments are held on the lake annually, bringing significant revenues to the surrounding area. Recreational areas are located around Lake Okeechobee offering day-use facilities, campgrounds, hiking and biking trails, and boat ramps. The Lake Okeechobee Scenic Trail (LOST) is designated as a segment of the Florida National Scenic Trail, encompassing 110 miles of the lake atop HHD. Heavy seasonal waterfowl utilization of Lake Okeechobee attracts hunters and recreational enthusiasts, as well. Lake Okeechobee has also been a popular destination for airboat rides.

Recreation opportunities in the Northern Estuaries include easy access to fresh, estuarine, and marine resources for fishing, boating, swimming, diving, camping, and sightseeing. Numerous recreation areas, such as the Ortona Lock Recreation Area, Caloosahatchee Regional Park, and W.P. Franklin Lock Recreational Area are extensively used.

STAs and the A-1 FEB provide recreational opportunities within and adjacent to the EAA. Passive recreational use includes bicycling, hiking, nature photography, star gazing, wildlife viewing, and fishing. Waterfowl and alligator hunting are extremely popular on the FEB and STA lands due to the excellent access by vehicle and small boat, and the hunter success rates. Small boats are allowed under certain restrictions.

Recreational opportunities are also present within the Greater Everglades. Rotenberger and Holey Land WMAs are open to public access year round. Primary recreational opportunities include hunting, fishing, camping, hiking, and bicycling. Game species occurring in the WMAs include white-tailed deer, common snipe (*Gallinago gallinago*), feral hog (*Sus scrofa*), marsh rabbit (*Sylvilagus palustris*), blue-winged teal (*Anas discors*), mottled duck (*Anas fulvigula*), and other game. Alligator hunting is also currently administered on Holey Land WMA. The Everglades (WCA 3A) and Francis S. Taylor (WCA 3B) WMA lands have been used for recreational activities including hunting, fishing, frogging, boating, camping, and limited off-road vehicle use. Fishing is a popular recreational activity and numerous tournaments are held each year. The majority of fishing activity occurs in the canals along Interstate75, Highway 41 (Tamiami Trail), and in the Miami, L-67 A, and L-67 C canals. These canals support many species of game fish. Private camps are located throughout WCA 3. These permitted camps are primarily used as weekend retreats and hunting camps. A variety of other nature-based recreational opportunities are also provided to the public within WCA 3A and WCA 3B. These activities include wildlife viewing and nature photography. Hiking and bicycling are also permitted on existing levees within the project area where appropriate. Though hiking and bicycling opportunities are available they lack sufficient facilities and markers. There are also several recreation areas at locations along the boundary of WCA 3 including the Sawgrass Recreation Area, Everglades Holiday Park, Thompson Park and Mac's Fish Camp. These facilities, along with several on Highway 41 (Tamiami Trail), provide boat ramps, camping facilities, boat rentals, airboat tours, fishing guides, bait and tackle supplies, and food. Some of these areas are privately owned, while others are public properties leased to private providers of services.

Similar recreational opportunities are provided in ENP. ENP provides high-quality fishing, boating, camping, wildlife viewing, hiking, bicycling, and nature interpretation activities. One third of ENP is covered by water, creating excellent boating and fishing opportunities. Saltwater fishing includes Florida Bay, Ten Thousand Islands, and elsewhere in the park's coastal zone. Marinas and boat ramps are located throughout the park. Day use and camping (front and back country) facilities are also available. There are also a number of elevated camping platforms (chickees) available in various locations throughout the Park. Regularly scheduled concession or ranger-guided tours are also available.

The 2013 State Comprehensive Outdoor Recreation Plan (SCORP) is a reliable source from which to determine if Florida residents and tourists need additional facilities to support outdoor recreation. Surveys determined the user rates for 26 different outdoor activities within eight regions of Florida. The SCORP divides all activities into either resource based or user based. The projects being considered provide opportunities for resource-based activities. **Table C.1-9** is a table from Florida's 2013 SCORP showing each region and the level of service provided as either above or below the State average for surveyed activities. The CEPP PACR project area is located in the SE region. The A-2 Reservoir and A-2 STA will be a destination for outdoor activities from across the State. The existing adjacent A-1 FEB, and STAs participate in State lotteries for hunting opportunities and commonly draw nonresidents and residents. A close review of the table shows that canoeing and kayaking is not listed. The SCORP did survey this popular activity and found participation rates similar to motorized boating. The SCORP found the high user rates are where the available resource has been developed for this outdoor activity. SCORP did not assess the level of service due to the abundance of available water, but encourages the provision of facilities and designating canoe trails.

Table C.1-9. Regional Levels of Service for Outdoor Recreation 2013

Comparing Regional Levels of Service to Statewide Median*

● Level of Service **Above** Statewide Median ○ Level of Service **Below** Statewide Median

Resource-Based Activities	NW	NC	NE	CW	C	CE	SW	SE
Saltwater Beach Activities	●	○	●	○	NA	●	●	○
Freshwater Beach Activities	●	●	○	○	○	●	○	●
Saltwater Fishing Non-boat	●	○	○	○	NA	●	●	●
Freshwater Fishing Non-boat	○	●	○	●	●	○	●	○
Saltwater Boat Ramp	●	●	○	○	NA	●	●	○
Freshwater Boat Ramp	●	●	●	○	○	●	○	○
Bicycling Paved	○	●	○	●	○	●	●	○
Bicycling Unpaved	○	●	●	○	○	●	●	○
Hiking	●	●	○	○	○	●	●	○
Horseback Riding	○	●	●	○	○	●	●	○
Off-Highway Vehicle Driving	●	●	○	○	○	●	●	○
Nature Study	●	●	●	○	○	●	○	○
Picnicking	○	●	○	○	○	●	●	●
Visiting Historical or Archaeological Sites	○	●	●	○	○	●	●	○
Tent Camping	●	●	●	○	○	○	●	○
RV or Trailer Camping	○	●	○	●	○	●	●	○
Hunting	●	●	○	○	○	○	●	●

User-Oriented Activities	NW	NC	NE	CW	C	CE	SW	SE
Swimming in Public Outdoor Pool	○	●	○	○	○	●	●	●
Baseball or Softball	●	●	●	○	○	●	○	○
Outdoor Basketball	○	●	●	●	○	●	○	○
Outdoor Tennis	○	●	○	○	○	●	●	●
Soccer	●	●	●	○	○	●	○	○
Football	●	●	●	○	○	●	○	○
Golf	○	○	●	○	○	●	●	●

* Table shows SCORP planning regions as either above or below the statewide median level of service, per activity. *See Appendix G for regional level of service calculations per activity.*

Table 4.1

C.1.1.21 Noise

Noise levels are associated with surrounding land use. Within the major natural areas of south Florida, external sources of noise are limited and of low occurrence. There is no significant noise generating land users within these areas. Existing sources of noise are limited to the vehicular traffic travelling on roads adjacent to and cutting through the project area. Other sources of noise which may occur within these natural areas include air boats, off road vehicles, swamp buggies, motor boats, and occasional air traffic. Sound levels are typically in the range of 85 to 105 decibels (dB) for motorboats and air boats, respectively. Wilderness ambient sound levels are typically in the range of 35 dB and should not be an issue for wildlife.

Rural areas have typical noise levels in the range of 35 to 55 dB. Sources of noise in rural, areas include noise associated with agricultural production such as the processing and transportation of agricultural produce. The use of farm equipment such as tractors, plows, and the use of irrigation facilities would be expected to be the dominant background noise.

Within the rural municipalities and urban areas, sound levels would be expected to be of greater intensity, frequency, and duration. Noise associated with transportation arteries, such as highways, railroads, primary and secondary roads, airports etc., inherent in areas of higher population would be significant and probably override those sounds associated with natural emissions. Other sources of noise might be expected to include noise from everyday social and human communication and activity, operations of construction and landscaping equipment, and operations at commercial and industrial facilities. In general, urban emissions would not be expected to exceed 60 dB, but may attain 90 dB or greater in busier urban areas or near to frequently used high volume transportation arteries.

C.1.1.22 Aesthetics

Visual and aesthetic environments are the natural and cultural features of the landscape that can be seen and contribute to the public's appreciation and enjoyment of the environment. The visual environment encompasses elements from both the built and natural environments. These can include solitary landmarks such as buildings and trees, bodies of water and corridors, or entire landscapes. Landscape character descriptions define a *sense of place*, or scenic expression, as well as provide a baseline from which to assess the effects of the proposed action on aesthetic resources.

The CEPP PACR is located in the southern portion of the EAA, northeast of the Holey Land and Everglades WMAs in Southern Florida. This section describes existing visual and aesthetic environments for the areas that may be potentially affected by the proposed action; specifically, southern Florida, southern Lake Okeechobee and the attributing canals.

C.1.1.22.1 Southern Florida

The existing visual characteristics of south Florida can be described in the context of the three dominant land use categories: natural areas, agricultural lands, and developed areas. Natural areas (i.e., nonagricultural) within south Florida are comprised of a variety of wetlands, sawgrass marshes, wet prairies, and tree islands (FWA 2017a). Agricultural lands are cultivated for citrus, sugarcane, vegetables, sod, and greenhouse/nursery. Overall, the land is flat, with few topographic features such as hills or other undulations. Much of the visible topographic features are man-made, including canals and levees. Additional man-made features include pump stations, navigation locks, secondary and primary roads, highways, electrical wires, communication towers, occasional buildings, borrow pits, and other features that make up the regional aesthetic. Vistas, when viewed from a high perspective such as atop a levee, offer pleasant and unspoiled perspectives of the Everglades marsh. Generally, urban development is concentrated along the Atlantic coastline from Palm Beach County to Miami-Dade County. Major cities are visually congested with residential communities, transportation features, and commercial and industrial facilities. Development is typically adjacent to or nearby natural areas.

C.1.1.22.2 Lake Okeechobee and Transmission System

Lake Okeechobee's southern shore is rural. Natural (nonagricultural) features along the southern coastline include native and invasive greenery, free-floating algae, and emergent plant life. The shoreline is refuge to small animals and other wildlife, which can be seen from the shoreline or by boat. Man-made features along the southern shore are highlighted by the HHD, a 143-mile levee structure, and canals. Non-native plant life is limited and includes maintained landscaping and shrubs along the shoreline, walkways, U.S. Highway 27, and the Lake Okeechobee Trail. Two culverts approximately 1 mile apart that direct water to the Miami Canal and North New River Canal can be seen nearby (USACE 2015). Further south on U.S. Highway 27, in Okeelanta, there is an airport, manufacturing facilities, and a power plant.

Nearby are the small communities of South Bay and Lake Harbor. South Bay, approximately two miles south on U.S. Highway 27, has a small urban center with outlying suburban residences. Lake Harbor is a smaller community with several industrial facilities. It is home to John Stretch Park, which contains a scenic viewpoint of the Lake Okeechobee. South Bay is the home Tanner Park, which has both recreational activities and heritage-agricultural tours (Palm Beach County 2017). U.S. Highway 27 provides access to these communities and recreational facilities, including the parks and Lake Okeechobee Trail atop the HHD. There are numerous secondary and tertiary roadways providing local scenery and viewing opportunities for passersby. Due to the height of the HHD, views of Lake Okeechobee from the south are limited until you reach the Lake Okeechobee Trail.

The existing visual and aesthetic features between Lake Harbor and South Bay and south through the EAA are primarily agricultural. These include rectangular tracts of land consisting of rows of plantings enhanced by groundwater irrigated basins (USACE 2016). Dominant plantings are sugarcane, vegetables, rice, and sod. Natural (nonagricultural) features include sparse intermittent groupings of native grasses and trees. Man-made features along the Miami and North New River canals include paved and gravel roadways lined by native greenery or crops. There are few residences, private piers, bridges, and rail spurs that cross the canals. The banks of the canals are lined with greenery, but show some erosion. Birds and other wildlife can regularly be seen along the canals. Areas between Lake Harbor and South Bay and the CEPP PACR project area is visually remote and not readily viewable. Although limited in number, the residents, workers, and occasional recreational boater have limited views of these areas. Individuals driving on U.S. Highway 27 and other secondary and tertiary roadways are exposed to continuous constrained views of agricultural fields with intermittent views of canals and side roads. These views are often restricted by flat topography and obstructed by intervening foliage. The overall visual aesthetics in these areas are of marginal value.

C.1.1.22.3 A-1 FEB, A-2 parcel and A-2 Expansion area

The existing visual and aesthetic features in and around and the A-2 parcel is primarily agricultural with the A-1 FEB in close proximity. Similar to other areas of the EAA, these include rectangular tracts of land consisting of rows of plantings enhanced by groundwater-irrigated basins. Natural (nonagricultural) features include intermittent groupings of native grasses and trees. Approximately 2 miles west of A-2 parcel is the Miami Canal and Miami Canal Road. The eastern border of the A-1 FEB is North New River Canal and U.S. Highway 27. TheA-1 FEB, A-2 parcel and A-2 Expansion area are not used for residential or recreational purposes. They are rural in nature and lack centralized community resources that serve as points from which to view the aesthetics of the area. Boaters in the Miami and North New River canals have views of agricultural fields and native features, and may have limited views of the culverts and SFWMD facilities. U.S. Highway 27 runs parallel to North New River Canal on the east side of A-1 FEB, and there are limited secondary and tertiary roadways providing limited viewing opportunities for passersby. Water control areas and associated man-made structures (i.e., levees and culverts) are partially obstructed from the adjacent canals and U.S. Highway 27. The overall visual aesthetics in these areas are of marginal value.

Holey Land WMA is a 35,000-acre public wildlife and recreational area bordering the A-2 parcel to the south and A-1 FEB to the west. Holey Land WMA has many indigenous visual features such as wildlife, migratory birds, and native plants and flowers. It is the northernmost extent of the Everglades sawgrass marsh containing exceptional year-round opportunities for birding and other wildlife viewing (FWC 2017a). Recreationalists such as birders, boaters, and hunters have the best view of the Holey Land WMA. Both on- and off-road vehicles are allowed on the L-5 and Miami Canal levees, where multiuse trails provide the best views of the WMA (FWC 2017b). There is no residential land use on or near the Holey Land WMA, and it cannot be viewed well from U.S. Highway 27 to the east or Miami Canal Road to the west. Although remote, the overall visual aesthetics in these areas are of moderate-to-high value.

C.1.2 EXISTING CONDITIONS OF NATIVE AMERICANS

Unless otherwise referenced, the information in this section is a summary compiled from the Seminole Tribe of Florida website at http://www.semtribe.com/History/ and from the Ah-Tah-Thi-Ki website at https://web.archive.org/web/20140630011851/http://www.ahtahthiki.com/History-Seminole-Tribe-FL-Ah-Tah-Thi-Ki-Museum.html

Refer to **Section 2.6** for additional information. The tribes known today as the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida are both descendants of the Muscogee Creek people, a diverse confederation that encompassed people who spoke seven languages spread over much of the Southeast. Between 1740 and 1812, early Creek villages were established in northern Florida in the mission provinces of Apalachee and Timucua, around Tallahassee and Gainesville, and along the Apalachicola and Lower Suwannee rivers. Other Indian groups also migrated into Florida, including the Yuchi and Tamasee Indians as well as the Hitchity, Mikasuki, Choctaw, and Oconee. From 1812 to 1820, pressures in Alabama and Georgia encouraged Upper and Lower Creek Indians to migrate to Florida (Covington 1993). These Seminoles, as they all came to be known (possibly a derivation of the Spanish cimarron, meaning runaway) were primarily seeking a solitary place to subsistence farm and raise cattle.

Beginning with the War of 1812 and ending with the Third Seminole War in 1858, the native people in Florida were subjected to an intensive effort by the U.S. Government to eradicate or remove them from the region. The U.S. Government reportedly spent more than $20 million on this effort and sent more than 52,000 troops to fight fewer than 2,000 Seminoles in Florida. At the end of these efforts, most of the southeastern tribes were removed west to Indian Territory and fewer than 300 Seminoles survived in the Everglades. Their descendants make up the populations of both tribes today.

The remaining native people lived a subsistence existence in the Florida Everglades for the next century. Again encroachment from white settlers by the early 1900s forced them to approach the Secretary of the Interior to request reservation lands. This request for Federal reservations and other services led to the split between the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida. The Miccosukee Tribe of Indians of Florida, who spoke Hitchiti and lived primarily along Tamiami Trail, objected to the acceptance of Federal monies and services in exchange for land. Despite their objections, they were removed from ENP and confined to the Reserved Area, a narrow strip of land along Tamiami

Trail. Although additional lands were designated and compensation money was paid to the Tribe by the United States, the money remains unclaimed by the Tribe to this day.

In the 1950s, when many tribes were facing the Indian Termination Act, the Seminole Tribe of Florida again had to fight the Government for Federal recognition and services to continue their existence. The Miccosukee Tribe of Indians of Florida instead sought and received recognition as a sovereign nation from Fidel Castro and Cuba, forcing the U.S. Government to recognize them.

During this time, both tribes lived in relative poverty, continuing their subsistence lifestyle in the Everglades and relying on the tourist trade to supplement their incomes. In 1979, the Seminole Tribe of Florida established the first high stakes bingo operation in the nation. The passage of the Indian Gaming Rights Act in 1988 allowed them to expand into other high-stakes gambling, and both tribes have financially prospered as a result.

Tribal members living today still recall growing up on tree islands in the Everglades and living as their ancestors did 100 years ago. Tribal members born before big gaming in 1979 recall selling their beadwork or patchwork, wrestling alligators, and dancing for tourists to bring in money to support their families. These people have lived in the heart of the Everglades since the 1830s, well before the first efforts to drain the land began in the 1880s, and have seen first-hand the impact of those efforts on their homes and livelihood.

Today, members of Miccosukee Tribe of Indians of Florida administer four reservations all located within the study area (**Figure C.1-11**): the Tamiami Trail (Forty-Mile-Bend) Miccosukee Tribe of Indians of Florida's Trail Reservation, the Alligator Alley Miccosukee Reservation, the Krome Avenue Miccosukee Reservation, and the Dade Corners Reservation. The Miccosukee Tribe of Indians of Florida also has a perpetual lease from the State of Florida for nearly 190,000 acres in WCA 3A. The Tribe is authorized to use this land for such purposes as hunting, fishing, trapping, and frogging. Members of the Seminole Tribe of Florida have several reservations in the State of Florida as well as an easement in WCA 3A for such purposes as hunting, fishing and frogging. Of particular note in regard to this report are the Big Cypress, Immokalee, Hollywood, and Coconut Creek reservations as these reservations are all located within the study area.

The Seminole Tribe of Florida has surface water entitlement rights pursuant to the 1987 Water Rights Compact between the Seminole Tribe of Florida, the State of Florida, and the SFWMD (Pub. L. No. 100228, 101 Stat. 1566 and Ch. 87-292 Laws of Florida as Codified in section 285.165, Florida Statues). Additional documents addressing the Water Rights Compact entitlement provisions have since been executed. Two of the Seminole Tribe of Florida's reservation surface water entitlements rely on Lake Okeechobee as a secondary irrigation supply source, with specific volumes of water identified for (1) the Seminole Tribe of Florida's Big Cypress Reservation and (2) the Brighton Reservation, located northwest of Lake Okeechobee.

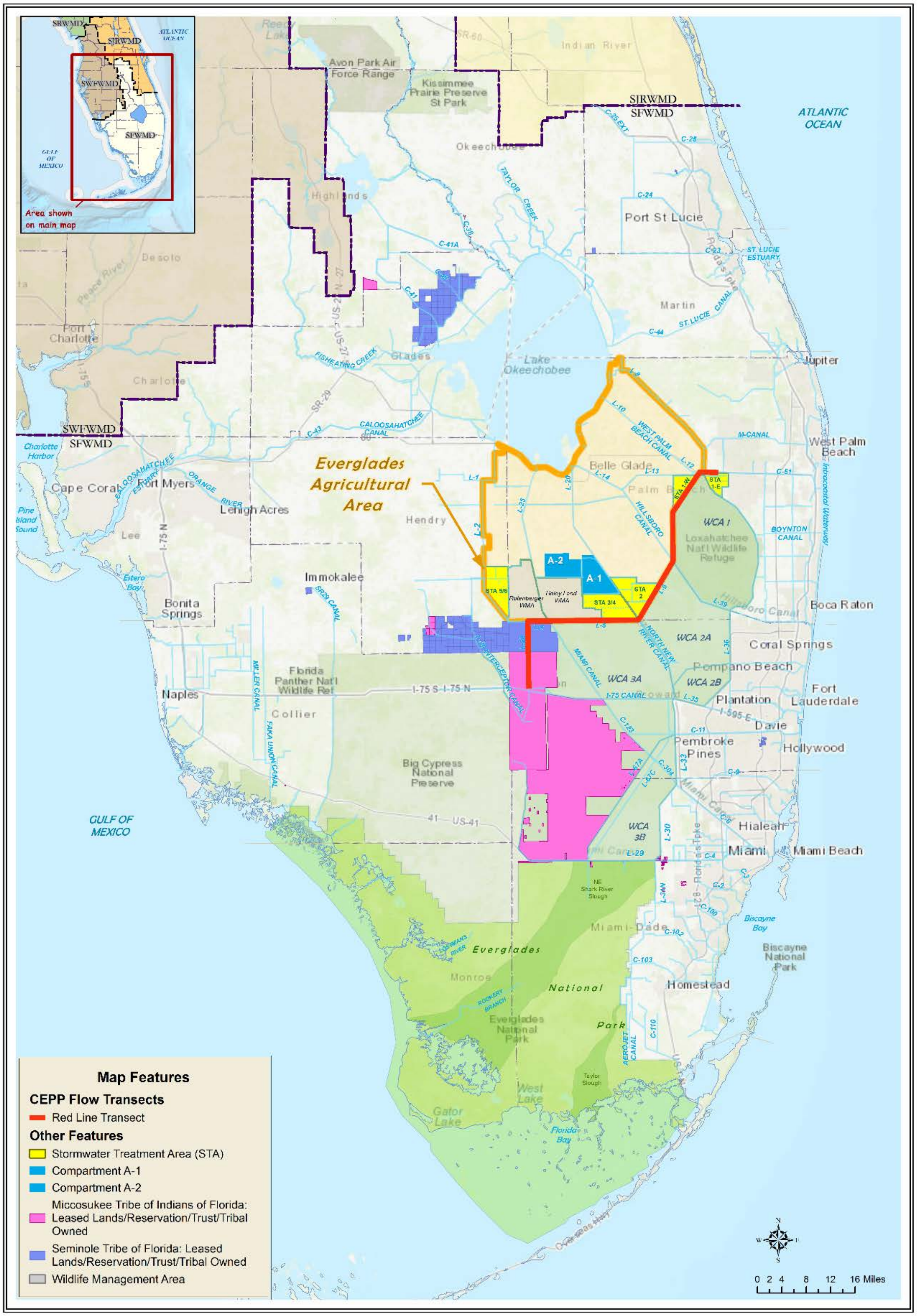

Figure C.1-11. Map Outlining the Location of the Tribal Reservations and Leased Lands

C.1.3 FUTURE WITHOUT PROJECT CONDITIONS OF RESOURCES

The future without (FWO) project condition is the projection and forecast of what is “most likely” to occur in the study area over the planning horizon. The FWO project condition for CEPP PACR assumes the construction and implementation of authorized CERP projects, including CEPP, non-CERP projects, and other Federal, State, and local projects constructed or approved under existing governmental authorities that occur in the CEPP study area. Under NEPA, the **No Action Alternative** needs to be evaluated, and for consistency of the report, the **No Action Alternative** is referred to as the **Future Without (FWO)** project condition for the remainder of the report. Construction on the first generation of CERP project modifications authorized by Congress is either underway or completed. These include the Indian River Lagoon-South (IRL-S) Project (USACE 2004a) (completion scheduled for 2023), the Picayune Strand Restoration Project (USACE 2004b) (completion scheduled for 2021), and the Site 1 Impoundment Project (USACE 2006b) (completed in 2016). Design or construction on the second generation of authorized CERP projects is either underway or complete, including the Biscayne Bay Coastal Wetlands (BBCW) Project (USACE 2012b) (completion scheduled for 2023), the Broward County Water Preserve Areas (WPA) Project (USACE 2012c) (design underway), the Caloosahatchee River (C-43) West Basin Storage Reservoir (USACE 2010) (completion scheduled for 2022), and the C-111 Spreader Canal Western Project (USACE 2011a) (construction complete). The CEPP plan that was authorized by Congress in 2016 is assumed to be constructed and operational in the FWO condition. Non-CERP projects included within the FWO project assumptions consist of the SFWMD Restoration Strategies (SFWMD 2012b), the C&SF Canal-51 West End Flood Control Project (USACE 1998), the C-111 South Dade Project, the Kissimmee River Restoration Project (USACE 1991), the MWDs to ENP Project (USACE 2000), and the DOI Tamiami Trail Modifications Next Steps (TTNS) Project (DOI 2010). **Table C.1-10** summarizes the status of non-CERP projects, CERP projects, and operational plans assumed to differ between the existing conditions or FWO project assumptions and are incorporated by reference unless otherwise noted. The following describes the projected physical, ecological, and socioeconomic conditions within the study area in the year 2076. The FWO project conditions are also summarized in **Section 2.0** of the main report. Refer to **Sections 2.5.1** through **2.5.15** for further information on how project features in **Table C.1-10** were represented in the hydrologic model simulation of the CEPP FWO baseline, where applicable.

Table C.1-10. Status of Non-CERP Projects, CERP Projects, and Operating Plans for Existing and FWO Project Assumptions

Category	Existing Condition	Future Without Project Condition
Status of Non-CERP Projects	MWDs to ENP Project features, including the S-355A and S-355B gated spillways, 4-mile degrade of L-67 Extension Levee, 8.5 SMA Flood Mitigation Project have been constructed and are operational. Other projects, including C-111 South Dade; C&SF C-51 West End Flood Control & STA 1-E; Kissimmee River Restoration; SFWMD Restoration Strategies (Central Flow Path features); DOI TTNS Project (5.5 miles of additional bridges); and Seepage Barrier near the L-31 N Levee are all either underway or nearing completion.	Construction completed and features operated: C-111 South Dade; C&SF C-51 West End Flood Control Project; Kissimmee River Restoration; SFWMD Restoration Strategies (Central Flow Path features); DOI TTNS Project (5.5 miles of additional bridges); Seepage Barrier Near the L-31 N Levee (Miami-Dade Limestone Products Association) MWD Project features including existing condition components plus Tamiami Trail Modifications (1-mile eastern bridge) are constructed. However, no operational changes for the L-29 Canal stage, G-3273 constraint, or the S-356 pump station were represented in the CEPP FWO project condition.
Status of CERP Projects	No completed projects. Construction of multiple CERP projects either in progress or complete. CEPP is authorized but construction has not been initiated.	Construction completed and features in operation: IRL-S Project; Picayune Strand Restoration Project; Site 1 Impoundment Project; BBCW Project; Broward County WPA Project; Caloosahatchee River (C-43) West Basin Storage Reservoir; C-111 Spreader Canal Western Project; and CEPP features.
Operations Plan for WCA 3A, ENP, and the SDCS	ERTP (2012) with Rainfall-Based Management Plan; L-29 Canal maximum operational stage limit: 7.5 ft NGVD; G-3273 constraint: 6.8 ft NGVD.	ERTP (2012) with Rainfall Driven Operations; L-29 Canal maximum operational stage limit: 9.7 ft NGVD; G-3273 constraint: 9.5 ft NGVD.

C.1.3.1 Vegetative Communities

C.1.3.1.1 Lake Okeechobee

The majority of the surface of Lake Okeechobee is not vegetated and currently provides open (pelagic) habitat. Littoral vegetation occurs along much of Lake Okeechobee's perimeter, but is most extensive along the southern and western borders. The continued use of Lake Okeechobee to store water for agricultural and flood control needs would continue to result in high water levels within the lake. High water levels within the lake would continue to adversely affect the extensive littoral marshes and nearshore habitat, and deeper nearshore areas that could support SAV would remain without vegetation. In addition, even with State BMPs and other projects to improve water quality within the watershed, due to legacy effects, it is anticipated that the continued storage of nutrient-rich waters would maintain reduced water clarity that in turn would adversely affect nearshore SAV and emergent vegetation areas. Vegetative communities in Lake Okeechobee are not expected to change significantly from existing conditions unless the regulation schedule is changed.

C.1.3.1.2 Everglades Agricultural Area

Habitat types within the EAA are divided into five general groups: aquatic, wetland, upland, disturbed (mostly agricultural), and urban/extractive. Changes to the remnant natural communities on lands within the EAA are dependent upon the overall agricultural use of the region and resultant water management.

The aquatic communities within the EAA include both natural and man-made areas of open water. With continued use of the EAA region for agriculture during the period between the present and 2076, with the exception of land utilized for the SFWMD Restoration Strategies water quality treatment implementation plan (SFWMD 2012a), no significant net increase or decrease in aquatic areas within the EAA should occur. For remnant wetlands, continued subsidence of lands surrounding existing, small isolated wetlands could slightly increase the extent of wetlands into formerly cultivated lands. Larger scale changes in wetland cover could occur if agriculture is abandoned in some portions of the EAA. Cessation of active drainage of the agricultural fields would likely cause the fallow lands to revert to wetlands. Similarly, upland community margins could change to transitional wetlands if the surrounding landscape becomes wetter. Disturbed communities consist of mostly agricultural lands. Shifts between specific agricultural cover types may occur during the period between the present and 2076. Most of the urban / extractive lands are concentrated around the Belle Glade area; increases in urban and extractive cover types may occur near existing population centers due to increased urbanization. Vegetative communities in the EAA are not expected to change significantly from existing conditions.

All of Compartment A of the Talisman Land Exchange property is considered to be atypical jurisdictional wetlands based on hydric soils and hydrology. The SFWMD Restoration Strategies water quality treatment implementation plan will be fully in place by 2076 (SFWMD 2012a). A portion of compartment A has been converted to a FEB, known as the A-1 FEB. Vegetative communities currently existing in the A-2 Expansion area would remain. The A-2 Expansion area would remain in State ownership.

C.1.3.1.3 Northern Estuaries

SAV and oysters are two important habitats in the Caloosahatchee River and Estuary and the St. Lucie River and Estuary (including the Southern Indian River Lagoon). Currently, SAV beds have been reduced or eliminated from their former areas by extreme salinity fluctuations, increased turbidity, sedimentation, dredging, reduced light penetration, damage from boats, and nutrient enrichment. Oysters in both systems were eliminated by the extremely high freshwater runoff from both Lake Okeechobee and the local watersheds and the subsequent reductions in salinity caused by Hurricane Irma. Frequent flood control regulatory freshwater releases from Lake Okeechobee to the Northern Estuaries would continue to cause salinities to drop below preferred ranges for estuarine biota. High-level freshwater discharges during the wet season would continue to result in increases in nutrient inflows and turbidity to the estuaries, thereby adversely affecting sea grasses. Some level of improvement is expected to occur during the period between the present and 2076 as a result of implementation of projects within the study area with the capability of improving the timing, quantity, and quality of freshwater flow to the Northern Estuaries. Improvements in water quality and salinity levels within the estuaries as a result of the C-43 West Basin Storage Reservoir Project (USACE 2010) and IRL-S Project (USACE 2004a) would reduce stress to SAV and oysters and aid in long term health of estuarine habitat and biota.

C.1.3.1.4 Greater Everglades

The Everglades landscape is dominated by a complex mosaic of freshwater wetland communities that includes open-water sloughs and marshes, dense grass and sedge-dominated marshes, forested islands, and wet marl prairies. The Everglades freshwater wetlands eventually grade into intertidal mangrove wetlands and subtidal sea grass beds in the estuarine waters of Florida Bay. Hydrology in WCA 3A, WCA 3B, and ENP would be significantly improved by the implementation of CEPP. Due to changes in the quantity, quality, distribution, and timing of water entering the Greater Everglades ecosystem, beneficial effects on wetland hydrology and vegetation would occur. The delivery of additional flow to the Everglades would return many of the currently dehydrated areas to a level of hydration that moves toward the predrainage, natural system condition. Improvements in the volume and distribution of flows to the Greater Everglades would be a step towards restoring natural landscape patterns and native flora and fauna (USACE 2014).

C.1.3.2 Fish and Wildlife Resources

With CERP projects already underway and with the completion of authorized CEPP features, hydrologic conditions necessary to sustain and recover the diversity and populations of fish and wildlife species in the Northern Estuaries, central Everglades, ENP, and Southern Estuaries will dramatically improve. Detrimental effects from regulatory discharges to the Northern Estuaries and coastal systems will continue during extreme wet weather events. Aquatic vegetation communities and disruption to aquatic productivity and function will continue to be stressed during high-flow regulatory releases. The improved flow conditions to the central Everglades, ENP, and Southern Estuaries resulting from these projects will fall short of established CERP goals because of a continued shortfall of water storage and treatment capacity to the south and north of Lake Okeechobee. Thus, improvements to fish and wildlife resources in the study area will continue to be limited by this constraint.

The project area supports a variety of fish and wildlife resources. Disruption of the natural hydrology has resulted in aquatic vegetation community changes and a resultant disruption of aquatic productivity and function that has had repercussions through the food chain, including effects on wading birds, larger predatory fishes, reptiles, and mammals. During the period between the present and 2076, a further reduction in habitat function is likely to result in a decrease in the abundance and diversity of fish and wildlife resources.

Desired restoration of historical water fluctuations within Lake Okeechobee would not be accomplished during the period between the present and 2076. Continued artificially high water levels within the lake reduce the availability of habitat for fishes and invertebrates by changing the extent and composition of the emergent and submergent vegetation communities. Lower water levels would provide opportunities for foraging for wading birds and other birds dependent upon aquatic prey species by concentrating prey and exposing additional shallow water habitat.

Altered native habitats dominate the EAA; however, remaining wetlands offer some habitat for fish and wildlife species. Some displacement of wildlife could result from expansion of urban or extractive land cover types within the EAA.

Fish and wildlife resources inhabiting the Northern Estuaries would continue to be impacted by flood control regulatory freshwater releases from Lake Okeechobee. Annual variability in flow would lead to salinity extremes outside the tolerance ranges of many fish and wildlife resources resulting in decreased species diversity. Further declines in estuarine habitat (SAV and oysters) would continue to result in additional declines in the species that utilize these habitats. Seagrass communities within the Northern Estuaries provide critical refugia for juvenile fish. The long-term loss of nursery habitat will result in population declines for many species of estuarine and marine fishes and macroinvertebrates, including those whose young of the year use fresher habitats. Waterfowl and wading birds are also expected to decrease by the year 2076 as estuarine habitat quality continues to decline. Some level of improvement is expected to occur as a result of implementation of projects within the study area with the capability of improving the timing, quantity, and quality of freshwater flow to estuarine systems and coastal areas (i.e., C-43 West Basin Storage Reservoir Project (USACE 2010) and IRL-S Project [USACE 2004a]).

Throughout the predrainage Everglades, the depth, distribution and duration of surface flooding largely determined the distribution, abundance, seasonal movements, and reproductive dynamics of all aquatic and many of the terrestrial animals of the Everglades. Within the Greater Everglades, productivity of native fish species, many important as prey species for wading birds, has been and would continue to be depressed due to water management practices. Nest numbers and success of wading birds have decreased dramatically across south Florida over the past 100 years. Continually decreasing hydroperiods in presently over-drained areas as well as unnaturally high water in some of the conservation areas due to levees prohibiting natural sheetflow across the landscape are likely to worsen during the period between the present and 2076. Wading birds will be directly affected by the decreased foraging opportunities due to these unnatural fluctuations in hydroperiods. Populations of several terrestrial mammals that are dependent on higher quality habitat or that require large areas of contiguous habitat to survive are also projected to decrease by 2076.

Some level of improvement to fish and wildlife resources is expected to occur as a result of implementation of projects within the study area with the capability of improving the timing, quantity, and quality of freshwater flow to the area such as the Broward County Water Preserve Areas Project (USACE 2012c), Biscayne Bay Coastal Wetlands Project (USACE 2012b), C-111 Spreader Canal Western Project (USACE 2011a), Everglades Restoration Transition Plan (USACE 2012a), MWDs Project (USACE 2000), and TTNS Project (DOI 2010). Water that is retained in the natural system and allowed to flow across the system without decompartmentalization helps maintain proper hydroperiods and stages within the WCAs, ENP, and Florida Bay, thereby increasing usage by fish and wildlife resources.

C.1.3.3 Invasive and Exotic Species

Currently, many non-native invasive species are thriving and negatively affecting the ecology throughout the project area. During the period between the present and 2076, it is expected that anthropogenic effects will continue to negatively impact the project area; therefore, it is expected new invasions and expansion of current invasive species will continue in the future. Many factors affect future increases and decreases of populations and ranges of invasive species currently present within the project area. Each species has a complex biological heritage which influences its ability to thrive in areas outside of its native range. In addition, there are numerous factors that affect new introductions of invasive species. This constrains the ability to predict new introductions, populations, and ranges of invasive species.

Factors that affect invasive species introductions are presented below. The subtropical climate of south Florida presents a hospitable environment for non-native species from warm parts of the world to establish and become invasive.

Canals within the project area provide deep water refugia for species of tropical fish and serve as pathways for invasive species to travel, spread, and expand into previously uninhabited areas. Drier conditions experienced currently due to compartmentalization and diversion of water will continue due to a lack of restoration projects within this region. The historically wetter areas that are now experiencing drier conditions will continue to shift in vegetation composition. Woody shrubs such as willow and non-native invasive species such as melaleuca will continue to expand in these areas. Continued deliveries of nutrient rich water to the project area will further promote the expansion of cattail.

Environmental manipulation and construction activities, urban development, and agriculture will continue to promote disturbance regimes within south Florida ecosystems that facilitate biological invasions. Disturbance from natural weather events, such as floods, droughts, and hurricanes can provide avenues for invasive species introduction and expansion.

Management of invasive species within the project area is conducted by numerous Federal, State, local, and Tribal agencies. However, all control programs within the project area are limited by the level of available funding and staffing. Portions of allocated funding for these programs have been and potentially will be redirected to other programs in the future. While there has been documented success in managing some invasive species (e.g., melaleuca), numerous highly invasive species continue to expand within the study area. Management activities vary in effectiveness which also influences species control and spread within the project area. Management components would be incorporated into CERP projects, thereby reducing the presence of some species within those projects. This would also reduce sources for invasions into other areas. Little is known about control and management measures for some species already present, therefore these species will propagate and spread to other areas.

The large aquarium, pet, and ornamental plant industries import new non-native species into Florida on a regular basis. New imported non-native species introductions will occur through intentional and unintentional releases. On average, 10 new non-native organisms that are capable of establishing, becoming invasive, and causing environmental harm are introduced into Florida each year. Educational efforts may slightly reduce the number of intentional releases.

The deeper navigation channels and expansion of ports in Florida, such as the Port of Miami and Port Everglades, will provide new trade opportunities for the State. Deeper channels will allow larger container cargo vessels to enter the ports. As a result, it is expected the Port of Miami will double its cargo traffic over the next several years with ships coming from all over the world. Many destructive species have entered the U.S. as stowaways on cargo ships and additional cargo traffic will likely increase this problem.

C.1.3.4 Threatened and Endangered Species

Federally listed threatened and endangered species are either known to exist or potentially exist within the project area. Continued increases in urbanization, water management practices, direct habitat loss, and other land requirements, as well as the degradation of existing habitat function, are likely to result in the continuance of negative population trends of State-threatened species and State species of special concern. Future Federal actions unrelated to the proposed action but located in the study area, will require separate consultations pursuant to Section 7 of the Endangered Species Act. For further information pertaining to potential impacts to Federally listed threatened and endangered species as a result of changes between the present and the FWO project condition, see the BA included in **Annex A.**

C.1.3.5 Essential Fish Habitat

Progress in restoring the natural timing, volume, and duration of freshwater flows to the Northern Estuaries would be expected to improve conditions for estuarine and marine systems by reducing excess nutrient loading and providing a more appropriate range of salinity conditions by reducing extreme salinity fluctuations and durations. Redistribution of flow to saltwater wetlands and nearshore bay areas would also be expected to result in favorable changes to salinity levels in the Southern Estuaries that would benefit essential fish habitat (USACE 2014).

Estuarine systems and coastal areas within the project area support fishery resources of recreational and commercial importance. At least 70% of Florida's recreationally or commercially sought fishes depend on estuaries for at least part of their life histories. Restoring the natural timing, volume, and duration of freshwater flows to the Northern Estuaries through implementation of the Federally authorized CEPP projects would be expected to improve conditions for estuarine and marine systems by reducing excess nutrient loading and providing a more appropriate range of salinity conditions. Reducing extreme salinity fluctuations and durations in the Northern Estuaries would be expected to benefit EFH. Redistribution of flow to saltwater wetlands and nearshore bay areas would also be expected to result in favorable changes in salinity levels in the Southern Estuaries that would be expected to benefit EFH (USACE 2014).

C.1.3.6 Climate

Climate change is expected to alter rainfall and evapotranspiration patterns over the next 100 years. Sea level change is one of the more certain consequences of climate change, and because it affects the land/ocean interface, it has the potential for environmental impacts on coastal areas. Various sites along the east coast of Florida indicate that the sea level is rising at a rate above the global average (Maul and Martin 1983). USACE sea level change projections for the period from 2015 to 2065 for Key West, Florida, and the broader south Florida area for historical, intermediate, and high rates of future sea level change are more than 4 inches, more than 10 inches, and more than 26 inches, respectively (USACE 2017). Some examples of sea level change impacts in the future are continued saltwater intrusion, reduced freshwater supply, retreating shoreline, and habitat transition.

Flood damage reduction might also decline as a result of sea level rise. Most coastal flood control structures are gravity driven. Discharge capability of these structures could be reduced. The regional hydrologic models used to simulate with and without project conditions require climatic and tidal data as boundary conditions. Given the uncertainty in future climatic conditions, the historical climate conditions used in the period of record are assumed to represent conditions that are expected to occur in the study area in the future. The model tidal boundary used in the regional hydrologic model was developed using historical tidal data from two primary National Oceanic and Atmospheric Administration (NOAA) stations (Naples and Virginia Key) and five secondary NOAA stations (Delray Beach, Everglades, Flamingo, Hollywood Beach, and Palm Beach). Simulation model tidal boundary conditions that reflect future sea level change were not available for the range of potential sea level rise expected. However, the impact of sea level change on project benefits is assessed for the FWO and with project conditions per USACE guidance provided in Engineering Circular 1165-2-212 (see **Section 6.0** and **Annex I**). Some of the ecological benefits associated with CERP projects under construction and future implementation of authorized CEPP features may be reduced or offset by climate change and associated sea level rise effects.

During the period between the present and 2076, south Florida may experience one or more multidecadal cycles of Atlantic hurricane activity. Currently the area is in an active phase of this cycle that appears to have started around 1995. This active phase followed a 25-year period of low hurricane activity, primarily during the 1970s and 1980s. The anthropogenic influence on the global climate system will likely have an impact on south Florida in terms of rainfall, evapotranspiration, and temperature. The natural, urban, and agricultural systems in the region are strongly interconnected in terms of water supply and demand, and, consequently, any change in rainfall patterns and evapotranspiration or sea level can have a significant impact on the region's water resources. There is good agreement among numerous climate models that temperature in south Florida will be higher in the future. These models predict that air temperatures will increase, with projections of summer temperatures being up to 3 °F to 7 °F warmer by 2100 (Twilley et al. 2001). Increases in air temperature, solar radiation, and water vapor deficit due to climate change are expected to increase evapotranspiration. Models used by Calanca et al. (2006) predict a 20% increase in evapotranspiration if summer temperatures increase from 4 °F to 7 °F.

Unlike temperature projections, there is less consensus on the changes in future precipitation. Based on available climate model outputs for south Florida, for planning purposes, Obeysekera et al. (2011) suggested a positive 1.5 °C increase of temperatures in the Everglades but a range of +/10% change in precipitation by 2060. They also showed that the temperature change might equate to a 7% increase in potential evapotranspiration (PET). A scenario of higher temperature (i.e., higher evapotranspiration) and less precipitation could result in more frequent droughts in the south Florida region. Increasing drought would impact the region's peat soil ecosystem by reducing the available water necessary to keep the soils wet, resulting in higher peat oxidation and loss of soil elevations in the freshwater wetlands (FAU 2013).

Regional surface water storage systems (lakes, rivers, canals, reservoirs, and WCAs) would most likely experience more rapid water loss, ultimately impacting availability of water supplies. Increased evapotranspiration may increase water demand for irrigation and natural wetland areas. In addition, accelerated evaporation losses from stormwater treatment areas could impact their phosphorus removal performance, increasing the need for supplemental water for these facilities.

Although extreme rainfall has been predicted to increase in many parts of the globe, the climate models to date do not have sufficient capability to project such a change in south Florida. Even in case of a future increase in heavy downpours in the region, much of that water could be lost eventually to the Atlantic Ocean and Gulf of Mexico unless measures are adopted to store that water. The environmental impact of changes to floods and droughts depends on the relationship between the climate extremes. If flooding and drought frequency increase together, the Everglades may return to a more natural slough-ridge-island landscape because the floods would redistribute soils and sediments onto ridges and the droughts would allow recruitment of trees on islands. They would likely cause large shifts in community structure due to saltwater intrusion into freshwater habitats, drying of inland wetlands, disappearance of ridge and slough microtopography, and an increase in frequency of fires (both terrestrial and wetland). Without the ability to maintain minimum flows and water levels in south Florida, agriculture and PWS well fields might not be able to function as designed. In addition, well fields might be contaminated by saltwater intrusion induced by sea level rise and higher salt levels in coastal waters could limit the usefulness of currently installed desalinization plants. More flooding may be good for the Everglades ecosystem because it would stimulate ridge-slough development and restore historic salinity regimes in Biscayne Bay and Florida Bay. However, increasing flooding alone may also create more frequent water level reversals during critical wading bird foraging periods, thus causing further declines in nesting success for wading birds.

Current research indicates that overall tropical storm frequency could increase or decrease, while the number of strong hurricanes (due to warmer temperatures) is expected to increase. Tropical storms and hurricanes provide huge amounts of rain for the area. The loss of storm-associated rainfall could have significant implications for the SFWMD regional water supplies. If a decrease in the number of storms does occur, there may be significant changes to the distribution of rainfall, which will affect the water supply and natural ecology of south Florida. Less rainfall may mean the region is under drought conditions more often. If tropical storms and hurricanes become more intense, the potential damage to levees, canals, and other water control structures may also increase – resulting in an increased likelihood of flooding on a local and regional scale. Water supply and water quality may also be adversely affected by this extreme.

Future rates of sea level change are expected to result in significant impacts on coastal canals and communities, with loss of flood protection and increased saltwater intrusion being the primary effects. Additionally, coastal ecosystems and estuaries are expected to be adversely affected and will require additional deliveries of freshwater to maintain desirable salinity patterns and healthy ecosystems. Sea level change is discussed in more detail in **Section C.1.3.10** and **Annex I**.

C.1.3.7 Physical Landscape: Regional Soils and Geology

Based on current land-use indicators, the landscape of south Florida would be developed consistent with County Growth Management Plans and the construction of CEPP, CERP, and non-CERP features would convert prime farmland into wetlands, which may reduce losses of organic soils due to inundated conditions. Hydroperiod performance on WCAs and in the ENP would be expected to improve. Despite restoration efforts, some wetland soils located in the EAA could be altered as a result of potential development. Wetland soils would be drained and/or displaced with fill materials to support the urban development.

During the period between the present and 2076, lands within the project area would be disposed and developed consistent with surrounding land use patterns. Within the Greater Everglades, continued loss of organic soils would continue as a result of oxidation (McVoy et al. 2011). It has been observed throughout the Greater Everglades that peat loss is associated with changes in water deliveries that reduce water depths and hydroperiods. Canal construction and drainage have led to increased drought intensity and a resultant loss of peat soils. As soil subsides, a continued lowering of topography would be expected. Characteristics of the physical landscape are expected to continue to show the lowering of the height of ridges and tree islands relative to the slough bottoms compared to existing conditions.

C.1.3.8 Hydrology

Hydrologic modeling simulations of the ECB and the FWO project condition were developed with the Regional Simulation Model for Basins (RSM-BN) and Regional Simulation Model for the Glades and Lower East Coast Service Area (RSM-GL) sub-regional modeling tools, to provide baseline conditions for plan formulation, the assessment of project benefits (comparisons against FWO), and the assessment alternative performance for the level-of-service for flood protection and water supply (comparisons against ECB). The ECB was developed to represent the system-wide infrastructure and operations that were in place at the time CEPP PACR plan formulation was initiated, approximately May 2017. The FWO for CEPP assumes the construction and implementation of currently authorized CERP and non-CERP projects, and other Federal, State or local projects constructed or approved under existing governmental authorities that occur in the CEPP study area; the CEPP FWO, therefore, included first-generation CERP projects already authorized and under construction (the IRL-S Project, Picayune Strand Restoration Project, and Site 1 Impoundment Project), second-generation CERP projects still pending Congressional authorization (the Biscayne Bay Coastal Wetlands Project, Broward County Water Preserve Areas Project, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project), and non-CERP projects currently in progress (the SFWMD Restoration Strategies, C&SF C-51 West End

Flood Control Project, C-111 South Dade Project, Kissimmee River Restoration Project, MWDs, and DOI TTNS Project). The ECB and FWO also include implementation of the ERTP WCA 3A Regulation Schedule, which replaced the IOP in October 2012.

Operations protocols for the first- and second-generation CERP projects were modeled consistent with the draft Project Operating Manuals (DPOMs), as documented in the respective PIRs. The completed Kissimmee River Restoration Project included the Headwaters Revitalization Schedule for the Kissimmee Chain of Lakes as defined for the Upper Kissimmee Chain of Lakes Routing (UKISS) modeling conducted by the Kissimmee River project team. The CEPP FWO representation of the C-111 South Dade and MWDs project features does not change operations from the ECB, which includes the L-29 Canal stage constraint at 7.5 ft NGVD, the G-3273 constraint at 6.8 ft NGVD, and the 2011 Interim Operating Criteria for the 8.5 SMA.

The CEPP is included in the FWO (USACE 2014). The CEPP increases freshwater flows to the central portion of the Everglades and Florida Bay by approximately 210,000 ac-ft per year, which will restore approximately two-thirds of the additional flow identified in the CERP, thereby, improving habitat in Lake Okeechobee, St. Lucie Estuary, Caloosahatchee Estuary, WCA 3, ENP, and Florida Bay. All of the elements identified as part of the CEPP selected alternative (ALTR42) are included in the FWO configuration. The components of the CEPP Tentatively Selected Plan (TSP) plan are organized into four geographic areas:

1. Construction and operations to divert, store, and treat Lake Okeechobee regulatory releases in the EAA (North of the Red line). Operational modifications included changes to the 2008 LORS, both within and outside of the flexibility of the schedule.
2. Conveyance features to deliver and distribute existing flows from WCA 2A to Northern WCA 3A (South of Red line) and the redirected Lake Okeechobee water through WCA 3A.
3. Conveyance features in Southern WCA 3A, WCA 3B, and ENP (Green/Blue lines) to deliver and distribute water from WCA 3A to WCA 3B and ENP.
4. Features for seepage management along the Lower East Coast Protective Levee (Yellow line).

A more detailed description of the components of the CEPP TSP and conveyance across the geographic regions can be found in Section 6 of the CEPP PIR (USACE 2014).

The extensive list of first- and second-generation CERP projects, non-CERP projects, and CEPP components included in the FWO will result in hydrologic interactions between the projects. Due to the CERP PIR sequencing and the project-specific assumptions for related projects defined in each CERP PIR, the hydrologic interactions observed for the FWO are likely unique to the CEPP PACR. Based on these considerations, the summary of regional hydrology for the FWO includes quantitative comparisons with the ECB based on the RSM-BN and RSM-GL modeling representations of these baselines.

The portion of the Greater Everglades within the CEPP PACR project area includes WCA 1, WCA 2A, WCA 2B, WCA 3A, WCA 3B, and ENP. This overview of FWO hydrological conditions is intended to provide a general overview of regional hydrological changes compared to the ECB. For a more detailed assessment, the reader should refer to the complete suite of RSM-GL modeling results. A map depicting the RSM-GL gage locations is provided as **Figure C.1-12**.

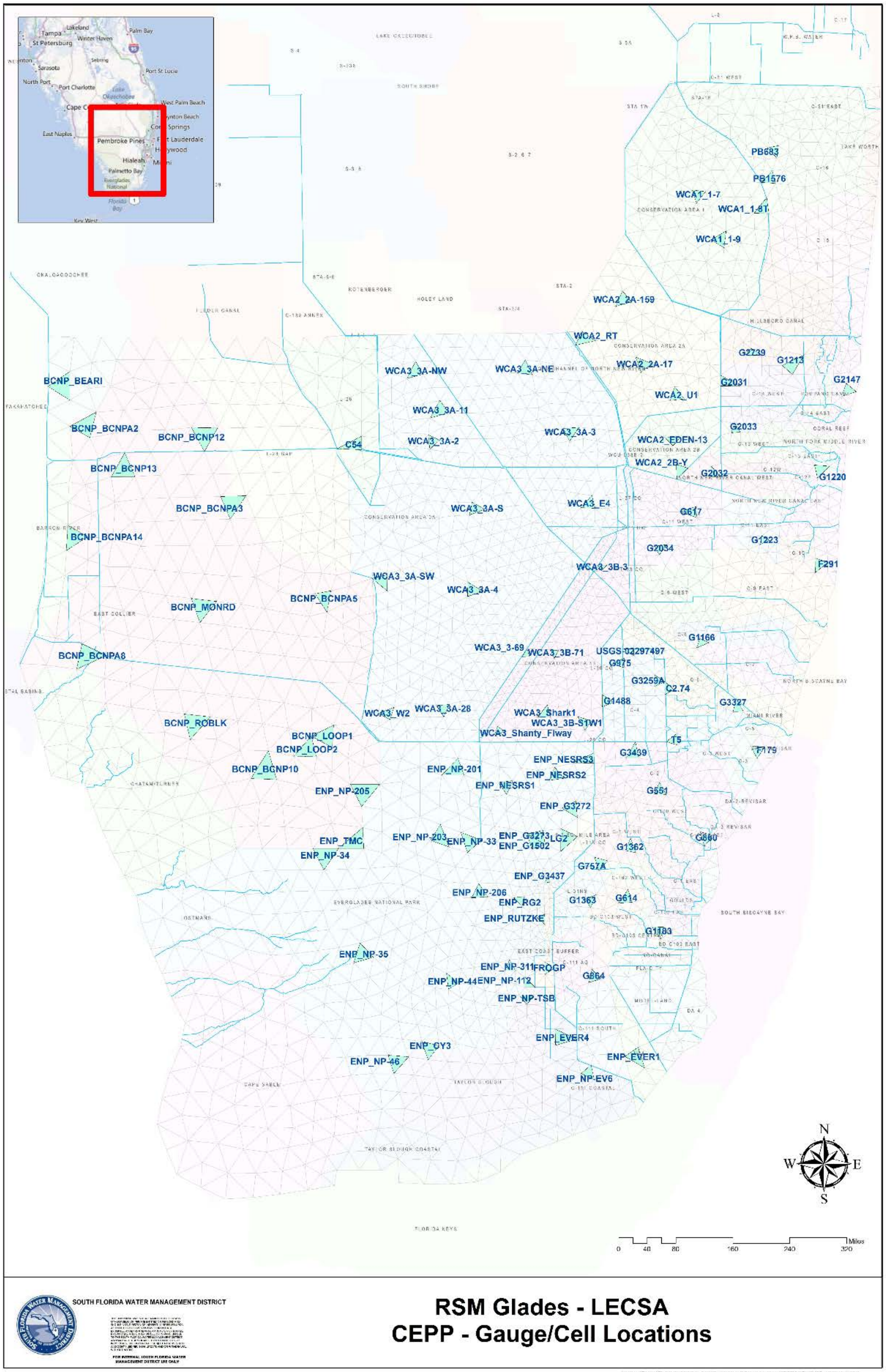

Figure C.1-12. Map of RSM-GL Monitoring Gauge Locations

The CEPP proposed changes to the operation of WCA 3 to better mimic a natural delivery of water through the system in response to rainfall. Unlike regulation schedule-based operations, the Rain-Driven Operations (RDO) estimates inflows and outflows in response to weekly rainfall and PET and target water deliveries so that the weekly stage at 10 target locations (3ANW, 3A11, 3ASW, W2, 3A4, 3AS, 3ANE, 3A28, E4, 3A3) (see **Figure C.1-12**) approach the corresponding weekly restoration targets. In addition to meeting these targets, the RDO aims at improved recession rates (measured in feet per week) in three range categories: excellent (0.03 to 0.06), acceptable (0 to 0.03 and 0.06 to 0.10), and unacceptable (higher than 0.10). The recession rate would be calculated as the difference between the current stage and the previous week's stage. The stage would be calculated as the average of three locations: 3A4, 3A28, and 3A3. The RDO employs a mechanism that resists the stage going into Zone A of the WCA 3A Interim Regulation Schedule. As part of a system-wide optimization, the WCA 3A RDO is constrained with the amount and timing of inflows upstream, and with the restoration targets and constraints in WCA 3B and the ENP.

It is recognized that transitioning to RDO would likely be a lengthy and complex process for the USACE, but a necessary step in achieving the proposed restoration objectives within WCA 3A and ENP. The process for making this transition has not yet been developed, but it is envisioned for RDO to be phased in gradually as CEPP components become operational. RDO operations might also be considered by the USACE during future operational planning studies prior to CEPP, as appropriate. Initially, system operations would be conducted under the current Rainfall Plan, with modeling and testing of RDO to occur alongside that plan; development and limited testing of RDO modeling tools should be initiated prior to this operational testing period. When RDO has been developed and approved for use, the USACE will fully implement it.

C.1.3.8.1 Lake Okeechobee and the Northern Estuaries

The hydrologic modeling of the CEPP alternatives and, therefore, the selected plan included proposed revisions to the 2008 LORS decision tree outcome maximum allowable discharges depending on the following criteria: Lake Okeechobee inflow and climate forecasts (class limits were modified for tributary hydrologic conditions, seasonal climate outlook, and multiseasonal climate outlook), stage level (regulation zone), and stage trends (receding or ascending). While some refinements were made within the operational flexibility available in the 2008 LORS, consistent with the original modeling intent, the final operational assumptions ultimately extended beyond this flexibility due to adjustments made to the tributary/climatological classifications. The LORS 2008 Regulation Schedule zones were unchanged. Additional information and documentation of these assumptions are provided in the Engineering Appendix (**Appendix A, Annex A-2**) of the CEPP PACR.

Compared to conditions under the ECB, FWO Lake Okeechobee stages are increased by 0.25-0.45 ft for the upper 90% of the stage duration curve, excluding extreme dry hydrologic conditions (**Figure C.1-13**). In the lower 10% range, stages were increased 0.10-0.40 ft. Peak lake stage increased from 17.59 ft NGVD in the ECB to 17.66 ft NGVD in the FWO during the 1965-2005 period of simulation. Average annual total discharges from Lake Okeechobee to the Northern Estuaries were reduced from 643,000 ac-ft in the ECB (445,000 to the Caloosahatchee Estuary; 198,000 to the St. Lucie Estuary) to 482,000 ac-ft in the FWO (356,000 to the Caloosahatchee Estuary; 126,000 to the St. Lucie Estuary).

For the Caloosahatchee Estuary, compared to conditions under the ECB, mean monthly flows above 2,800 cfs and 4,500 cfs are reduced by 22 months and 10 months, respectively, for the FWO (24% and 25%

reductions, respectively) (**Figure C.1-14**). Mean monthly flows less than 450 cfs are reduced by the FWO from the ECB (**Figure C.1-15**).

For the St. Lucie River and Estuary, compared to conditions under the ECB, mean monthly flows above 2,000 cfs and 3,000 cfs are reduced by 22 months and 5 months, respectively, for the FWO (41% and 17% reductions, respectively) (**Figure C.1-16**). Mean monthly flows less than 350 cfs are also reduced by the FWO from the ECB (**Figure C.1-17**).

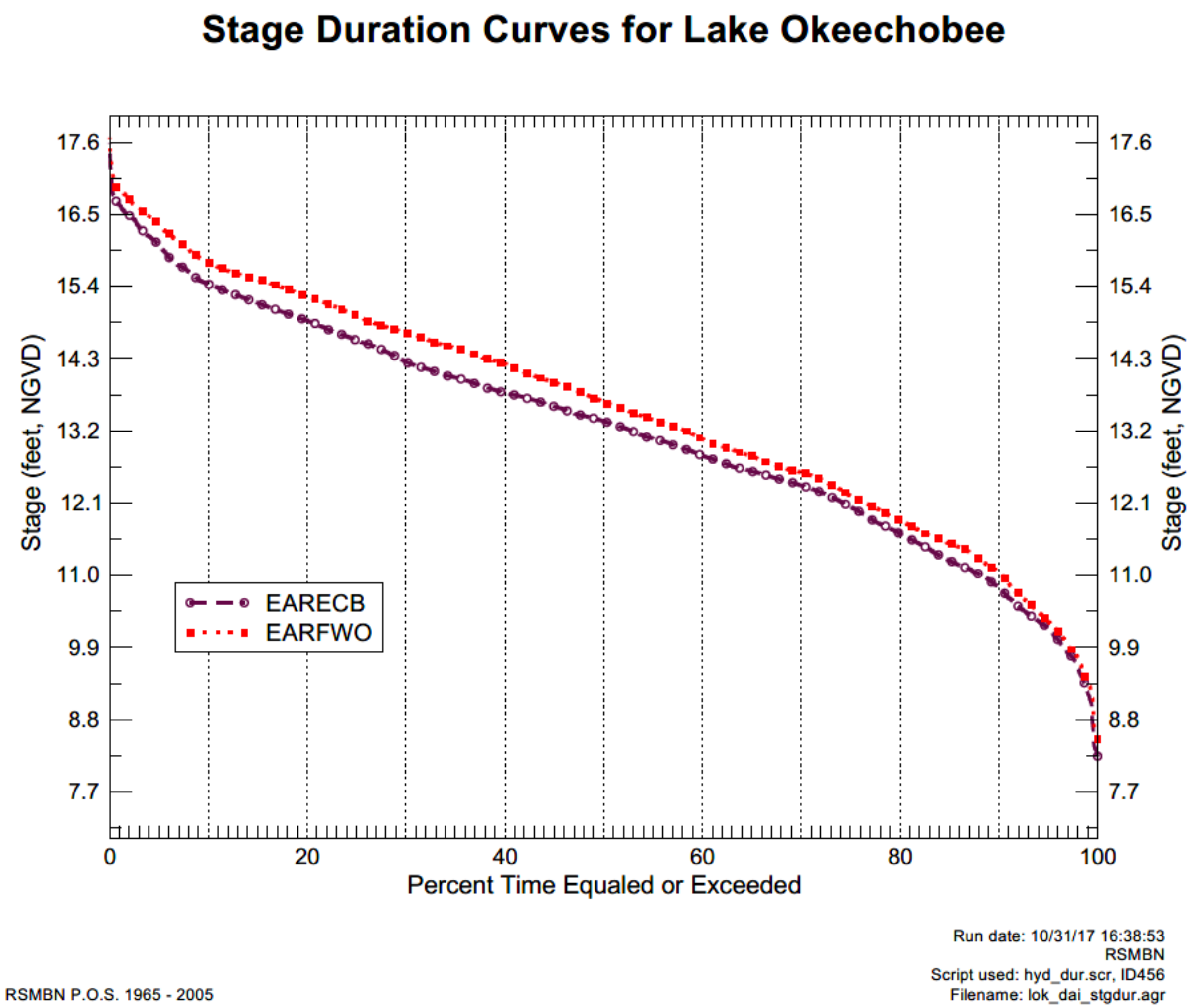

Figure C.1-13. Lake Okeechobee Stage Duration Curve for CEPP PACR Baselines

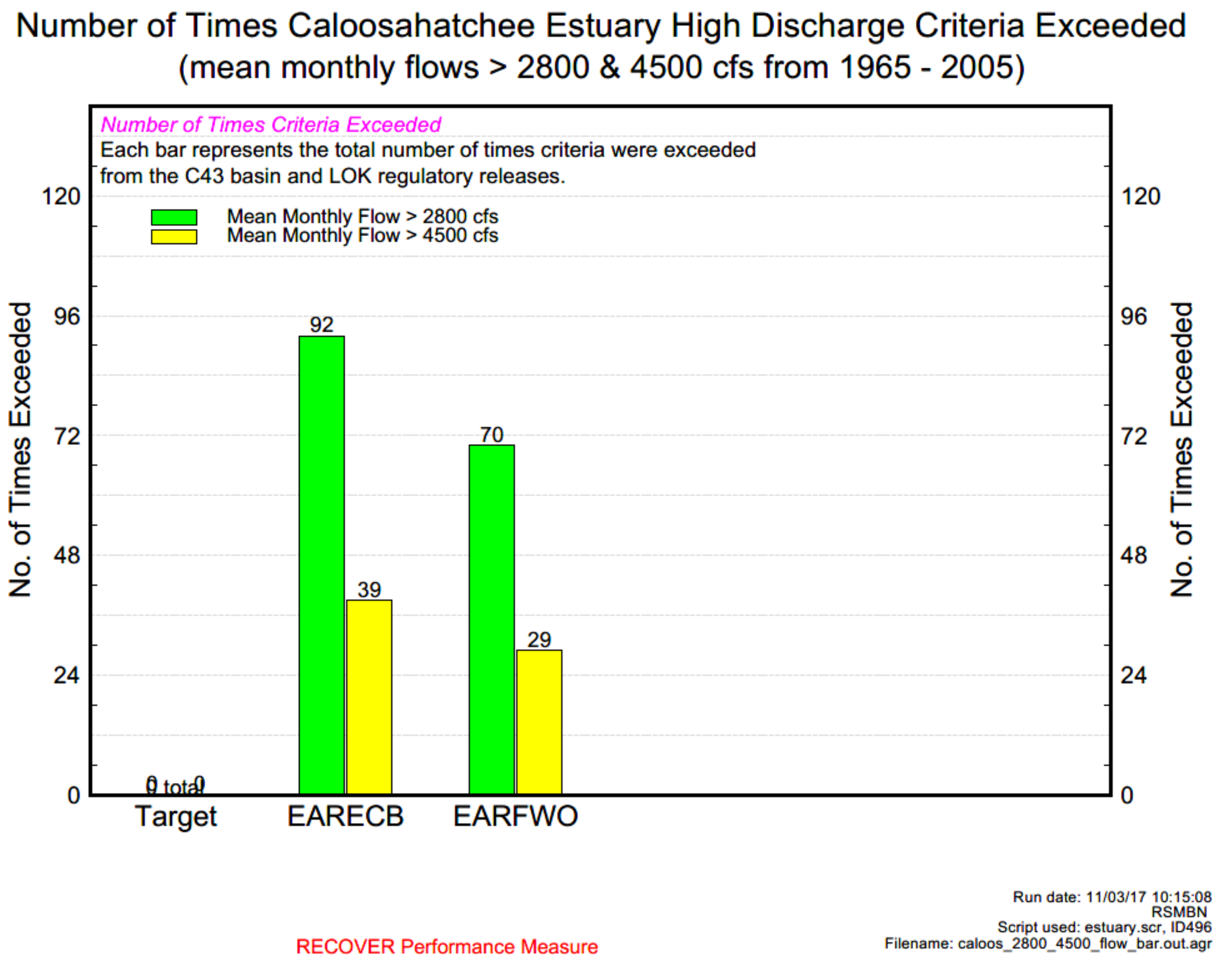

Figure C.1-14. Caloosahatchee Estuary High Discharge Frequency for CEPP PACR Baselines

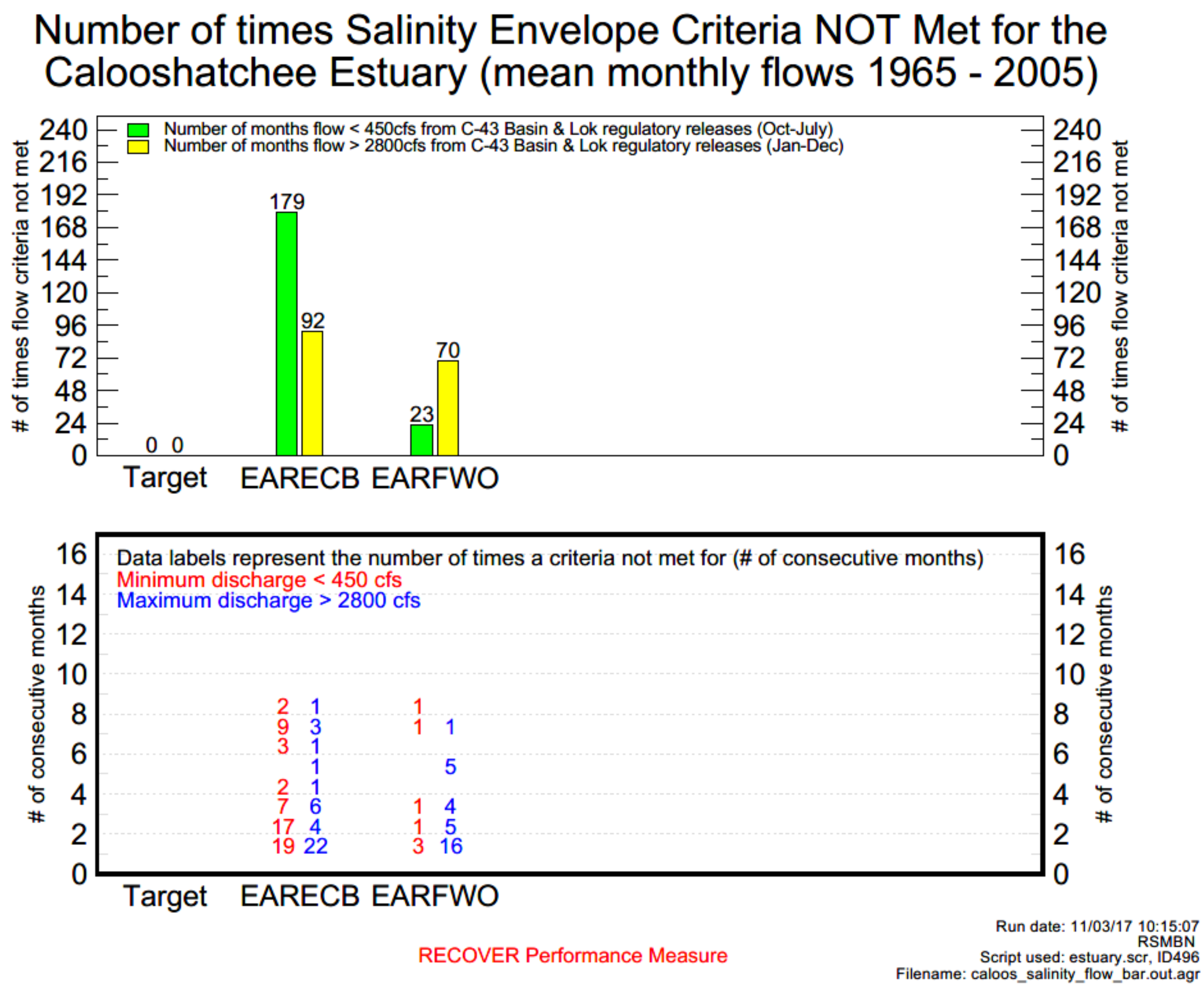

Figure C.1-15. Caloosahatchee Estuary Low Discharge Frequency for CEPP PACR Baselines

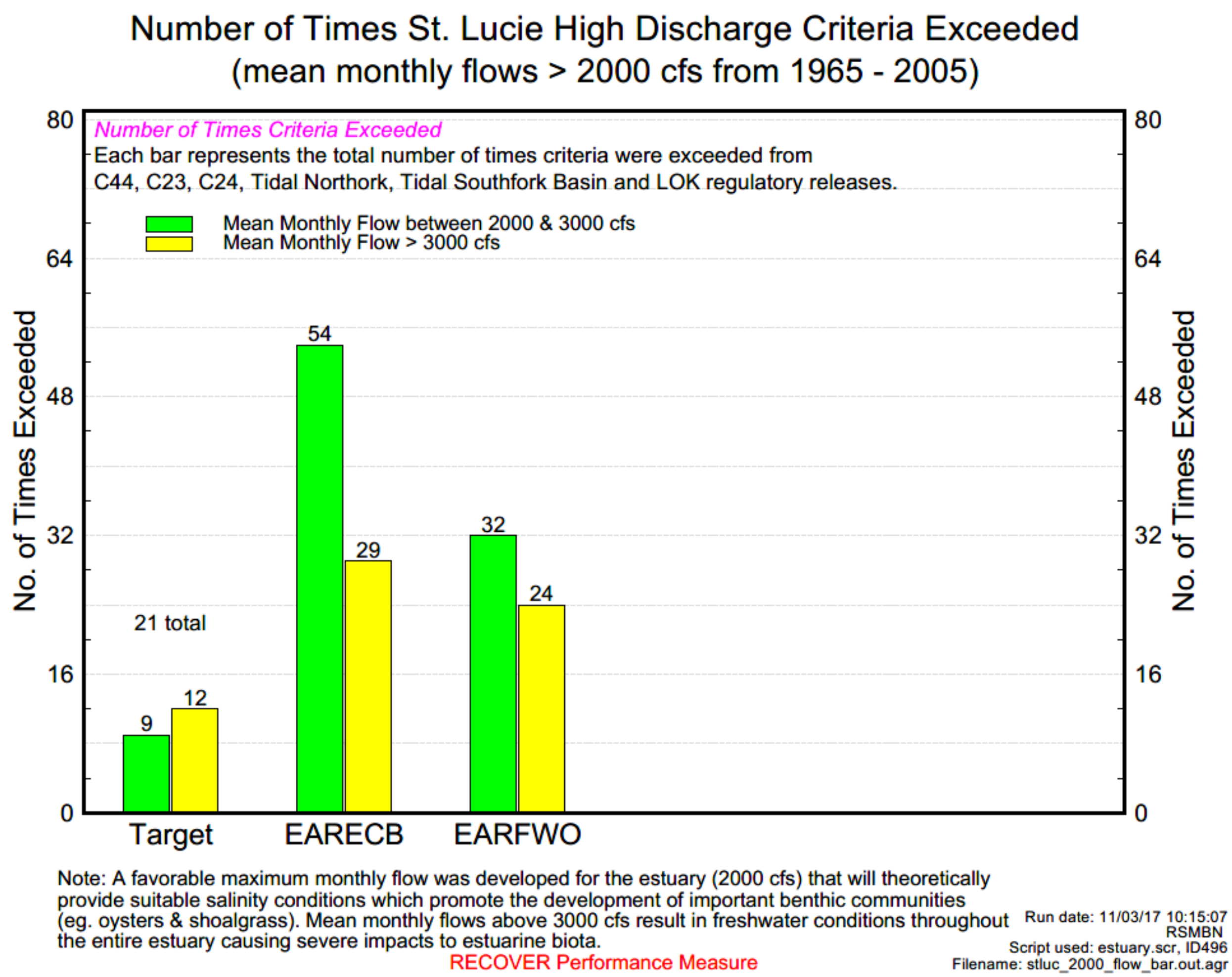

Figure C.1-16. St. Lucie River and Estuary High Discharge Frequency for CEPP PACR Baselines

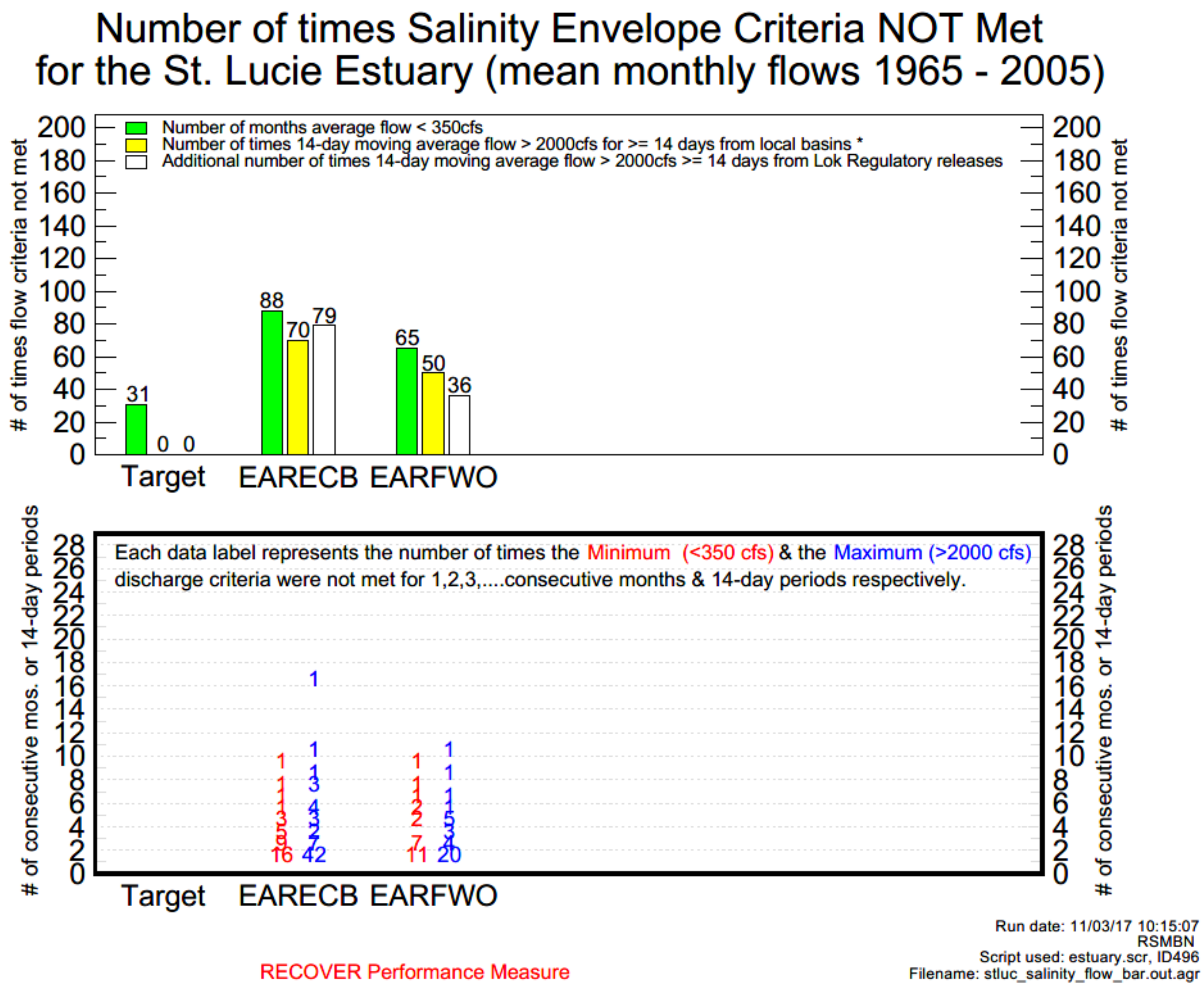

Figure C.1-17. St. Lucie River and Estuary Low Discharge Frequency for CEPP PACR Baselines

C.1.3.8.2 Everglades Agricultural Area

Minor changes to groundwater levels are expected adjacent to the proposed CEPP A-2 FEB (14,000 acres) compared to conditions under the ECB, which includes the SFWMD Restoration Strategies A-1 FEB. The A-2 FEB design includes perimeter seepage collection canals and associated seepage pumps to limit potential impacts. Detailed CEPP assessments within the EAA are not available because the RSM-BN does not simulate groundwater within the EAA.

C.1.3.8.3 Water Conservation Area 1

Compared to conditions under the ECB, no significant changes to WCA 1 stages are indicated. Average annual regulatory releases from WCA 1 to WCA 2A via the S-10 structures are moderately reduced from 293,000 ac-ft to 266,000 ac-ft.

C.1.3.8.4 Water Conservation Area 2A and 2B

Compared to conditions under the ECB, WCA 2A stages are moderately decreased by 0.1-0.3 ft under all hydrologic conditions for the FWO condition (**Figure C.1-18**). Average annual inflows from STA 2 (including Compartment B) to WCA 2A are significantly decreased from 377,000 ac-ft to 236,000 ac-ft in the FWO (a

37% decrease) with the assumed implementation of the L-6 diversion from WCA 2A to WCA 3A. The S-7 pump station also contributes inflows to WCA 2A; S-7 inflows are reduced from 74,000 ac-ft in the FWO to 68,000 ac-ft in the FWO, due to operations to redirect a portion of STA 3/4 discharges away from WCA 2A to WCA 3A via the S-8 pump station. The L-6 diversion from WCA 2A to WCA 3A is utilized approximately 70% of the period of simulation under the FWO operations, with the maximum diversion capacity of 500 cfs approximately 17% of the period of simulation. Average annual regulatory releases from WCA 2A to WCA 3A via the S-11s are significantly decreased from 482,000 ac-ft in the FWO to 323,000 ac-ft for the FWO.

Compared to conditions under the ECB, the FWO stages within WCA 2B are significantly decreased by 0.25-0.50 ft under dry hydrologic conditions, with minor decreases in the duration range. No changes in duration under extreme wet conditions (**Figure C.1-19**).

C.1.3.8.5 L-28 Triangle

Located to the west of northwestern WCA 3A, the areas immediately west of the L-28 Levee are affected by the increased stage levels in northwest WCA 3A through increased seepage westward across the L-28 Levee. South of the L-4 Levee and north of Interstate 75 (approximately 11 miles), the areas immediately west of the L-28 Levee include the Seminole Tribe of Florida's Big Cypress Reservation and the Miccosukee Tribe of Indians of Florida's Reservation. Compared to conditions under the ECB, FWO stages immediately west of the L-28 Levee are increased by 0.1-0.2 ft under wet-to-normal hydrologic conditions and increased by 0.2-0.3 ft under normal-to-dry hydrologic conditions, with no significant change indicated for extreme wet or dry conditions (**Figure C.1-20**). Stage increases are observed only for the RSM-GL cells located immediately west of the L-28 Levee, which corresponds to approximately 1-2 miles west of L-28.

Although FWO stages do not include modifications to the L-28 Levee or the adjacent canal, stages within the L-28 Triangle are slightly increased by 0.1-0.2 ft during nearly all hydrologic conditions, due to groundwater interactions with the down-gradient western WCA 3A marsh (**Figure C.1-21**). Compared to the ECB, no stage increases are indicated during extreme wet hydrologic conditions.

C.1.3.8.6 Big Cypress National Preserve

Stages within the BCNP, west of WCA 3A, do not change significantly between the ECB and the FWO.

C.1.3.8.7 Water Conservation Area 3A and 3B

The hydrologic effects of the CEPP selected plan included the combined effects from implementation of the A-2 FEB, L-6 Diversion, northern WCA 3A hydropattern restoration components along L-4, Miami Canal backfill (north of Interstate 75), and proposed new or expanded WCA 3A outlet structures along L-67A, in addition to the associated operations. Compared to conditions under the ECB, average annual combined structural inflows to WCA 3A from STA 3/4, STA 5/STA 6 (including Compartment C), and WCA 2A are significantly increased from 1,054,000 ac-ft to 1,258,000 ac-ft (a 19% increase) with FWO (CEPP in place). In order to avoid adverse increases to the frequency, duration, and peak stages of WCA 3A high water conditions with this net increase in WCA 3A inflows, average annual combined structural outflows from WCA 3A through S-151 (to WCA 3B), three new outflow structures along L-67A (to WCA 3B), S-333 (to ENP NESRS), the S-12 structures (to ENP WSRS), and the S-343/S-344 culverts are also significantly increased from 1,237,000 ac-ft in the ECB to 1,427,000 ac-ft in FWO (approximately 15% increases).

Since WCA 3A covers approximately 752 square miles, hydrologic differences between the ECB and the FWO are characterized at representative gages throughout WCA 3A.

Within northwest WCA 3A, compared to conditions under the ECB, stages are generally significantly increased by 0.6-0.8 ft for the FWO throughout the entire duration range (**Figure C.1-22**). Stages within northeast WCA 3A are significantly increased by 0.4-0.7 ft for the FWO, with no significant change during extreme wet conditions and a slight increase in stage for extreme dry conditions (**Figure C.1-23**). Within east-central WCA 3A (3A-3), FWO stages are significantly increased by 0.2-0.5 ft, with no significant change during the wettest 20% of conditions (**Figure C.1-24**). Proceeding south within central WCA 3A (3A-4), FWO stages are generally increased by 0.1-0.2 ft during average-to-dry conditions, with a slight depth reduction during the wettest 10% of conditions and no significant change during extreme dry conditions (**Figure C.1-25**). Southern WCA 3A (3A-28) stages for FWO are decreased by 0.1-0.2 ft during the wettest 5% of conditions and slightly decreased during normal-to-dry conditions (**Figure C.1-26**).

The ECB includes the existing S-151 gated culvert as the sole structural inflow to WCA 3B (341,000 ac-ft average annual) and the existing S-355 A and B spillways as the only structural outflows from WCA 3B (less than 2,000 ac-ft average annual). FWO conditions include three new inflow structures to WCA 3B along L-67A (in addition to increased capacity at S-333), resulting in an additional WCA 3B inflow design capacity of 1,500 cfs. Compared to conditions under the ECB, average annual combined structural inflows to WCA 3B from WCA 3A are significantly increased from 341,000 ac-ft in the ECB to 544,000 ac-ft in the FWO (60% increase). The WCA 3B outflow configuration for the FWO includes the removal of the L-29 Levee within the Blue Shanty flowway. The WCA 3B inflow structures indicated for the FWO hydrologic modeling (S-345D, S-345F, and S-345G) were renamed S-631, S-632, and S-633 (sequenced from north to south). The FWO, with the Blue Shanty flowway and L-29 Levee Gap, achieve significant north-to-south surface water flow directionality within WCA 3B only in the spatial footprint of the Blue Shanty flowway. Compared to conditions under the ECB, average annual combined structural outflows from WCA 3B to the L-29 Canal and ENP NESRS are significantly increased from less than 2,000 ac-ft in the ECB to 241,000 ac-ft in the FWO, with more than 98% of these WCA 3B outflows in the FWO discharged across the L-29 Levee degrade within the Blue Shanty flowway. Also included in the WCA 3B water budget, average annual combined structural outflows from WCA 3B to the LEC (S-31 and S-337) are moderately reduced from 137,000 ac-ft in the ECB to 104,000 ac-ft in FWO. Peak stages within central WCA 3B (Site 71) exceed 9.0 ft NGVD for only 15 days (0.10%) of the RSM-GL 1965-2005 period of simulation for the FWO; WCA 3B stages are above 8.0 ft NGVD for approximately 22-24% of the period of simulation.

The WCA 3B hydrologic effects, resulting from the targeted increased inflows to eastern WCA 3B with the FWO condition, are apparent. Compared to conditions under the ECB, FWO stages at WCA 3B Site 71 are increased under all hydrologic conditions (**Figure C.1-27**), including stage increases of 0.1 ft during the upper 40% of the stage duration curve (normal-to-extreme wet conditions), stage increases of 0.2-0.3 ft for normal-to-dry conditions, and a slight stage increase during extreme dry conditions. Resultant from the CEPP plan formulation process, based on ecological, seepage management, and cost considerations, stages within eastern WCA 3B for FWO were intentionally managed lower than they were within the Blue Shanty flowway, and increased structural inflows to this area of WCA 3B (S-345D) were targeted to achieve benefits of an extended hydroperiod without significantly increasing WCA-3B discharges through the existing S-355A and S-355B gravity spillway structures. For FWO, the peak stage within the Blue Shanty flowway is 9.74 ft NGVD and stages exceed 8.0 ft NGVD for approximately 42% of the period of simulation.

The FWO simulation included operational constraints for the inflow structures to the Blue Shanty flowway (S-345F and S-345G) to prevent L-29 Canal stages from exceeding 9.7 ft NGVD, the assumed design high-water criteria for the DOI TTNS project. Within the Blue Shanty flowway, approximately 97% of the increase in average annual structural inflows to this area of WCA 3B are discharged across the L-29 Levee degrade.

C.1.3.8.8 Northeast Shark River Slough

The FWO project condition assumes the L-29 Canal maximum operational limit to be 9.7 ft NGVD (7.5 ft NGVD is used for the ECB) and removal of the G-3273 stage constraint (6.8 ft NGVD is used for the ECB). Total net structural inflows to NESRS via the L-29 Canal, computed as the sum of S-333, S-355A, S-355B, L29 Levee Gap, and S-356 minus S-334, are significantly increased to 762,000 ac-ft compared to 87,000 ac-ft average annual under the FWO.

Compared to conditions under the ECB, stages are significantly increased by 0.5-0.8 ft under all hydrologic conditions at monitoring gage NESRS-2 for FWO (**Figure C.1-28**). Similar trends are also observed further south at the NESRS-1 monitoring gage. Changes to the average annual overland flow to NESRS across RSM-GL Transect 18 are shown in **Figure C.1-29**; a reference map for the RSM-GL transects (which are consistent with the SFWMM model transects, adjusted for the RSM grid resolution) is provided in **Figure C.1-30**.

C.1.3.8.9 Western Shark River Slough

WSRS, located to the west of L-67 Extension Levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C, and D). Under ERTP, the utilization of the S-12 structures and the seasonal sequential closure periods beginning from the west at S-12A (November 1 – July 14) and S-12B (January 1 – July 14), respectively, is meant to move water from WCA 3A into WSRS while providing conditions for CSSS-A nesting and breeding.

Changes to the average annual overland flows to WSRS across RSM-GL Transect 17 are shown in **Figure C.1-31**. FWO stages within northwest ENP (NP-201) are generally decreased by 0.1-0.3 ft under both wet and dry hydrologic conditions. Stages are slightly increased or unchanged for normal hydrologic conditions between approximately 35% and 55% on the stage duration curve (**Figure C.1-32**). To the south and west, the NP-205 monitoring gage (used as an indicator for CSSS-A hydrology) indicates a potentially significant stage decrease of 0.1-0.3 ft under all hydrologic conditions, compared to the ECB (**Figure C.1-33**). Stages further south within Central Shark River Slough (P-33) are generally significant increases by 0.2-0.4 ft under all hydrologic conditions (**Figure C.1-34**). Stages within Central Shark River Slough demonstrate a combined hydrologic response to the hydrologic changes previously indicated for both NESRS and WSRS; the resultant combined average annual transect flows within Central Shark River Slough (Transect 27) are 23% increased from an average annual volume of 618,000 ac-ft with the ECB to 760,000 ac-ft for FWO (**Figure C.1-35**).

C.1.3.8.10 Taylor Slough

Compared to the ECB, ENP stages along Taylor Slough (NP-TSB) are slightly increased by approximately 0.1-0.3 ft for durations in the range 90-10%. During the wettest 10% and the driest 10% of hydrologic conditions, stages increased by 0.1 ft during normal-to-dry hydrologic conditions, and slightly decreased for the driest 3% in FWO (**Figure C.1-36**).

C.1.3.8.11 Lower East Coast Area

The LEC area is located to the east of the L-31N, L-31W, and C-111 canals. Under the ECB (ERTP), specified canal water levels/ranges are meant to provide flood protection, water supply, and prevention of saltwater intrusion for the LEC. For the FWO, the operations for the SDCS are changed from the ECB operations for G-211 and the coastal canals are utilized to convey seepage water to Biscayne Bay to offset for reduced flows caused by implementation of FWO. Observed stage changes within the LEC are separately discussed with the summary of flood control and water supply performance for the FWO, included in **Section C.1.3.10**.

C.1.3.8.12 8.5 Square Mile Area

The 8.5 SMA is located along the eastern boundary of ENP. The FWO modifies the ECB operations of the S-357 pump station (including the S-331 trigger shifted from Angel's well to LPG-2, 2011 Interim Operating Criteria) (USACE 2011b), in an effort to increase discharges from the 8.5 SMA detention cell to the C-111 South Dade North Detention Area and reduce the reliance on the S-331 pump station in L-31N to provide flood mitigation for the 8.5 SMA protected area. Details of the S-357 operations are provided with the documentation of the modeling assumptions for the FWO, located in **Appendix A**. The resolution of the RSM-GL is extremely limiting for adequate representation of 8.5 SMA project features. Further technical investigations will likely be needed for the 8.5 SMA operations, and additional hydrologic/hydraulic modeling with a higher resolution model might be required. The 8.5 SMA detention cell weirs were lowered in the FWO, resulting in stages within the 8.5 SMA that are lowered by approximately 0.25-0.50 ft during wet conditions.

C.1.3.8.13 Biscayne Bay

Combined total average annual surface water canal discharges to central and southern Biscayne Bay (G-93, S-22, S-123, S-20F, S-20G, S-21, and S-21A) are increased by approximately 18,000 ac-ft for FWO, compared to the ECB. Average annual surface water canal discharges to northern Biscayne Bay (S-29, S-28, S-27, S26, S25, and S25B) are increased by 15,000 ac-ft for FWO, compared to the ECB.

C.1.3.8.14 Florida Bay

For the FWO, average annual surface water transect flows from southeastern ENP towards Florida Bay are slightly increased (2,000 ac-ft) for Craighead Basin (RSM-GL Transect 23A) (**Figure C.1-37**), increased by 16,000 ac-ft from Taylor Slough (Transect 23B), and decreased by 13,000 ac-ft for the Eastern Panhandle of ENP (Transect 23C), resulting in a net increase of approximately 5,000 ac-ft. Wet season overland flows to Florida Bay are slightly reduced compared to ECB for Transect 23C (**Figure C.1-38** and **Figure C.1-39**).

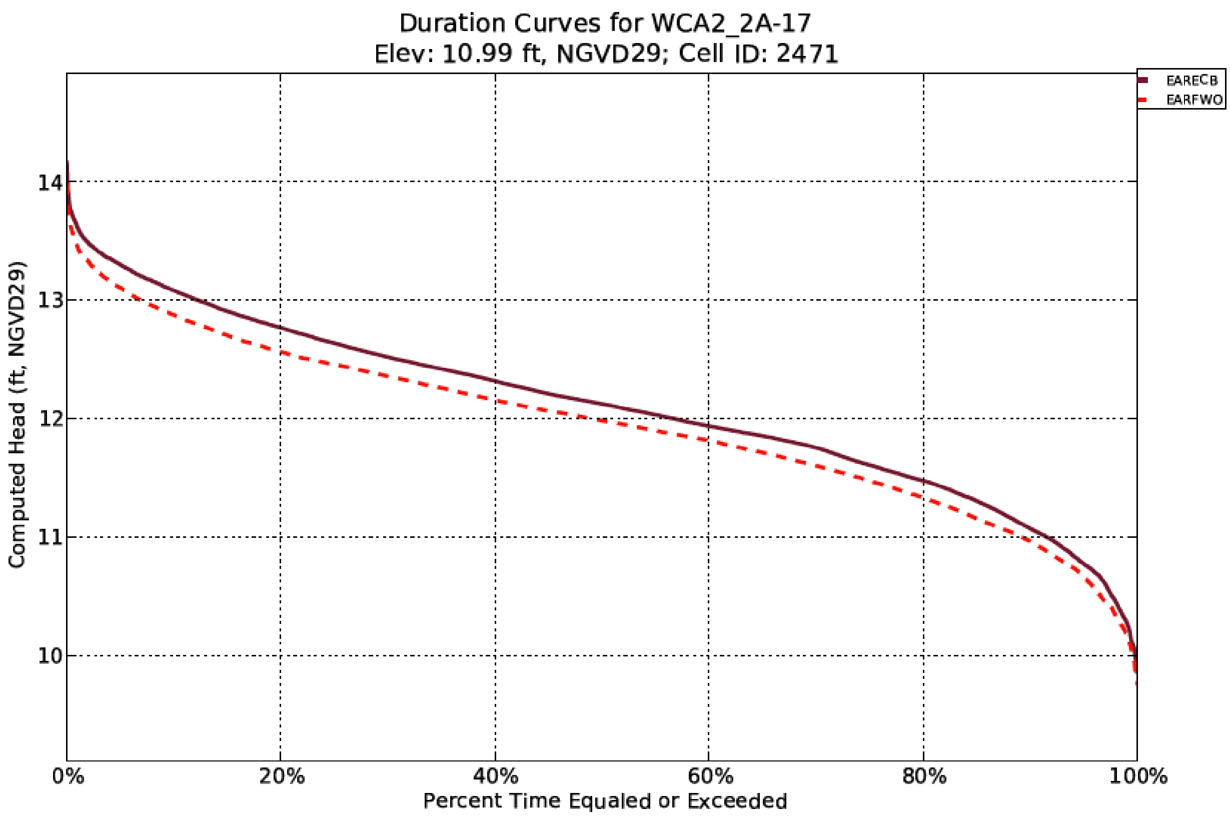

Figure C.1-18. Central WCA 2A Stage Duration Curve

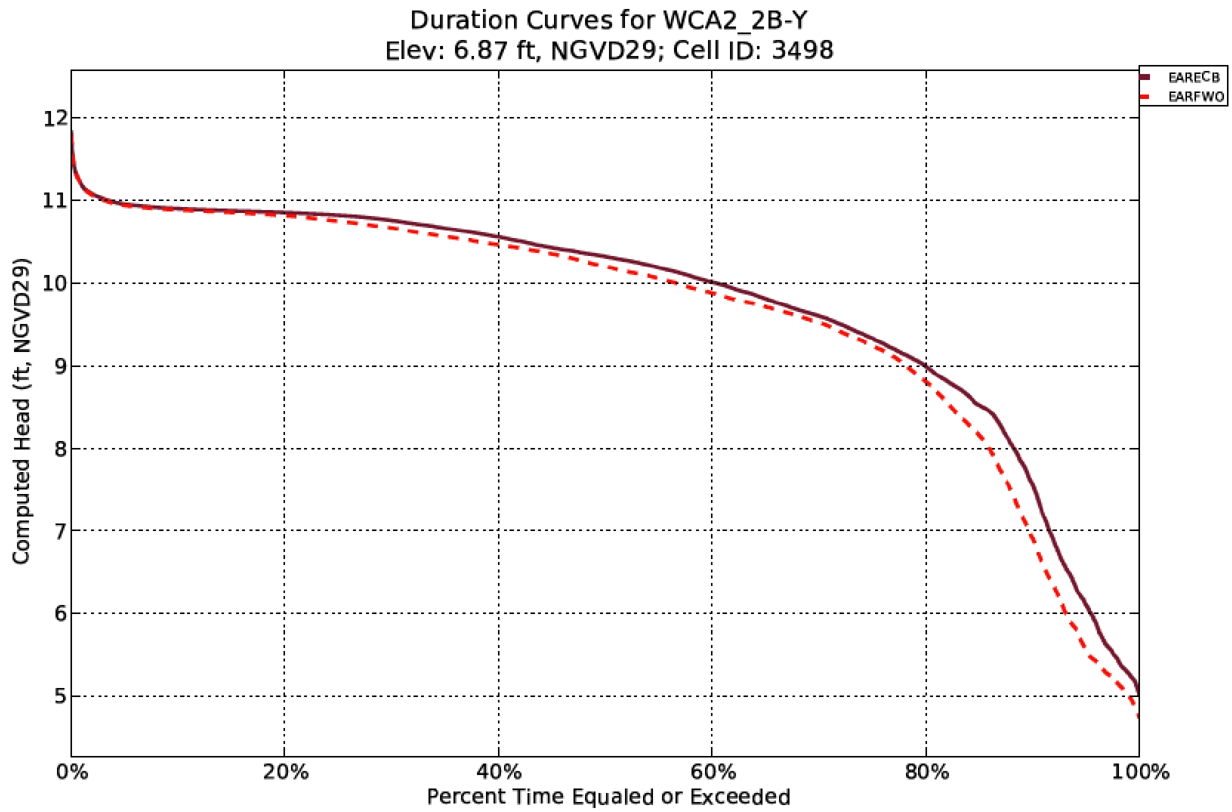

Figure C.1-19. Southern WCA 2B Stage Duration Curve

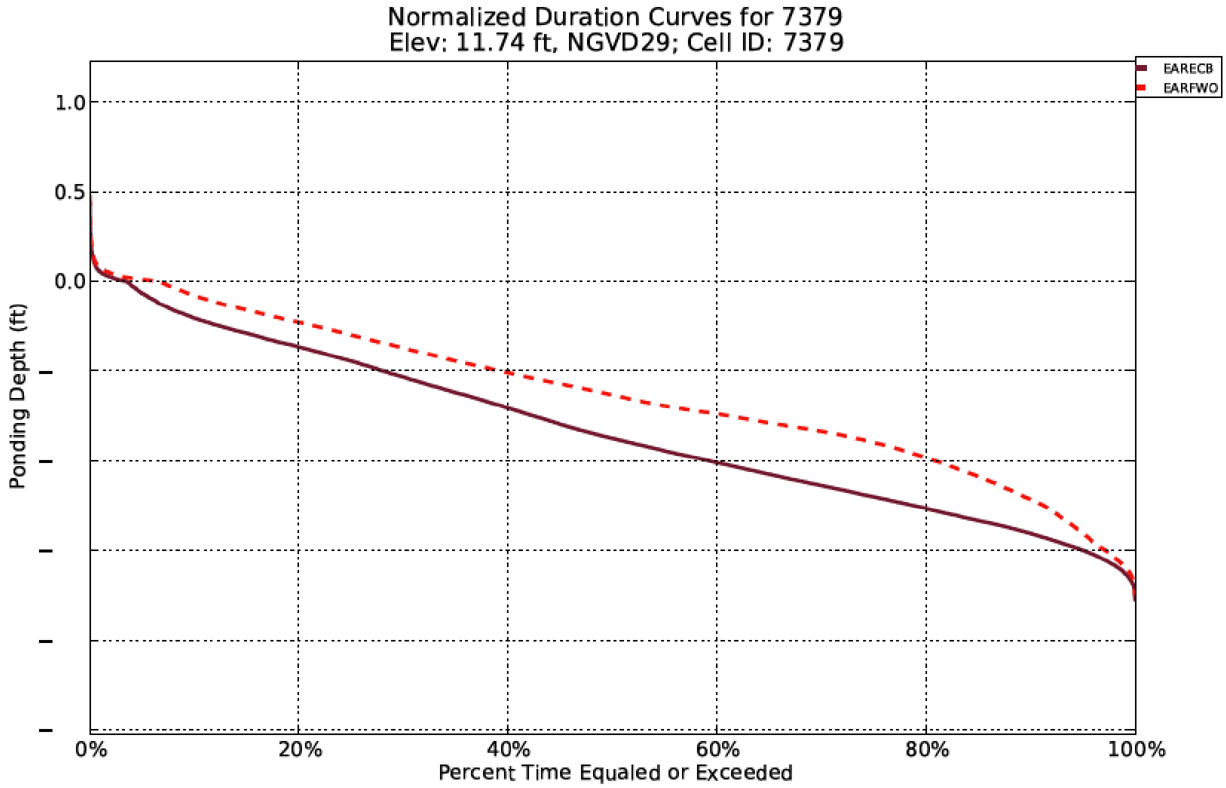

Figure C.1-20. Western L-28 Basin Stage Duration Curve

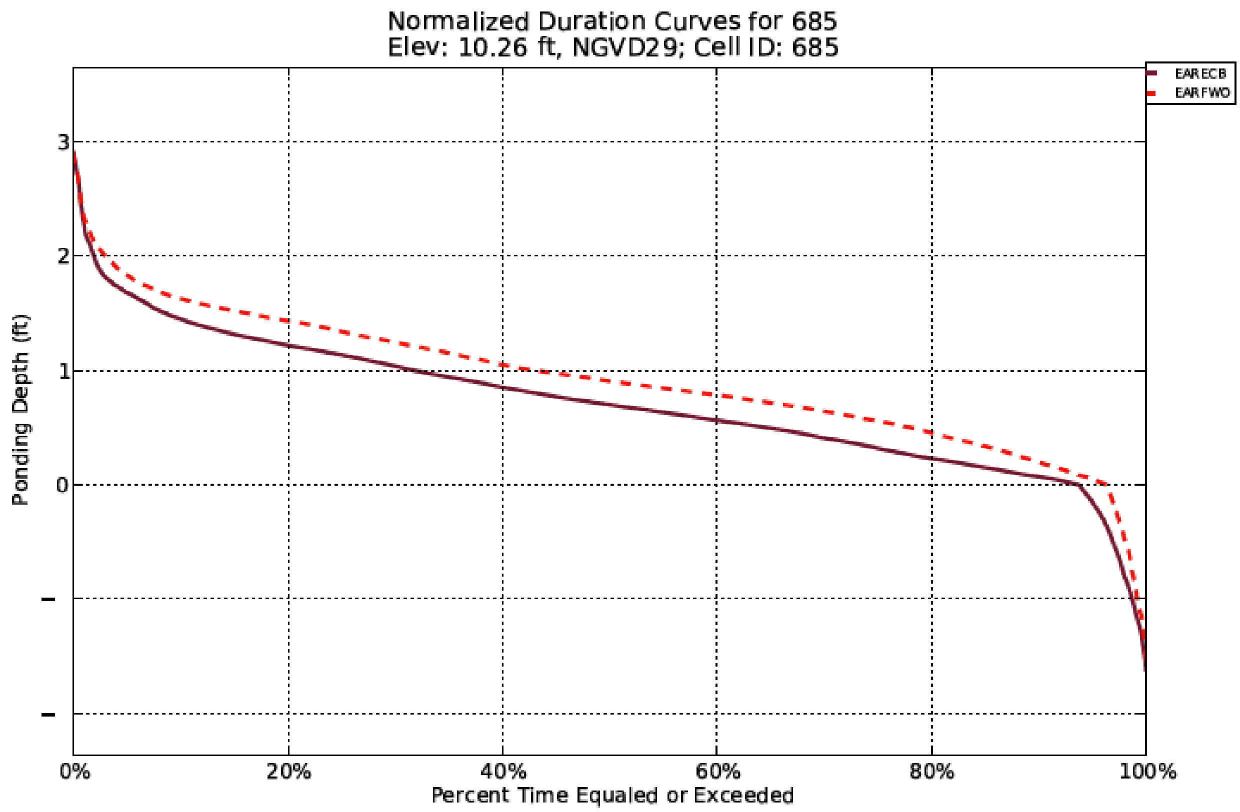

Figure C.1-21. L-28 Triangle Stage Duration Curve

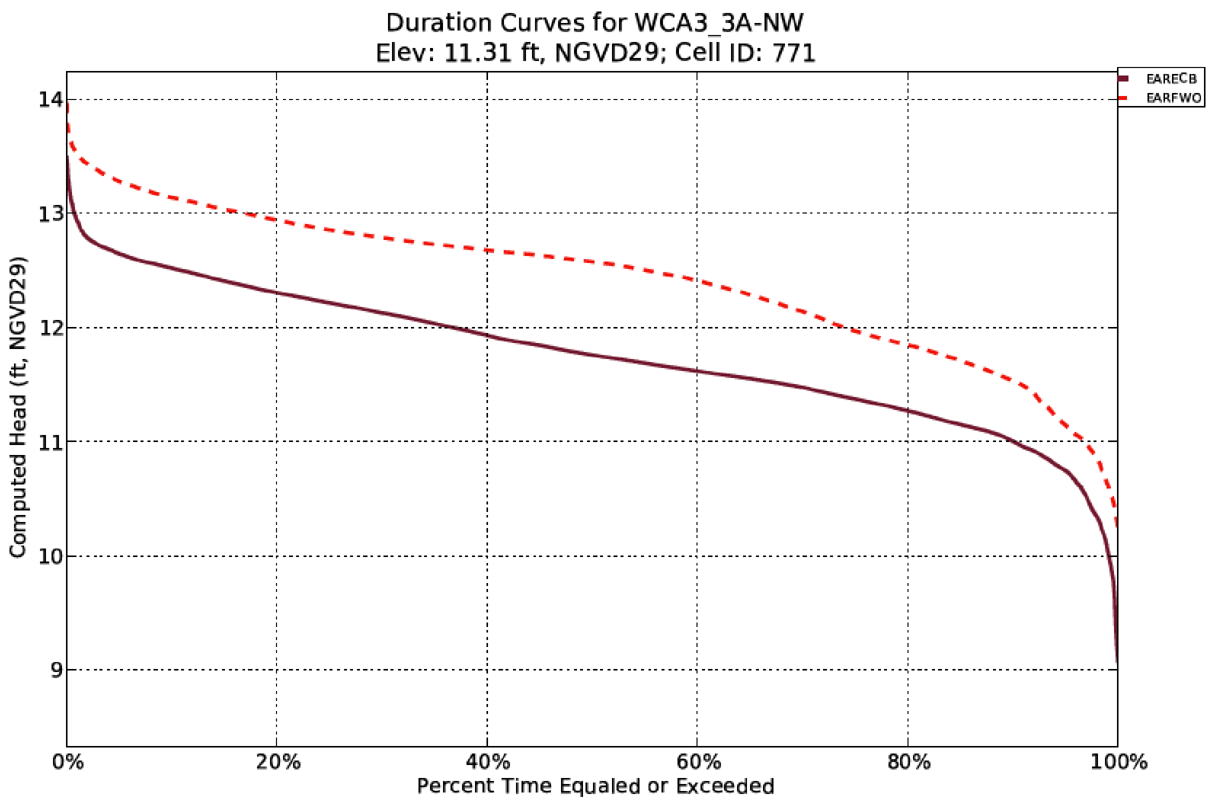

Figure C.1-22. Northwest WCA 3A Stage Duration Curve

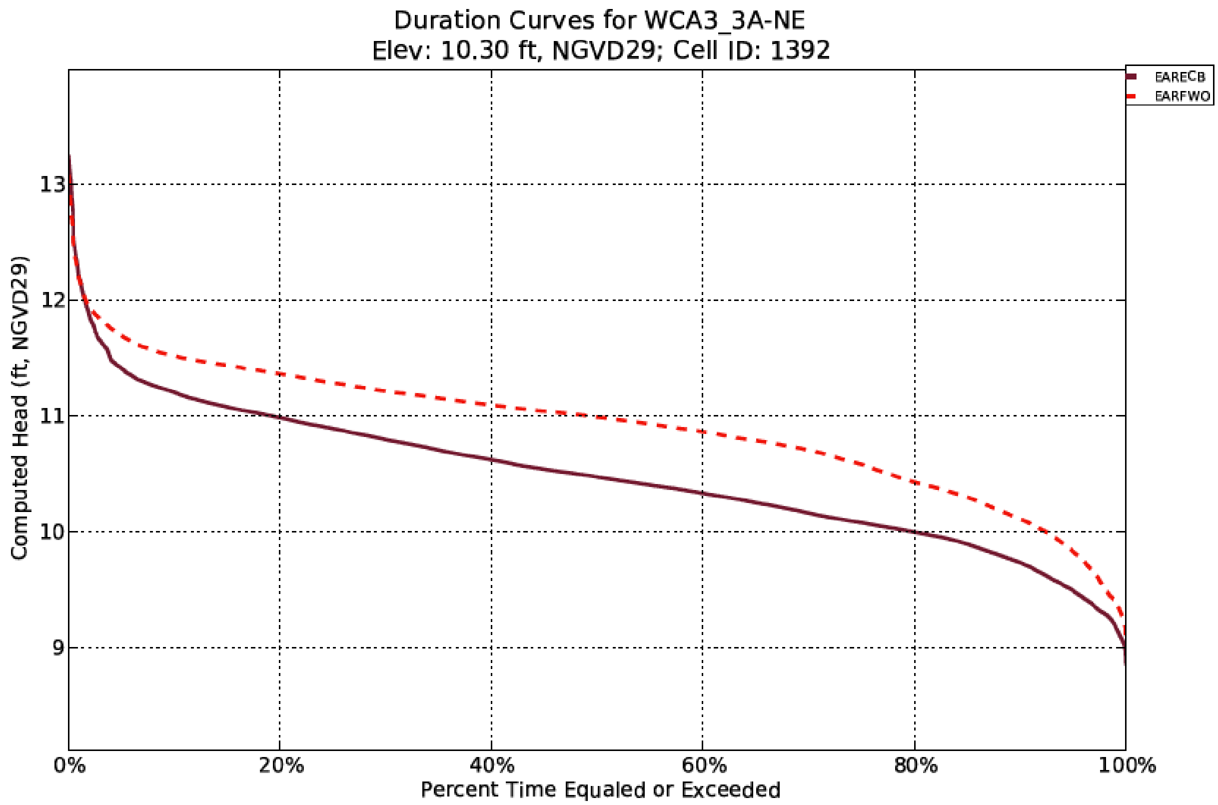

Figure C.1-23. Northeast WCA 3A Stage Duration Curve

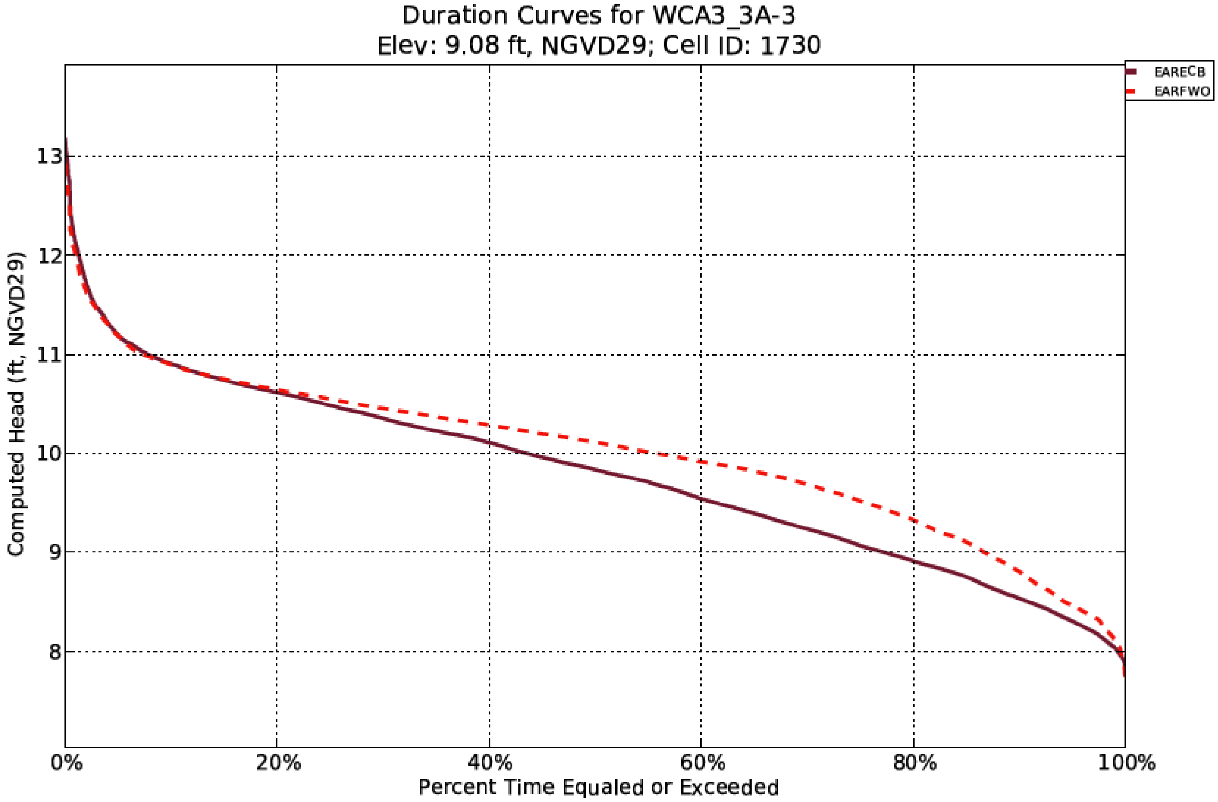

Figure C.1-24. East-Central WCA 3A Stage Duration Curve

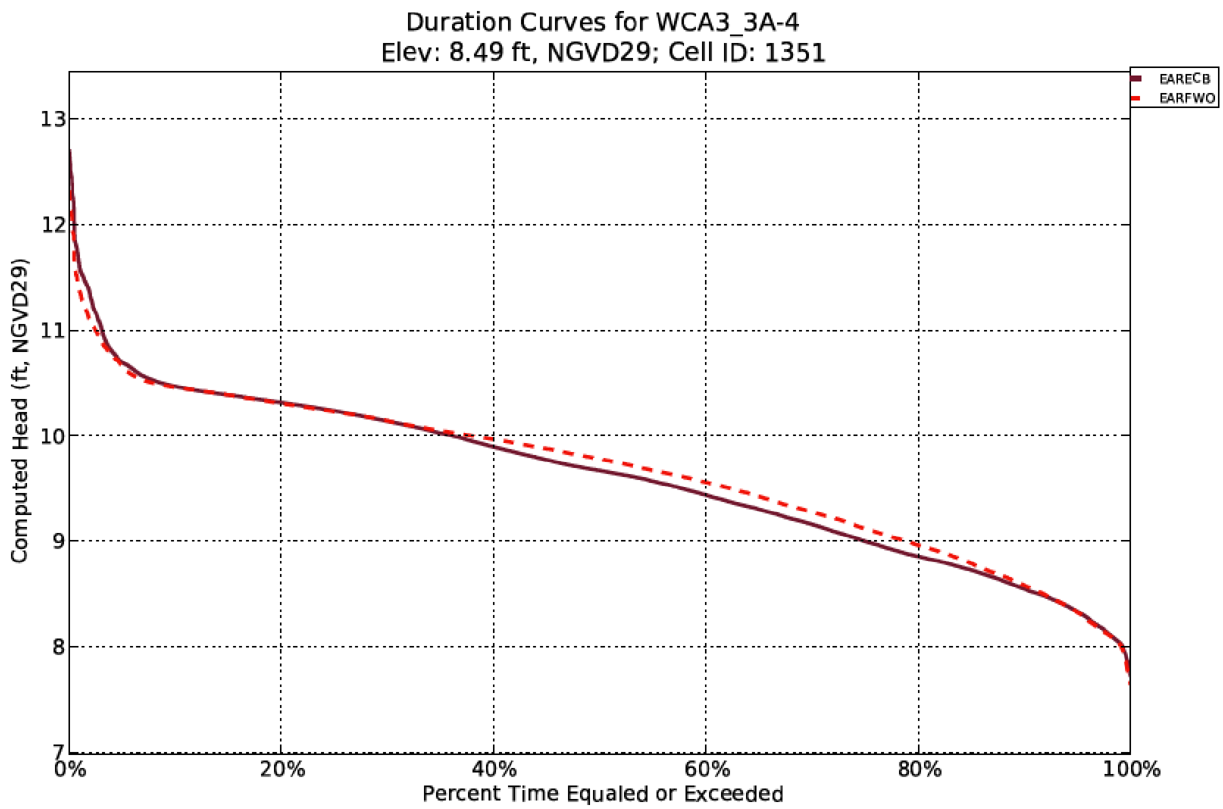

Figure C.1-25. Central WCA 3A Stage Duration Curve

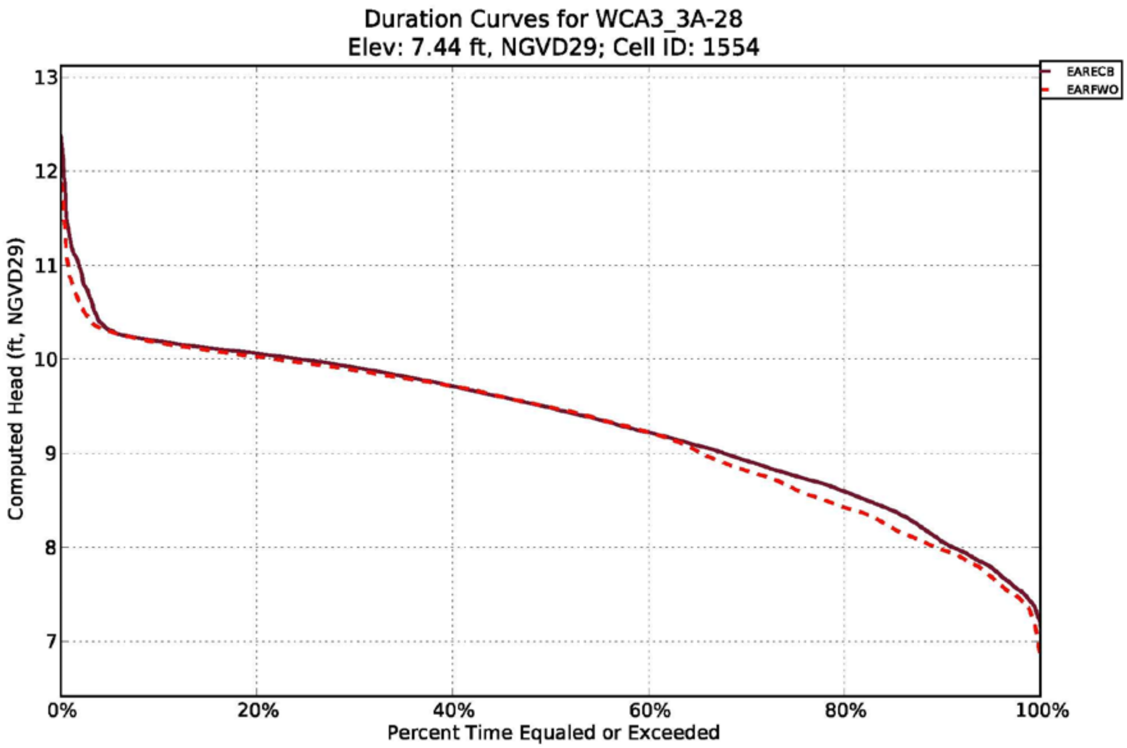

Figure C.1-26. Southern WCA 3A (3A-28) Stage Duration Curve

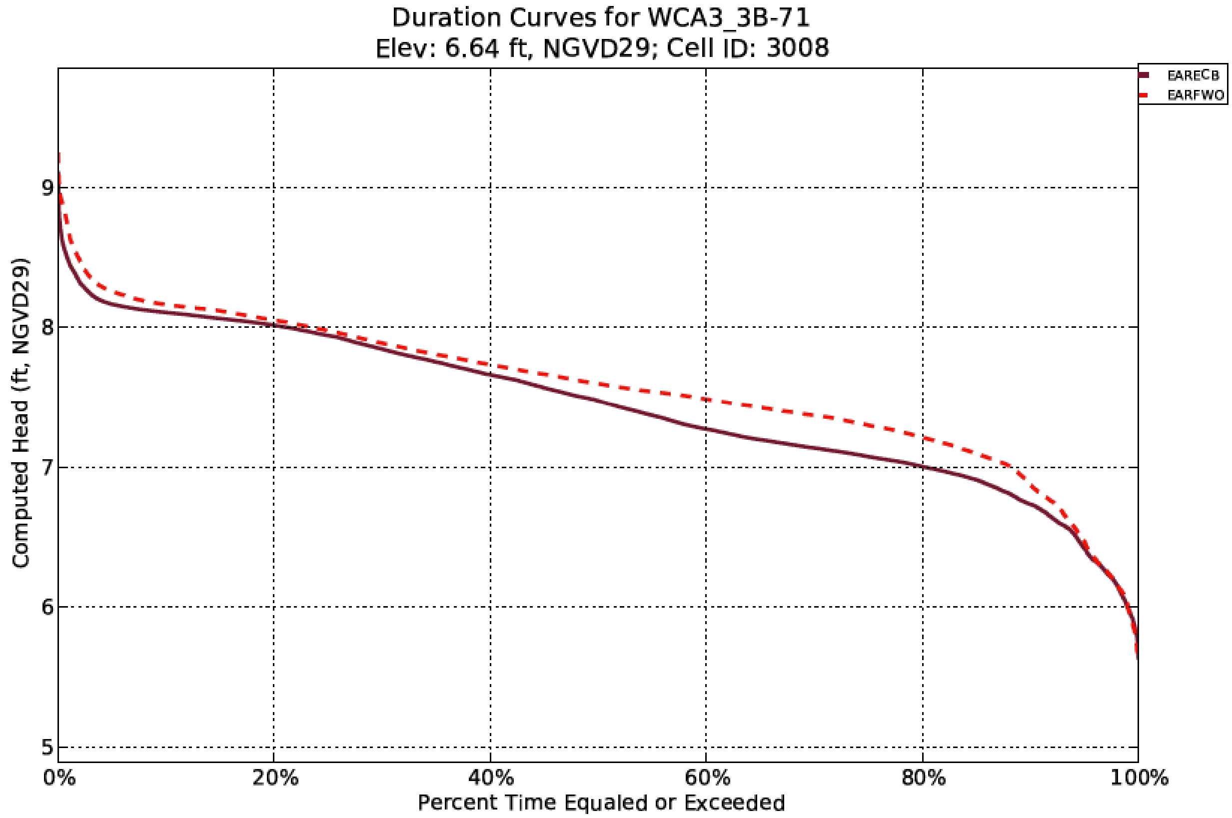

Figure C.1-27. Central WCA 3B Stage Duration Curve

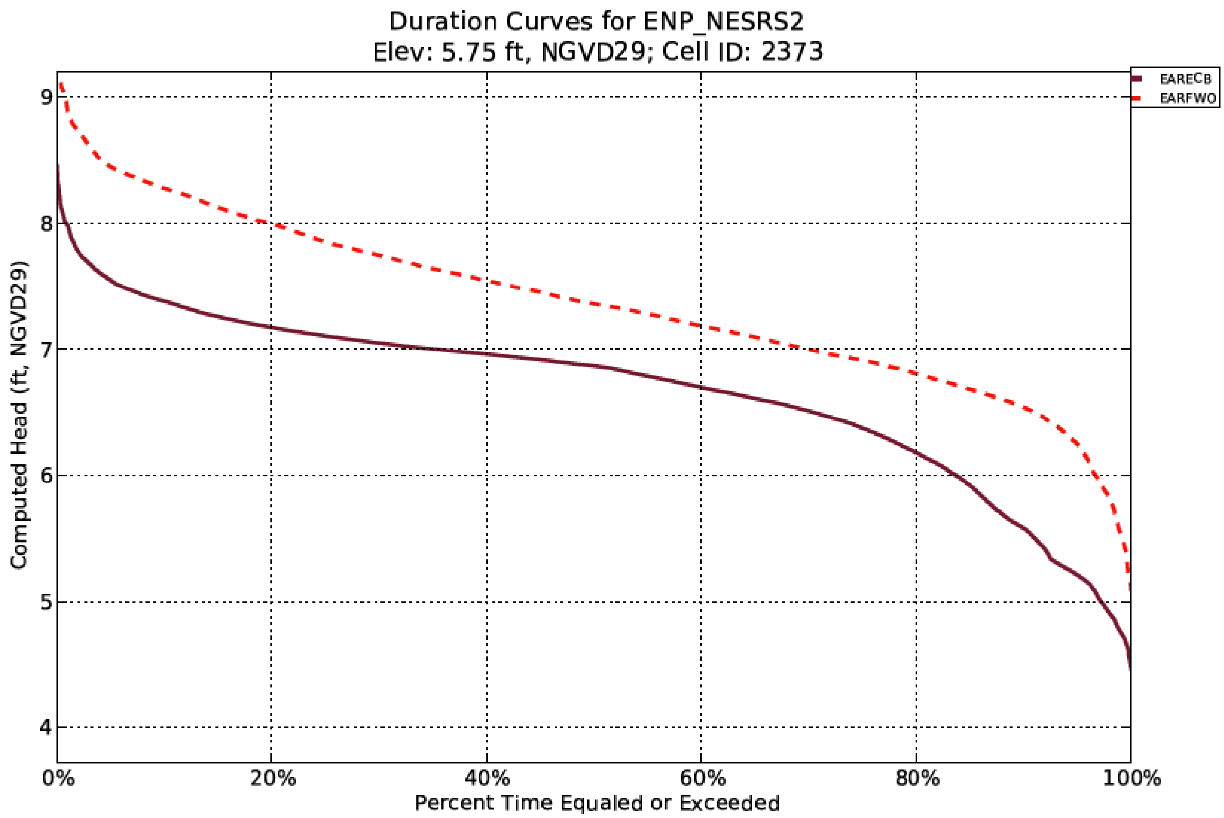

Figure C.1-28. Northeast ENP Stage Duration Curve

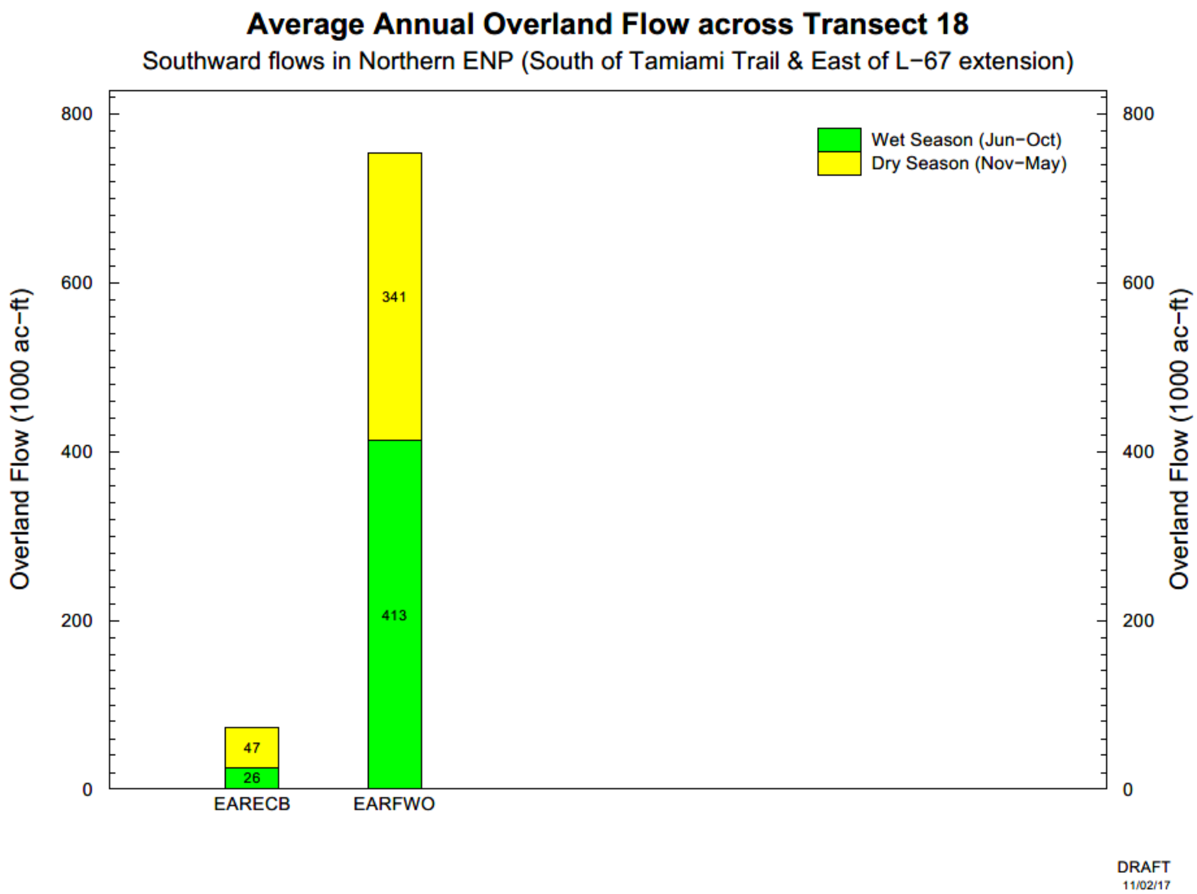

Figure C.1-29. Average Annual Overland Flow to NESRS

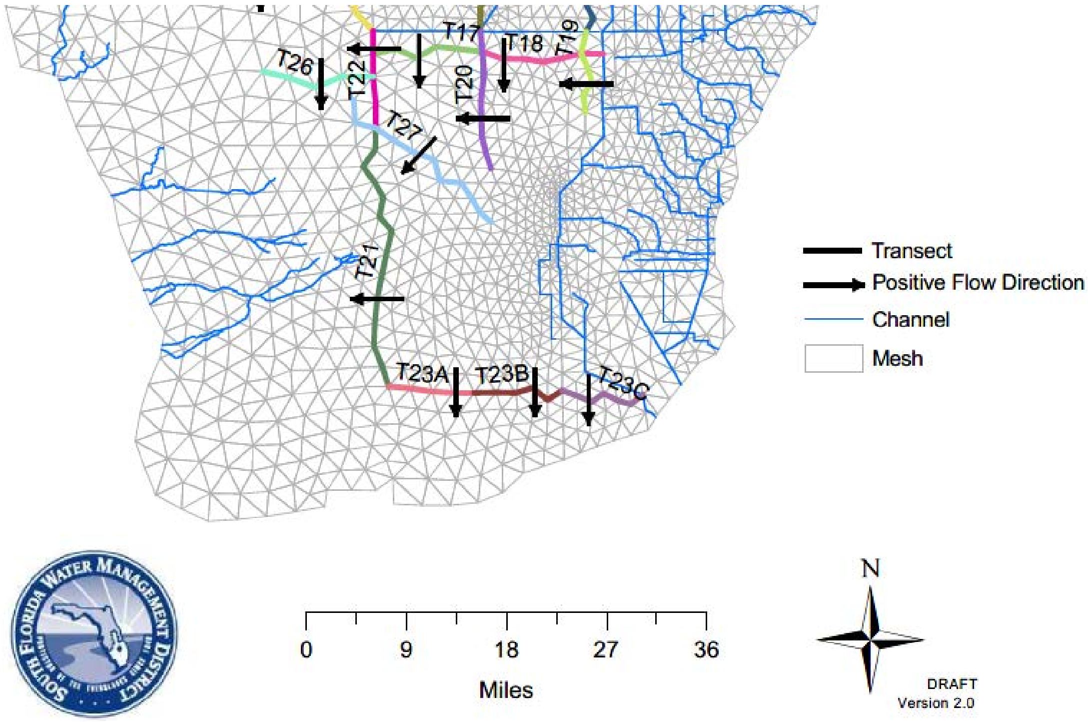

Figure C.1-30. RSM-GL Overland Flow Transects for ENP

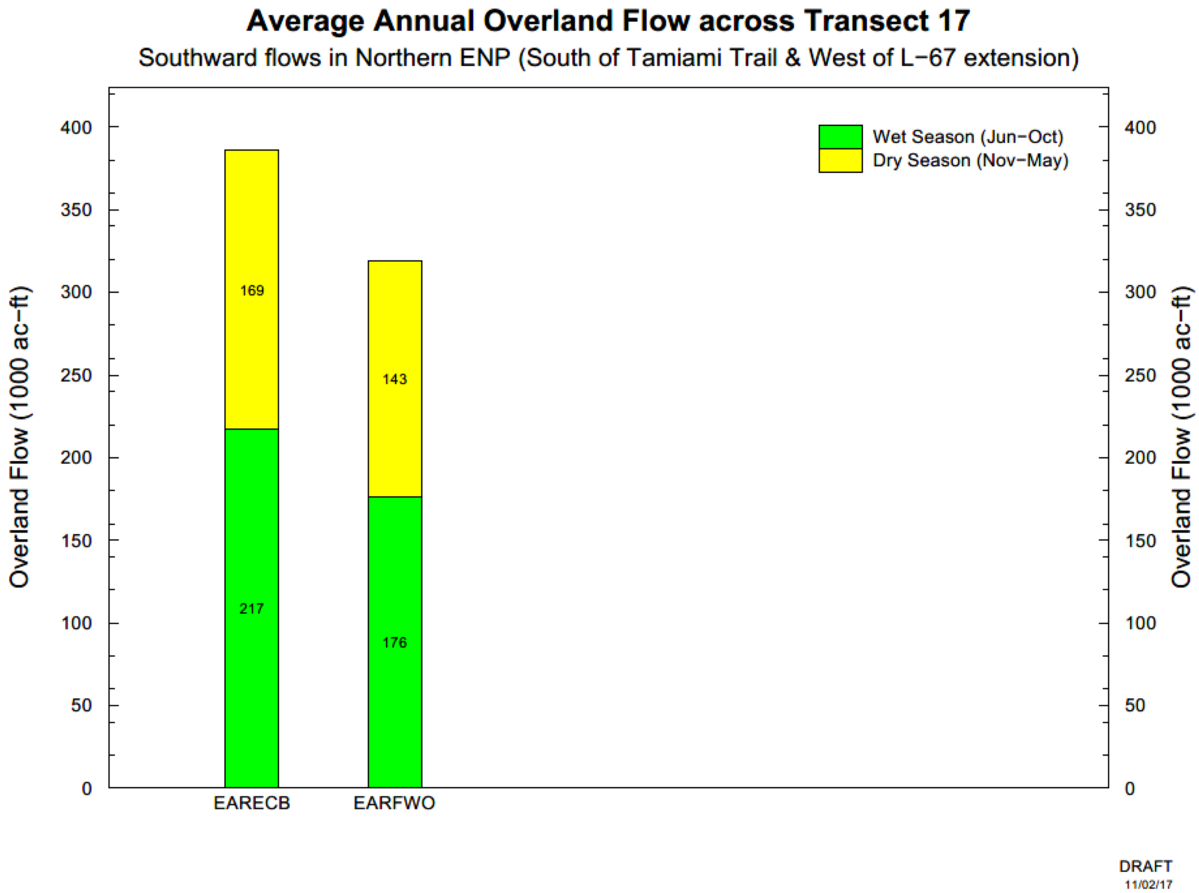

Figure C.1-31. Average Annual Overland Flow to WSRS

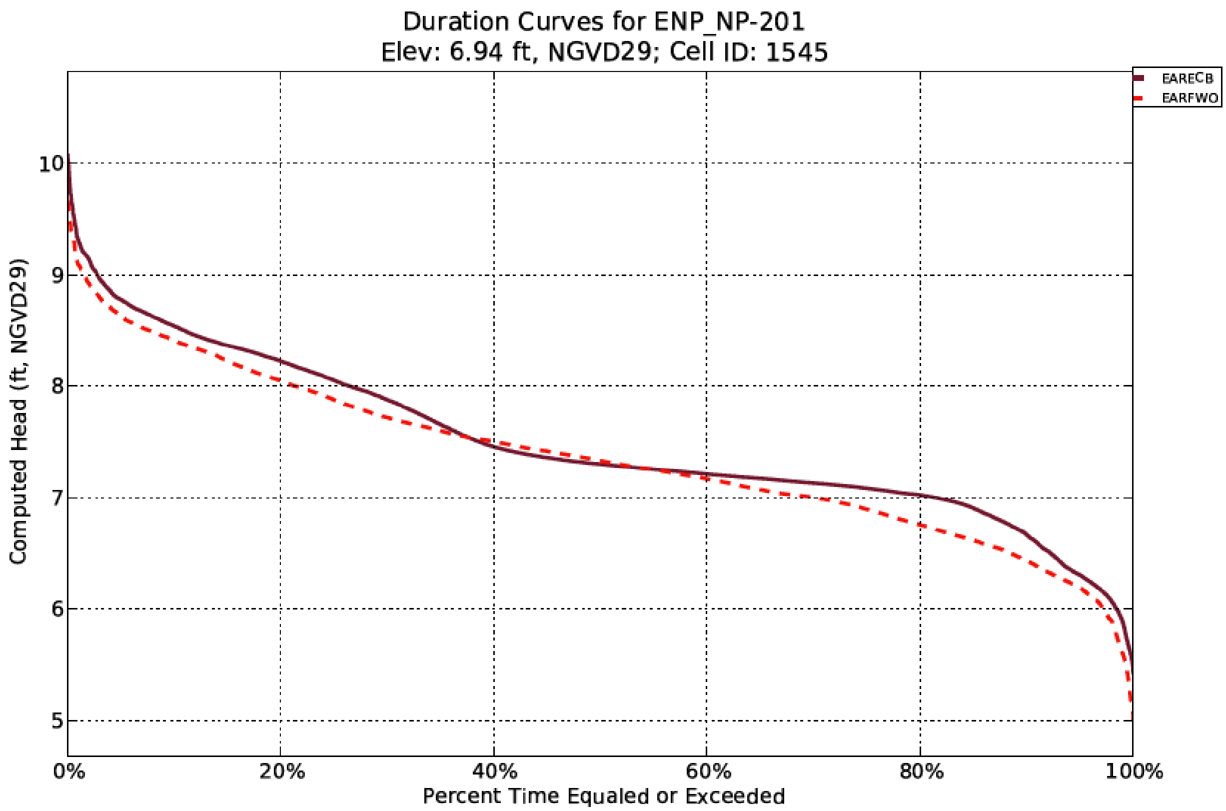

Figure C.1-32. Northwest ENP Stage Duration Curve (NP-201)

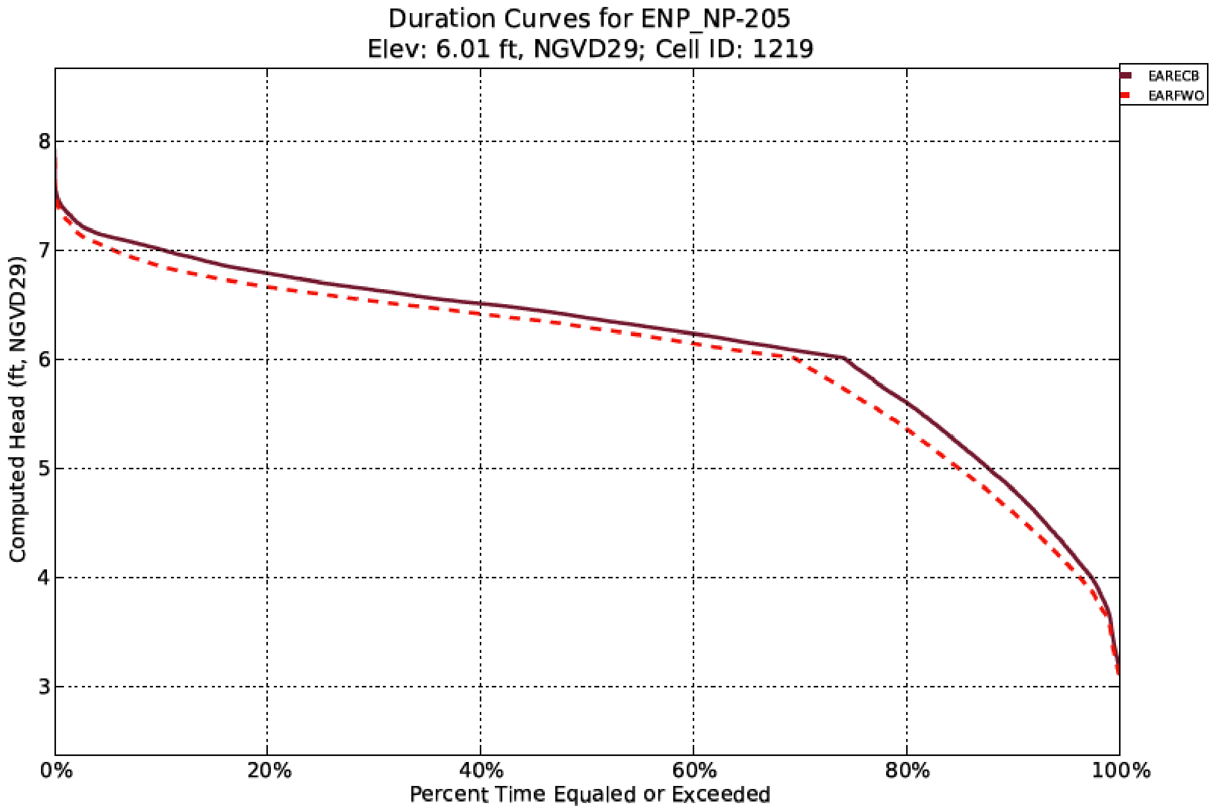

Figure C.1-33. Northwest ENP Stage Duration Curve (NP-205)

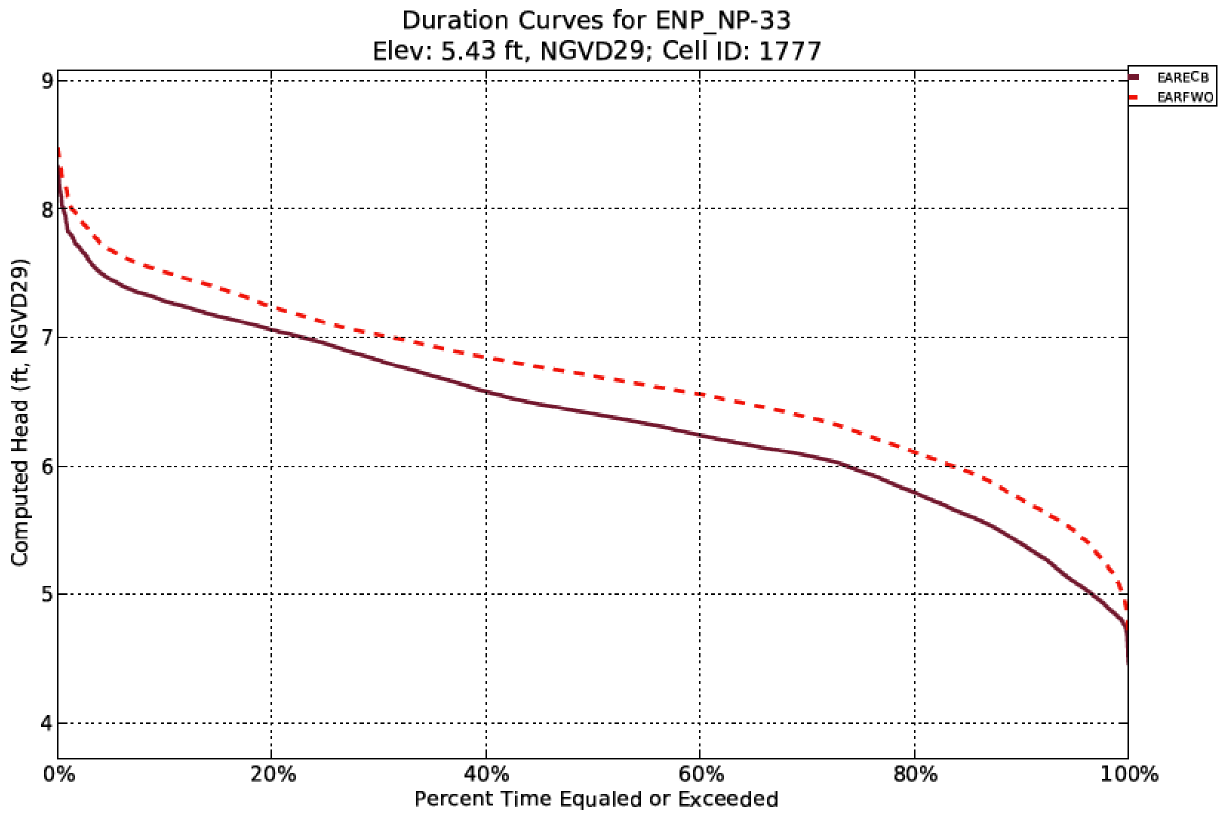

Figure C.1-34. Central ENP Stage Duration Curve

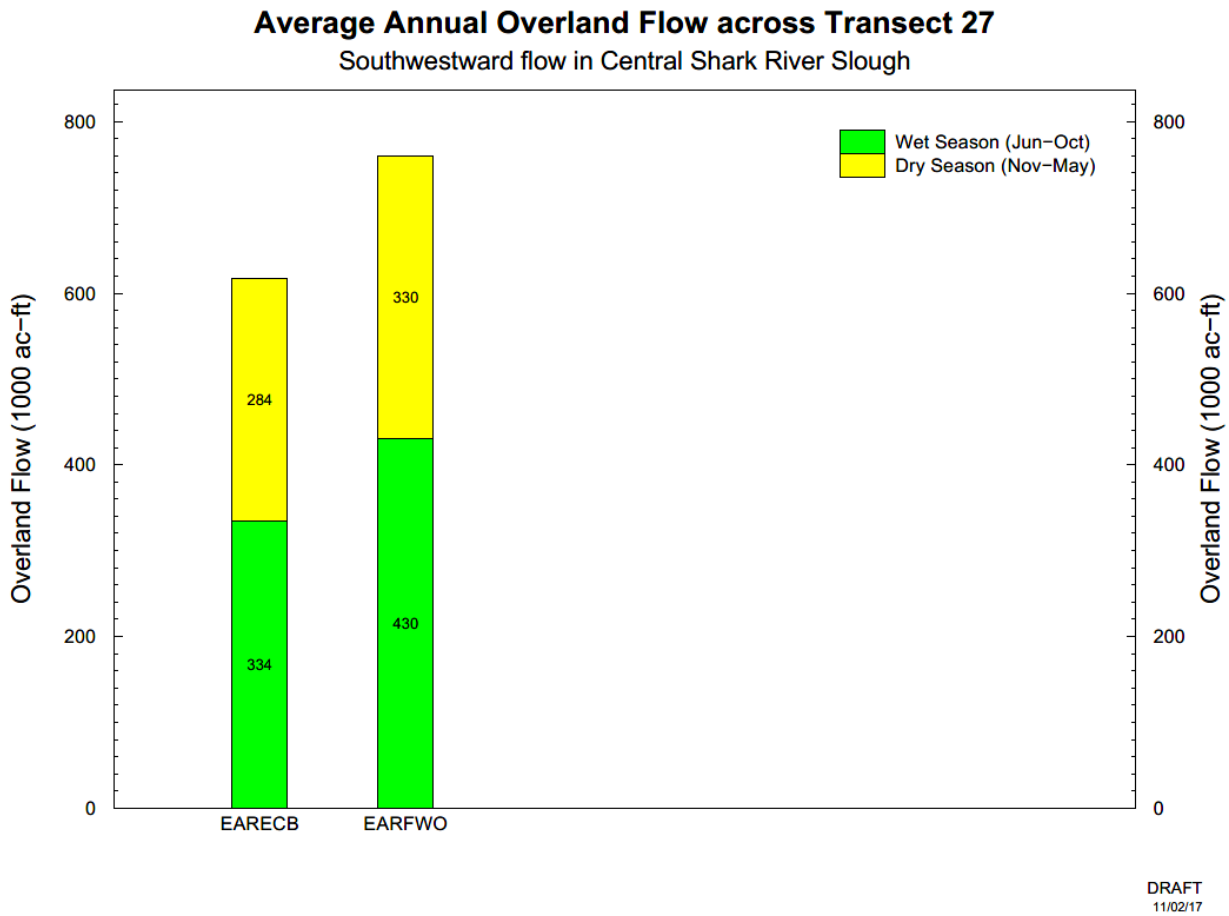

Figure C.1-35. Average Annual Overland Flow Transect for Central Shark River Slough

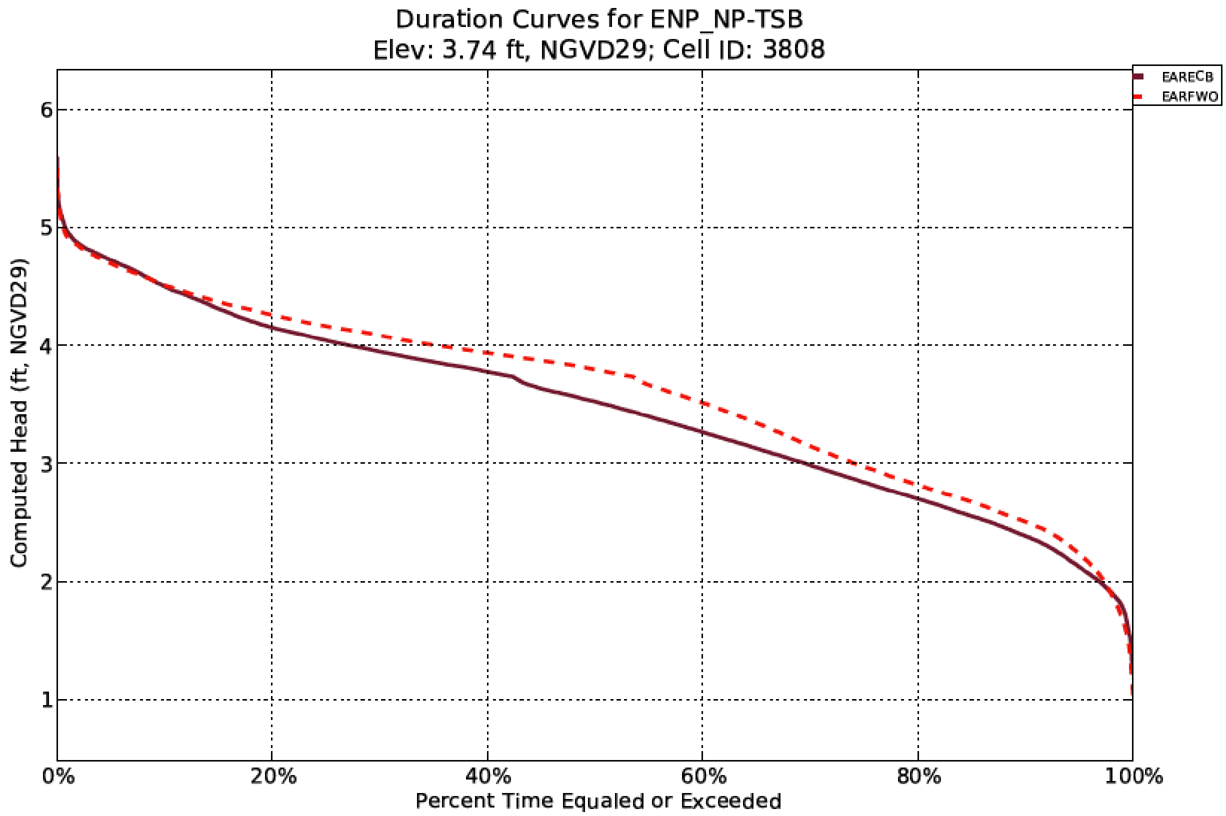

Figure C.1-36. ENP Taylor Slough Stage Duration Curve

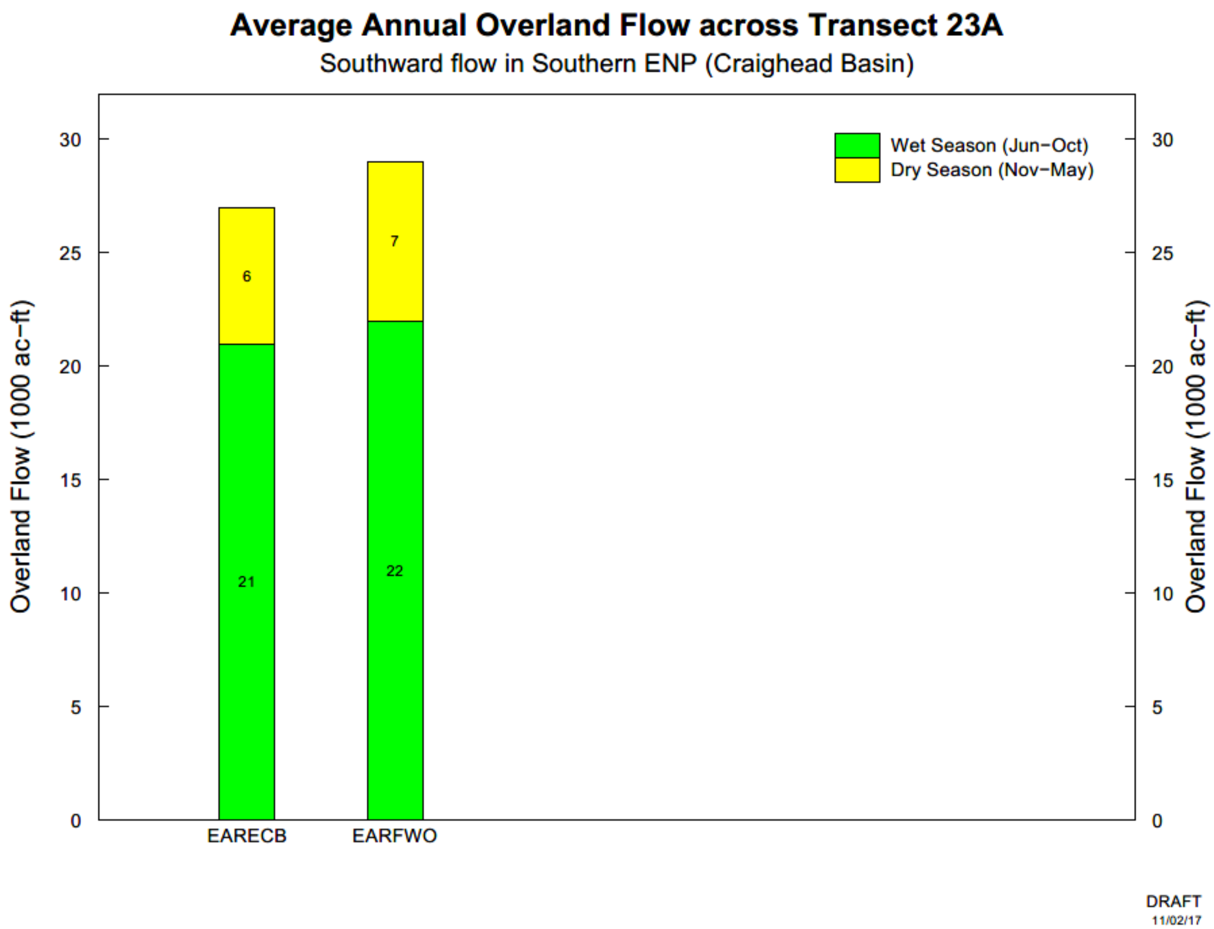

Figure C.1-37. Average Annual Overland Flow across Transect 23A

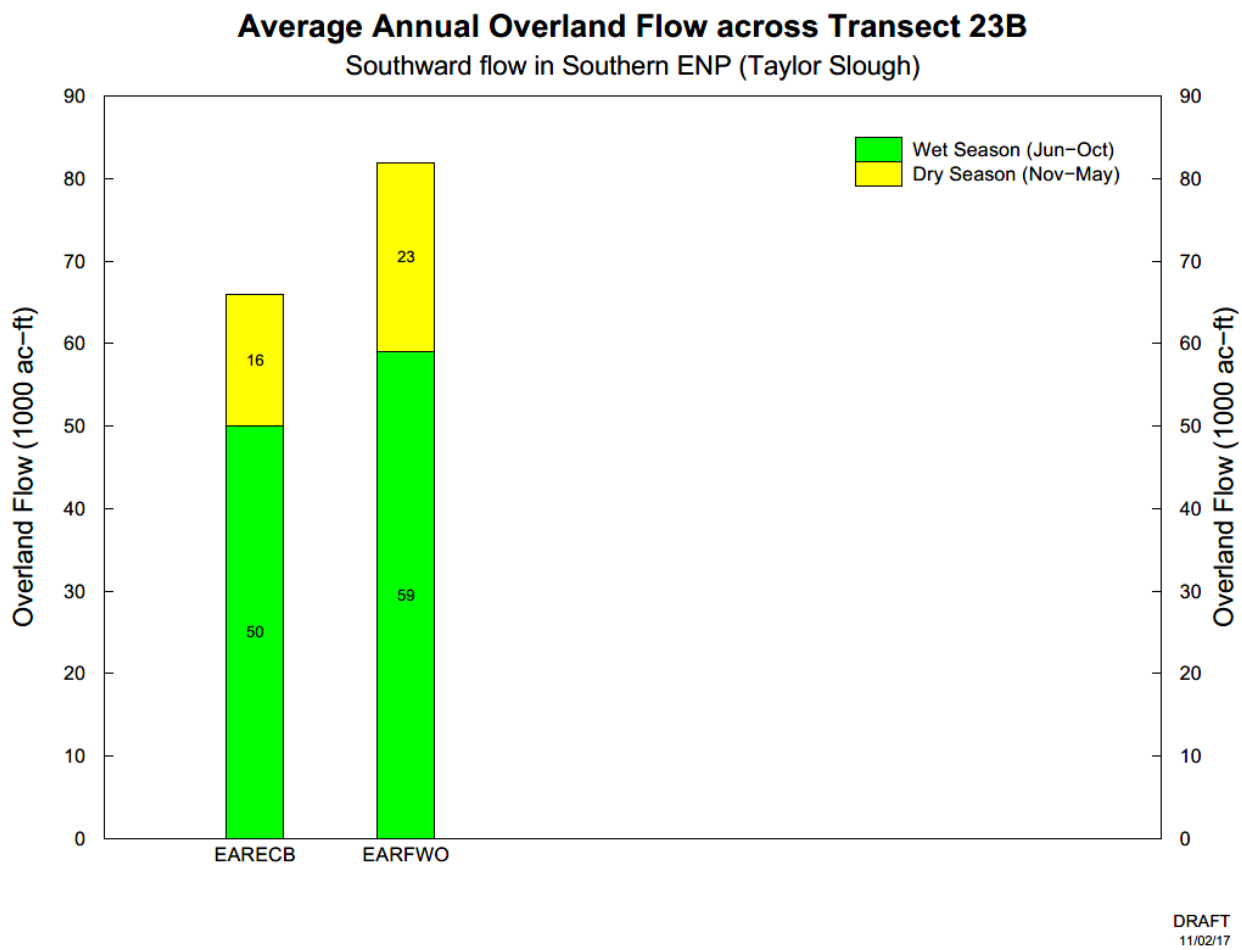

Figure C.1-38. Average Annual Overland Flow across Transect 23B

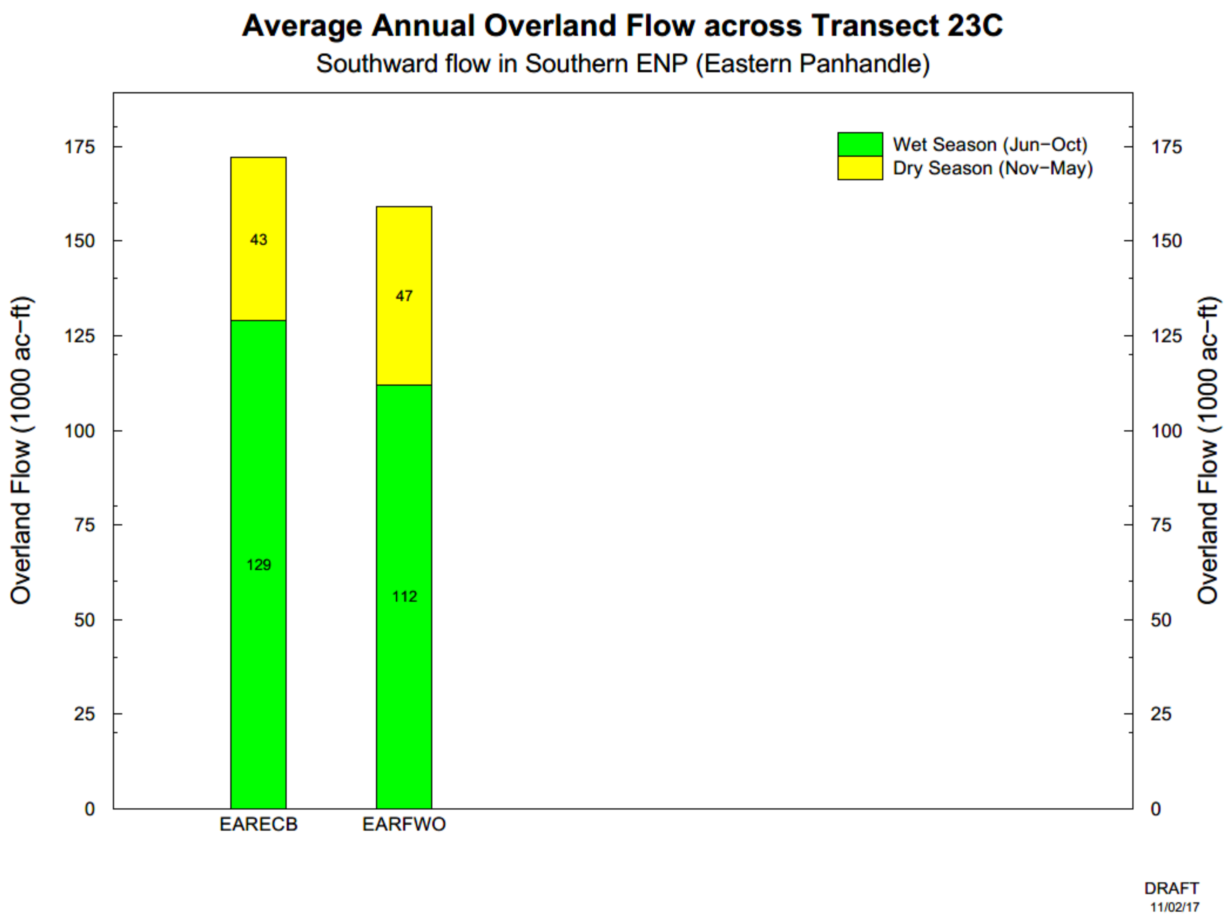

Figure C.1-39. Average Annual Overland Flow across Transect 23C

C.1.3.9 Regional Water Management (Operations)

The FWO assumes the construction and implementation of currently authorized CERP projects, including CEPP, non-CERP projects, and other Federal, State, or local projects constructed or approved under existing governmental authorities that occur in the CEPP study area. The CEPP PACR FWO, therefore, includes first-generation CERP projects already authorized and under construction (the IRL-S Project, Picayune Strand Restoration Project, and Site 1 Impoundment Project), second-generation CERP projects still pending Congressional authorization (the Biscayne Bay Coastal Wetlands Project, Broward County Water Preserve Areas Project, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project), and non-CERP projects currently in progress (the SFWMD Restoration Strategies, C&SF C-51 West End Flood Control Project, C-111 South Dade Project, Kissimmee River Restoration Project, MWDs, and DOI TTNS Project).

For modeling of the FWO with the RSM-BN and RSM-GL models, operations protocol for the first- and second-generation CERP projects was modeled consistent with the DPOMs, as documented in the respective PIRs. The completed Kissimmee River Restoration Project included the Headwaters Revitalization Schedule for the Kissimmee Chain of Lakes as defined for the UKISS modeling conducted by the Kissimmee River Project team. The FWO representation of the C111 South Dade and MWDs project features changes some operations from the ECB, including the L-29 Canal stage constraint at 9.7 ft NGVD (7.5 ft NGVD in the ECB), and the G-3273 constraint at 9.5 ft NGVD (6.8 ft NGVD in the ECB).

C.1.3.9.1 Lake Okeechobee

The FWO assumption for the operation of Lake Okeechobee is the LORS 2008, with operational changes incorporated into the CEPP TSP to optimize CEPP system-wide performance, which fall both within and outside the existing flexibility of the 2008 LORS. More specifically, the hydrologic modeling of the CEPP alternatives included proposed revisions to the 2008 LORS decision tree outcome maximum allowable discharges dependent on the following criteria: Lake Okeechobee inflow and climate forecasts (class limits were modified for tributary hydrologic conditions, seasonal climate outlook, and multiseasonal climate outlook), stage level (regulation zone), and stage trends (receding or ascending). These refinements are within the flexibility of the 2008 LORS. Other refinements were made outside the operational flexibility available in the 2008 LORS, and the final operational assumptions ultimately extended beyond this flexibility due to adjustments made to the tributary/climatological classifications. LORS 2008 Regulation Schedule zones were unchanged. Additional information and documentation of these assumptions are provided in **Appendix A, Annex A-2**.

C.1.3.9.2 Greater Everglades

The FWO includes the A-1 FEB and assumes implementation of the SFWMD Restoration Strategies to achieve compliance with the 2012 FDEP Consent Order for water quality inflows to the EPA. The Central Flowway components of the SFWMD Restoration Strategies are included in the CEPP FWO modeling. As stated previously, all of the components in the authorized CEPP plan (known as ALT R42) are included in the CEPP PACR FWO project condition.

No modifications to the WCA 1 or WCA 2 Regulation Schedules are included in the FWO, and operations of these WCAs are consistent with the ECB.

The CEPP includes changes to the operation of WCA 3 to better mimic a natural delivery of water through the system in response to rainfall. Unlike regulation schedule-based operations, the RDO estimates inflows and outflows in response to weekly rainfall, PET, and target water deliveries so that the weekly stage at 10 target locations (3ANW, 3A11, 3ASW, W2, 3A4, 3AS, 3ANE, 3A28, E4, and 3A3) approaches the corresponding weekly restoration targets. In addition to meeting these targets, the RDO aims at improved recession rates (measured in feet per week) in three range categories: excellent (0.03 to 0.06), acceptable (0 to 0.03 and 0.06 to 0.10), and unacceptable (more than 0.10). The recession rate would be calculated as the difference between the current stage and the previous week's stage. The stage would be calculated as the average of three locations: 3A4, 3A28, and 3A3. The RDO employs a mechanism that resists the stage going into Zone A of the WCA 3A Interim Regulation Schedule. As part of a system-wide optimization, the WCA 3A RDO is constrained with the amount and timing of inflows upstream, and the restoration targets and constraints in WCA 3B and the ENP.

It is recognized that transitioning to RDO would likely be a lengthy and complex process for the USACE, but a necessary step in achieving the proposed restoration objectives within WCA 3A and ENP. The process for making this transition has not yet been developed, but it is envisioned for RDO to be phased in gradually as CEPP components become operational. RDO operations might also be considered by the USACE during future operational planning studies prior to CEPP, as appropriate. Initially, system operations would be conducted under the current Rainfall Plan, with modeling and testing of RDO to occur alongside the Rainfall Plan; development and limited testing of RDO modeling tools should be initiated prior to this operational testing period. When RDO has been developed and approved for use, the USACE will fully implement it.

C.1.3.10 Flood Control

The negative effects associated with flooding are expected to increase during the period between the present and the year 2076. As agricultural and urban development continues, the volume, duration, and frequency of floodwaters may increase, and the actual levels of service for flood control may decline in some areas. If sea level change continues as predicted, it is foreseeable that the Biscayne aquifer is likely to experience greater intrusion of salt water possible rendering some of the current water supply well fields unusable due to contamination. Higher groundwater stages in the project area would reduce the ability of water managers to store rainfall runoff wither within wetlands or the surficial aquifer, resulting in increased intensity of stormwater discharges through the primary canals. Reduced water storage reduces the capacity of the flood control system to accommodate runoff and would likely lead to increased frequency of flooding events. Sea level change may also impact flood control effectiveness as rising tail water conditions at the coastal canal structures reduce the effective maximum discharge rates. As additional information becomes available, these structures may be modified or replaced with pumps to ensure continued effective flood control. This may also require the implementation of forward pumping to maintain the existing level of flood protection in the future. An analysis of sea level change of the FWO is presented in **Annex I of the CEPP PIR**. Sea level change is not included in the CEPP PACR FWO modeling.

Future non-CERP projects, implemented through the USACE and/or the SFWMD could potentially alter the levels of service for flood control within the project area, including but not limited to potential Lake Okeechobee Regulation Schedule changes, SFWMD Restoration Strategies, the C&SF C-51 West End Flood Control Project, the C-111 South Dade Project, the Kissimmee River Restoration Project, MWDs, and other potential future C&SF operational plan studies. Potential flood control effects, including improved or reduced levels of service, would be thoroughly assessed through the public NEPA process. To the extent that these projects have been identified and defined, they have been included in the FWO modeling assumptions; potential future operational plans for Lake Okeechobee, implementation of the MWDs and C-111 South Dade projects, and other potential future C&SF operational plan studies are, therefore, not able to be included in the FWO modeling.

The Water Resources Development Act of 2000 (Section 601 of WRDA 2000) approved the CERP Plan contained in the "Final Integrated Feasibility Report and Programmatic Environmental Impact Statement" dated April 1, 1999. As stated in Section 601(h) of WRDA 2000, "the overarching objective of the Plan is the restoration, preservation, and protection of the south Florida ecosystem while providing for other water-related needs of the region, including flood protection and water supply." Section 601 of WRDA 2000 required the Secretary of the Army, with the concurrence of the Secretary of the Interior and the Governor of Florida, and after notice and opportunity for public comment, to promulgate Programmatic Regulations to ensure that the goals and purposes of the Plan are achieved and to establish the processes necessary for implementing the Plan. The final Programmatic Regulations became effective on December 12, 2003 as Title 33 of the Code of Federal Regulations Part 385.

Identifying if an elimination or transfer of existing legal sources of water will occur as a result of implementation of CERP and whether levels of service for flood protection will be reduced by implementation of CERP is required by Section 601(h)(5) of WRDA 2000. The WRDA 2000 Savings Clause requires that "Implementation of the Plan shall not reduce levels of service for flood protection that are: (i) in existence on the date of enactment of this Act (December 11, 2000); and (ii) in accordance with applicable law." Consistent with the Savings Clause requirements, each CERP project included in the CEPP FWO (the IRL-S Project, Picayune Strand Restoration Project, Site 1 Impoundment Project, Biscayne Bay Coastal Wetlands Project, Broward County Water Preserve Areas Project, Caloosahatchee River (C-43) West Basin Storage Reservoir, and C-111 Spreader Canal Western Project) must independently demonstrate in the respective PIRs that implementation of these CERP projects would not adversely impact the levels of service for flood protection. Operations protocols for the first- and second-generation CERP projects were modeled in the FWO consistent with the DPOMs, as documented in the respective PIRs. Operations and components of the previously listed CERP projects are retained in the FWO, and the inclusion of the components is, therefore, implicit in the analyses in this section.

To address the Savings Clause requirements for CERP, the CEPP PIR included a detailed and comprehensive analysis of potential effects of the FWO, where applicable, to existing legal sources for water supply and/or the levels of service for flood protection (refer to Section 6 of the CEPP PIR main report for summary information and the corresponding CEPP PIR Annex B for the complete analysis).

C.1.3.10.1 Lake Okeechobee

Operational changes were incorporated into the hydrologic modeling conducted previously under the FWO in efforts to optimize CEPP system-wide performance within the existing flexibility of the 2008 LORS. More specifically, the hydrologic modeling of the FWO included proposed revisions to the 2008 LORS decision tree outcome maximum allowable discharge. While some refinements were made within the operational flexibility available in the 2008 LORS, consistent with the original modeling intent, the final operational assumptions ultimately extended beyond this flexibility due to adjustments made to the tributary/climatological classifications. The LORS 2008 Regulation Schedule zones were unchanged. Additional information and documentation of these assumptions are available in Appendix A of the CEPP PIR.

The USACE LORS EIS assessment recognized that minimizing the frequency of exceedance of the 17.25 ft elevation offers additional protection for public safety and the HHD, for the condition prior to completion of the current approved and planned HHD remediation measures, and this criterion was evaluated as a LORS project performance measure (USACE 2007). Significant increases in the frequency, duration, and magnitude of Lake Okeechobee peak stages do not result from the assumed modified Lake Okeechobee operations with the FWO despite the assumed completion of HHD remediation measures, because the adverse ecological effects associated with increased lake stages and the associated increases in high-volume releases to the estuaries were effectively balanced during the CEPP preliminary screening. Extreme high lake stages have also been documented to adversely impact the plant and animal communities, through processes that include physical uprooting of emergent and submerged plants, reduced light levels in the water column due to increased suspended sediment, and littoral zone exposure to increased nutrient levels from the water column. The number of days with stages above 16 ft NGVD is increased from 768 in the FWO to 1,163 in the FWO during the 1965-2005 period of simulation.

Following completion of the HHD remediation of reaches 1, 2, and 3, the degree to which higher maximum lake stages and increased frequency and duration of high lake stages would be accepted, if at all, will be contingent on the conclusions identified in the USACE 2016 Dam Safety Modification Report (DSMR) for the HHD. Any changes to the Lake Okeechobee Regulation Schedule would be analyzed and coordinated with the public through the NEPA process.

C.1.3.10.2 Lower East Coast Service Areas

FWO modeling indicates that no significant increases in regional groundwater stages during wet conditions would impact the levels of service for flood control within the LECSA, as compared to the ECB condition. No significant increases in stages were indicated within LECSA 1, LECSA 2, or LECSA3 in the wettest 10% of the duration curves. The L-30 Canal stages (north of S-335) for the FWO indicate a moderate reduction of 0.1-0.2 ft to flood control stages within the wettest 20% of hydrologic conditions, with no significant change observed for the upper 1% of the stage duration curve (**Figure C.1-40**). The L-31N Canal stages (north of G-211) indicate a significant reduction (up to 1.0 ft) in flood control stages within the wettest hydrologic conditions for Alt 4R and Alt 4R2 (**Figure C.1-41**). C-111 Canal stages between S-176 and S-18C indicate a small decrease in stages for the upper and lower percent time of the stage duration curve compared to the ECB (**Figure C.1-42**).

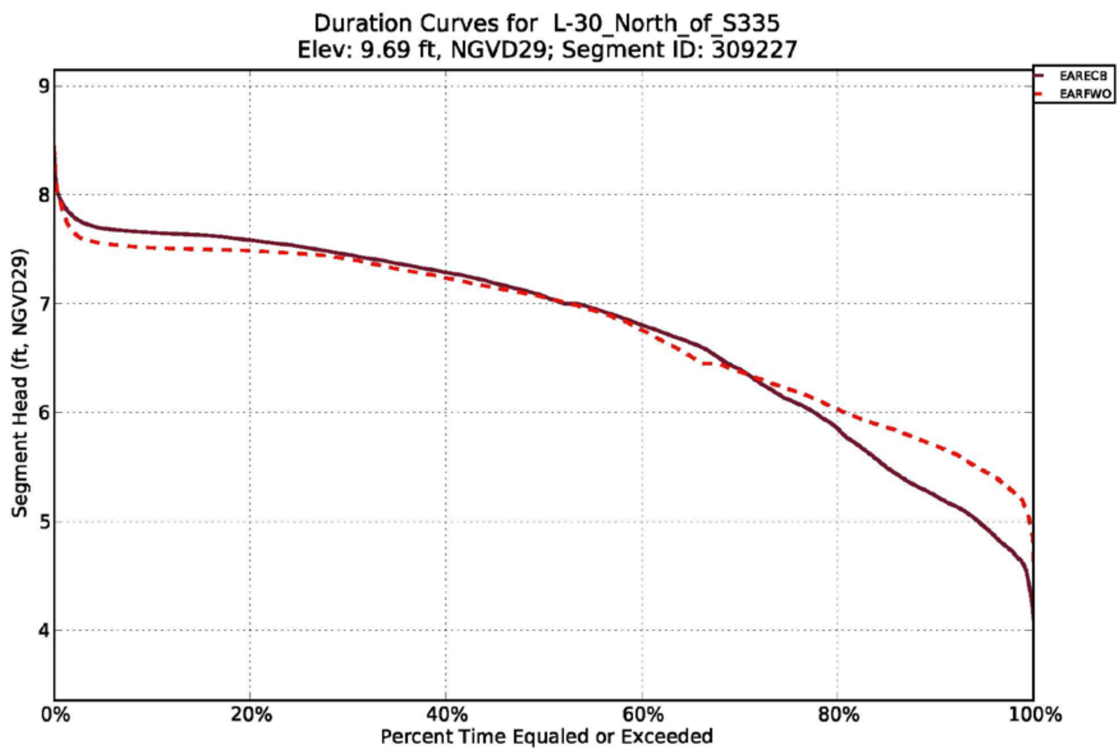

Figure C.1-40. Stage Duration Curve for L-30 Canal in LESCA 3

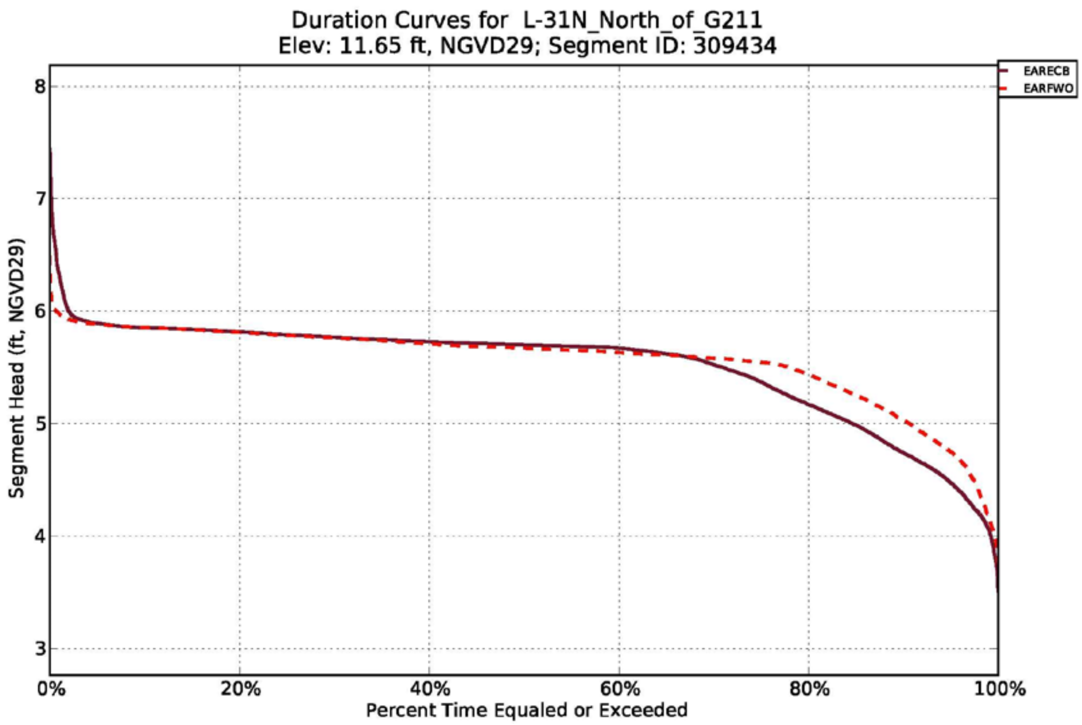

Figure C.1-41. Stage Duration Curve for L-31N Canal in LESCA 3

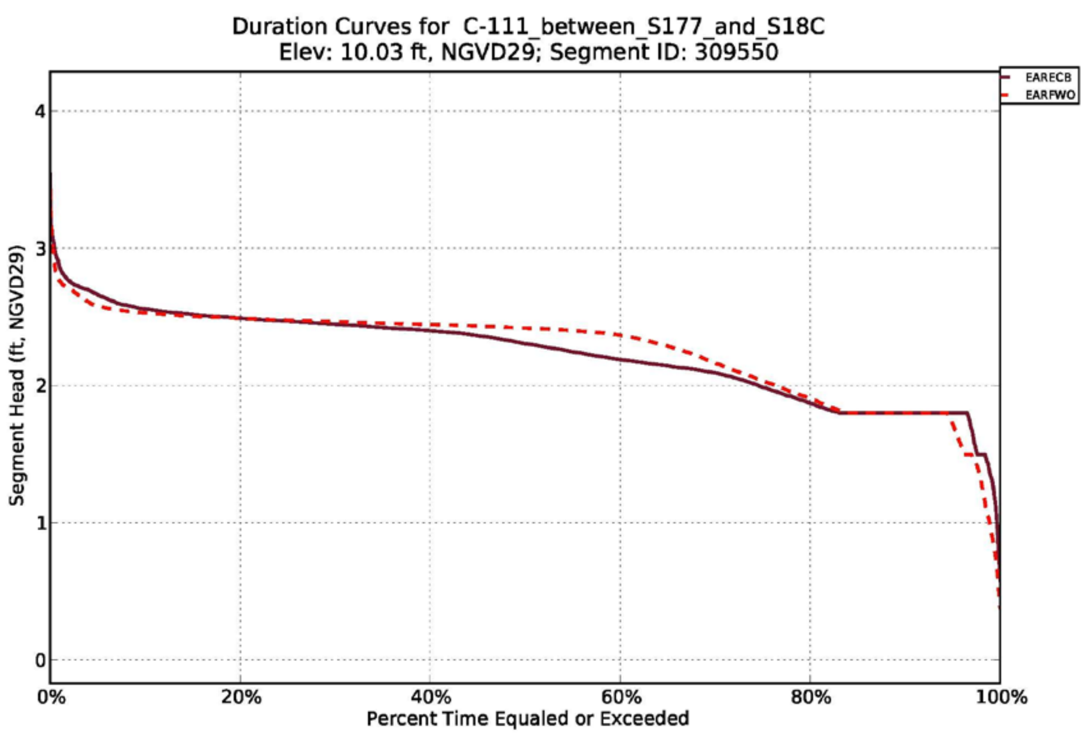

Figure C.1-42. Stage Duration Curve for C-111 Canal in LESCA 3

C.1.3.11 Water Supply

In the LEC, groundwater from the surficial aquifer system is the predominant source of water for municipal and industrial uses. This trend is expected to continue in the future. Since the Restudy, municipal and industrial users' reliance on water from alternative sources such as the Floridan aquifer and reuse has grown significantly. Use of these alternative sources to meet a portion (10-15%) of future demands will continue in the future. The LEC demand from all sources for PWS is projected to be 1,006 MGD in 2040. Like PWS, industrial demands are turning to alternative sources of water such as the surficial aquifer system. The projected industrial demands in 2040 from the surficial aquifer, including thermoelectric, are 95 MGD.

Modeling performed under CEPP PACR, presented as the FWO condition in this study, indicated that the frequency of water restrictions is projected to decrease.

C.1.3.11.1 Lake Okeechobee

Lake Okeechobee operational assumptions applied consistently for the CEPP-authorized project include changes to the decision tree outcome maximum allowable discharges dependent on Lake Okeechobee inflow forecasts, time of year (wet season or dry season), stage level (regulation zone), and/or stage trends (receding or ascending). The changes are all assumed to occur within the flexibility of LORS 2008 (Regulation Schedule zones unchanged) for the purpose of increasing CEPP potential benefits.

Based on modeling assumptions and the resulting similar stage increases as seen in CEPP within Lake Okeechobee, the average annual percentage of unmet water supply demand is projected to decrease for the EAA and the remainder of the LOSA. For the eight years with the largest water supply cutbacks within the LOSA, the water supply cutback percentage is reduced significantly in all eight years, compared to the FWO. The FWO indicates a slight stage increase in the stage duration curve within the EAA.

The LORS EIS assessment recognized that minimizing the frequency of exceedance of the 17.25 feet elevation offers additional protection for public safety and the HHD, for the condition prior to completion of the current approved and planned HHD remediation measures, and this criterion was evaluated as a LORS project performance measure (USACE 2007). Extreme high lake stages have also been documented to adversely impact the plant and animal communities, through processes that include physical uprooting of emergent and submerged plants, reduced light levels in the water column due to increased suspended sediment, and littoral zone exposure to increased nutrient levels from the water column. The number of days with stages above 16 ft NGVD is increased from 1,163 to 1,204 during the 1965-2005 period of simulation.

Following completion of the HHD remediation the degree to which higher maximum lake stages and increased frequency and duration of high lake stages would be accepted, if at all, will be contingent on the conclusions identified in the USACE 2014 DSMR Indian River Lagoon South Project for the HHD. Any changes to the Lake Okeechobee Regulation Schedule would be analyzed and coordinated with the public through the NEPA process.

C.1.3.11.2 Seminole Tribe of Florida

Two reservations of the Seminole Tribe of Florida rely on Lake Okeechobee as a secondary supplemental irrigation supply source for their surface water. The Seminole Tribe of Florida's Big Cypress Reservation has specific volumes of water identified for this purpose. The Brighton Reservation has an operational plan addressing water shortage conditions.

The Seminole Tribe of Florida has surface water entitlement rights pursuant to the 1987 Water Rights Compact between the Seminole Tribe of Florida, the State of Florida, and the SFWMD (P.L. No. 100-228, 101 Stat. 1566, and Chapter 87-292 Laws of Florida as codified in Section 285.165, F.S. Additional documents addressing the Water Rights Compact entitlement provisions have since been executed. These documents include agreements between the Tribe and SFWMD and an SFWMD Final Order. Of interest in this regard is the 1996 Agreement that commits the SFWMD to mitigate impacts to the Tribe's ability to obtain surface water supplies at both the Brighton and Big Cypress reservations, which might be diminished as a result of various activities. Impacts are not expected for the FWO based on the hydrologic modeling.

C.1.3.11.3 Lower East Coast Service Areas

The FWO modeling indicates that no significant reductions to regional groundwater stages during dry conditions (assumed as a surrogate for water supply conditions for this discussion) for most portions of the LECSA. No significant changes were indicated within LECSA 1, LECSA 2, or LECSA 3 that were prevalent through normal-to-dry hydrologic conditions. The driest hydrologic conditions in the FWO were generally the same as the ECB for areas east of WCA 2A and WCA 2B (monitoring gages G2031, G2033, and G2032).

C.1.3.12 Water Quality

The two most significant water quality issues within the study area are associated with nutrient pollution and the bioaccumulation of Hg by fish and birds. General discussion of the phosphorus issues within the basin are provided here. More detailed discussions on phosphorus can be found in **Annex F**.

C.1.3.12.1 Lake Okeechobee

Water quality in Lake Okeechobee should improve under the FWO condition relative to the existing conditions as a result of implementation of TMDLs and associated BMAPs within the Upper Kissimmee River Basin as well as lake basin. The State of Florida has committed to achieving the phosphorus TMDL for the lake by implementing a series of source controls and treatment facilities within the basin. Achieving the TP load TMDL for the lake of 140 tons/year is expected to result in improved dissolved oxygen conditions and reduced incidence of algal blooms. The reduction of extreme changes in lake stages from the FWO would also be expected to improve water quality. However, the expected improvement would be expected to be minor given the loading into the lake.

Mercury methylation conditions within the lake should improve due to the implementation of the proposed Hg TMDL for Florida; however, the greatest reduction in MeHg will only come about through international controls on atmospheric emissions of Hg related to the combustion of coal and other fuels.

C.1.3.12.2 Northern Estuaries

Nutrient and dissolved oxygen conditions in the FWO should improve during the wet season within the Caloosahatchee River and Estuary and St. Lucie River and Estuary given the reduction in the number of high-flow events due to implementation of the C-43 Reservoir Project, IRL-S Project (USACE 2010), and authorized CEPP (USACE 2014). The frequency of dry-season SAV impacts within the upper Caloosahatchee River and Estuary might decrease as a result of increased dry season flows through the S-79 structure during the late spring due to implementation of the C-43 Reservoir Project (USACE 2010) and authorized CEPP (USACE 2014). The number of months of flow less than 300 cfs in the St. Lucie River and Estuary would also be expected to decrease resulting in improved water quality during the latter part of the dry season (USACE 2014).

Mercury methylation conditions within the estuaries should improve due to the implementation of the proposed Hg TMDL for Florida; however, the greatest reduction in MeHG will come about only through international controls on atmospheric emissions of Hg related to the combustion of coal and other fuels.

C.1.3.12.3 Everglades Agricultural Area

Nutrient and sulfate loading into the EAA and from interbasin transfers (such as from Lake Okeechobee) should decrease as a result of the implementation of TMDLs and BMPs. Implementation of the SFWMD's Restoration Strategies program which includes the construction of additional STAs and storage capacity will increase removal of nutrients and sulfate and decrease loading to the downstream Everglades. Water quality modeling done using the DMSTA indicates that implementation of the Restoration Strategies program will result in meeting the 2012 WQBEL (Water Quality Based Effluent Limit). The cessation of agricultural activities on the A-2 parcel and other U.S. Sugar Lands purchased by the SFWMD will result in the reduction of sulfate loads downstream due to reduced soil oxidation and reduced sulfate loading on those lands. Construction of the A-2 FEB may cause a short-term release of MeHg; however, monitoring during the start-up phase should minimize this release.

C.1.3.12.4 Greater Everglades

Mercury methylation will continue to be a problem within the Greater Everglades in the FWO condition. The implementation of new Hg emission criteria by the USEPA and FDEP will reduce locally sourced Hg deposition; however, internationally sourced airborne Hg from developing countries such as Brazil, India, and China are not projected to decrease.

C.1.3.12.4.1 Water Conservation Areas 1 and 2

Water quality conditions for the FWO should be improved in WCA 1 and WCA 2 relative to the existing baseline condition because the implementation of the SFWMD's Restoration Strategies features will reduce TP loads into these areas.

C.1.3.12.4.2 Water Conservation Area 3A

Nutrient and sulfate concentrations and loads for WCA 3A for the FWO condition should decrease relative to the existing baseline condition because of the implementation of the SFWMD's Restoration Strategies features within the central flow path of the EAA. The reduction in nutrient loads to WCA 3A should reduce the rate at which native vegetation within the marsh is replaced by ecologically less desirable cattails. A summary of the existing and FWO nutrient conditions within WCA 3A is found in **Annex F**.

Given the complexity of the MeHg cycle, it is not possible to predict with certainty the effect of future hydrology and mercury/sulfate loading on MeHg formation and bioaccumulation. It is likely that some areas of WCA 3A will see higher mosquitofish Hg concentrations while other areas will see lower mosquitofish Hg concentrations. Given the reduction in atmospheric Hg deposition over the last 15 years which is thought to be the cause of the reduction in bioaccumulated Hg observed in fish over this time period, it is likely that future methylation and bioaccumulation of Hg will not exceed the peak concentrations seen 15 or so years ago unless atmospheric Hg loading increases.

C.1.3.12.4.3 Water Conservation Area 3B

The FWO alternative should have some improvement in WCA 3B water quality given the expected reduction in nutrient loading from the EAA and the Western C-11 basin. However, increased severity of dryout events due to shortened hydroperiods as a result of water management practices is likely to result in additional marsh fire events. Fire events re-mobilize soil bound pollutants and temporarily degrade water quality by increasing water column TP and possibly increasing MeHg formation. The effects of increased dry events on water column MeHg concentrations and THg body burden in fish and birds in WCA 3B cannot be predicted with certainty, though it is probable given recent downward trends in measured Hg concentrations in this area that the FWO condition is not likely to result in bioaccumulation that exceeds historic concentration maximums unless atmospheric Hg loads increase from present levels.

C.1.3.12.4.4 Everglades National Park

The quality of water entering SRS under the FWO condition should be improved relative to the baseline condition given the additional treatment capacity improvements in the EAA. In the Western C-11 basin, untreated stormwater discharges will be retained in the C-11 Impoundment. Discharges from WCA 3A into SRS are more likely to meet the applicable TP criteria under the FWO condition than under baseline conditions. Sulfate concentrations in water discharged to SRS should be lower under the FWO condition than present condition given the additional removal of sulfate that will result from the expansion of STAs and the A-1 FEB.

C.1.3.13 Air Quality

Direct emissions from the proposed construction of the project features of the FWO would be confined to exhaust emissions of labor transport equipment, and construction equipment (dump trucks, excavators, graders, bulldozers, etc.). Clean Air Act pollutants considered in this air quality assessment are SO_x; volatile organic compounds (VOCs); nitrogen oxides (NOx), CO, PM10, and PM2.5. Greenhouse gas emissions are also considered. Volatile organic compounds, sulfur oxides, and nitrogen oxides are important since they are precursors to ozone generation. These criteria pollutants are generated by the construction and operational activities associated with the FWO.

Pursuant to the General Conformity Rule, of the Federal Clean Air Act (CAA) as promulgated by the U.S. Environmental Protection Agency (USEPA), a federal agency must make a General Conformity Determination for all federal actions in non-attainment or maintenance areas where the total of direct and indirect emissions of a non-attainment pollutant or its precursors exceeds levels established by the regulations. Since Palm Beach, Broward, and Miami-Dade Counties are considered by USEPA to be in attainment for all criteria pollutants, the study area is exempt from CAA Conformity Determination requirements. The criteria pollutants, including ozone, are assumed with the FWO for planning purposes.

C.1.3.13.1 Emission Sources

The FWO emission rate factors shown in **Table C.1-11** for equipment such as excavators, dozers, dump trucks, and the associated support equipment, were derived from a USEPA non-road engine emissions modeling report (USEPA 2002). The number, type, and duration of use for each piece of equipment were estimated using preliminary earth moving volumes estimated for each of the project features.

Table C.1-11. CEPP Emission Rate Factors for Construction Equipment Likely to Be Used to Construct the FWO Project Features

Equipment	HP	Load Factor	Emission Factors in g/bhp-hr					
			CO	VOC	Nox	Sox	PM10	PM2.5
Tractor with bush hog	108	0.21	4.07	1.19	7.16	0.007	0.654	0.582
Dozer	140	0.58	2.19	0.59	6.15	0.006	0.229	0.204
Off Road Dump Truck	300	0.57	1.82	0.57	5.55	0.006	0.295	0.263
Road Grader	165	0.59	2.19	0.59	6.15	0.006	0.229	0.204
Roller	106	0.43	4.08	1.32	7.76	0.007	0.686	0.611
Scraper	250	0.7	2.45	1.32	7.76	0.007	0.686	0.611
Trac-hoe	270	0.59	2.19	0.59	6.15	0.006	0.229	0.204

C.1.3.13.2 Emission Calculations

Project related air pollution emissions were estimated for each of the constructed features included in the FWO. The construction effort for each project feature was derived from very rough estimates of the volume of earth material moved for each features, the likely construction methodology, and the estimated drive distance between material excavation and material placement. To account for emissions from activities not directly associated with earth moving, the estimates were increased by 20%. The duration of construction for each project feature was determined using the probable maximum annual expenditure and the estimated construction cost of the feature. For instance, if the feature is estimated to cost $400 million and the probable maximum annual construction budget is $100 million per year, the duration of construction for that feature was estimated to take four years. Since the sequencing of activities required to build an individual project feature is not available in the planning phase, all construction tasks were spread out over the entire duration of construction of the feature. Emission rates, reported in tons of pollutant emitted per year of operation (tons/year) for each engine were calculated for each of the six criteria air pollutants: CO, NOx, PM2.5, PM10, SOx, and VOCs. The emission rates were derived from the formula:

Emission Rate (tons/yr) = Engine Horsepower × Engine Load Factor × Emission Factor × duration of operation over the year

Greenhouse gas emissions (carbon dioxide) were estimated based upon the diesel fuel consumption for each feature.

C.1.3.13.3 FWO Construction Emissions

The criteria air pollutants emissions shown in **Table C.1-12** are the estimated total of direct and indirect emissions that would occur during the construction of the authorized CEPP project features. The project features included are:

- L-5: L-5 Canal Capacity Expansion
- MCB: Miami Canal Backfill
- BSL: Blue Shanty Flow-way Levee
- DGRD: Degrade of the L-67E, L-67A, L-67C, L-29 levee
- A2: A-2 FEB
- SB: L-29N Seepage Barrier

The emissions from the construction of pump stations and flow control structures are accounted for in the 20% contingency factor applied to the total loads.

Table C.1-12. Estimated Air Pollutant Emissions from Construction of the FWO

Feature Construction	Year	Regulated Air Pollutants CO (Mton/yr)	VOC (Mton/yr)	NOx (Mton/yr)	SOx (Mton/yr)	PM_{10} (Mton/yr)	$PM_{2.5}$ (Mton/yr)	Green House Gas Emissions Fuel Burnt (gallons/yr)	CO_2 (Mton/yr)
L-5	1	27.8	8.3	82.5	0.1	4.0	3.5	453,333	4,565
L-5	2	27.8	8.3	82.5	0.1	4.0	3.5	453,333	4,565
MCB	3	23.9	7.2	71.2	0.1	3.5	3.1	465,000	4,683
MCB	4	23.9	7.2	71.2	0.1	3.5	3.1	465,000	4,683
MCB	5	23.9	7.2	71.2	0.1	3.5	3.1	465,000	4,683
MCB	6	23.9	7.2	71.2	0.1	3.5	3.1	465,000	4,683
BSL	7	12.0	4.3	34.2	0.0	2.0	1.8	212,654	2,141
DGRD	8	7.8	2.1	21.8	0.0	0.8	0.7	162,000	1,631
DGRD	9	7.8	2.1	21.8	0.0	0.8	0.7	162,000	1,631
DGRD	10	7.8	2.1	21.8	0.0	0.8	0.7	162,000	1,631
DGRD	11	7.8	2.1	21.8	0.0	0.8	0.7	162,000	1,631
DGRD	12	7.8	2.1	21.8	0.0	0.8	0.7	162,000	1,631
A2	13	15.4	5.4	43.3	0.0	2.5	2.2	309,421	3,116
A2	14	15.4	5.4	43.3	0.0	2.5	2.2	309,421	3,116
A2+SB	15	17.7	6.1	50.2	0.0	2.8	2.5	353,421	3,559
A2+SB	16	17.7	6.1	50.2	0.0	2.8	2.5	353,421	3,559
Totals		**268**	**83**	**780**	**1**	**38**	**34**	**5,115,006**	**51,508**

C.1.3.13.4 FWO Operational Emissions

Operational emissions estimates are assumed to be generated primarily from the pumps moving water into the A-2 FEB and from the enlarged S-356 pump station (**Table C.1-13**). The pump stations feeding the A-2 FEB is the S-370 and the S372 pumps. The NOx and SOx loads are taken from Golder Associates (2010). The other pollutants loads were estimated from the Golder Associates NOx emissions. The A-2 FEB emissions and the ratio of A-2 FEB flows to S-356 flows were used to estimate the S-356 emissions. Emissions associated with employee transportation and maintenance of FWO features are not presented here because they should be minor in comparison to the emissions from the major pump stations. Emissions associated with the FWO will result in minor, localized, temporary increases in concentrations of NO_2, SO_2, CO, VOC, and PM. Since the project is located in an attainment area, there is no requirement to prepare a conformity determination. Nonetheless, estimates were tallied to determine the level of emissions that would occur due to the proposed actions. On an annual basis, the project would result in nitrous oxide emissions exceeding the General Conformity threshold (100 tons/year) during operations. However, as stated earlier since Broward County is in an attainment area, there is no CAA requirement to meet this threshold or to mitigate for exceedance of it.

Rehydration of peat soils in the portion of WCA 3A north of Alligator Alley (approximately 70,000 hectares) is expected to stop the oxidation of peat soils by 2025 which releases between 3.71 and 9.2 tons of $C0_2$ per hectare per year. By 2065, rehydration should result in peat accretion which is estimated to capture approximate 3.7 tons of $C0_2$ per hectare per year (Richardson et al. 2013). Peat accretion after 2065 will result in the sequestration of approximately 260,000 metric tons of $C0_2$ per year.

Table C.1-13. Air Quality Emissions for Major Project Features of the FWO during Operations

	Annual Emission Loads (Mton/yr)						Fuel Burnt	CO2
Project Feature	**CO**	**VOC**	**Nox**	**Sox**	**PM10**	**PM2.5**	**gallons/yr**	**Mtons/yr**
A2 Inflow Pumping (G372, G370)	84	25	250	5	12	11	50,000	500
S356 Pump	28	8	83	2	4	4	17,000	170
Peat Accretion after year 2065*								(260,000)

*Estimate of C02 sequestration from peat accretion is based on methodology found in Richardson et al, 2013.

C.1.3.13.5 FWO Air Emissions

The largest contributor of air emissions under the without project condition is the continued use of the 14,000 acre A-2 FEB lands for sugar cultivation. Sugar cane field burning is estimated to contribute 20% of the VOC, 48% of the PM2.5, 22% of the CO, and 11% of the NOx annual loads in Palm Beach County (Hall et. al 2010). **Table C.1-14** shows a rough estimate of the air emissions from sugar cane cultivation on the 14,400 acres A-2 FEB. Emissions for sugar cane cultivation were estimated using average heavy equipment emissions factors and an estimate of 16 gallons of diesel per acres of cultivation. Cane field burning factors were taken from Hall, et al (2010). Continued oxidation of peat soils will result in the release of as much as 51,500 tons of C02 from the A-2 FEB lands and 1,600,000 tons of C02 from northern WCA 3A.

Table C.1-14. Estimated Air Emissions from Continued Sugar Cane Operations on A-2 FEB Lands and from Peat Loss in WCA-3A (North of Alligator Alley)

	Annual Emission Loads (Mton/yr)						Fuel Burnt	CO2
Activity	**CO**	**VOC**	**Nox**	**Sox**	**PM10**	**PM2.5**	**(gallons/yr)**	**(Mtons/yr)**
Sugar Cane Cultivation	10	3.5	20	.02	1.8	1.65	225000	2,250
Cane Field Burning	9	6				0.7		450
Peat Loss on A-2 Lands*								21,000 to 52,000
Peat Loss in WCA-3A (North of Alligator Alley)*								650,000 to 1,600,000

* Estimate of C02 Emissions from peat loss is based on methodology found in Richardson et al. 2013.

The total increases in air pollutants are relatively minor in relation to the existing point and nonpoint and mobile source emissions in Palm Beach, Broward, and Miami-Dade Counties. Impacts from project related emissions during construction and during the operational phase of CEPP would not significantly impact air quality within the airshed. Short-term loadings of internal-combustion engine exhaust gasses are expected to be negligible and not pose a threat to workers or local populations. The G-370 and G372 pumps presently have air quality emissions permits. These permits may need modification to account for the additional operations and emissions. An air quality permit will be obtained prior to the construction of the S-356 pump station. Because the project is located within a designated attainment area, USEPA's general conformity rule to implement Section 176 (c) of the Clean Air Act does not apply, and a conformity statement should not be required. Over the long-term, rehydration of peat soils in WCA 3A would capture many more tons of C02 than that emitted during construction or as a result of pump operations.

C.1.3.14 Hazardous, Toxic and Radioactive Wastes

The HTRW conditions under the FWO the A-2 parcel would be converted to an FEB and the A-2 Expansion area would be expected to be very similar to the present condition. Under the FWO condition, the A-2 Expansion area lands would likely continue to be farmed which will result in the additional application of agricultural pesticides in the cultivated portions of this property and the inadvertent release of petroleum and pesticides in operation and maintenance areas. During the construction of the A-2 FEB and other project features, it is possible that undiscovered HTRW contamination would be found. Per EC 1165-2-132, the non-federal sponsor will be required to remediate these sites at their sole expense. There is also the potential for HTRW release associated with the operation of project pump stations; however, with modern facilities and best management practices (BMPs), this presents a minor risk to the environment.

C.1.3.14.1 Residual Agricultural Chemicals

The USACE HTRW policy (ER 1165-2-132) directs that Construction of Civil Works projects in HTRW-contaminated areas should be avoided where practicable. In September 2011, the ASA(CW) provided an exception to this HTRW policy for CERP Projects (Memorandum for Deputy Commanding General for Civil and Emergency Operations, Subject: Comprehensive Everglades Restoration Plan (CERP) – Residual Agricultural Chemicals, Dated September 14, 2011). If specific criteria are met, this policy memorandum allows residual agrichemicals to remain on project lands and allows the USACE or SFWMD to integrate response actions directly into the construction plan.

At the request of the SFWMD, this section of the CEPP PACR has been updated from the CEPP PIR to comply with the ASA(CW) policy. A copy of the CEPP PIR letter from the SFWMD requesting application of the policy is included in **Annex H** along with HTRW reports, sampling protocol, and correspondence during the CEPP PIR**.**

The FDEP and USFWS reviewed the sampling performed during CEPP on the A-2 parcel and preliminarily indicated that the soils do not require any remedial action to protect USFWS trust species. The FDEP and USFWS recommended that additional sampling of water quality, periphyton and apple snails be conducted in lieu of requiring soil remediation since they believe that the risks to trust species are minimal. Development of an agrochemical BMP plan for the interim use of the property was also recommended. It is possible that in the future, some impacted soils may be identified for removal or isolation or the USACE may come in contract with these soils during construction. For these reasons, the SFWMD has requested that the CERP Residual Agricultural Chemical (Ag-Chem) policy be applied to this project.

As part of CEPP, the CEPP PIR included language to partially fulfill the requirements established in the aforementioned policy for the A-2 FEB portion of the CEPP study area. In the CEPP PIR, the Jacksonville District sought conditional, but not final, approval of the application of the Ag-Chem policy from HQ USACE. Final approval will be requested prior to design when it is expected that supplemental information will be available to completely fulfill the policy requirements. Pursuant to paragraph 4 of the policy and prior to beginning construction, the Jacksonville District will obtain written documentation of regulatory approval(s) for all response actions from SFWMD, and enter into an agreement with the SFWMD wherein the USACE accepts and expends funds, contributed by the SFWMD, for performance of the approved response action(s).

As part of the land acquisition process and in coordination with the FDEP Bureau of Waste Cleanup and USFWS Contaminants Section, SFWMD assessed the A-2 parcel in a series of Phase I/II Environmental Site Assessments (ESA) and Ecological Risk Assessments (ERA). The SFWMD performed point source remediation and completed multiple corrective actions in accordance with FDEP regulations. A Summary of the completed corrective actions performed by the SFWMD is included in the audit reports included in **Annex H**. The only chemicals of concern remaining on the A-2 parcel are residual agricultural chemicals.

As required, the following is a discussion of each of the Policy Memorandum's requirements and conditions for only the constituents remaining on the A-2 parcel. Documentation of full compliance with the CERP Ag-Chem policy requirements will be provided prior to construction on lands that have impacted soils.

a. Residual Agricultural Chemicals

1. Determination that lands were formerly cultivated soils. At the time of acquisition, the 14,408-acre site was in active sugar cane and rice cultivation. The historical research included in the Phase I/II ESA indicated that prior to converting the land to agricultural production around the 1950s, the land was undeveloped lowlands.
2. The nature and extent of residual agricultural chemicals within the cultivated area of the A-2 FEB site was investigated by conducting soil sampling at 30 randomly selected 50-acre grids located within the 14,400-acre site. The 50-acre grid soil samples were analyzed for organochlorine pesticides (OCPs) by USEPA method 8081, organophosphorus pesticides plus atrazine by USEPA Method 8141, chlorinated herbicides by USEPA Method 8151, and total organic carbon (TOC), and RCRA 8 metals plus copper by USEPA method 6010/7471. This list includes a total of 88 distinct analytes. **Table C.1-15** is a summary of the detected analytes found on the property. **Table C.1-15** lists all of the residual agricultural chemicals with the maximum concentration remaining on the A-2 FEB site as well as the applicable regulatory criteria for each detected chemical. Arsenic was detected in all samples at concentrations above the residential direct exposure criteria. Given that the project lands will be inundated, exceedance of residential exposure criteria does not pose a risk to human health. Atrazine was detected above the groundwater leachate limit on approximately 23% of the tested grid cells. Since atrazine is a modern, low-persistence herbicide, this exceedance is classified as temporary and is expected to naturally attenuate once active sugarcane cultivation ceases. Copper was detected on approximately 30% of the tested grids at concentrations that exceed the USFWS interim criteria of 85 mg/kg for copper in inundated soils/sediments. The estimated 95% Upper Confidence Limit concentration for A-2 FEB residual soil copper is estimated to be 81 mg/Kg which is slightly lower than the USFWS interim criterion. The 85 mg/kg criterion which is intended to protect the endangered Everglades snail kite, was established based upon sandy soil conditions associated with citrus cultivation. Relevant scientific literature reviewed as part of the Screening Level Ecological Risk Assessment (SLERA) performed on behalf of the SFWMD (PSI, 2013) indicate that the bioavailability of copper to ecological receptors is likely to be significantly lower in organic muck soils found within the A-2 FEB lands than it is for sandy citrus soils. Given that most of the samples exceeding 85 mg/Kg copper were in the 85 to 95 mg/ range and that the organic soil would make copper less available, PSI, the SFWMD contractor determined that the copper concentrations in the highly organic soils would not

present a significant risk to the snail kite. The USFWS agreed with this assessment. Dieldrin, a legacy organo-chlorine pesticide was detected in 10% of the grid samples at concentrations that exceed the groundwater leachability criteria and the SQAG-TEC. Subsequent Synthetic Precipitation Leaching Procedure (SPLP) testing was conducted for the two (2) samples with the highest dieldrin concentrations. SPLP results indicated that dieldrin was not detected in either sample above the laboratory minimum detection limit (MDL); however, the MDL in this case was above the applicable surface water criteria. This is not uncommon since surface water criteria for organic chemicals are based on derived toxicity estimates and are not set with consideration for achievable laboratory detection limits. In this case, surface water flows and rainfall are expected to dilute the dieldrin from the sediments sufficiently such that surface water quality criteria will be met. After reviewing the analytical data, the USFWS and FDEP concurred that the detected concentrations of copper and other contaminants are unlikely to pose risk to trust resources or otherwise require remedial actions. The USFWS and FDEP agreed with the SFWMD's recommendation that sampling for detected pesticides and metals be performed during startup of the A-2 FEB. Copies of the USFWS and FDEP correspondence are found in **Annex H.**

Table C.1-15. Residual Agricultural Chemicals Detected on A-2 FEB Lands during January 2013 Sampling of Cultivated Lands (PSI 2013)

				Regulatory Limits (mg/Kg)				
Parameter	CAS #'s[1]	CERCLA[2] Regulated (Y/N)	Range[3] Observed (mg/Kg)	EPA Regulatory Limits[4] (mg/Kg)	SCTL-CDE[5]	SCTL-RDE[6]	SQAG-PEC[7]	SQAG-TEC[8]
Arsenic	7440-38-2	Y	3.1-6.8	1.6	12	2.1	33	9.8
Barium	7440-39-3	Y	69-110	190,000	130,000	120	60	20
Cadmium	7440-43-9	Y	<0.1 - 0.18	800	1,700	82	5.0	1.0
Chromium	7440-47-3	Y	5.6-28	NG	470	210	110	43
Copper	7440-50-8	Y	53-110	41,000	89,000	150	150	32/85[9]
Lead	7439-92-1	Y	4.7-8.4	800	1,400	400	130	36
Mercury	7439-97-6	Y	0.077-0.15	43	17	3	1.1	0.18
Selenium	7782-49-2	Y	<0.58 - 3.7	5,100	11,000	440	N/A	4.2[10]
Silver	7440-22-4	Y	<0.3 - 0.64	5,100	8,200	410	2.2	1.0
2,4-D	94-75-7	N	<0.057-0.94	7700	13,000	770	***	***
Atrazine	1912-24-9	N	<0.025 - 3.5	7.5	19	4	NG	0.0003
Metribuzin	21087-64-9	N	<0.018 - 1.7	15,000	290	54	***	***
Phorate	298-02-2	N	<0.0036 - 0.12	120	320	16	***	***
Dieldrin	60-57-1	Y	<0.00099 - 0.0051	0.11	0.3	0.06	0.062	0.0019

Notes:
mg/Kg - milligrams per Kilogram
NG - No guideline
- Site concentrations for carcinogenic polycyclic aromatic hydrocarbons must be converted to Benzo(a)pyrene equivalents before comparison with the appropriate direct exposure SCTL for Benzo(a)pyrene using the approach described in the February 2005 'Final Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C.'
[1]CAS Registry Number (CAS#'s) - unique numeric identifier which designates one substance and has no chemical significance
[2]40 Code of Federal Regulations (CFR) 302.4, Designation of Hazardous Substances - Comprehensive Environmental Response, Compensation, Liability Act
[3]Range of chemical concentrations observed in all the samples collected within the Agricultural Areas only.
[4]USEPA - Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites - Industrial Soil
[5]Chapter 62-777, FAC, Table 2 - Technical Background Document, SCTLs, Direct Exposure - Commercial / Industrial
[6]Chapter 62-777, FAC, Table 2 - Technical Background Document, SCTLs, Direct Exposure - Residential
[7]Development and Evaluation of Sediment Quality Assessment Guidelines, Volumes 1-4 (MacDonald, 2000), Sediment Quality Assessment Guidelines-Probable Effects Concentration
[8]Development and Evaluation of Sediment Quality Assessment Guidelines, Volumes 1-4 (MacDonald, 2000), Sediment Quality Assessment Guidelines-Threshold Effects Concentration
9USFWS Interim Screening Level for Everglades Snail Kite
10No SQAG criteria have been developed for selenium. An Action Level of 4.2 mg/kg was negotiated with USFWS on the C9/C11 project for Selenium in organic soils.

3. Determination that agricultural chemicals were commercially available products, lawfully applied for their intended purpose, not spilled, and did not result from waste management.

Phase I/II ESA were conducted on the site using an environmental protocol approved by SFWMD, USFWS and FDEP-Bureau of Waste Cleanup. (Copies of summary environmental audit report and the environmental protocol are included in **Annex H**.) These Phase I/II audits document long-term sugarcane farming activities that began in the 1960s. **Table C.1-15** lists the chemical compounds found on the FWO project lands that exceed regulatory limits or guidelines. These compounds are either active ingredients found in commercially available products registered under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) (7 U.S.C. 136a) or they are micro-nutrients that are added to increase the fertility of muck soils utilized to grow sugar cane (Rice et al. 2010).

Copper was found in 30% of the soil samples above 85 mg/kg. The average copper soil concentration was 76.8 mg/kg. The minimum concentration was 53 mg/kg and the maximum copper concentration was 110 mg/kg. The average concentration was compared to potential residual concentrations that result from long-term application at recommended rates. If one assumes 40 years of copper application at a rate of 2 lb/acre/year (Rice 2010), and a background of 30 mg/Kg, the potential average concentration of copper distributed in the top 1 ft of soil would be approximately 90 mg/Kg. That the measured average is somewhat lower can be accounted for by losses to deeper soils or use of less copper in some areas. For comparison, copper concentrations on industrial National Priority List sites where spills or disposal have occurred are typically are in the 1,000s of mg/Kg.

Arsenic has a long and continued history of use in agriculture. It is likely that the reported arsenic concentrations found on the A-2 FEB land (average of 4.5 mg/kg) are the result of a combination of background arsenic (0.8 to 3.7 mg/Kg, per Chen 2001) and arsenic added during agricultural operations.

Lead was found at concentrations above the residential exposure limit (RDLE); however, since the A-2 FEB land will be inundated this particular criteria is not relevant.

Elevated selenium concentrations have been found on previously farmed land in Miami-Dade and Broward counties. Residual selenium concentrations in farm soils in South Florida are attributed to trace selenium contained within fertilizers applied to farms to enhance fertility.

Dieldrin and Atrazine are pesticides and herbicides that are or were registered under FIFRA. Their presence on the A-2 FEB lands is not unusual for farmed soils in the EAA.

The exceedances for barium, cadmium, chromium, mercury, and silver were of the SQAG limits which are guidelines but not promulgated standards. Several pesticides were detected (2,4-D, metribuzin, and phorate; however, the concentrations were below applicable standards and no SQAG limits exist for these contaminants.

Given the information presented here and other site evidence, there is no indication that the concentrations found on the A-2 FEB cultivated lands are indicative of a spill, deliberate on-site disposal or some other non-farming activity. A reasonable conclusion regarding the source of these residual soil contaminants is that they are the result of routine application of chemicals to the fields during routine farming operations.

4. <u>Availability of Alternative Lands (why avoidance of land was not practicable).</u> Much of the land in south Florida that is not currently residential, commercial, or industrial was once used for agriculture, even including some areas that now comprise the Everglades National Park. There are few

open areas that were not used for agriculture. The lands for the A-2 FEB components were required to be located in the EAA Miami Canal Sub-basin with access to the Miami Canal on approximately 10,000 to 14,000 acres of land. There are several possible sites. The existing land use for these sites was predominantly sugar cane, turf grass, other agriculture or wetlands. Other than using other agricultural lands in the sub-basin, the A-2 FEB facility could be sited in wetlands. Siting storage facilities on wetlands obviously involves adverse impact to wetland habitat. In terms of the potential for presence of problematic concentrations of residual agricultural chemicals, sugar cane lands are considered to be lower risk than turf grass, citrus, or truck crop lands since persistent organo-chlorine pesticides were generally not applied at high rates during sugar cane cultivation.

5. Project Purpose (conversion from agricultural production to an aquatic restoration purpose). The project purpose for the A-2 FEB would be to capture and store releases from Lake Okeechobee and then distribute the water to STA3/4 and Compartment B of STA2 for treatment prior to releasing this water into northern WCA 3A. The project would inundate the land with water for an extended period of time to meet Federal project goals. This purpose would be achieved with a 14,000-acre (wetted area) reservoir which would be inundated with up to 4 feet of water.

b. Regulatory Coordination

The SFWMD has conducted several Phase I/II site assessments prior to and since acquiring the A-2 FEB lands in 1999. A discussion of the findings of these investigations and coordination of remedial activities with FDEP is in included in the Summary Environmental Report, PSI, Inc., August 21, 2012 which is in **Annex H**. In January of 2013, the SFWMD conducted additional sampling of cultivated areas on the A-2 FEB lands. The USFWS and FDEP have preliminarily determined that the residual agricultural chemicals found on the A-2 FEB lands do not present a risk to protected resources. Based on the results of the 2013 soil testing, the USFWS and FDEP recommended that during the initial operations of the FEB, the SFWMD perform testing of water for several contaminants (2,4-D, atrazine, metribuzin, phorate, dieldrin, chromium, mercury, selenium, copper) as well as testing of periphyton and apple snails for copper.

The FDEP also reviewed the 2013 soil sampling results and recommended the development of a soil management plan to address the fate of arsenic impacted soils during construction as well as the same start-up operations sampling program as provided by the USFWS. The FDEP and the USFWS both recommended that agrochemical BMPs be instituted during the continued cultivation of the lands.

The USFWS and FDEP review letters did not identify threshold concentrations or the potential consequences of detecting elevated concentrations of copper in water, periphyton, or apple snails during initial operations monitoring. The USFWS and FDEP provided the same comments on the A-1 FEB which has similar levels of copper in the cultivated soil. To better define threshold copper concentrations, the SFWMD has jointly sponsored several studies to evaluate copper bioaccumulation, toxicity, desorption, and other important parameters that significantly impact the potential risks associated with exposure of the Everglades snail kite, and other species to copper in sediments. The SFWMD believes that they will be in a better position to discuss threshold concentrations with the USFWS and FDEP prior to the A-1 FEB construction. The risk that threshold copper concentrations detected in the A-2 FEB during start-up operations will result in a post-construction remedial action requirements would be minimal given completion of ongoing copper bioaccumulation studies and because the operation of the A-1 FEB preceded the A-2 FEB design/construction by several years.

The A-2 FEB site was purchased with Farm Bill monies and per the Framework Agreement between the DOI, DOA, DEP and SFWMD, a subsequent protocol strictly controls the use of agricultural chemicals on leased lands to a predetermined list unless specifically approved by the USFWS. The A-2 parcel will remain in agricultural production for several years until the A-2 FEB is set for construction at which time the agricultural leases will be terminated. Once farming has ceased on the A2 FEB project lands, an Exit Assessment will be performed to determine the presence of any new potential sources of HTRW since the completion of the previous Phase II ESA, and to verify the concentration of contaminants in the cultivated areas at selected locations. The results of these audits will be provided to the FDEP and USFWS for their review, comment, and concurrence regarding the need for remedial actions.

c. Soils Removed

Testing and Investigations Performed. The environmental site assessments for the A-2 FEB site generally followed the FDEP and USFWS established protocols in terms of procedures with the exception that 10% of the 50-acre grids were sampled rather than the normal 30 to 50% of the grids. The lower sampling rate was acceptable to the USFWS because of the prior land use which was limited to sugar cane cultivation in the cultivated areas and because the sampling results showed similar concentrations of detected analytes rather than widespread differences between sampled grids. The testing and investigations performed during the Phase I/II concluded that the remaining residual agricultural chemicals on the A-2 FEB site are either not “listed” hazardous wastes or are at concentrations reflecting lawful application for its intended purpose, and was not the result of a spill or waste management.

Hazardous Waste Characteristics. Per Subpart C (40 CFR 261.20 et seq.) the four RCRA characteristics of hazardous waste are: ignitability, corrosivity, reactivity, and toxicity. Ignitable wastes readily catch fire, sustain combustion, and when ignited, burn so vigorously and persistently that it creates a hazard. Corrosive wastes are a liquid and are acidic or alkaline wastes that readily corrode or dissolve flesh, metal, or other materials. Reactive wastes are unstable, readily explode or undergo violent reactions.

None of the soils tested in 2013 on the A-2 FEB site exhibit any of these hazardous waste characteristics. Per **Table C.1-15**, the concentrations of the remaining residual agricultural chemicals are not sufficient to render the soils ignitable or reactive. FDEP-Bureau of Waste Cleanup required no special handling of similarly impacted soils at other CERP project sites. Also, cultivation of crops in these and similar soils in the region is not known to result in soil combustion or explosion. Similarly, no corrosive materials are known to be present. To be corrosive, materials must be in a liquid state. Soils on the site are solids. Therefore, testing for these three characteristics (ignitability, corrosivity, and reactivity) is not necessary.

The fourth characteristic is toxicity. Toxic wastes leach toxic compounds or elements into underlying soils or groundwater supplies. For a toxic constituent in 40 CFR 261, Subpart C, demonstration of the RCRA toxicity characteristics can be determined by utilizing the Toxicity Characteristics Leachate Procedure (TCLP) test or by analyzing for total constituent concentration and applying the “Rule of 20” to infer whether the RCRA Toxicity Characteristics regulatory limits would be exceeded. The “Rule of 20” allows a toxicity determination to be made by comparing the total concentration analysis (dry weight) to the TCLP regulatory concentration (wet weight). The rule is used by multiplying the RCRA TCLP limit (mg/L) by 20 and then comparing this value to the measured total constituent concentration (mg/kg). If the measured total constituent concentration value is less than the TCLP concentration multiplied by 20, the material does not exhibit RCRA characteristics based on toxicity as determined by analytical procedures.

Additionally, if the constituent is not listed in Table 1 of Subpart C, the material is not a RCRA characteristic waste based on toxicity.

Table C.1-16 summarizes the results of the "Rule of 20" for the residual agricultural chemicals on the A-2 FEB site. Based on the "Rule of 20" none of the remaining soils containing residual agricultural chemicals on the A-2 FEB site exceed the RCRA characteristic toxicity levels. Based on the information provided by the SFWMD, the USACE concurs that none of the remaining soils on site will need to be removed from the A-2 FEB site by SFWMD prior to the start of construction based on the criteria in the Policy Memorandum (Soils Removed). Should soils containing residual agricultural chemicals be found to contain concentrations that increase to a RCRA level before, during or after construction, the NFS shall remove, properly dispose, and manage such soils at 100% NFS cost and USACE shall not conduct such work. As discussed in previous sections, after agricultural operations have ceased on the lands, subsequent testing will be performed and the results subjected to the RCRA hazardous waste determination to ascertain compliance with the USACE Policy for Agricultural Chemicals on CERP lands

Table C.1-16. "Rule of 20" Test for Residual Soil Contaminants Found on A-2 FEB Lands

Agricultural Chemicals on site	Maximum Concentration (mg/kg)	RCRA TCLP Concentration (mg/L)	RCRA TCLP Concentration multiplied by 20 (mg/kg)	Is Max Concentration Less than TCLP times 20?
Arsenic	6.8	1.0	20.0	Yes
Atrazine	0.0035	Not Listed	Not Applicable	Not Applicable
Barium	110	100	2000	Yes
Cadmium	0.18	1.0	20	Yes
Chromium	28	5.0	100	Yes
Copper	110	Not Listed	Not Applicable	Not Applicable
Dieldrin	0.0045	Not Listed	Not Applicable	Not Applicable
Mercury	0.15	.2	4.0	Yes
Metribuzin	1.7	Not Listed	Not Applicable	Not Applicable
Phorate	0.12	Not Listed	Not Applicable	Not Applicable
Selenium	3	1	20	Yes
Silver	0.64	5.0	100	Yes
2,4-D	3	10	200	Yes

d. Cost Comparison for Soils Containing Residual Agricultural Chemicals Remaining on Project Lands

The FDEP and USFWS have preliminarily determined that the residual agricultural chemicals found on the A-2 FEB lands do not present an undue risk to protected resources. The FDEP and USFWS recommended that the SFWMD perform testing of water, periphyton algae, and apple snails for copper during the initial operations period for the FEB. Given that the USFWS has not identified soils requiring removal, no costs were identified for the FWO. If the USFWS determines in the future that some A-2 FEB project soils have to be removed or isolated, a cost comparison would be prepared.

e. Cost Comparison for USACE Acting as the Construction Agency and Performing the Response Action for the Non-Federal Sponsor

If the FDEP and/or USFWS determine in the future that some A-2 FEB project soils have to be removed or isolated, this cost comparison will be prepared as part of complying with the CERP Agricultural-Chemical Policy.

Cost effective analyses for determining if it is cost effective for the USACE to perform the non-RCRA response actions for the SFWMD will be prepared for the A-2 FEB if and when sufficient information is available. The assumptions used to develop the costs for the construction scenario, where the USACE does not touch impacted soil, will likely be: 1) the SFWMD performs all earth moving construction activities that involve excavating impacted soils, stockpiling impacted soils, blending impacted soils, and placing blended materials; 2) the USACE performs construction actions such as pump foundation excavation of clean limerock, pump station construction, culvert installation, and earth moving construction in areas where impacted soils have either been removed or are covered with a minimum of 6 inches of clean fill; 3) splitting the work between the two agencies does not result in additional costs associated with actual construction activities, i.e., no additional material handling occurs; and 4) the additional cost of having two construction agencies and two contracts, results in an increase in the total amount required for design/engineering and contract supervision/administration. This assessment will be prepared and submitted to HQUSACE for concurrence prior to construction by USACE.

f. Engineering and Other Risks

1. Engineering Risk. The USACE will address risks during design and construction of the project components by: 1) Regulatory review of plans and specifications by the FDEP which is the delegated RCRA authority in Florida; 2) Review of environmental audits and environmental risk assessments prepared for and by the USFWS for potential impacts to Threatened and Endangered Species; 3) Incorporation of appropriate safety and handling specifications into the project bid documents; 4) Review of plans and specifications by the USACE Environmental and Munitions Center for Expertise (EM CX) prior to contract advertisement; 5) Conducting appropriate supervision and oversight of construction; 6) Conducting confirmation sampling after feature construction, and 7) SFWMD's obtaining final approval of construction actions by FDEP. These safeguards further reduce the risk of future releases or exposure and are consistent with USACE construction standards and requirements.
2. Other Risk. Once constructed, it is possible that man-made actions might disturb the soils containing residual agricultural chemicals if such material is placed within the project features or otherwise remains on the project site. To limit this risk, land use restriction covenants may be incorporated into the property deeds where required by FDEP. The SFWMD shall ensure that land use restrictions if any will not reduce ecosystem restoration benefits, hinder O&M, or interfere with the Project's proper function. Once an approved soil management plan is available, CESAJ environmental specialists and the EMCX (Environmental and Munitions Center of Expertise) will review the plan to determine other risks if any. The results of the CESAJ and EMCX review will be provided to HQUSACE for concurrence.
3. Final Risk Determination. The USACE and SFWMD will prepare a final determination report for the A-2 FEB to confirm that the overall project risk from impacted soils is low and acceptable. The final determination report will be submitted to HQUSACE prior to construction. For each construction contract managed by the USACE, the SFWMD will be responsible for providing full funding to the

USACE prior to contract advertisement for the identified contract specific cost of addressing residual agricultural chemicals.

g. Non-Federal Sponsor Responsibility:

The non-Federal sponsor is 100% responsible for the cost of actions taken due to the presence of residual agricultural chemicals, at no expense to the Federal Government. Any future costs associated with the presence of residual agricultural chemicals at the Federal project site are a 100% non-Federal sponsor cost and responsibility. The costs for characterization of the project lands in preparation for conducting a response action for the residual agricultural chemicals and removal of soils that are hazardous waste shall be included as 100% non-Federal sponsor responsibility. The Jacksonville District shall not conduct actions to address residual agricultural chemicals for the SFWMD during the operation and maintenance, repair, replacement and rehabilitation (OMRR&R) phase of the project.

C.1.3.15 Cultural Resources

The conditions under the FWO are expected to be very similar to the existing conditions. Farming operations would continue in EAA A-2 lands and EAA Expanded lands, causing adverse effects to two known significant cultural resource sites. Cultural resources assessment surveys would be performed in the near future on the EAA Expansion lands.

All State-owned and/or State-managed lands, including cultural resources within those lands, would be managed as described in F.S. 267.061(2) and management plans developed in consultation with the Florida Division of Historic Resources. Cultural resources within the project lands would be managed in accordance with State and Federal laws and preestablished management plans.

C.1.3.16 Socioeconomics

The latest estimates and projections published by the University of Florida's Bureau of Economic and Business Research (BEBR) are used to examine population growth in the region. The BEBR estimates for permanent resident population (BEBR 2017) are the basis for estimating 2030 populations for each county in the LEC. **Table C.1-17** provides BEBR population projections for the low, medium, and high ranges for 2016-2045 for the LEC Planning Area.

Table C.1-17. BEBR Population Projections for the LEC Planning Area for 2016-2045

	Projections					
	2020	**2025**	**2030**	**2035**	**2040**	**2045**
Palm Beach County (2016 estimate: 1,391,741)						
Low	1,393,400	1,419,100	1,438,800	1,450,000	1,455,800	1,457,400
Medium	1,465,900	1,550,600	1,619,100	1,679,700	1,735,100	1,786,600
High	1,532,000	1,659,900	1,781,600	1,901,200	2,022,200	2,145,600
Broward County (2016 estimate: 1,854,513)						
Low	1,865,100	1,901,700	1,933,400	1,952,400	1,962,300	1,969,800
Medium	1,940,700	2,038,400	2,117,200	2,182,300	2,237,900	2,290,800
High	2,010,100	2,156,800	2,295,600	2,426,900	2,553,700	2,684,000

Table C.1-17. BEBR Population Projections for the LEC Planning Area for 2016-2045 (continued)

	Projections					
	2020	**2025**	**2030**	**2035**	**2040**	**2045**
Miami-Dade County (2016 estimate: 2,700,794)						
Low	2,718,500	2,787,400	2,857,000	2,910,300	2,950,900	2,976,000
Medium	2,861,400	3,048,600	3,220,000	3,374,200	3,515,800	3,642,700
High	2,988,900	3,260,600	3,537,700	3,816,000	4,098,800	4,381,300

C.1.3.17 Land Use

The region, including cities within the study area, is expected to continue to grow both in population and in the development that population demands. Florida is expected to grow at a rate exceeding the national expected growth rate. But the growth rate is expected to diminish in the future. This is consistent with the concept of urban sprawl. As most highly demanded real estate is developed and an area becomes built out, its ability or willingness to absorb additional population growth through more intense methods of development becomes limited. Counties that have traditionally grown at a rate exceeding the State growth rate will slow, and the most intense future population growth will occur in other counties. Growth beyond available developable land will require changes in land use and possible rezoning of existing land. Urban or commercial development should occur within major urban service areas located within the project area. Agriculture is expected to remain a strong economic force, yet conceding some ground to urban development and conservation efforts. It is not anticipated that land use acreages will increase or decrease substantially.

Much of the development of CEPP project features under the FWO and within the study area is expected to occur on lands that were formerly in agricultural use. Alt 4R2 from the original CEPP PIR would alter approximately 13,800 acres from agricultural land use with wetland soils to a higher quality wetland with the construction of the A-2 FEB. An increase of 625 acres of wetland/upland habitat and an additional increase in wetland function is also expected under the FWO relative to current conditions.

Under the FWO, the A-2 FEB would alter the land use from agriculture to an FEB that includes wetland habitat. Approximately 35 acres of wetlands would result from the degradation of the L-4 Levee and the reconnection of the wetlands in northwestern WCA 3A. The backfilling of the Miami Canal would restore the wetland habitat and provide an additional 417 acres of wetlands as well as reestablish sheetflow in northern WCA 3. Spoil mounds on both sides of the Miami Canal from S-8 to S-339 would be removed, and 22 spoil mounds (the highest priority/highest functioning Florida FWC enhanced spoil mounds) would be maintained. In addition to the removal of the selected spoil mounds in order to promote sheetflow across the back-filled Miami Canal, additional mounds (1.5 ft above the marsh surface) would be created every mile from S-8 to Interstate 75 to prevent hydraulic channelizing and flow and to provide an additional 45 acres of upland animal habitat under the FWO. This additional upland habitat would provide refuge for terrestrial mammals during periods of high water and a minor beneficial effect. These mounds also align with the historical ridge habitat, and it is possible that the placement of the mounds would help reestablish the ridge and slough pattern in WCA 3A.

In southern WCA 3A and WCA 3B, several features increase wetland habitat and other features remove/impact wetland habitat while connecting WCA 3A to WCA 3B and ENP. The planned L-67A culverts would have a minor adverse effect on the wetland of 4.5 acres/gated culvert. Alt 4R2 from the original CEPP PIR has three culverts, thus a total loss of 13.5 acres relative to existing conditions. However, the culverts are critical to connecting WCA 3A and WCA 3B and, in conjunction with the gated culverts in the L-67A Levee, there are 6,000-ft gaps in the L-67C Levee that would increase wetland habitat. Each 6,000-ft gap would provide an additional 9 acres of wetland habitat under the FWO. The degradation of approximately 8 miles of the L-67C Levee under the FWO would provide 64 acres of additional wetlands. The degradation of the L-29 Levee (approximately 4.3 miles) would provide an additional 46 acres of wetlands. The construction of the Blue Shanty Levee (an approximately 6.25-mile levee) to create the flowway between WCA 3B and ENP removes 84 acres of wetlands in WCA 3B. In ENP, the back-fill of the entire L-67 Extension canal would provide an additional 104 acres of wetlands.

In addition to the benefit of increased wetland/upland acres, the wetland function would be increased due to the back-filling of the Miami Canal and the restoration of sheetflow across WCA 3A and 3B into ENP. The initial construction under the FWO might have a temporary adverse effect on the wetland function in the construction areas, but once the project is complete, project features would increase wetland function based on the acres of wetlands gained.

C.1.3.18 Recreation

In general, the variety of recreational interests in the United States appears to be increasing along with recreational participation rates. As future recreation needs and interests develop, it is important to recognize that participation in specific types of recreational activities is often linked to demographic factors such as age and income. For example, participation in activities requiring vigorous exercise is considerably higher for young people than for senior citizens. However, the elderly population is increasing recreation participation because of the growing awareness of the importance of physical fitness. Participation in most activities is low for those with family incomes below $25,000 per year. Interestingly, participation is low for those with family incomes greater than $100,000 per year. Most outdoor recreational activities appear to be enjoyed largely by the middle class, those with family incomes between $25,000 and $75,000 per year.

The 2013 SCORP is a reliable source from which to determine if Florida residents and tourists need additional facilities to support outdoor recreation. Surveys determined the user rates for 26 different outdoor activities within eight regions of Florida.

Figure C.1-43 is a chart from SCORP 2013 that predicts population growth in each region of Florida. All regions are expected to have significant increases in demand for the selected recreation activities with a commensurate need to increase development of each region's recreation resources and facilities.

Population Growth by Region

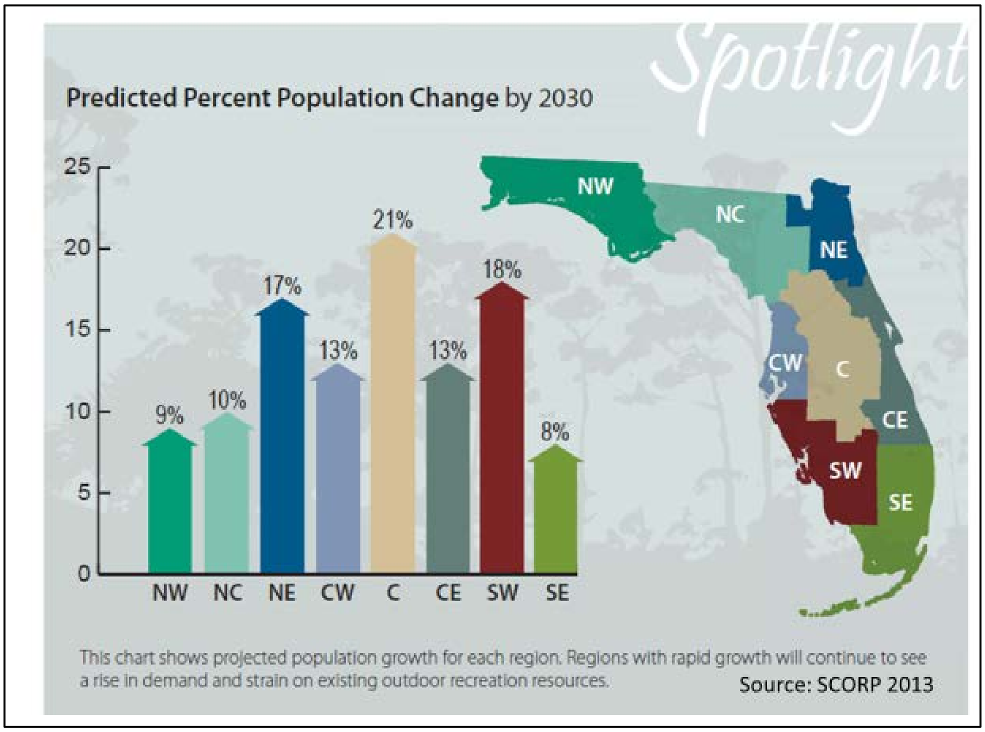

Figure C.1-43. Population Growth by Region (State of Florida 2018)

Reduced high flow events to the Northern Estuaries in the FWO would enhance utilization of the estuaries by fish and subsequently improve related recreational opportunities such as fishing and boating. The A-2 parcel would support nature-based outdoor recreational activities as a FEB. Other improvements to boating access and trail heads throughout the Greater Everglades would be expected to provide for increased recreational opportunities.

C.1.3.19 Noise

Sources of noise associated with surrounding land use are expected to be similar to those described in existing conditions. During the period between the present and the year 2076, noise within the major natural areas of south Florida would continue to be limited and of low occurrence. Noise levels would be expected to change where land use is projected to change. Within rural municipalities and urban areas, sound levels would be expected to be of greater intensity, frequency, and duration as areas are further developed in 2076 from agricultural to residential/commercial due to increased noise from traffic, construction associated with development, and increased operations at commercial and industrial facilities. There would be minor, short term increases in noise during construction of projects authorized from CEPP and the addition of pump stations which would result in long-term, localized increases in noise.

C.1.3.20 Aesthetics

This section describes future visual and aesthetic environments without the proposed action, specifically in southern Florida, southern Lake Okeechobee, A-1 and A-2 FEBs, and the attributing canals.

C.1.3.20.1 Southern Florida

Visual and aesthetic resources in southern Florida without the proposed action would be similar to existing conditions. Natural areas would continue to be comprised of a variety of wetlands, sawgrass marshes, wet prairies, and tree islands. There would be an ongoing increase in natural features due to re-establishment of hydropatterns and sheetflow throughout the region from CEPP and other restoration projects. This will increase habitat for native plants and animals, and increased opportunities for natural vistas and wildlife viewing. Agricultural lands would not change appreciably and would continue to be cultivated for citrus, sugarcane, vegetables, and sod. Over time with the CEPP implementation, there would be a slow but steady increase in the number of man-made visible features such as canals, levees, and associated infrastructure. The topography would remain flat, and vistas from atop these features would continue to offer some of the best, if not only, vistas in the region.

Urbanization is expected to occur in the future, resulting in a potential loss of opportunity to aesthetically view open agricultural and native areas due to build-out. Generally, urban development will be concentrated from Palm Beach County to Miami-Dade County. Major cities will continue to be visually congested with residential communities, transportation arteries, and commercial and industrial facilities. Within rural municipalities and urban areas, the occurrence of visible topographic features will be more common as areas are transformed from agricultural or natural uses to residential or commercial uses. Due to the existing congestion in the urban areas, future development will often be adjacent to, or near, natural areas. Visible anthropogenic features such as roads, highways, single-family homes, high rises, and commercial and industrial facilities might detract from the regional aesthetic.

CEPP would increase the long-term aesthetic value in the Northern Estuaries as reductions in high-volume discharges would result in lower amounts of suspended solids, increased water clarity, and healthier SAV beds. Restoration of flows south of the EAA and the southwestern coastal estuaries would improve habitat within the Everglades and Florida Bay for native vegetation and wildlife, enhancing the overall aesthetics in the region.

C.1.3.20.2 Lake Okeechobee and Transmission System

Under the FWO for CEPP PACR, visual and aesthetic resources along Lake Okeechobee's southern shore and in areas between Lake Harbor and South Bay would be similar to existing conditions. The land uses and basic aesthetic makeup of these areas would not change. The natural areas and agricultural features in these areas would remain relatively unchanged when compared to existing conditions as described in **Section C.1.1.1.2**. Population growth and some urbanization is expected to occur in South Bay and Lake Harbor, resulting in a potential loss of opportunity to aesthetically view open agricultural and natural areas due to build-out. However, the area would not likely become visually congested in comparison to the major cities throughout Palm Beach and Miami-Dade counties. The occurrence of visible topographic features would become more common as areas are transformed from agricultural or natural to residential or commercial. Development would often be adjacent to, or near, natural areas. Visible anthropogenic features such as roads, highways, single-family homes, and commercial and industrial facilities might detract from the regional aesthetic. The areas between Lake Harbor and South Bay would remain primarily agricultural with very sparse residential and natural (nonagricultural) land uses. The overall aesthetics value in these areas would remain marginal.

C.1.3.20.3 A-1 and A-2 FEBs

Under the FWO for CEPP PACR, visual and aesthetic resources in and around the A-1 and A-2 FEB would be similar to existing conditions. These parcels would be FEBs permanently changing the areas adjacent to the Miami Canal and North New River Canal. There would be an incremental increase in man-made visible features such as canals, levees, and associated infrastructure in these areas. There will be future development near natural areas in south Florida. Increased occurrence of visible features such as roads, highways, single-family homes, high rises, and commercial and industrial facilities may detract from the regional aesthetic.

C.1.4 FUTURE WITHOUT PROJECT CONDITIONS OF NATIVE AMERICANS

The Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida would continue to rely upon the Everglades to support their cultural, medicinal, subsistence, and commercial activities. The specific issues impacting each tribe have been different over the last few decades, but they are all related to man-made changes to the Everglades ecosystem. The Miccosukee Tribe of Indians of Florida's focus has been on the detrimental ponding of water on tribal property in WCA 3A, which affects subsistence practices and increases inundation risks to islands utilized by the Tribe. The Miccosukee Tribe of Indians of Florida has also voiced concerns with regards to the impacts of nutrient pollution on the system. The Seminole Tribe of Florida's focus has been on the detrimental drainage of water from the western basin and their Big Cypress Reservation, in addition to the impacts of nutrient pollution on the delicate Everglades system.

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APPENDIX C.2
EFFECTS OF THE ALTERNATIVES

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C.2 EFFECTS OF THE ALTERNATIVES

C.2.1 EFFECTS OF THE ARRAY OF ALTERNATIVES

This appendix provides a detailed discussion of the potential effects that could result from implementation of the Central Everglades Planning Project (CEPP) Post Authorization Change Report (PACR) array of alternatives. The evaluation of effects was based on results of modeling simulations, current information including scientific literature, direct observation, project design reports, reasonable scientific judgment, the scoping process, and other environmental impact statement (EIS) documents for similar projects. The No Action Alternative (for consistency of the report, the **No Action Alternative** is referred to as the **Future Without [FWO]** for the remainder of the report), previously discussed in **Section C.1.2**, considers the environmental conditions in the affected regions without the Proposed Action.

Environmental impacts include both direct and indirect effects. Under the Council on Environmental Quality (CEQ) regulations, direct effects are "caused by the action and occur at the same time and place," while indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8). Under the National Environmental Policy Act (NEPA), one purpose is to identify at an early stage the significant environmental issues deserving of study and deemphasizing insignificant issues, narrowing the scope of the environmental impact statement accordingly (40 CFR Sec 1501.1).

The resource conditions that were evaluated include climate; geology; soils; vegetation; wildlife; hydrology; flood control; water quality; air quality; hazardous, toxic and radioactive waste (HTRW); noise; aesthetics; socioeconomics; recreation; land use (included agriculture); cultural resources and invasive species.

C.2.1.1 Climate

Climate change is expected to alter rainfall and evapotranspiration patterns over the next 100 years. While there is agreement on the increase in temperature, consensus on the change in rainfall is lacking. Most studies to date have employed a scenario approach for impact assessment of climate change. Over the next 50 years, such scenarios to date cover 1.6 to 4 degrees Fahrenheit (°F) of temperature increase, and ±10% change in rainfall. USACE sea level change projections for the period from 2015 to 2065 for Key West, Florida, and the broader south Florida area for historical, intermediate, and high rates of future sea level rise are +4 inches, +10 inches, and +26 inches, respectively, per USACE guidance EC 1165-2-212 (USACE 2011). The *Southeast Florida Compact* (SFRCCC 2015) suggested three scenarios covering a planning range and a high curve intended for evaluating high-risk projects. The range referenced to the tidal epoch of 1992 was 14 to 24 inches.

Since 1900, there have been two cool phases and two warm phases of the Atlantic Multidecadal Oscillation (AMO) cycle with each of these phases lasting approximately 20-40 years. The exact years of the phase start and finish are estimates as each phase goes through a "transition period" of a few years. South Florida was in a much drier regime from 1965 to the early 1990s when the AMO transitioned from the cool phase to the warm phase. South Florida experienced more droughts and dry weather during the cool phase, with high-water events (some extreme) being more frequent during the current warm phase. South Florida has been in a "wetter" regime since the early 1990s mostly due to the AMO. Over the next 50 years, one or more cycles of AMO could occur, and it is difficult to predict the exact evolution of AMO as its periodicity is not fixed. In addition, the El Niño and La Niña cycles would be expected to continue to occur with a historical frequency of 3-7 years.

Global climate change and variability, particularly at regional levels, are not completely understood. Over the last two decades, South Florida Water Management District (SFWMD) scientists have researched how natural, global climatic patterns such as the El Niño/La Niña-Southern Oscillation and the AMO are linked to south Florida's weather and climate. Based on this expanded experience and knowledge, the SFWMD has already adopted progressive measures to incorporate climate outlook into its planning and operations.

Implementation of any of the CEPP PACR alternatives would have a negligible effect on climate within the affected area. Minor, localized, and less than significant effects to microclimate may occur under the FWO as a result of redistribution of water and shifts in vegetation. Potential effects may include increases in evapotranspiration and temperature changes due to an increase in spatial extent of wetlands, changes in vegetative communities, and redistribution of water as described in **Appendix C.1.1.1** and **Appendix C.1.3.1.**

C.2.1.2 Geology and Soils

On the A-2 parcel and A-2 Expansion area footprint, with all the alternatives, there would be negligible effect from the FWO. Consistent with the FWO, minor and less than significant geologic impacts would be expected from the existing condition within the project area from the removal of surface cover (e.g. vegetation and soil), of caprock from blasting, and removal of limestone to obtain material for construction of levees, canals and roads. All of the alternatives would result in conversion of a Flow Equalization Basin (FEB) (4-feet [ft] maximum operating depth) and exterior levees up to 10 ft above existing grade (generally 7 to 9 ft North Atlantic Vertical Datum 1988) to a deep storage reservoir (23-ft maximum operating depth) and associated exterior levees above existing grade (generally 7 to 9 ft North Atlantic Vertical Datum 1988) or STA.

Reduction in sediment and silt would have minor beneficial effects on the Northern Estuaries. In the southern portion of the EAA, conversion of agricultural lands to storage and treatment wetlands would have a moderate beneficial effect to soils within the project footprint by reducing dry condition-based soil subsidence.

Moderately improved hydroperiods and sheetflow in the northern regions of Water Conservation Area (WCA) 3A would be expected to reduce soil oxidation, which would, in turn, promote peat accretion necessary to rebuild the complex mosaic of habitats across the landscape. Minor hydroperiod improvements to the rest of the Greater Everglades would have a negligible effect on soil oxidation. All the alternatives showed a minor increase in inundation duration over the FWO that would decrease soil oxidation and subsidence, might decrease peat fires, and would increase carbon sequestration. All the alternatives showed a minor improvement in hydrologic conditions in northern WCA 3A, especially in the northwest. All the alternatives would maintain hydrologic conditions in northern and southern ENP (Zones ENP-N and ENP-S) consistent with the FWO. Consistent with other regions of the Greater Everglades, the alternatives scored equal to or slightly higher than the FWO in terms of meeting the desired targets for measures of inundation duration, drought intensity, and slough vegetation suitability. Within southern ENP, alternatives maintained FWO depths as depicted by the normalized weekly stage duration curve for Indicator Region (IR) 130 (**Figure G-24**).

C.2.1.3 Vegetation

C.2.1.3.1 Lake Okeechobee

Negligible and less than significant effects to vegetation within Lake Okeechobee's extensive littoral zone are anticipated from any of the alternatives. As compared with FWO, all the alternatives slightly increase frequency and duration of extreme high lake stages (>17.0 ft NGVD) by similar amounts (4 to 5.5 days per year on average), but vary by the amount of time stages exceed the beneficial ecological envelope (from 1 to 20 days per year on average), depending on the alternative. Additionally, all the alternatives decrease extreme low lake stages (<10.0 ft NGVD) similarly (by 3 to 4 days per year on average), but the amount of time stages fall below the beneficial ecological envelope varies by alternative (from 36 to 50 days per year on average). Lake stages in the middle to lower portions of the beneficial envelope (12.5 to 15.5 ft NGVD) would occur less frequently under all alternatives. Alternative C360 hold stages that are higher than other alternatives, with the greatest reduction in time stages below the ecological envelope (50 days per year on average), and increasing time stages are above the envelope by 7 to 20 days per year on average, respectively. Overall, the amount of time that lake stages remain within the beneficial envelope is increased from FWO with all alternatives, due to higher lake stages in general.

C.2.1.3.2 Northern Estuaries

Currently, many submerged aquatic vegetation (SAV) beds are stressed and have been reduced or eliminated from their former areas by extreme salinity fluctuations, increased turbidity, sedimentation, dredging, damage from boats, algal blooms, decreased light penetration and nutrient enrichment. All CEPP PACR alternatives divert undesirable damaging discharges from the Northern Estuaries to the south into the Greater Everglades compared to FWO. All CEPP PACR alternatives show performance improvement within the Northern Estuaries as indicated by fewer high volume flow months, and less frequent back to back months of damaging discharges providing a beneficial effect to the overall estuarine health and resilience of the systems. Reduction in return frequencies, high flows, and accompanying flow velocities would result in lower suspended solid loading and decreased concentration of colored dissolved organic matter, thereby allowing greater light penetration to promote growth of SAV. In addition, reduction in high volume discharge events from Lake Okeechobee would improve water clarity and reduce extreme salinity fluctuations associated with such events, and these reductions would provide a moderate, long-term benefit to benthic habitats such as mangrove communities and seagrass beds, which in turn improves the habitat conditions for many other estuarine species such as fish and invertebrates. Implementation of any CEPP PACR alternative would further reduce the frequency and duration of water releases to the Northern Estuaries and would help curtail continued habitat loss and allow the recovery of estuarine community health and resilience. See **Appendix G Figure G-10** and **Figure G-11**.

C.2.1.3.2.1 Upper Caloosahatchee River Estuary

Small increases in the number of target violations to the low flow criteria are observed in the CEPP PACR alternatives as compared to the FWO (see **Appendix G Figure G-10**), but these limited occurrences could potentially be alleviated by operational refinements to the C-43 Reservoir. Low flows are important to maintain low salinities in the upper estuary to help support SAV like *Vallisneria americana* as well as other oligohaline and freshwater species.

C.2.1.3.2.2 Lower Caloosahatchee River Estuary

In the Lower Caloosahatchee Estuary, all CEPP PACR alternatives performed better than the FWO having fewer high-flow events, providing beneficial effects to the downstream ecology as compared to the FWO (see **Appendix G Figure G-10**).

C.2.1.3.3 St. Lucie Estuary

Compared to FWO, all CEPP PACR alternatives have a lower number of high-flow events (**Appendix G Figure G-11)**. The reduction in high flows will have an overall beneficial effect on the estuary and should help decrease salinity fluctuations which will be a benefit to the oyster beds and other benthic habitats. The reduced flows should also improve water clarity which would benefit seagrass communities. Modeling indicated small increases in low flow violations in all alternatives as compared to the FWO (**Appendix G Figure G-11)**. Although these extreme dry spells are rare in the St. Lucie Estuary, they can occur and therefore supplemental flows during dry times may be warranted and have been accounted for in the Indian River Lagoon South (IRLS) water reservation process. Delivery of those supplemental flows should ideally take place through the North Fork St. Lucie River rather than from Lake Okeechobee.

C.2.1.3.4 Everglades Agricultural Area

Negligible and less than significant effects to vegetation within the Everglades Agricultural Area (EAA) are anticipated as a result of any of the alternatives. All of the property used to construct the project facilities included in the CEPP PACR is considered to be atypical jurisdictional wetlands based on hydric soils and hydrology. During construction of the new STA, temporary short-term effects are expected to vegetation within the construction area consistent with the effects of the FWO.

C.2.1.3.5 Greater Everglades

Due to small changes in the quantity, quality, distribution, and timing of water entering the Greater Everglades ecosystem under each of the CEPP PACR alternatives, minor, long-term improvements on wetland hydrology and vegetation are likely to occur. The primary factors influencing the distribution of dominant freshwater wetland plant species of the Everglades are soil type, soil depth, and hydrological regime (USFWS 1999). All alternatives had negligible improved hydroperiods and sheetflow in WCA 3A and ENP, which may result in localized, long-term reduction in soil oxidation, thereby promoting peat accretion necessary to rebuild the complex mosaic of habitats across the landscape. None of the alternatives provided any benefits to the hydroperiods in WCA 2A or WCA 2B compared to FWO. Slight differences among alternatives were found within northern WCA 3A and are described in greater detail below and in **Appendix G**. These differences may be largely attributed to the operational differences and varied spatial distribution of water across the landscape.

Improved sheetflow and related patterns of hydroperiod and water depth will help to restore and sustain the microtopography, directionality, and spatial extent of ridges and sloughs and improve the health of tree islands in the ridge and slough landscape.

Although none of the alternatives would provide the necessary inundation pattern for complete slough vegetation restoration, all of the CEPP PACR alternatives act to moderately rehydrate much of northern WCA 3A by redistributing treated STA discharges from the L-4 Canal north of WCA 3A in a manner that promotes sheetflow. The rehydration of the northern WCA 3A associated with all alternatives would promote peat accretion, reducing the potential for high intensity fires, and promoting transition from upland to wetland vegetation.

As compared with FWO, all alternatives produced negligible greater depths and inundation durations in northwestern WCA 3A (refer to **Appendix G**, **Figure G-12** through **Figure G-16**).

Many areas of WCA 3A, particularly within central WCA 3A still contain good quality wetland habitat consisting of a complex of tree islands, sawgrass marshes, wet prairies, and aquatic sloughs. Vegetation and landscape patterning in the central portion of WCA 3A resembles pre-drainage conditions most closely and represents some of the best examples of remnant Everglades habitat in south Florida (RECOVER 2009). These areas remain largely unaffected by any of the CEPP PACR alternatives. Increases in depth within central WCA 3A were negligible; however, maintenance of existing conditions within this region of the project area is desirable as ridge and slough habitat is well conserved.

In southern WCA 3A, high water levels during the wet season are important in maintaining quality wet prairie and emergent slough habitat (USFWS 2010). However, prolonged high water levels and extended hydroperiods have resulted in vegetation shifts within southern WCA 3A, negatively impacting tree islands and fragmenting sawgrass ridges, resulting in the loss of historic landscape patterning. None of the CEPP PACR alternatives, as stated in the FWO discussion, would provide beneficial effects to southern WCA 3A through reduction in high water levels or duration.

Typical Everglades vegetation, including tree islands, wet prairies, sawgrass marshes, and aquatic sloughs also occur throughout WCA 3B. However, within WCA 3B, the ridge and slough landscape has been severely degraded by the virtual elimination of overland sheetflow due to the L-67 Canal and Levee system. WCA 3B experiences very little overland flow and has become primarily a rain-fed system predominated by shorter hydroperiod sawgrass marshes with relatively few sloughs or tree islands remaining. Water levels in WCA 3B are also too low and do not vary seasonally, contributing to poor ridge and slough patterning. Loss of sheetflow to WCA 3B has also accelerated soil loss reducing elevations of the remaining tree islands in WCA 3B and making them vulnerable to high water stages. None of the alternatives met the desired dry and wet season water depths for slough vegetation nor improved hydrologic conditions in WCA 3B; however, none were hydrologically different from each other or from the FWO.

Flows through SRS under current system compartmentalization and water management practices are greatly reduced when compared with pre-drainage conditions (McVoy et al. 2011). The result has been lower wet season depths and more frequent and severe dry downs in sloughs and reduction in extent of shallow water edges. Over-drainage in the peripheral wetlands along the eastern flank of NESRS has resulted in shifts in community composition, invasion by exotic woody species and increased susceptibility to fire. Implementation of CEPP PACR alternatives are expected to moderately rehydrate much of the ENP by increasing flows from WCA 3A to NESRS by 74,000 ac-ft on an average annual basis and provide a long-term, beneficial effect. Resumption of sheetflow and related patterns of hydroperiod will help to restore pre-drainage patterns of water depths and the complex mosaic of Everglades' vegetation communities.

All alternatives had a very slight reduction in annual average flows by about 2,000 ac-ft from S-333 towards NESRS compared to the FWO. A small reduction in S-333 flow, would be expected to have a negligible effect on TP entering NESRS. Potential changes in water quality have the potential to effect vegetation within ENP. The Everglades, a phosphorus-limited system, historically received most inputs of phosphorus through rainfall, with average TP concentrations of less than 0.01 milligrams per liter (mg/L) (McCormick et al. 1996, Newman et al. 2004). However, more recently, areas within ENP, including NESRS, have been exposed to TP concentrations less than 0.10 mg/L (SFWMD 2017). Any additional inputs of nutrients have the potential to result in vegetation changes within NESRS. Vegetation that can assimilate nutrients directly from the water column appears to be the most sensitive to nutrient enrichment and include periphyton and floating-leaved plants, such as spatterdock and water lily (Chaing et al. 2000; Newman et al. 2004). Chaing et al. 2000 demonstrated that the periphyton-*Utricularia* complex may be quite sensitive to increased phosphorus, as illustrated by the disappearance of this complex from enriched study plots after the third year. Potential effects to vegetation and species community composition within NESRS and ENP cannot fully be determined at this time. Water quality within the study area will continue to be monitored, as described in **Annex D**, to determine any associated changes.

Non-native and invasive plant infestations in the affected area may temporarily occur during construction from soil disturbance. Many non-native and invasive species are flourishing in a variety of habitats and are negatively affecting the ecology throughout the Everglades. Non-native and invasive plant species are most frequently encountered in disturbed areas and areas where water quality has been impacted by increased nutrient loads. Project alternatives may increase nutrient load when compared to the FWO, which may also increase the non-native invasive plants. This will be addressed by implementation of the Adaptive Management Plan. Additional information can be found in **Annex D**. The degree of disturbance associated with the CEPP PACR alternatives is expected to be negligible in comparison to the FWO. Refer to **Section 5.1.17** and **Appendix C.2.1** for additional information. Refer to **Annex A, Figure 1-2** for a map of the affected area.

C.2.1.3.5.1 Slough/Open Water Marsh

Deep slough communities formerly occurred throughout the pre-drainage Ridge and Slough region of the Everglades (McVoy et al. 2011). Sloughs within the Greater Everglades have been degraded by compartmentalization resulting in reduced sheetflow, depths and inundation durations, altering vegetation community structure and resulting in expansion of wet prairie and sawgrass marsh communities. Overland sheetflow has been virtually eliminated from WCA 3B due to the L-67 Canal and Levee system, resulting in the loss of deep water sloughs and dominance of shorter hydroperiod dense sawgrass marsh. Vegetative trends within ENP have also included the conversion of slough/open-water marsh communities to shorter hydroperiod sawgrass marshes and wet prairies (Davis et al. 1994, Davis and Ogden 1997; Armentano et al. 2006; McVoy et al. 2011). All CEPP PACR alternatives provide only negligible increases in sheetflow and hydroperiod with little differences between alternatives. As a result of increased flows, depths and durations associated with the FWO, it is expected that with the CEPP PACR alternatives, the slightly shorter hydroperiod sawgrass marshes will transition to wet prairie and slough/open water marsh communities at a slightly faster rate. Shifts from one vegetation type to another may occur in a relatively short time frame (1 to 4 years) following hydrological alteration (Armentano et al. 2006, Zweig 2008, Zweig and Kitchens 2008, Sah et al. 2008). Although none of the CEPP PACR alternatives met desired dry and wet season water depths for slough vegetation in WCA 3B; none were hydrologically different from each other or from the FWO.

C.2.1.3.5.2 Sawgrass Marsh

As a result of slightly increased flows, depths and inundation durations under the alternatives, the shorter hydroperiod sawgrass marshes may transition to wet prairie, except where there is deep water that may transition to slough. It is expected that increased flow within northern WCA 3A will aid to reduce dense sawgrass stands and help to promote a mosaic of wetland vegetation types within this area providing minor beneficial effects.

C.2.1.3.5.3 Wet Marl Prairies

Areas within the eastern marl prairies along the boundary of ENP suffer from over-drainage, reduced water flow, exotic tree invasion and frequent human-induced fires (Lockwood et al. 2003; Ross et al. 2006). To alleviate the perpetually drier conditions and associated problems, increased water flows within this area are required. None of the CEPP PACR alternatives would provide significantly more water to SRS and the southern marl prairies as compared with the FWO.

Hydroperiods within the eastern marl prairies in the vicinity of Cape Sable Seaside Sparrow (CSSS) (*Ammodramus maritimus mirabilis*), sub-population E (CSSS-E), along the eastern edge of SRS, reveal no increase in hydroperiod with implementation of any of the CEPP PACR alternatives, within the vicinity of Indicator Regions E1, 18 and E2 (**Table C.2.1-1**). Increased hydroperiods within the eastern marl prairies may potentially result in a shift in vegetation and a significant and unavoidable adverse effect. Ross et al. (2004) noted differences in species composition within wet prairies based upon hydroperiod. Shorter hydroperiod prairies were dominated by *Muhlenbergia* (muhly grass), *Schizachyrium* (little bluestem) and *Paspalum* (bahia grass), while longer hydroperiod prairies consisted of *Cladium* (sawgrass), *Schoenus (sedge) and Rhynchospora* (beak-rush).

Table C.2.1-1. Number of Years from 1965 to 2005 the Hydroperiod between 90 and 210 Days (3 to 7 Months) per Year throughout Sparrow Habitat Maintains Marl Prairie Vegetation for the Alternatives

Alternative	Years Met/ Not Met	Subpopulation							
		A-1	A-2	B	C	D	E-1	E-2	F
ECB	Met	6	9	25	18	1	24	12	17
	Not Met	34	31	15	22	39	16	28	23
FWO	Met	10	8	24	15	4	18	10	14
	Not Met	30	32	16	25	36	22	30	26
R240	Met	10	8	24	15	2	16	9	13
	Not Met	30	32	16	25	38	24	31	27
R360	Met	10	8	24	15	2	16	9	13
	Not Met	30	32	16	25	38	24	31	27
C360	Met	10	8	24	15	1	17	9	13
	Not Met	30	32	16	25	39	23	31	27

C.2.1.3.5.4 Tree Islands

C.2.1.3.5.4.1 Northern WCA 3A

Since it is not yet clear how to restore the “ghost” tree islands that are indicative of where tree islands existed some 60 years ago nor the density and pattern of islands that existed before drainage of the

Everglades in 1888, the objectives for restoration for tree islands is predominantly to do no more harm. It is also to create a hydrologic regime that will facilitate a return of the elevations, extent, and diversity that currently exists (as reference sites) in central WCA 3A and in regions of ENP, where islands appear to be relatively large, healthy and devoid of exotics. The problem is that restoration solutions for one region of the landscape will not work for all regions because the legacy of water management is a strongly compartmentalized ecological landscape.

For this analysis of the CEPP PACR alternatives it is necessary to focus on the NW and NE WCA 3A regions where tree islands have been struggling to survive and where all alternatives have a relatively equal impact on tree islands.

Over the last 100 years of drainage and water management, northern WCA 3A has been significantly drier than all the other wetlands in WCA 3. This has caused the sawgrass-plains community to expand along the Eastern boundaries of WCA 3 (Davis 1943), the ridge and slough pattern to disappear (**Figure C.2.1-1**), and tree islands to be small and extremely few in number (**Figure C.2.1-2**). Most of the tree islands left in northern WCA 3A are small round features with no obvious natural tear-drop shape. Many have very short hydroperiods and only support terrestrial vegetation because they “sit” on high rock pedestals, which prevent them from subsiding to the same extent as the surrounding marshes.

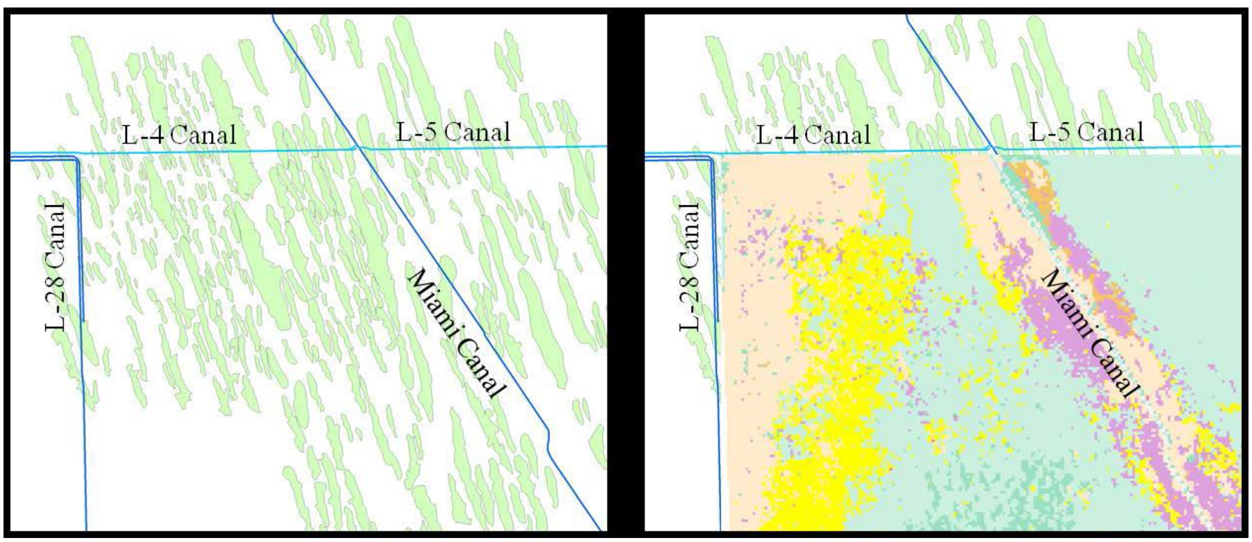


Figure C.2.1-1. Vegetation Patterns Seen Today in NW WCA 3A (*right*) Compared to the Ridge and Slough Pattern Observed in 1942 Black and White Aerial Photography (*left*). The L-4, L-5, and L-28 Canals Are Shown as Georeferences and Did Not Exist in 1942. Color Legend for Current Vegetation Map: Light Blue=Sawgrass, Dark Blue=Slough Vegetation, Purple=Cattail, Yellow=Shrubs/Sawgrass, Peach=Shrubs/Trees (USACE 2014)

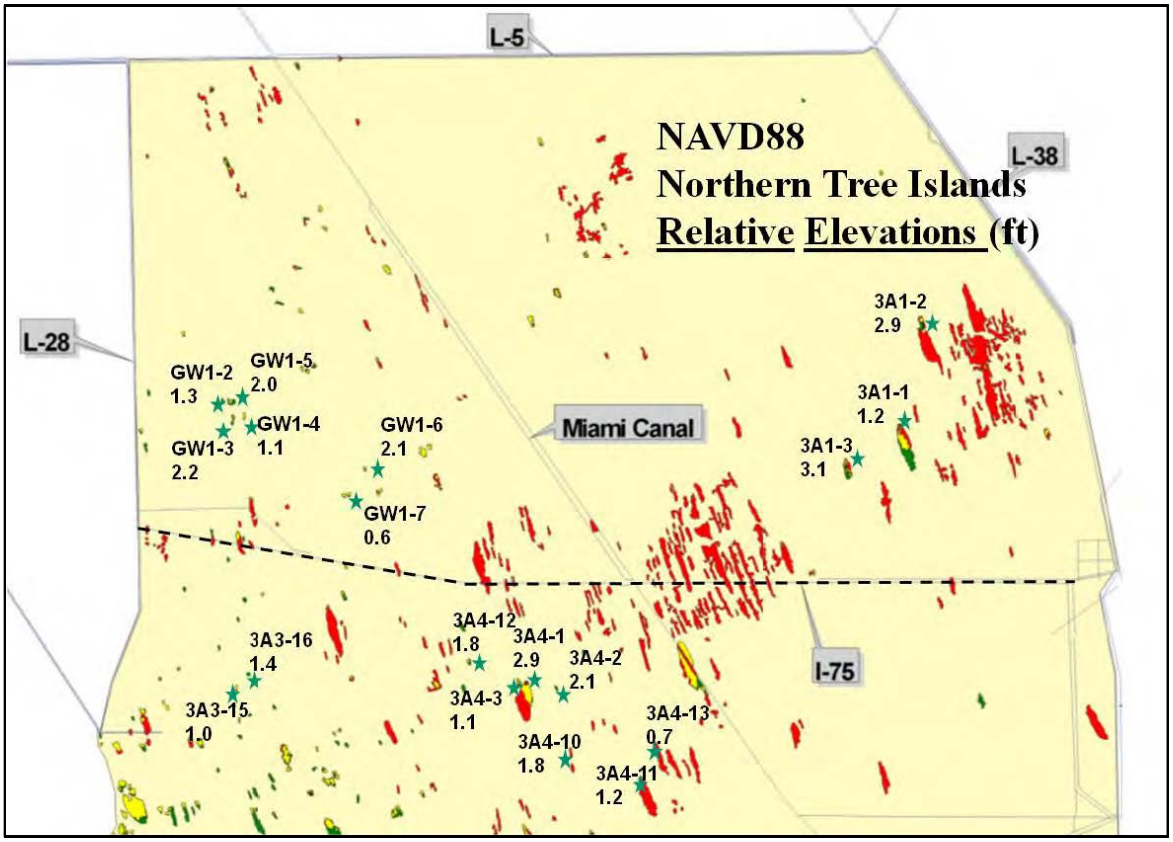


Figure C.2.1-2. Shrub-Dominated Ridges and Tree Islands in Northern WCA 3A that are Greater than or Equal to 2 Hectares are Shown in Green (islands getting larger), Yellow (islands that have not changed), or Red (shrubs and trees no longer exist) (USACE 2014)

Mean annual ponding depths, comparing alternatives and the FWO within northern WCA 3A (**Figure C.2.1-3**) indicate minor hydrological improvement and beneficial effect. With the backfilling of the Miami Canal as part of the FWO, the water depths significantly increase throughout the Greater Everglades, but especially in the western areas of northern WCA 3A, where the average depth increases from 0.5 ft to 2.0 ft. All the CEPP PACR alternatives increased water depths in this region by an additional 0.1 ft to 0.2 ft. The increased depths are not expected to adversely affect tree islands. These water depths are not expected to create any flooding stress on islands that already exist and especially those needed by the wading birds for nesting (designated as 3A1-1, 3A1-2 and 3A1-3 in **Figure C.2.1-2**). Instead these water depths are expected to significantly increase fish habitat and density of fish and improve the potential for tree island restoration. Any resumption of sheetflow and related patterns of hydroperiod extension and increased water depths would help to improve the health of tree islands in the ridge and slough landscape.

As indicated in **Figure C.2.1-4a and C.2.1-4b**, all CEPP PACR alternatives result in similar patterns of rehydration within northern WCA 3A and all only slightly decrease the amount of time when this region goes completely dry. Gage 3A-3 in northeastern WCA 3A, used to track droughts, indicates that the hydrology would be an improvement for tree islands. Tree islands are connected to the surrounding peat marshes via the roots of the trees when the water table drops below these roots, the microclimate of these islands gets too dry and they can burn. All CEPP PACR alternatives maintain the hydrology necessary to reduce the potential for devastating fires providing major beneficial effects.

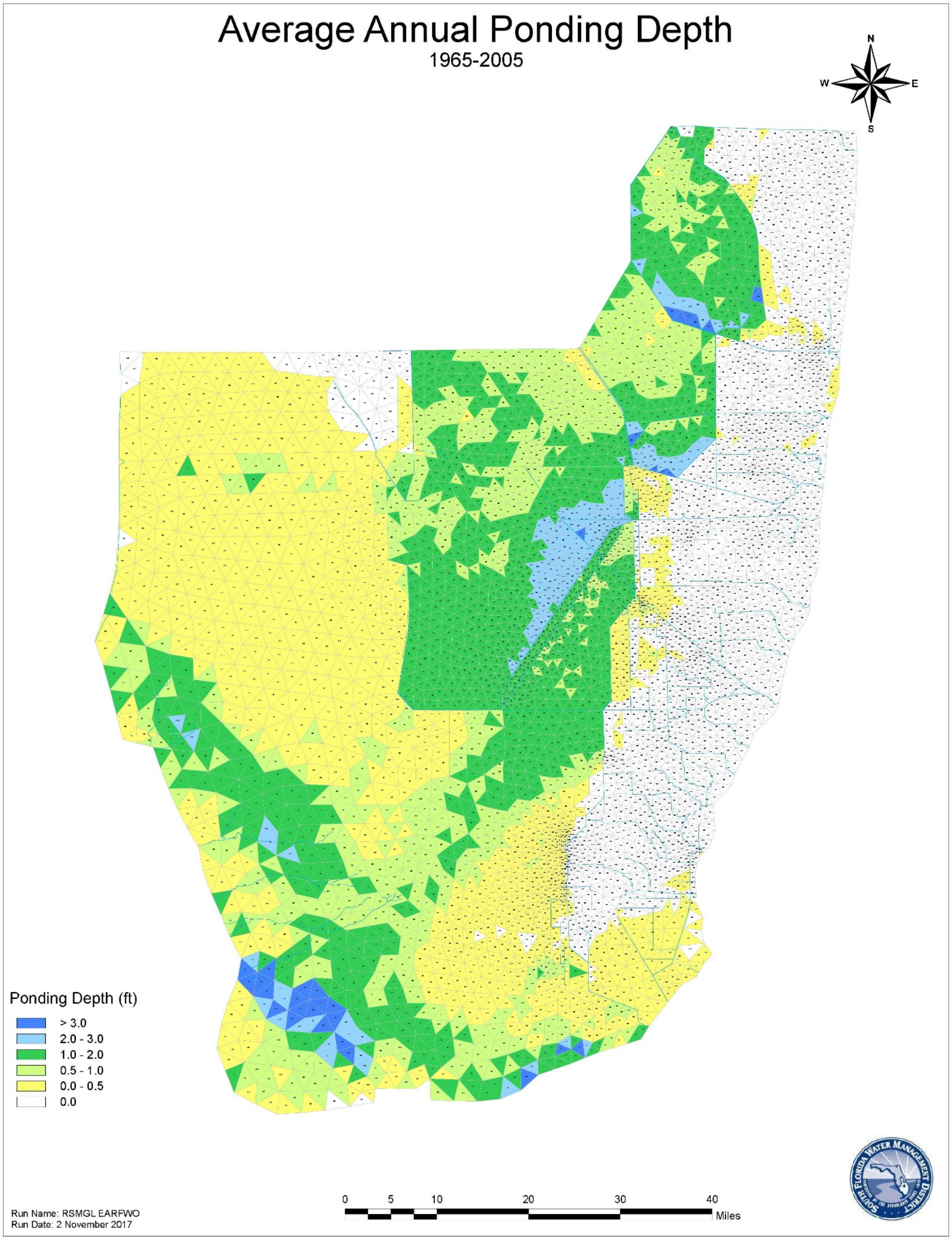


Figure C.2.1-3a. Mean Annual Ponding Depth (1965-2005) for the FWO

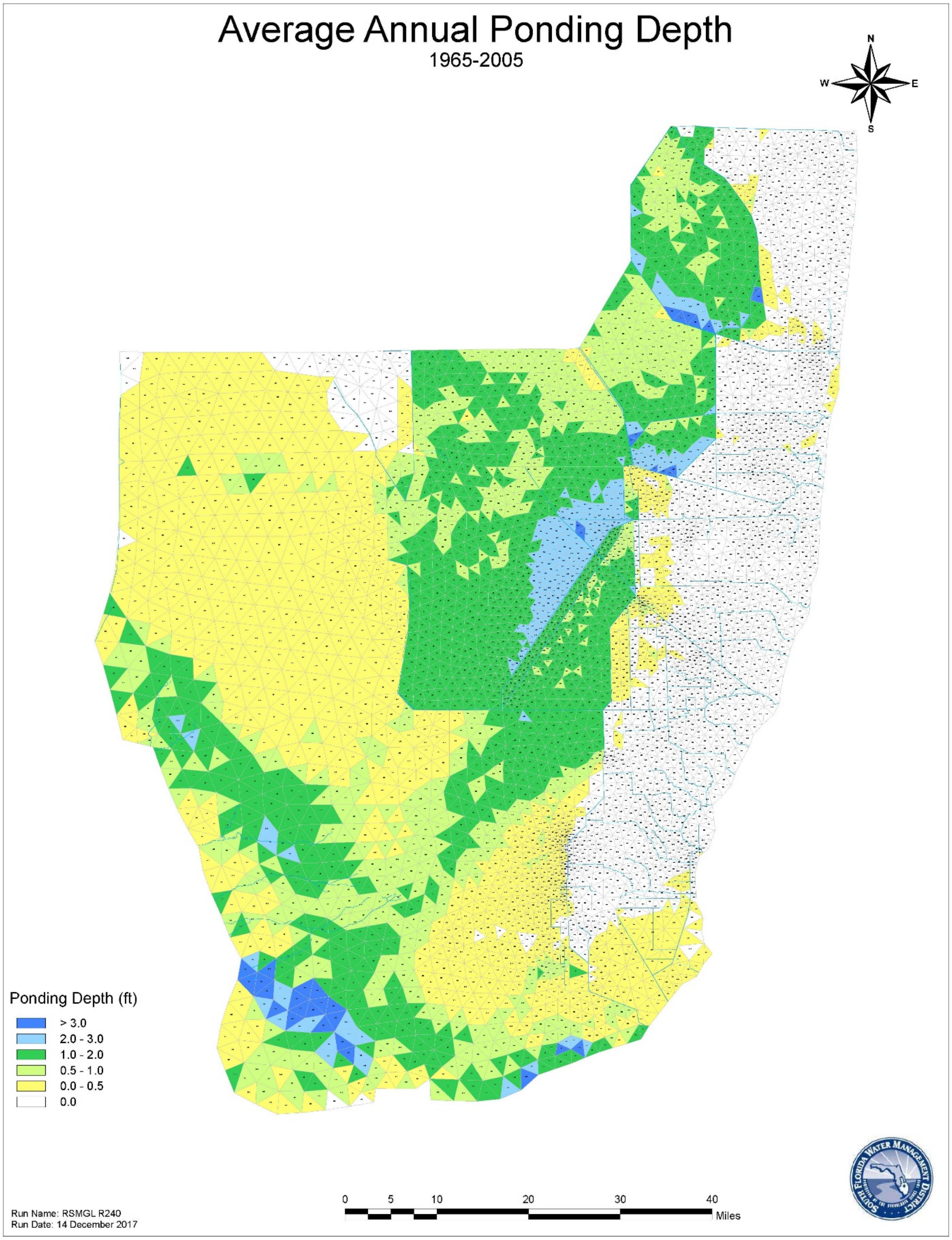


Figure C.2.1-3b. Mean Annual Ponding Depth (1965-2005) for the R240

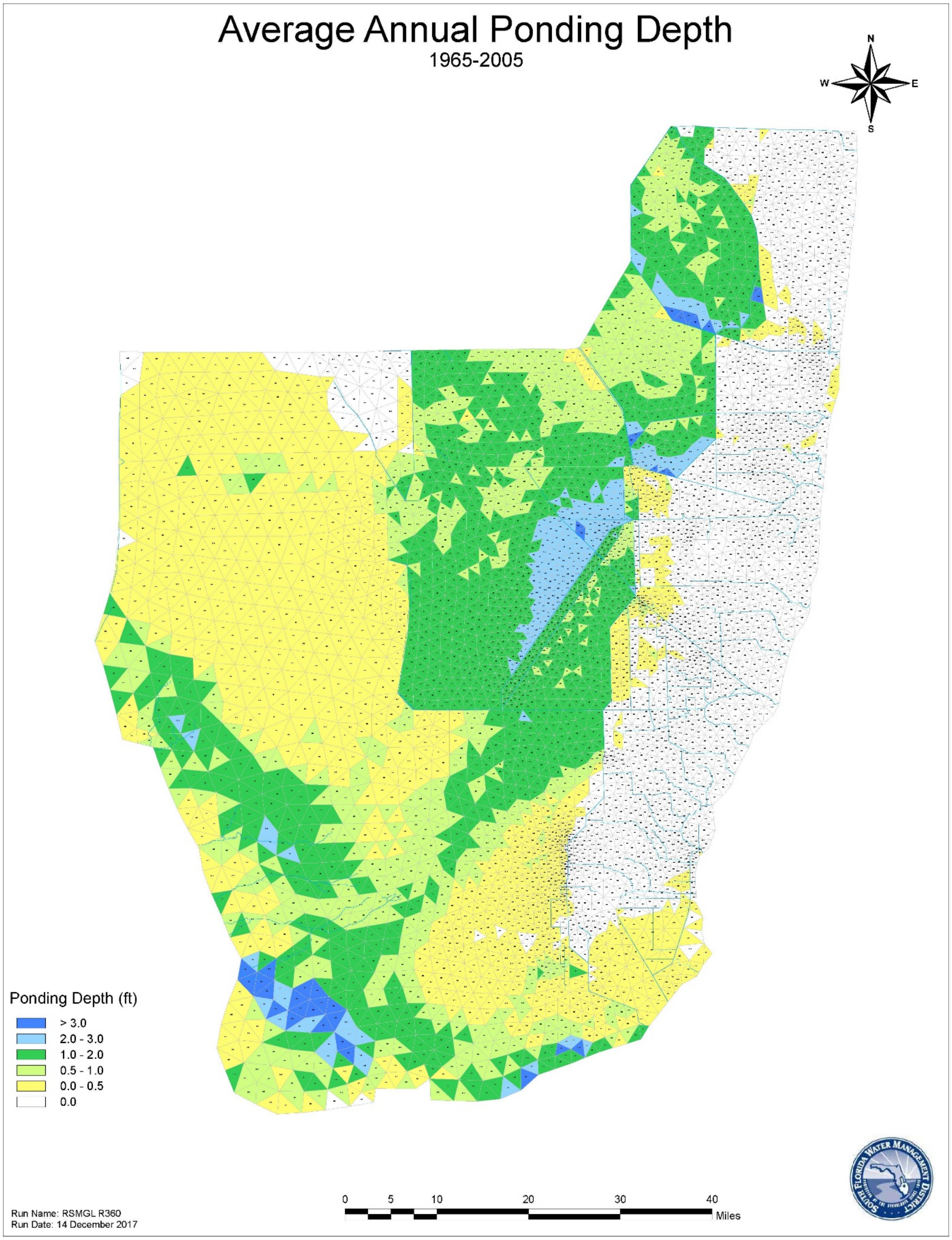


Figure C.2.1-3c. Mean Annual Ponding Depth (1965-2005) for Alternative R360

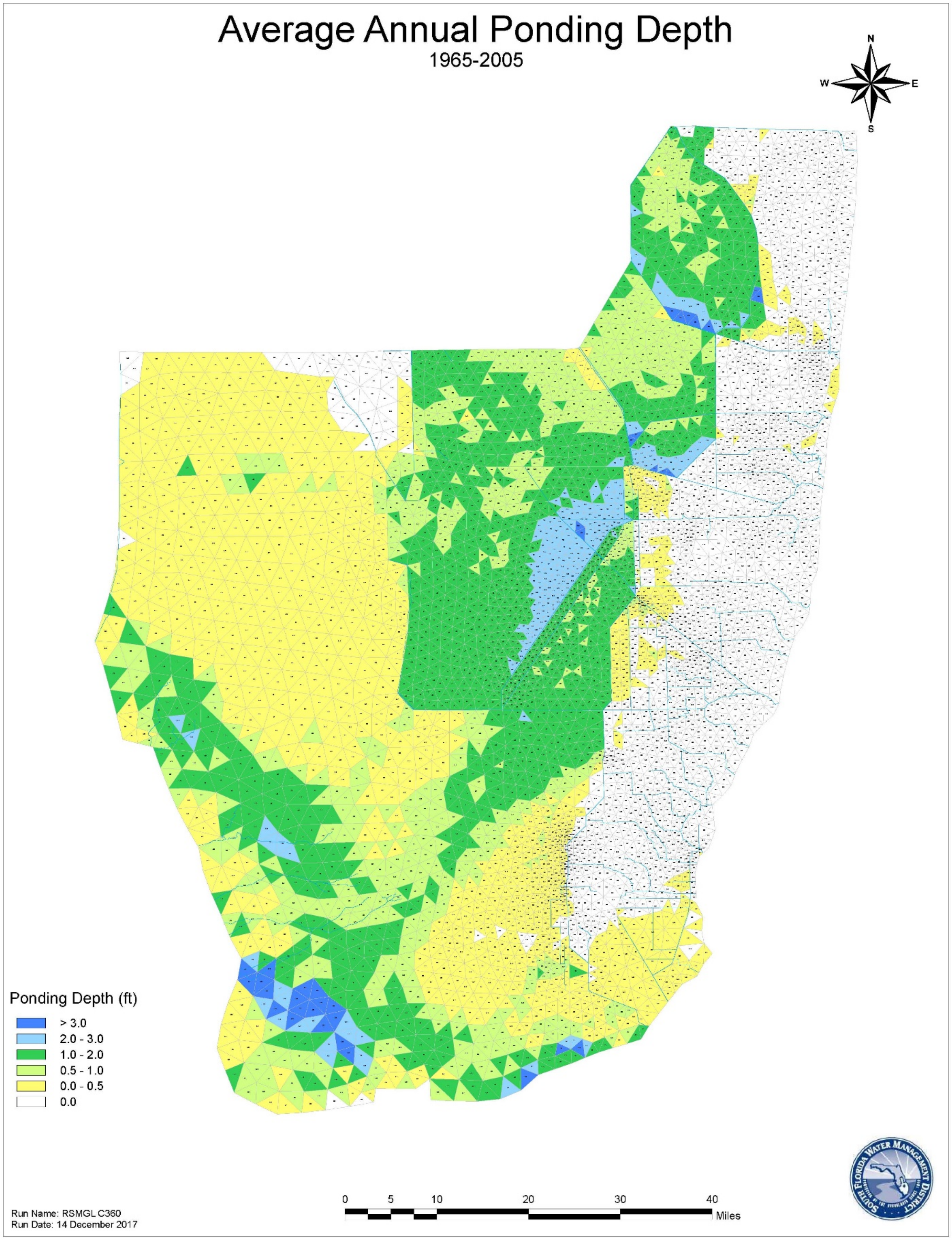


Figure C.2.1-3d. Mean Annual Ponding Depth (1965-2005) for Alternative C360

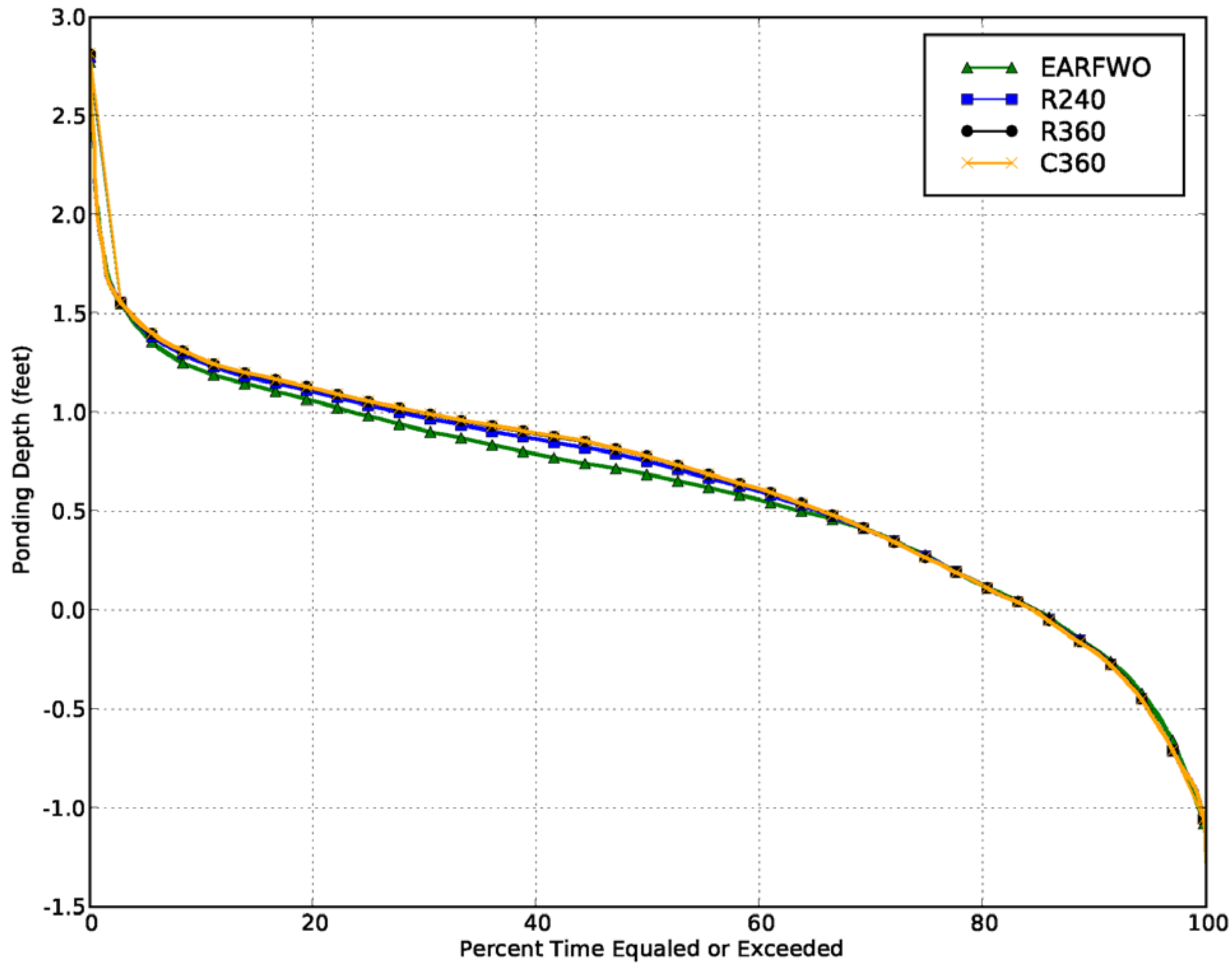


Figure C.2.1-4a. Normalized Weekly Stage Duration Curves for Alternatives Indicator Region Gage 3A-NE

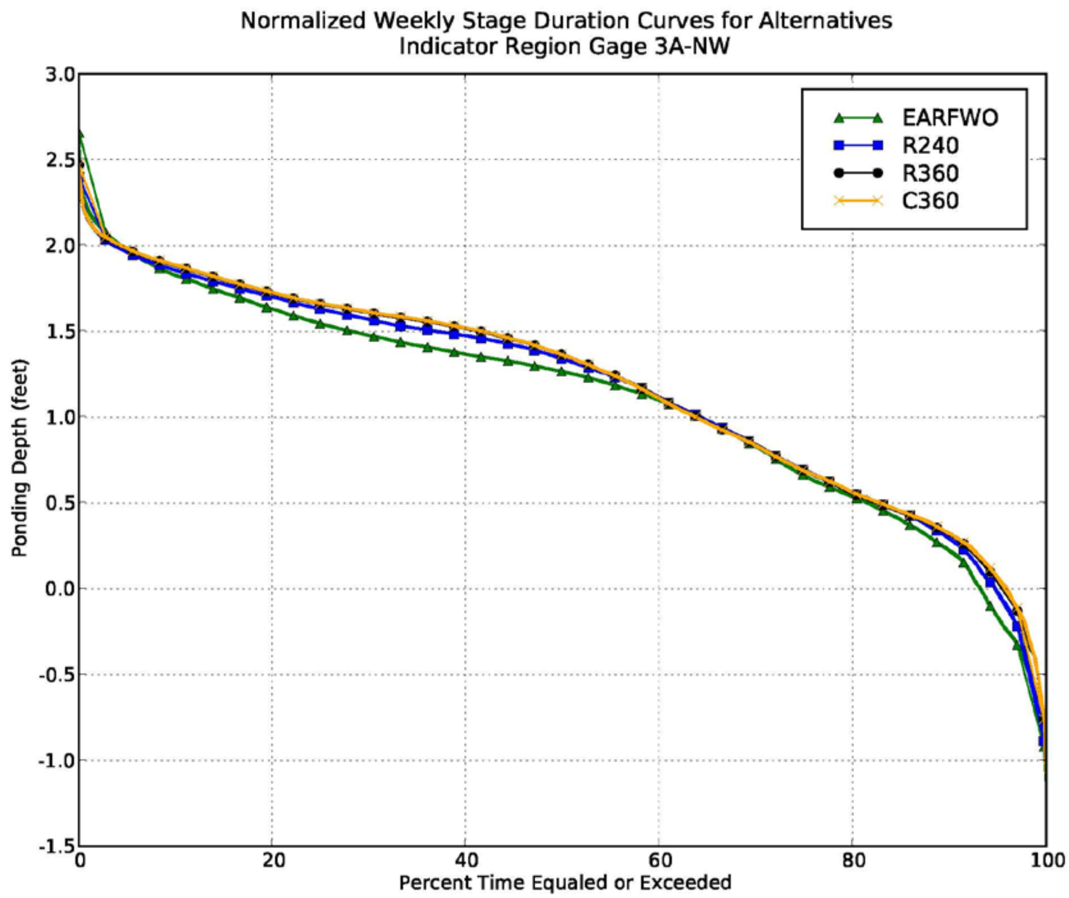


Figure C.2.1-4b. Normalized Weekly Stage Duration Curves for Alternatives Indicator Region Gage 3A-NW

C.2.1.3.5.4.2 Southern WCA 3A

The long-term goals for CERP are to reconnect the historic flow paths along the flow lines shown in **Figure C.2.1-5**. As part of CEPP PACR, this evaluation looks at the L1 transect in relation to a continuous flow and depth relationship and the known elevations of tree islands along a 2-mile swatch down each north-south transect represented in **Figure C.2.1-5**. Upon review of soil elevations and water depths along the L1 transect (**Figure C.2.1-6**); it is very difficult to see any differences between any of the alternatives. Hydrologic regimes in central WCA 3A for each alternative were not different. However, hydrologic regimes in ENP did change very slightly and potential impacts are discussed in further detail within the SRS section.

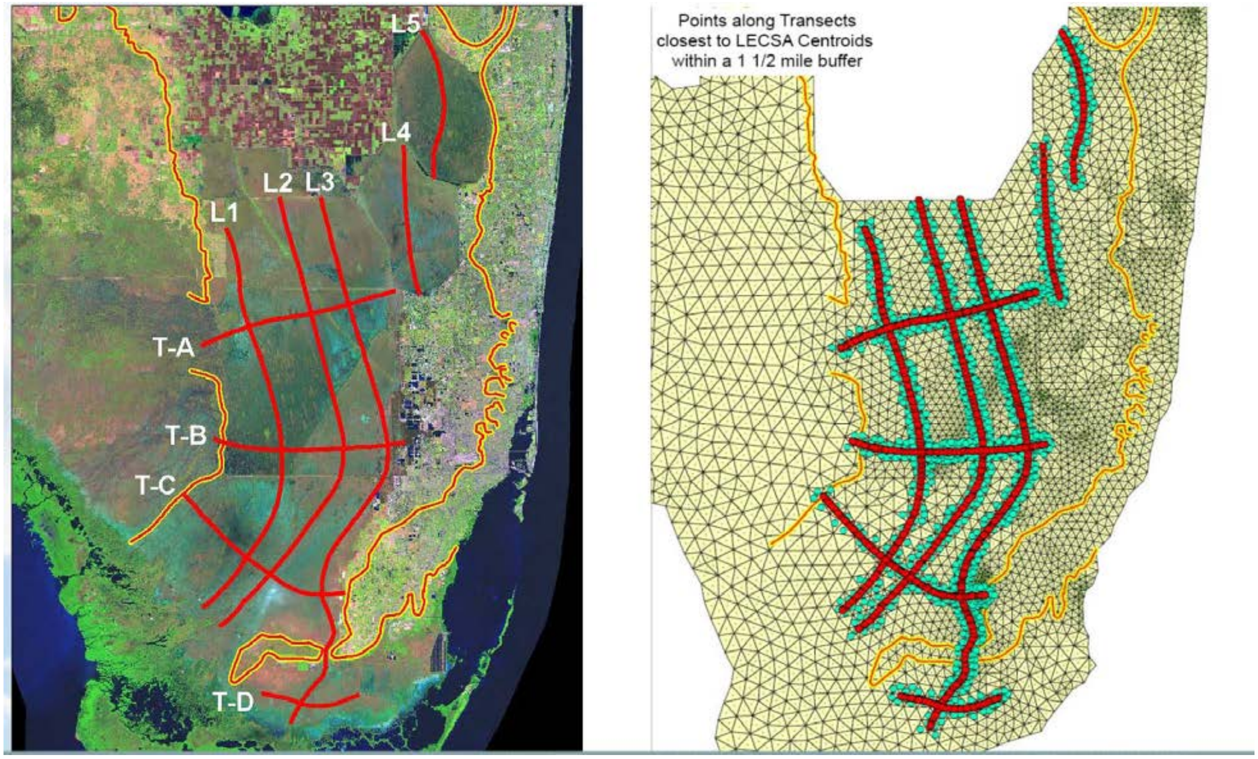
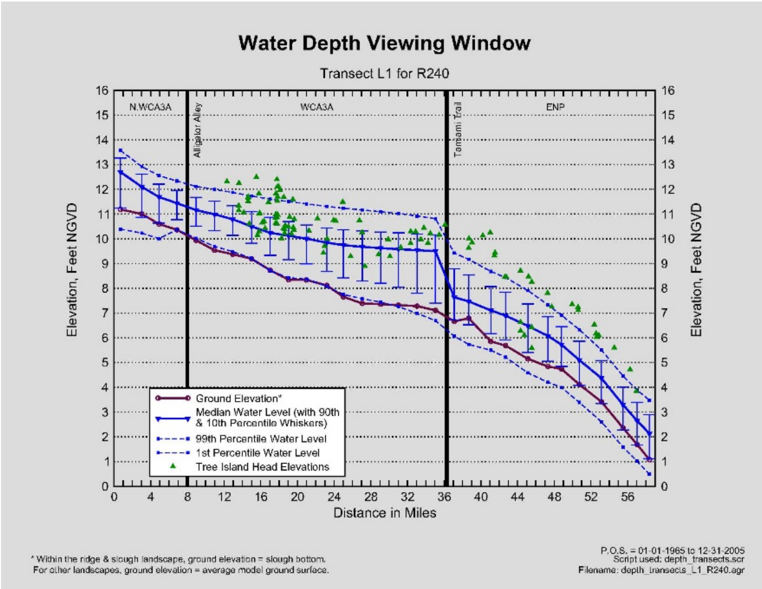
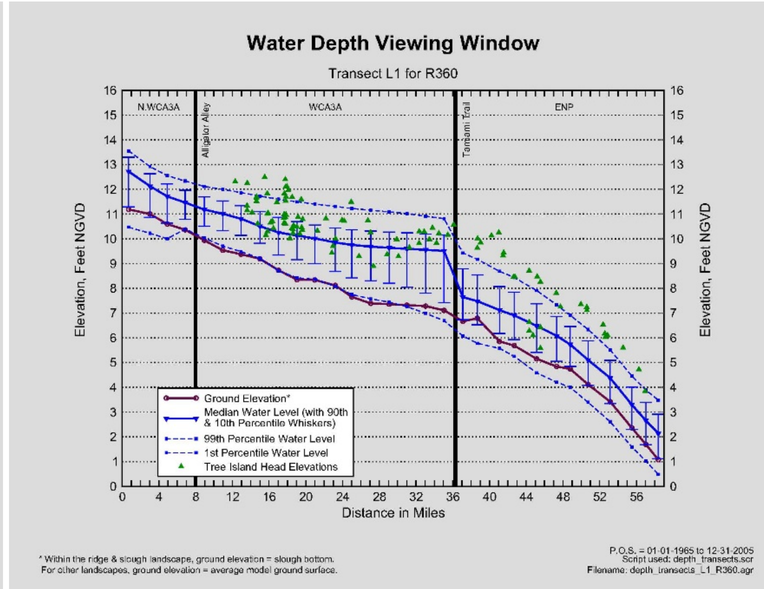


Figure C.2.1-5. "Everglades Viewing Window" Transects Aligned with Landscape Directionality

Note: L1 and L2 are Historic Flow Paths across the Extant Landscape (*left*) and across Known Elevations of Tree Islands within a 2-Mile Swath down Each North-South Transect (*right*)





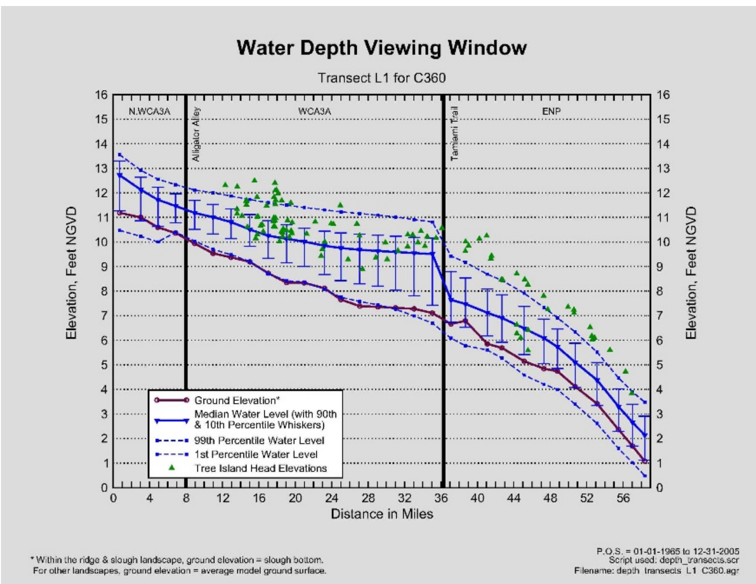


Figure C.2.1-6. The L1 "Viewing Window" Transect Going from Northern WCA 3A through SRS Was Used to See If the Water Depths (Means and Standard Deviations Relative to Ground Elevations) for the CEPP PACR Alternatives Were Significantly Different (Green Triangles=Tree Islands)

Finally, for Southern WCA 3A, none of the alternatives had any impact on the stage duration curves (**Figure C.2.1-7**). This was due to the inclusion of the 2012 Everglades Restoration Transition Plan (ERTP) WCA 3A regulation schedule in the FWO. The FWO effectively lowers the potential of flooding stress of trees on trees islands in the most southern reaches of WCA 3A. All the CEPP PACR alternatives provide similar benefits to tree islands, slough vegetation and ridge-slough pattern within southern WCA 3A. Any resumption of sheetflow and related patterns of hydroperiod extension and increased water depths would improve the health of tree islands in the ridge and slough landscape.

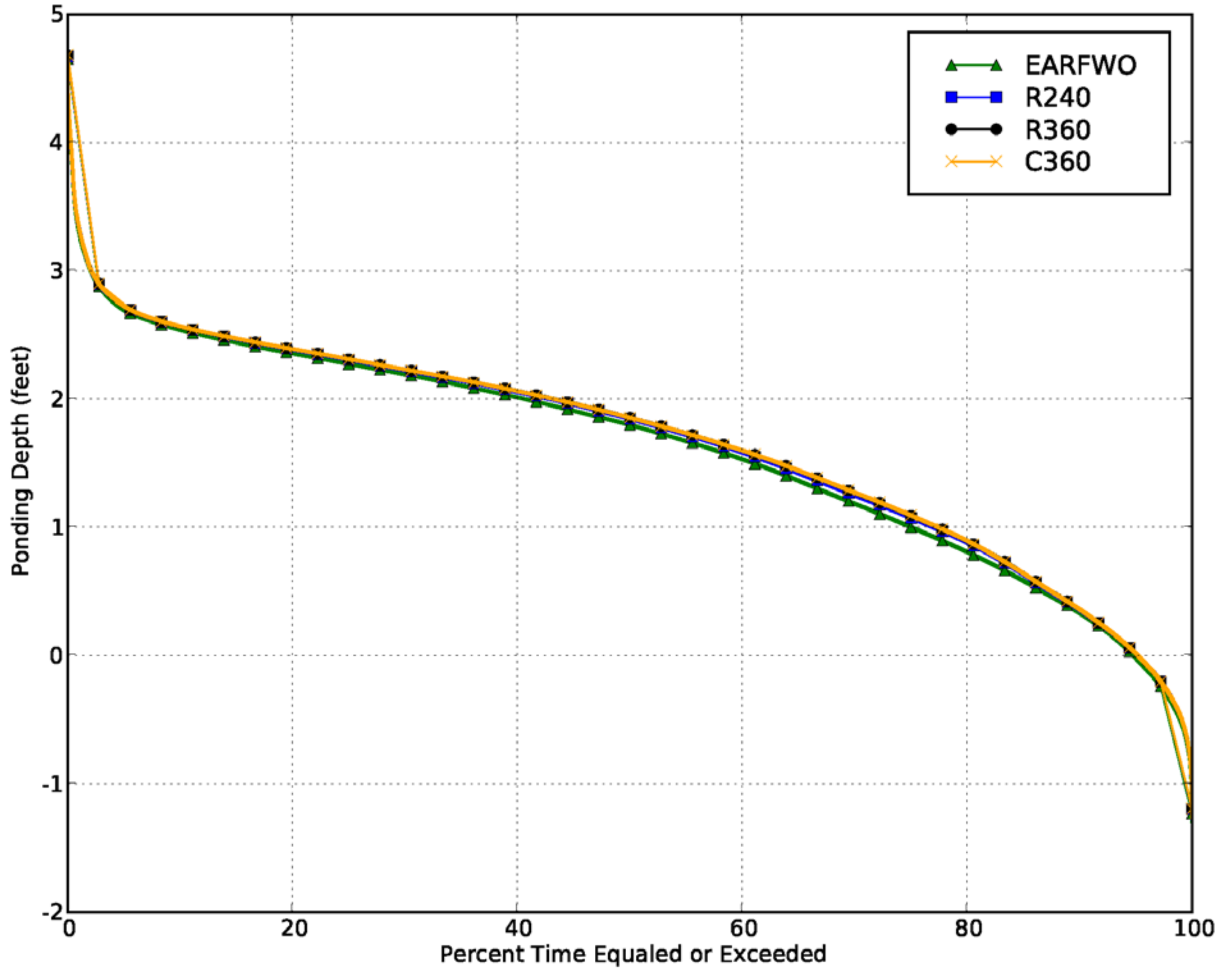


Figure C.2.1-7. Normalized Weekly Stage Duration Curves for Alternatives Indicator Region 124. Indicator Region 124 is in the Southern Extent of WCA 3A Where Tree Islands Can Occasionally Be Stressed by Depths Greater than 2.5 Ft for Extended Periods of Time. All Alternatives Were the Same as the FWO.

C.2.1.3.5.4.3 Shark River Slough (SRS)

Tree islands in SRS rise high above the surrounding marsh. Their potential for flooding stress is practically non-existent. Instead, ENP is faced with a reduction in islands due to intensive fires that migrate across the marshes and burn tree island peat soils leaving only rocky outcroppings. The objective of CEPP PACR alternatives is to prevent extensive dry-downs and create extended hydroperiods.

The normalized stage duration curve for central SRS Gage NP-33 (**Figure C.2.1-8**) is an example of the hydrologic effects of the alternatives for tree islands in ENP. The FWO provides an additional 0.5 ft of water in SRS to better reconnect the groundwater dynamics (roots and peat) of tree islands to the hydrology of the surrounding marshes. This has been found in tests done in the Loxahatchee Impoundment Landscape Assessment Facility to be an important natural connectivity that hydrates the island peats, transports nutrients and supports vegetative growth (Fred Sklar, Personal Communication). The CEPP PACR alternatives maintain the same SRS hydrology and do not significantly differ from each other. All alternatives have the same maximum water depths of approximately 3.0 ft. The advantage to tree islands of one alternative over another does not appear in the stage duration analysis until stages fall below 1.0 ft.

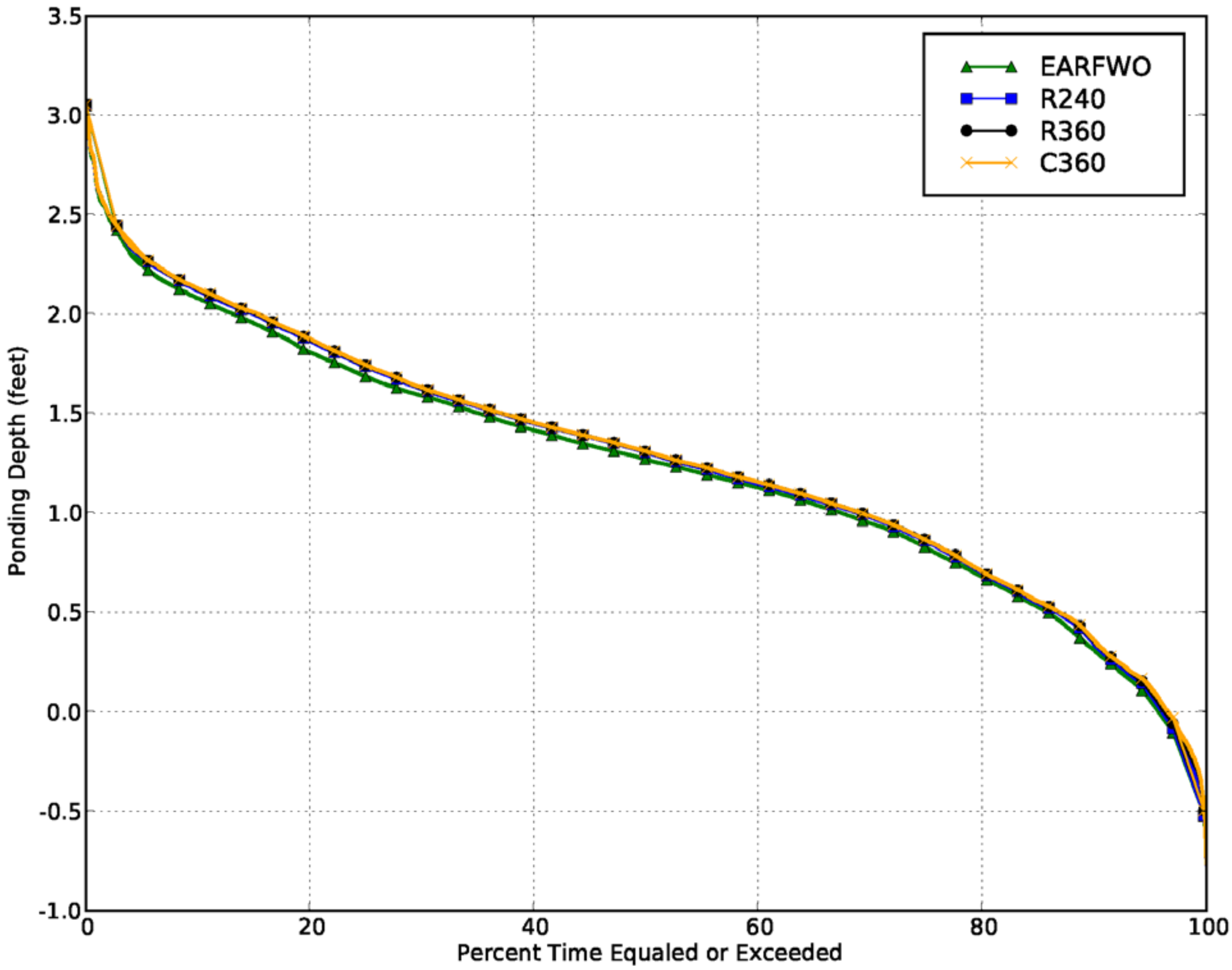


Figure C.2.1-8. Normalized Stage Duration Curves for CEPP PACR Alternatives for Indicator Region Gage ENP NP-33

In summary, negligible and less than significant effects to tree islands within WCA 3A and ENP are anticipated to occur under any of the alternatives compared to the FWO.

C.2.1.3.5.5 Rockland Pine Forest

No changes in hydrology are expected within rockland pine forest and therefore negligible and less than significant effects are predicted within Rockland pine forest as a result of implementation of any of the CEPP PACR alternatives.

C.2.1.3.5.6 Tropical Hardwood Hammock

Tropical hardwood hammocks on the Miami Rock Ridge have been affected by a lowered water table associated with the reduction of freshwater flow through the Everglades. Since all CEPP PACR alternatives provide minimal increased flow through the Greater Everglades, it is anticipated that the CEPP PACR alternatives would have minor beneficial effects on tropical hardwood hammocks.

C.2.1.3.6 Southern Coastal Systems

The estuarine communities of Biscayne and Florida Bays have been affected by upstream changes in freshwater flows through the Everglades and eastward across the Miami Rock Ridge. The estuarine communities of Biscayne Bay have been further affected by agricultural and urban development of the areas east of the current boundaries of Everglades National Park.

C.2.1.3.6.1 Mangroves

A reduction in freshwater inflows into Florida Bay and alterations of the normal salinity balance have affected mangrove community composition and may have contributed to a large-scale die-off of seagrass beds (USFWS 1999). Mangrove communities along Biscayne Bay have also seen a reduction in freshwater inflows and a reduction in historic habitat range by urban and agricultural development leaving only a remnant ribbon of suitable habitat immediately adjacent to the Bay. Mangrove communities occur within a range of salinities from 0 to 40 psu. Both bays experiences salinities in excess of 40 psu on a seasonal basis. Biscayne Bay is also subject to rapid decreases in salinity on the order of 10-20 psu from fresh water pulses delivered by the surface water management canal system.

As compared with FWO, the CEPP PACR alternatives provided slightly improved freshwater flows to Florida Bay, thereby aiding to lower salinity levels within these areas to better encompass mangrove salinity tolerance range. Mangrove communities associated with Florida Bay would be expected to show a negligible, long-term, and less than significant benefit under all alternatives from a very small reduction in average salinities.

C.2.1.3.6.2 Seagrass Beds

Seagrasses within Biscayne and Florida Bays have long suffered from high salinities due to long-term reductions of freshwater flow. In addition, seagrass beds in Biscayne Bay are also subject to rapid decreases in salinity on the order of 10-20 psu and scouring of bottom sediments from fresh water pulses delivered by the surface water management canal system. Seagrasses have an optimum salinity range of 24 to 35 psu, but can tolerate considerable short-term salinity fluctuations.

As compared with FWO, all CEPP PACR alternatives provide very slight improvement of freshwater flows to Florida Bay, thereby lowering salinities within these areas to better align with seagrass salinity tolerance ranges and providing a small beneficial effect in coastal bays and nearshore to the transition zone. Models predicted that reduced salinity would contribute to enhanced seagrass species diversity and improved resilience of the ecosystem in northern Florida Bay. Seagrass beds associated with Florida Bay would be expected to show a negligible, long-term, and less than significant benefit under all alternatives from a very small reduction in average salinities.

C.2.1.4 Threatened and Endangered Species

One objective of the CEPP PACR is to rehydrate the Everglades to help restore the WCAs and the Everglades to historical, pre-drainage conditions. This should improve conditions for Everglade snail kite (*Rostrhamus sociablis plumbeus*), wood stork (*Mycteria americana*), and other wading birds and their habitats in south Florida, while also striving to maintain nesting season requirements for the CSSS.

Federally threatened and endangered species that may occur within the study area include: Florida panther (*Puma concolor coryi*), Florida population of West Indian Manatee and its critical habitat (Florida manatee) (*Trichechus manatus*), CSSS, Everglade snail kite and its critical habitat, Northern crested caracara (*Caracara cheriway*), piping plover (*Charadrius melodus*), red-cockaded woodpecker (*Picoides borealis*), roseate tern (*Sterna dougallii dougallii*), wood stork, American alligator (*Alligator mississippiensis*), Florida bonneted bat (*Eumops floridanus*), American crocodile (*Crocodylus acutus*) and its critical habitat, Eastern indigo snake (*Drymarchon corais couperi*), Schaus swallowtail butterfly (*Heraclides aristodemus ponceanus*), Miami blue butterfly (*Cyclargus thomasi bethunebakeri*), Florida leafwing butterfly (*Anaea troglodyta floridalis*), Bartram's hairstreak butterfly (*Strymon acis bartrami),* Stock Island tree snail (*Orthalicus reses* [not incl. *nesodryas*]), crenulate lead-plant (*Amorpha crenulata*), Cape Sable thoroughwort (*Chromolaena frustrata*), deltoid spurge (*Chamaesyce deltoidea* ssp. *deltoidea*), Garber's spurge (*Chamaesyce garberii*), Okeechobee gourd (*Cucurbita okeechobeensis* ssp. *okeechobeenis*), Small's milkpea (*Galactia smallii*), tiny polygala (*Polygala smallii*), smalltooth sawfish (*Pristis pectinata*) and its critical habitat, green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), Kemp's ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*), and Johnson's seagrass (*Halophila johnsonii*) and its critical habitat. Species described in the following section were determined by USACE to potentially be affected by the project. **Annex A**, Biological Assessment includes a draft Biological Assessment prepared for the CEPP PACR and depicts the affected area referenced in this section (**Annex A, Figure 1-2**).

The USACE and U.S. Fish and Wildlife Service (USFWS), in conjunction with a multi-agency CEPP team, used performance measures (PMs) (**Table C.2.1-2**) and ecological targets (ETs) (**Table C.2.1-3**) for each species and their habitat when evaluating alternatives for CEPP. PMs are defined as a set of operational rules that identify optimal WCA 3A water stages and recession rates to improve conditions in WCA 3A for snail kite, wood stork, wading birds, and tree islands. For CEPP, the USACE believed that the depths in PM-B were too restrictive and therefore did not use that PM in their analysis of effects. Instead, they deferred to using apple snail (*Pomacea paludosa*) (PM-C) PM as a more appropriate assessment since they are based upon published literature (Darby et al. 2005). In addition, PM-A addresses the nesting window for CSSS-A, as outlined in the 1999 USFWS Reasonable and Prudent Alternative (RPA). Ecological Targets are designed to support the intention of the PMs by providing hydroperiod guidelines to help maintain appropriate nesting and foraging habitat. As referenced in the ERTP PMs and ETs (USACE 2011), **Figure C.2.1-9** shows the locations of the gages specified within the ERTP PMs and ETs.

Table C.2.1-2. Performance Measures Used to Evaluate Potential CEPP PACR Effects on Threatened and Endangered Species

Species	PM	Description of PM
CSSS	A	*NP-205 (CSSS-A): Provide a minimum of 60 consecutive days at NP-205 below 6.0 ft NGVD beginning no later than March 15.*
Everglade snail kite	B	*WCA 3A: For Everglade snail kites, strive to reach waters levels between 9.8 and 10.3 ft NGVD by December 31, and between 8.8 and 9.3 ft between May 1 and June 1.*
	C	*WCA 3A: For apple snails, strive to reach water levels between 9.7 and 10.3 ft NGVD by December 31 and between 8.7 and 9.7 ft between May 1 and June 1.*
	D	*WCA 3A (Dry Season Recession Rate): Strive to maintain a recession rate of 0.05 ft per week from January 1 to June 1 (or onset of the wet season). This equates to a stage difference of approximately 1.0 ft between January and the dry season low.*
	E	*WCA 3A (Wet Season Rate of Rise): Manage for a monthly rate of rise less than or equal to 0.25 ft per week to avoid drowning of apple snail egg clusters.*
Wood stork/wading birds	F	*WCA 3A (Dry Season Recession Rate): Strive to maintain a recession rate of 0.07 ft per week, with an optimal range of 0.06 to 0.07 ft per week, from January 1 to June 1.*
	G	*WCA 3A (Dry Season): Strive to maintain areas of appropriate foraging depths (5-25 cm) within the Core Foraging Area (CFA) (18.6 mile radius) of any active wood stork colony.*
	H	*WCA 3A (Dry Season): Strive to maintain areas of appropriate foraging depths (5-15 cm) within the CFA (7 to 9 mile radius) of any active white ibis or snowy egret colony.*

*Note: All stages for WCA 3A are as measured at WCA 3 gage average [WCA 3AVG] [Sites 63, 64, 65]).

Table C.2.1-3. Ecological Targets Used to Evaluate Potential CEPP PACR Effects on Threatened and Endangered Species

Species	ET	Description of PM
CSSS	1	*NP-205 (CSSS-A): Strive to reach a water level of less than or equal to 7.0 ft NGVD at NP-205 by December 31 for nesting season water levels to reach 6.0 ft NGVD by mid- March.*
	2	*Strive to maintain a hydroperiod between 90 and 210 days (3 to 7 months) per year throughout sparrow habitat to maintain marl prairie vegetation.*

*Note: All stages for WCA 3A are as measured at WCA 3 gage average [WCA 3AVG] [Sites 63, 64, 65])

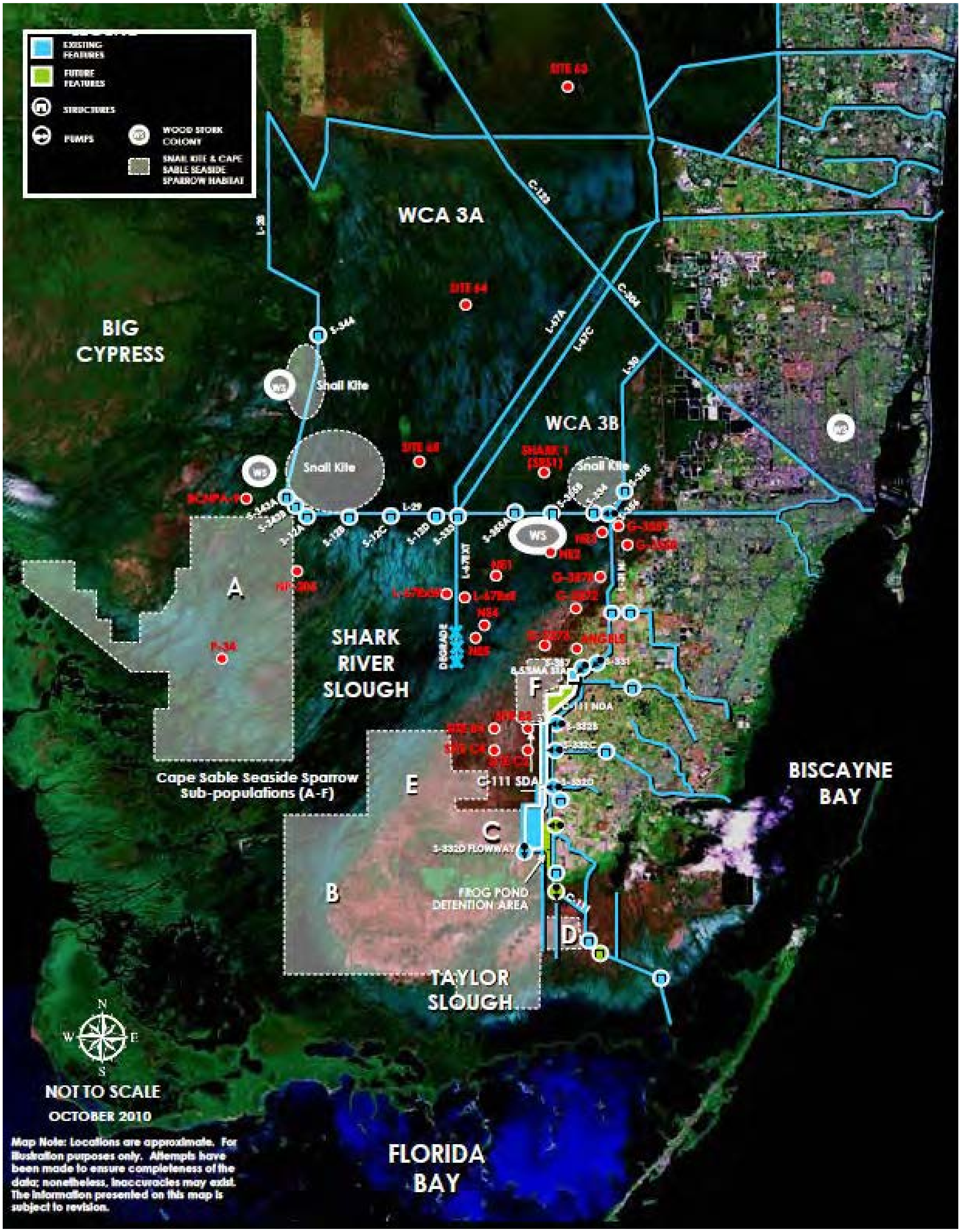


Figure C.2.1-9. Location of Gages within the CEPP Affected Area as Referenced in the Everglades Restoration Transition Plan Performance Measures and Ecological Targets (USACE 2014)

USFWS, along with Dr. Wiley Kitchens (Ph.D. of the University of Florida), Phil Darby (Ph.D. of the University of West Florida), and Dr. Christa Zweig (Ph.D. of the University of Florida), developed a series of water depth recommendations for WCA 3A that addresses the needs of the snail kite, Florida apple snail, and vegetation characteristic of their habitat, along with a wood stork component that was developed by James Beeren and Mark Cook (Ph.D.) from the SFWMD (**Figure C.2.1-10**). This water management strategy is divided into three time periods representing the height of the wet season (September 15 to October 15), the pre-breeding season (January) and the breeding season (termed dry season low, May 1 to June 1) and illustrates appropriate water depths to attain within each time period. Water depth recommendations as measured at the WCA 3AVG proposed within the USFWS 2010 Draft Multi-Species Transition Strategy (MSTS) form the basis for ERTP PMs and ETs. Please note that these water depths are not targets, but used as guidance and represent a compromise between the needs of the three species. Inter-annual variability is extremely important in the management of the system to promote recovery of the species.

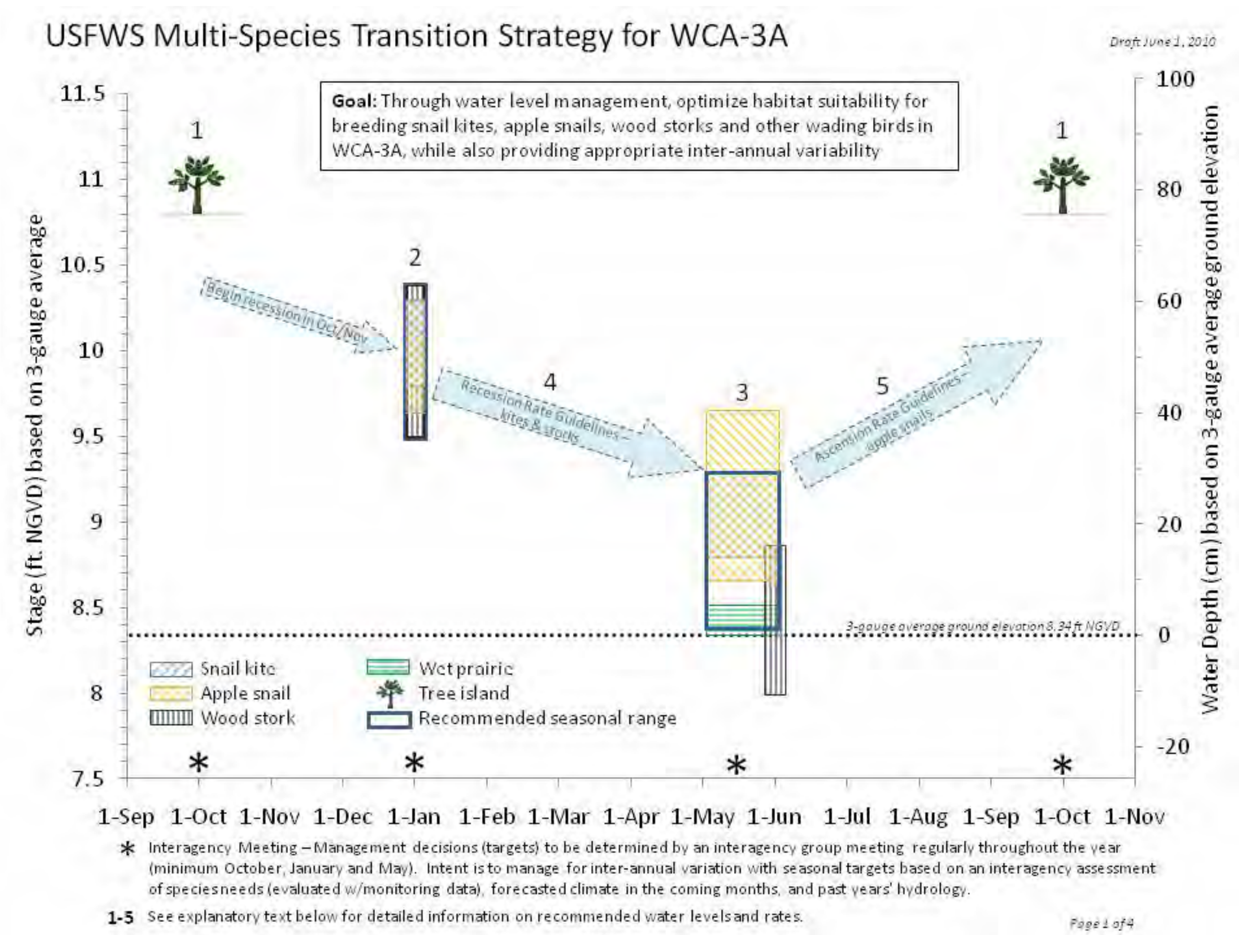


Figure C.2.1-10. U.S. Fish and Wildlife Service Multi-Species Transition Strategy for WCA 3A (USACE 2014)

Regional Simulation Model – Glades Lower East Coast Service Area (RSM-GL) model results were used to compare performance of the alternatives in relation to the ERTP PMs and ETs to select the alternative that best met the CEPP PACR objectives. Microsoft Excel 2007 was used to analyze RSM results and create bar graphs to graphically compare the alternatives. All calculations are based upon the RSM 41-year POR from 1965 through 2005.

C.2.1.4.1 Everglades Snail Kite

Snail kite habitat consists of freshwater marshes and the shallow vegetated edges of lakes where the apple snail, the snail kite's main food source, can be found. Snail kite populations in Florida are highly nomadic and mobile; tracking favorable hydrologic conditions and food supplies, and thus avoiding local droughts. Snail kites move widely throughout the primary wetlands of the central and southern portions of the State of Florida. Snail kite is threatened primarily by habitat loss and destruction. Widespread drainage has permanently lowered the water table in some areas. This drainage permitted development in areas that were once snail kite habitat. In addition to loss of habitat through drainage, large areas of marsh are heavily infested with water hyacinth, which inhibits the snail kite's ability to see its prey (USFWS 1986).

The snail kite has a highly specialized diet typically composed of apple snails, which are found in palustrine, emergent, long-hydroperiod wetlands. As a result, the snail kite's survival is directly dependent on the hydrology and water quality of its habitat (USFWS 1999). Snail kites require foraging areas that are relatively clear and open to visually search for apple snails. Suitable foraging habitat for the snail kite is typically a combination of low profile marsh and a mix of shallow open water. Shallow wetlands with emergent vegetation such as spike rush (*Eleocharis* spp.), maidencane, sawgrass, and other native emergent wetland plant species provide good snail kite foraging habitat, as long as the vegetation is not too dense to locate apple snails. Dense growth of plants reduces the ability of the snail kite to locate apple snails and their use of these areas is limited even when snails are in relatively high abundances (Bennetts et al. 2006). Areas of sparse emergent vegetation enable apple snails to climb near the surface to feed, breathe, and lay eggs and thus they are easily seen from the air by foraging snail kites. Suitable foraging habitats are often interspersed with tree islands or small groups of scattered shrubs and trees which serve as perching and nesting sites.

Snail kite nesting primarily occurs from December to July, with a peak in March-June, but can occur year-round. Nesting substrates include small trees such as willow, cypress (*Taxodium* spp.) and pond apple, and herbaceous vegetation such as sawgrass, cattail, bulrush (*Scirpus validus*) and reed (*Phragmites australis*). Snail kites appear to prefer woody vegetation for nesting when water levels are adequate to inundate the site (USFWS 1999). Nests are more frequently placed in herbaceous vegetation during periods of low water when dry conditions beneath willow stands (which tend to grow to at higher elevations) prevent snail kites from nesting in woody vegetation (USFWS 1999). It is rare for a nest to collapse (not survive) in woody vegetation but common in non-woody vegetation, especially on lake margins (USFWS 1999). To deter predators, nesting almost always occurs over water (Sykes 1987; Sykes et al. 1995).

Rehydration and vegetation shifts within northwestern WCA 3A and decreases in the frequency and duration of extreme low lake stages in Lake Okeechobee may increase suitable habitat for apple snails, thereby increasing spatial extent of suitable foraging opportunities for snail kites, providing a minor beneficial effect. Alternatives R360 and C360 produced slightly greater depths and hydroperiods in northwestern WCA 3A relative to the R240 alternative, but all increased depths and durations relative to FWO. Everglades snail kite designated critical habitat (emergent aquatic vegetation) within Lake Okeechobee, WCA 1, or WCA 2 would not be affected by the TSP (see **Figure C.2.1-11** for gage locations).

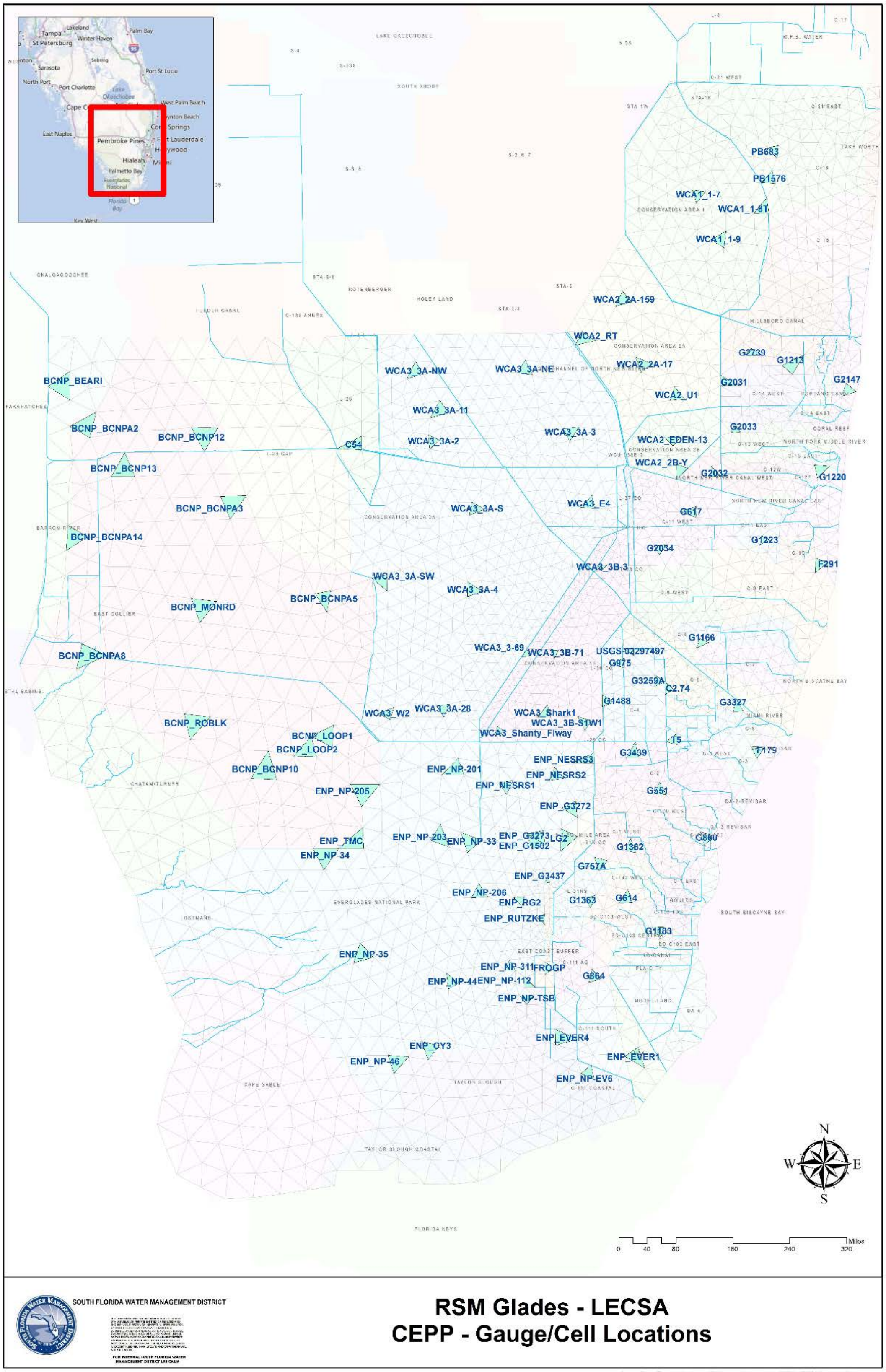


Figure C.2.1-11. Gage Locations

C.2.1.4.2 Cape Sable Seaside Sparrow

Presently, the known distribution of the CSSS is restricted to two areas of marl prairies east and west of SRS in the Everglades region (within ENP and Big Cypress National Preserve [BCNP]) and the edge of Taylor Slough in the Southern Glades Wildlife and Environmental Area in Miami-Dade County. CSSS surveys resulted in a range map that divided the CSSS into six separate subpopulations, labeled as A through F (**Figure C.2.1-12**), with CSSS-A as the only subpopulation west of SRS (Curnutt et al. 1998).

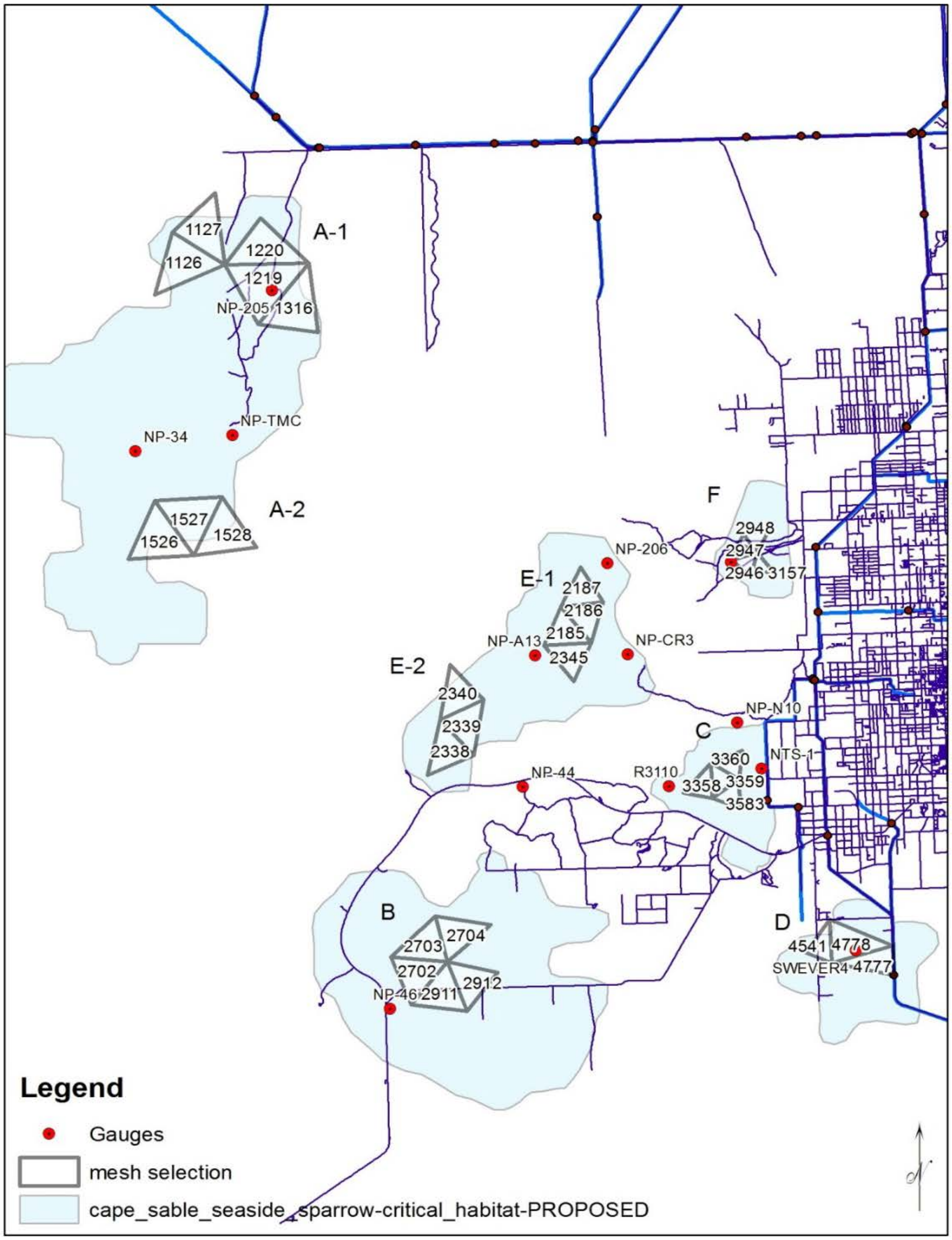


Figure C.2.1-12. Range of CSSS Subpopulations

Effects of the alternatives on the CSSS will be discussed below based on the appropriate PM and ET.

PM-A (CSSS-A): Provide a minimum of 60 consecutive days below ground surface elevation (GSE) beginning no later than March 15.

Table C.2.1-4 shows the number of years this criterion is met out of the 40-year period of record (1966-2005) for each of the areas within the subpopulations. The sites shown in **Table C.2.1-4** are IR-A1 within subpopulation A, north; IR-A2 within subpopulation A, south; P34 within subpopulation A, central; TMC within subpopulation A, east central; CY3 within subpopulation B, central; R3110 within subpopulation C, west; E112 within subpopulation C, central; NPA13 within subpopulation E, central; and RG2 within subpopulation F, southwest.

Table C.2.1-4. Number of Years a Minimum of 60 Consecutive Days at Below Each Area's GSE (NGVD) Beginning No Later than March 15 is Met Out of the 40-Year Period of Record

Alternative	IR-A1	IR-A2	P34	TMC	CY3	R3110	E112	NE of NPA13	NE of RG2
ECB	19	31	28	29	39	38	38	35	33
FWO	21	25	28	28	39	38	38	32	33
R240	20	23	27	26	39	38	38	32	33
R360	20	23	28	26	39	38	38	31	32
C360	20	23	27	26	39	38	38	31	32

ET-1 (NP-205, CSSS-A): Strive to reach a water level of less than or equal to 7.0 ft, NGVD at NP-205 by December 31 for nesting season water levels to reach 6.0 ft, NGVD by mid-March.

ET-1 would have been achieved in 97% of years (39 of 40 years) under each of the alternatives and the FWO. The only site examined that met this criterion during the model runs was CY3 within subpopulation B, central.

ET-2 (CSSS): Strive to maintain a hydroperiod between 90 and 210 days (three to seven months) per year throughout sparrow habitat to maintain marl prairie vegetation.

To maintain suitable habitat for CSSS, the annual hydroperiod (i.e., time above ground surface during wet season) should be between 90 and 210 days. Sparrows prefer to nest in short-stature clumped grasses such as Muhlenbergia, Schizachryium, and Schoenus. Habitat can tolerate infrequent years of up to 240 days and below 90 days. To compare the alternatives for hydroperiod throughout CSSS habitat, ETs were employed. RSM-GL results for each CSSS subpopulation are depicted in **Table C.2.1-5**. **Table C.2.1-5** compares the array of alternatives with FWO to maintain a hydroperiod between 90 and 210 days (three to seven months) per year throughout sparrow habitat to maintain marl prairie vegetation. In northern and southern subpopulation A, all alternatives perform the same as the FWO (10 and 8 years) having no beneficial effect. In subpopulation B, the alternatives performed the same (24 years met) as the FWO (25 years met) having no effect relative to the FWO. In subpopulation C, the alternatives perform the same (15 years met) as the FWO. In subpopulation D, all the alternatives performed worse than the FWO, with only one year projected for Alternative C360. A moderate negative effect on the habitat of subpopulation D is anticipated. In subpopulation E, the alternatives performed slightly worse than the FWO. In subpopulation F, the alternatives also performed slightly worse (13 years met) than the FWO (14 years met). Thus the number of years out of the period of record that the hydroperiod was between 90 and 210 days (three to seven months) each year throughout sparrow habitat to maintain marl prairie vegetation for the FWO and any alternatives have the potential of providing a minor to moderate negative impact.

Table C.2.1-5. Number of Years Out of the Period of Record that the Hydroperiod Was Between 90 and 210 Days (3 to 7 Months) Each Year throughout Sparrow Habitat to Maintain Marl Prairie Vegetation

Alternative	A-1	A-2	B	C	D	E-1	E-2	F
ECB	6	9	25	18	1	24	12	17
FWO	10	8	24	15	4	18	10	14
R240	10	8	24	15	2	16	9	13
R360	10	8	24	15	2	16	9	13
C360	10	8	24	15	1	17	9	13

In summary, implementation of any alternative as well as the FWO, with currently defined operations, has the potential to provide an adverse effect and an unavoidable effect on hydroperiods within the marl prairies adjacent to NESRS. Longer hydroperiods than the FWO are predicted within CSSS-E and southern portions of CSSS-A. For all of the CEPP PACR alternatives, the incremental effects of the minor increase in hydroperiod durations are anticipated to cause a minor to moderate negative effect on the CSSS nesting pattern as compared to the FWO. However, the mitigation efforts from the major adverse effects created by the FWO would be expected to continue.

C.2.1.4.3 Wood Stork

An analysis by the South Florida Natural Resources Center (Beerens 2013) of wood stork foraging potential was done for CEPP to evaluate and predict improvements to foraging habitat. Results from this analysis indicated improved foraging conditions in Northern WCA 3A, WCA 3B and ENP due to improved fish abundance, vegetation and hydrology. Although the Beerens Model (2013) is not available for this evaluation, the TSP hydroperiods would be indicative of a long term, but minor improvement in the foraging conditions in NE WCA 3A and in the western regions of ENP. Hydrological patterns that produce a maximum number of patches with high prey availability (i.e. high water levels at the end of the wet season and low water levels at the end of the dry season) are necessary for high reproductive outputs (Gawlik 2002, Gawlik et al. 2004). Depending upon the elevation and microtopography throughout WCA 3 and ENP, implementation of the TSP would produce the same variety of wetland habitats as the FWO that would support prey densities conducive to successful wading bird foraging and nesting, providing a minor to moderate beneficial effect.

Water depth and recession rate are the two most important hydrological variables for wood storks (Gawlik et al. 2004) and wading birds. In their analysis of habitat suitability, Gawlik et al. (2004) identified feeding sites where the weekly average water depths from November to April (pre-breeding and breeding season) were between 0.0 and 0.5 ft as the most suitable. Suitability drops to 0.0 when water depths are -0.3 ft below marsh surface or greater than 0.8 ft. Wood storks and other wading birds require recession to condense their prey items into shallow pools for more effective foraging. It is recognized that areas of suitable foraging habitat will vary both within and between years due to microtopography, antecedent conditions, hydrological and meteorological conditions, and water management actions. It is anticipated that provisions of the FWO will help to improve foraging conditions within WCA 3A and provide a direct benefit to the wood stork and other wading bird species, as beneficial and significant effects for habitat and foraging conditions for wood storks would occur throughout much of the Greater Everglades. The CEPP PACR alternatives would provide relatively similar increases in hydroperiods. Any increase in hydroperiods provides longer duration foraging, as long as depths do not exceed 1 ft. This is particularly important for wood storks because of their long nesting season and the need to fledge nestlings before the summer rains arrive.

C.2.1.4.4 Eastern Indigo Snake

The Eastern indigo snake is the largest native non-venomous snake in North America. It is an isolated subspecies occurring in southeastern Georgia and throughout peninsular Florida. The Eastern indigo snake prefers drier habitats, but may be found in a variety of habitats from xeric sandhills, to cabbage palm hammocks, to hydric hardwood hammocks (Schaefer and Junkin 1990). Eastern indigo snakes need relatively large areas of undeveloped land to maintain their population. The main reason for its decline is habitat loss due to development. Further, as habitats become fragmented by roads, Eastern indigo snakes become increasingly vulnerable to highway mortality as they travel through their large territories (Schaefer and Junkin 1990).

In south Florida, the Eastern indigo snake is thought to be widely distributed. Given their preference for upland habitats, Eastern indigo snakes are not commonly found in great numbers in the wetland complexes of the Everglades region, even though they are found in pinelands, tropical hardwood hammocks, and mangrove forests in extreme south Florida (Duellman and Schwartz 1958, Steiner et al. 1983).

Habitat loss for the Eastern indigo snake was considered from implementation of the FWO project components from the footprint of the A-2 FEB. Similar effects would occur for all alternatives as well as within the A-2 Expansion area. For all alternatives, effects would be similar to the FWO and standard protection measures for the Eastern indigo snake will be implemented during construction to minimize impacts.

C.2.1.4.5 Florida Bonneted Bat

The Florida bonneted bat is Florida's largest bat, weighing approximately 1.1 to 2.0 ounces, with a 19- to 21-inch wingspan, and a body length of 5.1 to 6.5 inches. The species has dark brown fur and large broad ears that join together and slant forward over the eyes. Relatively little is known regarding the ecology and habitat requirements of this species (USFWS 2009). In general, bats will forage over ponds, streams and wetlands and require roosting habitat for daytime roosting, protection from predators and rearing of young (Marks and Marks 2008). Florida bonneted bats roost in tree cavities, rocky outcrops and dead palm fronds. Colonies are small, with the largest reported as just a few dozen individuals. The bat is a nocturnal insectivore and relies upon echolocation to navigate and detect prey. Females give birth to a single pup from June through September (Scott 2004); however, limited data suggest that a female may undergo a second birthing season possibly in January or February (USFWS 2009).

The Florida bonneted bat is Florida's only endemic bat. It is a Federal endangered species and is listed by FWC as a State listed endangered species. The range of this species is limited to southern Florida, although this species was encountered in 2008 in two locations within the Kissimmee River Wildlife Management Area north of Lake Okeechobee. Records indicate that it was once common in the 1950s and early 1960s near Coral Gables and Miami (Belwood 1992). The Florida bonneted bat has only been documented in 12 locations within Florida, including areas within Coral Gables, Homestead, Naples, Everglades City and North Fort Myers. Seven of the locations are under public ownership with the Florida bonneted bat found in discrete and specific areas within BCNP, Fakahatchee Strand Preserve State Park, Kissimmee River Wildlife Management Area, Babcock Ranch, and Fred C. Babcock and Cecil M. Webb Wildlife Management Area (USFWS 2009). Loss of suitable habitat is believed to be the primary cause of population declines. Other perceived threats include pesticide and herbicide use, which decrease populations of insects, the bats primary prey. Given the documented location of the located bats outside of the project area and that increased hydroperiods and wetland area from CEPP implementation should provide for ideal habitat, the Corps determination is that the Florida bonneted bat would not be affected by CEPP and it is expected that the CEPP PACR will result in the same determination.

C.2.1.4.6 Florida Manatee

The Federally endangered Florida manatee is a large, plant-eating aquatic mammal that can be found in the shallow coastal waters, rivers, and springs of Florida. Florida manatees live in freshwater, brackish, and marine habitats, and can move freely between salinity extremes. Florida manatees have been observed in conveyance canals within the affected area, specifically in the lower C-111 Canal just downstream of S-197; and adjacent nearshore seagrass beds throughout Florida Bay including all waters of Card, Barnes, Blackwater, Little Blackwater, Manatee and Buttonwood sounds. The extensive acreages of seagrass beds in the bay provide important feeding areas for Florida manatees.

Similar to the FWO, high-volume discharge events from Lake Okeechobee to the Northern Estuaries would decrease. The CEPP PACR alternatives would also reduce the duration of these events further reducing stress on seagrass beds, thereby increasing foraging potential for manatees within this region and provide minor beneficial effects to the manatee and its critical habitat.

C.2.1.4.7 Florida Panther

The Federally endangered Florida panther was once the most widely distributed mammal (other than humans) in North and South America, but it is now virtually exterminated in the eastern United States. Habitat loss has driven the subspecies known as the Florida panther into a small area, where the few remaining animals are highly inbred, causing such genetic flaws as heart defects and sterility. Recently, closely-related panthers from Texas were released in Florida and are successfully breeding with the Florida panthers. Increased genetic variation and protection of habitat may save the subspecies. Florida panthers presently inhabit lands in ENP adjacent to the Southern Glades Wildlife and Environmental Area, and radio tracking studies have shown that they venture into the Southern Glades on occasion during post-breeding dispersion. Reference is made to the revised Panther Key and Panther Focus Area Map for use in determining effects to the Florida panther.

For the FWO, a loss of 14,000 acres of upland habitat would occur due to construction of the proposed A-2 FEB, and potential loss of upland habitat (levee) due to backfilling the Miami Canal in WCA 3A, which would result in a minor adverse effect. All the alternatives have the potential to have a similar effect on both the Primary and Secondary Zones for Florida panther habitat. Construction of a storage reservoir and STA within the A-2 parcel and the A-2 Expansion area in EAA would result in conversion of upland habitat that could be potentially used by Florida panther to transverse the area to wetland habitat, thereby eliminating potential habitat within the panther Secondary Zone in this region.

Since potentially suitable habitat occurs within the affected area, increased water deliveries under all alternatives could affect Florida panther habitat. For all alternatives, conversion of upland habitat that could be potentially used by the Florida panther to transverse the area to wetland habitat, thereby eliminating potential habitat for the Florida panther, would result in an adverse effect.

C.2.1.4.8 American Alligator

A keystone species within the Everglades ecosystem, the American alligator is dependent on spatial and temporal patterns of water fluctuations that affect courtship and mating, nesting, and habitat use (Brandt and Mazzotti 2000). Historically, American alligators were most abundant in the peripheral Everglades marshes and freshwater mangrove habitats, but are now most abundant in canals and the deeper slough habitats of the central Everglades. Water management practices including drainage of peripheral wetlands and increasing salinity in mangrove wetlands as a result of decreased freshwater flows has limited occurrence of American alligators in these habitats (Craighead 1968, Kushlan 1990, Mazzotti and Brandt 1994). A Habitat Suitability Index (HSI) for alligators was employed to predict potential effects of implementation of CEPP alternatives. The HSI measures habitat suitability annually for five components of alligator production: (1) land cover suitability, (2) breeding potential (female growth and survival from April 16 of the previous year - April 15 of the current year), (3) courtship and mating (April 16 – May 31), (4) nest building (June 15 – July 15), and egg incubation (nest flooding from July 01 – September 15). (South Florida Natural Resources Conservation Center 2013).

Results indicate that all CEPP PACR alternatives slightly improve alligator habitat suitability as compared with FWO and provide a minor beneficial effect, but only in the northern section of WCA 3A. All of the alternative plans improve alligator habitat due to additional water deliveries within this region. Hydroperiod improvements within ENP would be expected to have a negligible or minor positive impact in the long-term on the spatial extent and quality of suitable habitat for the American alligator.

C.2.1.4.9 American Crocodile

An HSI for juvenile American crocodiles, employed during CEPP to predict potential effects of implementation of CEPP Alts (Brandt 2013) was not used for this analysis because none of the PACR alternatives have given any indication that their incremental hydrological changes in northern WCA 3A were large enough to have any positive or negative impacts on crocodiles in the Southern reaches of Florida.

For the FWO, a reduction in salinity fluctuations would provide minor beneficial effects and improve habitat suitability for American crocodile. All of the CEPP PACR alternatives would slightly increase freshwater flows, ultimately reducing salinity fluctuations, which would be expected to provide minor beneficial effects and improve habitat suitability for the American crocodile.

C.2.1.4.10 Smalltooth Sawfish

The FWO conditions and all of the PACR CEPP alternatives would provide a minor beneficial effect to the smalltooth sawfish and its critical habitat by reducing the volume of high level flows from Lake Okeechobee to the Northern Estuaries. Reduction in flows to the Northern Estuaries will improve the overall salinity regime and habitat quality. Improving freshwater delivery to downstream estuaries in ENP and Florida Bay will reduce salinity fluctuations and increase habitat suitability for the smalltooth sawfish. Implementation of the proposed project, the smalltooth sawfish may benefit from increased freshwater flows into the coastal wetlands adjoining Florida Bay, which would provide more natural and historic overland flows. All action the alternatives have the potential to benefit the smalltooth sawfish by slightly reducing excessive freshwater flows and improving the salinity regime throughout the Caloosahatchee estuary; and by increasing freshwater flows into the coastal wetlands adjoining Florida Bay, subsequently reducing the duration and occurrence of hypersaline conditions and provide minor beneficial effects.

Discharging large volumes of freshwater from Lake Okeechobee to the Caloosahatchee River during the wet season significantly reduces salinities and increases nutrient loading; all of which has a profound adverse effect on estuarine flora and fauna. As a result, the smalltooth sawfish may benefit from the project's ability to reduce excessive freshwater flows by improving the salinity regime throughout the Caloosahatchee estuary.

C.2.1.4.11 Green Sea Turtle

The green sea turtle weighs approximately 150 kilograms and lives in tropical and sub-tropical waters. Areas that are known as important feeding areas for the green turtles in Florida include the Indian River Lagoon, the Florida Keys, Florida Bay, Homosassa, Crystal River and Cedar Key. Green turtles occupy three habitat types: high energy oceanic beaches, convergence zones in the pelagic habitat, and benthic feeding grounds in the relatively shallow, protected waters. Females deposit eggs on high energy beaches, usually on islands, where a deep nest cavity can be dug above the high water line. Hatchlings leave the beach and move in the open ocean. Green sea turtles forage in pastures of seagrasses and/or algae, but small green turtles can also be found over coral reefs, worm reefs, and rocky bottoms.

For the FWO, a reduction in high volume discharge events from Lake Okeechobee to the Northern Estuaries would reduce stress on seagrass beds, thereby increasing foraging potential and nursery habitat for sea turtles thereby providing minor beneficial effects to sea turtles. Implementation of any of the CEPP PACR alternatives would further reduce high-volume discharge events from Lake Okeechobee to the Northern Estuaries, and would reduce stress on seagrass beds, thereby increasing foraging potential and nursery habitat for sea turtles, providing minor beneficial effects. Increased flows to Florida Bay would improve salinity and reduce stress on seagrasses important to foraging sea turtles and would provide minor beneficial effects.

Although green sea turtles are expected to be found foraging in nearshore seagrass habitats within Florida Bay, the increased freshwater flows associated with all the alternatives may alter seagrass species composition but should have a negligible and less than significant effect on the overall biomass available for sea turtle feeding habits. Additionally, no green sea turtles would attempt to utilize areas for nesting purposes since there is no suitable habitat for nesting in the project area. With the expectation of improved nearshore habitat, no utilization of the project area for nesting purposes, and the implementation of agency approved Sea Turtle and Smalltooth Sawfish Construction Conditions, in CEPP, USACE determined green sea turtle may be affected, but is not likely to be adversely affected, by the proposed project. All CEPP PACR alternatives would have similar effects to the FWO.

C.2.1.4.12 Hawksbill Sea Turtle

The hawksbill sea turtle is a small to medium-sized marine turtle weighing up to 15 kilograms in the United States. The hawksbill lives in tropical and sub-tropical waters of the Atlantic, Pacific, and Indian Oceans. Areas that are known as important feeding areas for hawksbill turtles in Florida include the waters near the Florida Keys and on the reefs off Palm Beach County. Hawksbill turtles use different habitat types at different stages of their life cycle. Post hatchlings take shelter in weed lines that accumulate at convergence zones. Coral reefs are the foraging habitat of juveniles, sub-adults, and adults. They are also known to inhabit mangrove-fringed bays and estuaries, particularly along the eastern shore where coral reefs are absent. Hawksbills feed predominantly on sponges and nest on low and high energy beaches, frequently sharing high-energy beaches with green sea turtles. Nests are typically placed under vegetation.

For the FWO, a reduction in high volume discharge events from Lake Okeechobee to the Northern Estuaries would reduce stress on hardbottom habitats, thereby increasing foraging potential for sea turtles thereby providing minor beneficial effects. Implementation of any of the PACR CEPP alternatives would further reduce high-volume discharge events from Lake Okeechobee to the Northern Estuaries, and would reduce stress on hardbottom habitats that support sponges and corals, thereby increasing foraging potential and nursery habitat for sea turtles, providing minor beneficial effects. Increased flows to Florida Bay would improve salinity and reduce stress on important foraging areas for sea turtles and would provide minor beneficial effects.

Although hawksbill sea turtles are expected to be found foraging near hardbottom habitats within Florida Bay, the increased freshwater flows associated with all the alternatives may reduce nearshore salinity concentrations but should have a negligible and less than significant effect on sponges or other food sources utilized by this species. Additionally, no hawksbill sea turtles would attempt to utilize areas for nesting purposes since there is no suitable habitat for nesting in the project area. With the expectation of improved nearshore habitat, no utilization of the project area for nesting purposes, and the implementation of agency approved Sea Turtle and Smalltooth Sawfish Construction Conditions, in CEPP, USACE determined hawksbill sea turtle may be affected, but is not likely to be adversely affected, by the proposed project. All CEPP PACR alternatives would have similar effects to the FWO.

C.2.1.4.13 Leatherback Sea Turtle

The leatherback sea turtle is the largest living turtle and weighs up to 700 kilograms. The leatherback lives in tropical and sub-tropical waters. Habitat requirements for juvenile and post-hatchling leatherbacks are virtually unknown. Nesting females prefer high-energy beaches with deep unobstructed access. Leatherbacks feed primarily on jellyfish.

For the FWO, a reduction in high volume discharge events from Lake Okeechobee to the Northern Estuaries would reduce stress on coastal habitats, thereby providing minor beneficial effects to sea turtles. Implementation of any of the PACR CEPP alternatives would further reduce high-volume discharge events from Lake Okeechobee to the Northern Estuaries, and would reduce stress on coastal systems that may provide foraging and nursery habitat for sea turtles, providing minor beneficial effects. Increased flows to Florida Bay would improve salinity and reduce stress on coastal habitats that are important to foraging sea turtles and would provide minor beneficial effects.

Although leatherback turtles are expected to be found foraging in nearshore habitats within Florida Bay, the increased freshwater flows associated with all the alternatives may reduce nearshore salinity concentrations but should have a negligible and less than significant effect on jellyfishes or other food sources utilized by this species. Additionally, no leatherback sea turtles would attempt to utilize areas for nesting purposes since there is no suitable habitat for nesting in the project area. With the expectation of improved nearshore habitat, no utilization of the project area for nesting purposes, and the implementation of agency approved Sea Turtle and Smalltooth Sawfish Construction Conditions, in CEPP, USACE determined leatherback sea turtle may be affected, but would not likely be adversely affected, by the proposed project. All CEPP PACR alternatives would have similar effects to the FWO.

C.2.1.4.14 Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle is the smallest of all sea turtles and weighs up to 45 kilograms. This species is a shallow water benthic feeder consuming mainly algae and crabs. Juveniles grow rapidly. Juveniles and sub-adults have been found along the eastern seaboard of the United States and in the Gulf of Mexico. However, the major nesting beach for the Kemp's ridley sea turtle is on the northeastern coast of Mexico. This species occurs mainly in coastal areas of the Gulf of Mexico and in the northwestern Atlantic Ocean. The post-pelagic stages are commonly found dwelling over crab-rich sandy or muddy bottoms. Juveniles frequent bays, coastal lagoons, and river mouths.

Although Kemp's ridley sea turtles could be found foraging in nearshore habitats within Florida Bay, this species is not expected to be found within the direct area of influence. Additionally, no Kemp's ridley sea turtles would attempt to utilize areas for nesting purposes since their main nesting location is on a single stretch of beach on the Gulf Coast of Mexico. With the expectation of improved nearshore habitat, no utilization of the project area for nesting purposes, and the implementation of agency approved Sea Turtle and Smalltooth Sawfish Construction Conditions, in CEPP, USACE determined Kemp's ridley sea turtle may be affected, but would not likely be adversely affected, by the proposed project. All CEPP PACR alternatives would have similar effects to the FWO.

C.2.1.4.15 Loggerhead Sea Turtle

Loggerhead sea turtles inhabit the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Females select high energy beaches on barrier strands adjacent to continental land masses for nesting. Steeply sloped beaches with gradually sloped offshore approaches are favored. After leaving the beach, hatchlings swim directly offshore and eventually are found along drift lines. They migrate to the near-shore and estuarine waters along the continental margins and utilize those areas as the developmental habitat for the sub-adult stage. Loggerheads are predators of benthic invertebrates.

Although loggerhead sea turtles are expected to be found foraging in nearshore habitats within Florida Bay, the increased freshwater flows associated with all the alternatives may reduce nearshore salinity concentrations but should have a negligible and less than significant effect on crustaceans, mollusks or other invertebrate food sources utilized by this species. Additionally, no loggerhead sea turtles would attempt to utilize areas for nesting purposes since there is no suitable habitat for nesting in the project area. With the expectation of improved nearshore habitat, no utilization of the project area for nesting purposes, and the implementation of agency approved Sea Turtle and Smalltooth Sawfish Construction Conditions, in CEPP, USACE determined loggerhead sea turtle may be affected, but would not likely be adversely affected, by the proposed project. All CEPP PACR alternatives would have similar effects to the FWO.

C.2.1.4.16 State Listed Species

The CEPP PACR project area contains habitat suitable for the presence, nesting, and/or foraging of 16 state-listed threatened animal species and two state species of special concern. Threatened animal species include the Big Cypress fox squirrel (*Sciurus niger avicennia*), Everglades mink (*Mustela vison evergladensis*), American oystercatcher (*Haematopus palliates*), black skimmer (*Rynchops niger*), Florida burrowing owl (*Athene cunicularia floridana*), Florida sandhill crane (*Grus canadensis pratensis*), little blue heron (*Egretta caerulea*), reddish egret (*Egretta rufescens*), roseate spoonbill (*Platalea ajaja*), snowy plover (*Charadrius nivosus*), southeastern American kestrel (*Falco sparverius paulus*), tricolored heron (*Egretta tricolor*), least tern (*Sternula antillarum*), white-crowned pigeon (*Patagioenas leucocephalus*), gopher tortoise (*Gopherus polyphemus)*, and Rim Rock crowned snake (*Tantilla oolitica*). State species of special concern include Sherman's fox squirrel (*Sciurus niger shermani*) and osprey (*Pandion haliaetus*) [Monroe county population only].

Threatened and endangered plant species include the pine-pink orchid (*Bletia purpurea*), which frequents the edges of the farm roads just above wetland elevation; the lattice-vein fern (*Thelypteris reticulate*) which is found occasionally in forested wetlands, Eaton's spikemoss (*Selaginella eatonii*), and Wright's flowering fern (*Anemia wrightii*), both found in the Frog Pond natural area; along with the Mexican vanilla plant (*Vanilla mexicana*) and Schizaea tropical fern (*Schizaea pennula*) located on tree islands in the upper Southern Glades region.

While small foraging or nesting areas utilized by many of these animal species may be affected by this project, none of the alternatives are likely to adversely affect protected state species. Impacts to wading bird species will be similar to those affecting the wood stork. Overall, negligible and less than significant adverse impacts are anticipated to state listed species as a result of any of the alternatives.

C.2.1.5 Fish and Wildlife Resources

A comparison of FWO and CEPP PACR alternatives and their potential effects on wildlife within the area are summarized below. Effects to State and Federally listed species are described in further detail in **Section C.2.1.4, Threatened and Endangered Species** and in **Annex A**. Changes in water quality also have the potential to affect prey forage base through altering of vegetation composition or structure. Implementation of alternatives would benefit fish and wildlife resources within the area, particularly within the Northern Estuaries and Northern Everglades. These benefits are described in greater detail in the sections below. Water quality will continue to be monitored; potential effects are largely uncertain at this time but some improvements are expected.

C.2.1.5.1 Invertebrates

Short-term, negligible effects to the invertebrate community within Lake Okeechobee or EAA are anticipated under any alternative. As compared with FWO, all alternatives show a minor beneficial effect with performance improvement within the Northern Estuaries as indicated by less frequent and fewer high-volume flow months. Reductions in high-volume discharges and salinity fluctuations would likely benefit oysters, benthic, and epibenthic invertebrates associated with seagrass, hardbottom, and mangrove communities within the Northern Estuaries. Reduction in high flows and accompanying flow velocities would help lessen the current problem of flushing of oyster spat into outer areas of the Northern Estuaries that experience high salinities levels during the dry season resulting in increased predation and disease in the oyster population. In both the Caloosahatchee and St. Lucie estuaries, a minor adverse effect is expected due to the slight increases in low-flow violations during the dry season. Oyster monitoring data during extended dry conditions in the estuaries has shown an increase in oyster disease related to the timing, duration, and severity of high-salinity conditions. Supplemental flows during dry times may be warranted and have been accounted for in the IRLS water reservation process as well as the

C-43 reservoir water reservation. These dry season base flows should, whenever possible, be directed through the North Fork of the St. Lucie Estuary as was the case in pre-drainage conditions.

Within the EAA, it is anticipated that conversion of agriculture lands to an STA would improve habitat for invertebrates.

Within the Greater Everglades, aquatic invertebrates would be sustained by even slightly longer hydroperiods with implementation of any of the CEPP PACR alternatives, providing a long-term, moderate, and beneficial effect, especially in northern WCA 3A. Even slight increases in stages and hydroperiods within WCA 3A and ENP would promote wetland vegetation transition, increasing periphyton. Periphyton is a primary component of invertebrate diets, including apple snails. In addition to the potential for increased foraging opportunities, changes in vegetation resulting in expansion of wet prairie and increases in emergent vegetation would also provide habitat structure critical for apple snail aerial respiration and egg deposition (Turner 1996, Darby et al. 1999).

Crayfish are important components within the Everglades food web, serving as primary dietary components of higher trophic level species including fish, amphibians, alligators, wading birds and mammals such as raccoons and river otters (Kushlan and Kushlan 1979). Even the slight increases in hydroperiods associated with the CEPP PACR alternatives would likely increase crayfish density within northern WCA 3A and ENP, particularly within the marl prairies. CEPP PACR alternatives would increase hydroperiods within this region, resulting in increased native crayfish productivity having a long-term, minor beneficial effect.

Invertebrate populations associated with nearshore Florida Bay may likely show a long-term, minor beneficial effect under all CEPP PACR alternatives from a small increase in freshwater input resulting in minor decreased salinities.

Implementation of any CEPP PACR alternatives is expected to have a negligible effect in Lake Okeechobee and a minor beneficial effect on fish in the Northern Estuaries; by reducing the number of high-flow discharge events, improvements in fisheries habitat such as seagrass and oyster beds are expected to occur. A negligible effect on fish species throughout much of the Greater Everglades, ENP, and Florida Bay would be expected.

Within the EAA, it is anticipated that conversion of agriculture lands to freshwater wetlands within the proposed STA footprint would improve fish habitat. Introduction or expansion of non-native fish species due to changes in water distribution is not likely to occur; however, the extent of invasion is uncertain at this time, providing a minor adverse effect.

C.2.1.5.2 Amphibians and Reptiles

Long-term, minor beneficial effects to amphibian and reptile communities are anticipated under all CEPP PACR alternatives. Within the EAA, it is anticipated that conversion of agriculture lands to freshwater wetlands within the STA would improve habitat for amphibians and reptiles. Rehydration within previously dry areas within northern WCA 3A would increase spatial extent of suitable habitat for aquatic amphibian species in this area. Similarly, increased hydroperiods within ENP would also benefit aquatic amphibian species. As hydrology improves within WCA 3 and ENP, it is expected that amphibian and reptile species diversity will likely change. However, declines in some amphibian and reptile species will be offset by favorable habitat conditions for other species. Increase in forage prey availability (i.e., crayfish and other invertebrates, fish) in areas rehydrated by CEPP PACR implementation would also directly benefit amphibian and reptile species.

Submerged aquatic vegetation and algal communities are also common foraging areas for sea turtle. Slight reductions in high flow violations within the Northern Estuaries reduce stress on Seagrass and promote increases in seagrass shoots that have the potential to increase foraging opportunities for sea turtles in this region. Similarly, increased freshwater flows to Florida Bay and the southwestern coastal estuaries resulting in lowered salinity levels that better encompass seagrass salinity tolerance ranges, would also increase foraging opportunities for sea turtles.

C.2.1.5.3 Birds

The freshwater and estuarine wetlands of the Everglades and south Florida estuaries are noted for their abundance and diversity of colonial wading and shore birds. Nesting and foraging activities of resident bird species are anticipated to show a long-term, moderate beneficial effect with implementation of any CEPP PACR alternative. Within the EAA, it is anticipated that conversion of agriculture lands to freshwater wetlands within the STA would improve habitat for bird species (Beck et al. 2013). Impacts to the CSSS, snail kite, wood stork and wading birds are further discussed in **Appendix C.2.1**, **Section C.2.1.5**, and **Annex A**. Changes in water quality also have the potential to affect birds through alteration of vegetation composition or structure or impacts to their forage base. Water quality would continue to be monitored and potential effects are largely uncertain at this time.

As predicted by the Trophic Hypothesis (RECOVER 2004) an increase in density of small fishes would directly benefit higher trophic level predators such as wading birds. Crayfish are a particularly important forage resource for nesting white ibis (*Eudocimus albus*). Appropriate foraging conditions and crayfish densities within core foraging areas of nesting wading bird colonies can reduce foraging flight distance, thereby enhancing overall body condition. As indicated in **Section C.2.1.5.1, Invertebrates**, increases in hydroperiod associated with implementation of any of the alternatives would likely increase crayfish density within northern WCA 3A, WCA 3B and ENP, particularly within the marl prairies.

The largest wading bird rookery within the Everglades ecosystem is Alley North. The incremental hydrological improvements within northeastern WCA 3A would be expected to add to the benefits provided by the FWO. Associated increased depths, hydroperiods and sheetflow with Alley North decrease the potential for nest predation and provide a minor beneficial effect.

Consistent with the FWO, all CEPP PACR alternatives reveal the potential for short-term minor adverse effects to aquatic vegetation within Lake Okeechobee due to higher than preferred lake stages, events in which Lake Okeechobee stage exceeded 15.0 ft NGVD, as described in **Section C.2.1.7.1**.

C.2.1.5.4 Mammals

As compared with the FWO, potential long-term, minor beneficial effects to mammals within the CEPP PACR affected area are anticipated with implementation of any alternative. As compared with FWO, the CEPP PACR alternatives would provide potential long-term, minor beneficial effects to mammals anticipated with implementation of any alternative. Small mammals including raccoons and river otters would benefit from increased numbers of crayfish and small prey fish biomass. The increase in water availability and rehydration within the northern WCA 3A and ENP under the CEPP PACR alternatives would likely benefit Everglades mink (*Mustela vison evergladensis*) as a result of increased foraging opportunities within ENP. Effects to State and Federally listed species are described in further detail in **Section C.2.1.5,**

Threatened and Endangered Species and within **Annex A**. Changes in water quality also have the potential to affect prey forage base through altering of vegetation composition or structure. Water quality would continue to be monitored; potential effects are largely uncertain at this time. However, it is predicted that restoration of sheetflow will aid to remove nutrients within the water column.

The implementation of the CEPP PACR alternatives may negatively affect some mammals dependent upon upland habitat. Due to increased water flow and changes in water distribution, it is anticipated that overdrained areas in northern WCA 3A would be rehydrated, triggering a vegetation transition from upland to wetland habitat. Although mammals occurring within the area are adapted to the naturally fluctuating water levels in the Everglades, there is an increased potential for this vegetation transition to have a short-term, moderate, adverse, and unavoidable effect on some mammals using upland habitat for refugia and food source. For additional information on high-water closures for mammals in WCA 3A, see **Appendix C.2.2.15**. High water is a concern for deer populations within northern WCA 3A that utilize tree islands. Deer and other upland wildlife species (e.g., bobcats, raccoons, and marsh rabbits) are mobile and will move in response to high-water conditions from tree islands to higher ground, including levees. Habitat quality in these areas is generally less desirable and potential for predation is greater, which results in increased mortality. No significant negative effects on mammals in the remainder of the project study area is anticipated under any of the alternatives.

C.2.1.6 Essential Fish Habitat

All CEPP PACR alternatives reduce damaging freshwater discharges into the Northern Estuaries, which will be beneficial to essential fish habitat (EFH).

The Magnuson-Stevens Fishery Conservation and Management Act (Title 16 of the United States Code [U.S.C.] 1801 *et seq*.; Public Law [P.L.] 104208) reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fish habitat (EFH). Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH. In conformance with the 1996 amendment to the Act, the information provided in this Integrated Environmental Impact Statement (EIS) will comprise the required EFH assessment and has been coordinated with NMFS.

Consultation for the CEPP PACR will be initiated following delivery of the PACR to the Assistant Secretary of the Army (ASA). Under CEPP, the NMFS indicated that beneficial effects to fish resources and EFH may occur as a result of this project. The NMFS requested an evaluation of potential impacts to living marine resources, including mangroves, seagrasses, live bottom communities, and the marine/estuarine water column that may be impacted by activities or operations of the project alternatives. The alternatives considered in the CEPP PACR result in effects similar to the FWO, therefore it is anticipated that NMFS would provide a similar response to the CEPP PACR.

C.2.1.6.1 Essential Fish Habitat by Geographic Area

The project area includes two distinct regional estuarine and nearshore coastal systems: the Northern Estuaries including the Caloosahatchee River and the St. Lucie Estuary and Florida Bay.

Lake Okeechobee discharges into the two northern estuaries. The St. Lucie Canal feeds into the St. Lucie Estuary, and the Caloosahatchee Canal/River feeds into the Caloosahatchee Estuary to the west. The Southern Estuaries comprise a shallow estuarine system (average depth less than 3 ft). Florida Bay is the main receiving water of the Greater Everglades, heavily influenced by changes in timing, distribution, and quantity of freshwater flows into the Southern Estuaries.

C.2.1.6.1.1 Caloosahatchee River

The Caloosahatchee River estuary contains essential fish habitat for juvenile brown shrimp (*Penaeus aztecus*), juvenile gray snapper (*Lutjanus griseus*), small tooth saw fish (*Pristis pectinate),* juvenile pink shrimp (*Penaeus duorarum*), adult and juvenile red drum, (*Sciaenops ocellatus*), adult and juvenile Spanish mackerel (*Scomberomorus maculatus*), and juvenile stone crab (*Menippe mercenaria*). Downstream habitats include oyster reefs and seagrass beds (submerged aquatic vegetation).

C.2.1.6.1.2 St. Lucie Estuary

The proposed project is within the jurisdiction of the South Atlantic Fishery Management Council (SAFMC) and is located in areas designated as EFH for wormrock, live bottom habitat, for the American oyster (*Crassostrea virginica*); pink shrimp (*Penaeus duorarum*); white shrimp (*Penaeus* sp.) and brown shrimp (*Penaeus aztecus*); Florida red drum (*Sciaenops ocellatus*); grouper (*Epinephelus* spp.); gray snapper (*Lutjanus griseus*); white grunt (*Haemulon plumieri*); red porgy (*Pagrus pagrus*); spiny lobster (*Panulirus argus*); and the snapper-grouper complex. In addition, the nearshore hardbottom habitat outside of the St. Lucie Estuary is designated as Essential Fish Habitat-Habitat Areas of Special Concern (EFH-HAPC) for the snapper-grouper complex.

C.2.1.6.1.3 Florida Bay

The Southern Estuaries contain EFH for corals; coral reef and live bottom habitat; red drum (*Sciaenops ocellatus*); penaeid shrimps; spiny lobster (*Panulirus argus*); other coastal migratory pelagic species and the snapper-grouper complex. Species generally present in the Southern Estuaries region include brown shrimp (*Penaeus aztecus*), pink shrimp (*Penaeus duorarum*), white shrimp, spiny lobster, stone crab, gulf stone crab, red drum, Spanish mackerel, and gray snapper (*Lutjanus griseus*). EFH in the Southern Estuaries comprises seagrasses, estuarine mangroves, intertidal flats, the estuarine water column, live/hard bottoms, and coral reefs.

C.2.1.6.2 Assessments of Effects on Essential Fish Habitat:

C.2.1.6.2.1 Northern Estuaries

Aquatic habitats within the Caloosahatchee Basin have been altered through the channelization of the river. Nevertheless, the basin continues to support fishery resources of some recreational and commercial importance. Seagrass communities within the Caloosahatchee estuary provide critical refugia for juvenile fishes such as redfish, grouper, snook, saw fish and spotted seatrout. The decline in juvenile abundance and distribution of these and other species, along with an overall decrease in species richness may be related to the loss of seagrass habitat and/or a result of alterations in the salinity regime and the timing of the freshwater discharges from the S-79 structure. Implementation of the project would reduce slightly the frequency of high volume freshwater discharges during the wet season, ultimately resulting in minor beneficial effects to essential fish habitat within the Caloosahatchee estuary.

Another primary goal of this project is to reduce high nutrient freshwater flows to the estuaries. The CEPP PACR alternatives help improve restoration potential of seagrass beds, oyster reef, benthic infauna, and the estuarine water column itself. Increases in seagrass and oyster reef would provide benefits to the essential fish habitat species. The TSP increases the acres of oysters by 81 in the Caloosahatchee River Estuary (CRE) and by 5 in the St. Lucie Estuary.

C.2.1.6.2.2 Southern Estuaries

Project construction activities should have no effect on the nearshore communities or EFH downstream of the project areas in Florida Bay consistent with the FWO. However, this project is expected to have a minor beneficial indirect effect by increasing overland flow into Eastern Florida Bay. The increased flow is anticipated to have negligible effect on water quality and salinities compared with the FWO. The FWO was expected to benefit seagrasses, mangrove wetlands, and estuarine fisheries. The CEPP PACR alternative would be expected to increase fresh water slightly adding an increment of benefit to the FWO benefits.

Consistent with the FWO, this project is not expected to have an effect on coral reef or hard bottom communities in the Southern Estuaries. There are no coral reefs or hard bottom communities located within the proposed project site or the nearshore waters affected by the project. Corals found within Florida Bay are outside the area of potential effect.

C.2.1.6.3 EFH Conclusion

C.2.1.6.3.1 Northern Estuaries

The Caloosahatchee and St. Lucie estuaries both receive excessive discharges from Lake Okeechobee as well as their local basins during wet years, and suffer from too little discharge on excessively dry years.

Restoration goals in the Caloosahatchee estuary include; re-establishment of a salinity range favorable to juvenile marine fish, shellfish, oysters and submerged aquatic vegetation (SAV), re-establishment of seasonally appropriate freshwater flows of favorable quality that maintain low salinities in the upper estuary and re-establishment of more stable salinities and ranges in the lower estuary. Restoration goals for the St. Lucie estuary include maintaining a salinity range favorable to fish, benthic invertebrates, oysters and SAV. This requires a reduction of high volume, long duration discharge events from Lake Okeechobee, the C-44, C-23 and C-24 watersheds.

In summary, CEPP PACR may have minor improvements in conditions for estuarine and marine resources throughout the Northern Estuaries by restoring more natural timing, volume, and duration of freshwater flows to the Caloosahatchee and St. Lucie estuaries and provide beneficial effects. It has the potential to reduce excess nutrient loading and provide a more appropriate range of salinity conditions by reducing extreme salinity fluctuations and durations. Increases in low flow violations do occur and would need to be offset by careful operations of both the C-43 and IRLS projects to improve low flow conditions during extreme dry times. The improvement of estuarine conditions will ultimately have a beneficial effect to essential fish habitat resources.

C.2.1.6.3.2 Southern Estuaries

Previous water management operations have resulted in an inland migration of saline conditions in both groundwater and surface waters. This has caused the expansion of moderate to high salinity zones and has diminished the spatial extent of freshwater wetland habitats in the Southern Estuaries. Landward expansion of saltwater and mangrove wetlands, including low-productivity, sparsely vegetated dwarf mangrove communities typical of the hypersaline “white zone” has also occurred in the Southern Estuaries.

The proposed project components would improve freshwater delivery to coastal wetlands and adjacent estuaries in Eastern Florida Bay. Implementation of the project would slightly redistribute flow to salt water wetlands and nearshore bay areas and result in small favorable changes to salinity levels. These changes may affect EFH, although the impacts to the aquatic resources are anticipated to be mildly significant and beneficial.

C.2.1.7 Hydrology

Hydrologic modeling simulations of the CEPP PACR were developed with the RSM-BN and RSM-GL sub-regional modeling tools, to provide baseline conditions for plan formulation, the assessment of CEPP PACR project benefits (comparisons against FWO), and the assessment of CEPP PACR alternative performance for the level-of-service for flood protection and water supply. The FWO for CEPP PACR assumes the construction and implementation of currently authorized CERP and non-CERP projects, and other Federal, State, or local projects constructed or approved under existing governmental authorities that occur in the CEPP PACR study area. The reader should refer to **Section 2** of the CEPP PACR main report and **Appendix C.1** for additional documentation of the existing condition baseline (ECB) and FWO conditions.

The portion of the Greater Everglades within the CEPP PACR project area includes WCA 1, WCA 2A, WCA 2B, WCA 3A, WCA 3B, and ENP. This overview of CEPP PACR hydrological conditions is intended to provide a general overview of regional hydrological changes for the CEPP PACR alternatives compared to the CEPP PACR FWO. RSM-BN and RSM-GL hydrologic modeling simulations for the CEPP PACR array of alternatives (R240, R360, C360) were developed starting from the FWO modeling simulations. Hydrologic performance within any specific spatial area is due to the combined effect of CEPP PACR alternative components and operations identified throughout the project area. For a more detailed assessment, the reader should refer to the complete suite of RSM-GL modeling results in **Appendix A, Annex A-2**. A map of the RSM-GL gage locations is provided in **Figure C.2.1-11**.

C.2.1.7.1 Lake Okeechobee and the Northern Estuaries

All the CEPP PACR alternatives would result in minimal hydrologic change in Lake Okeechobee, with improvements from reducing the frequency of lake stages near the top of the beneficial range and from further reducing frequency of extreme low stages. A minor adverse effect would result from slightly increasing the frequency of extreme high lake stages above the beneficial range. A minor adverse effect also would result from decreasing the frequency of low lake stages in the lower portion of the beneficial range.

In the Caloosahatchee Estuary, moderate additional improvement in mean monthly flows above 2,800 cfs would be reduced from the FWO by 6 for Alternative R240, by 7 for Alternative R360, and by 9 for Alternative C360. Minor additional improvement in mean monthly flows above 4,500 cfs would be reduced from the FWO by 1 for R240, by 0 for R360, and by 1 for C360. Mean monthly flows less than 450 cfs would increase by 1-4 for the alternatives. In the St. Lucie Estuary, minor additional improvements in 14-day moving average flows above 2,000 cfs would be reduced by 4 for Alternative R240, by 6 for Alternative R360, and by 4 for Alternative C360. Minor additional improvement in mean monthly flows above 3,000 cfs would occur. They would be reduced by 1 for R240, by 2 for R360, and by 2 for C360. Mean monthly flows below 350 cfs would increase by 3 for R240, by 2 for R360, and by 1 for C360.

For the modeling of the array of alternatives, operational changes to Lake Okeechobee included both changes within the flexibility of the Lake Okeechobee Regulation Schedule (LORS) 2008 (no adjustments to the defined LORS zones) and changes to the class limit thresholds for the tributary hydrologic conditions, the seasonal and multi-seasonal Lake Okeechobee net inflow outlooks, changes that are outside the LORS 2008 flexibility. Details pertaining to the proposed CEPP PACR operations for Lake Okeechobee are separately addressed in the draft Preliminary Operations Manual (refer to **Annex C**).

Compared to the CEPP, Lake Okeechobee stages are increased by 0.2-0.4 ft for the upper 60% of the stage duration curve, excluding extreme wet hydrologic conditions (**Figure C.2.1-13**). Peak lake stage increased from 17.66 ft NGVD in the CEPP to 18.29 ft NGVD in the alternatives. The number of days with stages above 16 ft NGVD is increased from 1163 to 1224 during the 1965-2005 period of simulation.

For the Caloosahatchee Estuary, compared to the CEPP, mean monthly flows above 2800 cfs and 4500 cfs are reduced by 9 and 1 months, respectively (13% and 3% reductions, respectively) (**Figure C.2.1-14**). Mean monthly flows less than 450 cfs are increased by a month (**Figure C.2.1-15**).

For the St. Lucie Estuary, compared to the CEPP, mean monthly flows above 2000 cfs and 3000 cfs are reduced by 4 and 2 months, respectively (13% and 8% reductions, respectively) (**Figure C.2.1-16**). Mean monthly flows less than 350 cfs are increased by a month (**Figure C.2.1-17**). Note that the St. Lucie performance measures for the ECB and FWO base conditions were subsequently updated during development of the array of alternatives, due to an identified error that the performance measure was not accounting for local groundwater flow contributions to the estuary.

Hydrologic effects to Lake Okeechobee and the Northern Estuaries would be the same for all alternatives.

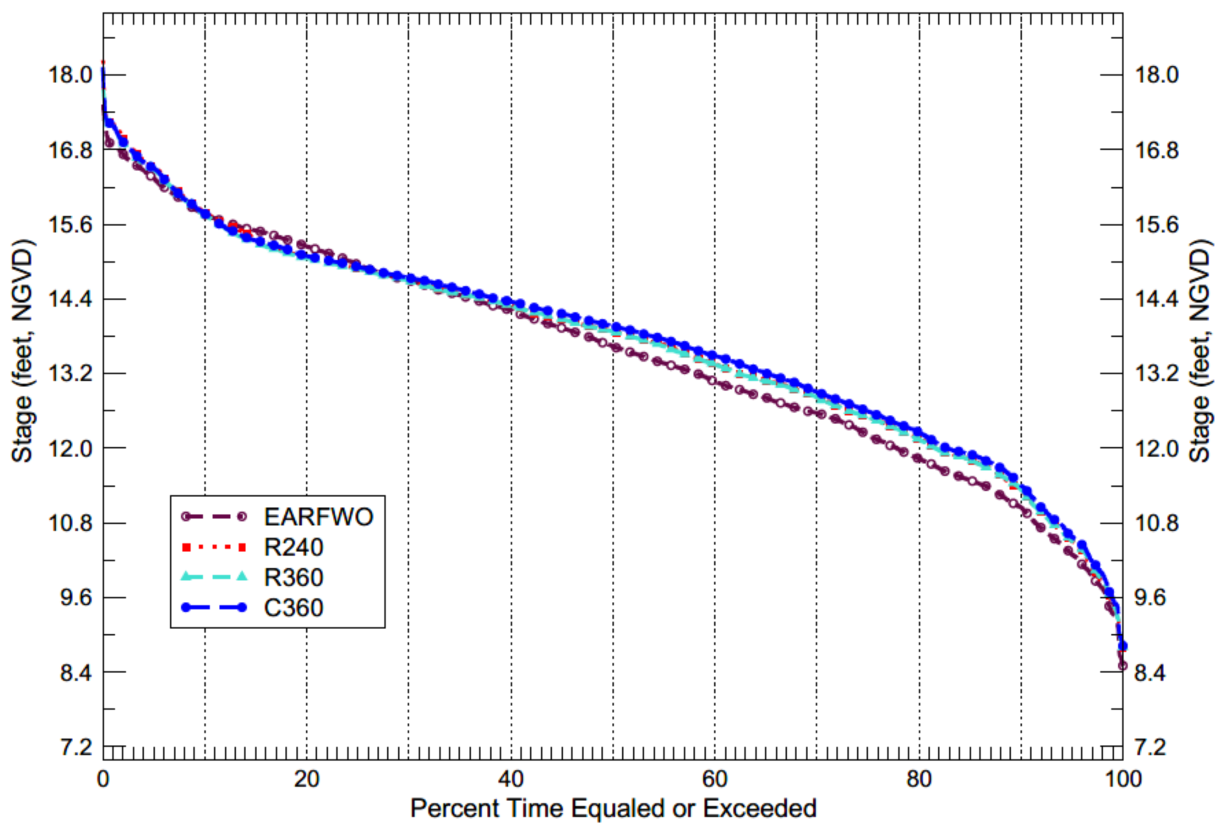


Figure C.2.1-13. Lake Okeechobee Stage Duration Curve for Alternatives

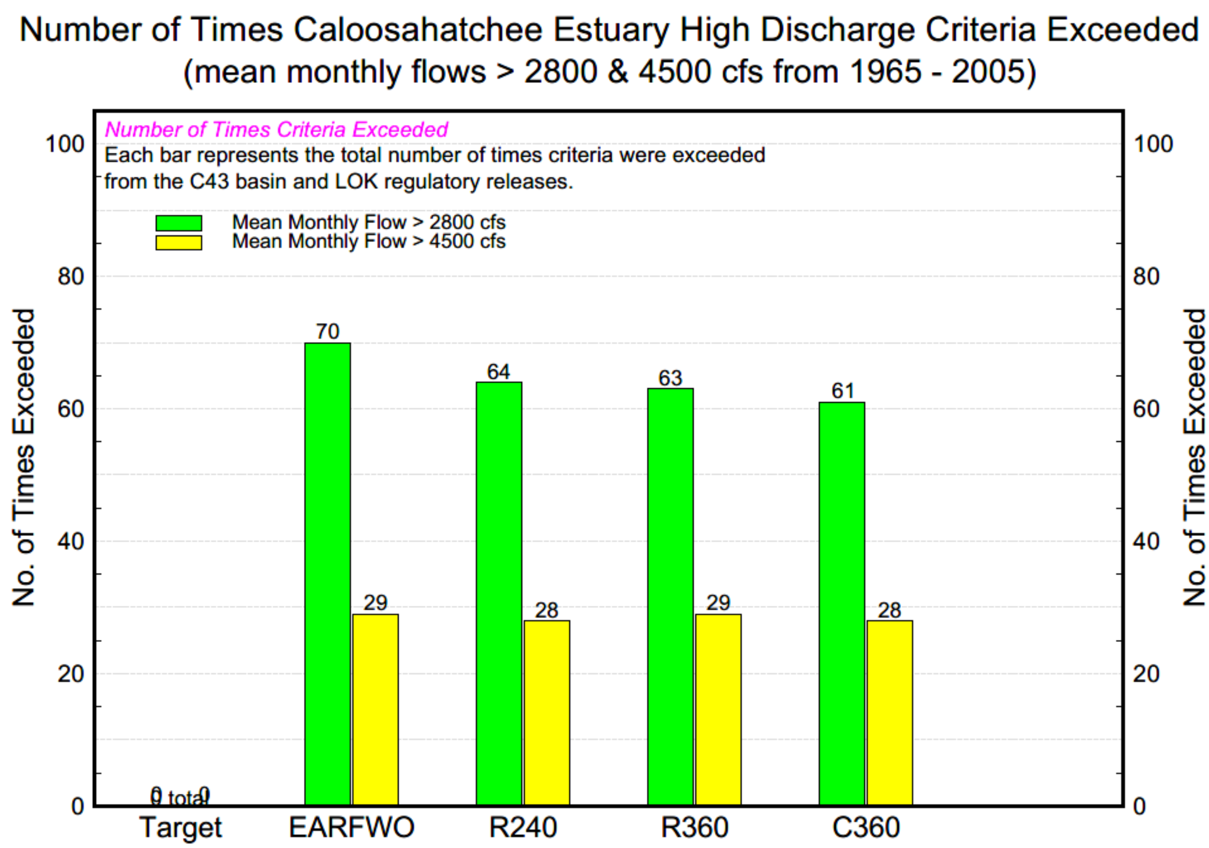


Figure C.2.1-14. Caloosahatchee Estuary High Discharge Frequency for Alternatives

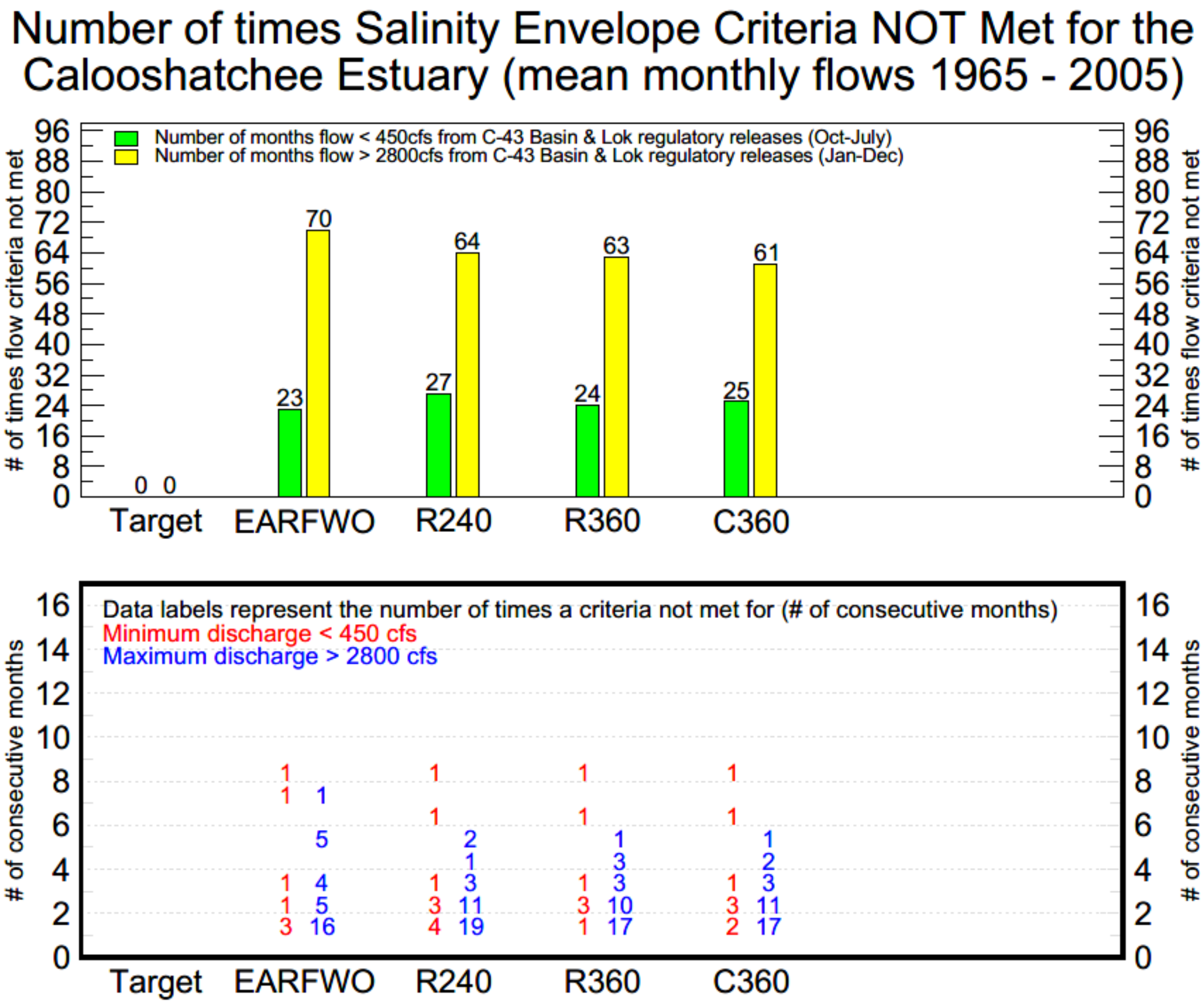


Figure C.2.1-15. Caloosahatchee Estuary Low Discharge Frequency for Alternatives

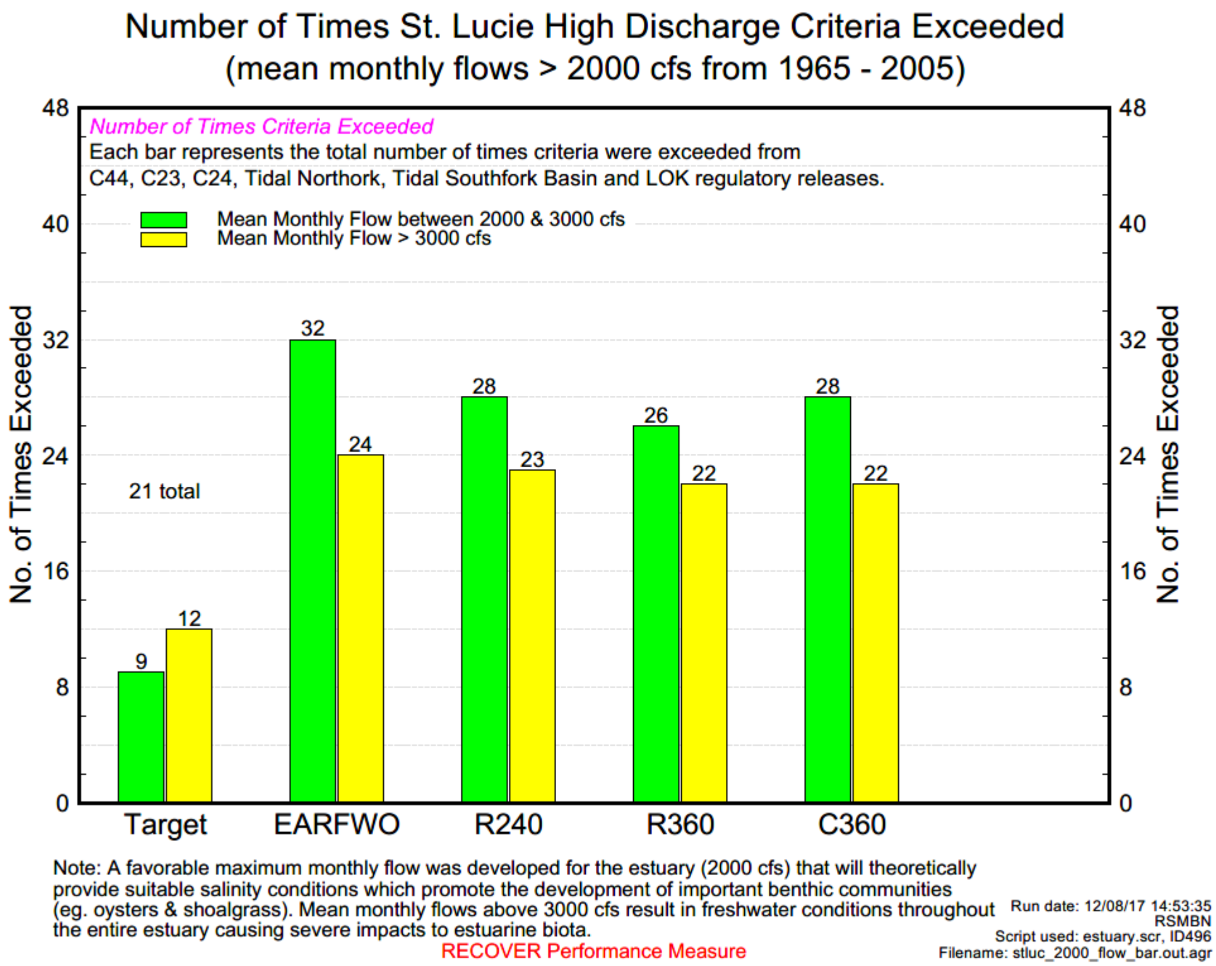


Figure C.2.1-16. St. Lucie Estuary High Discharge Frequency for Alternatives

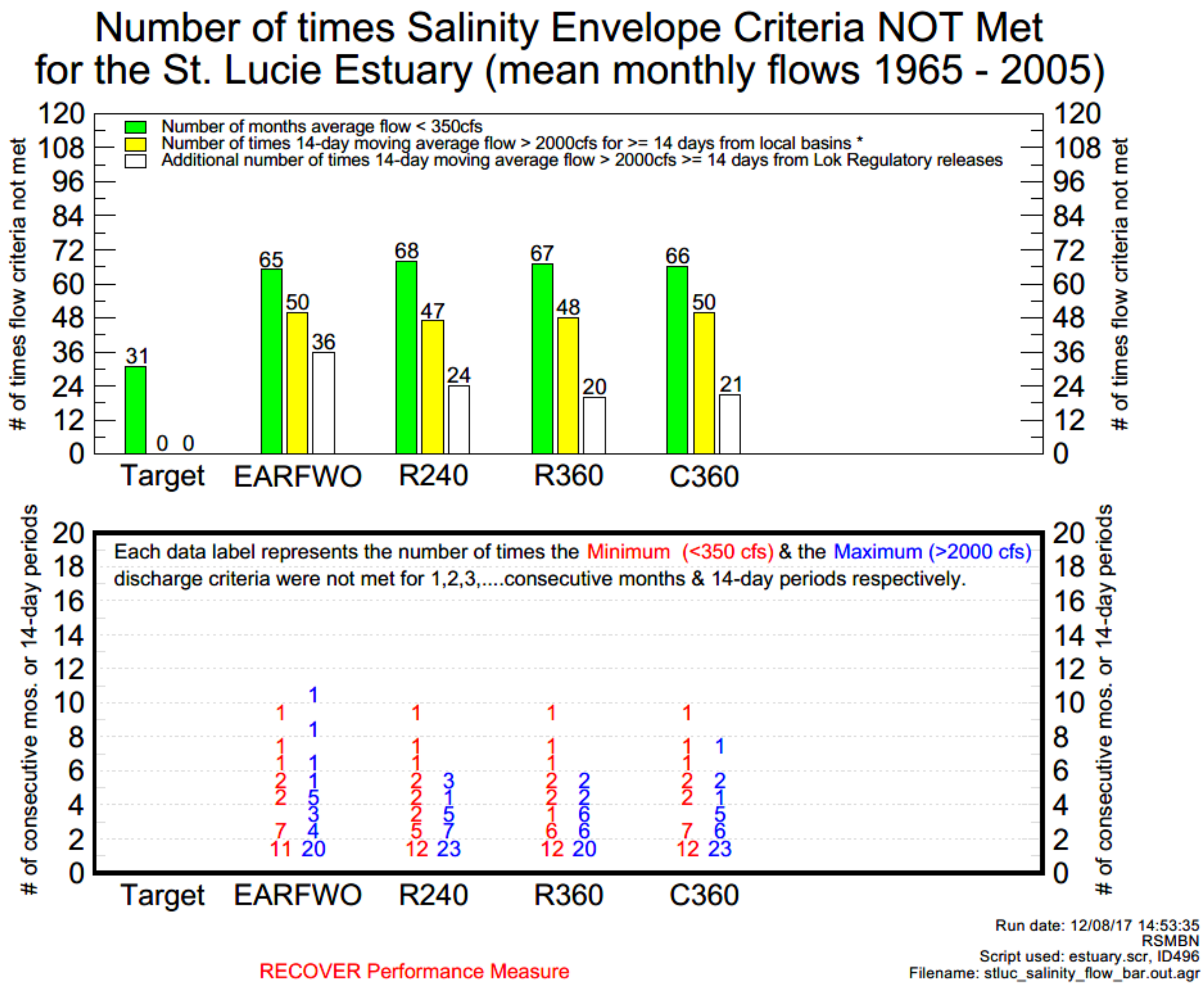


Figure C.2.1-17. St. Lucie Estuary Low Discharge Frequency for Alternatives

C.2.1.7.2 Everglades Agricultural Area

Minor changes to groundwater levels are expected adjacent to the proposed project features, compared to the FWO. The FWO condition and all alternatives include the SFWMD Restoration Strategies A-1 FEB. All alternative designs include perimeter seepage collection canals and associated seepage pumps to limit potential impacts. Detailed CEPP PACR assessments within the EAA are not available because the RSM-BN does not simulate groundwater within the EAA. Hydrologic effects to the Everglades Agricultural Area would be the same for all alternatives. Hydrologic modeling results are included in **Appendix A, Annex A-2**.

C.2.1.7.3 Water Conservation Area 1

Compared to the FWO, no significant changes to WCA 1 stages are indicated with the alternatives. Average annual regulatory releases from WCA 1 to WCA 2A via the S-10 structures are slightly increased from 266,000 acre-feet (ac-ft) to approximately 267,000 ac-ft with all alternatives.

C.2.1.7.4 Water Conservation Area 2A and 2B

Under all CEPP PACR alternatives, WCA 2A overland flow (Transect 2) would have moderate Improvement. It would have a general increase in flow during the dry season of 18,000-29,000 ac-ft compared to the

FWO. It would be the same as the FWO during the wet season. For WCA 2B overland flow (Transect 4), it would be the same during the dry and wet seasons as the FWO.

Compared to the CEPP, WCA 2A stages are moderately increased by 0.1-0.2 ft under all hydrologic conditions (**Figure C.2.1-18**). Average annual inflows from STA 2 (including Compartment B) to WCA 2A are significantly increased from 236,000 ac-ft to 274,000 ac-ft. The S-7 pump station also contributes inflows of 56,900 ac-ft to WCA 2A under all scenarios. Average annual regulatory releases from WCA 2A to WCA 3A via the S11s are significantly increased from 323,000 ac-ft to 356,000-376,000 ac-ft for all the Alternatives.

Compared to the FWO, stages within WCA 2B are increased by 0.1-0.3 ft under nearly all hydrologic conditions for the R240 alternative, excluding wet and dry conditions. For Alternatives C360 and R360, stages under dry conditions are decreased by up to 0.5 ft (**Figure C.2.1-19**).

C.2.1.7.5 L-28 Triangle

The L-28 Triangle area is located entirely within the boundaries of the Miccosukee Tribe of Indians of Florida's Reservation and encompasses 7830 acres of Tribal lands and approximately 230 acres of BCNP. The L-28 Triangle area is confined on north by Interstate 75, the west by L-28 Interceptor Canal (L-28I) and the BCNP, and the east by the L-28 Canal.

The L-28 Interceptor Canal is bound by levees on both sides and maintains no direct connection to wetlands in the Triangle. Within the L-28 Triangle Area, the L-28 Canal is bound on the east side by a confining levee separating the wetlands of the L-28 Triangle from WCA 3A. Wetlands interior to the L-28 Triangle do maintain a connection to the L-28 canal along the west side of the L-28 canal. The L-28 canal terminates at the southern tip and is not connected to the L-28I canal. Historically the S-140 pump station maintained flood protection within the Triangle. A weir was installed in 2009, within the L-28 Canal and immediately south of Interstate 75, to restrict regional pumping and maintain water within the Triangle.

Although none of the alternatives include modifications to the L-28 Levee or the adjacent canal, stages within the L-28 Triangle are slightly increased by 0.1 ft during most of hydrologic conditions, due to groundwater interactions with the down-gradient western WCA 3A marsh (**Figure C.2.1-20**).

C.2.1.7.6 Big Cypress National Preserve

Stages within the BCNP, west of WCA 3A and Western Shark River Slough (ENP), do not change appreciably between the FWO and the CEPP PACR alternatives.

C.2.1.7.7 Water Conservation Area 3A and 3B

All CEPP PACR alternatives would have the following effects on WCAs 3A and 3B:

- Northwest WCA 3A (3A-NW**)**: Minor beneficial effect. Stages would increase by less than a 0.1 ft throughout the entire duration range.
- Northeast WCA 3A (3A-NE): Minor beneficial effect. Stages would increase by 0.1 ft with a minor decrease during 30% dry conditions.
- East-Central WCA 3A (3A-3): Minor beneficial effect. Stages would slightly increase by less than 0.1 ft, with no significant change during the wettest 5% of conditions.

- Central WCA 3A (3A-4): Negligible effect. Stages would experience a minor increase of less than a 0.1 ft during average conditions, with no significant change during extreme dry and wet conditions.
- Southern WCA 3A (3A-28): Minor beneficial effect. Stages would decrease by 0.1-0.2 ft during the wettest 5% of conditions and slightly decrease during normal-to-dry conditions.
- WCA 3B (Site 71): Negligible effect. Peak stages would exceed 9.0 ft NGVD less than 1% of period of simulation.

Compared to the FWO, average annual combined structural inflows to WCA 3A from STA 3/4, STA 5/ STA 6 (including Compartment C), and WCA 2A are increased from 1,258,000 ac-ft to 1,377,000 ac-ft (a 10% increase) following implementation of the CEPP PACR project features. To avoid adverse increases to the frequency, duration, and peak stages of WCA 3A high water conditions with this net increase in WCA 3A inflows, average annual combined structural outflows from WCA 3A through S-151 (to WCA 3B), S-333 (to ENP NESRS), the S-12 structures (to ENP WSRS), and the S343/S344 culverts are also significantly increased from 1,427,000 ac-ft in the FWO to 1,516,000-1,531,000 ac-ft for alternatives (1,516,000 ac-ft for R240; 1,527,000 ac-ft for R360, and 1,531,000 ac-ft for C360).

Since WCA 3A covers approximately 752 square miles, hydrologic differences between the FWO and CEPP PACR alternatives are characterized at representative gages throughout WCA 3A.

Within northwest WCA 3A, compared to the FWO, stages are generally increased by 0.1 to 0.2 ft for all alternatives (**Figure C.2.1-21**). Stages within northeast WCA 3A are generally increased by 0.1 ft for all alternatives, with a little decrease during 30% dry conditions (**Figure C.2.1-22**). Within east-central WCA 3A (3A-3), stages are generally slightly increased by less than 0.1 ft, with no significant change during the wettest 5% of conditions (**Figure C.2.1-23**). Proceeding south within central WCA 3A (3A-4), stages experience a minor increase of less than a 0.1 ft during average conditions with no significant change during extreme dry and wet conditions for all the alternatives (**Figure C.2.1-24**). Similar conditions in stages were observed at the southern WCA 3A (3A-28) (**Figure C.2.1-25**).

The FWO would result in additional WCA 3B inflow capacity up to 2,000 cfs. Water budget maps for the CEPP PACR alternatives, focusing primarily on the structure flows (ac-ft average annual) and locations (levee seepage flux along L-30 and L-29 is also indicated), are provided in **Figure C.2.1-26** through **Figure C.2.1-28**. Peak stages within central WCA 3B (Site 71) exceed 9.0 ft NGVD less than 1% of the RSM-GL 1965-2005 period of simulation (**Figure C.2.1-29**).

The WCA 3B hydrologic effects, resultant from the water budget differences, also do not vary significantly between the CEPP PACR alternatives (**Figure C.2.1-29**).

C.2.1.7.8 Northeast Shark River Slough

The CEPP PACR alternatives assume the L-29 Canal maximum operational limit at 9.7 ft NGVD and removal of the G-3273 stage constraint. Total net structural inflows to NESRS (via the L-29 Canal; computed as the sum of S-333, S355A, S-355B, L-29 Levee Gap, and S-356 minus S-334) are increased compared to the CEPP (762,000 ac-ft average annual): 777,000 ac-ft for R240; 780,000 ac-ft for R360; and 781,000 ac-ft for C360.

Stage duration curves for the L-29 Canal are provided in **Figure C.2.1-30.** For the CEPP PACR alternatives, peak stages in the L-29 Canal range between 9.57-9.63 ft NGVD.

Compared to the FWO, stages are not significantly increased under all hydrologic conditions at NESRS-2 (**Figure C.2.1-31**). Similar trends are also observed further south at the NESRS-1 monitoring gage. Changes to the average annual overland flow to NESRS across RSM-GL Transect 18 are shown in **Figure C.2.1-33**; a reference map for the RSM-GL transects (which are consistent with the SFWMM model transects, adjusted for the RSM grid resolution) is provided as **Figure C.2.1-32**.

C.2.1.7.9 Western Shark River Slough

Western SRS (WSRS), located to the west of L-67 Extension Levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C and D). Under ERTP, the utilization of the S-12 structures and the seasonal sequential closure periods beginning from the west at S-12A (November 1 – July 14) and S-12B (January 1 – July 14), respectively, is meant to move water from WCA 3A into SRS while providing conditions for Cape Sable seaside sparrow Subpopulation-A (CSSS-A) nesting and breeding. Modification to the ERTP seasonal closure periods for the S-12A and S-12B was not considered during CEPP PACR preliminary screening and alternative formulation, based on USACE consideration of the USFWS Biological Opinion for ERTP.

Changes to the average annual overland flows to WSRS across RSM-GL Transect 17 are shown in **Figure C.2.1-34**. Compared to the FWO, stages within northwest ENP (NP-201) are increased by 0.1 ft during 30% wettest hydrologic conditions for all the alternatives (**Figure C.2.1-35**). To the south and west, the NP-205 monitoring gage (used as an indicator for CSSS -A hydrology) indicates no significant stage changes under all hydrologic conditions for all alternatives, compared to the FWO (**Figure C.2.1-36**). Stages further south within Central Shark River Slough (NP-33) are slightly increased under 30% wettest hydrologic conditions for all alternatives (**Figure C.2.1-37**). Stages within Central Shark River Slough demonstrate a combined hydrologic response to the hydrologic changes previously indicated for both NESRS and WSRS; the resultant combined average annual transect flows within Central Shark River Slough (Transect 27) are significantly increased compared to the FWO (average annual 760,000 ac-ft): 813,000 ac-ft for R240 (7% increase); 821,000 ac-ft for R360 (8%); and 823,000 ac-ft for C360 (8%) (**Figure C.2.1-38**).

C.2.1.7.10 Taylor Slough

With all the CEPP PACR alternatives, a minor beneficial effect would result. Compared to the FWO, ENP stages along Taylor Slough (NP-TSB) are slightly increased by less than a 0.1 ft during the driest 50% of hydrologic conditions for all alternatives (**Figure C.2.1-39**).

C.2.1.7.11 Lower East Coast Area

The LEC area is located to the east of the L-31N, L-31W, and C-111 canals. Under the FWO (ERTP), specified canal water levels/ranges are meant to provide flood protection, water supply, and prevention of saltwater intrusion for the LEC. For the CEPP PACR alternatives, the operations for the SDCS are changed from the FWO operations for G-211 and the coastal canals are utilized to convey seepage water to Biscayne Bay to offset for reduced flows caused by implementation of CEPP PACR.

Observed stage changes within the LEC are separately discussed with the summary of flood control and water supply performance for the CEPP PACR alternatives, included in **Section C.2.1.8**.

C.2.1.7.12 8.5 Square Mile Area

The CEPP PACR alternatives modify the FWO operations of the S-357 pump station, in an effort to increase discharges from the 8.5 SMA detention cell to the C-111 South Dade North Detention Area and reduce the reliance on the S-331 pump station in L-31N to provide flood mitigation for the 8.5 SMA protected area. Details of the S-357 operations are provided with the documentation of the modeling assumptions for the CEPP PACR alternatives, located in **Annex A-2** of the Engineering Appendix (**Appendix A**). The protected portion of the 8.5 SMA is represented by three model grid cells in the RSM-GL, and the resolution of the RSM-GL is extremely limiting for adequate representation of the 8.5 SMA project features. Prior to implementation of CEPP PACR, further technical investigations will likely be needed for the 8.5 SMA operations, and additional hydrologic/hydraulic modeling with a higher resolution model may be required.

Stages within the southwest portion of the 8.5 SMA protected area, represented by RSM-GL grid cell 2749 (**Figure C.2.1-40**), do not vary under all hydrologic conditions for all the alternatives.

C.2.1.7.13 Biscayne Bay

The CEPP PACR alternatives would have minor beneficial effects on Biscayne Bay. There would be a slight increase in freshwater flows to the bay and Biscayne National Park.

Combined total average annual surface water canal discharges to central and southern Biscayne Bay (G-93, S-22, S-123, S-20F, S-20G, S-21, S-21A) are increased between 4,900 and 5,600 ac-ft for R240 to C360. Average annual surface water canal discharges to northern Biscayne Bay (S-29, S-28, S-27, S26, S25, and S25B), which are affected by the assumed operations of the CERP BCWPA project, are increased by 8,900 ac-ft for R240, 9,900 ac-ft for R360, and 10,300 ac-ft for C360.

C.2.1.7.14 Florida Bay

The CEPP PACR alternatives would have minor beneficial effects on Florida Bay. Combined average annual overland flows from southern ENP to Florida Bay (Transect 23) would be increased by 6,000 ac-ft.

For the CEPP PACR alternatives, average annual surface water transect flows from southeastern ENP towards Florida Bay are not changed for Craighead Basin (RSM-GL Transect 23-A), increased by 2,000 ac-ft (2%) from Taylor Slough (Transect 23-B), and increased by 4,000 ac-ft (3%) for the Eastern Panhandle of ENP (Transect 23-C), resulting in a net increase of approximately 6,000 ac-ft for the alternatives, compared to the FWO. The salinity effects within Florida Bay from this overall increase and changed spatial distribution of flows were minor and limited to the nearshore area. Additional information for the changes observed between the CEPP PACR alternatives and the FWO is discussed in **Appendix G, Environmental Benefits Model**.

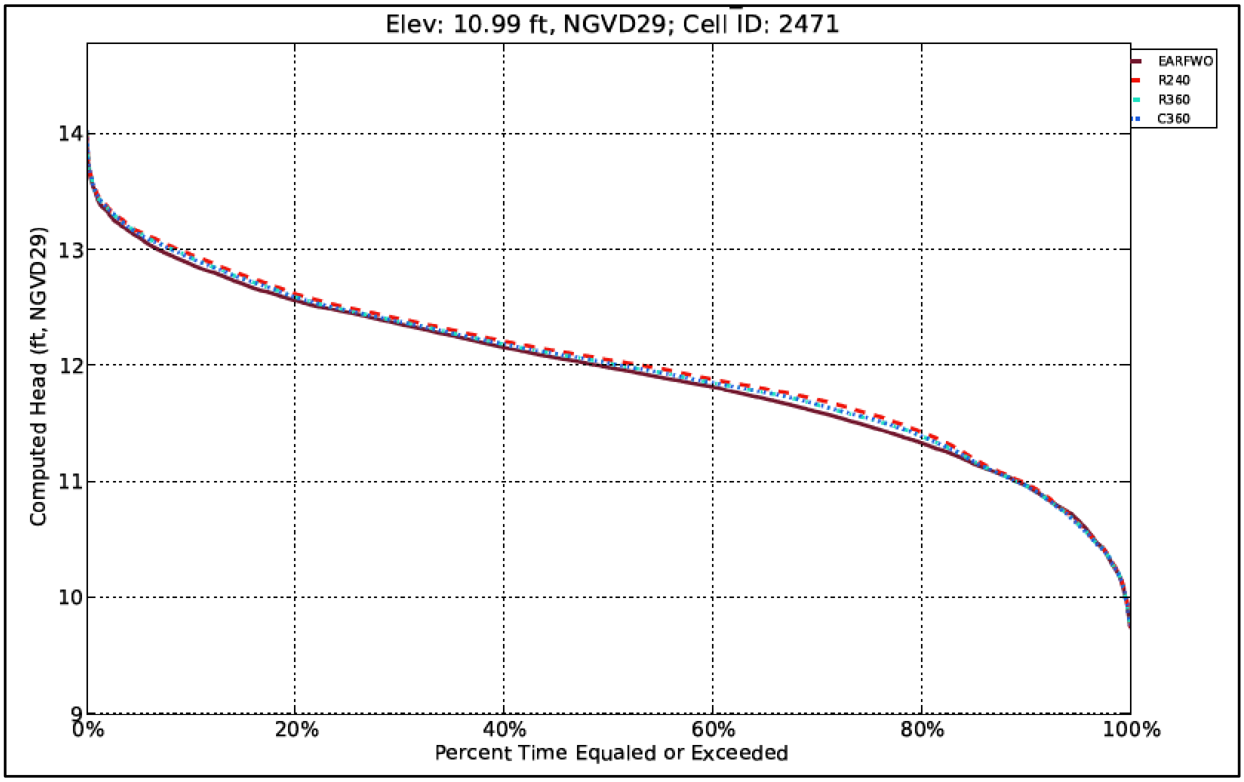


Figure C.2.1-18. Central WCA 2A Stage Duration Curve

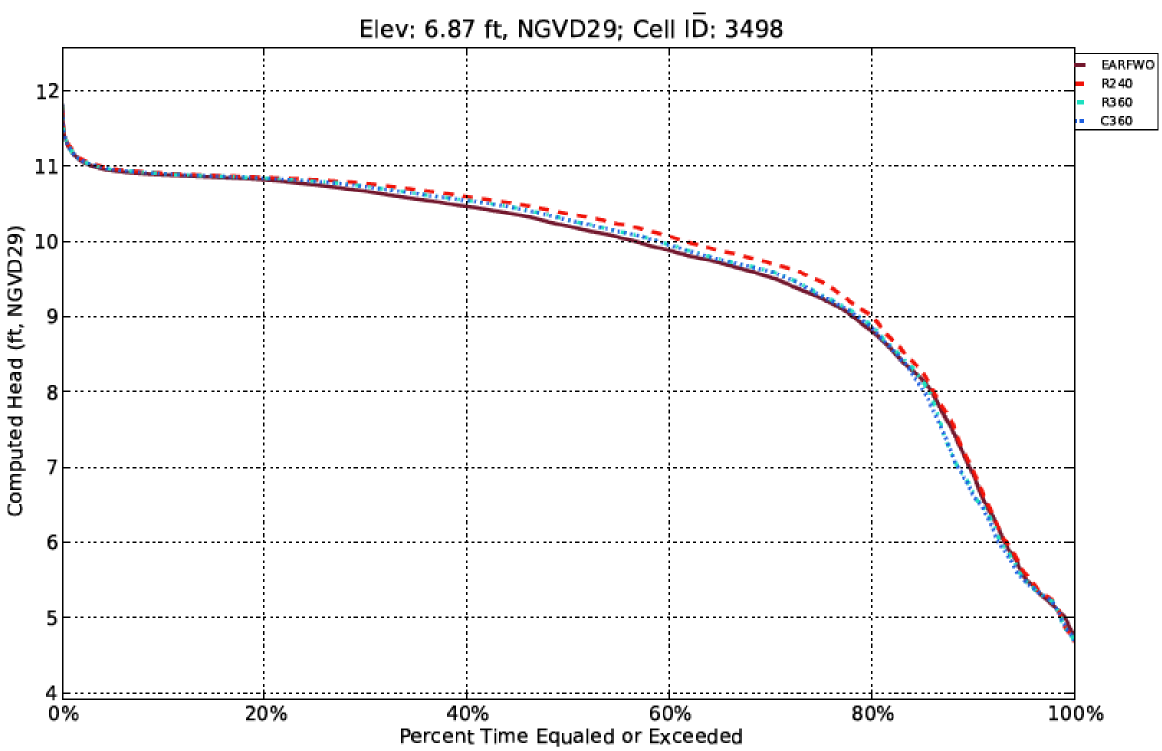


Figure C.2.1-19. Southern WCA 2B Stage Duration Curve

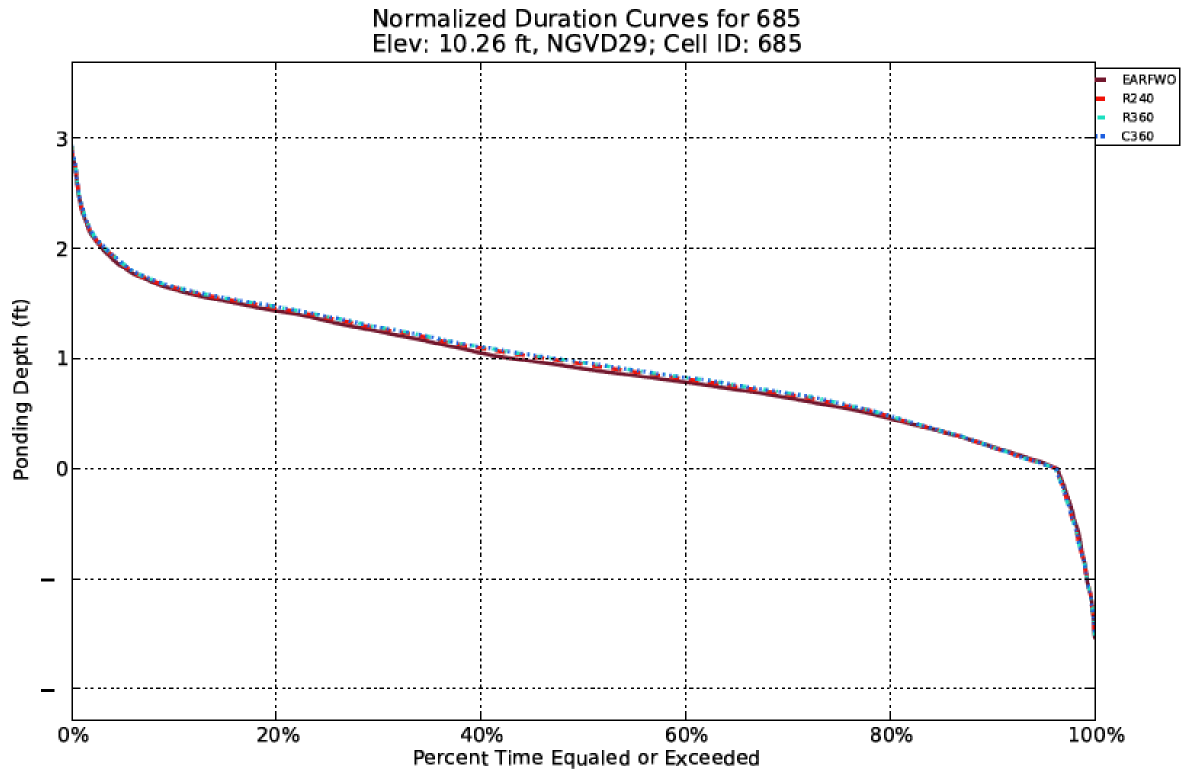


Figure C.2.1-20. L-28 Triangle Stage Duration Curve

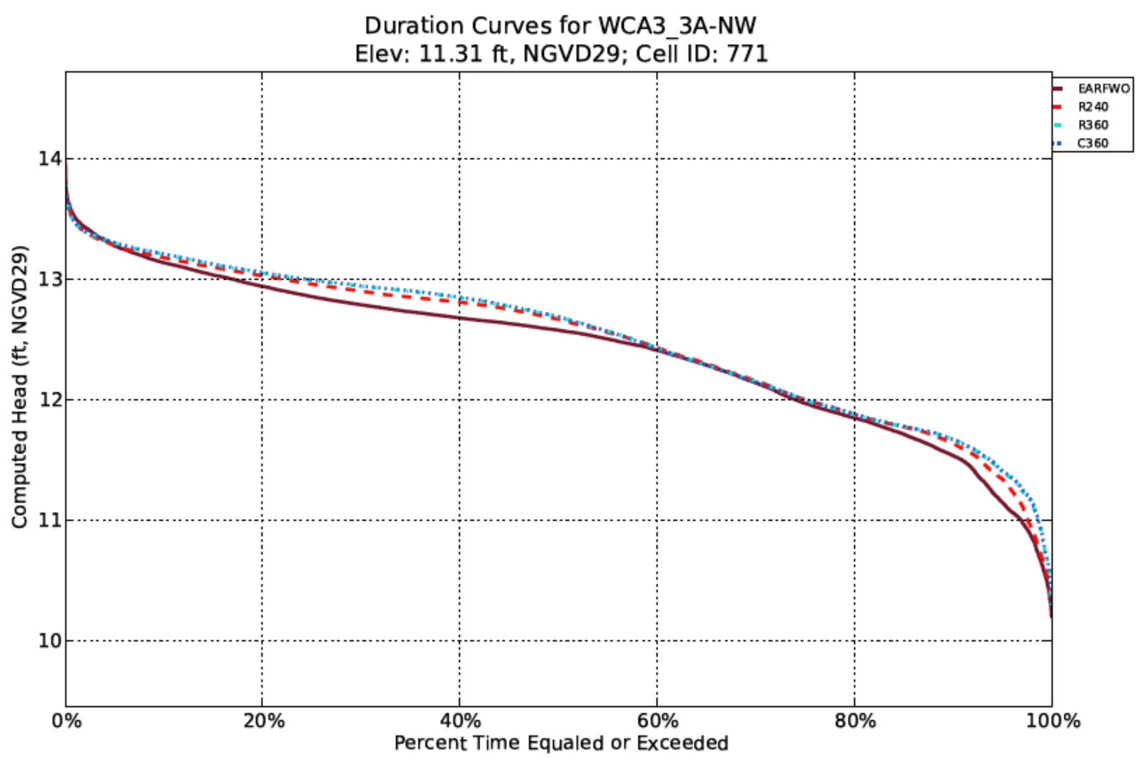


Figure C.2.1-21. Northwest WCA 3A Stage Duration Curve

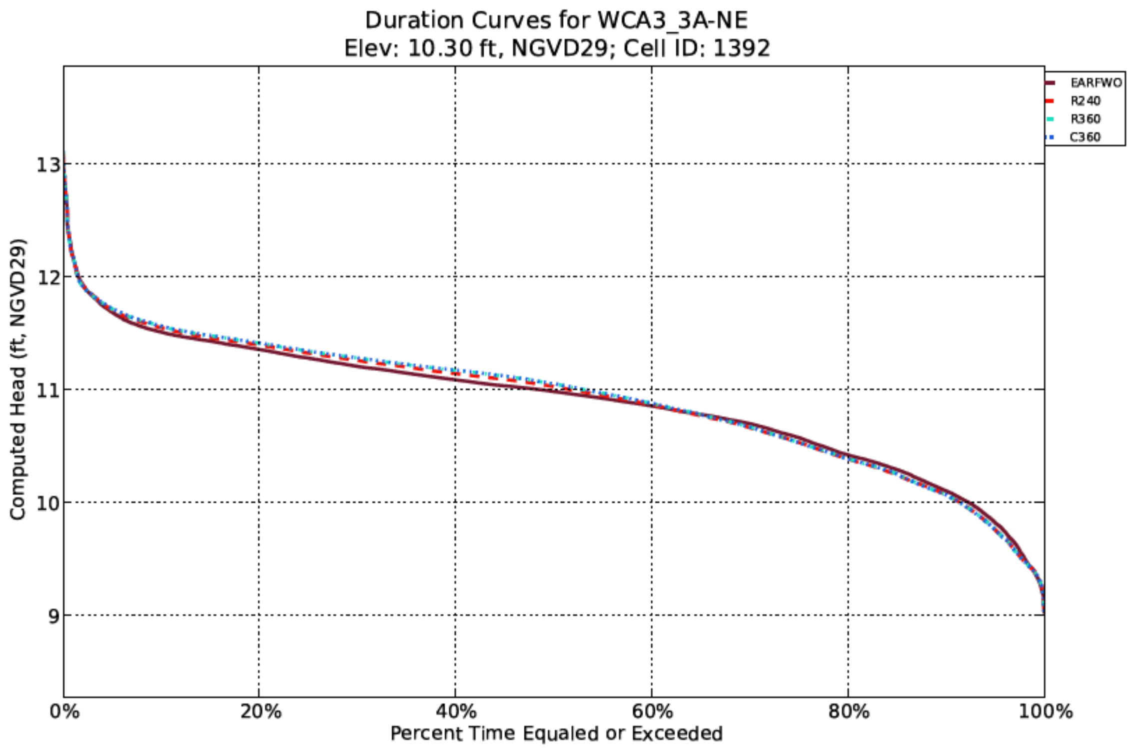


Figure C.2.1-22. Northeast WCA 3A Stage Duration Curve

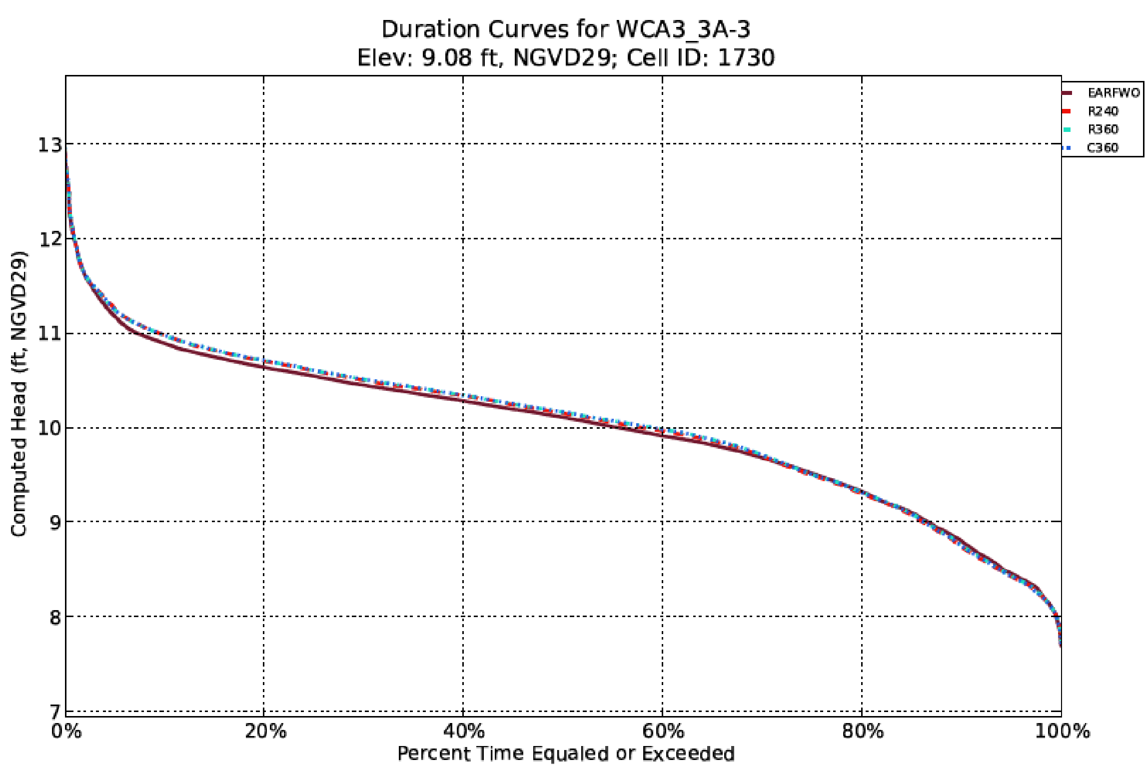


Figure C.2.1-23. East-Central WCA 3A Stage Duration Curve

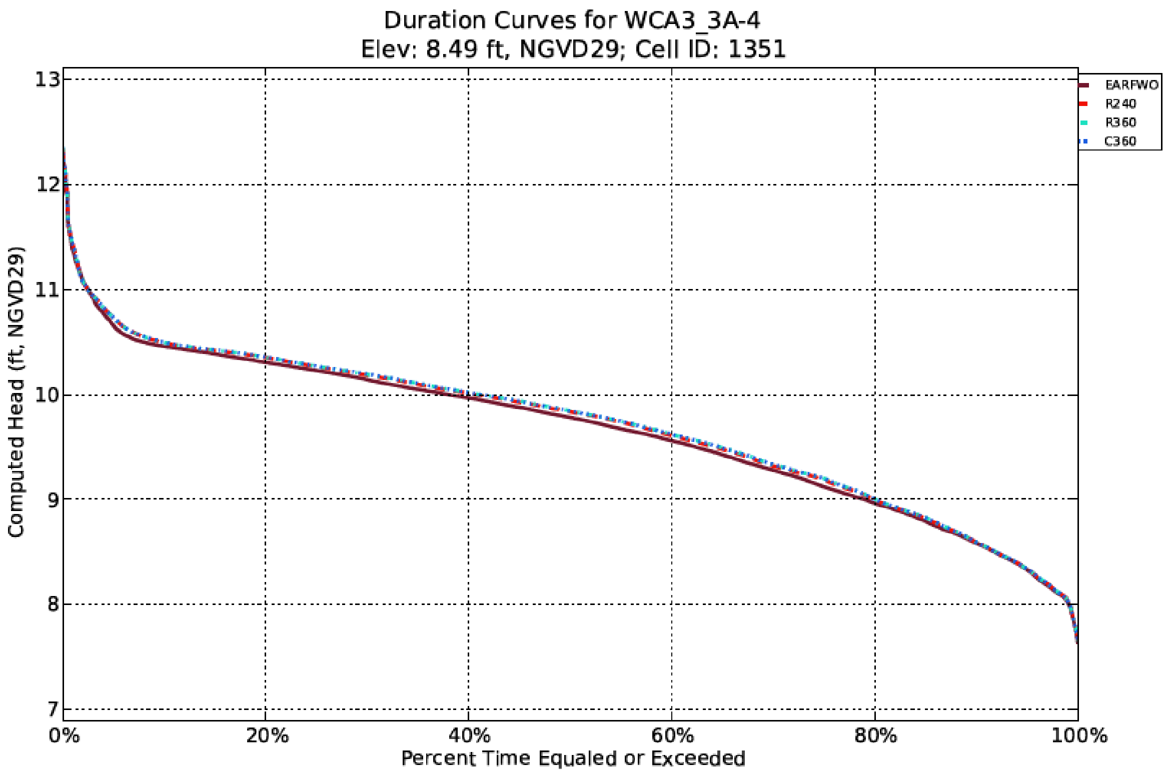


Figure C.2.1-24. Central WCA 3A Stage Duration Curve

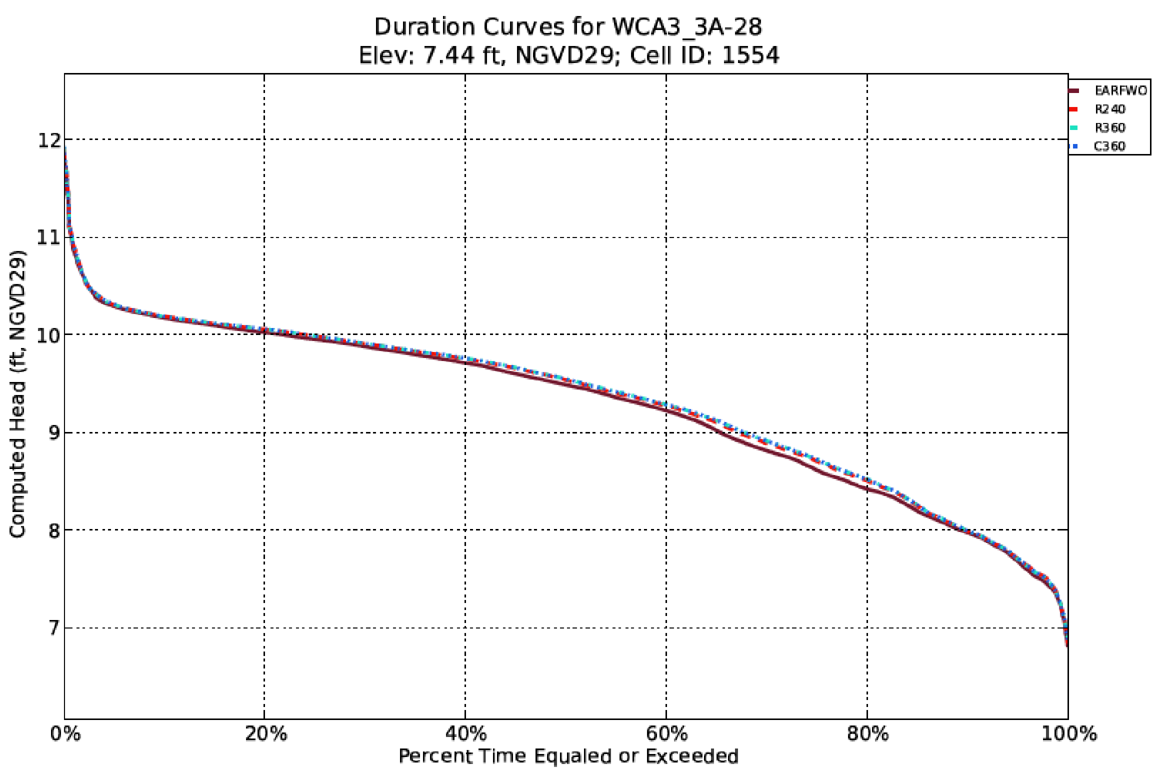


Figure C.2.1-25. Southern WCA 3A Stage Duration Curve

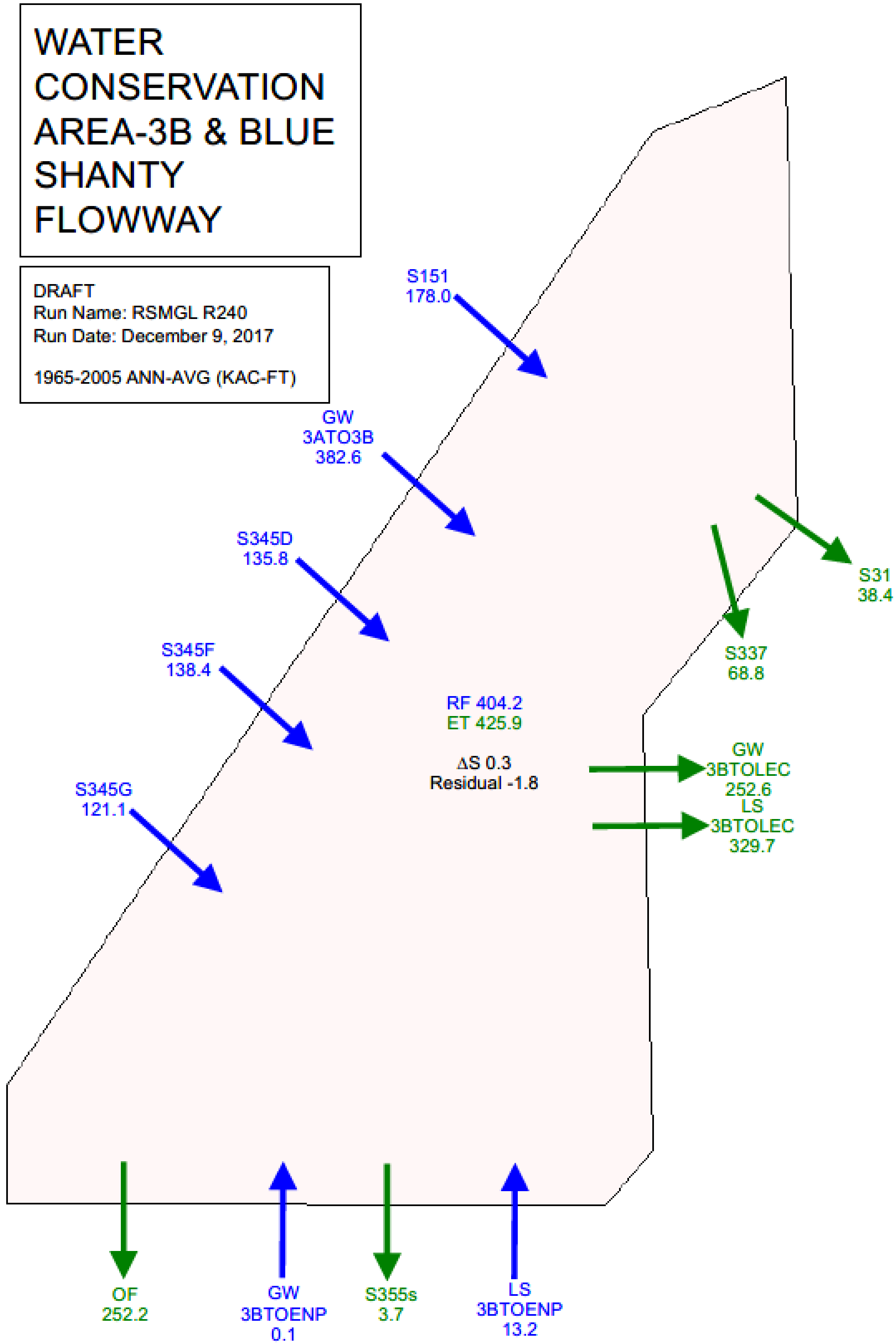


Figure C.2.1-26. WCA 3B Water Budget and Flow Vector Map for R240

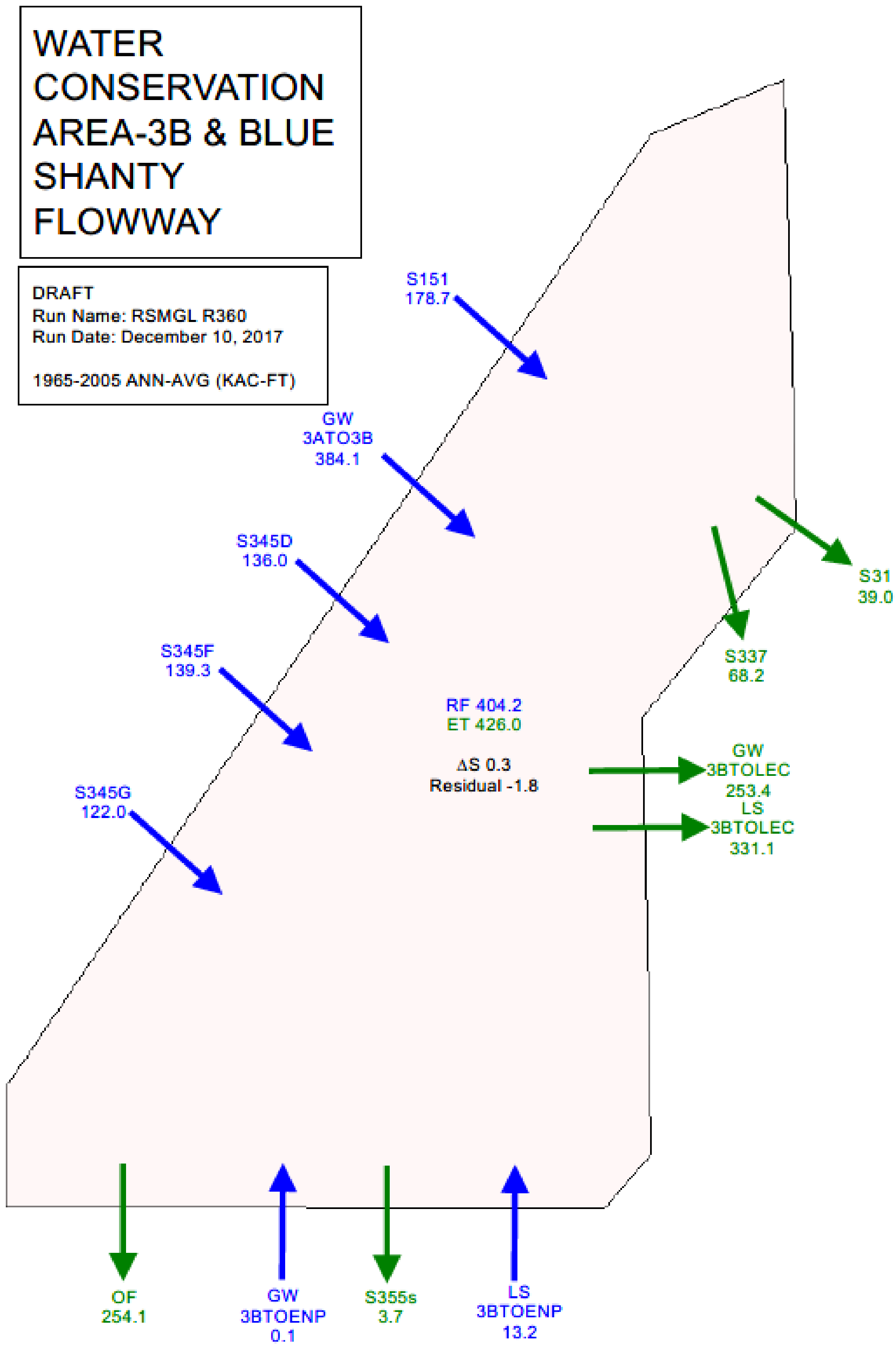


Figure C.2.1-27 WCA 3B Water Budget and Flow Vector Map for R360

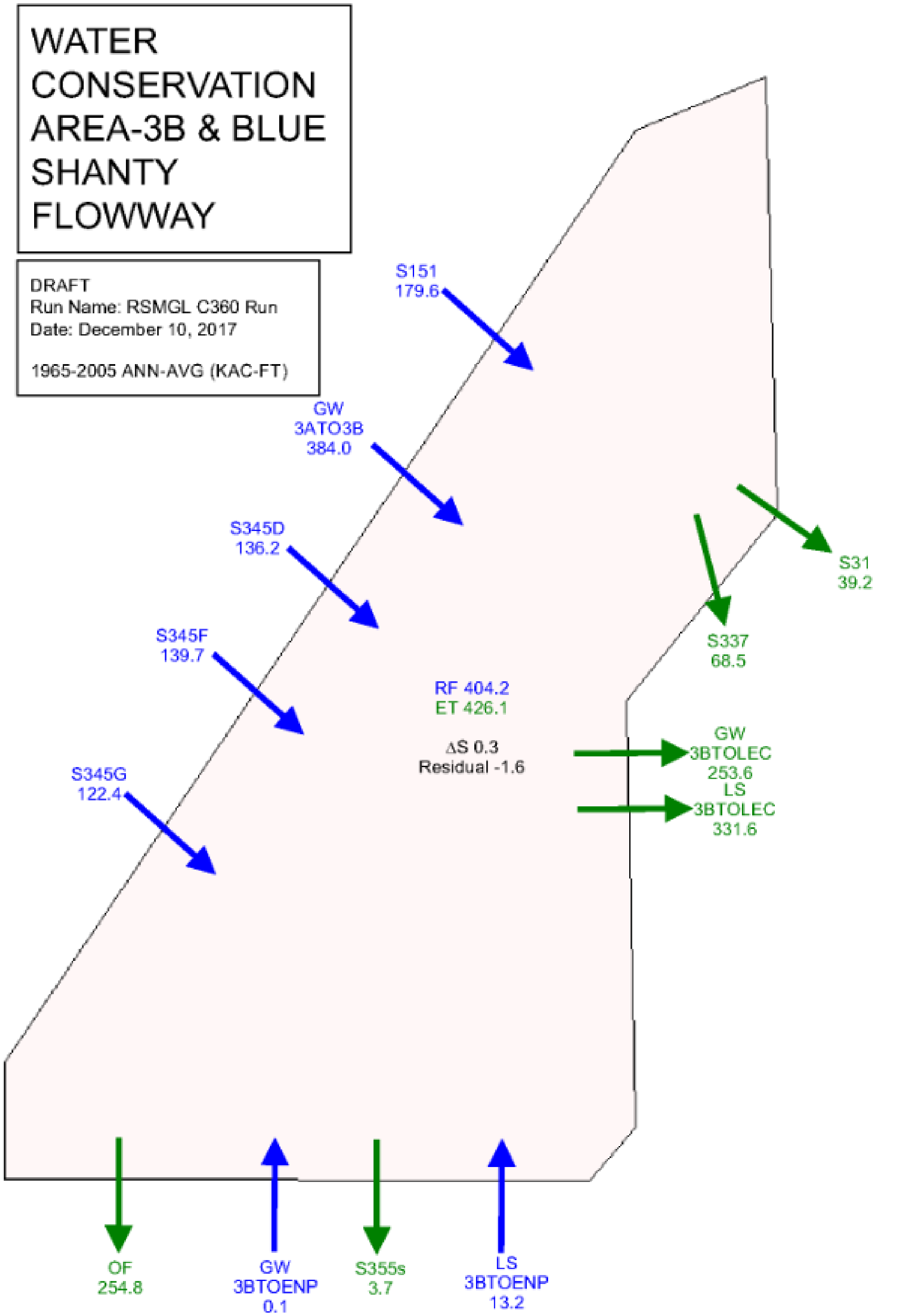


Figure C.2.1-28. WCA 3B Water Budget and Flow Vector Map for C360

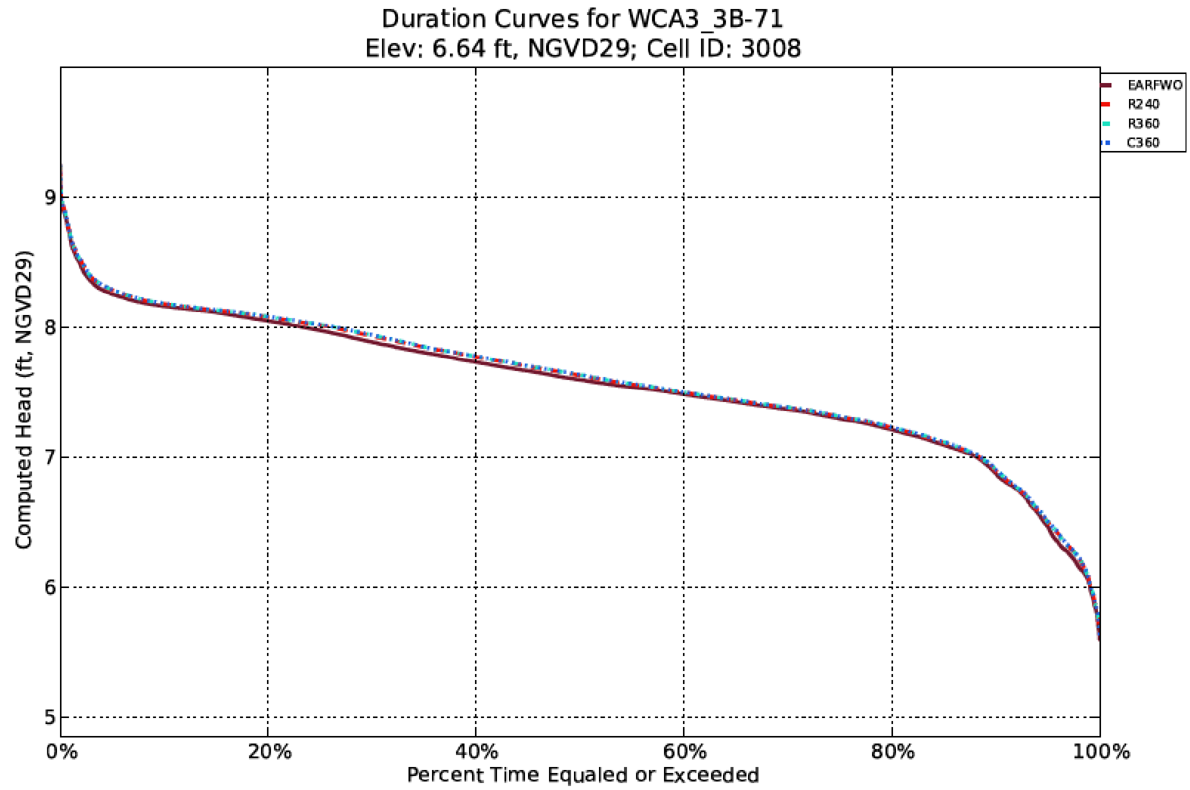


Figure C.2.1-29. Central WCA 3B Stage Duration Curve

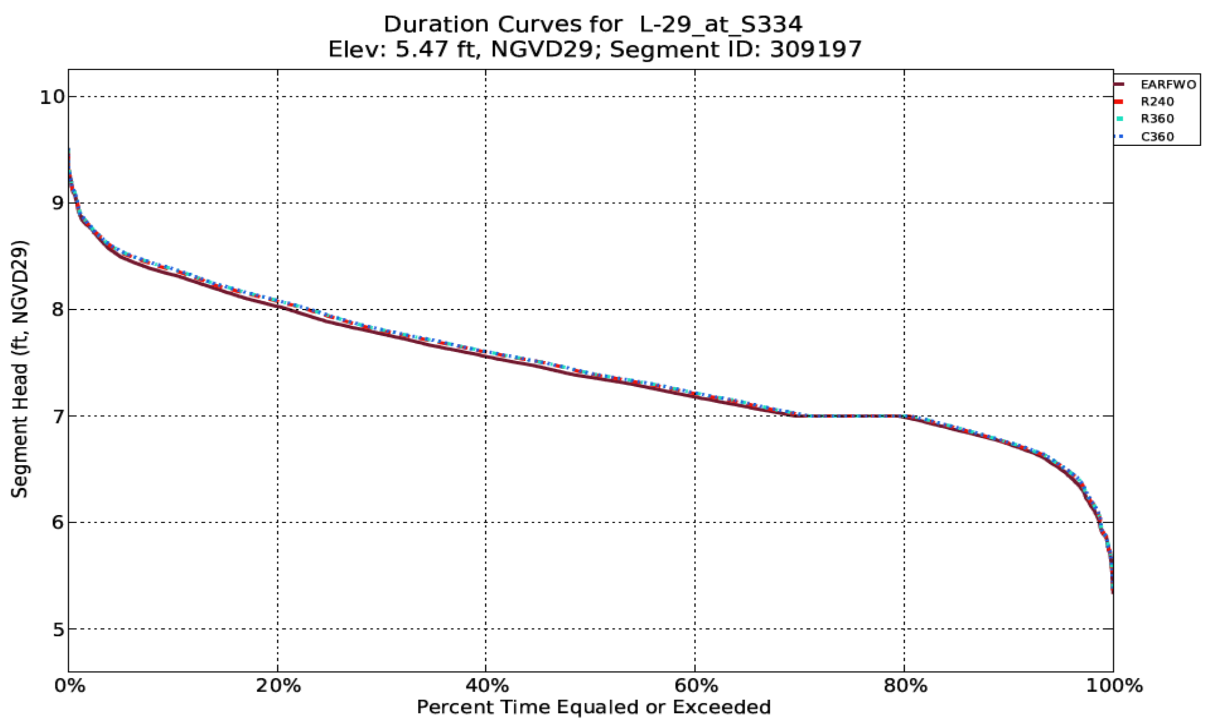


Figure C.2.1-30. L-29 Canal Stage Duration Curve (NESRS1)

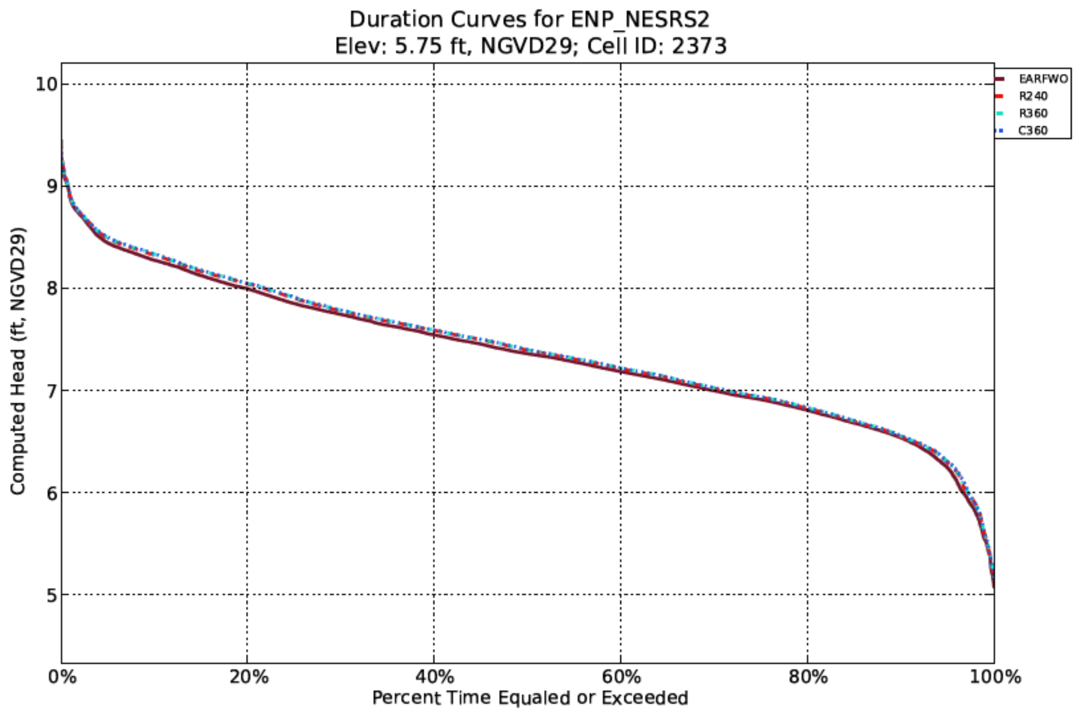


Figure C.2.1-31. Northeast ENP Stage Duration Curve

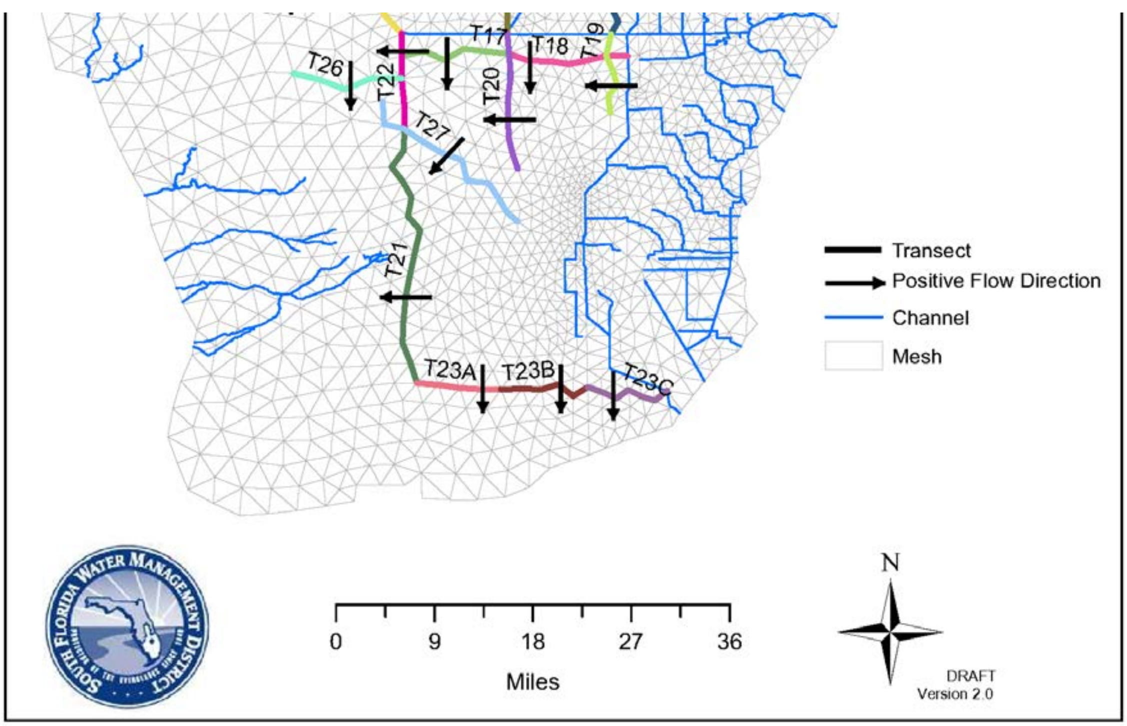


Figure C.2.1-32. RSM-GL Overland Flow Transects for ENP

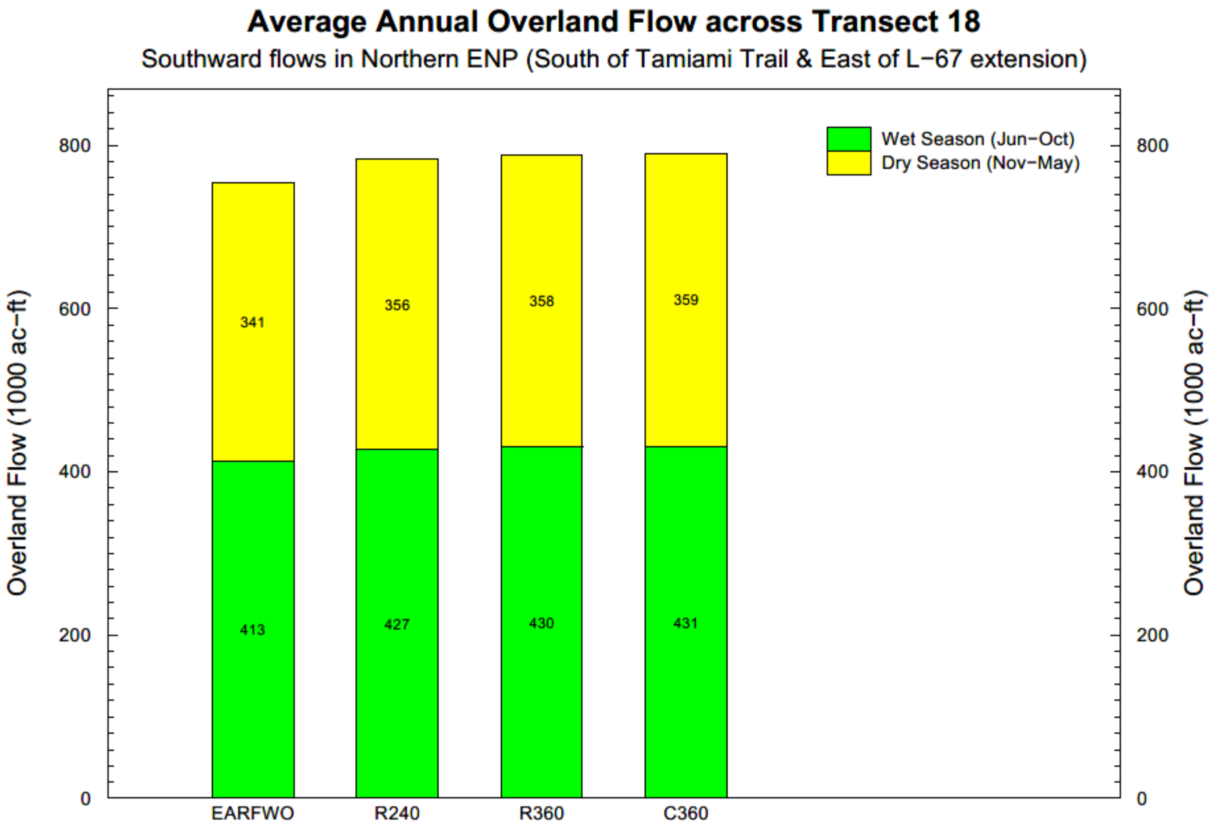


Figure C.2.1-33. Average Annual Overland Flow across Transect 18

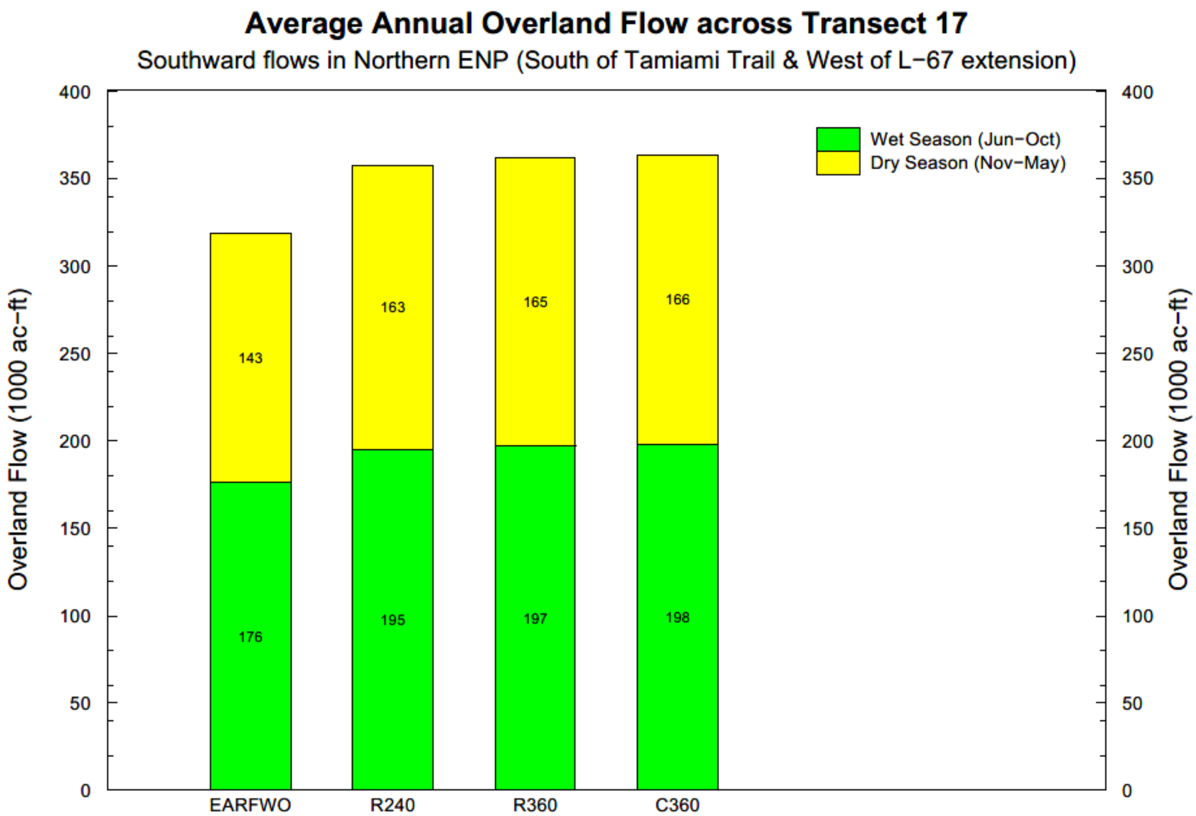


Figure C.2.1-34. Average Annual Overland Flow across Transect 17 to WSRS

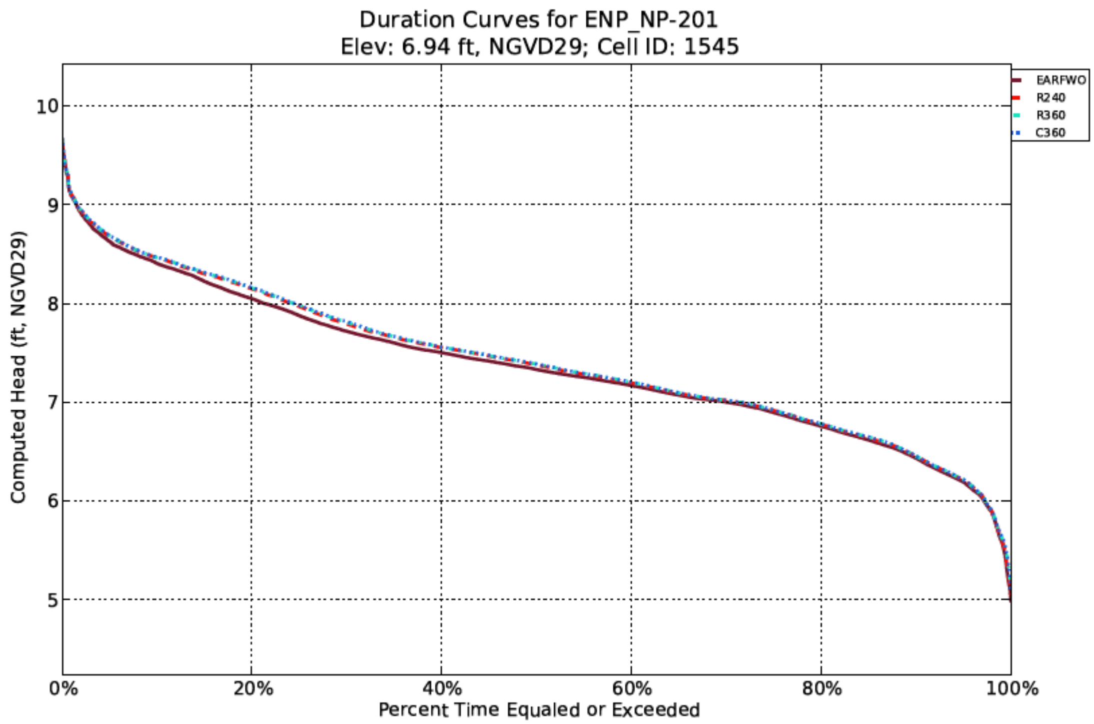


Figure C.2.1-35. Northwest ENP Stage Duration Curve (NP-201)

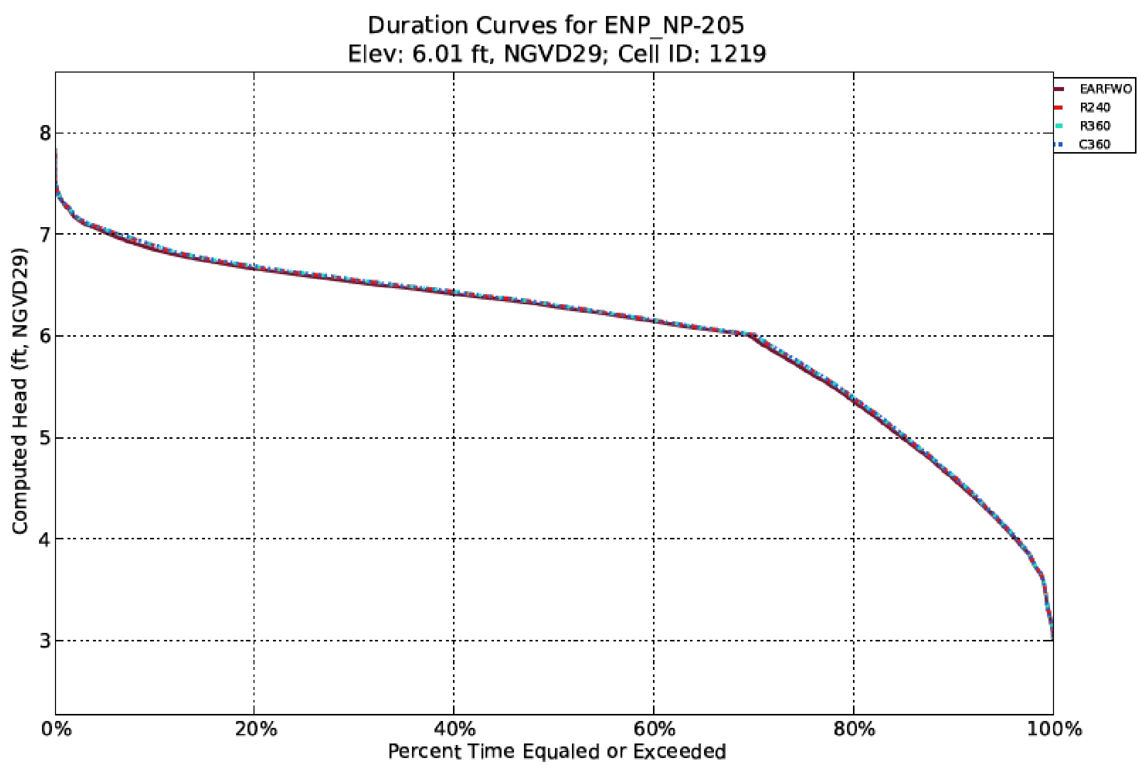


Figure C.2.1-36. Northwest ENP Stage Duration Curve (NP-205)

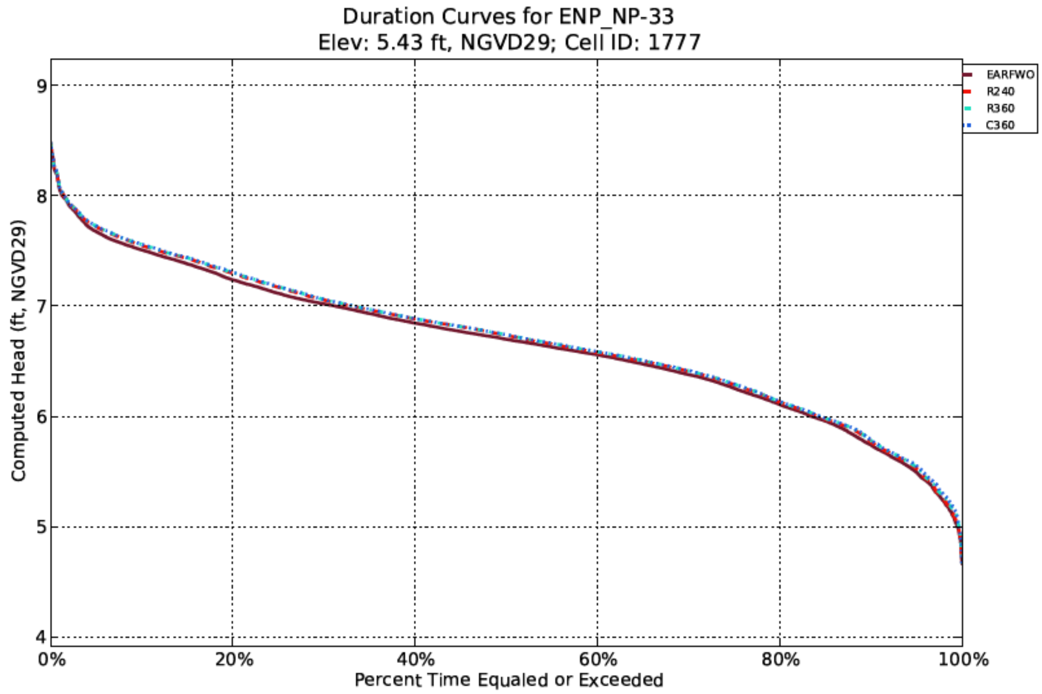


Figure C.2.1-37. Central ENP Stage Duration Curve

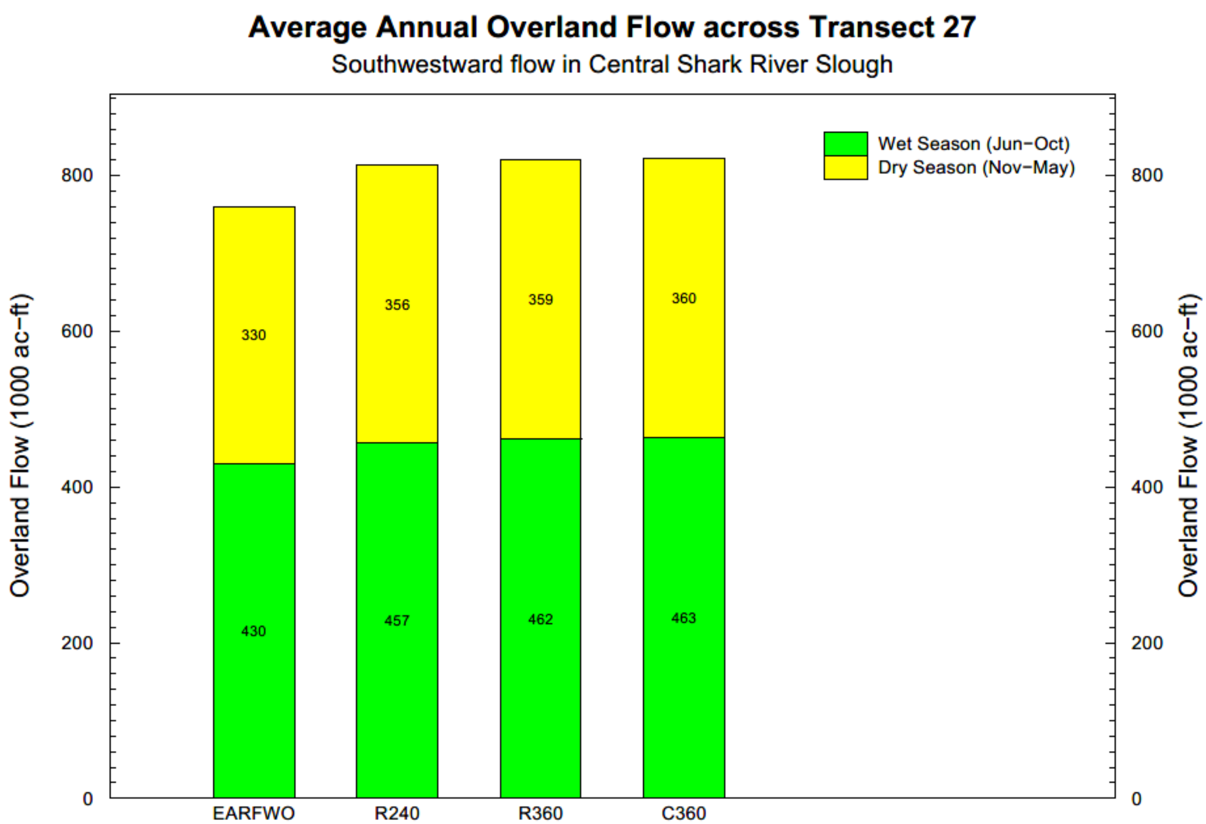


Figure C.2.1-38. Average Annual Overland Flow through Transect 27 for Central Shark River Slough

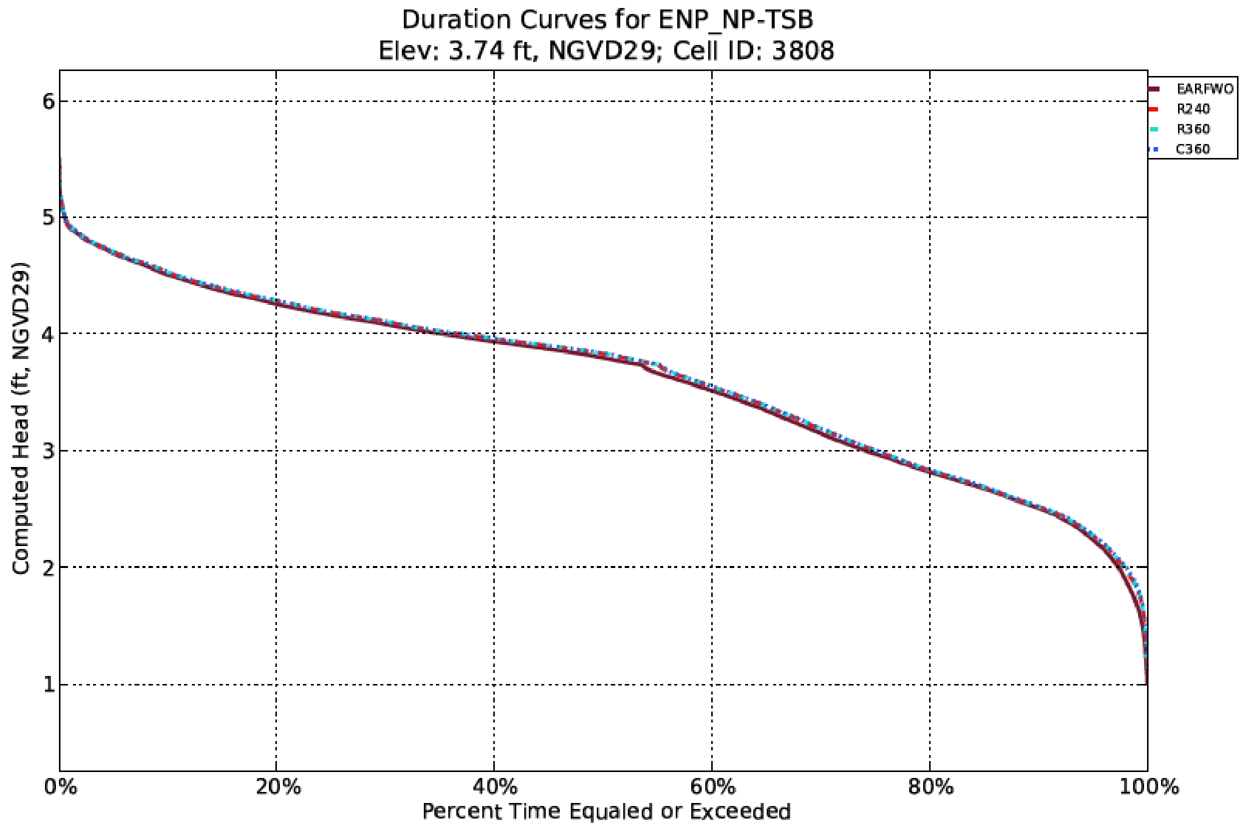


Figure C.2.1-39. ENP Taylor Slough Stage Duration Curve

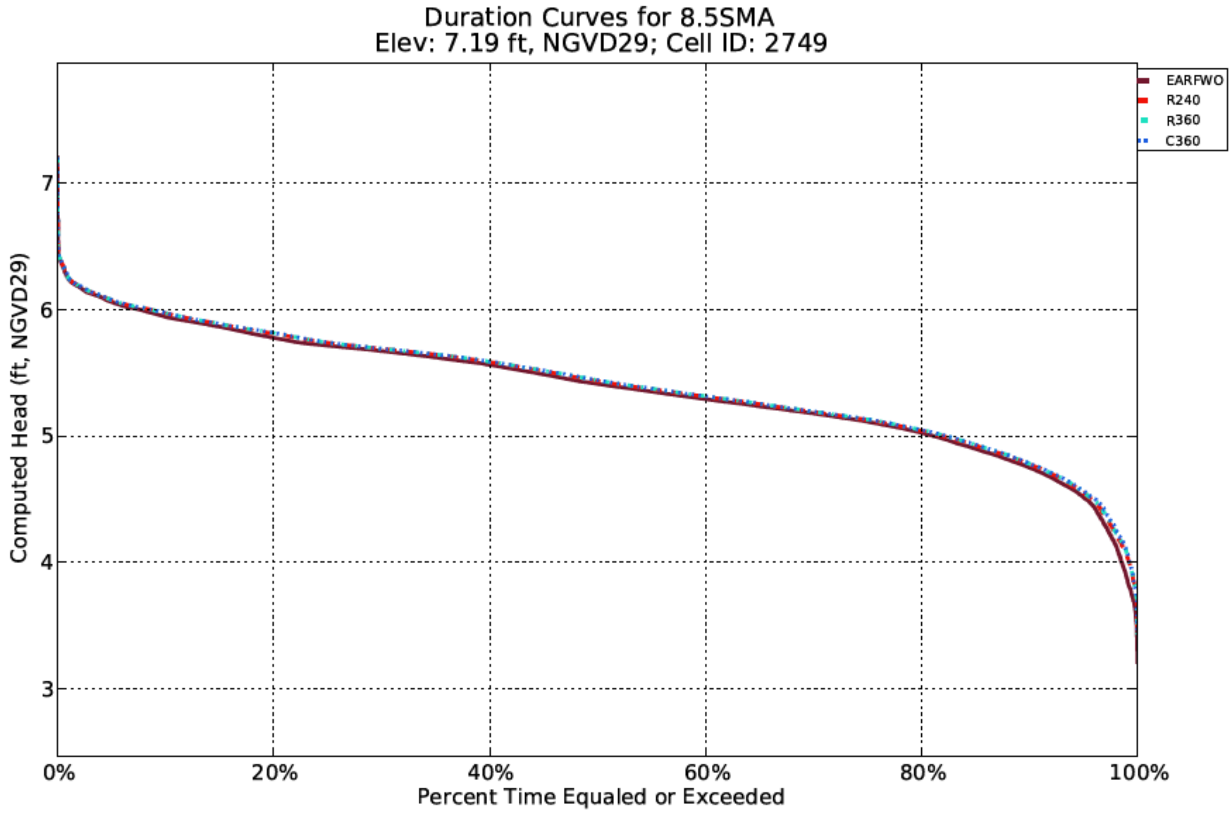


Figure C.2.1-40. Stage Duration Curve for Southwest 8.5 SMA

C.2.1.8 Water Supply and Flood Control

Based on the period of simulation analysis for the CEPP PACR alternatives, the project modifications maintain the pre-project levels of service for flood control and water supply consistent with the requirements of the WRDA 2000 and Chapter 373.1501.

Consistent with the Savings Clause requirements for CERP, each CERP project included in the FWO (IRLS Project, Picayune Strand Restoration Project, Site 1 Impoundment Project, Biscayne Bay Coastal Wetlands Project, Broward County Water Preserve Areas Project, Caloosahatchee River (C-43) West Basin Storage Reservoir, C-111 Spreader Canal Western Project) must independently demonstrate in the respective PIRs that implementation of these CERP projects would not adversely impact the existing legal sources for water supply or the levels of service for flood protection. Operations protocols for the first and second generation CERP projects were modeled in the FWO consistent with the draft Project Operating Manuals, as documented in the respective PIRs. Operations and components of the previously listed CERP projects are retained in the CEPP PACR array of alternatives, and the inclusion of the components is therefore implicit to the analyses within this section.

To address the Savings Clause requirements for CERP, the CEPP PACR includes a detailed and comprehensive analysis of potential effects of the TSP described in Section C.2.2, where applicable, to existing legal sources for water supply and/or the levels of service for flood protection (refer to CEPP PACR **Annex B** for the complete analysis and to CEPP PACR **Section 6.9** of the main report for summary information). The general hydrologic overview of water supply and flood control performance of the alternatives in this section is separate and distinct from the content of the Savings Clause analysis contained in the CEPP PACR **Annex B** and **Section 6.9**. Areas within the project area that are not specifically discussed in this section may be presumed to have no changes to water supply or flood control from the FWO.

C.2.1.8.1 Lake Okeechobee

A minor improvement would result from each of the CEPP PACR alternatives. Compared to the FWO, mean annual EAA water supply demands not met would be decreased from 6% to 4%. The LOSA water supply cutback percentage would decrease from 4% to 3%. The LOSA water supply cutback severity, magnitude, and duration would improve when compared to the FWO for all 8 worst years in the period of record (POR).

Consistent with the FWO, Lake Okeechobee operational assumptions applied consistently for the modeling of alternatives include changes to the decision tree outcome maximum allowable discharges dependent on Lake Okeechobee inflow forecasts, time of year (wet season or dry season), stage level (regulation zone), and/or stage trends (receding or ascending). These changes are all occur within the flexibility of LORS 2008 (Regulation Schedule zones unchanged), for the purpose of increasing potential benefits. Other refinements were made outside the operational flexibility available in the 2008 LORS and the operational assumptions ultimately extended beyond this flexibility due to adjustments made to the tributary/climatological classifications. LORS 2008 Regulation Schedule zones were unchanged.

Based on modeling assumptions and the resulting similar stage increases within Lake Okeechobee in the alternatives compared to the FWO, the average annual percentage of water supply demand not met is projected to decrease for the EAA and the remainder of the LOSA (**Figure C.2.1-41**). For the eight years with the largest water supply cutbacks within the LOSA, the water supply cutback percentage is reduced in all eight years, compared to the FWO (**Figure C.2.1-42**).

The FWO indicates a slight stage increase of the stage duration curve within the EAA. Using "Standard Score" weighting from CEPP, Lake Okeechobee performance is similar between FWO and the alternatives. Alt C360C shows slightly higher Lake Okeechobee stages over the FWO and other alternatives except for stages between 15.6 and 15.0 ft NGVD (**Figure C.2.1-43)**.

Different RSM-BN simulations were completed for all the CEPP PACR alternatives. Peak stages are summarized as follows: 17.59 ft NGVD for the ECB; 17.66 ft NGVD for the FWO; and 18.29, 18.07, and 18.12 ft NGVD for the alternatives R240, R360, and C360C, respectively. The alternatives all show simulated stages above 17.25 ft NGVD: 11 days for the ECB; 29 days for the FWO; and 81, 67, and 71 days for alternatives R240, R360, and C360C, respectively. The LORS 2008 EIS assessment recognized that minimizing the frequency of exceedance of the 17.25-ft elevation offers additional protection for public safety and the Herbert Hoover Dike (HHD), for the condition prior to completion of the current approved and planned HHD remediation measures, and this criterion was evaluated as a LORS project performance measure. Extreme high lake stages have also been documented to adversely impact the plant and animal communities, through processes which include the following: physical uprooting of emergent and submerged plants; reduced light levels in the water column due to increased suspended sediment; and littoral zone exposure to increased nutrient levels from the water column. The number of days with stages above 16 ft NGVD is increased from 1,163 for the FWO to 1,224, 1,197, and 1,203 for alternatives R240, R360, and C360C, respectively, during the 1965-2005 period of simulation.

Following completion of the HHD remediation to which under certain conditions higher maximum lake stages and increased frequency and duration of high lake stages would be accepted, if at all, will be contingent on the conclusions identified in the USACE 2014 Dam Safety Modification Report (DSMR) for the HHD. Any changes to the Lake Okeechobee Regulation Schedule would be analyzed and coordinated with the public through the NEPA process.

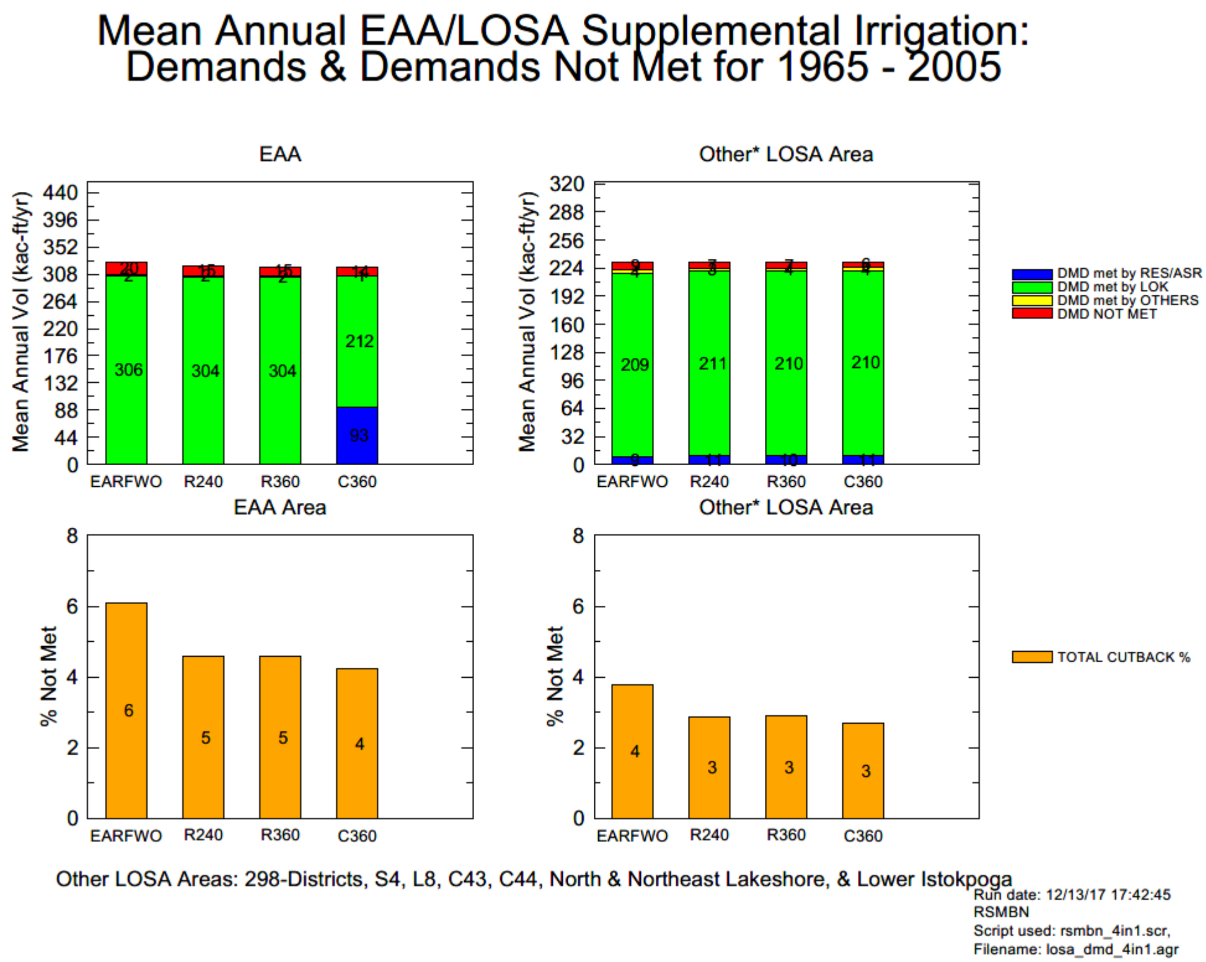


Figure C.2.1-41. EAA and LOSA Water Supply Performance

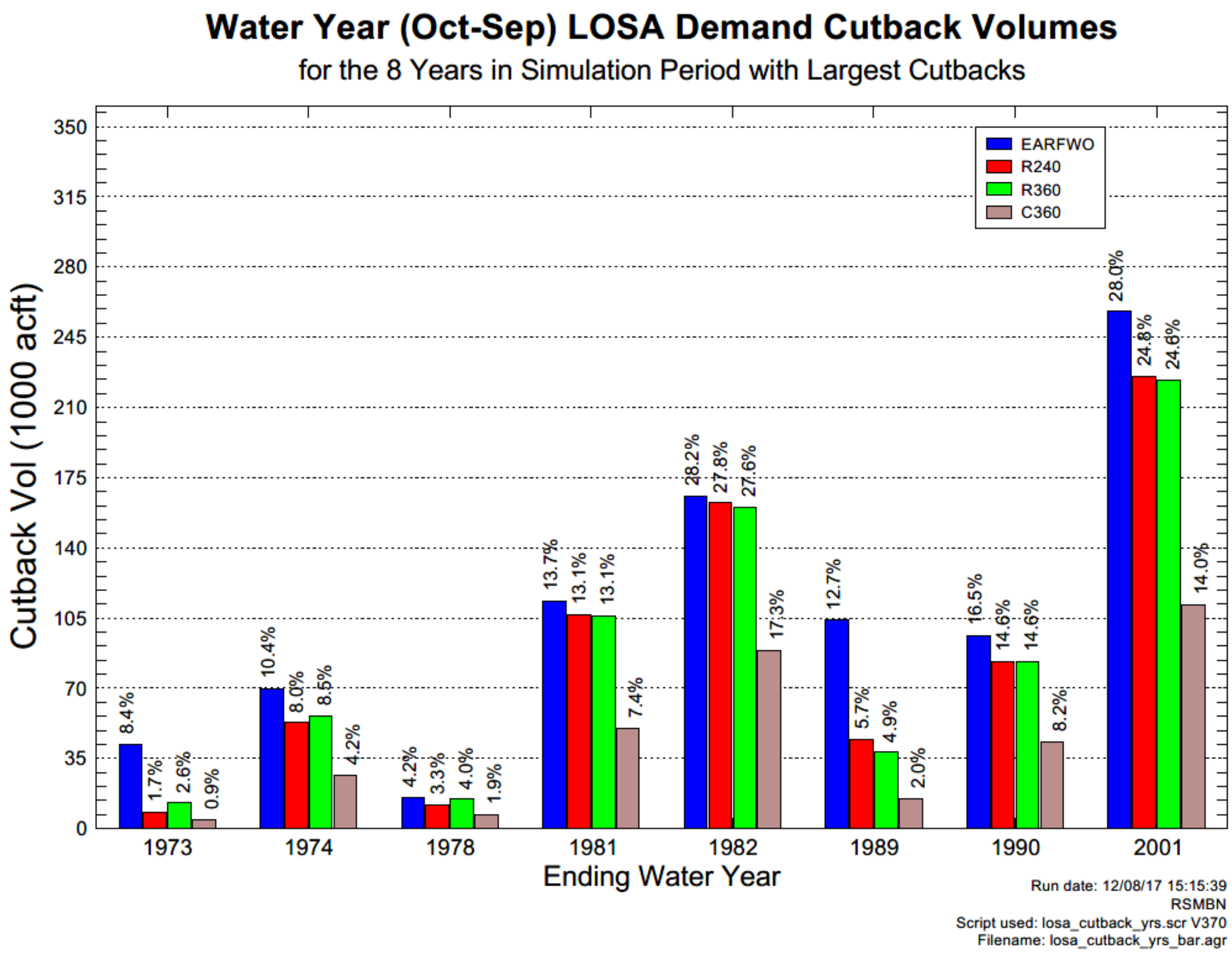


Figure C.2.1-42. LOSA Water Supply Performance for the Eight Largest Cutback Years

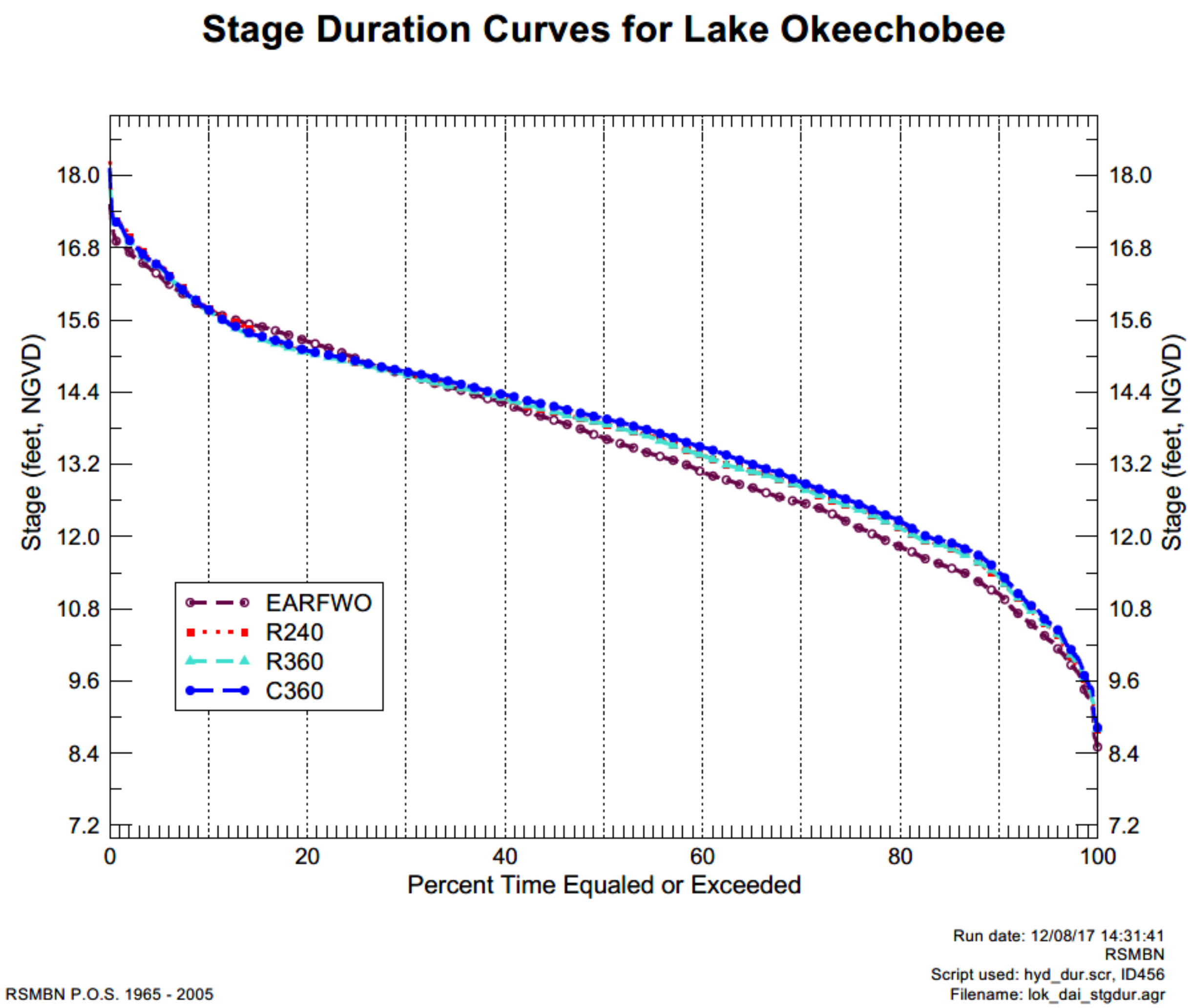


Figure C.2.1-43. Lake Okeechobee Stage Duration Curves

C.2.1.8.2 Seminole Tribe of Florida

Based on CEPP PACR alternative modeling assumptions regarding Lake Okeechobee operational flexibility and the resulting moderate stage increase within Lake Okeechobee, the percentage of water supply demand not met for the Brighton Reservation is shown to slightly decrease by approximately 0.7% compared to the FWO (**Figure C.2.1-44**). The percentage of water supply demand not met for the Big Cypress Reservation is shown to be slightly reduced by approximately 0.6% (**Figure C.2.1-45**). The Seminole Tribe of Florida has surface water entitlement rights pursuant to the 1987 Water Rights Compact and subsequent entitlement provisions executed between the Seminole Tribe of Florida, the State of Florida, and the SFWMD. Impacts are not expected for the alternatives based on the hydrologic modeling.

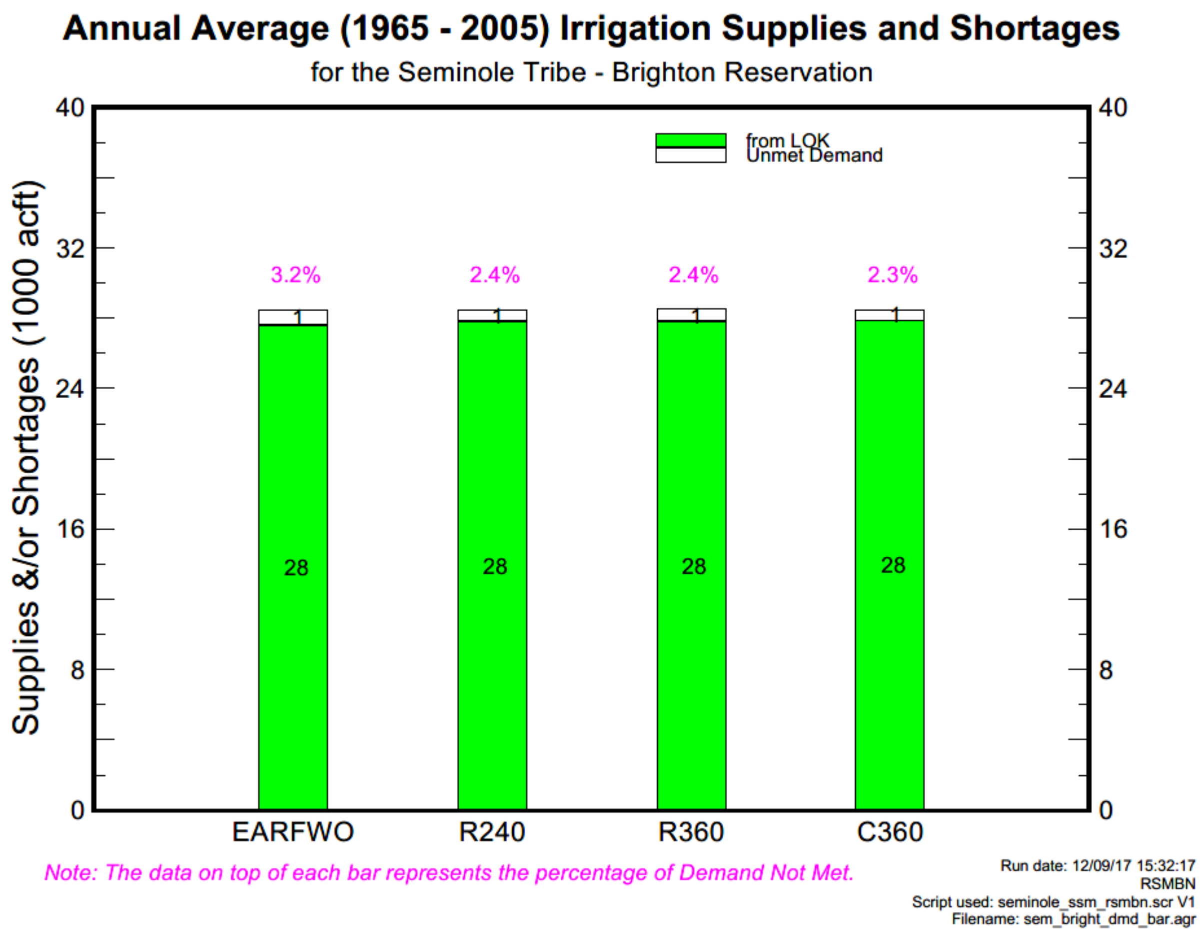


Figure C.2.1-44. Water Supply Demand for Seminole Tribe of Florida's Brighton Reservation

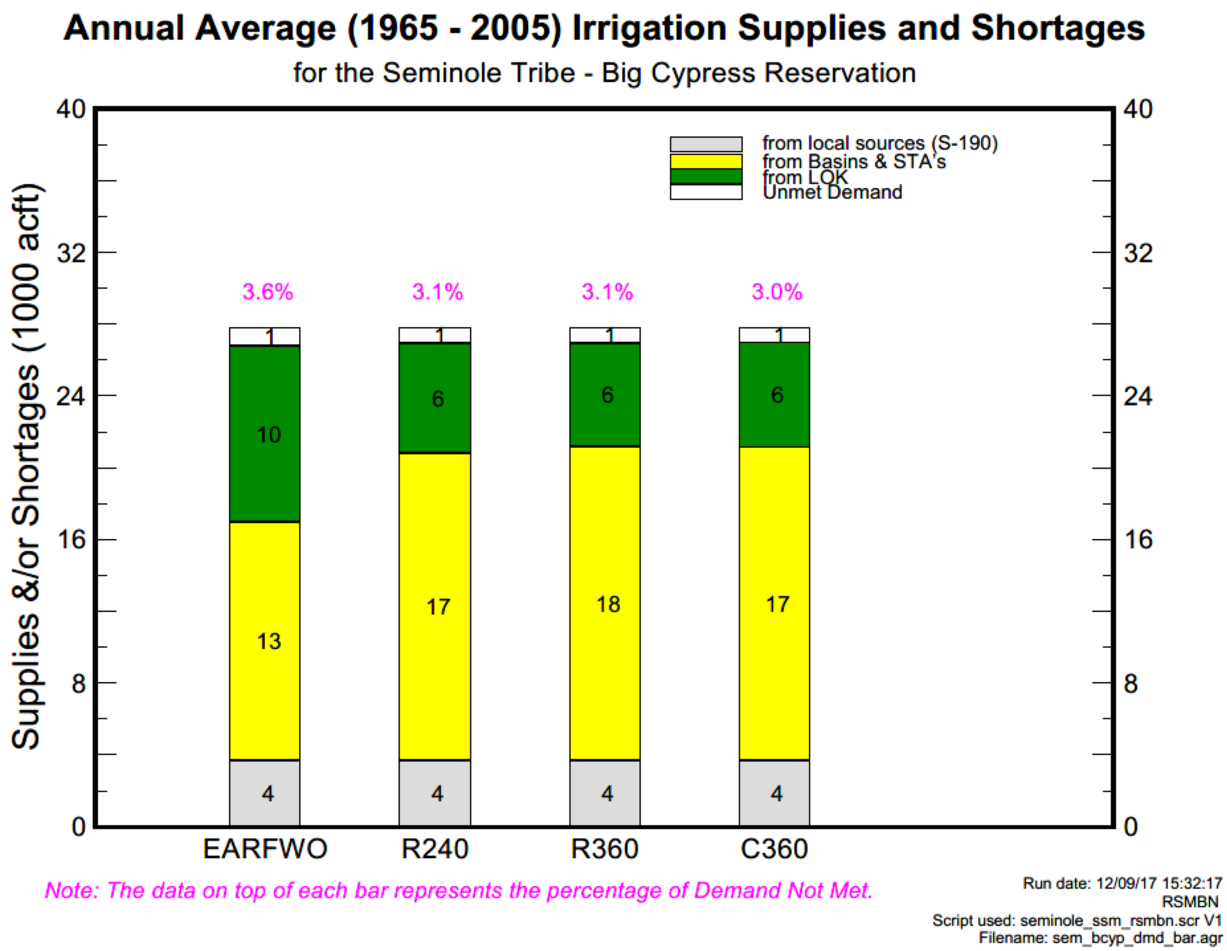


Figure C.2.1-45. Water Supply Demand for Seminole Tribe of Florida's Big Cypress Reservation

C.2.1.8.3 Lower East Coast Service Areas

For LECSA 2, there would be no change from the FWO. For LECSA 3, there would be no change from the FWO for water supply and negligible effects on flood control. Modeling of alternatives illustrates negligible changes between the FWO and alternatives in the Lower East Coast Service Areas (LECSA). No significant reductions to regional groundwater stages during dry conditions (assumed as a surrogate for water supply conditions for this discussion) for the LECSA could be expected, as compared to the FWO project condition. Changes to the L-30 Canal, L-31N Canal, and C-111 Canal stages are generally negligible (**Figure C.2.1-46, Figure C.2.1-47, and Figure C.2.1-48**, respectively).

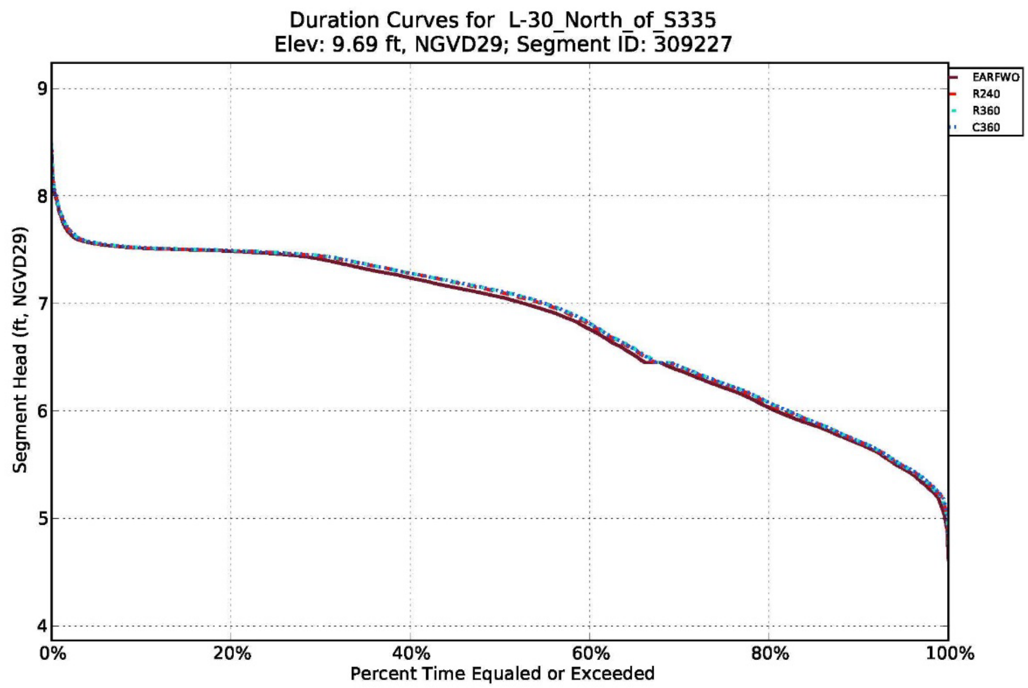


Figure C.2.1-46. Stage Duration Curve for L-30 Canal in LECSA 3

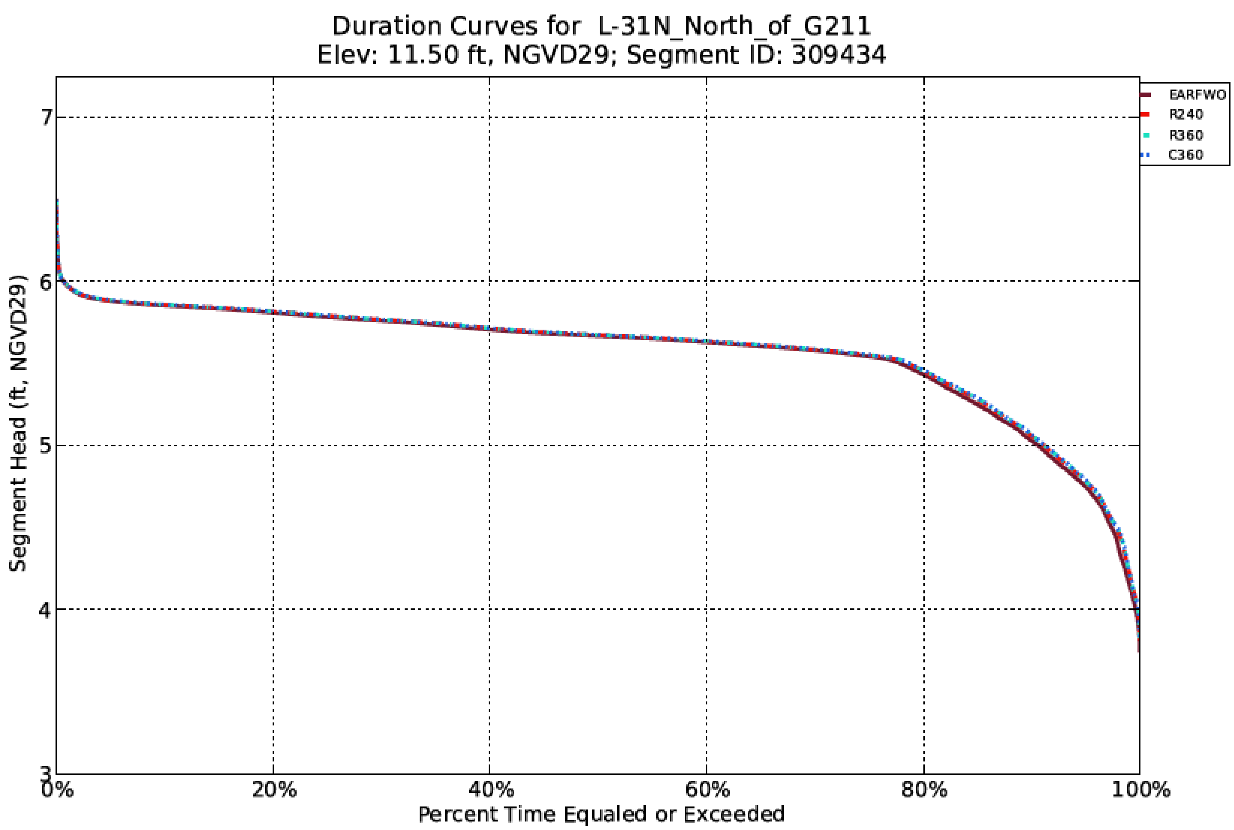


Figure C.2.1-47. Stage Duration Curve for L-31N Canal in LECSA 3

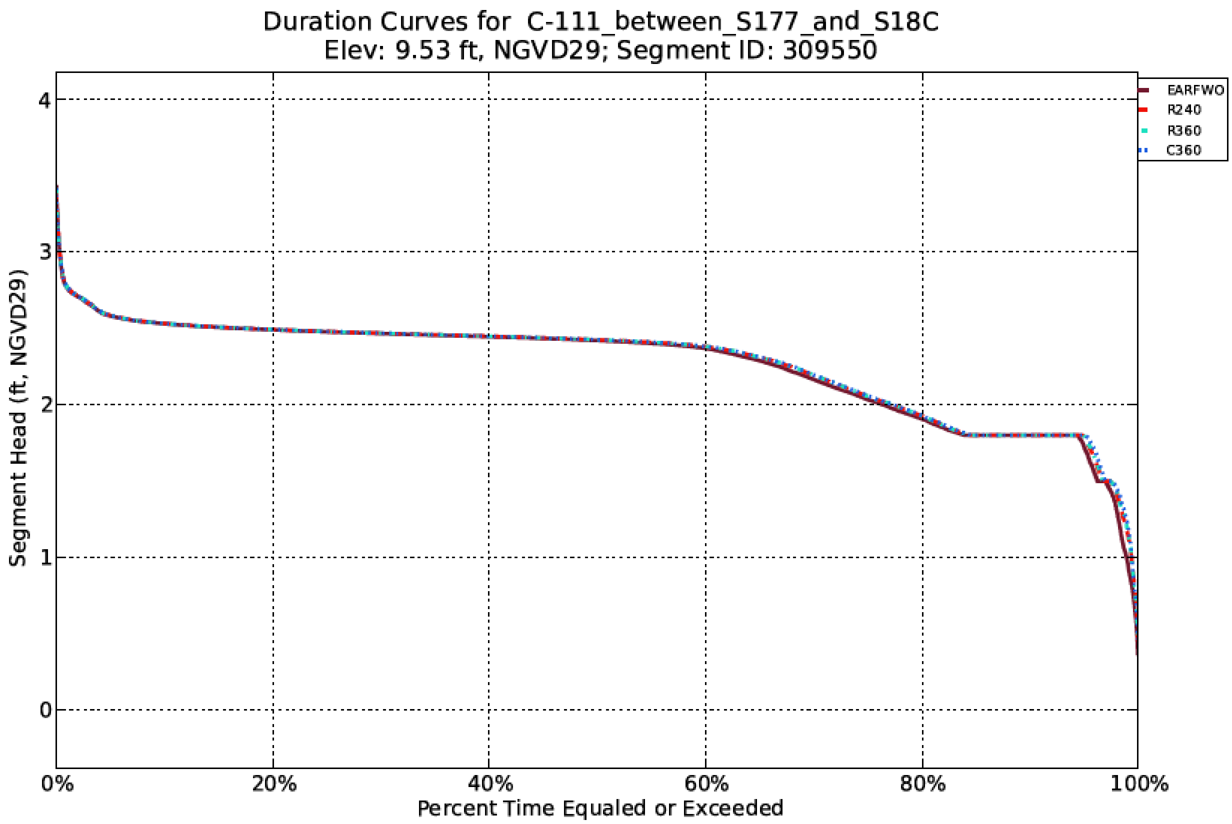


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Figure C.2.1-48. Stage Duration Curve for C-111 Canal in LECSA 3

C.2.1.9 Water Quality

C.2.1.9.1 Lake Okeechobee

Relative to the FWO, no effect to lake water quality would be expected from the CEPP PACR alternatives.

Relative to the FWO project, the with-project alternatives are not likely to result in improvement in Lake Okeechobee water quality, since changes in stage under either alternative would be minimal. Additionally, nutrient loading conditions are not expected to differ between the with- and without-project conditions. All with-project alternatives are expected to result in the same water quality conditions since lake operations are nearly the same for all of them. As discussed in the existing conditions section for Lake Okeechobee, there is an existing TMDL for phosphorus. This TMDL requires a reduction in annual phosphorus loading from more than 500 metric tons per year to 140 metric tons per year. The allocation of TMDL phosphorus loads will be addressed through revisions to the Lake Okeechobee Basin Management Action Plan. Specifically, the FDEP developed a BMAP for Lake Okeechobee in 2014 pursuant to Section 403.067, Florida Statutes.

C.2.1.9.2 Northern Estuaries

Under all CEPP PACR alternatives, minor beneficial effects to salinity, color, turbidity, nutrient, and dissolved oxygen conditions would be improved over existing conditions because of the reduced number of high-flow events from Lake Okeechobee. Relative to the FWO, the number of high-flow events for the

Caloosahatchee and St. Lucie estuaries would be reduced. The number of low-flow events would increase slightly in both estuaries but could potentially be managed with improved operations of local basin reservoirs such as C-43, the C-23/24, and C-44 reservoirs, and Lakeside Ranch STA, Taylor Creek STA, and Nubbin Slough STA.

Caloosahatchee Estuary: Improved salinity conditions within this estuary as a result of a reduction in the number of high flow events as characterized by flows through the S-79 structure. Nutrient and dissolved oxygen conditions should improve during the wet season within the estuary given the reduction in high flow events. A slight increase in the number of low flow events could have a detrimental effect on the low salinity zone of the upper estuary including *Vallisneria Americana.* Careful operations of the C-43 reservoir could help alleviate this problem.

St. Lucie Estuary: A reduction in the number of high flow events, as characterized by flows through the S-80 structure, would be expected to improved salinity conditions within this estuary. Nutrient and dissolved oxygen conditions should also improve during the wet season within the estuary given the reduction in high flow events. The number of months of flow less than 300 cfs increases. Low flows only become an issue in the St. Lucie Estuary during the driest of times and should be able to be offset by careful operations of the IRLS project by moving water from the C-23/24 reservoirs through Ten Mile Creek and into the north fork of the St. Lucie River where its more natural flow path occurs.

C.2.1.9.3 EAA

All alternatives considered the need for additional STAs to treat water from an EAA Storage Reservoir. DMSTA water quality modeling was performed and STAs were sized to ensure compliance with the Water Quality-based Effluent Limits (WQBEL) with increase flow.

The EAA nutrient loads would be similar to the FWO. The modeling assumptions for water quality for both Lake Okeechobee and the EAA irrigation water are unchanged when compared to the assumptions used in Restoration Strategies and CEPP. As with CEPP, the majority of the new water is delivered "off-peak" limiting the risk of higher nutrient loads. Nutrient loads from existing conditions should decrease from the conversion of agricultural practices from the A-2 Expansion area when the CEPP PACR is implemented. The with-project alternatives all include the A-2 reservoir and an additional A-2 STA integrated (R360C, R360D) and/or operated in conjunction with (R240A, R240B) the A-1 FEB and the same volume of additional Lake Okeechobee water distributed south of the EAA. Additionally, the A-2 STA would remove more phosphorus and increase the treatment capacity and improve water quality compared with FWO. Dynamic Model for Stormwater Treatment Areas (DMSTA) water quality modeling indicates that the with-project alternatives would meet the 2012 WQBEL. Similar to the FWO, monitoring during construction will occur to minimize the potential adverse impact on downstream biota from a short-term release of methylated mercury.

C.2.1.9.4 Greater Everglades

Negligible beneficial effects would be expected from the CEPP PACR alternatives. Conditions in WCA 2, WCA 3A, WCA 3B, and ENP would be expected to be similar to the FWO.

C.2.1.9.4.1 WCA 1, WCA 2

Water quality conditions for WCA 1 are not expected to be changed by any of the alternatives since none of them include features that influence flows and treatment within the eastern flow path. Nutrient and sulfate loading conditions in WCA 2 should improve somewhat given the reduction in hydrologic load sent to this water conservation area. Reduced sulfate loading could somewhat alter the areas where mercury methylation is problematic within WCA 2.

C.2.1.9.4.2 WCA 3A

The hydrologic predictions show that FWO flows will be slightly (11%) increased relative to ECB while the TSP flows would be greater than both the ECB (43%) and FWO (29%) condition. The TP concentration of the TSP would be the same as FWO and decreased by 5% compared with ECB. **Figure C.2.1-49** shows the average annual flow across three transects in WCA 3A. Relative to the FWO condition, the alternatives show an increase in flow crossing the northern and southern transects. Increased uptake in the northern portion of WCA 3A will likely result in reduced TP concentrations at the southern end of this WCA similar to the FWO condition. It is likely that northern portions of the WCA 3A marsh that are adjacent and south of the L4, and L-5 canals will experience higher TP loads because of increased flow but similar concentrations as the FWO. The effects of the with-project alternatives on WCA 3A compliance with the four-part TP criterion defined in Section 62302.540, F.A.C. are expected to be similar. A detailed discussion of phosphorus impacts to WCA3A are found in **Annex F**.

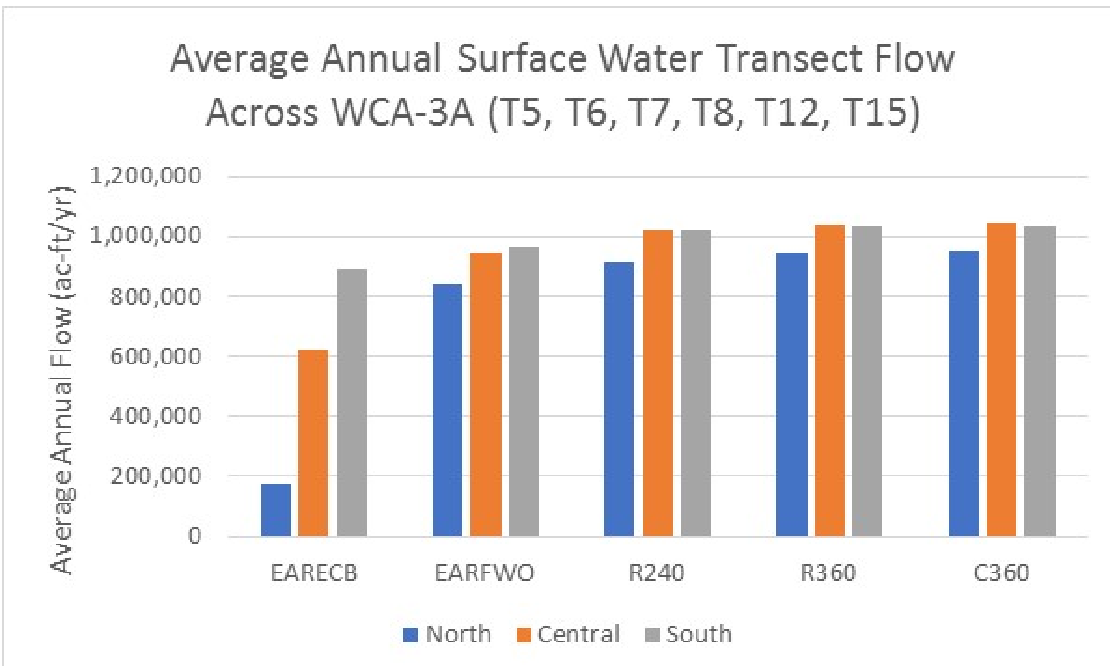

Figure C.2.1-49. Average Annual Surface Water Transect Flows for WCA 3A

Given the conditions in WCA 3A in the FWO and changes in complexity of the methylmercury cycle, changes in mercury from the FWO would be negligible. Given the reduction in atmospheric mercury deposition over the last 15 years, it is likely that any future methylation and bioaccumulation of mercury that occurs after implementation will not exceed the peak concentrations seen 15 or so years ago unless atmospheric mercury loading increases.

C.2.1.9.4.3 WCA 3B

Additional water flow into WC 3B will result from all the alternatives. Increased hydration of WCA 3B will reduce the risk for severe dry down and thus reduce fire risk relative to FWO. Water quality degradation such as the release of TP into the water column and increased Hg in the water column associated with fire events and their aftermath will be reduced. Additional flow into WCA 3B will increase nutrient loads relative to the FWO condition but concentrations would be expected to be similar to the FWO. **Annex F** includes a detailed discussion of the impact of phosphorus within WCA 3B.

C.2.1.9.4.4 Everglades National Park

C.2.1.9.4.4.1 Shark River Slough

Water entering Shark River Slough (SRS) from WCA 3 is likely to have similar concentrations of TP as compared with the FWO condition due to the treatment to stored water in STAs. Additional discussion of the effect of phosphorus concentrations in ENP is provided in **Annex F**.

C.2.1.9.5 Southern Estuaries

Minor beneficial effects to salinity would be expected from the CEPP PACR alternatives. Other conditions would be similar to the FWO. See analysis in **Appendix G, Environmental Benefits Model.**

C.2.1.10 Air Quality

Direct emissions from the proposed construction of the project features would be confined to exhaust emissions of labor transport equipment, and construction equipment (dump trucks, excavators, graders, bulldozers, etc.). Clean Air Act pollutants considered in this air quality assessment are SO_x; volatile organic compounds (VOCs); nitrogen oxides (NOx), CO, PM10, and PM2.5. Greenhouse gas emissions are also considered. Volatile organic compounds, sulfur oxides, and nitrogen oxides are important since they are precursors to ozone generation. These criteria pollutants are generated by the construction and operational activities associated with the proposed alternatives.

In Lake Okeechobee and the Northern Estuaries, population growth in the area is expected in the FWO condition relative to the ECB, this is an increase in air pollution. However, air quality compliance is expected. All alternatives are expected to have no change relative to FWO conditions in Lake Okeechobee and the Northern Estuaries. In the Everglades Agricultural Area (EAA) no change in compliance with air quality standards is expected in the FWO compared to the baseline condition. For all alternatives, no change in air quality compliance is expected. Reduction in farming equipment use on the A-2 Expansion area in FWO condition will be offset by increase in air pollutants from new pump stations. Particulate loading should be reduced since sugar cane cultivation will no longer done on the A-2 Expansion area and thus annual burning during harvesting will no longer be done. Minor beneficial effects with a decrease in dry events and subsequent fire incidence would also be expected, which should improve air quality. Creation and rehydration of wetlands is expected to result in increased carbon dioxide (CO_2) sequestration through peat accretion. In the Greater Everglades, increased Lower East Coast (LEC) development in the FWO will result in air quality degradation relative to baseline conditions. Enforcement of the Clean Air Act should limit impacts. All environmental air permits will be acquired to ensure all air quality standards are met for proposed pump stations.

C.2.1.11 Hazardous, Toxic and Radioactive Waste

The FWO and CEPP PACR alternatives will have similar hazardous, toxic and radioactive waste (HTRW) conditions in the future with the exception of the lands used for the A-2 Expansion area. (See **Appendix C.1** for the expanded HTRW assessment and **Annex H** for HTRW reports and correspondence.) Under the FWO condition, the A-2 expansion area will likely continue to be farmed which will result in the additional application of agricultural pesticides in the cultivated portions of this property and the inadvertent release of petroleum and pesticides in operation and maintenance areas. During the construction of project features, it is possible that undiscovered HTRW contamination will be found similar to what would be expected in the FWO. Per EC 1165-2-132, the non-Federal sponsor will be required to remediate these sites at their sole expense. There is also the potential for HTRW release associated with the operation of project pump stations, similar to the FWO; however, with modern facilities and best management practices (BMPs), this presents a minor risk to the environment.

C.2.1.11.1 Residual Agricultural Chemicals

All of the CEPP PACR alternatives include the use of the A-2 Expansion area. Approximately 50% of the total acreage within the A-2 Expansion area has been assessed in a Phase I ESA with the remaining areas requiring Phase II investigations. Residual agricultural chemicals similar to those described by the FWO would be expected in the cultivated soils on the A-2 Expansion area lands. A discussion of residual agricultural chemicals on the A-2 parcel and A-2 Expansion area is found in **Annex H**.

C.2.1.12 Noise

For the alternatives there would be minor short-term and less than significant increases in noise during construction activities. All alternatives include additional pump stations which would result in long-term, localized increases in noise. Alternative 360D adds the largest number of pump stations (two), it would have the greatest effect with Alternatives 240A, 240B, and 360C having the least effect by only having one pump station.

C.2.1.13 Aesthetics

Effects to aesthetics would be considered significant if changes in the landscape from any alternative would appreciably affect high quality scenery or visually sensitive lands. As discussed in **Appendix C.1**, none of the visual resources in the region hold unique aesthetic value or are visually sensitive lands. The discussion below details the nature and overall level of effects the storage and treatment components, conveyance improvements, and the Lake Okeechobee operations would have on aesthetics and visual resources.

C.2.1.13.1 Storage and Treatment

Short- and long-term minor adverse effects to aesthetics and visual resources would be expected from the storage and treatment components of both the R240 and R360 alternatives. Short-term effects would be due to the use of heavy equipment during the construction of the reservoir and supporting infrastructure. Long-term effects would be due to the establishment of a permanent man-made reservoir and supporting infrastructure, and the removal of the existing agricultural and native scenery. These effects would be confined primarily to areas in and around the A-1 parcel, A-2 parcel, and A-2 Expansion area. There would be negligible adverse effects to Lake Okeechobee, the areas between Lake Harbor and South Bay and the A-1 parcel, A-2 parcel, and A-2 Expansion area and southern Florida when compared to FWO.

Both the R240 and the R360 alternatives would have short-term minor adverse effects from the use of heavy equipment during the construction of the storage and treatment components and supporting infrastructure. During construction, the visual and aesthetic characteristics of areas undergoing development would be altered by the use of construction equipment, and delivery and stockpiling of construction materials. These effects would be temporary in nature and end with the construction phase. Individuals that would experience these effects are limited to a sparse residential population, limited regional workers, recreationalists, and persons on local roadways. The visual environment in the EAA and does not constitute a unique or sensitive viewshed, and is of marginal aesthetic value. Due to the temporary nature of the construction, the lack of receptors, and the existing aesthetics in these areas, these effects would be minor.

Long-term effects would be due to the establishment of a permanent man-made reservoir and supporting infrastructure, and the removal of the existing agricultural and native scenery. Following completion of construction, the proposed reservoir and associated infrastructure would remain as permanent features within the viewshed; however, the principle visual features of the area would remain consistent with existing and the FWO conditions.

Effects from the R240 alternatives would be primarily confined to A-2 parcel, A-2 Expansion area, and the areas near the proposed inflow canals from the Miami Canal and the North New River Canal (NNR). Establishment of the reservoir would considerably change the A-2 Expansion area footprint permanently, converting an agricultural area to a water body. The levees would be an enduring visual feature in the area, and higher than anything in its immediate surroundings. There would be added pump stations and water control structures attached to these elements. The reservoir and supporting infrastructure would be visible from U.S. Highway 27 to the east, Miami Canal Road to the west, and the most northern portions of the Holey Land Wildlife Management Area (WMA) to the south. Individuals who would experience these effects are limited to a sparse residential population, limited regional workers, recreationalists, and persons on local roadways. Due to the lack of receptors, and that the existing aesthetics in these areas is of marginal value, these effects would be minor.

Effects from the 360 alternatives would be similar in nature, but somewhat greater, than those outlined for the R240 alternative. Effects from the R360 alternatives would include the A-1 FEB, A-2 parcel, A-2 Expansion area, and areas adjacent to the Miami Canal and the NNR Canal, including additional levees, pump stations and water control structures. The reservoir and supporting infrastructure would be visible from U.S. Highway 27 to the east, Miami Canal Road to the west, and the most northern portions of the Holey Land WMA to the south. As with the R240 alternatives, individuals that would experience these effects are limited to a sparse residential population, limited regional workers, recreationalists, and persons on local roadways. Due to the lack of receptors, and that the existing aesthetics in these areas is of marginal value, these effects would be minor.

Although there would be long-term minor adverse effects to visual resources under both the R240 alternatives and the R360 alternatives, the proposed reservoir may be considered to be a new scenic resource. The water body in-and-of itself, as well as potential viewing opportunities atop the proposed levees would have a permanent beneficial effect to aesthetics in the area. This would somewhat offset any realized adverse effects.

C.2.1.13.2 Conveyance Improvements

Both the R240 and the R360 alternatives would have short-term minor adverse effects from the use of heavy equipment during the conveyance improvements. During construction, the visual and aesthetic characteristics along the canals undergoing improvements would be altered by the use of construction equipment, and delivery and stockpiling of construction materials. These effects would be temporary in nature, and end with the construction phase. Individuals that would experience these effects are limited to a sparse residential population, limited regional workers, recreationalists, and persons on local roadways. These effects would be primarily confined the areas within and adjacent to the Miami Canal and the NNR Canal south of Lake Okeechobee and north of the A-1 parcel and A-2 parcel. The visual environment in these areas and does not constitute a unique or sensitive viewshed and is of marginal aesthetic value. Due to the temporary nature of the construction, the lack of receptors, and the existing aesthetics in these areas, these effects would be minor.

There would be minor long-term effects from the conveyance improvement components of both the R240 and the R360 alternatives, as there would be judicious changes to the shorelines of the existing canals due to their expansion. The configuration of the canals would maintain a more uniform and engineered appearance when compared to existing conditions. There would be a slight reduction in native biota and associated viewing opportunities. These effects would be minor.

C.2.1.13.3 Lake Okeechobee Operations

Lake Okeechobee operations, under the CEPP PACR alternatives, would have long-term minor beneficial effects to aesthetics and visual resources. The additional increase in water flow to the south would enhance the visual and aesthetic resources in southern Florida when compared to FWO. Although natural areas in southern Florida would continue to be comprised of wetlands, sawgrass marshes, wet prairies, and tree islands, there would be an expedited increase in natural features due to hastened re-establishment of hydropatterns and sheetflow throughout the region. In addition, the reservoir would be a complementary management tool to reduce high volume discharges into the Northern Estuaries resulting in lower suspended solids, increased water clarity, and better maintenance of healthy SAV beds. These beneficial effects would somewhat offset any minor adverse effects from the storage and treatment components and the conveyance improvements.

C.2.1.14 Socioeconomics

Effects are provided in the main report in **Section 5.1.15**.

C.2.1.15 Recreation

The overall trend is an improvement in recreational benefits from the project features in the CEPP PACR alternatives. In Lake Okeechobee and the Northern Estuaries, FWO and CEPP PACR alternatives would have a minor effect on FWO recreation opportunities. In Lake Okeechobee recreational navigation opportunities would be expected to improve. Alternatives may provide enhanced fishing opportunities due to better salinity conditions in the Caloosahatchee and St. Lucie estuaries. Further reductions in high flows to the estuaries would be expected to continue to improve conditions for fish. This improvement would further increase and enhance utilization of estuaries by fish and subsequently improve related recreational opportunities such as fishing, boating, and kayaking.

Moderate beneficial recreational effects would be expected in the EAA from the reservoir and STA features. Recreational opportunities on the STA would be similar to activities already occurring on the existing A-1 FEB. On the A-1 FEB, there are overnight hours and the public may drive on the levees and bring in non-motorized boats providing access for fishing and frogging. Other activities include hiking, biking, quota hunting for waterfowl and alligator. Alternatives that provide a reservoir and an STA in place of the A-2 FEB would enhance the outdoor recreation opportunities by having one large site with the remaining A-1 FEB and therefore have three different types of projects. This would be positive for public access meeting the identified needs according to Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP) compared to FWO.

In the Greater Everglades, in the FWO condition recreational fishing would be affected little if at all. Hiking, biking and camping will not be affected directly. Improved hydrology will enhance wildlife populations through improved survival and reproduction, subsequently resulting in a minor beneficial effect for outdoor recreation opportunities. Short term impacts to terrestrial mammal hunting (deer, hog, rabbit, etc.) could result from increased hydration in areas that have been drier. In the long term, the CEPP PACR alternatives have 12 to 16 more days of decreased stages resulting in minor effects to hydration which leads to peat loss, soil oxidation and fire which could degrade current habitat further. **Table C.2.1-6** compares alternatives, showing when high water would have prompted FWC to evaluate WCA 3 for a high water closure. The table uses the current closure criteria to compare alternatives, and does not replicate history or forecast FWC decisions. Negligible increases in the number of days of high water closures during hunting seasons occur in years where a closure during that hunting season would be expected during the FWO, with the exception of one occasion for two weeks in the POR. Waterfowl hunting should improve with better hydration throughout the greater everglades during the early part of the dry season. Bird watching should improve with increased hydration of the Greater Everglades as well. Improved access and designation of blue and greenway trails will be positive. In the Southern Estuaries there is no effect on recreation with the FWO. Access to the Southern Estuaries would not change; however, impacts to existing quality of recreation can be negatively or positively affected depending on location and changes to fish habitat as identified above for the Greater Everglades.

Table C.2.1-6. Weeks with High Water Closures for FWO Alternative Comparisons with Existing Hunting Seasons Displayed for WCA 3

	High Stage Closures over POR (2 Gage avg. > 11.6')			Fire Closures over POR (2 Gage avg. <= 9.16')			Total High Water and Low Water Closures			
Alt.	Closure Days	Closure Events	Avg. Closure Duration (Days)	Closure Days	Closure Events	Avg. Closure Duration (Days)	Closure Days	Closure Events	Avg. Closure Duration (Days)	% of POR-closure
FWO	614	18	34.1	203	9	22.6	817	27	30.3	5.5%
R240A R240B	698	20	34.9	219	7	31.3	917	27	34.0	6.1%
R360C R360D	703	24	29.3	217	7	31.0	920	31	29.7	6.1%
C360C	710	25	28.4	215	7	30.7	925	32	28.9	6.2%

Notes: * 2 Gage avg. is based on cells WCA 3A-2 and WCA 3A-3.
*3A-2 & 3A-3 elevation average = 9.66' NGVD (Closure threshold is 2 gage avg < 9.16.)

C.2.1.16 Land Use

C.2.1.16.1 Wetlands and uplands

For all alternatives, almost all the future development within the study area is expected to occur on lands that are currently or formerly used for agriculture. All alternatives are expected to have negligible effect in the gain or loss of wetlands relative to FWO conditions. However, Alternatives R240A and R240B would shift 4,155 acres from agricultural land use with wetland soils to higher quality wetlands with the conversion of the A-2 Expansion from sugar cane to an STA or Reservoir. Conversion of sugar cane agricultural fields to freshwater wetlands would provide additional benefit of carbon sequestration.

C.2.1.16.2 Agriculture

The CEPP PACR project area consists of lands primarily under public ownership with the exception of 500 acres of privately owned land. There are 14,500 acres in the proposed A-2 parcel currently cultivated for sugar cane, and under the FWO these acres would be converted to an FEB with wetland habitat. Under Alternatives R240A and R240B, the 4,155 acres of the A-2 Expansion area would be converted from sugar cane to part of an STA with wetland habitat. The remaining alternatives would convert the same A-2 Expansion area to part of reservoir water storage. With the exception of the conversion of 4,155 acres within the A-2 Expansion area the alternatives are expected to have negligible effect on agriculture relative to FWO conditions. As described in the **CEPP PACR Section 5.1.8**, Hydrology, negligible changes were noted for water stages within the South Dade Conveyance System; therefore, no indirect effects to agriculture within this region are anticipated. Coordination with the United States Department of Agriculture (USDA) and National Resources Conservation Service (NRCS) to meet the requirements of the Farmland Protection Policy Act, is ongoing. When detailed design information that locates each of the plan components is completed, it can then be determined how many acres of unique farmland would be affected by the Project.

C.2.1.17 Cultural Resources

The Everglades and associated ecosystems are a nationally significant resource and have been severely impacted by human activities for over a hundred years, primarily through drainage practices and agriculture. A review of the Florida State Master Site Files (FSMSF) indicate that there are 23,499 recorded cultural resource sites and resource groups within the CEPP PACR study area that have a survey determination and/or State of Florida Historic Preservation Office (SHPO) evaluation of other than ineligible for listing with the National Register of Historic Places (NRHP). For this document, the use of the term cultural resources includes significant historic properties that are determined eligible or potentially eligible for NRHP listing and culturally significant sites.

Avoidance of adverse effects to cultural resources is preferred, Pursuant to 36 CFR 800.1, where possible, the project design will be modified to avoid impacting significant historic properties and culturally significant sites. Where avoidance is not possible, other mitigation measures will be considered, which could include but are not limited to data recovery excavations. The mitigation measures will be developed in consultation with SHPO, tribal groups and other interested parties as established in implementing regulations for Section 106 of the NHPA.

Similar to CEPP, Section 106 compliance with the NHPA would be conducted separately from NEPA and will not be completed during the current feasibility phase of the project; however, it would be complete prior to construction of the project.

Engineering Regulation (ER) 1105-2-100 Appendix C, paragraph C-4(d)(6)(a) states that results of cultural resources investigations conducted during the feasibility phase and if needed, the PED phase will "serve as the basis for formulation of plans for management of historic properties prior to or during the construction and operational stages of projects." At which time, as required under ER 1105-2-100 Appendix C, paragraph C-4 (d)(6)(b), the USACE will determine effects to historic properties and any need "to mitigate adverse project effects on National Register and eligible properties" and to "serve as the basis for negotiation of a Memorandum of Agreement (MA) (if no MA has been previously prepared) with the SHPO/THPO and, if appropriate, the advisory council on Historic Preservation (ACHP) specifying actions which will be taken by the Corps of Engineers prior to or during the project construction period to mitigate adverse effects on National Register and eligible properties."

In conjunction with the National Historic Preservation Act (NHPA), formal consultation would be initiated with the Seminole Tribe of Florida's Tribal Historic Preservation Office (THPO); the Miccosukee Tribe of Indians of Florida's NAGPRA Representative; the Florida State Historic Preservation Office (SHPO); and the Florida Bureau of Archaeological Research after the report is submitted to the ASA(CW). Formal consultation would determine if additional surveys may be needed, specifically during the PED phase, when feature designs are finalized and construction staging areas are identified.

C.2.1.17.1 Area of Potential Effect

The area of potential effect (APE) for cultural resources on the project differs greatly from the overall study area. For this project, the APE for cultural resources covers approximately 34,500 acres which includes the A-1 parcel, A-2 parcel, A-2 Expansion lands, conveyance improvements along the Miami Canal, and the NNR Canal. A cultural resources assessment still remains to be completed on the A-2 Expansion lands.

C.2.1.17.2 Evaluation Criteria Specific to Cultural Resources

Impacts to cultural resources do not vary by individual alternatives.

The following significance thresholds have been used for CEPP and will be used in the CEPP PACR in determining whether components proposed for each alternative would result in a significant impact to cultural resources. The use of the term cultural resources includes historic properties eligible or potentially eligible for NRHP listing and culturally significant sites. A cultural resource impact is considered significant if implementation of a component of an Alternative would result in any of the following when compared to the FWO:

- Result in a change in the significance or eligibility for NRHP, including but not limited to any contributing elements, of a historical resource
- Result in an adverse change in the significance or eligibility for NRHP of a historic resource
- Disturb any human remains, including but not limited to those outside of formal cemeteries[1]
- Disturb memorials determined to hold public significance regardless of age

[1] The Burial Resources Agreement (2015) applies - This Agreement establishes a framework that will serve as the basis for consultation regarding the presence of burial resources within the Jacksonville District's area of action and jurisdiction for the Civil Works and Regulatory Programs, respectively, and sets forth procedures that will ensure culturally sensitive treatment of burial resources pursuant to the USACE Trust Responsibility.

- Result in adverse changes to sites identified through consultation with the Seminole Tribe of Florida and/or the Miccosukee Tribe of Indians of Florida as having cultural significance.

C.2.1.17.3 Comparison of Proposed Action Alternatives and Future Without Conditions

The project schedule (**Sections 6.7** and **6.11.2.3**) allows for a phased approach to Section 106 compliance, in that each suite of features will be consulted on as they arise. This will ensure that the most up to date information will be considered in the determination of effect. Also, based on final designs or modifications of the project features, additional work may be required for compliance with the NHPA. *While the Corps is currently in compliance with the procedural requirements of the NHPA, the Corps recognizes that additional consultation and other requirements are not yet complete, but the project will be in full compliance prior to construction.*

Consultation would be expected to formally begin with delivery of the CEPP PACR to the ASA(CW). At that time the process of making a determination of effects and potential mitigation of effects would begin. Given the similarity between the alternatives and FWO similar actions, as those proposed for the CEPP authorized plan, the FWO, would be expected.

C.2.1.18 Invasive and Native Nuisance Species

All CEPP PACR alternatives would have negligible effect for establishment and spread of non-native invasive and native nuisance species, similar to the FWO. A more detailed description of the effects the alternatives is provided in **Appendix C.2.1.18**. Disturbed areas resulting from construction are likely to temporarily influence the recruitment of non-native invasive and native nuisance species. The large number of existing and potential invasive plant and animal species and the often incomplete knowledge of invasive mechanisms for each species create moderate uncertainty in this evaluation. Long-term monitoring in an adaptive management framework is critical to ensure efficient management of the most threatening non-native invasive species in the affected area. Proposed management activities to address invasive species are provided in **Annex G**.

C.2.1.19 References

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C.2.2 EFFECTS OF THE TENTATIVELY SELECTED PLAN

Analysis of the CEPP PACR alternatives identified Alternatives R240A and C360C as best buys. Further consideration and optimization of the alternatives described in **Section 4** identified Alternative C240A as the National Ecosystem Restoration (NER) plan to be carried forward for further analysis. This appendix provides a detailed discussion of the potential environmental effects, which can be either positive or negative, that could result from implementation of Alternative C240A, the tentatively selected plan (TSP).

Alternative C240A was identified as the TSP because it offers the lowest cost reservoir and operational design but provides similar benefits, in terms of HUs, as the larger 360,000 ac-ft storage reservoir when water supply is a component of operations (Alternative C360C). Allowing the same level of benefits, for less cost, meets the expressed desires of stakeholders while decreasing the occurrence of undesirable regulatory releases from Lake Okeechobee and moving closer to the original CERP Goal. The C240A alternative project features consist of:

- 240,000 ac-ft storage reservoir, plus A-1 FEB
- 10,100-acre reservoir, approximately 23 ft deep
- 6,500 acre STA
- Conveyance improvements to the Miami and NNR Canal (1,200 cfs)
- Multi-purpose project operations

The No Action Alternative (for consistency of the report, the **No Action Alternative** is referred to as the **Future Without [FWO]** for the remainder of the report) considers the environmental conditions in the affected regions without the Proposed Action and is fully discussed in **Appendix C.1.2**.

The features of the TSP are described in **Section 6.1 Plan Description** with specific features located in **Figure 6-1**. The TSP would reduce the damaging freshwater discharges from Lake Okeechobee that are sent east to the St. Lucie Estuary and west to the Caloosahatchee Estuary and redirect this water south through Everglades Agricultural Area (EAA) canals to the A-2 Reservoir. The A-2 Reservoir would provide storage capacity for attenuation of high flows. Water would be delivered to the A-2 STA, which would reduce phosphorus concentrations in the water to meet required water quality standards. The A-2 Reservoir and STA proposed in the CEPP PACR would replace the A-2 FEB authorized in CEPP. The treated water would be distributed across the northwestern boundary of Water Conservation Area (WCA) 3A to flow through and help restore more natural quantity, timing, and distribution of waters to WCA 3A, WCA 3B, Everglades National Park (ENP), and Florida Bay.

Environmental impacts include both direct and indirect effects. Under the Council on Environmental Quality (CEQ) regulations, direct effects are "caused by the action and occur at the same time and place," while indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8).

C.2.2.1 Climate

The historical climate conditions used in the period of record are assumed to be representative of future scenario climate conditions. South Florida was in a much drier regime from 1965 to the early 1990s when the AMO transitioned from the cool phase to the warm phase. South Florida experienced more droughts and dry weather during the cool phase, with high-water events (some extreme) being more frequent during the current warm phase. South Florida has been in a “wetter” regime since the early 1990s mostly due to the AMO. The AMO phases last typically 20 to 40 years but it is difficult to predict the future evolution of the current AMO. Thus, the generally wetter than normal conditions that Florida has experienced since the early 1990s may begin to slowly decline at some point in the future. At some point when a cooler phase occurs, south Florida may experience drier years as was the case during the decades of the 1970s and 1980s. Low frequency dry years can still occur due to other events such as La Niña, which can occur on an average of every 3 to 7 years. In view of the difficulties in predicting multi-decadal and intra-decadal cycles over the planning horizon, the long period of historical data used for modeling is expected to include the switching of various phases of AMO and El Niño southern oscillation, thereby incorporating drier and wetter periods typical of south Florida.

Implementation of the TSP would have effects on climate conditions similar to those of the FWO.

C.2.2.2 Geology and Soils

Features of the TSP are similar to FWO features. On the A-2 parcel and A-2 Expansion area, the geologic impacts within the project area from the removal of surface cover (i.e., vegetation and soil), the caprock from blasting, and limestone to obtain material for construction of levees, canals, and roads were considered in the FWO.

Improved hydroperiods and sheetflow in Water Conservation Area (WCA) 3A and Everglades National Park (ENP) would reduce soil oxidation, which promotes peat accretion necessary to rebuild the complex mosaic of habitats across the landscape. The TSP shows a minor increase in inundation duration over the FWO that will decrease soil oxidation, subsidence, and peat fires. In most areas, hydrologic conditions in the TSP and the FWO are similar. However, in the northwest WCA 3A, hydroperiods are reduced and, in WCA 3B, hydroperiods are increased (see **Appendix G**, **Table G-21** and **Table G-26,** respectively). Inundation duration showed minor improvements in WCA 3A, WCA 3B, and the southern ENP (see **Appendix G, Table G-21** through **Table G-29**).

C.2.2.3 Vegetation

C.2.2.3.1 Lake Okeechobee

Negligible and less than significant effects to vegetation within Lake Okeechobee’s extensive littoral zone are anticipated as a result of implementation of the TSP. The TSP would reduce the frequency and duration of low and extremely low lake stages in Lake Okeechobee, and slightly increase the frequency and duration of extreme high lake stages. Additionally, lake stages in the mid- to lower-portions of the beneficial envelope (12.5 to 15.5 ft NGVD) would occur less frequently with the TSP. Overall, however, lake stages would be within the beneficial range more often with the TSP relative to FWO (**Figure C.2.2-1**).

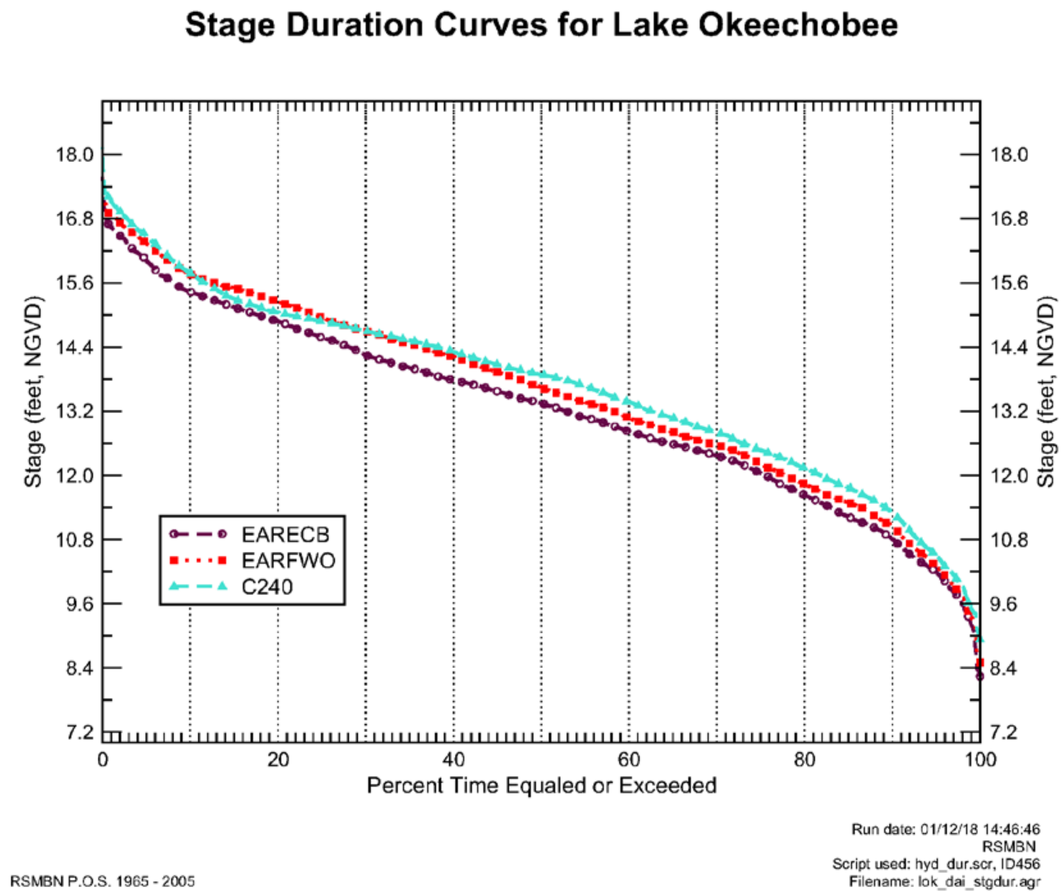

Figure C.2.2-1. Lake Okeechobee Stage Duration Curve for the TSP

C.2.2.3.2 Northern Estuaries

Currently, many submerged aquatic vegetation (SAV) beds are stressed and have been reduced or eliminated from their former areas by extreme salinity fluctuations, increased turbidity, sedimentation, dredging, damage from boats, and nutrient enrichment which causes algal blooms that, in turn, restrict light penetration. As compared with the FWO, the TSP shows a performance improvement within the Northern Estuaries as indicated by fewer high-volume flow months and less frequent damaging events, providing moderate beneficial effect. Reduction in return frequencies, high flows, and accompanying flow velocities would result in lower suspended solids, color, and colored dissolved organic material, thereby allowing greater light penetration to promote growth of SAV. In addition, reduction in high volume discharge events from Lake Okeechobee would reduce extreme salinity fluctuations associated with such events. Although some seagrasses are tolerant of a wide range of salinity levels, a reduction in high volume discharge events would reduce stress to SAV and aid in long term health of estuarine habitat and biota.

C.2.2.3.2.1 Caloosahatchee River Estuary

The TSP performed better than the FWO in the number of times the high flow criteria were not met which would help to re-establish a salinity range favorable to SAV and provides minor beneficial effects (**Figure C.2.2-2**).

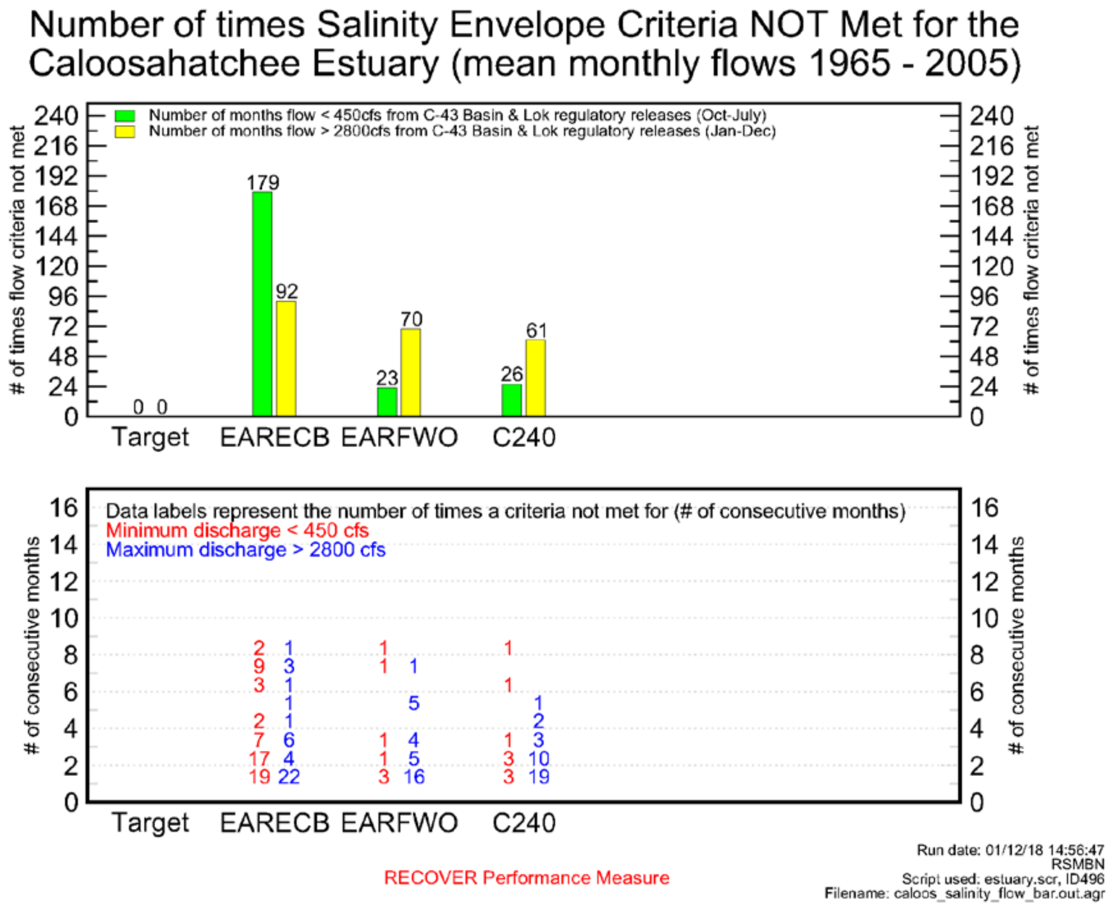

Figure C.2.2-2. Number of Times Salinity Criteria Not Met for the Caloosahatchee River Estuary for the FWO and TSP

C.2.2.3.2.2 St. Lucie Estuary

Compared to the FWO, the TSP had a fewer number times the high flow criteria were not met, which provide minor beneficial effects and benefit oysters and SAV within the estuary and IRLS (**Figure C.2.2-3**).

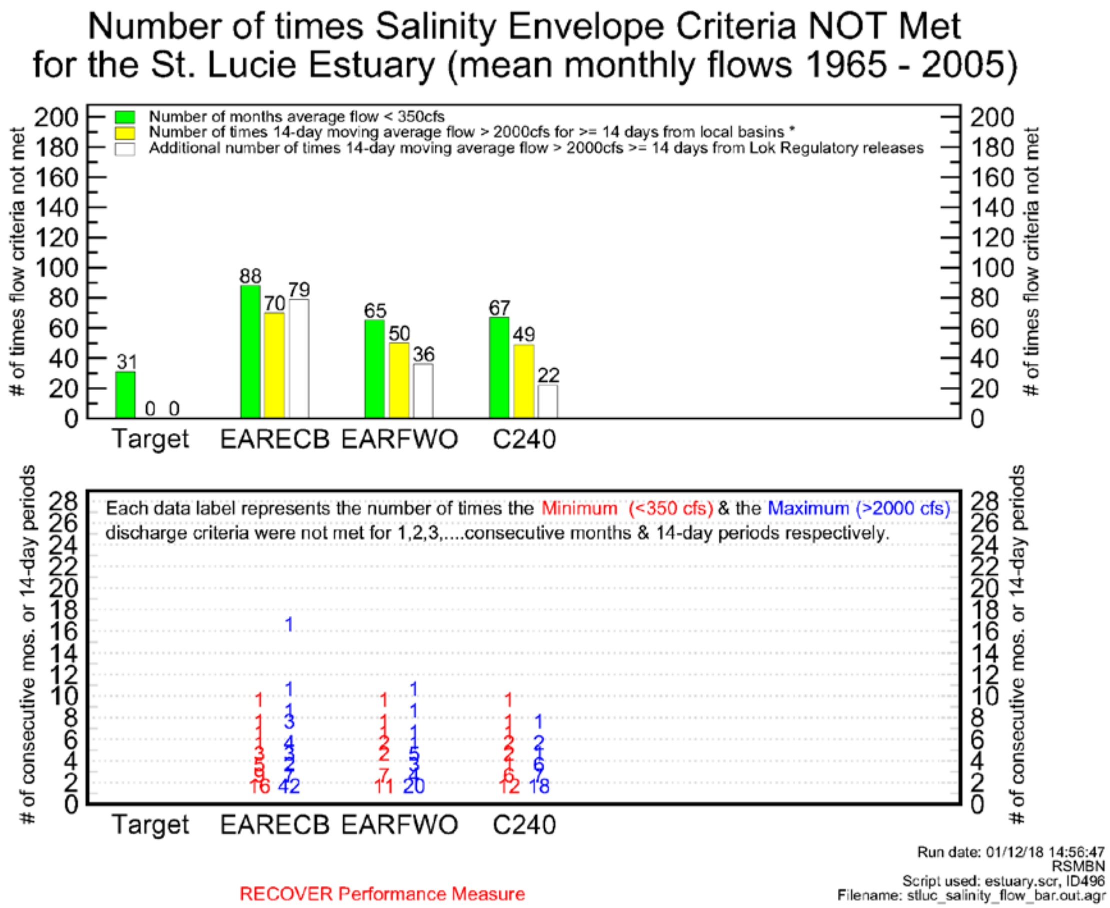

Figure C.2.2-3. Number of Times Salinity Criteria Not Met for the St. Lucie Estuary for the FWO and TSP

C.2.2.3.3 Everglades Agricultural Area

Negligible and less than significant effects to vegetation within the EAA are anticipated as a result of implementation of the TSP. As all of the property that will be used to construct the project is considered to be atypical jurisdictional wetlands based on hydric soils and hydrology; for a portion of the property, wetland vegetation is anticipated to return to the site once construction of the STA is complete. During construction, temporary short-term adverse effects would be consistent with the effects of the FWO during construction of the A-2 FEB.

C.2.2.3.4 Greater Everglades

Due to changes in the quantity, quality, distribution and timing of water entering the Greater Everglades ecosystem, long-term and minor effects on wetland hydrology and vegetation would potentially occur with implementation of the TSP. The TSP distributes almost all of its additional water through the CEPP-designed L-4 spreader canal across the northern WCA 3A, thereby increasing hydroperiods and depths within this area more than any other area. CEPP PACR implementation of the TSP would act to increase the hydration of northern WCA 3A (**Figure C.2.2-4**), especially northwest WCA-3A, promoting peat accretion, reducing the potential for high intensity fires and promoting transition from upland to wetland vegetation. The CEPP PACR TSP provides moderate improvements to the low-depth (0.0-1.0 ft) hydroperiods in WCA 2A compared to FWO, but does nothing to decrease the duration of ponding depths below 0.0 ft and would slightly increase the duration of the high-depth (1.0–2.5-foot) hydroperiods (**Figure C.2.2-31**). Essentially, there is very little difference between the FWO and the TSP for WCA 2A. There is no difference between the TSP and the FWO on the environmental impacts of the hydrology in WCA 2B (**Figure C.2.2-32**). Restoration of sheetflow and historic hydropatterns within WCA 3 and ENP would result in beneficial shifts in vegetation communities, landscape patterns, and animal populations. Improved sheetflow (**Figure C.2.2-5**) and related patterns of hydroperiod and water depth will significantly help to restore and sustain the microtopography, directionality, and spatial extent of ridges and sloughs and improve the health of tree islands in the ridge and slough landscape. Central and southern WCA 3A would remain largely unaffected by the project.

Most of the hydrological benefits occurs because of decreasing the time that water levels go below zero by some 5% and by increasing the time that water levels hoover between zero and 1 ft by about 5%. Long hydroperiods and deep water periods that can be harmful to tree islands do not differ from that expected with the FWO.

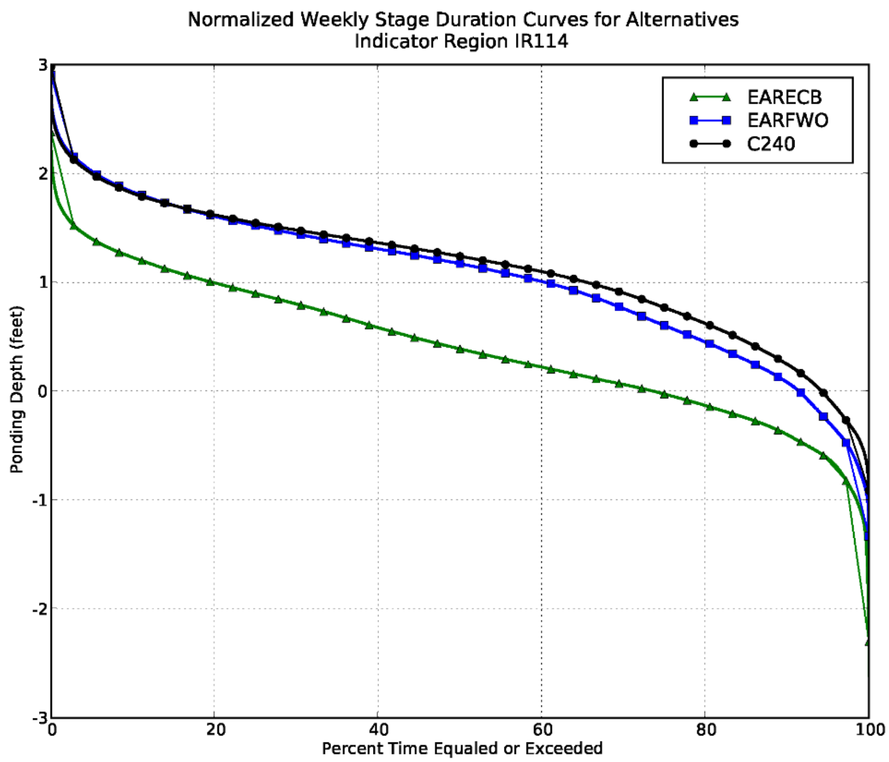

Figure C.2.2-4. Normalized Weekly Stage Duration Curve for Indicator Region 114 (Northwestern WCA 3A) for the TSP

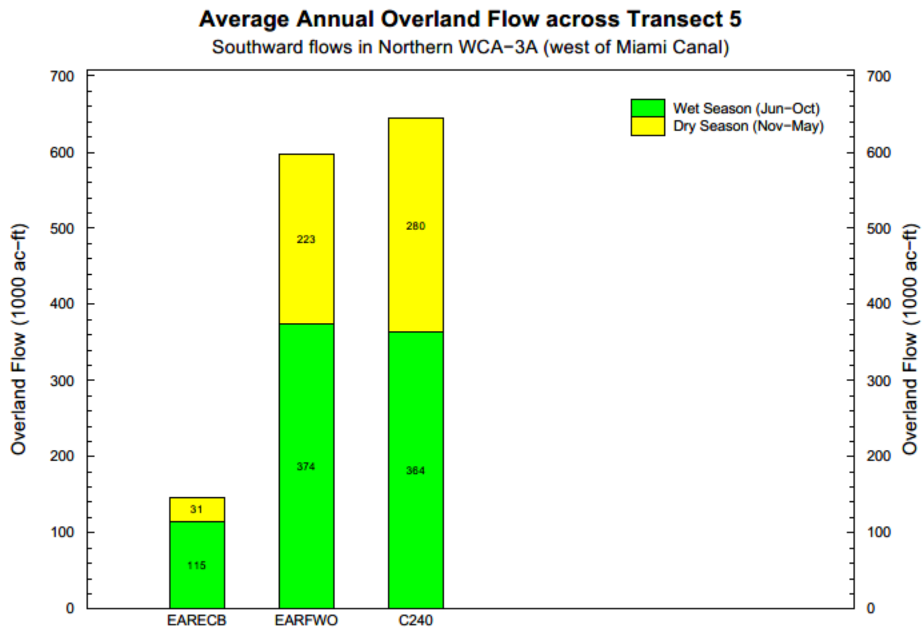

Figure C.2.2-5. Average Annual Overland Flow across Transect 5 in the Northwest WCA 3A Indicates that Flow Volumes Increase by 57,000 ac-ft during the Dry Season in Comparison to the FWO

The northwestern WCA-3A is the only region in the Greater Everglades where the TSP would have a long-term, moderate beneficial effect to the vegetation. The routing of flows through the northwest portion of WCA 3A in the FWO may result in the expansion of cattail vegetation due to increasing nutrient loads. There is the potential for this loading to continue with this TSP and it is difficult to know exactly how the northwest region vegetation would respond to the increase flows associated with this TSP. That is why the Adaptive Management Plan for this TSP (**Annex D**) is mostly focused upon vegetation management in northwestern WCA-3A.

As compared to FWO, the TSP produced slightly higher depths during average hydrologic conditions in northeastern WCA 3A (**Figure C.2.2-6**). Concern for deer and deer habitat in northeast WCA 3A may increase slightly due to this small increase in depth durations. It should be noted that neither the FWO nor the TSP provide the necessary inundation pattern for slough vegetation restoration; however, both act to rehydrate northern WCA 3A promoting peat accretion, reducing the potential for high intensity fires and promoting transition from upland to wetland vegetation.

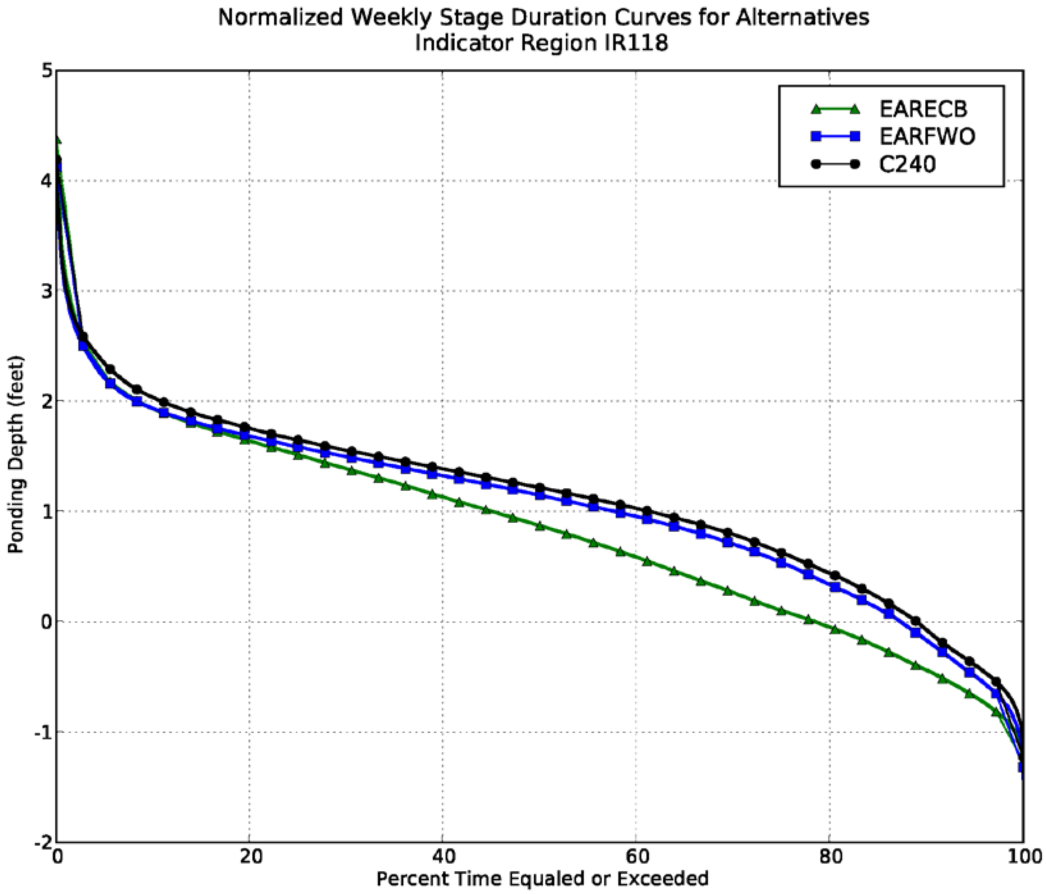

Figure C.2.2-6. Normalized Weekly Stage Duration Curve for Indicator Region 118 (Northeastern WCA 3A) for the TSP

Rehydration of previously dry areas within northern WCA 3A has the potential to temporarily mobilize nutrients within the water column; however, this is not expected to be a significant issue since portions of WCA 3A north of I-75 experience annual dryout and rehydration with no significant downstream impact. One notable concern would be the introduction of phosphorus into previously unimpacted areas (i.e. central and southern WCA 3A) potentially resulting in vegetation shifts, providing a minor adverse effect. Chaing et al. (2000) suggested that phosphorus loadings alter the Everglades plant communities through increased plant productivity, tissue phosphorus storage, soil phosphorus enrichment and shifts in plant species composition. Substantial vegetation changes may result from elevated phosphorus concentrations. Previous studies have shown that slough and sawgrass communities have been replaced by cattail-dominated communities (Davis et al. 1994; Rutchey, Schall, and Sklar 2008; Newman et al. 1998). However, Craft et al. (1995) and Chaing et al. (2000) observed no significant change in macrophyte species diversity or expansion of cattails in study plots receiving nutrient additions during the two years and four years, respectively, of their studies. Vegetation that can assimilate nutrients directly from the water column appears to be the most sensitive to nutrient enrichment and include periphyton and floating-leaved plants, such as spatterdock and water lily (Chaing et al. 2000; Newman et al. 2004). The periphyton-*Utricularia* complex may be quite sensitive to increased phosphorus, as illustrated by the disappearance of this complex from enriched study plots after the third year (Chaing et al. 2000).

Many areas of WCA 3A, particularly within central WCA 3A, still contain good quality wetland habitat consisting of a complex of tree islands, sawgrass marshes, wet prairies, and aquatic sloughs. Vegetation and patterning in the central portion of WCA 3A resembles pre-drainage conditions most closely and represents some of the best examples of remnant Everglades habitat in south Florida. As compared to the FWO the TSP produced the same average hydrologic conditions in central WCA 3A (**Figure C.2.2-7**), preserving pre-drainage characteristics. Although these areas remain largely unaffected by the TSP, maintenance of existing conditions within this region of the project area is desirable as ridge and slough habitat is well conserved, providing a negligible effect.

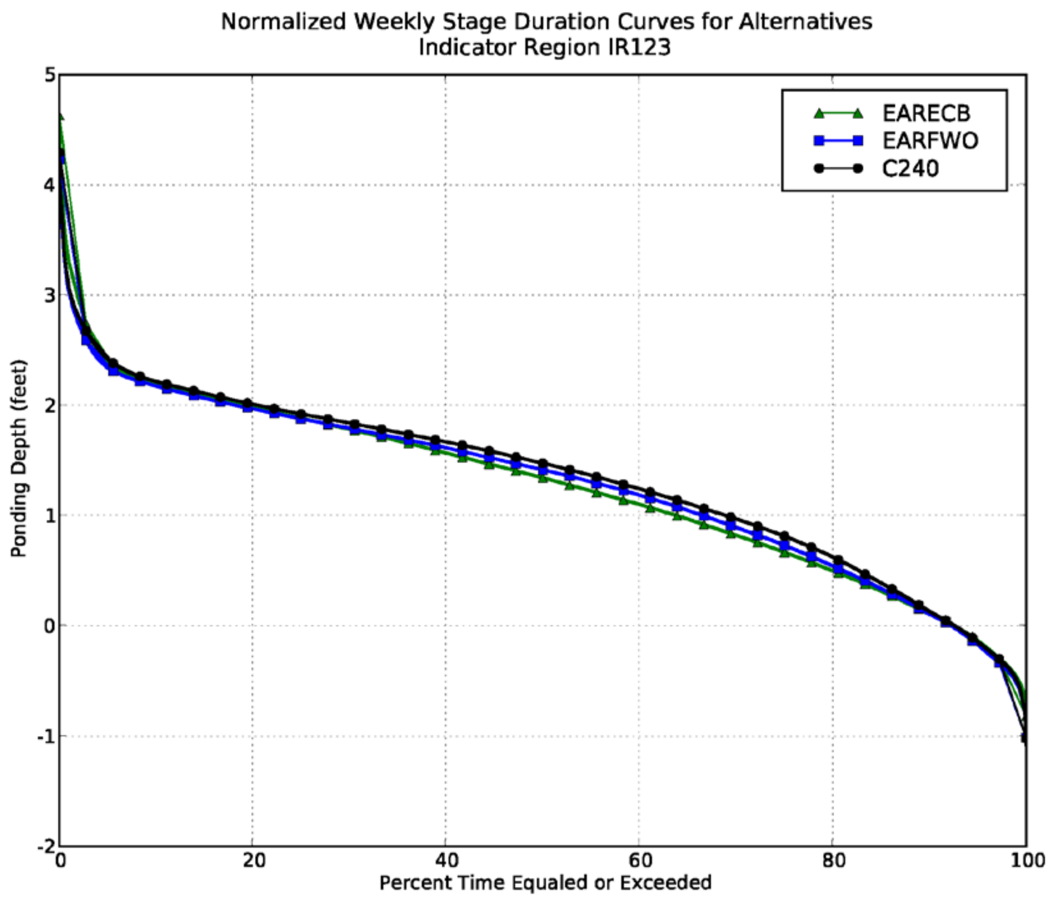

Figure C.2.2-7. Normalized Weekly Stage Duration Curve for Indicator Region 123 (Central WCA 3A) for the TSP

In southern WCA 3A, high water levels during the wet season are important in maintaining quality wet prairie and emergent slough habitat (USFWS 2010). However, prolonged high water levels (i.e., during both wet and dry season) and extended hydroperiods have resulted in vegetation shifts within southern WCA 3A, negatively impacting tree islands and fragmenting sawgrass ridges, resulting in the loss of historic landscape patterning (**Figure C.2.2-8**). Neither the TSP nor the FWO would provide significant benefits to southern WCA 3A through reduction in high water levels or duration, therefore, significant shifts in vegetation are not anticipated within this region, providing a negligible effect.

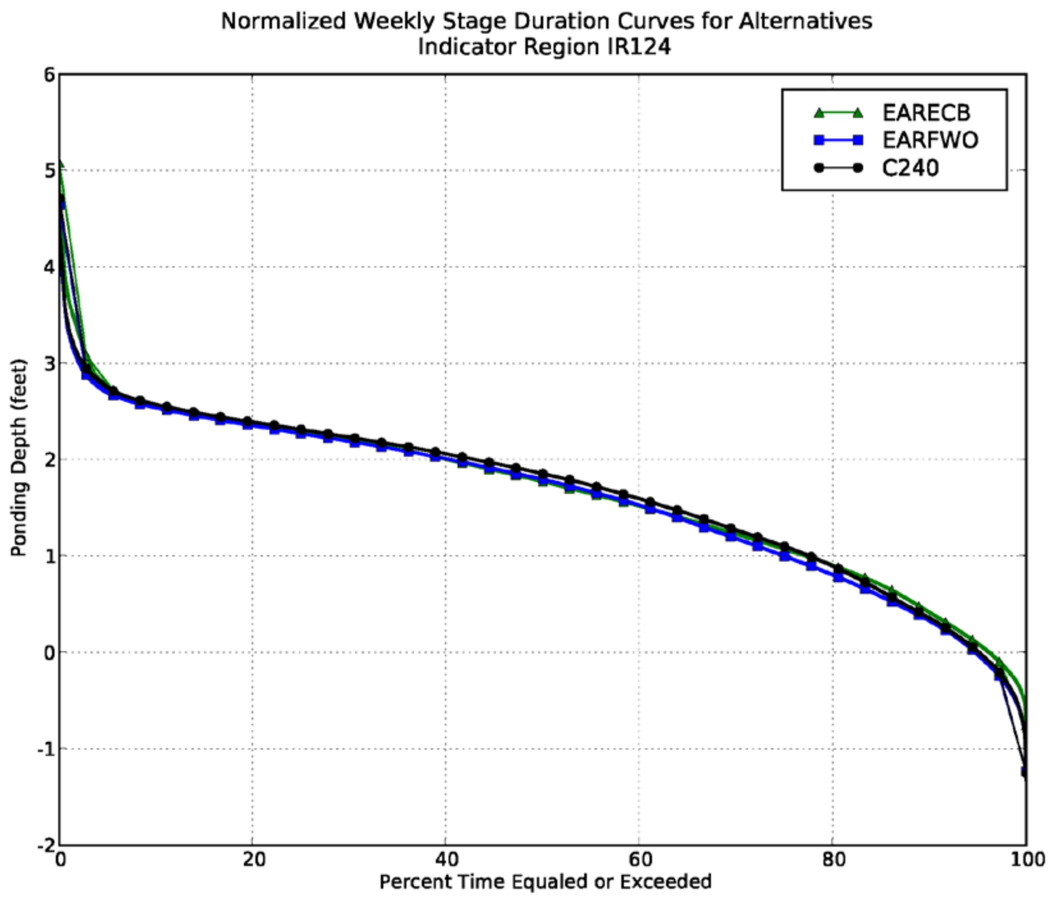

Figure C.2.2-8. Normalized Weekly Stage Duration Curve for Indicator Region 124 (Southern WCA 3A) for the TSP

Typical Everglades vegetation, including tree islands, wet prairies, sawgrass marshes, and aquatic sloughs also occur throughout WCA 3B. However, within WCA 3B, the ridge and slough landscape has been severely degraded by the virtual elimination of overland sheetflow due to the L-67 Canal and Levee system. WCA 3B experiences very little overland flow and has become primarily a rain-fed system predominated by shorter hydroperiod sawgrass marshes with relatively few sloughs or tree islands remaining. Loss of sheetflow to WCA 3B has also accelerated soil loss reducing elevations of the remaining tree islands in WCA 3B and making them vulnerable to high water stages. The TSP does not provide significant improved hydroperiods or ponding depths (**Figure C.2.2-9**) to WCA 3B; therefore, significant shifts in vegetation, water quality, tree island sustainability or use by wildlife are not anticipated in comparison to the FWO, providing negligible to no effect.

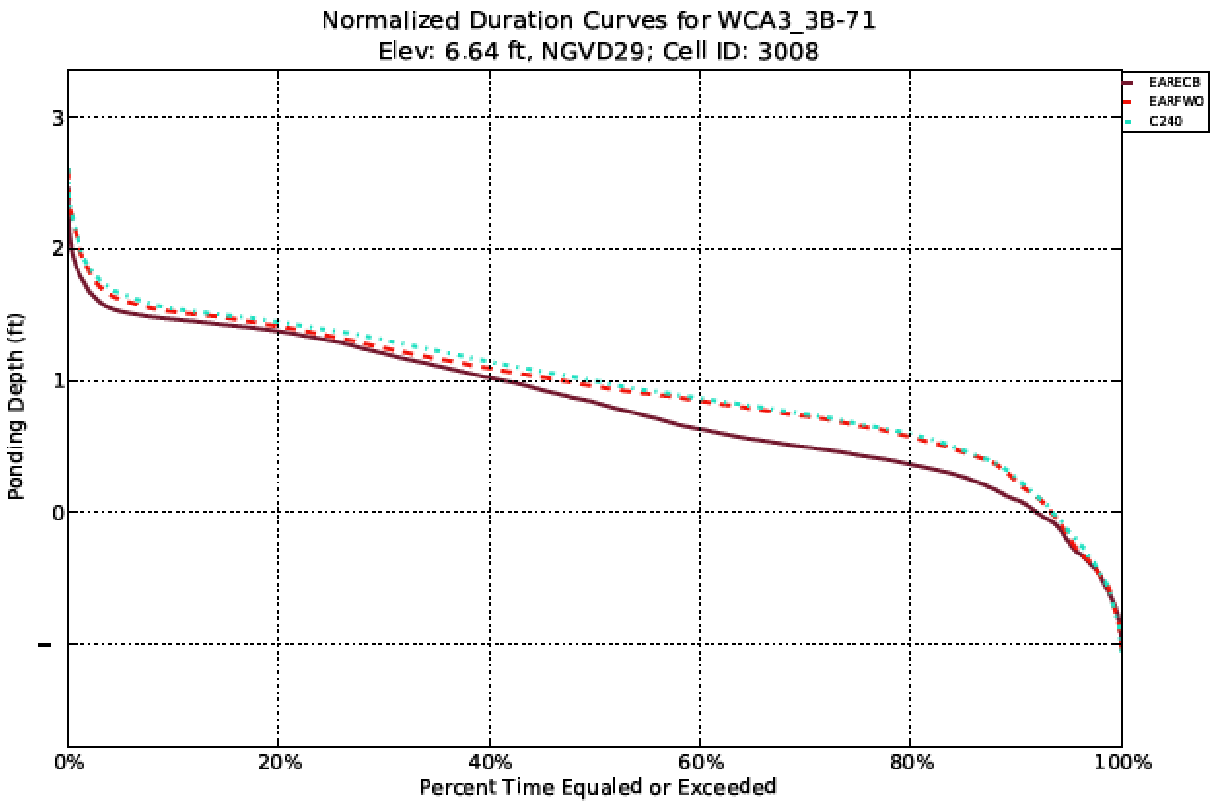

Figure C.2.2-9. Duration Curves for the Gage 3B-71 in WCA 3B Indicate No Significant Hydrological Improvement with the TSP

Flows through NESRS under current system compartmentalization and water management practices are greatly reduced when compared with pre-drainage conditions. The result has been lower wet season depths and more frequent and severe dry downs in sloughs and reduction in extent of shallow water edges. Over-drainage in the peripheral wetlands along the eastern flank of NESRS has resulted in shifts in community composition, invasion by exotic woody species, and increased susceptibility to fire. Implementation of TSP is expected to slightly continue the benefit of rehydration of NESRS (**Figure C.2.2-10**) by increasing the average annual overland flow to NESRS (Transect 18) (**Figure C.2.2-11** and **Figure C.2.2-12**) by some 40,000 ac-ft compared to the FWO, providing long-term moderate environmental benefits. Resumption of sheetflow and related patterns of hydroperiod extension will significantly help to restore pre-drainage patterns of water depths and the complex mosaic of Everglades' vegetation communities.

Reduction in the number and duration of dry events in NESRS is a major environmental benefit because extended hydroperiods will reduce soil oxidation, decrease fire potential, promote peat accretion, and aid in restoration of historic wetland vegetation communities. A count of the ability of the TSP to decrease the duration of dry events, calculated for the driest of years (1972, 80, 81, 87, 89, 93), was 11 weeks and was no different from the average duration of dry events for the FWO.

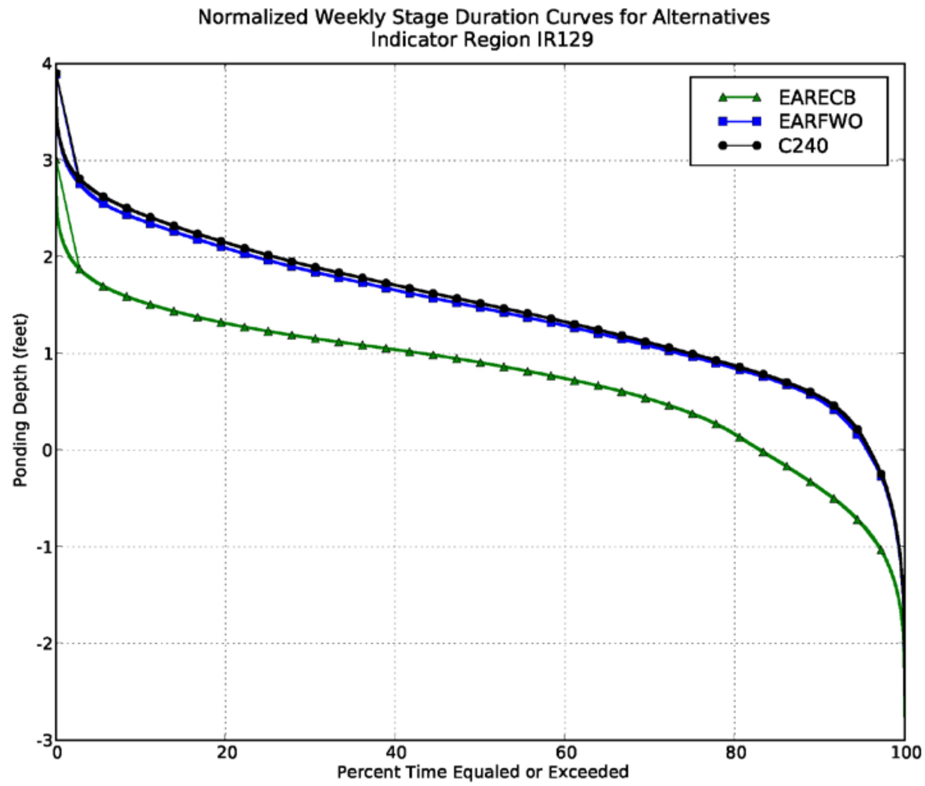

Figure C.2.2-10. Normalized Weekly Stage Duration Curve for Indicator Region 129 (in NESRS) for the TSP

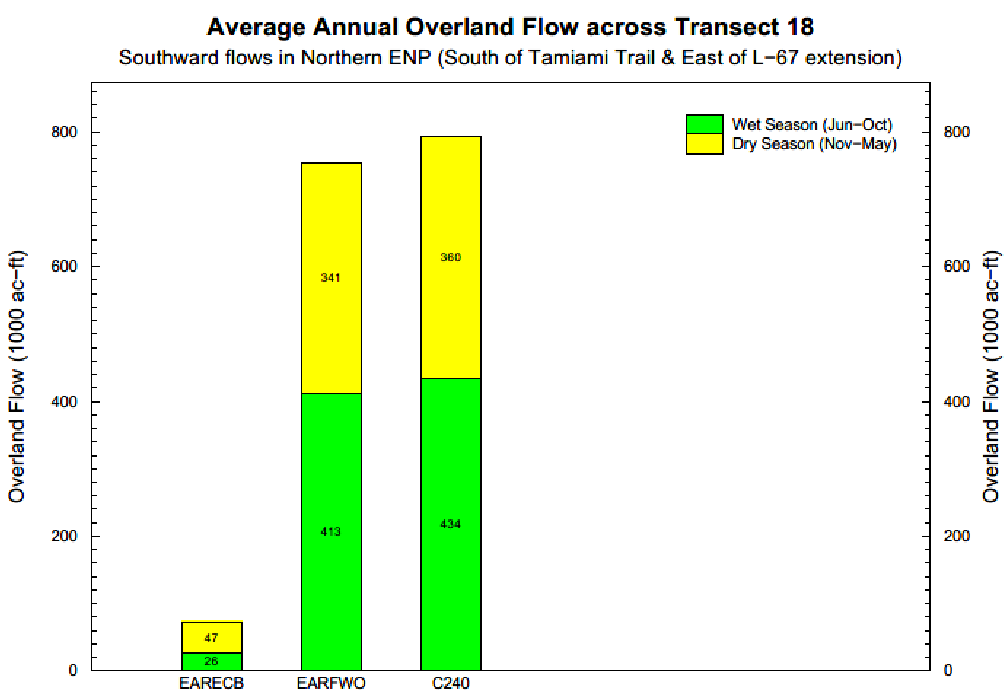

Figure C.2.2-11. Average Annual Overland Flow across Transect 18 in NESRS for the TSP

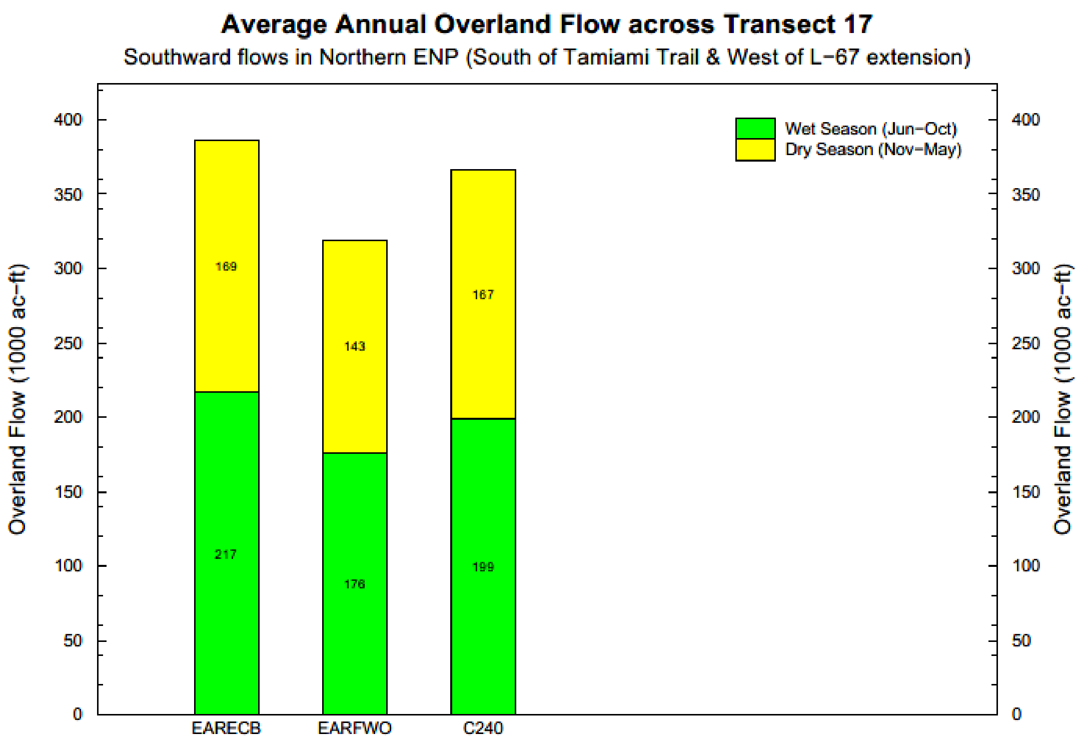

Figure C.2.2-12. Average Annual Overland Flow across Transect 17 in NWSRS for the TSP

There is a long term, moderate to minor increase in the overland flow rates in NESRS and Taylor Slough, respectively. Such flows can reduce coastal salinities and maintain hydrological and ecological connectivity. Overland flows also help to maintain the ridge-slough patterns in all of SRS. Average annual increase in sheetflow across Transect 27 in SRS is increased by 68,000 ac-ft. The average annual sheetflow across Transect 23B in Taylor Slough is increased by 3,000 ac-ft as compared to the FWO.

The Everglades, a phosphorus-limited system, historically received most inputs of phosphorus through rainfall, with average TP concentrations of less than 0.01 milligrams per liter (mg/L) (McCormick et al. 1996, Newman et al. 2004). However, more recently, areas within ENP, including NESRS, have been exposed to TP concentrations less than 0.10 mg/L (SFWMD 2017). Any additional inputs resulting from implementation of the TSP (refer to the **CEPP PACR Section 5.2.9, Water Quality** for details) have the potential to result in vegetation changes within NESRS. Vegetation that can assimilate nutrients directly from the water column appears to be the most sensitive to nutrient enrichment and include periphyton and floating-leaved plants, such as spatterdock and water lily (Chaing et al. 2000, Newman et al. 2004). Potential effects on vegetation and species community composition within NESRS and ENP cannot fully be determined at this time. Water quality within the CEPP PACR study area will continue to be monitored, as described in the Water Quality and Adaptive Management sections in **Annex D**.

Non-native and invasive plant infestations in the Greater Everglades may be exacerbated by soil disturbance, increased nutrients, and hydrological modification. Many non-native and invasive species are flourishing in a variety of habitats and are negatively affecting the ecology throughout the Everglades. Nonnative and invasive plant species are most frequently encountered in disturbed areas and areas where water quality has been impacted by increased nutrient loads. Construction and hydrological modification under the TSP are not expected to influence the spread and establishment of invasive and native nuisance plant species within the CEPP PACR affected area. Refer to **Section 5.2.17** and **Appendix C, Section C.2.2.18** for additional information.

C.2.2.3.4.1 Slough/Open Water Marsh

Deep slough communities formerly occurred throughout the pre-drainage Ridge and Slough region of the Everglades (McVoy et al. 2011). Sloughs within the Greater Everglades have been degraded by compartmentalization resulting in reduced sheetflow, depths and inundation durations, altering vegetation community structure and resulting in expansion of wet prairie and sawgrass marsh communities. Overland sheetflow has been virtually eliminated from WCA 3B due to the L-67 Canal and Levee system, resulting loss of deep water sloughs and dominance of shorter hydroperiod dense sawgrass marsh. Vegetative trends within ENP have also included the conversion of slough/open-water marsh communities to shorter hydroperiod sawgrass marshes (Davis et al. 1994, Davis and Ogden 1997, Armentano et al. 2006). The TSP only slightly increases sheetflow in SRS (**Figure C.2.2-11**) and has little to no impact on hydroperiod (**Figure C.2.2-10**). As a result, there would be no increase transition to wet prairie and slough/open water marsh communities.

C.2.2.3.4.2 Sawgrass Marsh

Increased flows, depths, and inundation durations associated with the TSP are minor to negligible through most of the PACR project area. Therefore, the TSP is not expected to help facilitate the transition of short hydroperiod sawgrass marshes to slough/open water marsh communities.

C.2.2.3.4.3 Wet Marl Prairies

Areas within the eastern marl prairies along the boundary of ENP suffer from over-drainage, reduced water flow, exotic tree invasion and frequent human-induced fires (Lockwood et al. 2003; Ross et al. 2006). To alleviate the perpetual drier conditions and its associated problems, increased water flows within this area are required. The TSP has a long-term moderate benefits to the vegetation because increased hydroperiods within the eastern marl prairies may act to alleviate some of the problems associated with drier conditions and promote a shift in species community composition.

On the other hand, a HSI for marl prairie habitat was employed to predict potential effects of implementation of CEPP and CEPP PACR on the habitat utility for the CSSS. This Marl Prairie Indicator is a temporally and spatially explicit modeling tool that simulates hydrologic suitability of marl prairie CSSS habitats based on CSSS survey presence data threshold ranges (Pearlstine et al. 2013). The Marl Prairie Indicator evaluates marl prairie hydrologic suitability with four metrics: (1) average wet season water depths (June – October), (2) dry season water depths (November – May), (3) discontinuous annual hydroperiod (May – April of the next year), and (4) maximum continuous dry days during the nesting season (March 1 – July 15). Suitability for marl prairie habitat for the TSP and the FWO trend similarly. However, differences between the ECB and the TSP within the project area are significant (**Table C.2.1-1)**.

Locations of CSSS subpopulations are depicted in **Figure C.2.1-12**. **Table C.2.2-1** displays Marl Prairie Indicator results for existing conditions, future without CEPP (FWO), and the TSP. Considered at the scale of all potential sparrow habitats within each subpopulation or habitat area, there were minor to negligible differences between the FWO and the TSP. As was decided for CEPP, these differences are not discussed further in this document. Hydrologic suitability for marl prairie habitat will transition throughout the southern Everglades, substantially improving in localized regions while notably declining in other regions.

The TSP has an overall moderate impact to marl prairie hydrologic suitability in the southern Everglades relative to FWO because of the substantial transitional shifts expected to occur throughout the spatial extent of the southern Everglades. These local differences in performance may warrant further consideration because they illustrate where within the southern Everglades that changes to marl prairie hydrologic suitability are anticipated.

Table C.2.2-1. Number of Years from 1965 to 2005 when the Hydroperiod between 90 and 210 Days (3 to 7 Months) per Year throughout Sparrow Habitat Maintains Marl Prairie Vegetation for the Existing Conditions, FWO, and TSP

Alternative	Subpopulation							
	A-1	A-2	B	C	D	E-1	E-2	F
ECB	6	9	25	18	1	24	12	17
FWO	10	8	24	15	4	18	10	14
C240	10	9	24	16	3	16	9	13

The overall impact to marl prairie hydrologic suitability, when comparing the combined spatial region scores of TSP relative to FWO, in Subpopulation A appears relatively beneficial. Benefits are anticipated within northeastern Subpopulation A and the spatial regions flanking the northeastern and northern region east of Subpopulation A due to the improved distribution of water deliveries across the Tamiami Trail associated with the TSP

The overall impact to marl prairie hydrologic suitability of the combined spatial regions within designated Subpopulation B critical habitat with the TSP relative to FWO appears neutral.

Benefits to marl prairie hydrologic suitability appear moderate when comparing the TSP to FWO within Subpopulation C (**Table C.2.2-1**), while the overall impact to marl prairie hydrologic suitability of the TSP within designated Subpopulation D critical habitat appears to be a moderate decline. However, there are limited spatial regions throughout Subpopulation D where there are negative impacts.

The overall impact to marl prairie hydrologic suitability of the TSP to FWO of the combined spatial regions within designated Subpopulation E critical habitat appears relatively moderate to major. However, as found in CEPP (FWO), there are spatial regions within Subpopulation E where there are substantial negative impacts to marl prairie hydrologic suitability and there are spatial regions where there are beneficial effects due to the increased water deliveries that occur in this region with the TSP. Slight declines in hydrologic suitability occur along the regions of E that abut Shark River Slough due to the increased water deliveries that occur in this region with the TSP. However, these shifts within the critical habitat are accompanied by some areas of hydrologic improvements to habitat between subpopulations E and C.

The overall negative impact to marl prairie hydrologic suitability of TSP relative to FWO of the combined spatial regions within designated Subpopulation F appears relatively moderate. However, as in CEPP, negative effects are probably occurring in the regions between E and F due to increased water deliveries but this is somewhat balanced by the projected habitat improvement in interior regions of F with the TSP.

C.2.2.3.4.4 Tree Islands

The hydrological and ecological responses of tree islands in the Greater Everglades to the recommended plan are not significantly different from the FWO. Slight differences are easily seen when the figures below are compared to their counterparts in **Appendix C.2.1.3.4.4**. Starting in the Northeast section of WCA 3A where there is concern that hydrologic restoration might be stressful for the sawgrass plain and tree islands, the duration curve for ponding depths indicates a long-term, moderate increase in hydroperiods and depths (**Figure C.2.2-13**). However, these differences are not at the high depth potion of the duration curve where deep water can stress vegetation on tree islands, instead it is at the low depth section of the curve where the TSP reduces damaging dry-down durations by 4% and it adds, on average between 0.05 ft. and 0.10 ft. of ponding depth to the stage duration curve, providing moderate beneficial effects.

Since water depths on the marsh surface is predicted to be 1.0 ft or less 80% of the time for the TSP, this is not considered to be harmful to existing tree islands.

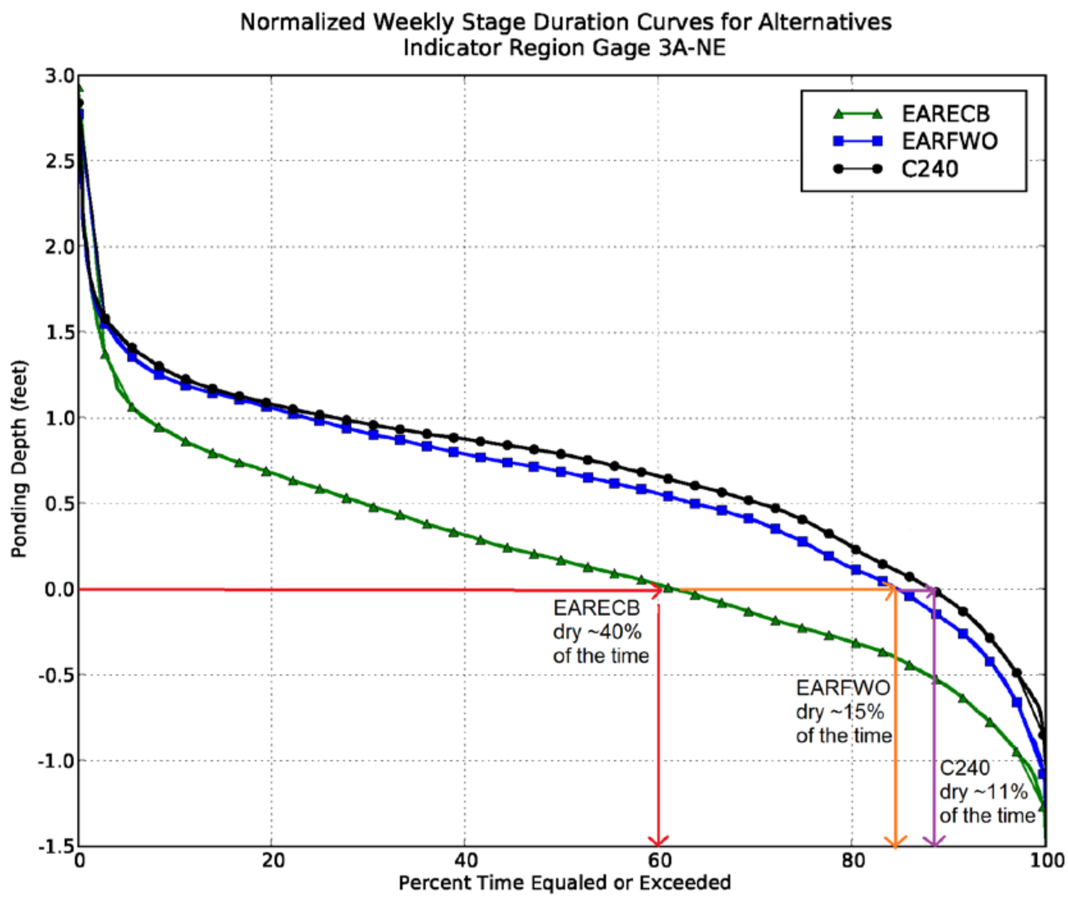

Figure C.2.2-13. Rehydration of Northeastern WCA 3A due to the TSP

Moving down through WCA 3A, the central and southern regions are expected to respond similarly. For the evaluation of the alternatives in Southern WCA 3A, the TSP does not lower the damaging ponding depths in comparison to the FWO and does not improve the ecological condition of trees islands in this region. Thus, benefits are deemed negligible.

Moving into WCA 3B (not including the Blue Shanty Flowway); the TSP makes no significant improvements to the hydroperiods in comparison to the FWO (**Figure C.2.2-14**).

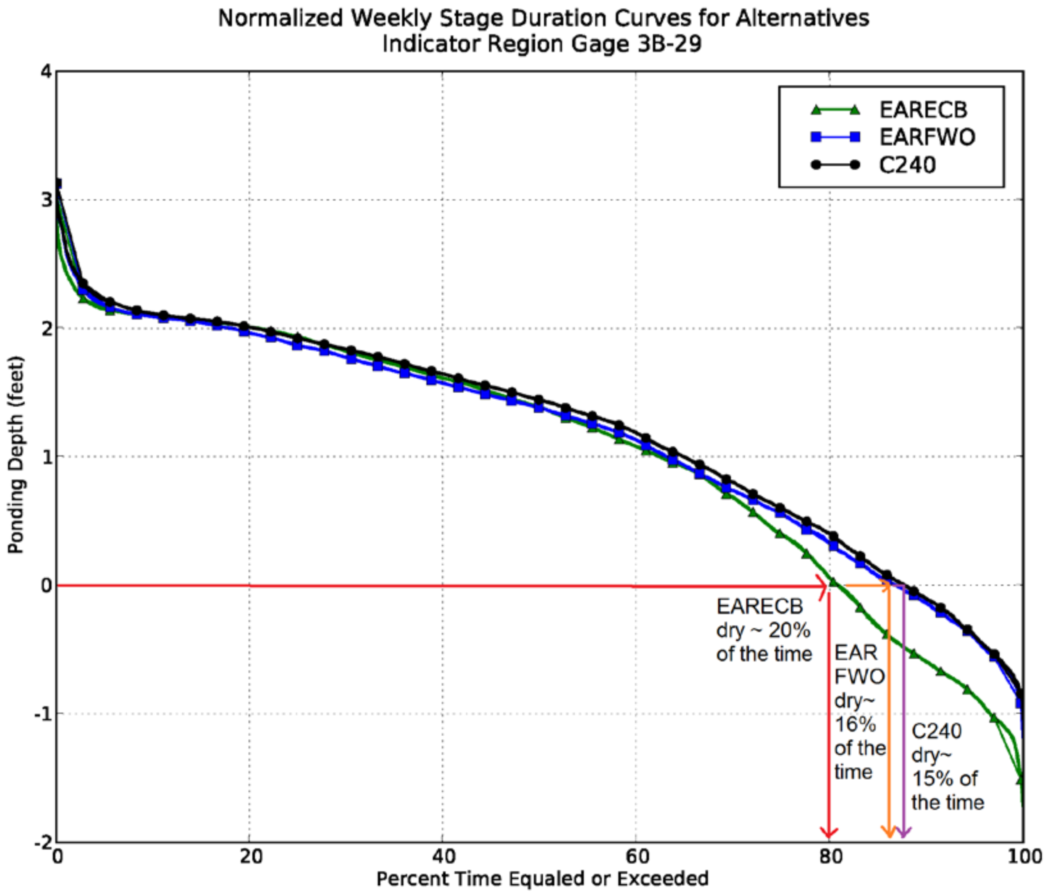

Figure C.2.2-14. Rehydration of WCA 3B due to the TSP

C.2.2.3.4.4.1 Shark River Slough (SRS)

Finally, looking at SRS where tree islands rise high above the surrounding marsh, their potential for flooding stress is practically non-existent. Instead, ENP is faced with a reduction in islands due to intensive fires that migrate across the marshes and burn tree island peat soils so that all that is left are rocky outcroppings. The objective of the TSP is to prevent extensive dry-downs and create extended hydroperiods. **Figure C.2.2-15** shows a TSP marsh surface hydrology that is essentially the same as the FWO, providing only a negligible benefit.

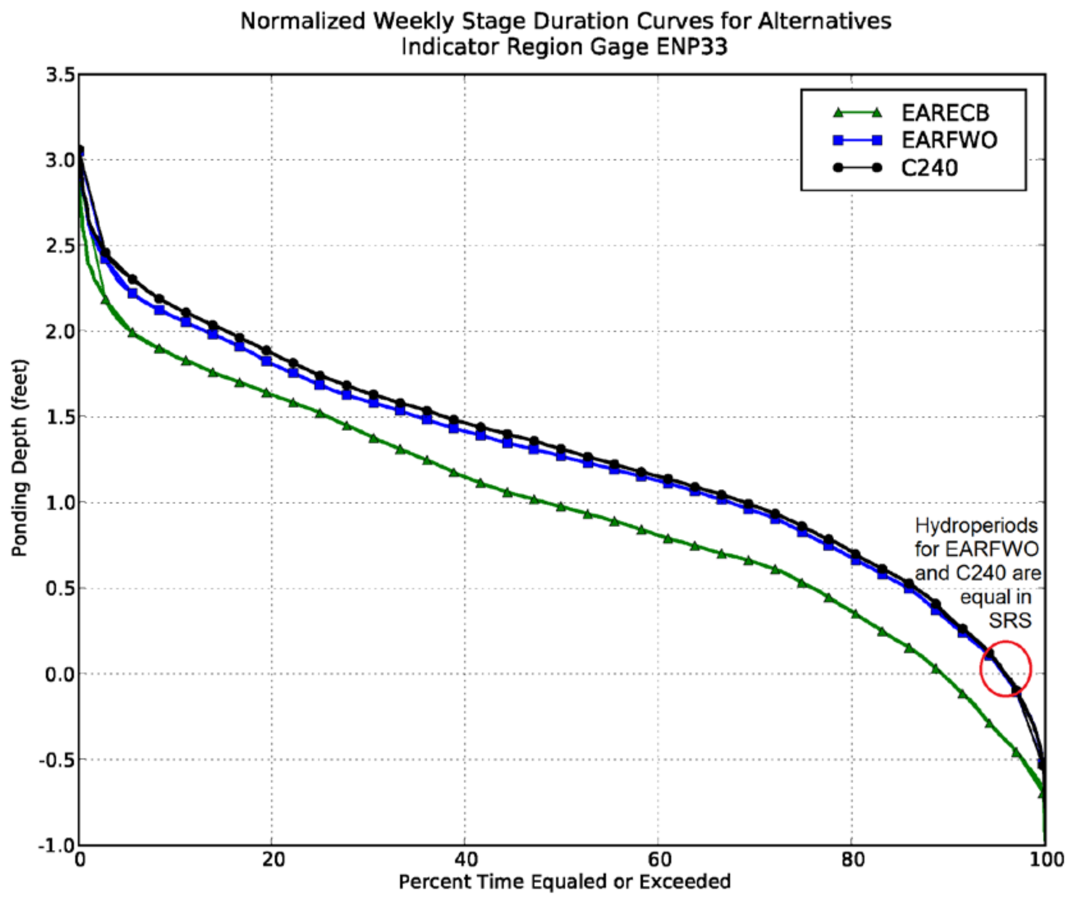

Figure C.2.2-15. Ponding Depths for Tree Islands in SRS Will Be Equal for TSP to FWO

It should be noted that south Florida's forest dynamics are driven significantly by hurricanes and wind storms. Damage to tree island species can be caused by hurricanes, depending on many factors: the location of tree islands in relation to a hurricane's center, sustained winds and wind gusts speed, soil conditions and types of vegetation. The intensity of a hurricane including duration and precipitation immediately prior to and during the event affect the stability of trees. If winds exceed the resistance of root/soil systems, trees uproot (Mitchell 2013). "In general, taller and larger trees are more susceptible to wind damage than shorter, smaller trees (Merry et al. 2011)." Also, tree species type affects vulnerability to damage (Barry et al. 1998). Therefore, while TSP hydrologic conditions are expected to be beneficial, some plant species may be negatively impacted due to their interaction with wind and storms. The Adaptive Management and Monitoring Plan (**Annex D**) will ensure that vegetation is adapting to restoration conditions.

C.2.2.3.4.5 Rockland Pine Forest

Negligible and less than significant effects are predicted within Rockland pine forest as a result of the TSP implementation.

C.2.2.3.4.6 Tropical Hardwood Hammock

Tropical hardwood hammocks on the Miami Rock Ridge have been affected by a lowered water table associated with the reduction of freshwater flow through the Everglades. Since the TSP provides some increased flow through the Greater Everglades, it is anticipated that tropical hardwood hammocks would show a minor to negligible beneficial effect from TSP implementation. As with other vegetative communities, the TSP would provide slight rehydration benefits to ENP as compared with the FWO.

C.2.2.3.5 Southern Coastal Systems

C.2.2.3.5.1 Mangroves

As compared with the FWO, mangrove communities associated with the Northern Estuaries would likely show a moderate and long-term benefit with the TSP from reduction in high flows, and accompanying flow velocities would result in lower suspended solid loading and decreased concentration of colored dissolved organic matter, thereby allowing greater light penetration to promote growth of SAV.

Florida Bay experiences salinities in excess of 40 psu on a seasonal basis. As compared with FWO, the TSP provides only a small increase of direct freshwater flows to Florida Bay via Taylor Slough as captured by the overland flow values across Transect 23b (**Figure C.2.2-46**). The TSP provides slightly improved salinity conditions in Florida Bay in comparison to the FWO.

C.2.2.3.5.2 Seagrass Beds

As compared with the FWO, seagrass beds associated with the Northern Estuaries would show a moderate and long-term benefit with the TSP from reduction in high flows, and accompanying flow velocities would result in lower suspended solid loading and decreased concentration of colored dissolved organic matter, thereby allowing greater light penetration to promote growth of SAV.

Seagrasses within Florida Bay have long suffered from high salinities due to long-term reductions of freshwater flow. Seagrasses have an optimum salinity range of 24 to 35 psu, but can tolerate considerable short-term salinity fluctuations.

As compared with the FWO, the TSP provides slightly greater sheetflow volumes across Taylor and Shark River Sloughs (**Figure C.2.2-16** and **Figure C.2.2-17**), which translates into minor, but long-term increased freshwater flows to Florida Bay and the southwestern coastal estuaries, thereby aiding to lower salinities levels within these areas to better encompass seagrass salinity tolerance range and providing minor beneficial effects. A non-linear, dynamic statistical regression model developed by RECOVER and the ENP (Find Reference) for CEPP was also used here to see if Florida Bay salinity values would show a general improvement with the TSP (**Figure C.2.2-18**). A small but significant reduction in the mean salinities, found across the entire Bay, ranged from 0.1 psu to 0.5 psu.

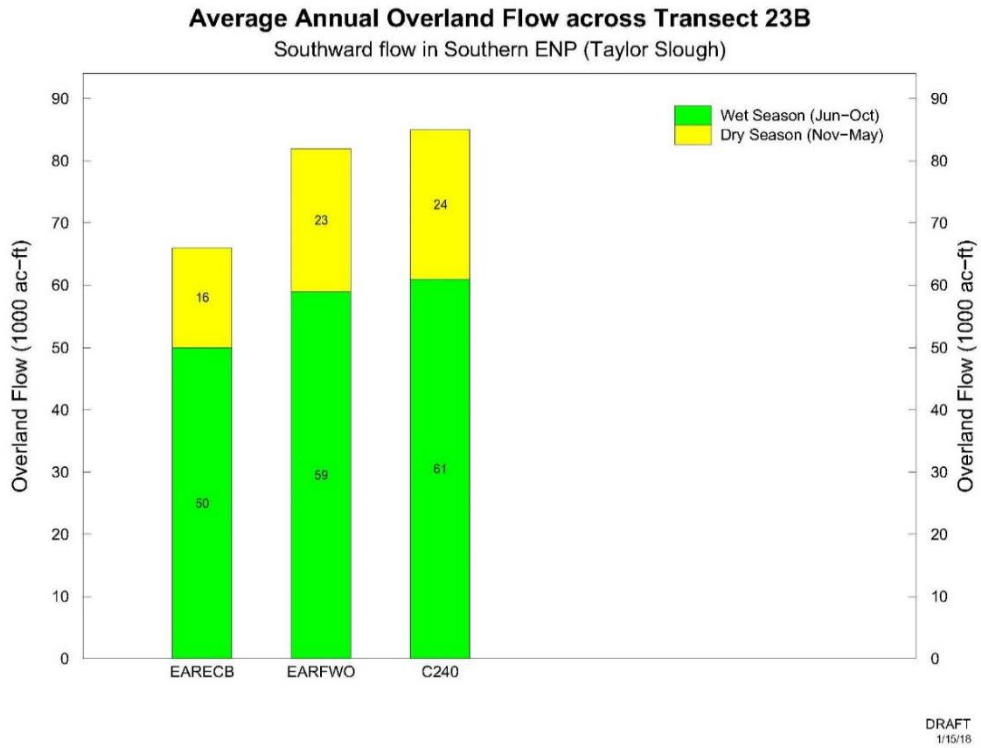

Figure C.2.2-16. Average Annual Overland Flow Transect for Taylor Slough

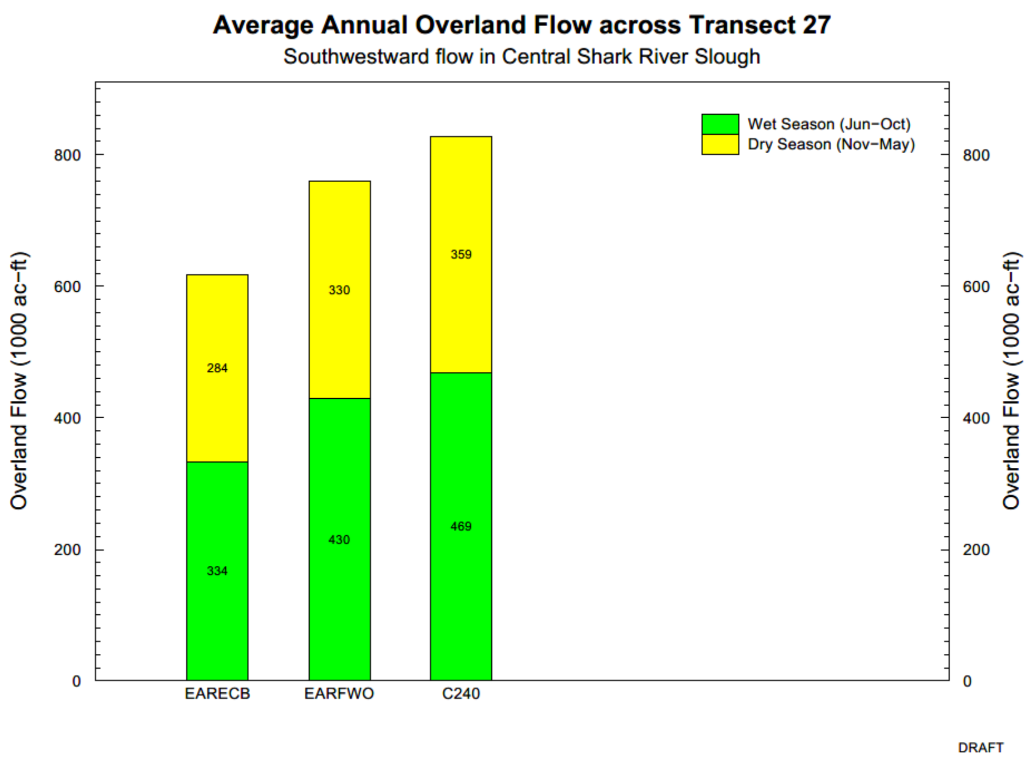

Figure C.2.2-17. Average Annual Overland Flow Transect for Central Shark River Slough

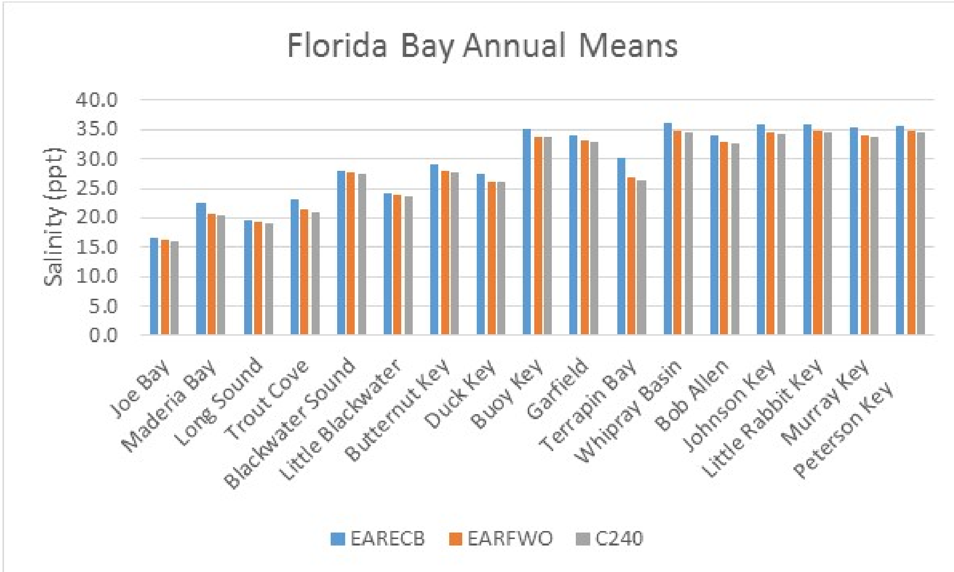

Figure C.2.2-18. Annual Mean Salinity in Florida Bay for Existing Conditions, FWO, and TSP

C.2.2.4 Threatened and Endangered Species

RSM-GL model results were used to compare performance of alternatives in relation to the ERTP PMs and ETs on species (discussed in Section 5 and C.2.1) the USACE determined may be affected by the project. All calculations are based upon the RSM 41-year POR from 1965 through 2005. A detailed comparison between the ECB, the FWO, and TSP is contained within the draft CEPP PACR Biological Assessment, located in **Annex A**. For the purposes of the CEPP PACR, coordination for threatened and endangered species will occur after the report has been submitted to the ASA (CW). Effect determination on protected species should not change. Further consultation will be required before the CEPP PACR is authorized.

Figure 1-2 in **Annex A** depicts the affected area referenced in this section.

C.2.2.4.1 Everglade Snail Kite

As compared to the FWO, rehydration and minor vegetation shifts within northwestern WCA 3A, and decreases in the frequency and duration of extreme low lake stages in Lake Okeechobee would increase suitable habitat for apple snails, thereby increasing the spatial extent of suitable foraging opportunities for snail kites, providing a minor beneficial effect. The TSP produced slightly greater depths and hydroperiods in northwestern WCA 3A relative to the FWO. However, Everglades snail kite designated critical habitat (emergent aquatic vegetation) within Lake Okeechobee, WCA 1, or WCA 2 would not be affected by the TSP.

C.2.2.4.2 Cape Sable Seaside Sparrow

Effects of the TSP on the CSSS are discussed below based on the appropriate PM and ET. CSSS surveys resulted in a range map that divided the CSSS into six separate subpopulations, labeled as A through F (**Figure C.2.1-12**), with CSSS-A as the only subpopulation west of SRS (Curnutt et al. 1998).

PM-A (CSSS-A): Provide a minimum of 60 consecutive days below ground surface elevation (GSE) beginning no later than March 15.

Table C.2.2-2 shows the number of years this criterion is met out of the 40-year period of record for each of the areas within the subpopulations for the TSP and the FWO. The sites shown in **Table C.2.2-2** are IR-A1 within subpopulation A, north; IR-A2 within subpopulation A, south; P34 within subpopulation A, central; TMC within subpopulation A, east central; CY3 within subpopulation B, central; R3110 within subpopulation C, west; E112 within subpopulation C, central; NPA13 within subpopulation E, central; and RG2 within subpopulation F, southwest.

Table C.2.2-2. Number of Years a Minimum of 60 Consecutive Days at below Each Area's GSE (NGVD) Beginning No Later than March 15 is Met Out of the 40-Year Period of Record

Subpopulation	Gage/Cell	C240	FWO
A	IR-A1	21	21
	IR-A2	22	25
	P34	28	28
	TMC	24	28
B	CY3	39	39
C	R3110	38	38
	E112	38	38
D	EVER4	NA	NA
E	NE of NPA13	30	32
F	NE of RG2	32	33

CSSS are largely sedentary, occupy the prairie habitats year-round and are completely dependent on the condition of the prairies. The CSSS have a short life expectancy of two to three years. This short life expectancy range identifies that for the population to sustain itself, there must not be three or more years in a row where water depths are not suitable for nesting. This means that there should not be three consecutive years in a row where the minimum of 60 consecutive dry days during the nesting season is not met. Additional analysis shows the number of consecutive dry days during the nesting season over the POR with the red line indicating 60 days (**Figure C.2.2-19** through **Figure C.2.2-24**). The target is 60 or more consecutive dry days during the nesting season (March 1-May 15) and only the site in subpopulation B (CY3) meets this criterion for 97% of the time (**Figure C.2.2-21**). Subpopulation C comes close with 38 of the 40 days meeting the criterion (**Figure C.2.2-22**). The FWO shows a similar result. Model runs from all other subpopulations indicate poorer performance.

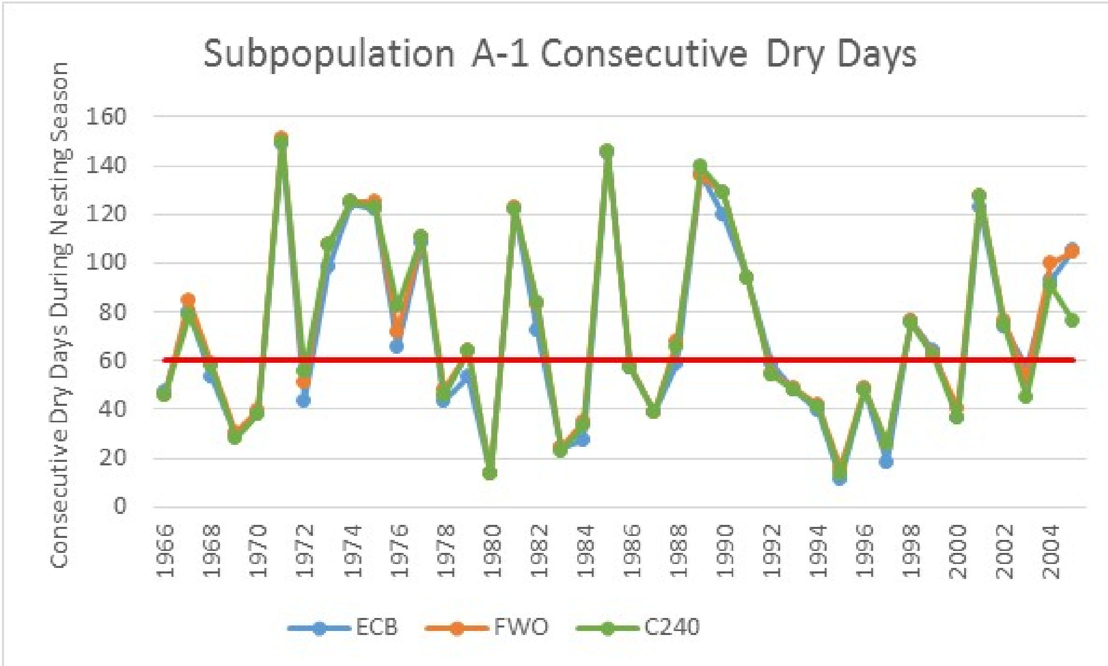

Figure C.2.2-19. Duration of Consecutive Dry Days for the Northern Region of CSSS-A (IR-A1) between March 1 and July 15

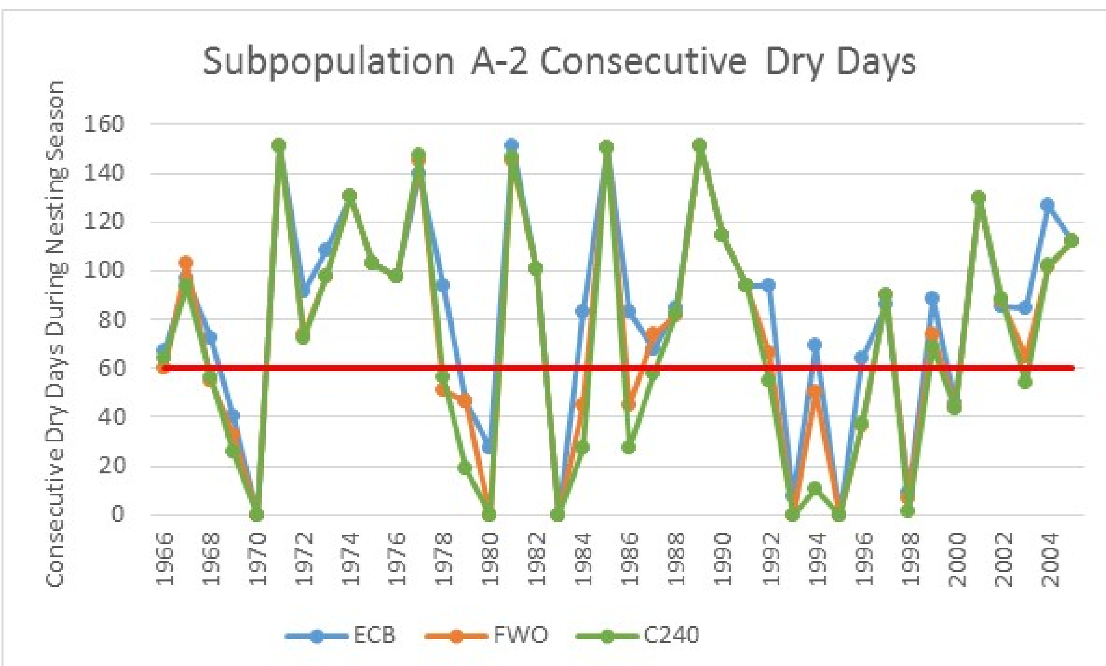

Figure C.2.2-20. Duration of Consecutive Dry Days for the Southern Region of CSSS-A (IR-A2) between March 1 and July 15

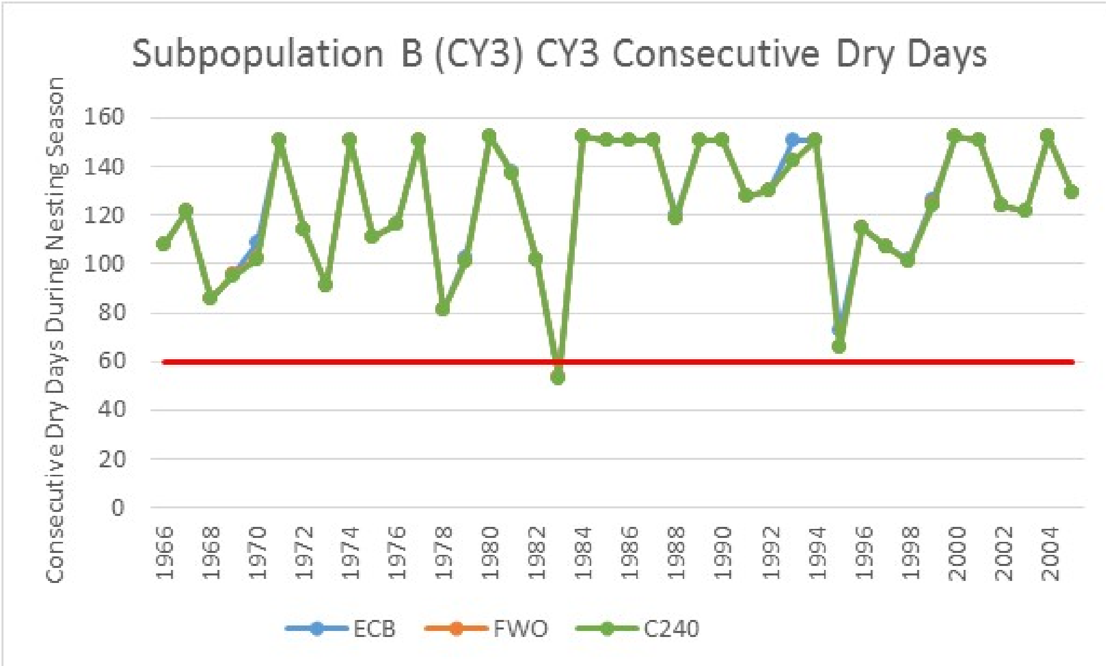

Figure C.2.2-21. Duration of Consecutive Dry Days for CSSS-B (CY3) between March 1 and July 15

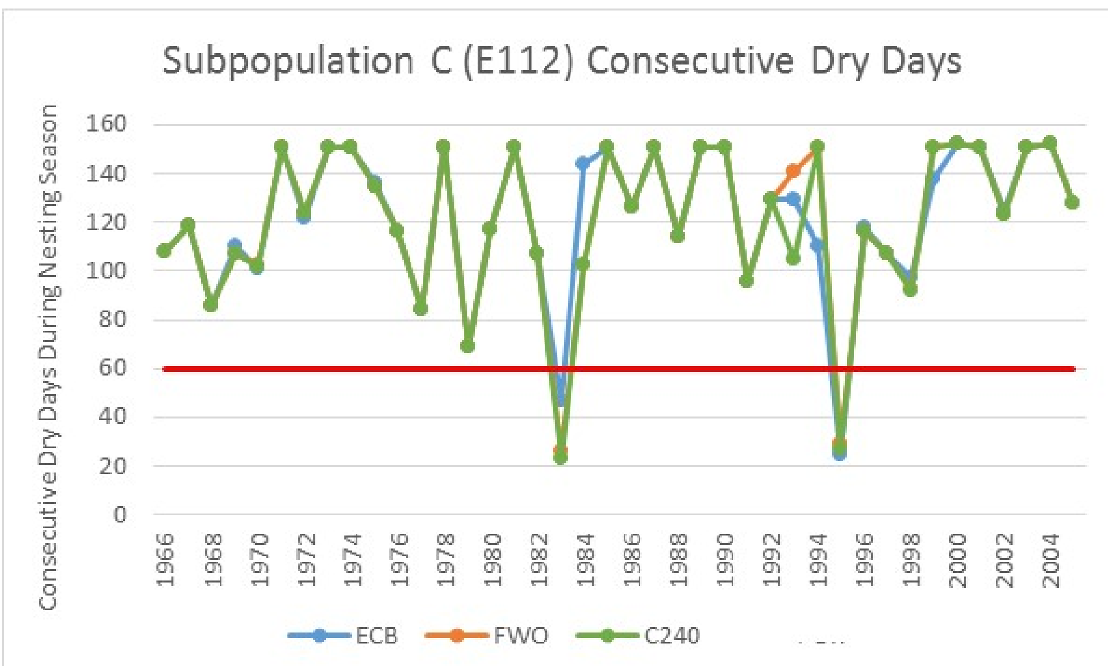

Figure C.2.2-22. Duration of Consecutive Dry Days for CSSS-C (E112) between March 1 and July 15

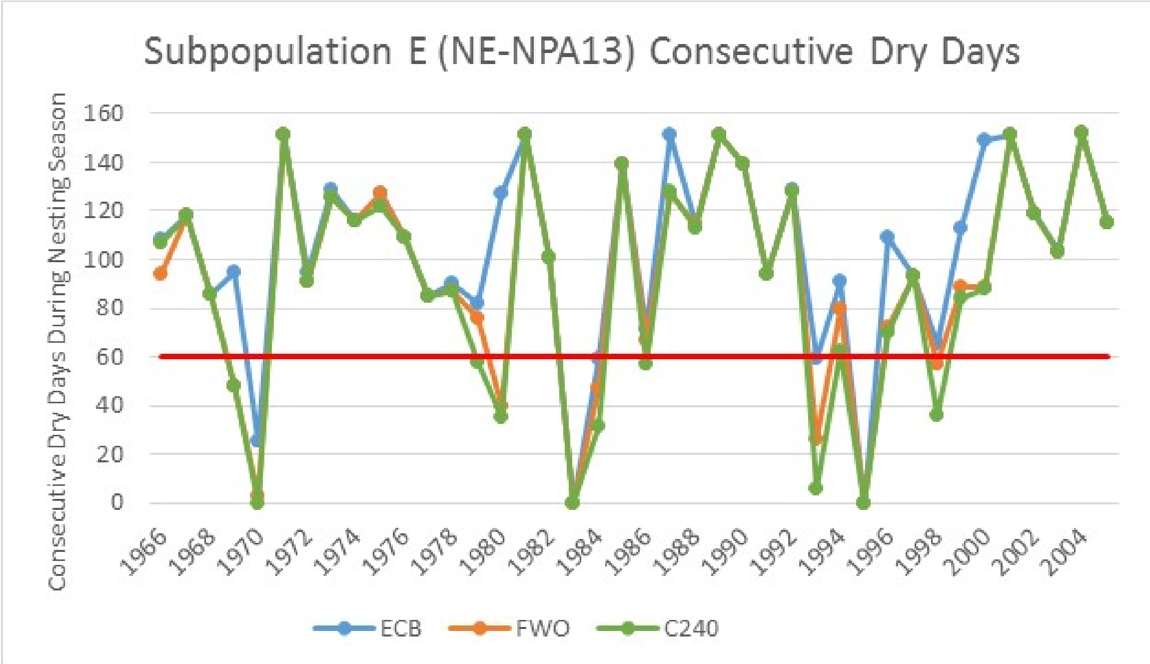

Figure C.2.2-23. Duration of Consecutive Dry Days for CSSS-E (NE of NPA13) between March 1 and July 15

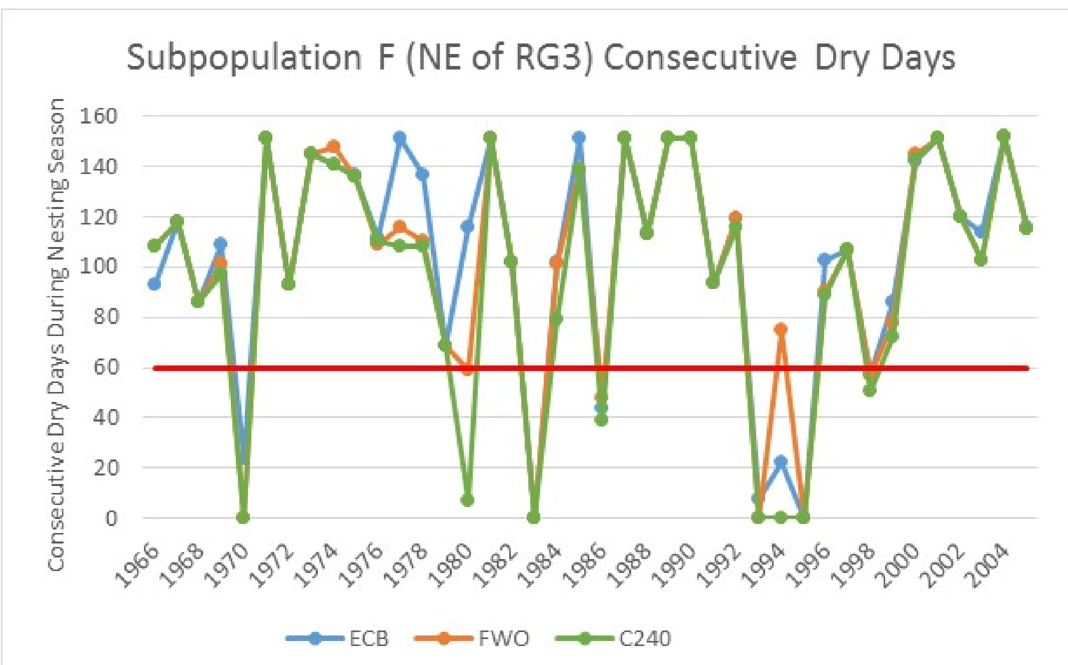

Figure C.2.2-24. Duration of Consecutive Dry Days for CSSS-F (NE of RG2) between March 1 and July 15

T-2 (CSSS): Strive to maintain a hydroperiod between 90 and 210 days (three to seven months) per year throughout sparrow habitat to maintain marl prairie vegetation.

To maintain suitable habitat for CSSS, the annual hydroperiod (i.e. time above ground surface during wet season) should be between 90 and 210 days. Sparrows prefer to nest in short-stature clumped grasses such as Muhlenbergia, Schizachryium, and Schoenus. Habitat can tolerate infrequent years of up to 240 days and below 90 days. To compare alternatives for hydroperiod throughout CSSS habitat, ETs were used. RSM-GL results for each CSSS subpopulation are depicted in **Table C.2.2-1**. **Table C.2.2-1** compares the TSP to the FWO to maintain a hydroperiod between 90 and 210 days (three to seven months) per year throughout sparrow habitat to maintain marl prairie vegetation. The TSP performed the same or worse than the FWO for all subpopulations. The only subpopulation for which the criterion was met was subpopulation B (both FWO and TSP) and the only subpopulation showing a minor negative impact was subpopulation C (with 38 of 40 years meeting the criterion for both FWO and TSP). All other subpopulations are anticipated to experience a moderate to major negative impact due to the FWO and the TSP. The Federally authorized CEPP plan, the FWO, had the potential to have a major adverse effect and significant and unavoidable effect on hydroperiods within the marl prairies adjacent to SRS, but were mitigated as described in the CEPP Annex D. These mitigation measures would be maintained for implementation of the TSP (see **Annex D**).

The incremental effects of the minor increase in hydroperiod durations are anticipated to cause a minor to moderate negative effect to the CSSS nesting pattern as compared to the FWO, accept for sub-population F which shows a moderate negative effect. However, the mitigation efforts from the adverse effects created by the FWO would be expected to continue for the TSP.

C.2.2.4.3 Wood Stork

An analysis by the South Florida Natural Resources Center (Beerens 2013) of wood stork foraging potential was done for CEPP to evaluate and predict improvements to foraging habitat. Results from this analysis indicated improved foraging conditions in northern WCA 3A, WCA 3B, and ENP due to improved fish abundance, vegetation, and hydrology. Although the Beerens Model (2013) is not available for this evaluation, the TSP hydroperiods would be indicative of a long-term, but minor improvement in the foraging conditions in NE WCA 3A and negligible everywhere else (**Figure C.2.2-13** through **Figure C.2.2-15, Figure C.2.2-25** through **Figure C.2.2-28**). Hydrological patterns that produce a maximum number of patches with high prey availability (i.e. high water levels at the end of the wet season and low water levels at the end of the dry season) are necessary for high reproductive outputs (Gawlik 2002, Gawlik et al. 2004). Depending upon the elevation and microtopography throughout WCA 3 and ENP, implementation of the TSP would produce the same variety of wetland habitats as the FWO that would support prey densities conducive to successful wading bird foraging and nesting, providing a minor to moderate beneficial effect to wood stork.

Restoration of hydroperiods and hydropatterns closer to a pre-drainage condition (Pre-drainage conditions are defined as those conditions that occurred in the late 1800s, prior to the wide-scale drainage, urbanization, and compartmentalization of the Everglades.) is a focal Everglades restoration objective for the CERP. A related CERP restoration goal is to restore historic wading bird foraging and colonial nesting habitats in the mainland estuary zones of Everglades National Park (ENP). Therefore, the general transitioning of wood stork foraging habitat (under most climatic conditions) from Shark River

Slough, which historically was a deep water white-water lily-dominated slough habitat, back into southern ENP, is considered a progressive step toward ecosystem restoration.

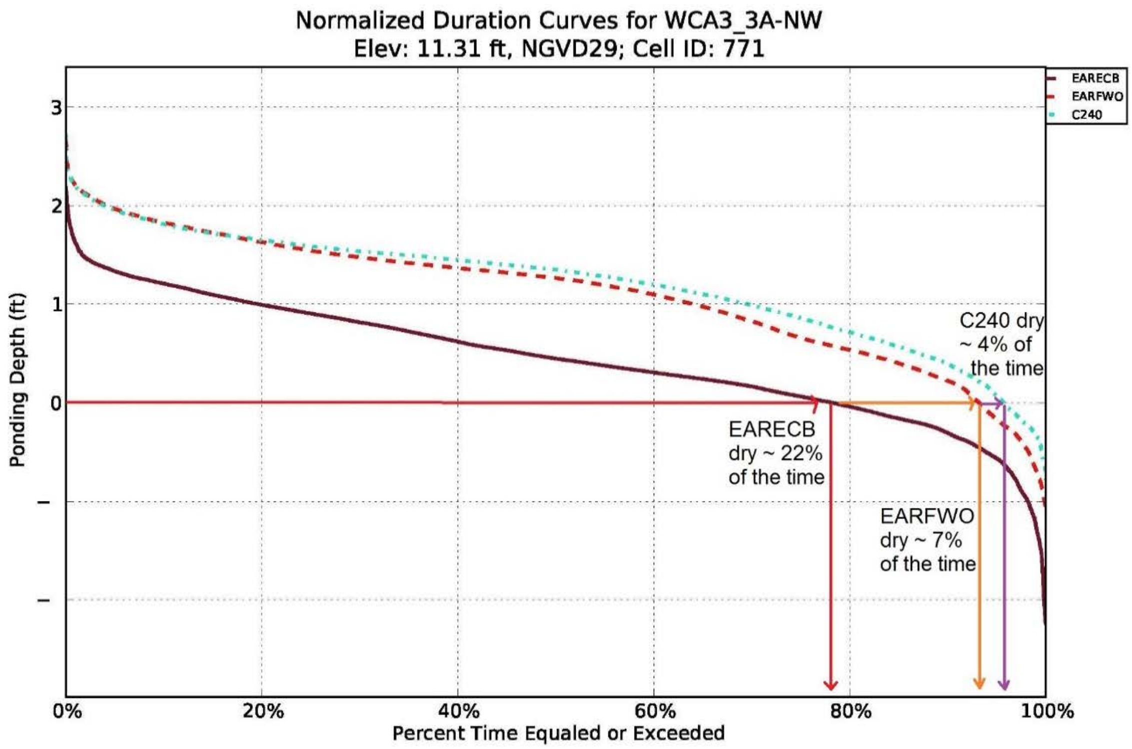

Figure C.2.2-25. Rehydration of Northwestern WCA 3A Gage 3A-NW due to the TSP

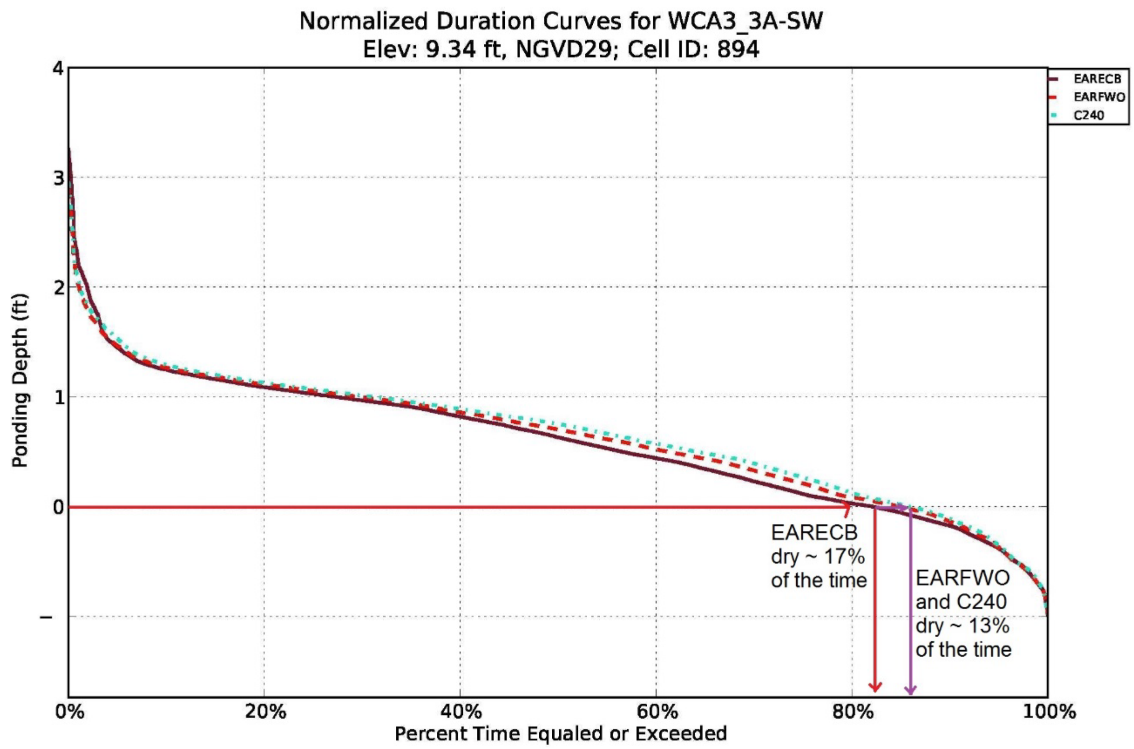

Figure C.2.2-26. Rehydration of Southwestern WCA 3A Gage 3A-SW due to the TSP

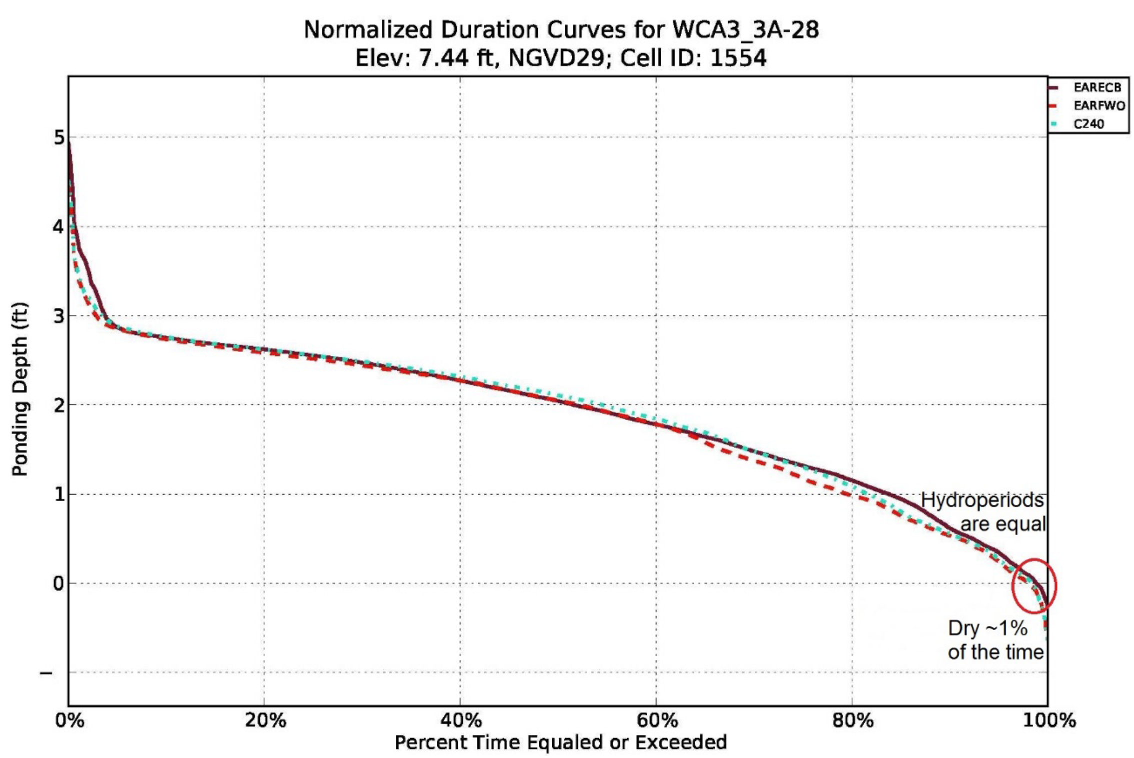

Figure C.2.2-27. Rehydration of WCA 3A Gage 3A-28 due to the TSP

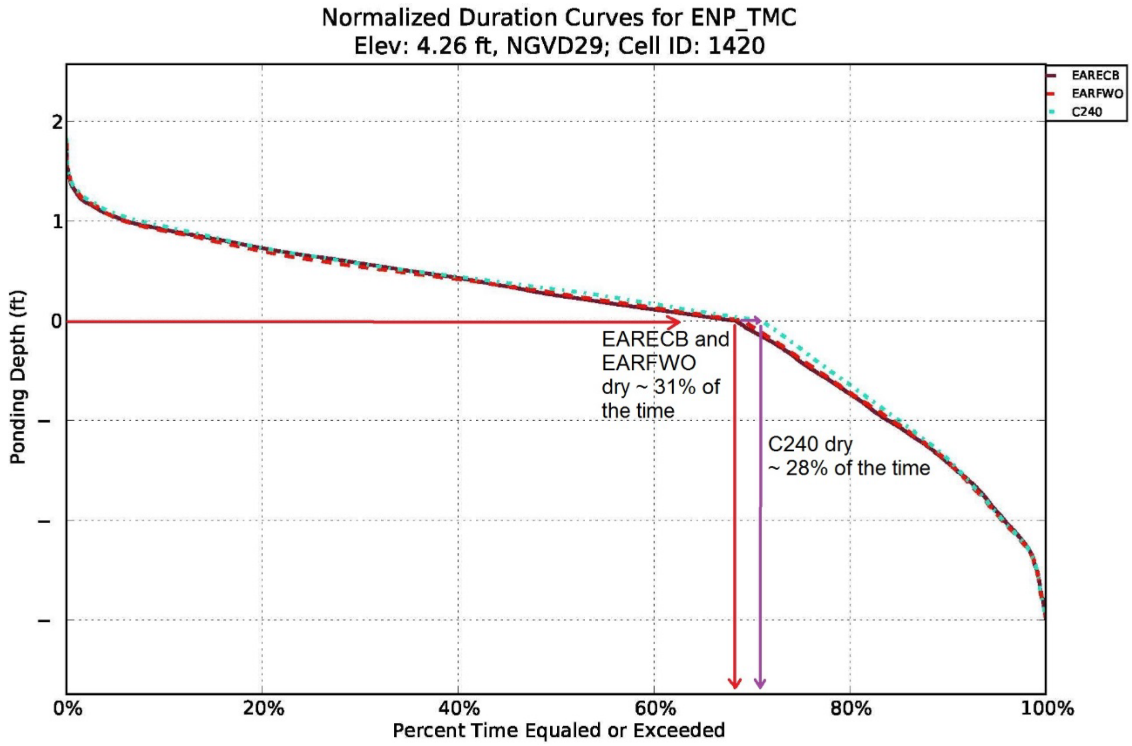

Figure C.2.2-28. Rehydration of TMC due to the TSP

C.2.2.4.4 Eastern Indigo Snake

Since Eastern indigo snakes occur primarily in upland areas, their presence within the Greater Everglades portion of the project area is somewhat limited; however, they have a high probability of occurrence within the project construction footprint. Standard protection measures for the Eastern Indigo snake will be implemented during construction of the TSP in order to minimize impacts. The effects of the TSP to the indigo snake would be comparable with the FWO.

C.2.2.4.5 Florida Manatee

The Federally endangered Florida manatee is a large, plant-eating aquatic mammal that can be found in the shallow coastal waters, rivers, and springs of Florida. Florida manatees live in freshwater, brackish, and marine habitats, and can move freely between salinity extremes. Florida manatees have been observed in conveyance canals within the affected area, specifically in the lower C-111 Canal just downstream of S-197; and adjacent nearshore seagrass beds throughout Florida Bay including all waters of Card, Barnes, Blackwater, Little Blackwater, Manatee and Buttonwood sounds. The extensive acreages of seagrass beds in the bay provide important feeding areas for Florida manatees. Decreased salinities within the Northern Estuaries that reduce stress on SAV and promote increases in seagrass shoots have the potential to increase foraging opportunities for manatees in this region. Similarly, increased freshwater flows to Florida Bay and the southwestern coastal estuaries resulting in lowered salinity levels that better encompass seagrass salinity tolerance ranges would also increase foraging opportunities for manatees. The effects of the TSP to Florida manatee would be comparable with the FWO.

As compared to the FWO, the TSP would decrease damaging high-volume flows to the Northern Estuaries, providing minor beneficial effects to manatees and their critical habitat. Decreased flows within the Northern Estuaries would reduce stress on SAV and promote increases in seagrass density and aerial extent, thereby increasing foraging opportunities for manatees in this region. Minor Increases in freshwater flows to Florida Bay could reduce salinity fluctuations and overall salinity to levels that better encompass seagrass salinity tolerance ranges. Optimal salinity ranges result in higher seagrass productivity that ultimately provides increased foraging opportunities for manatees.

C.2.2.4.6 Florida Panther

Florida panthers presently inhabit lands in the EAA and ENP adjacent to the Southern Glades, and radio tracking studies have shown that they venture into the Southern Glades on occasion during post-breeding dispersion. The FWO would convert upland habitat that could be potentially used by Florida panther to transverse the area to wetland habitat, thereby eliminating potential habitat within the panther secondary zone in this region.

The TSP has the potential to have an adverse effect on Florida panther habitat. Construction of the STA on the 4,551-acre A-2 Expansion area would result in conversion of upland habitat that could be potentially adverse to the Florida Panther's ability to move between natural habitats. Overall the conversion of upland habitats to habitats that prohibit the ability of Florida panther to traverse the project area is expected to result in an adverse effect to the Florida panther.

C.2.2.4.7 American Alligator

A keystone species within the Everglades ecosystem, the American alligator is dependent on spatial and temporal patterns of water fluctuations that affect courtship and mating, nesting, and habitat use (Brandt and Mazzotti, 2000). Historically, American alligators were most abundant in the peripheral Everglades marshes and freshwater mangrove habitats, but are now most abundant in canals and the deeper slough habitats of the central Everglades. Water management practices including drainage of peripheral wetlands and increasing salinity in mangrove wetlands as a result of decreased freshwater flows has limited occurrence of American alligators in these habitats (Craighead 1968, Kushlan 1990, Mazzotti and Brandt 1994). Due to rehydration and decreased salinity of previously drained areas, particularly in northern WCA 3A and ENP, it is anticipated that implementation of TSP would moderately improve alligator habitat suitability as compared with the ECB and provide a minor beneficial effect. The conversion of agricultural lands to freshwater wetlands and storage features will also have a moderate beneficial effect on alligators.

C.2.2.4.8 American Crocodile

Negligible changes in hydrology are expected within the habitats utilized by the American crocodiles; therefore, negligible and less than significant effects are predicted as a result of implementation of the TSP. The juvenile American crocodiles' growth and survival index is one of the components of a crocodile HSI that characterizes suitable habitat for crocodiles based on habitat, location of known nest sites, salinity, and prey biomass. The growth and survival index is calculated for August through December, the period following hatching when hatchlings are most vulnerable to high salinities (Mazzotti 1999; Mazzotti et al. 2007). Mean salinity data from Florida Bay indicate that a negligible change would be expected and, as previously stated, these changes would be expected to have negligible effect on the juvenile crocodile HSI compared with the FWO. The TSP would slightly increase freshwater flows, ultimately reducing salinity fluctuations, which would be expected to provide minor beneficial effects and improve habitat suitability for the American crocodile.

C.2.2.4.9 Smalltooth Sawfish

Smalltooth sawfish (*Pristia pectinata*) have been reported in the Pacific and Atlantic Oceans, and the Gulf of Mexico; however, the United States population is found only in the Atlantic Ocean and Gulf of Mexico. Historically, the United States population was common throughout the Gulf of Mexico from Texas to Florida, and along the east coast from Florida to Cape Hatteras. The current range of this species includes peninsular Florida, with some regularity only in south Florida from Charlotte Harbor to Florida Bay. Juvenile sawfish use shallow habitats with a lot of vegetation, such as mangrove forests, as important nursery areas. Many such habitats have been modified or lost due to development of the coastal areas of Florida and other southeastern states. The loss of juvenile habitat likely contributed to the decline of this species.

Although the main Florida population resides in the Caloosahatchee River and adjacent Charlotte Harbor estuaries, smalltooth sawfish has the potential to be found in the Southern Estuaries where the juveniles could potentially occur and feed in red mangrove wetlands. By implementation of the proposed project, the smalltooth sawfish may show a minor beneficial effect from increased freshwater flows into the coastal wetlands adjoining Florida Bay, which would provide more natural and historic overland flows.

Discharging large volumes of freshwater from Lake Okeechobee to the Caloosahatchee River during the wet season significantly reduces salinities and increases nutrient loading; all of which has a profound adverse effect on estuarine flora and fauna. As a result, the smalltooth sawfish and their critical habitat may show a minor beneficial effect from the project's ability to reduce excessive freshwater flows by improving the salinity regime throughout the Caloosahatchee estuary; and by increasing freshwater flows into the coastal wetlands adjoining Florida Bay, subsequently reducing the duration and occurrence of hypersaline conditions. As a result, the TSP will have a minor beneficial effect on the smalltooth sawfish from reduced excessive freshwater flows and improved salinity regime throughout the Caloosahatchee estuary.

C.2.2.4.10 Sea Turtles

Protected sea turtles included for the evaluation of the TSP include Green, Hawksbill, Leatherback, Kemp's Ridley and Loggerhead. Decreased high-level freshwater flows to the northern estuaries in the TSP would reduce stress on SAV and promote increases in seagrass density and aerial extent. Increased freshwater flows to Florida Bay estuaries would reduce salinity fluctuations and produce overall salinity beneficial to seagrass. Optimal salinity ranges result in higher seagrass productivity, ultimately providing increased foraging opportunities for sea turtles. The TSP has the potential to provide a minor beneficial effect to sea turtles as a result of the improved salinity regime within the Northern Estuaries and Florida Bay.

Additionally, there is no suitable habitat for nesting in the project area. With the expectation of improved nearshore habitat, no utilization of the project area for nesting purposes, and the implementation of agency approved Sea Turtle and Smalltooth Sawfish Construction Conditions, the TSP would have beneficial effects, similar to the FWO.

C.2.2.5 State Listed Species

Figure 1-2 in **Annex A** depicts the affected area referenced in this section.

C.2.2.5.1 State Threatened Species

C.2.2.5.1.1 Big Cypress Fox Squirrel

Big Cypress fox squirrel is a large member of the genus *Sciurus*, having a length of 17–27 inches and weighing 1–3 pounds. It has a black head and back, with buffy fur on the sides and belly, white ears and nose, and a long, bushy black and tan tail (FWC 2018a). This subspecies is secretive, has a limited range, and is difficult to capture, so much of the available information for this species is based on fox squirrels in general. Big Cypress fox squirrels generally feed on nuts, seeds, fungi, fruit, and buds, but occasionally feed on insects and bird eggs. Both males and females of the species mater with more than one individual, with breeding occurring throughout the year, although most breeding occurs between November and February and April and July. Average gestation period is 44 with litter sizes of 1–3. Once mature, females are reproductively active for 12 or more years.

Big Cypress fox squirrel are primarily ground-dwellers, inhabiting cypress stands, slash pine savannah, mangrove swamps, tropical hardwood forests, live oak woods, coastal broadleaf evergreen hammocks, and suburban habitats including golf courses, city parks, and residential areas (FWC 2018a). It's range in south Florida includes Hendry and Lee counties south of the Caloosahatchee River, Collier County, mainland northern Monroe County, and extreme western Miami-Dade County (within a strip of land largely located within BCNP).

Big Cypress fox squirrel is the only fox squirrel species that is endemic to Florida, and it is a FWC threatened species. Primary threats to this species includes habitat destruction and fragmentation from development activities, conversion of rangeland to citrus groves, fire suppression (which causes the understory to grow, making the habitat uninhabitable to Big Cypress fox squirrel). Squirrel poxvirus is virulent disease that can result in 75–100% death rate in infected squirrels (FWC 2018a).

Recommendations for Big Cypress fox squirrel identified by the International Union of Concerned Scientists and outlined in the Biological Status Review Report prepared for this species includes: conducting studies to determine optimum habitat requirements, and survey for presence of populations in BCNP; conduct controlled burns to open up the understory for better foraging areas; and set aside remaining occupied habitat as refuges for the species (FWC 2011a).

Suitable habitat to support Big Cypress fox squirrel is not present within the project area, and this species is unlikely to occur. No impact to Big Cypress fox squirrel is expected from implementation of the TSP.

C.2.2.5.1.2 Everglades Mink

The Everglades mink is an exceedingly rare, small, semi-aquatic mammal. The mink is medium to dark brown in color with dense, glossy, water repellant fur. Minks have a small head with beady black eyes and an elongated body with five partially-webbed toes. Males weigh 2 to 3.5 pounds and are typically two ft in length; females are smaller in size. Minks are nocturnal and generally solitary, except when raising young; three to six kits are born inside the den during the spring and are weaned at five to six weeks. Dens typically consist of a hollow log. Minks are carnivorous, primarily feeding on crayfish, fish, insects, small snakes, small mammals, and birds (Conservancy of Southwest Florida 2009).

The Everglades mink is listed by FWC as a state listed threatened species. Historically, the Everglades mink ranged into the northern Everglades, near the Lake Okeechobee region, but no sightings have been reported in the northern range in recent years. The range of the Everglades mink is currently limited to the shallow freshwater marshes and swamps of ENP, BCNP, and Fakahatchee Strand. Most of the recent sightings of the minks occurred in ENP, near Tamiami Trail (U.S. Highway 41) (Smith 1980).

Seasonal habitat use by the Everglades mink was documented by Humphrey and Zinn (1982) within a large wetland in south Florida (Big Cypress Swamp) using line transects of chalk-dusted trackboards and anal scent attractant. Results indicated a higher frequency of track station visits to marshes in autumn (late wet season) than in spring (late dry season). In the late dry season, most mink track station visits occurred in swamps, where aquatic habitat and high concentrations of prey (fishes) persisted, suggesting that disruptions in the timing and magnitude of water level fluctuations or hydroperiods may negatively impact the species.

The quality of the Everglades mink habitat has been degraded through development and the drainage of wetlands. Unnatural high water levels have also resulted in flooding of dens and an increase in road-related deaths. Suitable freshwater wetland habitat for the species exists within the project area. Evidence of direct impacts to the Everglades mink as a result of the existing operating regime (i.e. ERTP) is lacking; however, the species is extremely rare and difficult to trap and/or monitor. Shorter hydroperiods potentially decrease the distribution and abundance of small fish species sensitive to hydrologic changes upon which the Everglades mink feeds. The TSP would increase hydroperiods within WCA 3 and ENP and would have a minor beneficial effect on the Everglades mink.

C.2.2.5.1.3 Florida Sandhill Crane

Florida sandhill crane has a height of approximately 47 inches, and has a wingspan of about 79 inches (FWC 2018b). This species is gray with a long neck and legs, and a bald spot of red skin on the top of its head. The sandhill crane has a unique flight in that it flies with its neck stretched out completely. Florida sandhill crane feed on grains, berries, seeds, insects, worms, mice, small birds, snakes, lizards, and frogs. They are non-migratory, nesting in freshwater ponds and marshes. They breed with one mate, with both males and females contributing to a nest built with grass, moss, and sticks. Two eggs are laid and incubated for 32 days. Once hatched, the young begin traveling from the next with their parents within 24-hours of hatching. Juveniles leave their parents around 10 months of age, with pair bonding beginning at two years of age (FWC 2018b).

Florida sandhill cranes inhabit freshwater marshes, prairies, and pastures throughout peninsular Florida north to the Okefenokee Swamp in southern Georgia; however, they are less common at the northernmost and southernmost portions of this range (FWC 2018b).

Florida sandhill crane is a FWC threatened species. Primary threats to Florida sandhill crane includes degradation or direct loss of habitat due to wetland drainage, or conversion of prairie for development or agricultural use (FWC 2018b). The range of the Florida sandhill crane diminished in the southeastern United States during the 20th century, with breeding populations disappearing from coastal Texas, Alabama, and southern Louisiana due to degradation, habitat loss, and overhunting.

Much of the available information for Florida sandhill cranes is from data collected on private cattle ranches. Recommendations for Florida sandhill crane outlined in the Biological Status Review Report prepared for this species includes developing a state-wide monitoring program to garner a more informed understanding of the population and to determine detection of trends. The collection of information on survivorship, productivity, and habitat use are needed for conservation lands and urban areas to facilitate the management of habitats for Florida sandhill cranes (FWC 2011b).

The TSP is not expected to impact Florida sandhill crane, and restoration of natural hydrological processed are expected to provide a minor beneficial effect to Florida sandhill crane.

C.2.2.5.1.4 Southeastern American Kestrel

The southeastern American kestrel is a non-migratory subspecies of kestrel found in open pine savannahs, sandhills, prairies, and pastures in Florida and the southeastern United States (FWC 2018c). It is listed as threatened in Florida due to declines in nesting and foraging habitat, specifically the removal of isolated trees from agricultural fields, residential development, conversion of open pinelands to agriculture, and the modification of pine forest understory vegetation resulting from fire suppression (FWC 2018d).

Historically, southeastern American kestrel occurred within sandhill and open pine savannah habitat that was maintained by frequent fire. Today, this species has adapted to utilize other open habitats, including pastures and low-intensity agriculture, and open woodlots and fields within residential areas. High-quality kestrel habitat must provide both suitable nesting habitat and suitable foraging habitat where the birds can see and capture their prey (FWC 2018e).

Kestrels primarily nest in large dead trees in cavities previously excavated or hollowed out by woodpeckers. They also are known to readily use nest boxes. In Florida, this species mostly feeds on grasshoppers and small lizards; although they also prey on other invertebrates, including insects, worms, and spiders, and occasionally frogs and other small vertebrates. Kestrels most often hunt by watching for prey from perches, but will hunt from the air when perches are not available. Prey is usually captured with the feet (FWC 2018e).

Southeastern American kestrels occur in Florida year-round, but little is known about their behavior or movements during the winter. Bonds between a breeding pair of kestrels will last for multiple years and pairs often maintain territories throughout successive years. Breeding occurs from mid-March to early-June, with females laying 3-5 eggs. Eggs hatch after approximately one month of incubation, with nestlings leaving the nest once they have reached adult weight, approximately 30 days after hatching. The average life expectancy of a kestrel is about 15 months, with survival rates as low as 30% during the first year, and about 50% in subsequent years. Sources of mortality include mammal and avian predators, with some fatalities occurring from collision with motor vehicles (FWC 2018e).

Conservation recommendations for southeastern American kestrel includes proper management of open pineland habitat, specifically sandhills, as well as open fields with scattered trees clearly to provide benefit to this species (FWC 2018d). Controlled burning should be used to maintain a grassy, open understory, and dead tree snags should be preserved to provide nesting sites. Nest boxes also can be installed in areas where natural cavities are sparse.

No impacts to southeastern American kestrel is expected from implementation of the TSP.

C.2.2.5.1.5 White-Crowned Pigeon

White-crowned pigeon is a medium size member of the genus *Patagioenas*. This pigeon species can reach a length of 14 inches, with a wingspan of 23 inches (FWC 2018f). White-crowned pigeon gets their name from their white head, and have a gray body with green feathers on the back side of the neck.

Breeding occurs from May to September, but is concentrated from May to early June and July to early August. Females will lay two eggs and both males and females will incubate the eggs for about 14 days before the eggs hatch. Both parents have responsibility to feed the young, until they fledge around 3 weeks of age; however, the young may still be fed by their parents up to three weeks after fledging (FWC 2018f).

White-crowned pigeons primarily feed on tropical hardwood tree fruits, and they primarily inhabit low-lying forest habitats with ample fruiting trees. Its distribution in the United States is restricted to Florida Bay, Biscayne Bay, and the Florida Keys, although a few individuals probably nest inland in Monroe and Miami-Dade counties (FWC 2018f).

White-crowned pigeon is restricted to low-lying areas, and current primary threats to this species includes habitat degradation and deforestation. Other threats to white-crowned pigeon include destruction of tropical hammocks (an important component of their food supply), pesticides and other contaminants, collisions with structures or objects, and direct human/research impacts (FWC 2018).

No impacts to white-crowned pigeon is expected from implementation of the TSP.

C.2.2.5.1.6 Tricolored Heron, Little Blue Heron, and Reddish Egret

The tricolored heron, little blue heron, and reddish egret are Florida threatened species.

The tricolored heron shows a preference for freshwater habitat; however, it also inhabits saltwater marshes. Breeding occurs in February through August (FWC 2003). The tricolored heron is ornately colored; it is slate-blue on its head and upper body and has a purplish chest with white under parts and fore-neck (Frederick 1997). A review of ebird observations for the project identified several occurrences of tricolored heron in the project area, including the affected area (ebird 2018d). Tricolored heron was once considered one of the most common herons in the state; however, they experienced a population decline from approximately 35,000 in the late 1970s to approximately 16,000 birds in the late 1980s (FWC 2011c). Nesting numbers of wading birds such as tricolored heron (as well as reddish egret and little blue heron) can be highly variable from year to year, and population estimates for wading birds that are small and have dark plumage are more difficult due in part to their nesting behavior beneath the canopy. About 1,144 pairs of tricolored herons were documented nesting in the three WCAs and mainland ENP in 2009 (FWC 2011c). In comparison, an estimated 10,000-15,000 nesting pairs were observed in this area in the 1930s, and an estimated 1,723 nesting pairs were observed in this area during the 1999 nesting season.

The little blue heron is a smaller-sized heron, dark blue overall with yellow-green legs, and a blue bill with a black tip. Young birds are initially white, and gradually transition into the bluish adult plumage (Rodgers and Smith 1995). The little blue heron shows habitat preferences similar to tricolored heron. Little blue herons breed later than tricolored herons or snowy egrets; breeding occurs in April through September in Florida. The little blue heron is more widely distributed throughout the state in comparison to the tricolored herons or snowy egrets. Like the snowy egret, breeding populations are concentrated in central and southern Florida (FWC 2003). A review of ebird observations for the project identified several occurrences of little blue heron in the project area, including the affected area (ebird 2018e). Little blue heron populations gradually increased through the 20th century as a result of increased protection measures and hunting prohibitions. Decline in the Florida population occurred between the 1970s and 2009, with more than 20,000 individuals reported in the late 1970s, which declined to only 2,000 nesting pairs observed in 2009 (FWC 2011d). This species has been reported to have exhibited a slow but steady decline since the late 1990s, especially in south Florida.

Reddish egrets have two color morphs; white (exceptionally rare) and dark. Dark morphs have gray bodies with chestnut heads, blue legs and pink bills with black tips (Lowther and Paul 2002). The reddish egret is the rarest heron in Florida and is entirely restricted to the Florida coast with concentrations in Florida Bay and the Keys; two-thirds of the state's breeding population. The heron forages on shallow flats and sandbars for fish species, including killifish. In Florida Bay, reddish egrets nest from November through May (FWC 2003). Reddish egret populations suffered huge losses during the plume trade of the late 1800s and early 1900s (FWC 2011e). Reddish egret populations gradually increased throughout the 20th century as a result of protection measures and hunting prohibitions. However, current population estimates are still estimated at only 10% of the pre-plume hunting population size. While the non-breeding range of the species extends along both the Atlantic and Gulf of Mexico coasts of the state, breeding sites are located along the southern half of the state into Florida Bay and the Lower Keys. Estimates for the Florida population of reddish egrets were 350-400 pairs in the early 1990s (FWC 2011e). A review of ebird observations for the project area did not identify any occurrences of reddish egret within the affected area; however, observations of this species occurred within STA 2 in 2011, 2015, and 2017, and within STA 3/4 in 2013 (ebird 2018f). Suitable habitat to support reddish egrets occurs within the project area.

Although these species are known or have the potential to occur in the affected area, improved hydroperiods in the WCAs and ENP may have a minor beneficial effect to the tricolored heron, little blue heron, and reddish egret.

C.2.2.5.1.7 Roseate Spoonbill

Roseate spoonbills have a pink body with a white neck and breast, pink wings with highlights of red and long reddish legs. Spoonbills have an unfeathered head which can be yellow or green. Roseate spoonbills are large wading birds, weighing about three pounds and have a 50-inch wingspan. Characteristic to the species is a long, spatulate bill. The spoonbill feeds by wading through shallow water, head down, probing the bottom by sweeping its long, spoon-shaped bill back and forth in the water. When prey is detected by touch, the bill snaps shut; small fish, crustaceans, and insects make up the bulk of the diet (Dumas 2000).

Spoonbills typically establish nests in Florida Bay between November 1 and December 15, with a mean nest initiation date of November 18. Females typically lay three eggs; eggs are incubated for about 21 days. After the young spoonbills hatch, chicks require a continuous supply of food for 42 days. Spoonbills primarily feed on wetland fishes. Foraging adult spoonbills require water levels at or below 13 centimeters within the coastal wetlands to forage efficiently and feed young (Lorenz et al. 2010). Nestlings fledge in approximately four weeks (FWC 2003).

Thirty-nine of Florida Bay's keys have been used by roseate spoonbills as nesting colonies. These colonies have been divided into five distinct nesting regions based on the colonies primary foraging locations: northeast region, northwest region, central region, south region, and southwest region. The northeast and northwest colonies contain the largest nesting colonies and these birds principally use wetlands on the mainland as their primary foraging grounds (Lorenz et al. 2010). In addition to a large nesting population in Florida Bay, roseate spoonbills historically nested along the southwest coast of the Everglades in the SRS and Lostman's Slough estuaries. Although there has been some documentation of spoonbill nesting in this area, the numbers have been negligible (Lorenz et al. 2010). A review of ebird observations for the project identified several occurrences of roseate spoonbill in the project area, including the affected area (ebird 2018g).

The roseate spoonbill is a Florida threatened species. In 1979, 1,258 roseate spoonbill nests were located in Florida Bay. More than half of these nests (688) were located in the northeast region (Lorenz et al. 2008). Drops in nests coincide with the completion of the South Dade Conveyance System (SDCS) in 1982, when water deliveries to Taylor Slough and northeastern Florida Bay changed dramatically. Since completion of the SDCS, spoonbill nesting effort has shifted to the northwest region of Florida Bay; nesting effort has been consistent since the early 1980s and the population remains stable with an average of 1.24 chicks produced per nest, per year (Lorenz et al. 2008). Prior to the construction of the SDCS, spoonbills in the northeast region of Florida Bay produced an average of 1.38 chicks per nest, per year. Following completion of the SDCS, spoonbill production dropped to 0.67 chicks per nest, per year (Lorenz et al. 2008). Wading bird studies suggest that a population that does not produce at least one chick per nest, on average, will decline.

The TSP may provide minor beneficial effects to the roseate spoonbill.

C.2.2.5.1.8 Florida Burrowing Owl

Florida burrowing owl is a pint-sized bird that inhabits open, treeless areas. This species spends most of its time on the ground, where it is camouflaged from potential predators by its sandy brown plumage. Florida burrowing owl is one of Florida's smallest owls, averaging 9 inches in height, and having a wingspan of 21 inches (FWC 2018g). The burrowing owl lacks the ear tufts of the more familiar woodland owls. It has bright yellow eyes and a white chin accent on the face. At ground level, this owl’s unusually long legs provide additional height for a better view from its perch.

The Florida burrowing owl occurs throughout Florida although its distribution is considered local and spotty. Presence is primarily dependent upon habitat, which may be created from forest clearing and wetland draining activities. They inhabit open native prairies and cleared areas that provide short groundcover, including pastures, agricultural fields, golf courses, airports, and vacant lots in residential areas. Historically, the burrowing owl occupied the prairies of central Florida. Recently, these populations have decreased because of disappearing habitat while populations in south Florida coastal areas have increased due to modification of habitat by humans (FWC 2018g).

Burrowing owls live as single breeding pairs or in loose colonies consisting of two or more families. Unlike most owls, burrowing owls are active during both day and night. During the day, they are usually seen standing erect at the mouth of the burrow or on a nearby post. When disturbed, the owl bobs in agitation and utters a chattering or clucking call. In flight, burrowing owls typically undulate as if they are flying an invisible obstacle course. They also can hover in midair, a technique effective for capturing food (FWC 2018g).

Burrowing owls use burrows year-round. Young are raised in the burrow during the breeding season, which occurs from February through July. Florida’s owls typically dig their own burrows, but also will use gopher tortoise or armadillo burrows. Burrowing owls mainly feed on insects, especially grasshoppers and beetles. They can provide a benefit in urban settings from their predation on roaches and mole crickets. Other important foods are small lizards, frogs, snakes, birds, and rodents (FWC 2018g).

A review of ebird data for observations of this species did not identify any occurrences within the affected area (ebird 2018h). Due to the lack of suitable habitat to support Florida burrowing owl within the affected area, this species is unlikely to occur. No impacts to Florida burrowing owl are expected from the TSP.

C.2.2.5.1.9 Snowy Plover, Least Tern, Black Skimmer, and American Oystercatcher

Snowy plover, least tern, black skimmer, and American oystercatcher are Florida threatened species.

Snowy plovers are small in size, weighing about two ounces, with a 13-inch wingspan, and a length of 6–7 inches. Snowy plovers have inconspicuous plumage, with white undersides, pale-brown upperparts, a short black bill, and dark grey to blackish legs (Warriner et al. 1995). Florida populations of snowy plovers include both migrant and resident species. Breeding birds are discontinuously distributed along the Gulf coast from Marco Island north to Anclote Key and along the coast of the Florida Panhandle, where most Florida breeders now occur. In central and southern Florida, breeding occurs only in a few protected parks, such as Caladesi Island, Fort DeSo Park, and Cayo Costa and on isolated peninsulas (FWC 2003). No breeding records exist from the Keys or Atlantic coast. A review of ebird data for observations of this species did not identify any occurrences within the affected area (ebird 2018i).

Least terns have a length of approximately 9 inches and a wingspan of 20 inches and a length of nine inches. Least terns have a grayish-white body with yellow legs, a short notched tail, and a yellow bill unique among North American terns (Thompson et al. 1997). The least tern is more widely distributed than the snowy plover; breeding populations are distributed along both the Gulf and Atlantic Coasts and the Florida Keys (FWC 2003). A review of ebird observations for the project identified several occurrences of least tern in the project area, including the affected area (ebird 2018j).

Black skimmer is a seabird with defining physical characteristics, including its large red and black bill, that make it easily distinguishable from others. Skimmers can reach a height of approximately 20 inches, and have a wingspan of 3.0–3.5 ft. They have a black back, black wings with white edging, and a white belly and head (FWC 2018h).

Black skimmers feed on fish by skimming the surface of the water with their lower bill, quickly scooping up their prey by quickly bending their head forward to snap the upper bill closed. Breeding generally occurs between May and early September, with nests located on sand along beaches, sandbars, and islands created from dredged material. Nesting occurs in colonies consisting of one to several hundred pairs. They will utilize group mobbing to protect their nests. In Florida, black skimmer inhabits coastal estuaries, beaches, and sandbars. Habitat loss due to coastal development is the main threat to the species (FWC 2018h). A review of ebird observations for the project identified several occurrences of black skimmer in the project area, including the affected area (ebird 2018k).

American oystercatcher is a shorebird species that is easily identified by its long, bright reddish-orange bill, yellow eyes, and distinct red eye ring (FWC 2018i). These features are a contrast to the deep black-colored head, brown and black backside, and white belly. The wings are characterized by a white “V” shape, which can be seen as they are in flight. This large shorebird can reach 18 inches in length and has a wingspan of 32 inches.

American oystercatchers inhabit coastal areas that support intertidal shellfish, feeding primarily on mollusks, but also will eat jellyfish, worms, and insects. In Florida, American oystercatchers nest in shallow scrapes in the sand or shell, often on open or sparsely vegetated beaches or spoil islands (islands developed from dredged up material). Nesting begins in March and can extend through August, with males and females taking turns to incubate the eggs. Oystercatchers can be found from the coasts of the northeastern U.S. down to Florida’s Gulf Coast. Florida contains both a resident breeding population and a large wintering population (FWC 2018i). Threats to this species includes coastal development and shoreline armoring, which have resulted in widespread habitat loss and loss of suitable breeding sites. American oystercatchers are largely dependent on marine mollusks, which are particularly sensitive to changes in water quality. Oil spills and pollutants can affect distribution and abundance of mollusks, which subsequently affects prey availability for oystercatchers. Global climate change and sea level rise also is an impending threat to American oystercatchers. A review of ebird data for observations of this species did not identify any occurrences within the affected area (ebird 2018l).

Snowy plover, least tern, black skimmer, and American oystercatcher are shorebirds that inhabit sparsely vegetated sandy beaches where they nest in shallow depressions on bare, open ground. The numbers and distribution of these shorebirds have steadily decreased due to loss and degradation of coastal habitats and breeding grounds. Continued development of beachfront property into residential, commercial, and recreational areas has led to population declines. Birds quickly abandon nesting attempts when they are disturbed by people. Conservation efforts include closing nesting beaches, monitoring nests, roping off or fencing in breeding sites, posting educational signs and banning pets and vehicle use.

Although construction activities within the affected area may temporarily disrupt foraging least terns and black skimmers, these affects are expected to be minor and short-term. The TSP would not affect shorelines; therefore, the project would have no long-term effect on the snowy plover, least tern, black skimmer, or American oystercatcher. The project is not expected to affect snowy plover, least tern, black skimmer, and American oystercatcher.

C.2.2.5.1.10 Gopher Tortoise

Gopher tortoises are long-lived reptiles that occupy upland habitat throughout Florida including forests, pastures, and yards (FWC 2018j). They dig deep burrows for shelter and forage on low-growing plants. This terrestrial tortoise is moderate in size, averaging 9–11 inches in length. It has stumpy, elephantine hind feet and flattened, shovel-like forelimbs adapted for digging. The shell is oblong and generally tan, brown, or gray in coloration. In the wild, gopher tortoises can live for 40–60 years.

Gopher tortoises inhabit well-drained sandy areas with a sparse tree canopy and abundant low growing vegetation (FWC 2018k). They are commonly found in habitats such as sandhill, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hammock, pine-mixed hardwoods, and coastal dunes which have historically been maintained by periodic wild fires. When fire is suppressed in gopher tortoise habitat, small trees, shrubs, and brambles begin to grow, which make it difficult for them to move around, and eventually shade out the low growing plants that gopher tortoises eat.

Gopher tortoises are slow to reach sexual maturity, have a low fecundity, and a long life span (FWC 2018k). Females reach sexual maturity at 9–21 years of age, depending on local resource abundance and latitude; males mature at a slightly younger age. Breeding generally occurs from April–November.

These reptiles feed on low-growing plants like wiregrass, broadleaf grasses, and legumes (bean family plants). They also eat prickly pear cactus, blackberries, paw-paws, and other seasonal fruits. In addition to needing open areas with abundant food, gopher tortoises require relatively deep, sandy soils for burrowing and sunny spots for laying eggs (FWC 2018k).

Gopher tortoises share these burrows with more than 350 other species, including burrowing owls, Florida mice, indigo snakes, opossums, rabbits, gopher frog, eastern diamondback rattlesnakes and gopher crickets. For this reason, they are considered a keystone species. Animals which utilize the gopher tortoise burrows are known as commensal species. Since many commensal species depend on the burrows for survival, decreases in gopher tortoise populations result in a decline of other species (FWC 2018k).

Suitable habitat to support gopher tortoise is not present within the affected area, and this species is unlikely to occur. No impact to gopher tortoise is expected from implementation of the TSP.

C.2.2.5.1.11 Rim Rock Crowned Snake

Rim Rock crowned snake is named after the Miami Rim Rock geological formation. This non-venomous snake can reach a length of 10 inches, and has a grayish-black back, a black to light-brown head, yellow to red belly with black spots, and smooth scales (FWC 2018l). The Rim Rock crowned snake is very rare, within only 26 individuals known to exist.

Much of the life history details for the Rim Rock crowned snake, including diet, reproduction, and lifespan, are unknown, largely due to its fossorial behavior (it is adapted to digging and living underground). It likely feeds on insects and other small invertebrates (FWC 2018l). Maturity likely occurs by 2 years of age, with a likely lifespan in the wild of 5 years.

Rim Rock crowned snake inhabits pine rockland and tropical hardwood hammocks near fresh water (FWC 2018l). They occur in holes and depressions in the oolitic limestone (formed by calcium carbonate), and also occur periodically in rotten logs, and under rocks and trash. Rim Rock crowned snakes are known from various localities in Miami, including Brownsville, Coconut Grove, Coral Gables, Cutler, Cutler Ridge, Kendall, Leisure City, North Miami, and Perrine; and they also occur in the Upper, Middle, and Lower Florida Keys (FWC 2018l).

Primary threats to Rim Rock crowned snake include habitat fragmentation, especially for the population known to occur in and around Miami, as their habitat is mixed in with agricultural and residential lands. The population in the Florida Keys is threatened by severe storms such as hurricanes and tropical storms, which can flood their habitat. Sea level rise from global climate change also a threat to this species, which also can flood its habitat (FWC 2018l).

The TSP would not negatively affect Rim Rock crowned snake. Suitable habitat to support Rim Rock crowned snake is not present within the affected area, and this species is unlikely to occur. No impact to Rim Rock crowned snake is expected from implementation of the TSP.

C.2.2.5.2 State Species of Special Concern

C.2.2.5.2.1 Sherman’s fox squirrel

Sherman’s fox squirrel is a large rodent member of the Family Sciuridae. It can reach a length of up to approximately 28 inches, and weighs 1–2 pounds (FWC 2018m). Overall coloration varies from black to brown with a black head, white ears, and a white snout. Fox squirrels are known for their long bushy tails and their strong hind legs which enables them to leap far.

Sherman’s fox squirrel primarily feed on longleaf pine seeds and turkey oak acorns, but also will eat fungi, fruit, and buds. They typically have two breeding seasons per year, with the winter breeding season occurring from October to February, and the summer breeding season occurring from April to August (FWC 2018m). Most nests are made of Spanish moss, pine needles, twigs, and leaves, but nests may also be placed within tree cavities.

Sherman's fox squirrels inhabit open, fire-maintained longleaf pine, turkey oak, sandhills, and flatwoods. They occur throughout the Florida peninsula, with populations extending north into central Georgia (FWC 2018m). The primary threat to Sherman's fox squirrel is habitat destruction, with only an estimated 10–20 % of their native habitat remaining intact. Most of their native habitat has been logged, converted to pasture, degraded by lack of fire, or used for agriculture, commercial and residential development. Improperly burned longleaf pine communities also affect the fox squirrel's population as it prevents longleaf pine seeds from properly reproducing in the bare ground. This species has a slow gait, increasing their chance of being struck by motor vehicles.

Suitable habitat to support Sherman's fox squirrel is not present within the affected area, and this species is unlikely to occur. No impact to Sherman's fox squirrel is expected from implementation of the TSP.

C.2.2.5.2.2 Osprey (Monroe County Population Only)

Osprey are a raptor species that can reach a height of 23 inches, and have a wingspan of 72 inches (FWC 2018n). Ospreys have a white underside and head, and a brownish upper body with a black line across the eyes that extends to the wings. Several features distinguish the osprey from other birds of prey, including a reversible fourth toe and spines located on their feet that are used to help grasp their prey as they fly over the water.

Osprey feed primarily on fish, catching them by flying over water and diving feet first to grasp fish with their talons (FWC 2018n). They feed over most open-water habitats along the coast and inland lakes and rivers. Nesting usually begins in December and lasts until February, with nests placed in large trees, utility poles, channel markers, and in urbanized areas where they readily utilize man-made nesting platforms. Nests will be reused for many years. Both adults tend to the eggs and nestlings, though the female does more while the male brings food to the nest. Young osprey take their first flight around 55 days after hatching, and the adults feed young until they are approximately 100 days old (FWC 2018n).

In Florida, osprey inhabit coasts, lakes, rivers, and swamps. Most North American osprey winter in South and Central America, except for the non-migratory, resident subpopulation that occurs in coastal southern Florida (FWC 2018n). The non-migratory, Florida resident population of osprey have been well-documented and extensively studied only in Florida Bay, the southern Everglades, and the Florida Keys, which are primarily or entirely within Monroe County (FWC 2018n). Threats to this species includes exposure to mercury, which is found in many waterways. Mercury exposure can result in reproductive issues. Prey availability also can be a limiting factor, which has decreased as a result of coastal development, degraded water quality, and pesticides.

A review of ebird observations for the project identified several occurrences of osprey in the project area, including the affected area (ebird 2018m). Although construction activities within the affected area may temporarily disrupt foraging osprey, these affects are expected to be minor and short-term. Over the long-term, CEPP would improve hydrology and water quality, which is expected to improve foraging habitat and prey availability. Overall, implementation of the project is expected to provide a net benefit to osprey and their habitats. No adverse impact to osprey is expected to occur.

C.2.2.6 Wildlife

A comparison of the FWO and the TSP and their potential effects on wildlife within the affected area is summarized below. Effects on State and Federally listed species are described in further detail in **Section C.2.2.4** and **Annex A**. Changes in water quality also have the potential to affect prey forage base through altering of vegetation composition or structure. Water quality will continue to be monitored; potential effects are largely uncertain at this time.

C.2.2.6.1 Invertebrates

Negligible and less than significant effects on the invertebrate community within Lake Okeechobee or the EAA are anticipated with implementation. As compared with the FWO, the TSP shows a minor beneficial effect with performance improvement within the Northern Estuaries as indicated by fewer high-volume flow months. Reductions in high volume discharges and salinity fluctuations would likely benefit oysters and other benthic fauna within the Northern Estuaries. Reduction in high flows and accompanying flow velocities would help lessen the current problem of flushing of oyster spat into outer areas of the Northern Estuaries that experience high salinity levels during the dry season, resulting in increased predation and disease in the oyster population. To assess the improvement in oyster habitat that would result from implementing the TSP, an oyster suitability model was run.

Oyster HSI models are designed to evaluate the suitability of a habitat to support oysters (Cake 1983, Brown & Hartwick 1988, Soniat & Brody 1988, Barnes et al. 2007). Cake (1983) developed the initial eastern oyster HSI model for environmental impact assessment and habitat management. Since the beginning of CERP, HSI models have been selected as a planning and evaluation tool to quantify effects of each CERP restoration alternative on Everglades ecosystems (RECOVER 2004, Barnes et al. 2007). Barnes et al. (2007) used an HSI model to simulate habitat responses to proposed freshwater inputs to the Caloosahatchee Estuary.

The oyster HSI model used in this study was built on the relationships developed in the Caloosahatchee River Estuary (CRE) and St. Lucie Estuary. Selected variables are salinity, temperature, and bottom substrates with equal weight of 1. The 41-year (1965-2005) daily freshwater inflows derived from the Regional Simulation Model (RSM) were used to predict daily salinity with a time series model developed by Qiu and Wan (2013). The two project scenarios evaluated were the FWO and the TSP. Daily average temperatures were derived from recent monitoring data (2000-2010) and used as representative temperatures for each day throughout the 41 years. The daily salinities and temperatures then were aggregated into monthly averages and applied to the HSI models. Bottom substrates from a benthic mapping effort in 2010 were used (DCA 2011). Oyster experts then calibrated the bottom types to HSI scores based on empirical observations. Preliminary validation showed that the estimated HSI values correlated well with monitoring live oyster density, suggesting the HSI can be used as a robust predictor of suitable oyster habitat in the Northern Estuaries.

Based on the validation results, HSI values were divided into four categories—0.0-0.25, 0.25-0.5, 0.5-0.75, and > 0.75—representing degrees of habitat quality for oysters with “0” being not suitable and “1” being the best quality habitat for oysters. The time series of 41 years was used to quantify potential changes in environmental variables and habitat units with the FWO and TSP modeled project scenarios. All 41 years were totaled, and the categories of habitat suitability (with a combined score of > .50) were calculated to compare the increased numbers of acres of suitable habitat from the FWO condition with those from the TSP. The Caloosahatchee Estuary gained 81 acres of suitable oyster habitat and the St. Lucie Estuary gained 5 acres, smaller gains in the St. Lucie Estuary can mostly be attributed to the relatively smaller size of the estuary as compared to the Caloosahatchee Estuary (see **Table C.2.2-3**). It is estimated that one acre can produce nearly 750,000 oysters, which could filter between 57,000 to 150,000 cubic meters (15,000,000 to 40,000,000 U.S. gallons) of water daily (Brown 2013).

Table C.2.2-3. Comparison of Oyster Suitability from the FWO to the TSP

Estuary	Parameters	FWO	C240	Change
St. Lucie Estuary	Daily Average Salinity at US1	17.07	17.47	0.40
	Total Average Habitat Unit (HSI>0.5) (acres)	372	377	5
Caloosahatchee River Estuary	Daily Average Salinity at the MARKH	23.78	24.42	0.64
	Total Average Habitat Unit (HSI>0.5) (acres)	4581	4662	81

Within the Greater Everglades, aquatic invertebrates would be sustained by even slightly longer hydroperiods with implementation of the TSP, providing a long-term, moderate beneficial effect, especially in the northern WCA-3A. Even slight increases in stages and hydroperiods within WCA 3A and ENP would promote wetland vegetation transition, increasing periphyton. Periphyton is a primary component of invertebrate diets, including apple snails. In addition to the potential for increased foraging opportunities, changes in vegetation resulting in expansion of wet prairie and increases in emergent vegetation would also provide habitat structure critical for apple snail aerial respiration and egg deposition (Turner 1996, Darby et al. 1999).

Crayfish are important components within the Everglades food web, serving as primary dietary components of higher trophic level species including fish, amphibians, alligators, wading birds, and mammals such as raccoons and river otters (Kushlan and Kushlan 1979). Even the slight increases in hydroperiods associated with the CEPP PACR alternatives would likely increase crayfish density within the northern WCA 3A and ENP, particularly within the marl prairies. The TSP would increase hydroperiods within this region, resulting in increased native crayfish productivity and having a long-term, minor beneficial effect.

The TSP would have long-term minor beneficial effects on invertebrate populations associated with near-shore Florida Bay with a small increase in freshwater input, resulting in minor decreased salinities.

C.2.2.6.2 Fish

Implementation of the TSP is expected to have a negligible effect in Lake Okeechobee and a minor beneficial effect on fish in the Northern Estuaries by reducing the number of high-flow discharge events, and improvements in fisheries habitat such as seagrass and oyster beds are expected to occur. Negligible effects on fish species throughout much of Florida Bay, ENP, and the Greater Everglades would be expected, except for the northern WCA-3A, where moderate, long-term benefits are expected.

Within the EAA, it is anticipated that conversion of agricultural lands to freshwater wetlands within the STA under the TSP would improve fish habitat.

Introduction or expansion of non-native fish species due to changes in water distribution are not likely to occur; however, the extent of invasion is uncertain at this time providing a minor adverse effect.

Introduction or expansion of non-native fish species due to changes in water distribution is not likely to occur; however, the extent of invasion is uncertain at this time, providing a minor adverse effect.

C.2.2.6.3 Amphibians and Reptiles

Long-term, minor beneficial effects to the amphibian and reptile communities are anticipated with the TSP. Within the EAA, it is anticipated that conversion of agriculture lands to freshwater wetlands within the STA would improve habitat for amphibians and reptiles. Rehydration within previously dry areas within the northern WCA 3A would increase spatial extent of suitable habitat for aquatic amphibian species in this area. Similarly, increased hydroperiods within ENP would also benefit aquatic amphibian species. As hydrology improves within WCA 3A and ENP, it is expected that amphibian species richness would also change. Increase in forage prey availability (e.g., crayfish and other invertebrates, fish) in areas rehydrated by TSP implementation would also directly benefit amphibian and reptile species.

C.2.2.6.4 Birds

The freshwater and estuarine wetlands of the Everglades and South Florida Estuaries are noted for their abundance and diversity of colonial wading and shore birds. Nesting and foraging activities of resident bird species are anticipated to show a long-term, moderate beneficial effect with implementation of the TSP. Within the EAA, it is anticipated that conversion of agricultural lands to freshwater wetlands within the STA would improve habitat for bird species. Impacts on the CSSS, snail kite, wading birds, and shore bird species are further discussed in **Sections C.2.2.4 and C.2.2.5**.

C.2.2.6.5 Mammals

As compared with the FWO, the TSP would provide potential long-term, minor beneficial effects to mammals as anticipated with implementation of any alternative. Small mammals, including raccoons and river otters, would benefit from increased numbers of crayfish and small prey fish biomass. The increase in water availability and rehydration within the northern WCA 3A and ENP under the TSP would likely benefit Everglades mink (*Mustela vison evergladensis*) as a result of increased foraging opportunities within ENP.

CEPP PACR implementation may negatively affect some mammals dependent upon upland habitat. Due to increased water flow and changes in water distribution, it is anticipated that overdrained areas in northern WCA 3A will be rehydrated, triggering a vegetation transition from upland to wetland habitat. Although mammals occurring within the area are adapted to the naturally fluctuating water levels in the Everglades, there is an increased potential for this vegetation transition to have a short-term moderate, adverse, and unavoidable effect on some mammals using upland habitat for refugia and food source. For additional information on high water closures for mammals in WCA 3A, see **Appendix C.2.2.15**. High water is a concern for deer populations within northern WCA 3A that utilize tree islands. Deer and other upland wildlife species (e.g., bobcats, raccoons, and marsh rabbits) are mobile and will move in response to high water conditions from tree islands to higher ground, including levees. Habitat quality in these areas is generally less desirable, and predation is more of a threat, which results in increased mortality. No significant negative effects on mammals in the remainder of the project study area are anticipated from the TSP.

C.2.2.7 Essential Fish Habitat

The TSP will reduce the duration, frequency, and volume of damaging discharges from Lake Okeechobee to the Caloosahatchee River Estuary and the St. Lucie Estuary, thus reducing the potential for adverse impacts on estuarine and nearshore biota associated with EFH. The TSP will provide a minor beneficial effect to EFH.

As described in **Section 2.1.6**, consultation with the National Marine Fisheries Service (NMFS) regarding the potential effects of the TSP on EFH will be initiated following delivery of the CEPP PACR to the ASA(CW). The TSP results in effects similar to the FWO, so it is anticipated that NMFS will provide comments similar to those received during CEPP.

C.2.2.8 Hydrology

Hydrologic modeling simulations of the ECB, FWO and the TSP were developed with the RSM-BN and RSM-GL sub-regional modeling tools to provide baseline conditions for plan formulation, the assessment of project benefits (compared against FWO), and the assessment of alternative performance for the level-of-service for flood protection and water supply (compared against the ECB). The ECB was developed to represent the system-wide infrastructure and operations that were in place at the time CEPP PACR plan formulation was initiated, approximately May 2017. The FWO for CEPP assumes the construction and implementation of currently authorized CERP and non-CERP projects, and other Federal, State, and local projects constructed or approved under existing governmental authorities that occur in the CEPP study area. Selection of the recommended plan was conducted based on comparing the CEPP PACR alternatives (R240, R360, and C360) and the ECB. See Section 2 of the CEPP PACR PIR main report and **Appendix C.1** for additional documentation of the ECB and FWO conditions.

The portion of the Greater Everglades within the CEPP PACR project area includes WCA 1, WCA 2A, WCA 2B, WCA 3A, WCA 3B, and ENP. This section provides a general overview of regional hydrological changes for the CEPP PACR recommended plan (TSP) compared to the ECB. RSM-BN and RSM-GL hydrologic modeling simulations for the CEPP PACR array of alternatives were developed starting from the FWO modeling simulation. Hydrologic performance within any specific spatial area is the result of the combined effect of TSP components and operations identified throughout the project area. Deduction of cause-effect relationships between CEPP PACR alternative components was conducted throughout the CEPP PACR preliminary screening and alternative formulation effort (see **Sections 3** and **4** of the CEPP PACR main report). For a more detailed assessment, see the complete suite of RSM-GL modeling results. A map of the RSM-GL gage locations is provided in **Figure C.2.1-11**.

C.2.2.8.1 Lake Okeechobee and the Northern Estuaries

As a result of the CEPP PACR preliminary screening process, operational changes were incorporated into the hydrologic modeling conducted for the CEPP PACR alternatives, including the TSP, in efforts to optimize CEPP PACR system-wide performance within the assumed existing flexibility of the 2008 LORS. More specifically, the hydrologic modeling of the CEPP PACR alternatives included proposed revisions to the 2008 LORS decision tree outcome maximum allowable discharges dependent on the following criteria: Lake Okeechobee inflow and climate forecasts (class limits were modified for tributary hydrologic conditions, seasonal climate outlook, and multi-seasonal climate outlook), stage level (regulation zone), and stage trends (receding or ascending). While some refinements were made within the operational flexibility available in the 2008 LORS, consistent with the original modeling intent, the final operational assumptions ultimately extended beyond this flexibility due to adjustments made to the tributary/climatological classifications. For all CEPP PACR alternatives, the LORS 2008 Regulation Schedule zones were unchanged. Additional information and documentation of these assumptions can be found in the Engineering **Appendix A** of the CEPP PACR PIR.

Compared to the FWO, TSP Lake Okeechobee stages are increased by 0.23-0.47 ft for the upper 70% of the stage duration curve (**Figure C.2.2-1**). Likewise, Lake Okeechobee stages are increased by 0.30-0.47 ft for the upper 60% of the stage duration curve. Peak lake stage increased from 17.66 ft NGVD in the FWO to 18.14 ft NGVD in TSP. The number of days with stages above 16 ft NGVD is increased from 1,163 in the FWO to 1,222 in TSP during the 1965-2005 period of simulation. Average annual total discharges from Lake Okeechobee to the Northern Estuaries were reduced from 482,000 ac-ft in the FWO (356,000 ac-ft to the Caloosahatchee Estuary; 126,000 ac-ft to the St. Lucie Estuary) to 314,000 ac-ft in the TSP (210,000 ac-ft to the Caloosahatchee Estuary; 104,000 ac-ft to the St. Lucie Estuary).

For the Caloosahatchee Estuary, compared to the FWO, mean monthly flows above 2,800 cfs and 4,500 cfs are reduced by 9 months and 5 months, respectively for TSP (13% and 21% reductions, respectively) (**Figure C.2.2-29**). Mean monthly flows less than 450 cfs are increased by 3 months (12%) for the TSP (**Figure C.2.2-2**).

For the St. Lucie Estuary, compared to the FWO, mean monthly flows above 2,000 cfs and 3,000 cfs are reduced by 4 months and 3 months, respectively for the TSP (13% and 9% reductions, respectively) (**Figure C.2.2-30**). Mean monthly flows less than 350 cfs are increased by two months for the TSP (**Figure C.2.2-3**).

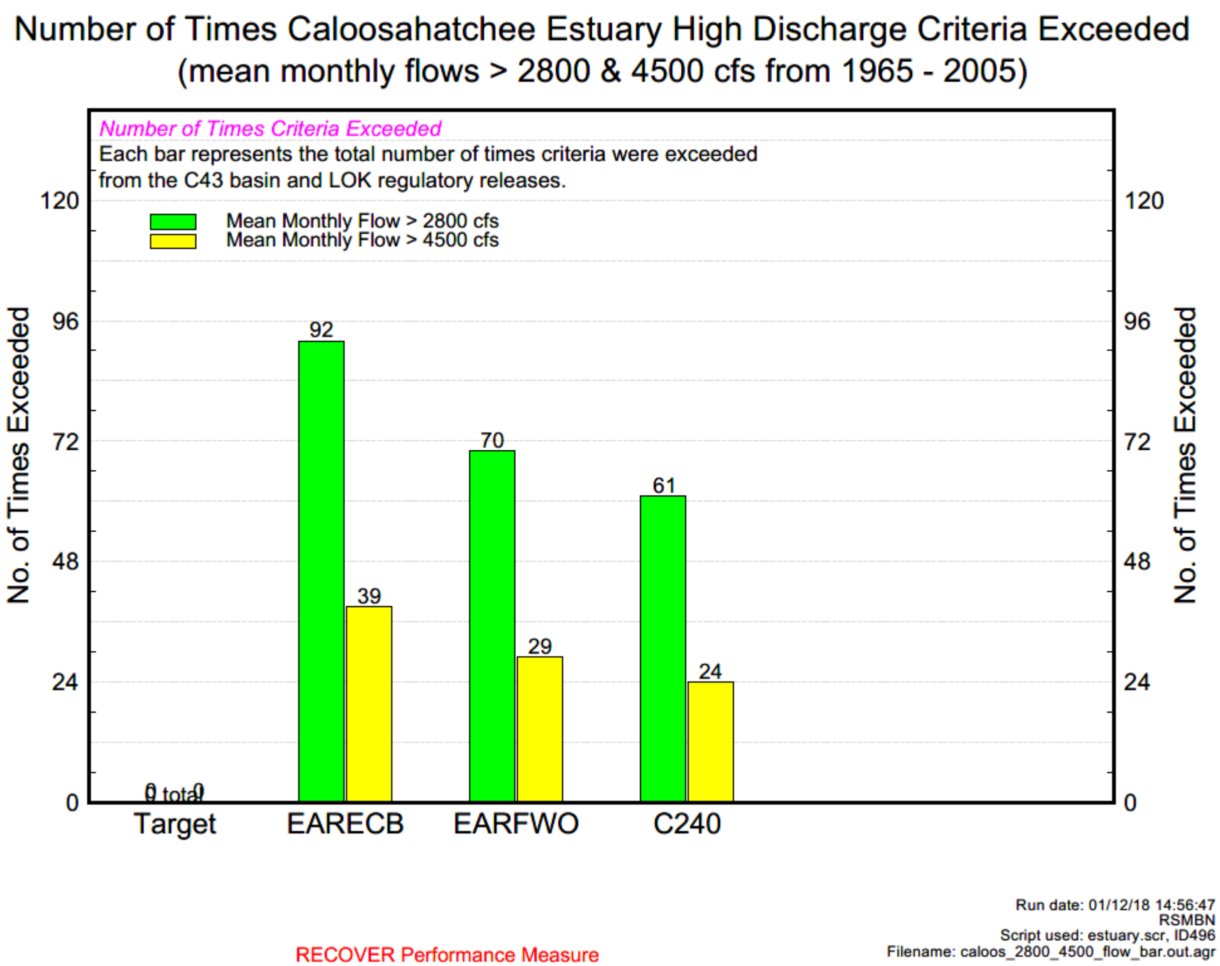

Figure C.2.2-29. Caloosahatchee Estuary High Discharge Frequency for CEPP PACR

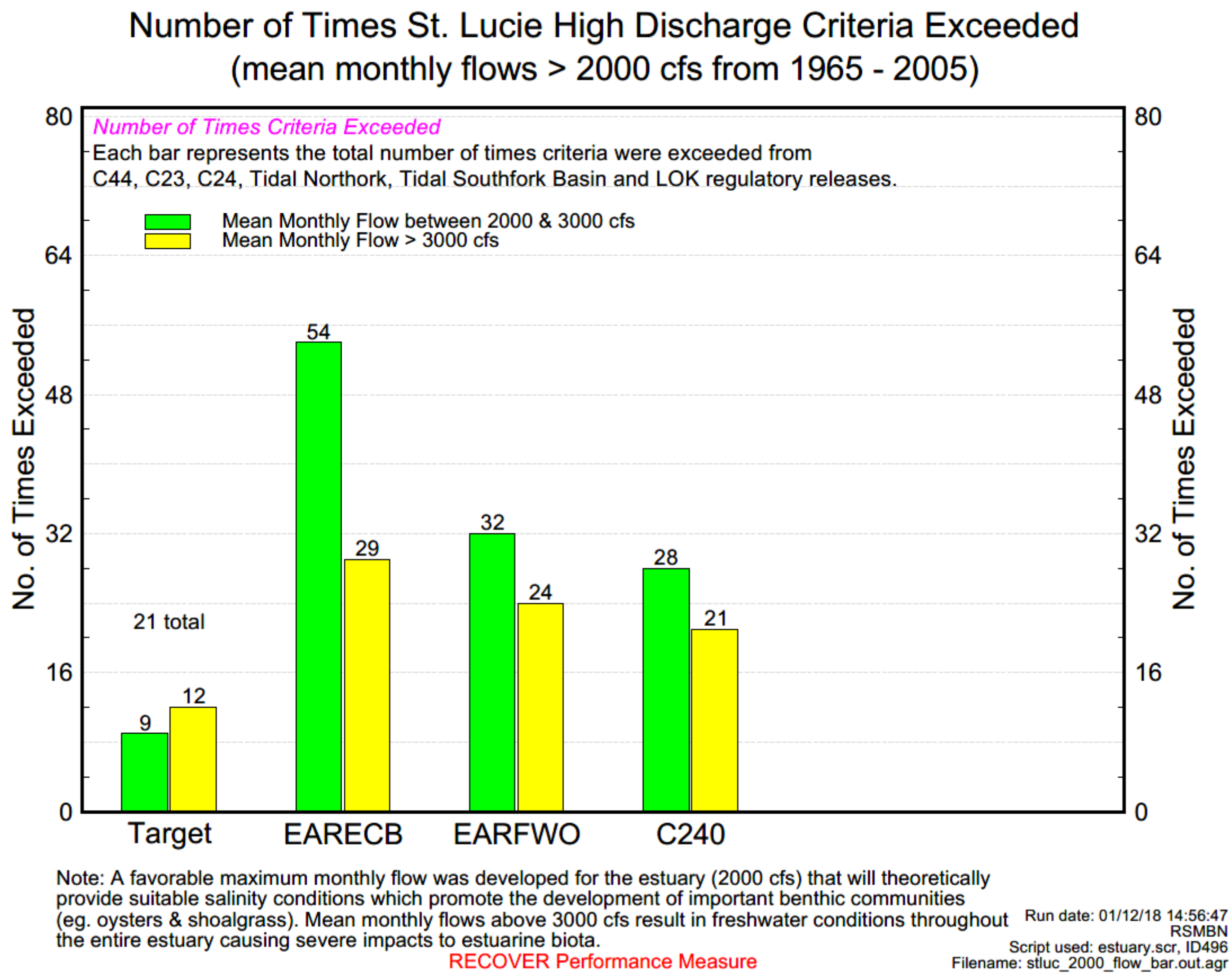

Figure C.2.2-30. St. Lucie Estuary High Discharge Frequency for CEPP PACR Alternatives

C.2.2.8.2 Everglades Agricultural Area

Minor changes to groundwater levels are expected adjacent to the TSP project features compared to the FWO. The TSP project features includes perimeter seepage collection canals and associated seepage pumps to limit potential impacts. Hydrologic effects to the Everglades Agricultural Area would be the same for all alternatives. Hydrologic modeling results are included in **Appendix A, Annex A-2**.

C.2.2.8.3 Water Conservation Area 1

Compared to the FWO, no significant changes to WCA 1 stages are indicated with TSP. Average annual regulatory releases from WCA 1 to WCA 2A via the S-10 structures are slightly increased from 266,000 ac-ft to approximately 267,000 ac-ft with TSP.

C.2.2.8.4 Water Conservation Area 2A and 2B

Compared to the FWO, WCA 2A stages (2A-17) are slightly increased under all hydrologic conditions for TSP while no changes are observed for 10% driest (**Figure C.2.2-31**). Average annual inflows from STA 2 (including Compartment B) to WCA 2A are significantly increased from 236,000 ac-ft to 300,000 ac-ft in the TSP (a 16% increase). No changes observed at the S-7 pump station inflow (56,900 ac-ft) to WCA 2A.

Average annual regulatory releases from WCA 2A to WCA 3A via the S-11s are significantly increased from 323,000 ac-ft in the FWO to 378,000 ac-ft for the TSP.

Compared to the FWO, TSP stages within WCA 2B (2B-Y) are slightly increased by less than 0.10 ft between 20%-80% of the stage duration curve (**Figure C.2.2-32**).

C.2.2.8.5 L-28 Triangle and Western L-28 Basin

Located to the west of northwestern WCA 3A, the areas immediately west of the L-28 Levee are affected by the increased stage levels in northwest WCA 3A through increased seepage westward across the L-28 Levee. South of the L-4 Levee and north of Interstate 75 (approximately 11 miles), the areas immediately west of the L-28 Levee include the Seminole Tribe of Florida's Big Cypress Reservation and the Miccosukee Tribe of Indians of Florida's Reservation.

Compared to the FWO, TSP stages immediately west of the L-28 Levee are increased by 0.1-0.2 ft under normal to dry hydrologic conditions, with no significant change indicated for extreme wet conditions (**Figure C.2.2-33**). Stage increases are only observed for the RSM-GL cells located immediately west of the L-28 Levee, which correspond to approximately 1-2 miles west of L-28. Average annual hydroperiods for these cells are increased by 10 to 60 days with TSP for the 7-8 miles north of Interstate 75 (FWO hydroperiods range from 25-150 days), with no significant hydroperiod changed indicated for the 2-3 miles south of L-4 (FWO hydroperiods range from 0-15 days). The L-28 Triangle area is located entirely within the boundaries of the Miccosukee Tribe of Indians of Florida's Reservation and encompasses 7830 acres of Tribal lands and approximately 230 acres of BCNP. The L-28 Triangle area is confined on north by Interstate 75, the west by L-28 Interceptor Canal (L-28I) and the BCNP, and the east by the L-28 Canal. Although CEPP PACR does not include modifications to the L-28 Levee or the adjacent canal, stages within the L-28 Triangle are slightly increased by less than 0.1 ft during normal to dry hydrologic conditions, due to groundwater interactions with the down-gradient western WCA 3A marsh (**Figure C.2.2-34**). Compared to the FWO, no stage increases are indicated during extreme wet hydrologic conditions.

C.2.2.8.6 Big Cypress National Preserve

Stages within the BCNP, west of WCA 3A and Western Shark River Slough (ENP), do not change significantly between the FWO and TSP.

C.2.2.8.7 Water Conservation Area 3A and 3B

Compared to the FWO, average annual combined structural inflows to WCA 3A from STA 3/4, STA 5/STA 6 (including Compartment C), and WCA 2A are significantly increased from 1,258,000 ac-ft to 1,388,000 ac-ft (10% increase) with the TSP. To avoid adverse increases to the frequency, duration, and peak stages of WCA 3A high-water conditions with this net increase in WCA 3A inflows, average annual combined structural outflows from WCA 3A through S-151 (to WCA 3B), S-333 (to ENP NESRS), the S-12 structures (to ENP WSRS), and the S-343/S-344 culverts are also increased from 1,427,000 ac-ft in the FWO to 1,534,000 ac-ft in TSP (approximately 8% increases).

Since WCA 3A covers approximately 752 square miles, hydrologic differences between the FWO and TSP are characterized at representative gages throughout WCA 3A.

Within northwest WCA 3A, compared to the FWO, stages are increased by 0.1-0.2 ft for TSP except in the wettest 20% (**Figure C.2.2-35**). Similar conditions are observed for the stages within northeast (3A-NE) and east-central (3A-3) WCA 3A, except in the wettest 5% for the latter (**Figures C.2.2-36** and **C.2.2-37**).

Proceeding south, likewise, no significant stage changes were observed within central (3A-4) (**Figure C.2.2-38**) and Southern WCA 3A (3A-28) (**Figure C.2.2-39**).

Compared to the FWO, average annual combined structural inflows to WCA 3B from WCA 3A are increased from 548,000 ac-ft to 578,000 ac-ft in the TSP (6% increase). A water budget map for TSP, focusing primarily on the structure flows (ac-ft average annual) and locations (levee seepage flux along L-30 and L-29 is also indicated), is provided in **Figure C.2.2-40**. Compared to FWO, average annual combined structural outflows from WCA 3B to the L-29 Canal and ENP NESRS are significantly increased from 240,000 ac-ft to 259,000 ac-ft in TSP. Also included in the WCA 3B water budget, average annual combined structural outflows from WCA 3B to the Lower East Coast (S-31 and S337) are moderately increased from 104,000 ac-ft in FWO to 108,000 ac-ft in the TSP. Peak stages within central WCA 3B (Site 71) exceed 9.0 ft NGVD for only 14 days (0.10%) of the RSM-GL 1965-2005 period of simulation for TSP (compared to 15 days for FWO), and WCA 3B stages are above 8.0 ft NGVD for approximately 27% or the period of simulation.

The WCA 3B hydrologic effects, resultant from the targeted increased inflows to eastern WCA 3B with the TSP compared to the FWO are apparent. For the TSP, stages at WCA 3B Site 71 are slightly increased (less than 0.1 ft) under all hydrologic conditions (**Figure C.2.2-41**). For TSP, the stage duration curves for stages within the interior of the Blue Shanty flowway and the down-gradient L-29 Canal stages are shown in **Figure C.2.2-42**. Peak stage within the Blue Shanty flowway is 9.70 ft NGVD and stages exceed 8.0 ft NGVD for approximately 46% of the period of simulation. The TSP simulation included operational constraints for the inflow structures to the Blue Shanty flowway (S-345F and S-345G) to prevent L-29 Canal stages from exceeding 9.7 ft NGVD, the assumed design high water criteria for the DOI TTNS project. Within the Blue Shanty Flowway, approximately 97% of the increase in average annual structural inflows to this area of WCA 3B are discharged across the L-29 Levee degrade.

C.2.2.8.8 Northeast Shark River Slough

The TSP assumes the L-29 Canal maximum operational limit at 9.7 ft NGVD and removal of the G-3273 stage constraint. Total net structural inflows to NESRS (via the L-29 Canal), computed as the sum of S-333, S355A, S-355B, L29 Levee Gap, and S-356 minus S-334, are increased to 782,000 ac-ft (3%) with TSP compared to the FWO (762,000 ac-ft average annual).

Stage duration curves for the L-29 Canal are provided in **Figure C.2.2-43** (note: for FWO, L-29 Canal stages are indicated west of the proposed L-29 divide structure). For FWO, peak stages in the L-29 Canal range are 9.59-9.60 ft NGVD west of the L-29 divide structure and 9.50-9.51 ft NGVD east of the L-29 divide structure. Based on the assumed operational constraints, the FWO L-29 Canal stage exceeds the maximum operational limit of 7.5 ft NGVD approximately 6% of the 1965-2005 RSM-GL period of simulation (due to direct rainfall); by contrast, the 9.7 ft NGVD maximum operational limit prescribed for TSP is not constraining during any period within the period of simulation, and L-29 Canal stages exceed 8.5 ft NGVD during only approximately 5% within the eastern L-29 Canal segment in TSP.

Compared to the FWO, stages are not significantly (less than 0.1 ft) increased under all hydrologic conditions at NESRS-2 for TSP (**Figure C.2.2-44**). Similar trends are also observed further south at the NESRS-1 monitoring gage. A reference map for the RSM-GL transects (which are consistent with the SFWMM model transects, adjusted for the RSM grid resolution) is provided in **Figure C.2.2-45**. Changes to the average annual overland flow to NESRS across RSM-GL Transect 18 (794,000 ac-ft) are shown in **Figure C.2.2-46** indicating of 40,000 ac-ft (5%) increase in Northern ENP.

C.2.2.8.9 Western Shark River Slough

Western Shark River Slough, WSRS, located to the west of L-67 Extension Levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C, and D). Under ERTP, the utilization of the S-12 structures and the seasonal sequential closure periods beginning from the west at S-12A (November 1 – July 14) and S-12B (January 1 – July 14), respectively, is meant to move water from WCA 3A into SRS while providing conditions for Cape Sable seaside sparrow Subpopulation-A (CSSS-A) nesting and breeding. Modification to the ERTP seasonal closure periods for the S-12A and S-12B was not considered during CEPP PACR preliminary screening and alternative formulation, based on USACE consideration of the USFWS Biological Opinion for ERTP.

Changes to the average annual overland flows to WSRS across RSM-GL Transect 17 (366,000 ac-ft) are shown in **Figure C.2.2-47** indicating of 47,000 ac-ft increase with the TSP. Compared to the FWO, stages within northwest ENP (NP-201) are increased by 0.1 ft during 30% wettest hydrologic conditions for TSP (**Figure C.2.2-48**). To the south and west, the NP-205 monitoring gage (used as an indicator for CSSS-A hydrology) indicates no significant stage changes under all hydrologic conditions, compared to the FWO (**Figure C.2.2-49**). Stages further south within Central Shark River Slough (NP-33) are slightly increased under 40% wettest hydrologic conditions for TSP (**Figure C.2.2-50**). Stages within Central Shark River Slough demonstrate a combined hydrologic response to the hydrologic changes previously indicated for both NESRS and WSRS; the resultant combined average annual transect flows within Central Shark River Slough (Transect 27) are increased (68 ac-ft) from an average annual volume of 760,000 ac-ft with the FWO to 828,000 ac-ft for TSP (9% increase) (**Figure C.2.2-15**).

C.2.2.8.10 Taylor Slough

Compared to the FWO, ENP stages along Taylor Slough (NP-TSB) are slightly increased by less than 0.1 ft during the driest 50% of hydrologic conditions for TSP (**Figure C.2.2-51**).

C.2.2.8.11 Lower East Coast Area

The LEC area is located to the east of the L-31N, L-31W, and C-111 canals. For the CEPP PACR array of alternatives, the operations for the SDCS are changed from the FWO operations for G-211 and the coastal canals are utilized to convey seepage water to Biscayne Bay to offset for reduced flows caused by implementation of CEPP PACR.

Observed stage changes within the LEC are separately discussed with the summary of flood control and water supply performance for the CEPP PACR alternatives, included in **Section C.2.2.8**.

C.2.2.8.12 8.5 Square Mile Area

The protected portion of the 8.5 SMA is represented by three model grid cells in the RSM-GL, and the resolution of the RSM-GL is extremely limiting for adequate representation of the 8.5 SMA project features. Prior to implementation of CEPP PACR, further technical investigations will likely be needed for the 8.5 SMA operations, and additional hydrologic/hydraulic modeling with a higher resolution model may be required.

The 8.5 SMA detention cell weirs were lowered with TSP to allow overflow when depths exceeded 1.0 ft, which resulted in performance improvements within the southwestern portion of the 8.5 SMA protected area compared to the CEPP PACR alternatives. RSM-GL modeling of TSP indicate that stages within the 8.5 SMA are not changed significantly during wet and dry conditions for the three RSM-GL grid cells 2965 that represent the protected portion of the 8.5 SMA, compared to the FWO. Stages for the southwest portion of the 8.5 SMA protected area are indicated in **Figure C.2.2-52**.

C.2.2.8.13 Biscayne Bay

Combined total average annual surface water canal discharges to central and southern Biscayne Bay (G-93, S-22, S-123, S-20F, S-20G, S-21, S-21A) are 366,000 ac-ft, which is increased by 6,200 ac-ft for TSP, compared to the FWO (359,700 ac-ft). Average annual surface water canal discharges to northern Biscayne Bay (S-29, S-28, S-27, S26, S25, S25B), which are affected by the assumed operations of the CERP BCWPA project, are increased by 11,700 ac-ft (560,000 ac-ft) for TSP, compared to the FWO (548,300 ac-ft).

C.2.2.8.14 Florida Bay

For the CEPP PACR alternatives, average annual surface water transect flows from southeastern ENP towards Florida Bay are not changed significantly (1,000 ac-ft) for Craighead Basin (RSM-GL Transect 23-A), increased by 3,000 ac-ft (4%) from Taylor Slough (Transect 23-B), and increased by 3,000 ac-ft (2%) for the Eastern Panhandle of ENP (Transect 23-C), resulting in a net increase of approximately 7,000 ac-ft for the TSP, compared to the FWO. The salinity effects within Florida Bay from this overall increase and changed spatial distribution of flows were minor and limited to the nearshore area. Additional information for the changes observed between the TSP and the FWO is discussed in **Appendix G, Environmental Benefits Model**.

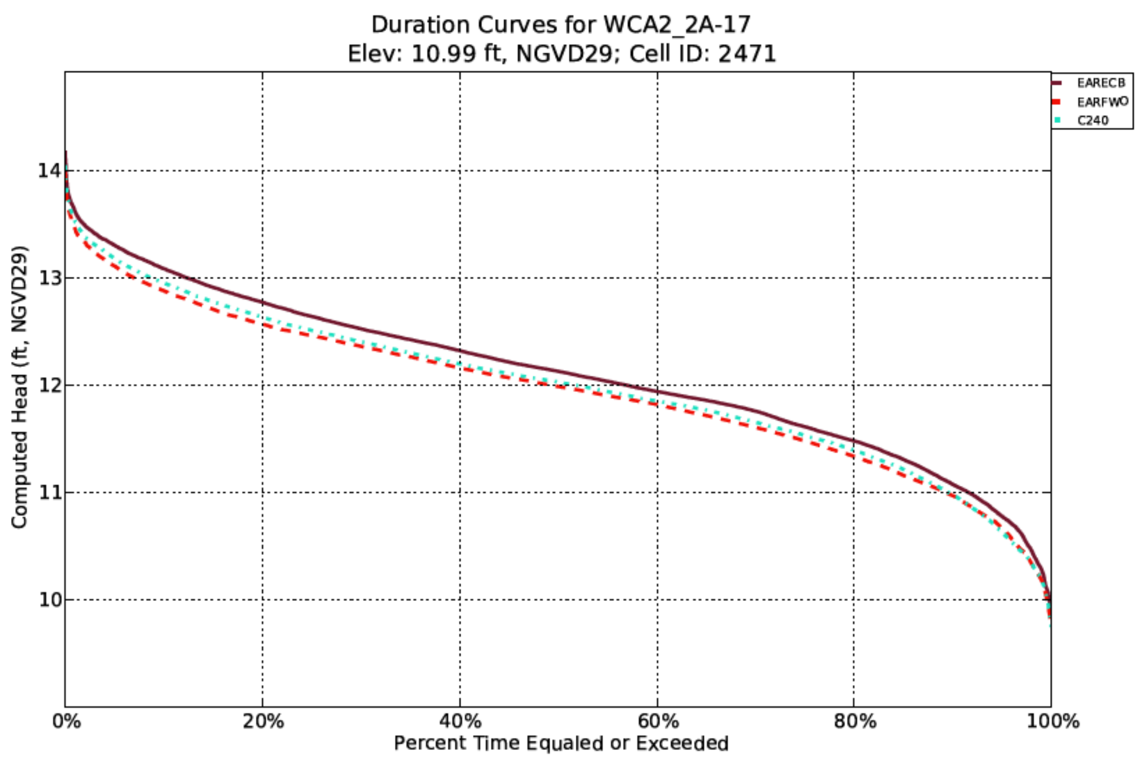

Figure C.2.2-31. Central WCA 2A Stage Duration Curve

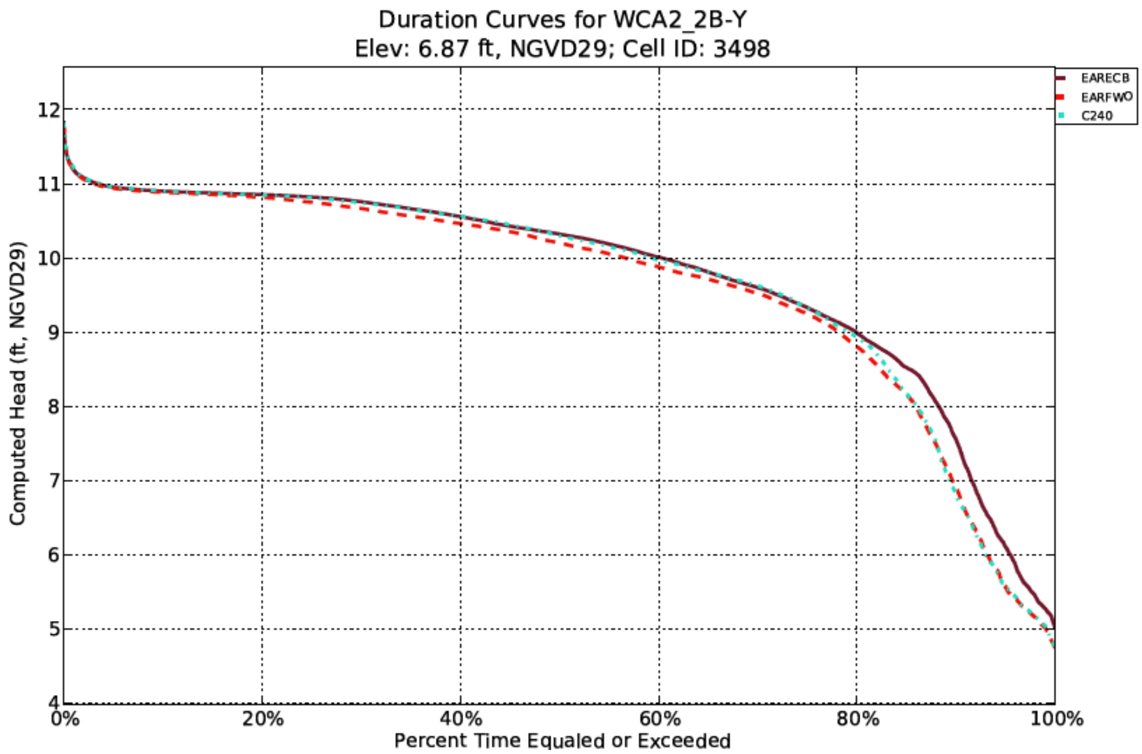

Figure C.2.2-32. Southern WCA 2B Stage Duration Curve

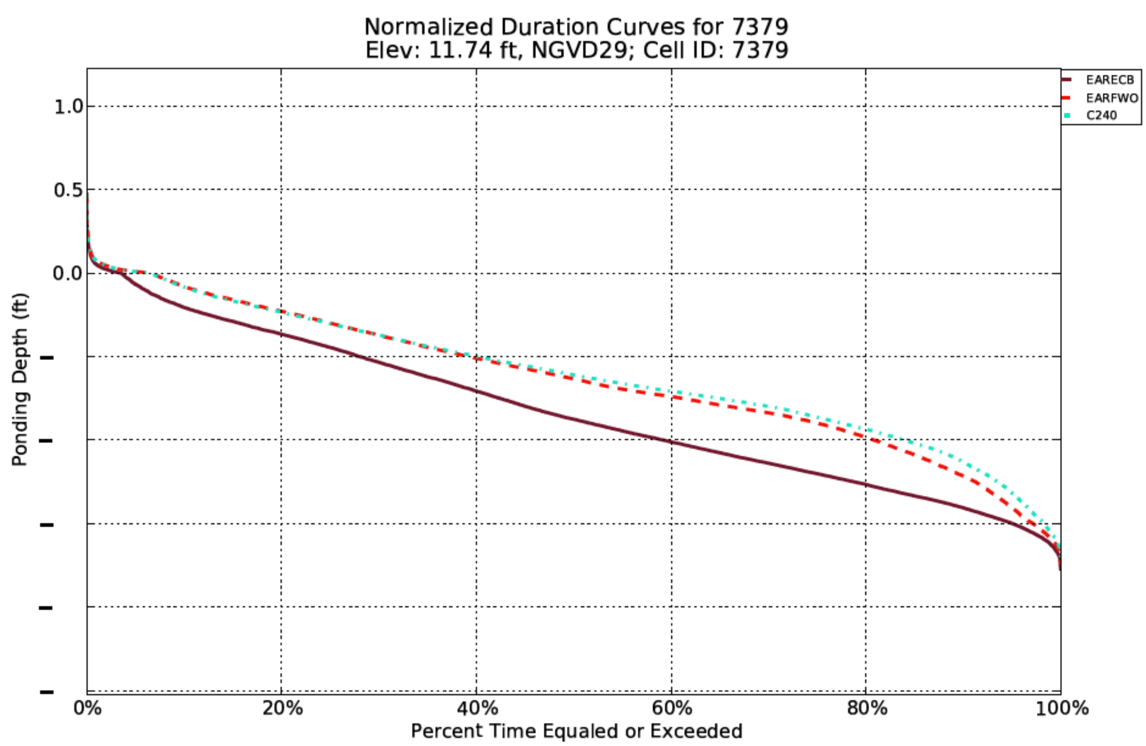

Figure C.2.2-33. Western L-28 Basin Stage Duration Curve

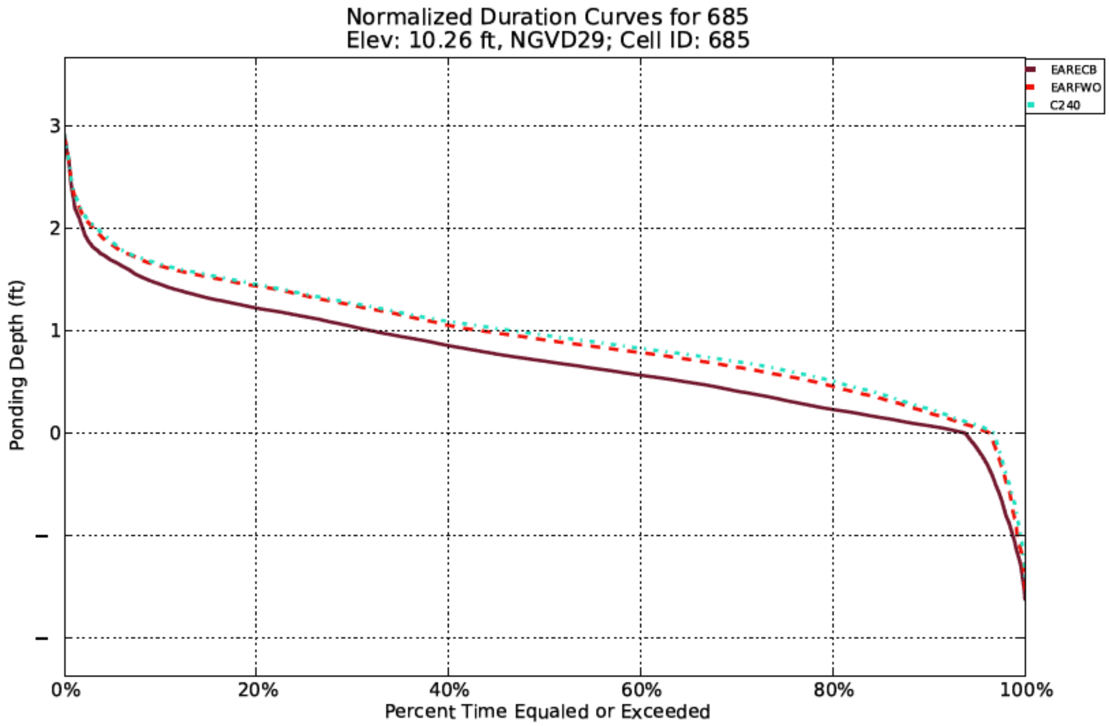

Figure C.2.2-34. L-28 Triangle Stage Duration Curve

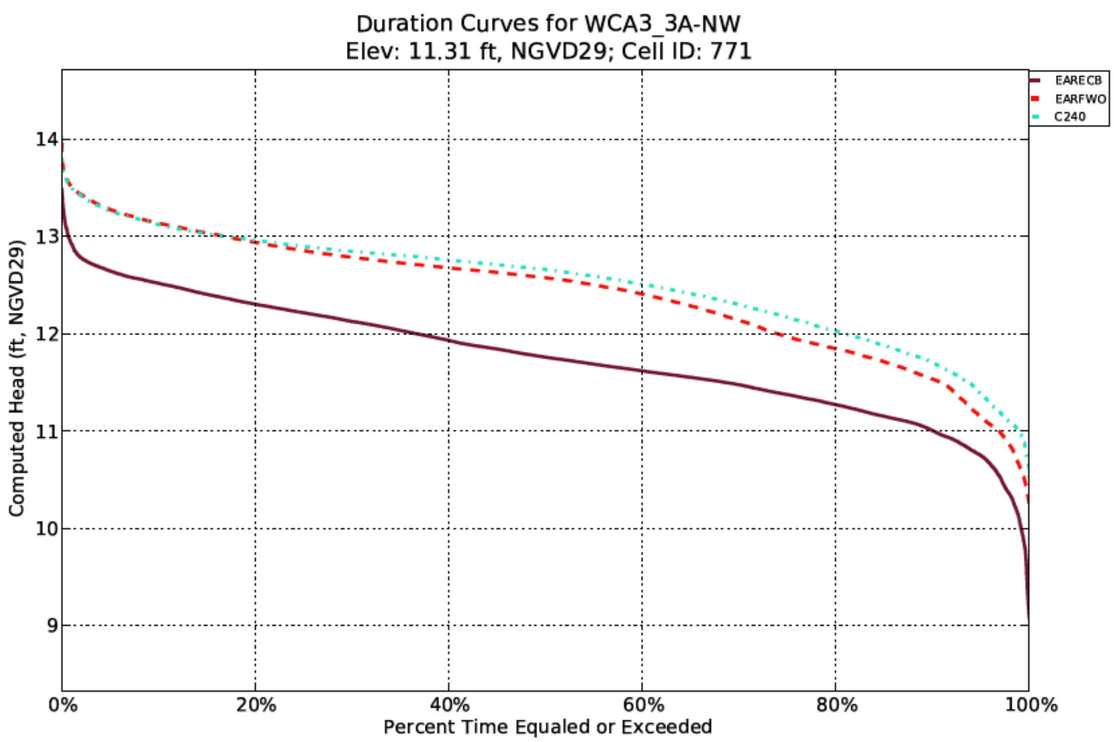

Figure C.2.2-35. Northwest WCA 3A Stage Duration Curve

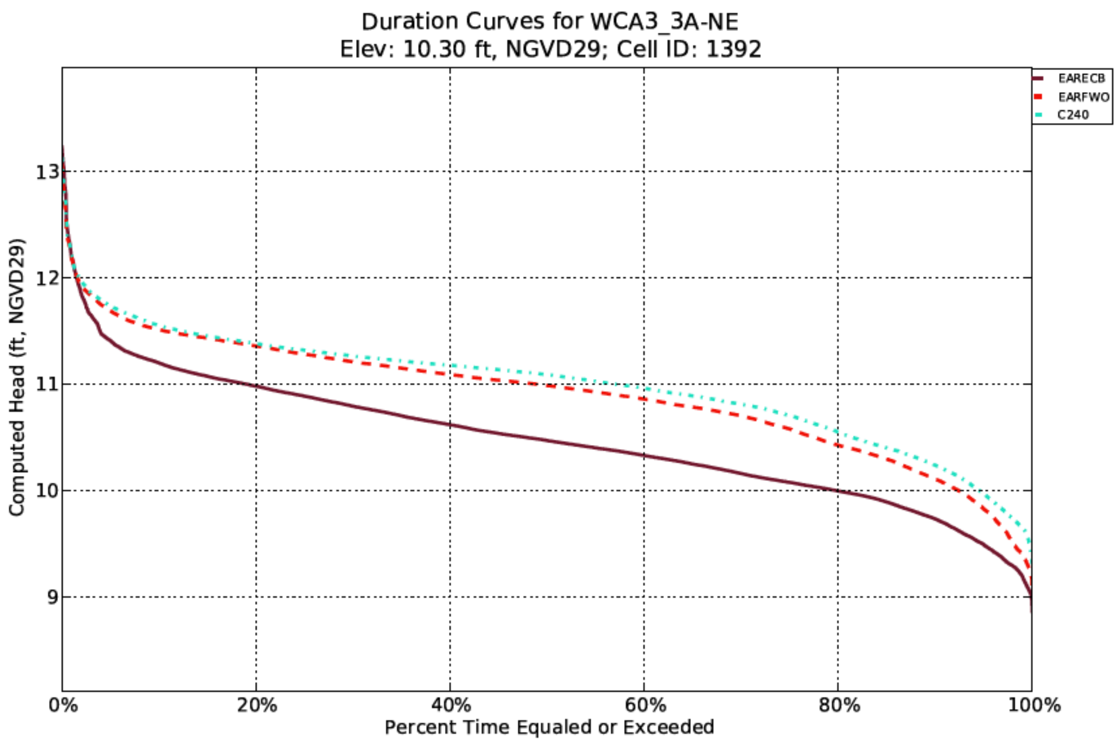

Figure C.2.2-36. Northeast WCA 3A Stage Duration Curve

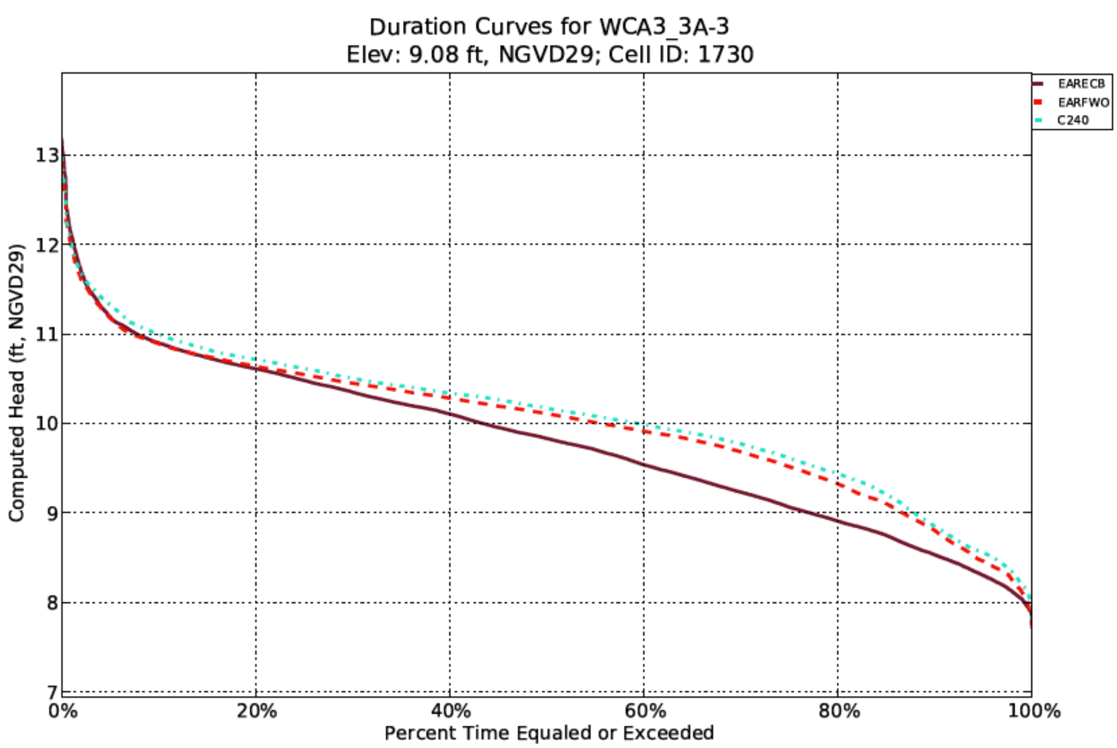

Figure C.2.2-37. East-Central WCA 3A Stage Duration Curve

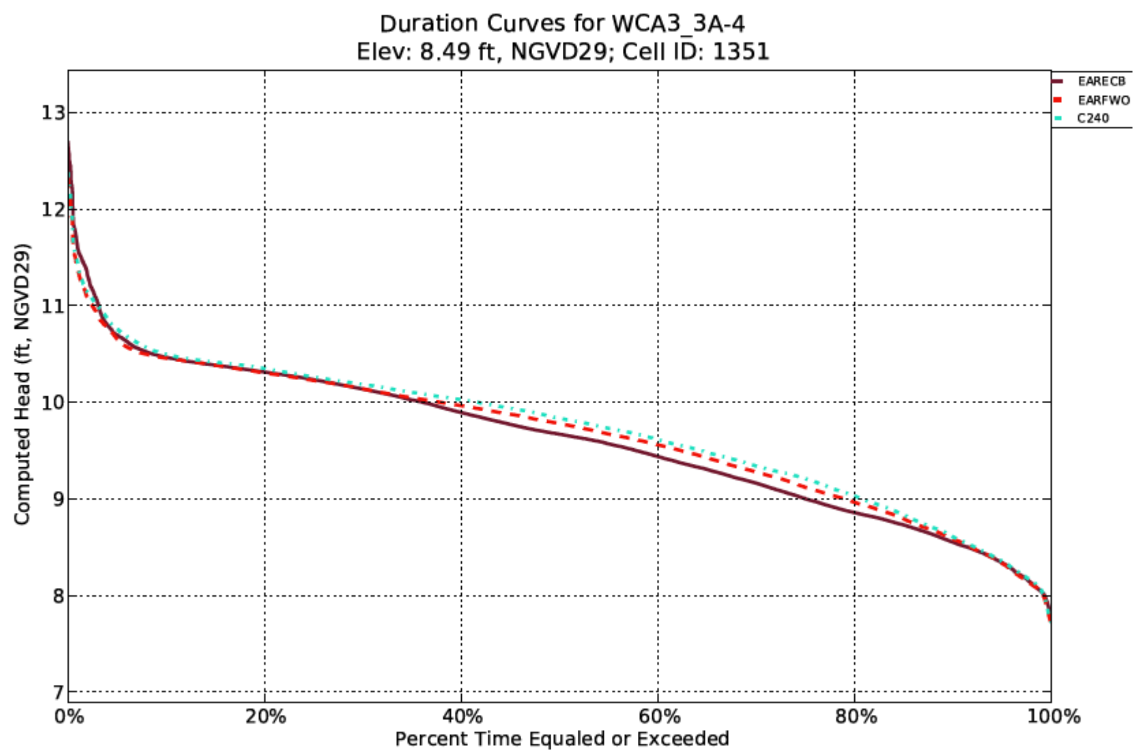

Figure C.2.2-38. Central WCA 3A Stage Duration Curve

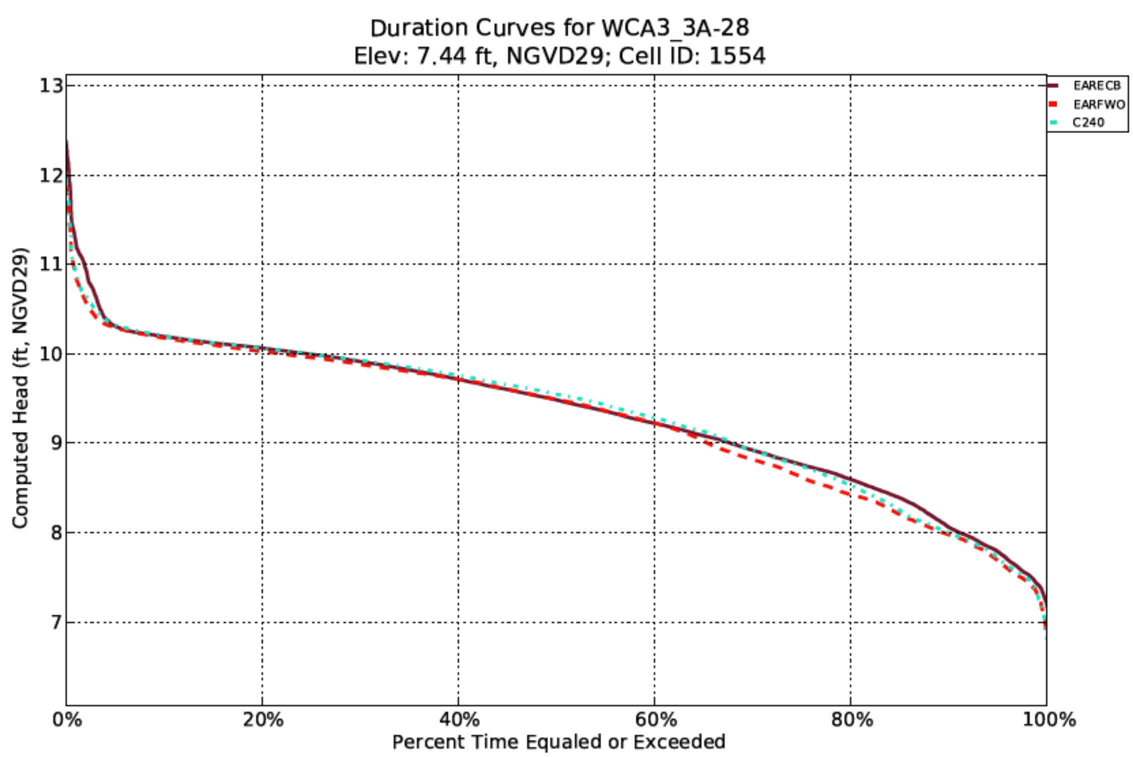

Figure C.2.2-39. South WCA 3A Stage Duration Curve

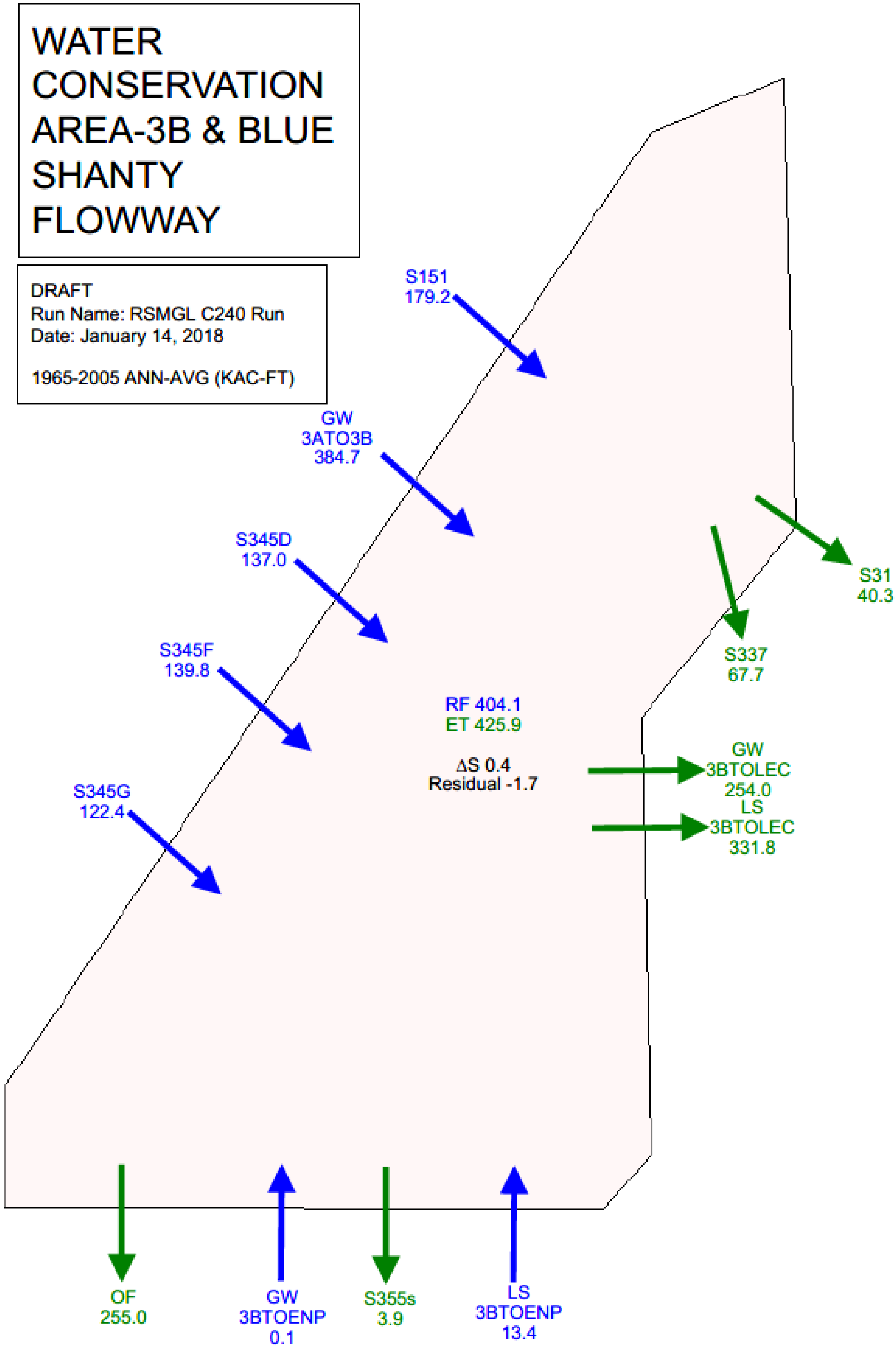

Figure C.2.2-40. WCA 3B Water Budget for the TSP

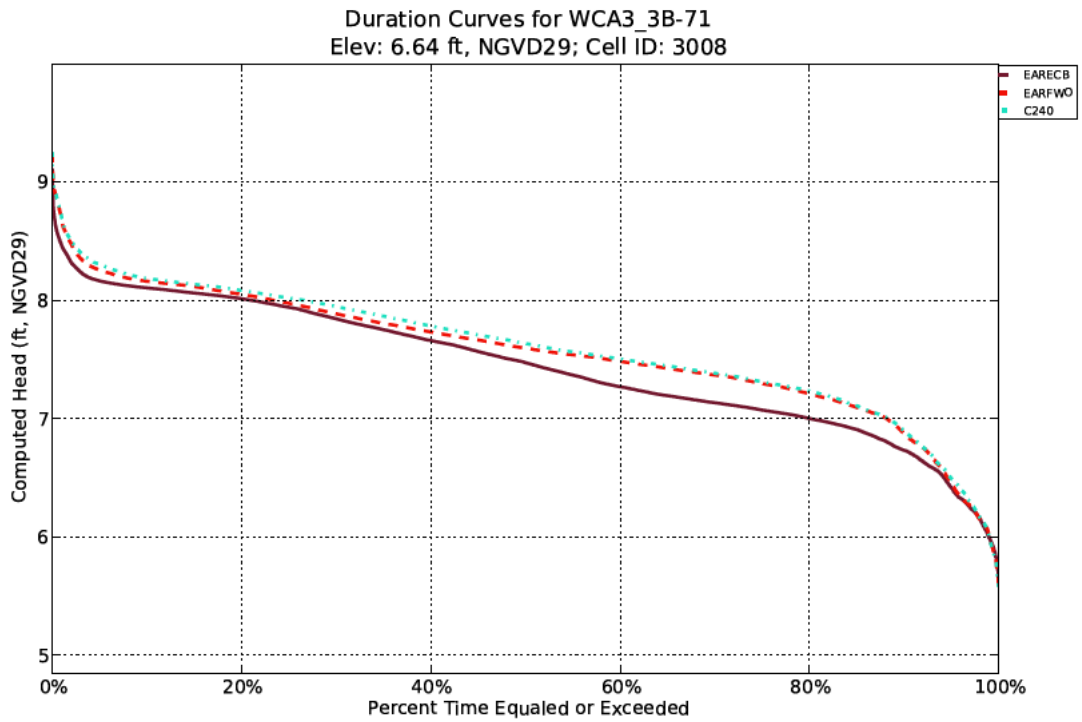

Figure C.2.2-41. Central WCA 3B Stage Duration Curve

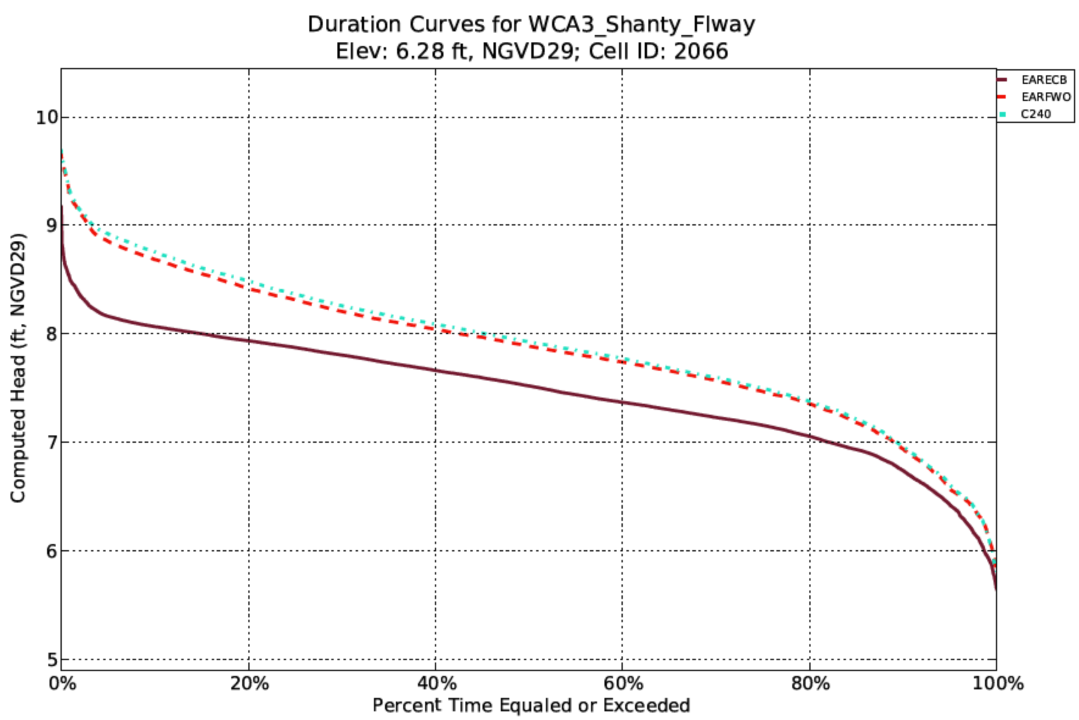

Figure C.2.2-42. WCA 3B Blue Shanty Flowway Stage Duration Curve (TSP)

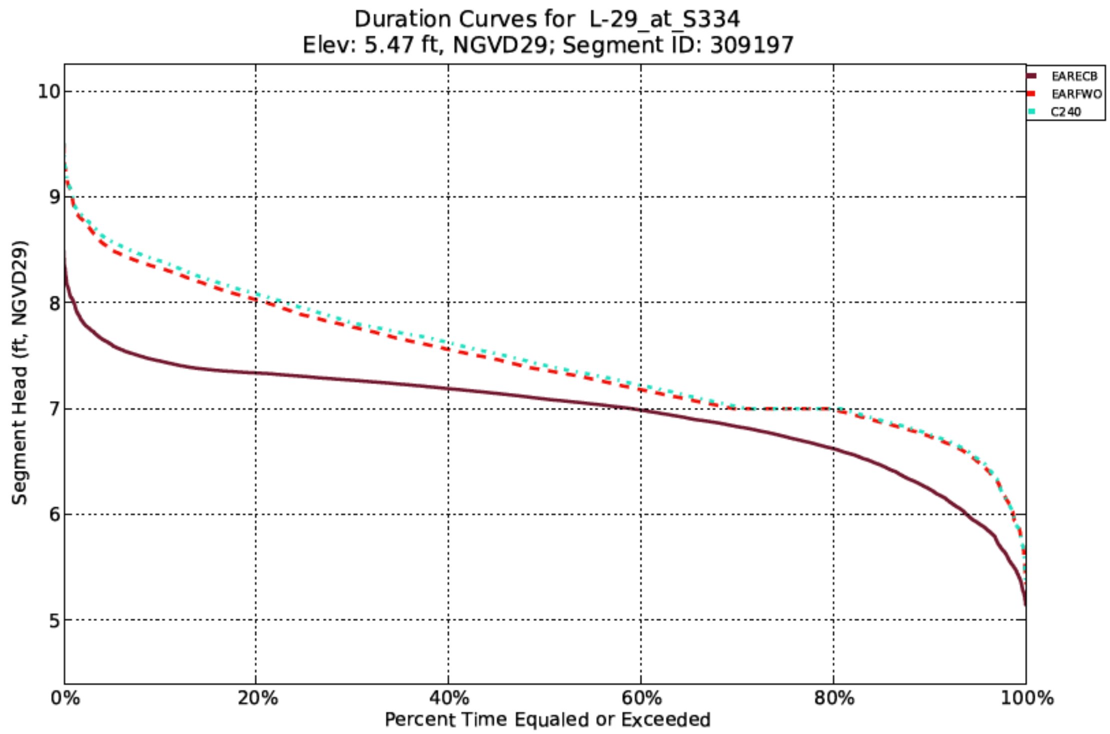

Figure C.2.2-43. L-29 Canal Stage Duration Curve

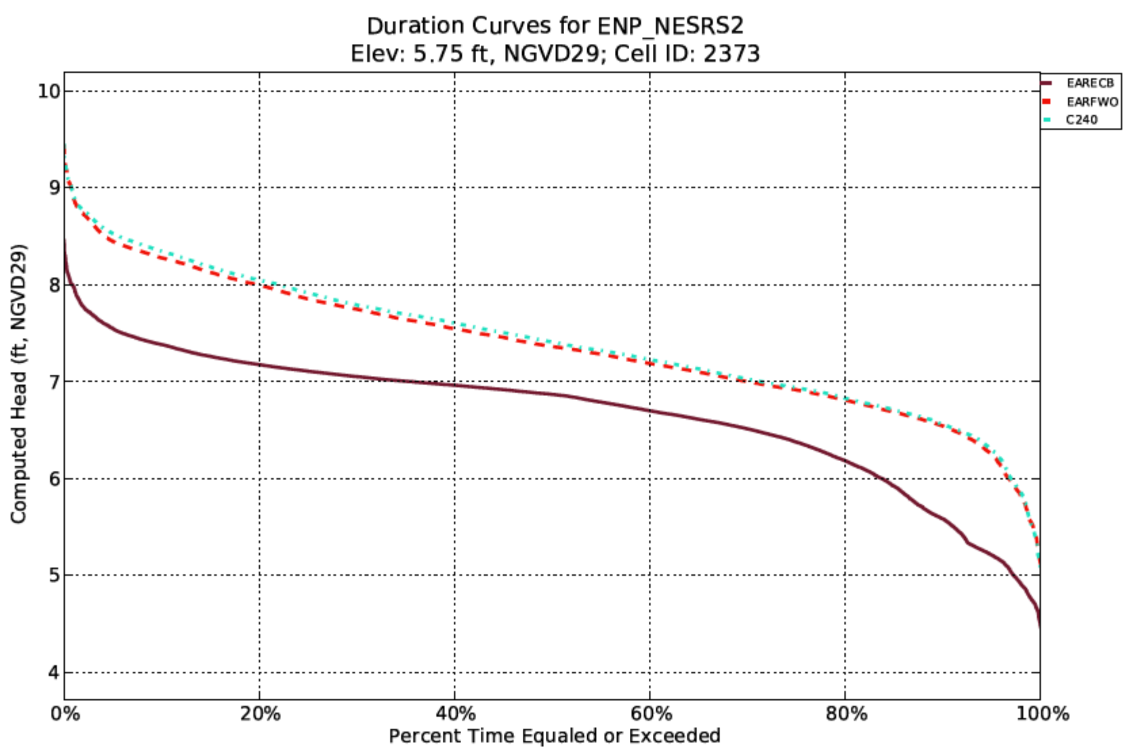

Figure C.2.2-44. Northeast ENP Stage Duration Curve

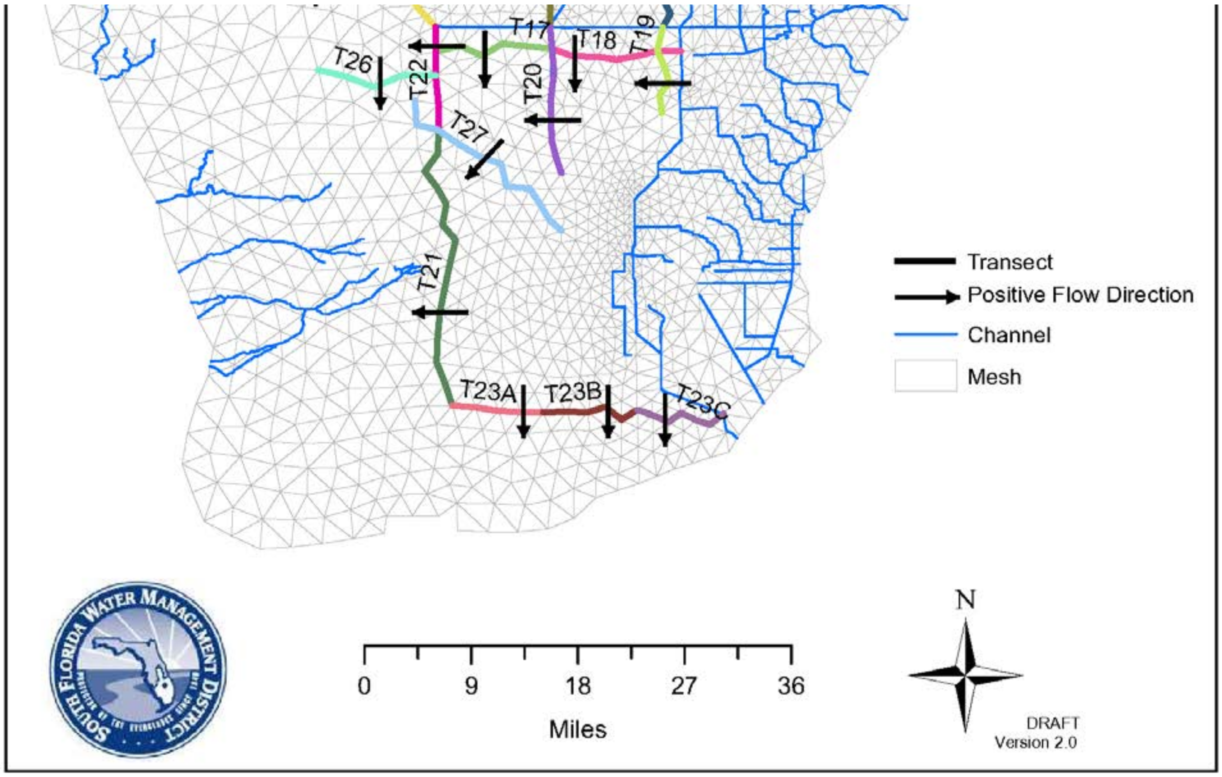

Figure C.2.2-45. RSM-GL Overland Flow Transects for ENP

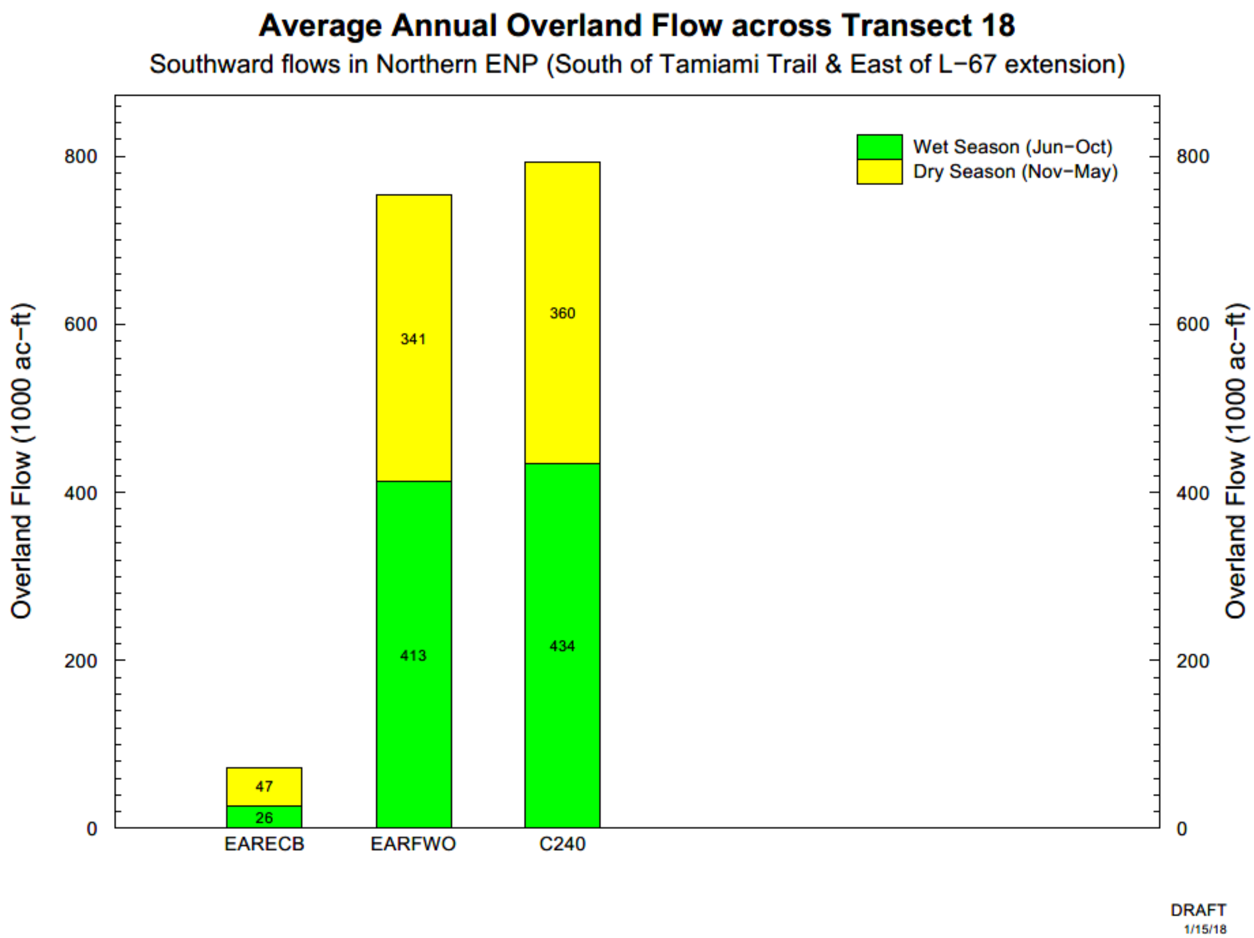

Figure C.2.2-46. Average Annual Overland Flow to NESRS

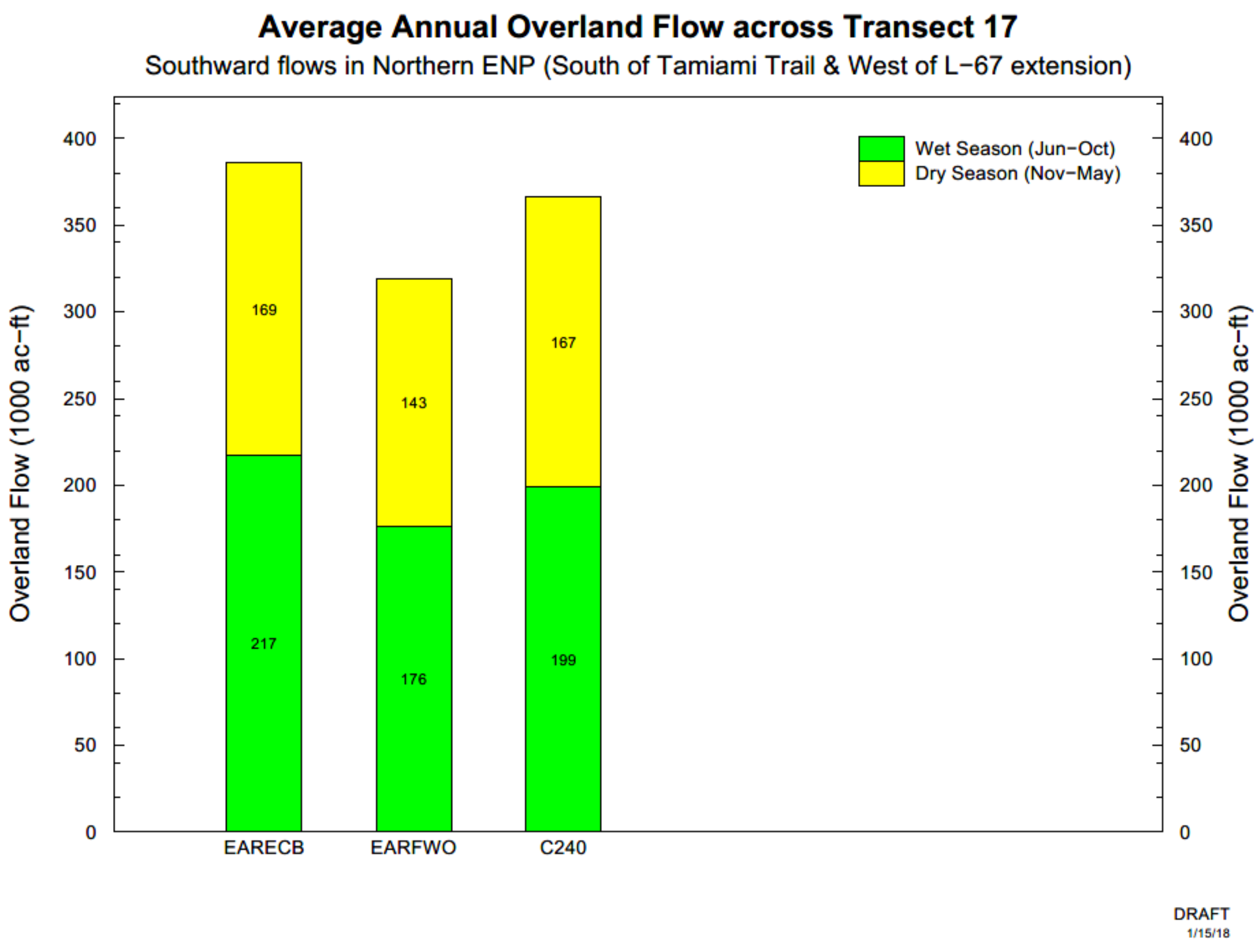

Figure C.2.2-47. Average Annual Overland Flow to WSRS

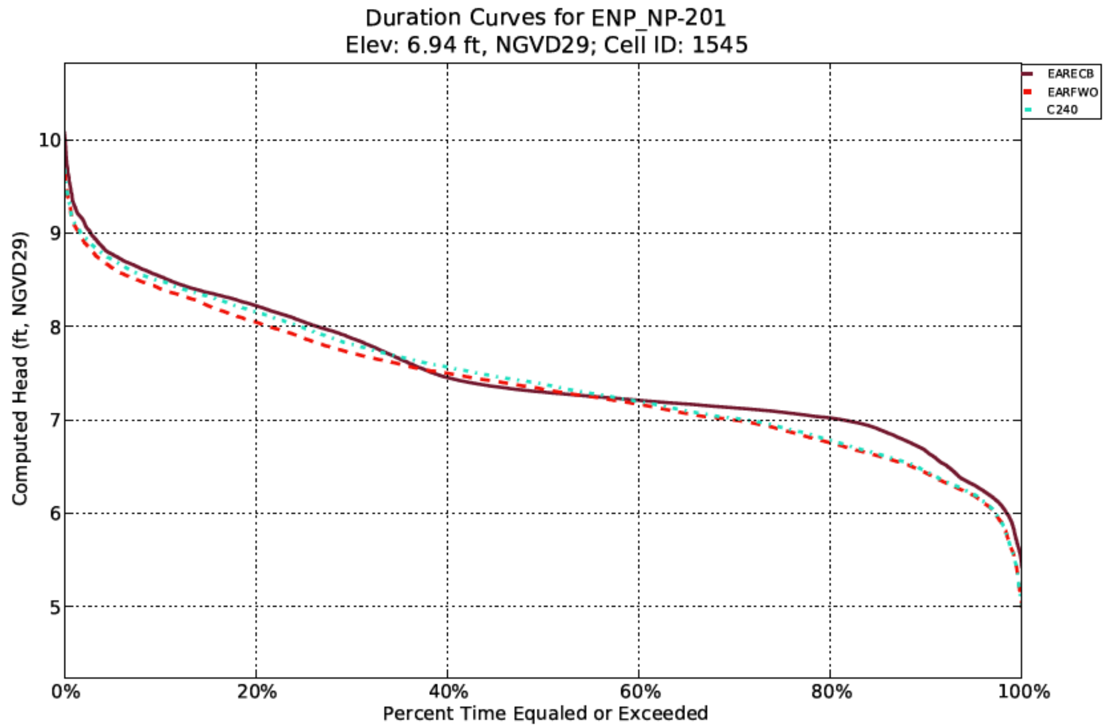

Figure C.2.2-48. Northwest ENP Stage Duration Curve (NP-201)

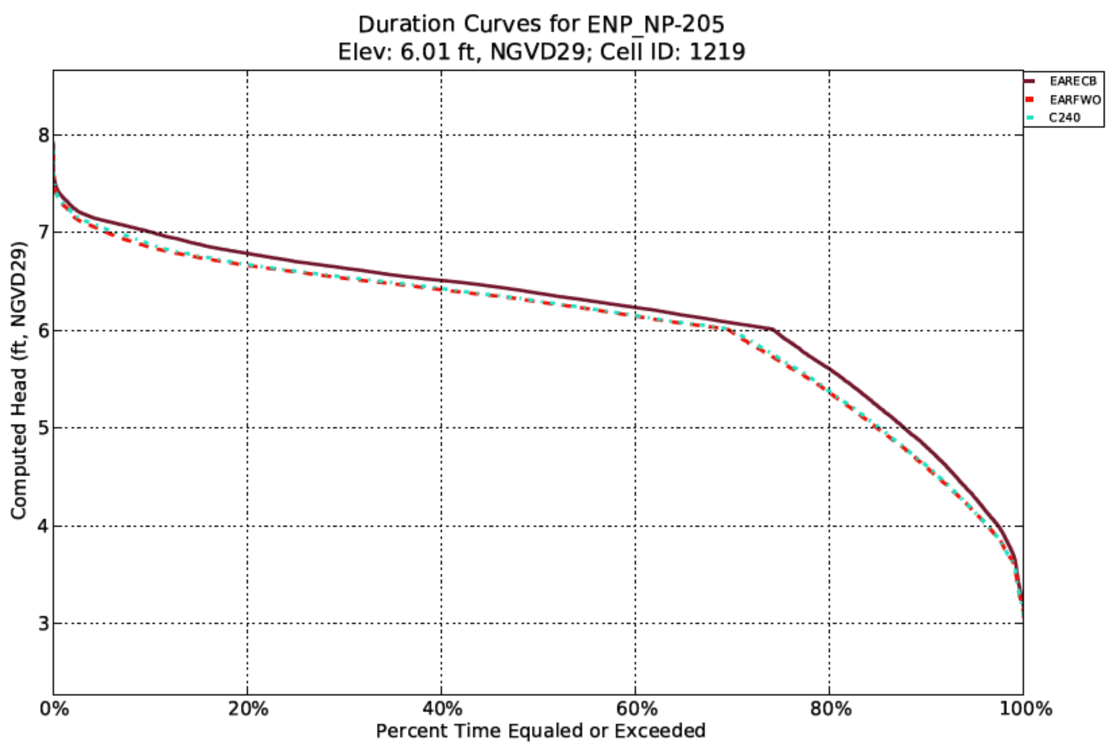

Figure C.2.2-49. Northwest ENP Stage Duration Curve (NP-205)

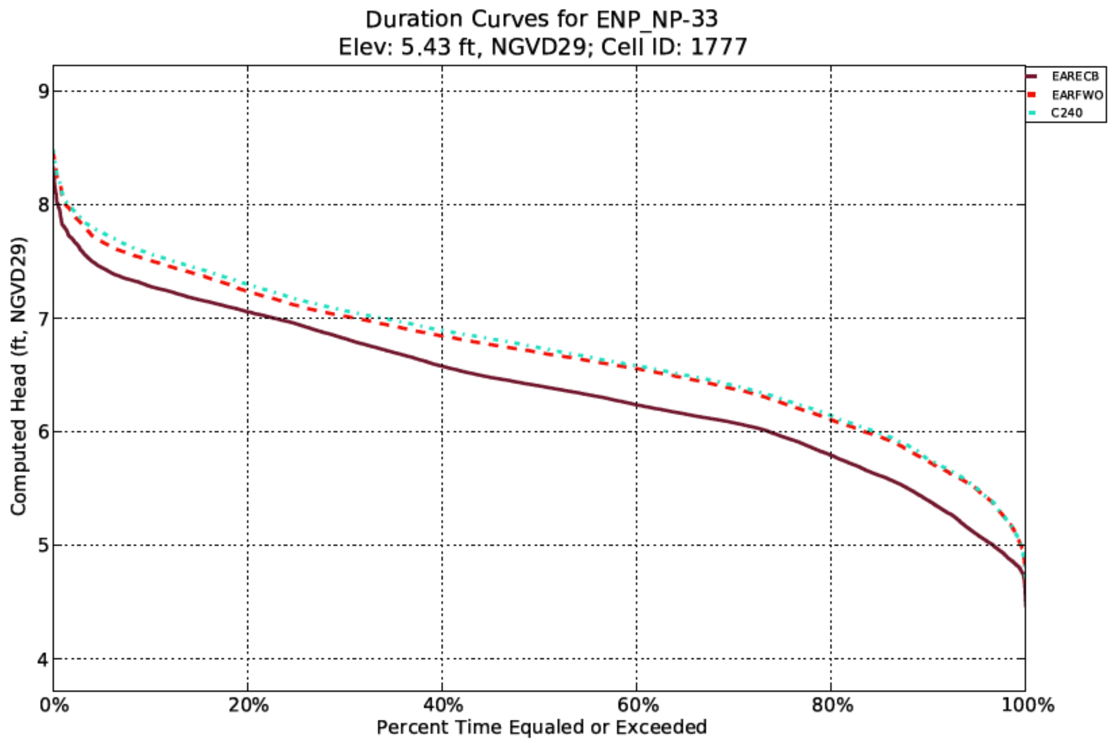

Figure C.2.2-50. Central ENP Stage Duration Curve

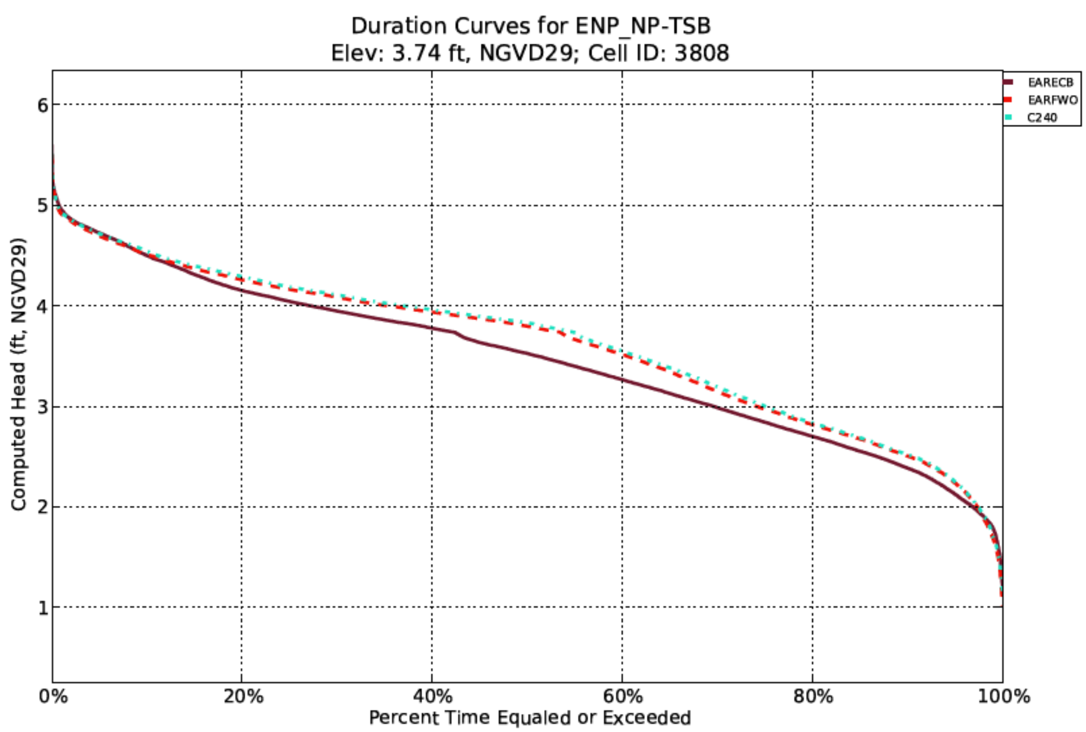

Figure C.2.2-51. ENP Taylor Slough Stage Duration Curve

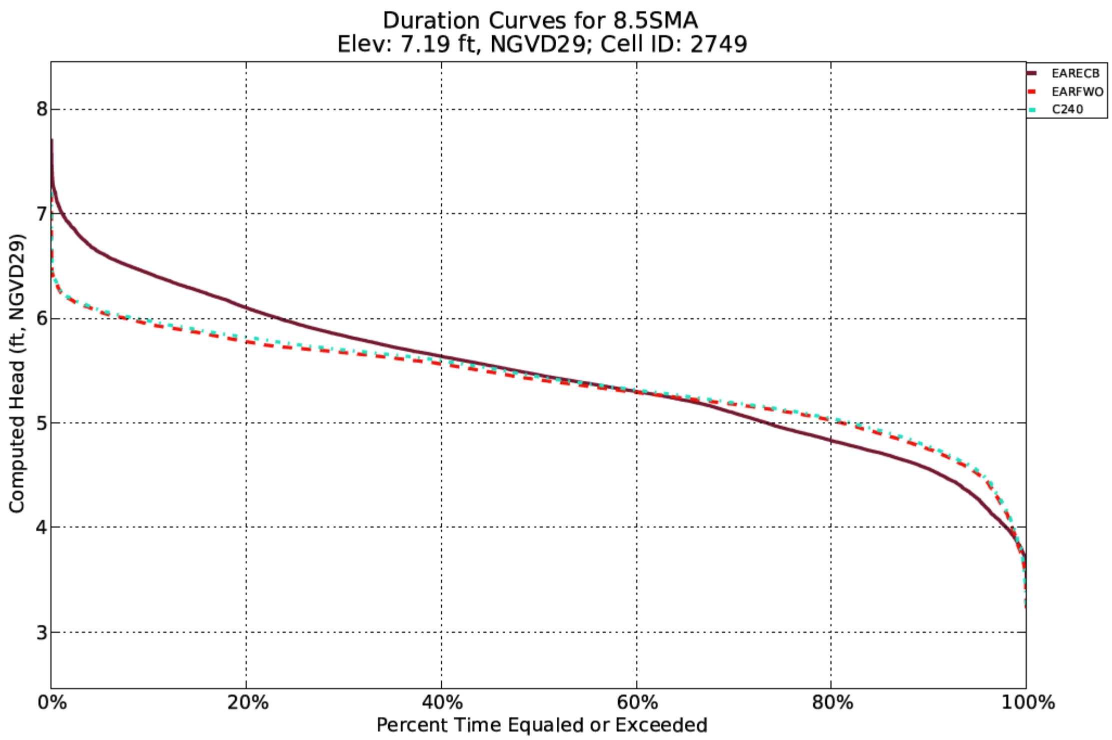

Figure C.2.2-52. Stage Duration Curve for Southwest 8.5 SMA

C.2.2.9 Water Supply and Flood Control

To address the Savings Clause requirements for CERP, a detailed and comprehensive analysis of potential effects of the CEPP PACR recommended plan (TSP), where applicable, to existing legal sources for water supply and/or the levels of service for flood protection (refer to **Section 6** of the main report for summary information and **Annex B** for the complete analysis). The general hydrologic overview of water supply and flood control performance of the TSP in this section is separate and distinct from the content of the recommended plan Savings Clause analysis contained in **Annex B**. Areas within the CEPP PACR project area that are not specifically discussed in this section may be presumed to have insignificant impacts to water supply or flood control as compared to the alternatives.

C.2.2.9.1 Lake Okeechobee

Based on TSP modeling assumptions and the resulting stage increases in Lake Okeechobee similar to those seen in CEPP, the average annual percentage of water supply demand not met is projected to decrease for the EAA and the remainder of the LOSA (**Figure C.2.1-53**). For the 8 years with the largest water supply cutbacks within the LOSA, the water supply cutback percentage is reduced significantly compared to the FWO (**Figure C.2.1-54**).

Lake Okeechobee stage duration curves for the RSM-BN model representation of the ECB (LORS 2008), CEPP EARFWO (LORS 2008 and CEPP, plus additional CERP and non-CERP projects), and CEPP PACR TSP are shown in **Figure C.2.2-1**. Compared to the FWO, TSP Lake Okeechobee stages are increased by up to 0.30 ft for the lower 70% of the stage duration curve, excluding extreme wet hydrologic conditions. Stages in the 10 to 30% duration are decreased by up to 0.20 ft, while the extreme 10% stages are slightly increased.

The CEPP baselines and CEPP PACR TSP all show simulated stages above 17.25 ft NGVD: 11 days for the ECB; 29 days for the FWO and 60 days for the TSP, respectively. Extreme high lake stages have also been documented to adversely impact the plant and animal communities, through processes which include the following: physical uprooting of emergent and submerged plants; reduced light levels in the water column due to increased suspended sediment; and littoral zone exposure to increased nutrient levels from the water column. The number of days with stages above 16 ft NGVD is increased from 1,163 in the FWO to 1,222 in the TSP during the 1965-2005 period of simulation.

Following completion of the HHD remediation of Reaches 1, 2, and 3, the degree to which higher maximum lake stages and increased frequency and duration of high lake stages would be accepted, if at all, will be contingent on the conclusions identified in the USACE 2014 DSMR for the HHD. Any changes to the Lake Okeechobee Regulation Schedule would be analyzed and coordinated with the public through the NEPA process.

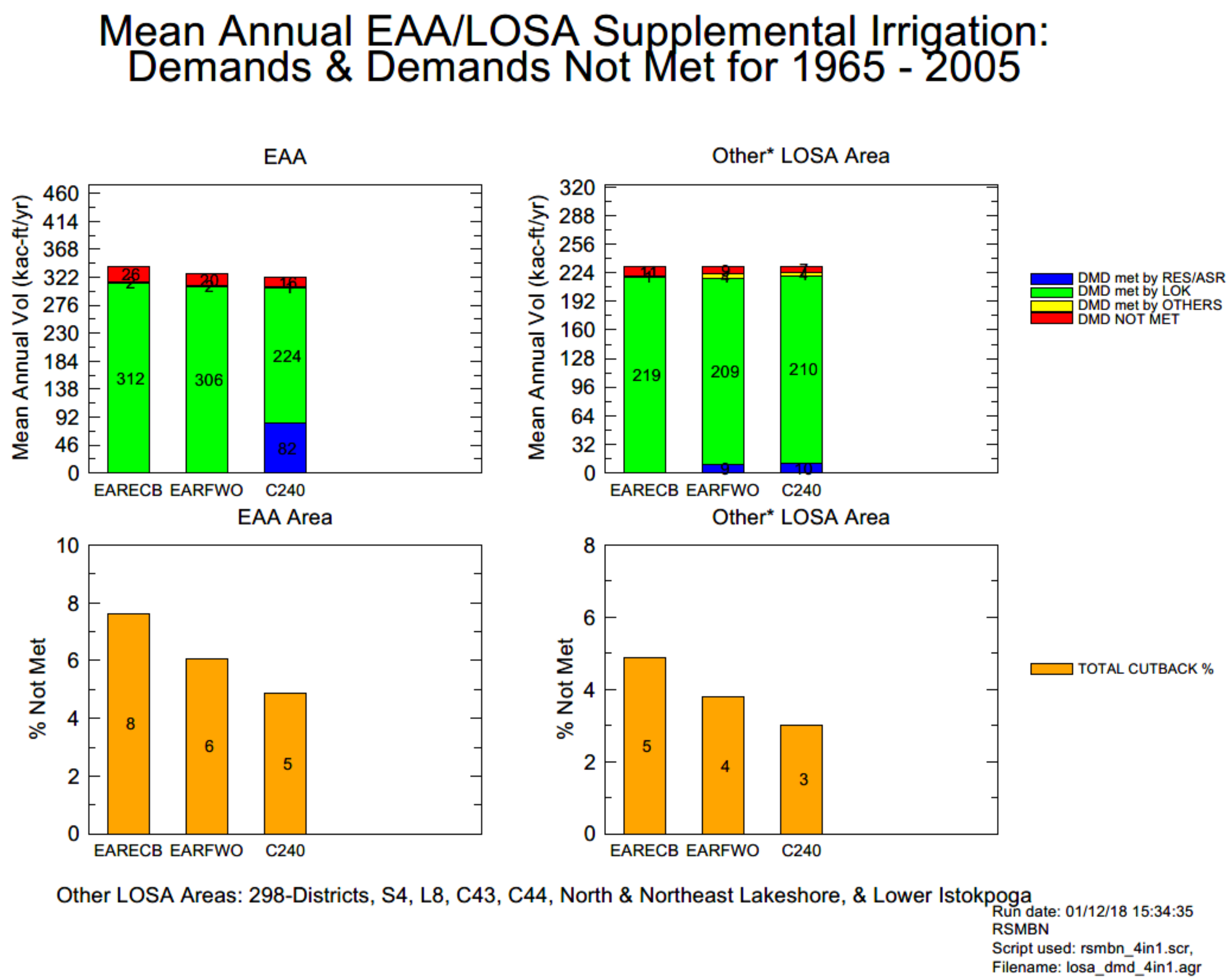

Figure C.2.2-53. EAA and LOSA Water Supply Performance

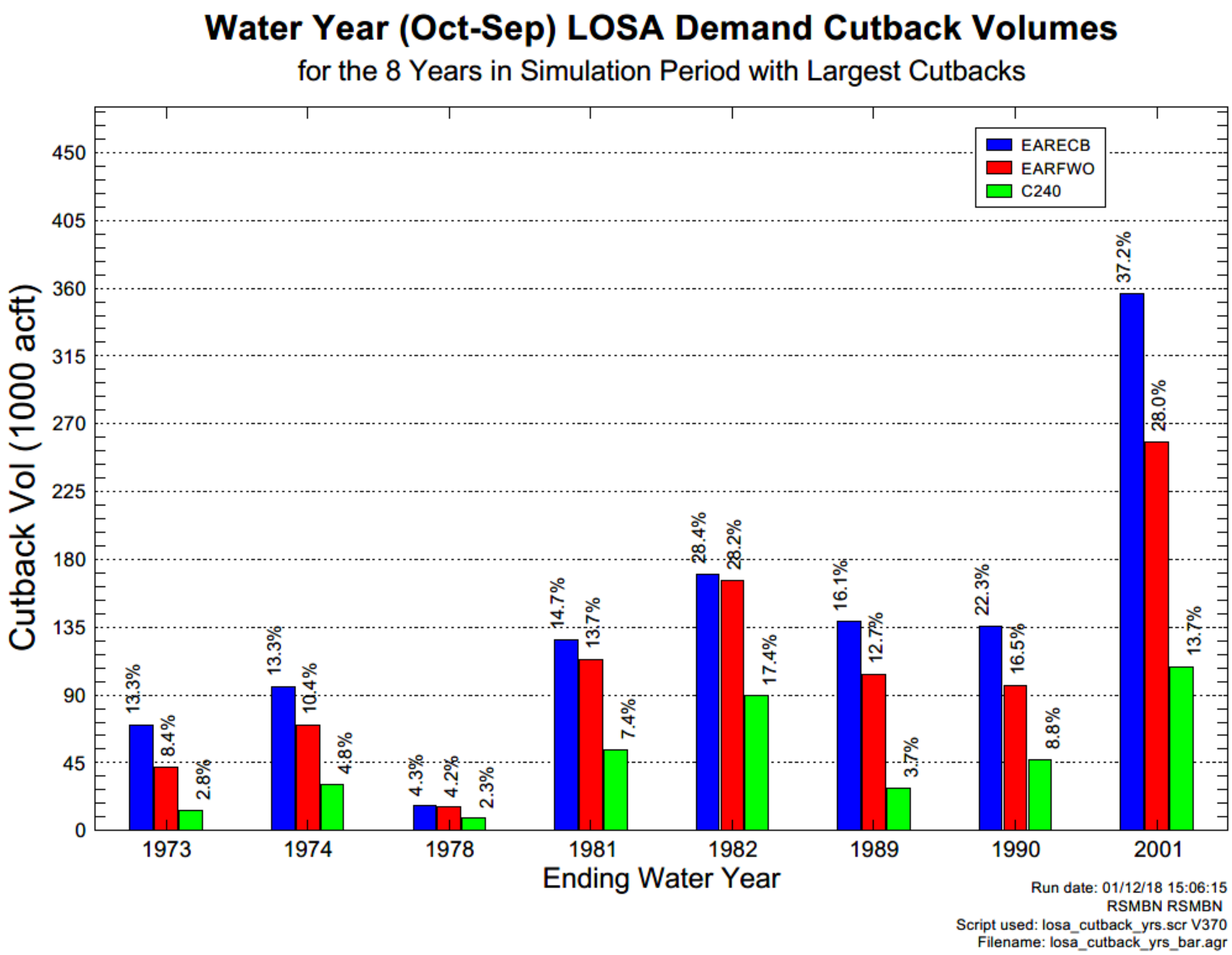

Figure C.2.2-54. LOSA Water Supply Performance for the 8 Largest Cutback Years

C.2.2.9.2 Seminole Tribe of Florida

Based on the CEPP PACR alternative modeling assumptions regarding Lake Okeechobee operational flexibility and the resulting general moderate stage increases within Lake Okeechobee, the percentage of water supply demand not met for the Brighton Reservation is shown to slightly decrease by approximately 0.9% compared to the FWO (**Figure C.2.2-55**) for the TSP. The percentage of water supply demand not met for the Big Cypress Reservation is shown to be slightly reduced by approximately 0.6% compared to the FWO (**Figure C.2.2-56**) for the TSP. The Seminole Tribe of Florida has surface water entitlement rights pursuant to the 1987 Water Rights Compact and subsequent entitlement provisions executed between the Seminole Tribe of Florida, the State of Florida, and the SFWMD. Impacts are not expected for alternatives based on the hydrologic modeling.

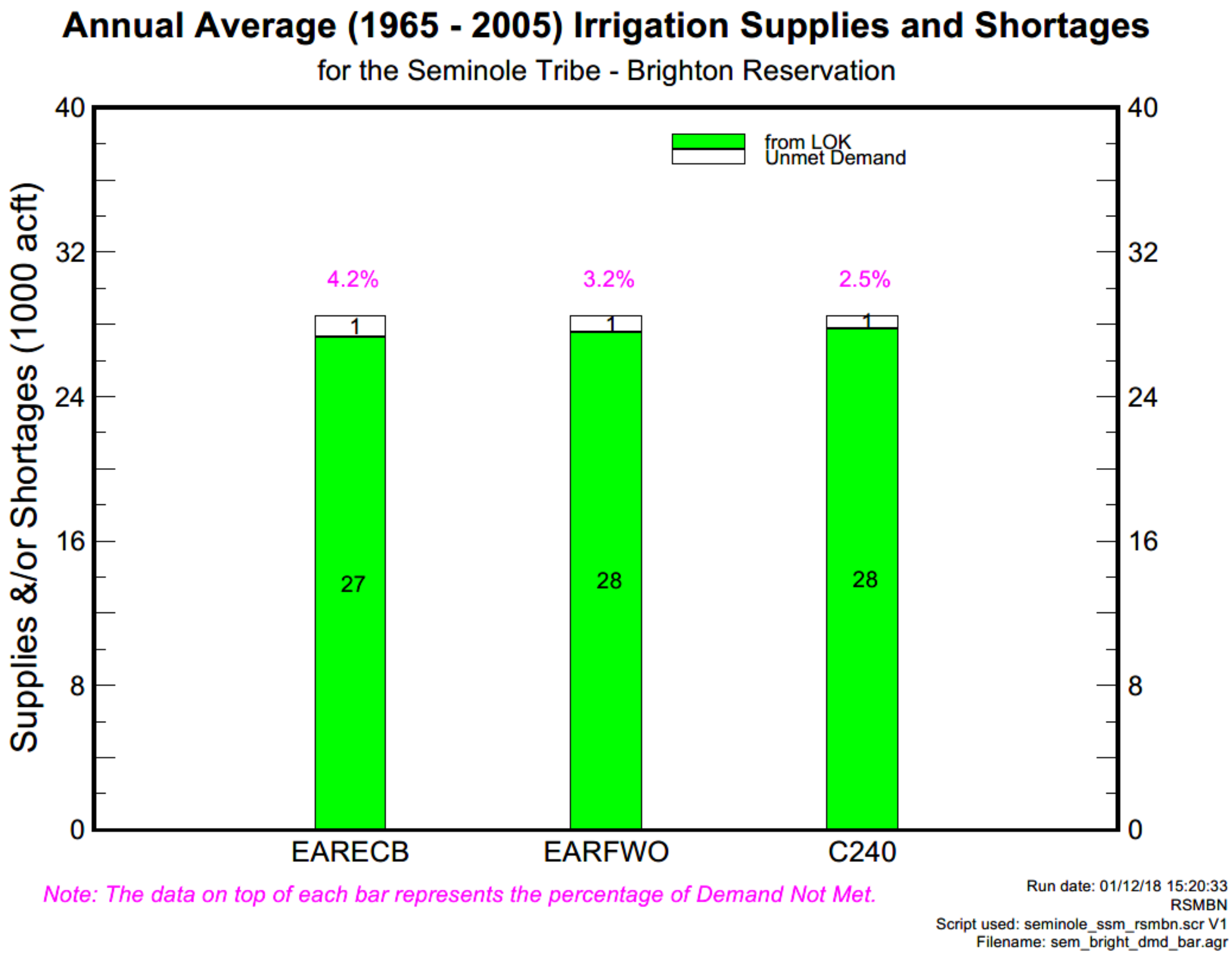

Figure C.2.2-55. Water Supply Demand for Seminole Tribe of Florida's Brighton Reservation

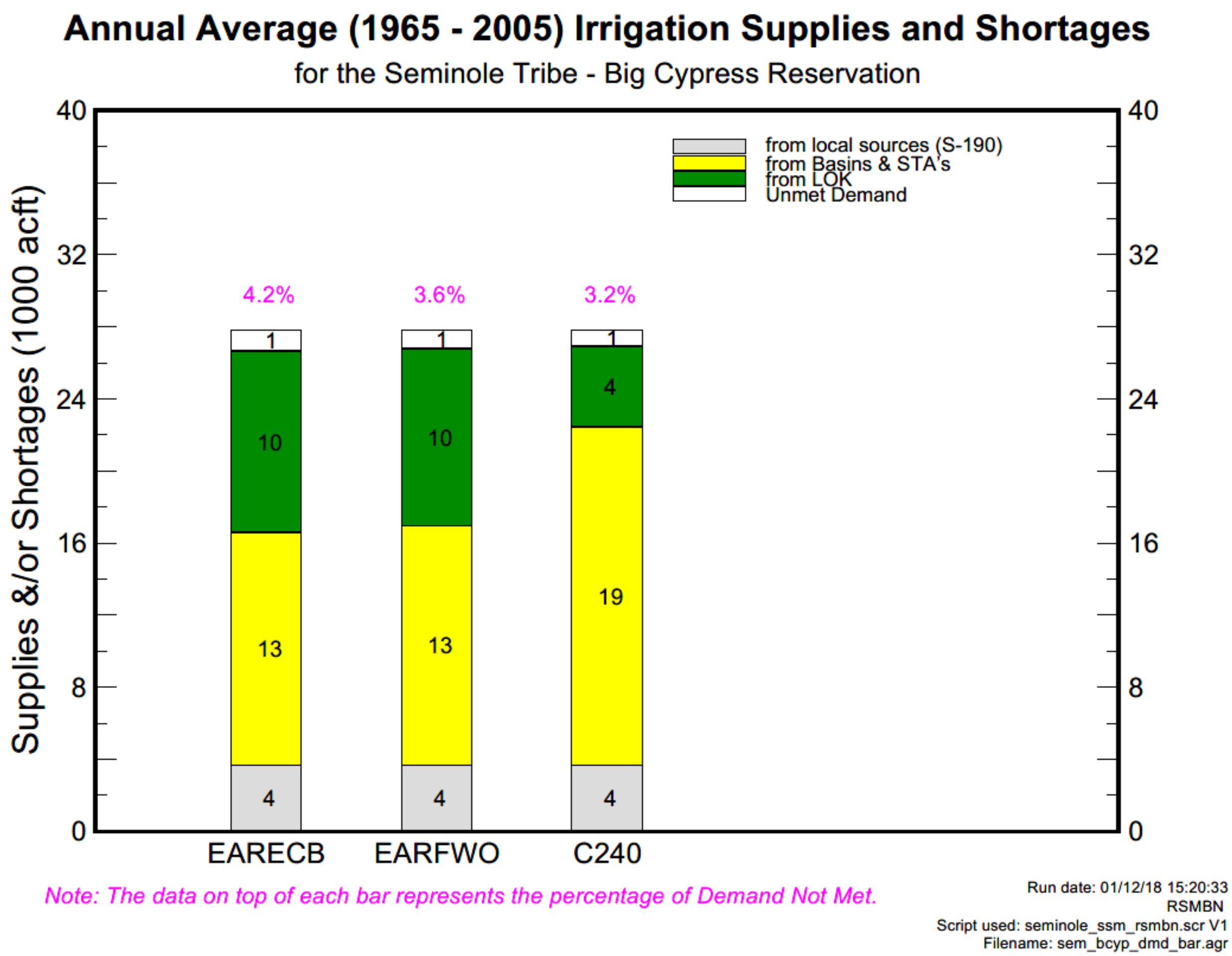

Figure C.2.2-56. Water Supply Demand for Seminole Tribe of Florida's Big Cypress Reservation

C.2.2.9.3 Lower East Coast Service Areas

For the TSP, compared to the FWO, L-30 Canal stages (north of S-335) (**Figure C.2.2-57**), L-31N Canal stages (north of G-211) (**Figure C.2.2-58**), C-111 Canal stages (**Figure C.2.2-59**), and G3259A (**Figure C.2.2-60**) all show no significant stage reductions.

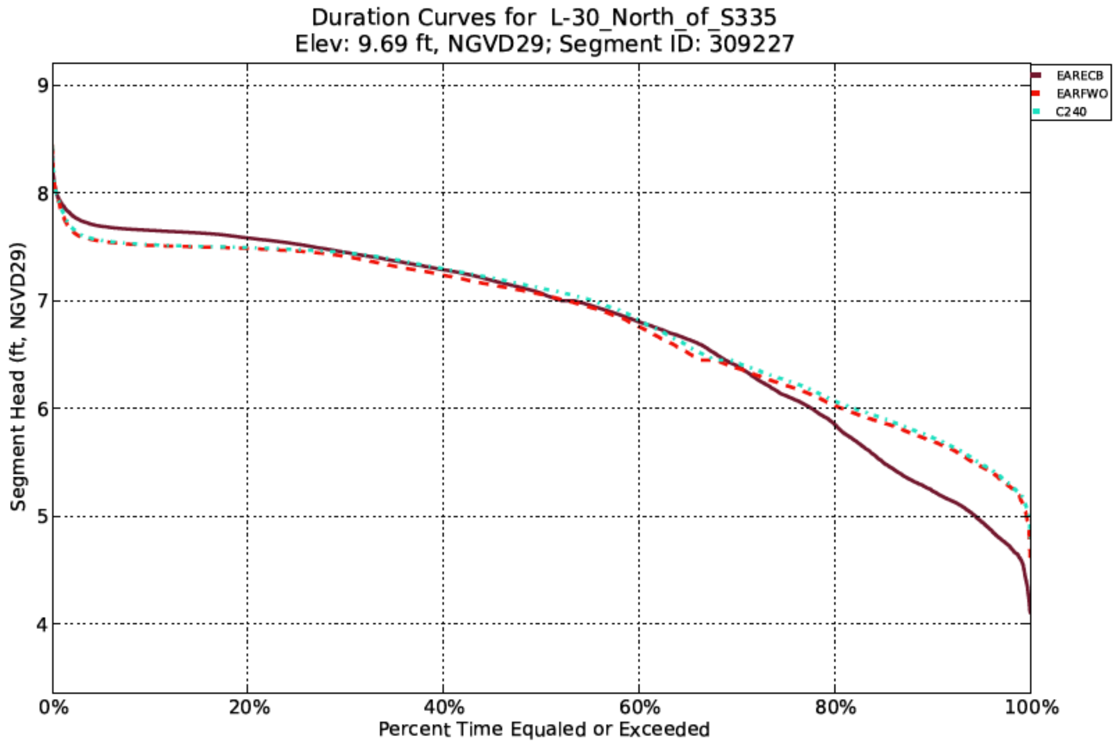

Figure C.2.2-57. Stage Duration Curve for L-30 Canal in LECSA 3

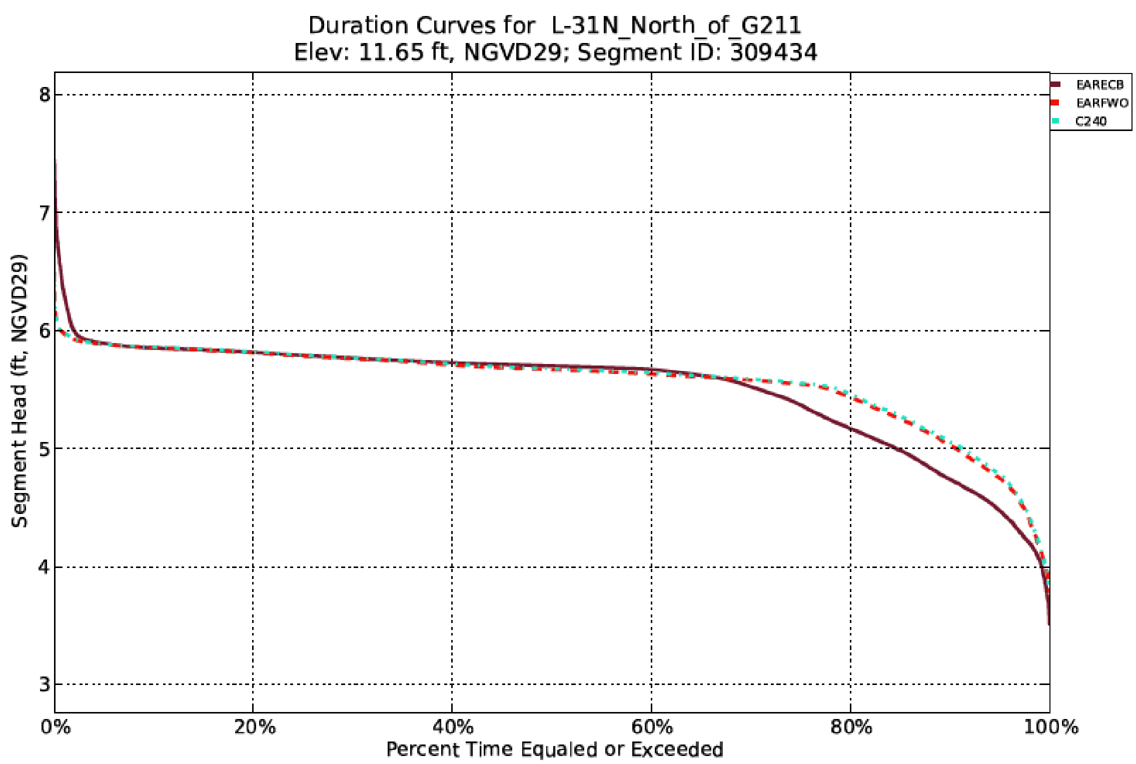

Figure C.2.2-58. Stage Duration Curve for L-31N Canal in LECSA 3

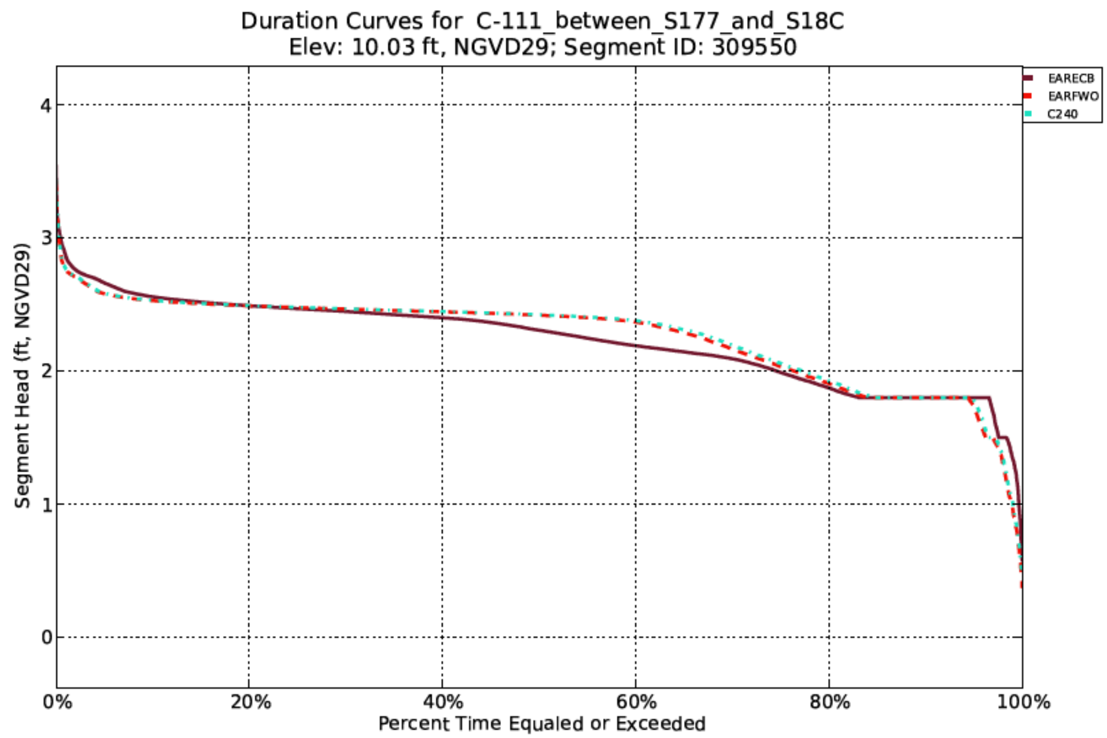

Figure C.2.2-59. Stage Duration Curve for C-111 Canal in LECSA 3

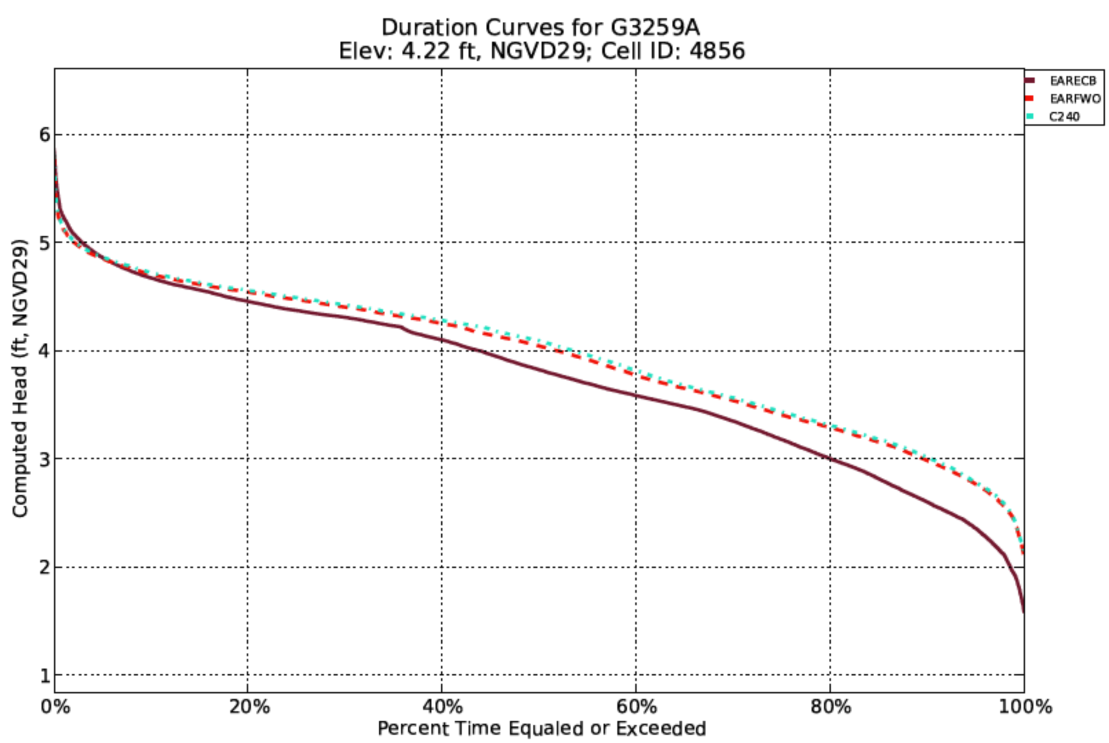

Figure C.2.2-60. Stage Duration Curve for G-3259A in LECSA 3

C.2.2.10 Water Quality

Water quality impacts from the TSP are considered to be similar to the FWO because of the water quality treatment features and similar operating criteria.

C.2.2.10.1 Lake Okeechobee

Relative to the FWO project, the TSP would not be expected to affect lake water quality as stages are not substantially different. Additionally, nutrient loading conditions are not expected to differ between FWO and the TSP.

C.2.2.10.2 Northern Estuaries

A moderate beneficial effect to water quality relative to FWO would be expected from the TSP. The number of damaging discharge events for the Caloosahatchee and St. Lucie Estuaries are to be reduced in the TSP. The number of low-flow events would increase slightly in both estuaries but would be managed with improved operations of local basin reservoirs such as C-43 and the C-23/24 reservoirs. Improved salinity, color, turbidity, nutrient, and dissolved oxygen conditions are expected to result from reduced high-flow events from Lake Okeechobee.

C.2.2.10.3 EAA

The TSP includes the A-2 reservoir and additional A-2 STA integrated into the A-1 FEB to store and treat additional Lake Okeechobee water and distribute it south of the EAA. The additional STA for the TSP will increase the treatment capacity and increase phosphorus removal, improve water quality, and ensure compliance with State water quality standards. Dynamic Model for Stormwater Treatment Areas (DMSTA) water quality modeling indicates that the TSP will meet the 2012 Water Quality-based Effluent Limits (WQBEL).

C.2.2.10.4 Greater Everglades

C.2.2.10.4.1 WCA 1, WCA 2

Water quality conditions for WCA 1 are not expected to be significantly changed by TSP since it does not include features that influence flows and treatment within the eastern flow path. Nutrient and sulfate loading conditions in WCA 2 should improve somewhat given the reduction in hydrologic load sent to this water conservation area.

C.2.2.10.4.2 WCA 3A

Phosphorus loading into the northern portion of WCA 3A is expected to increase by about 30% relative to the FWO condition as a direct result of the increase in hydrologic loading; however, relative to the existing condition, phosphorus loads from the TSP will be increase by approximately 36% due to 43% flow increase. Phosphorus concentrations in water discharged into WCA 3A are expected to be lower by approximately 5% relative to existing conditions; consistent with the FWO.

Figure C.2.2-61 shows the average annual flow across three transects in WCA 3A illustrating the changes in flow. A comparison of total flow (**Figure C.2.2-61**) to the surface water flow (**Figure C.2.1-49**) for these three transects shows that surface water flows dominate the flow. Increased nutrient uptake in the northern portion of WCA 3A will likely result in reduced TP concentrations at the southern end of this WCA as compared with the FWO condition which has significant canal flows that provide less nutrient uptake than sheetflow across the marsh. A detailed discussion of the project's impacts to phosphorus loads and concentrations in WCA 3A is provided in **Annex F**.

Given the changes from FWO of conditions in WCA 3A, changes in complexity of the methylmercury cycle, changes from the FWO would be negligible.

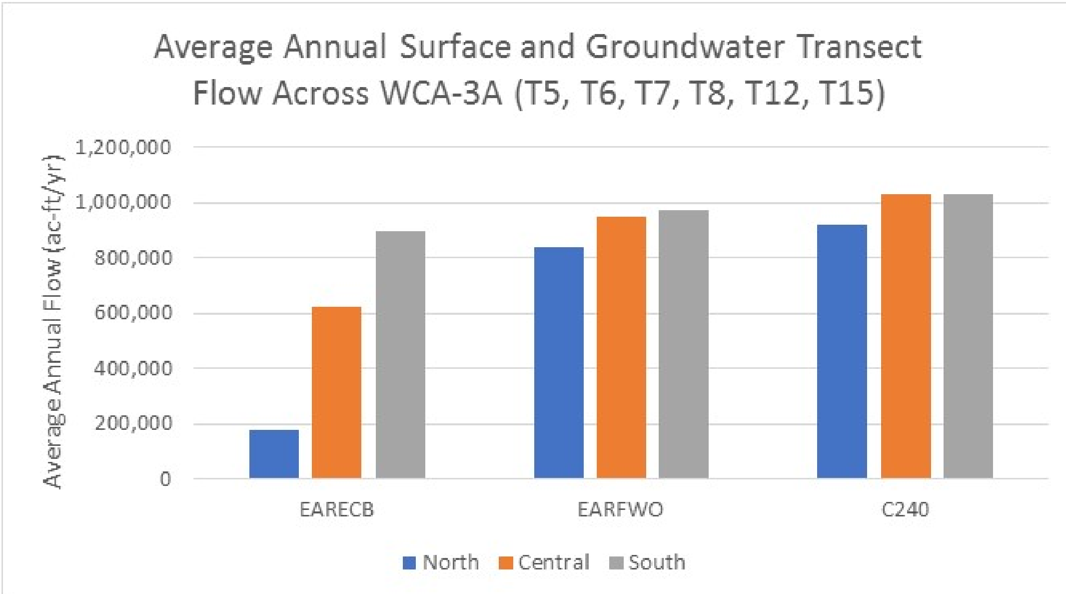

Figure C.2.2-61. Average Annual Surface and Groundwater Transect Flows for WCA 3A

C.2.2.10.4.3 WCA 3B

Additional water flow into WCA 3B would be expected to increase nutrient loads relative to the FWO condition but concentrations would be expected to be similar to the FWO; negligible change in water quality in WCA 3B would be expected from the FWO.

C.2.2.10.5 Everglades National Park

C.2.2.10.5.1 Shark River Slough

Water entering Shark River Slough (SRS) from WCA 3 is likely to have similar TP concentrations as compared with the FWO condition; negligible changes in water quality would be expected from the FWO. A detailed discussion of the effect of the project on phosphorus concentrations in ENP is provided in **Annex F**.

C.2.2.11 Air Quality

Comparison between the FWO and the TSP results in minor beneficial effects with a decrease in dry events and subsequent fire incidence should improve air quality. Creation and rehydration of wetlands is expected to result in increased CO_2 sequestration through peat accretion.

Negligible effects would be expected from emissions. All environmental air permits will be acquired to ensure all air quality standards are met for proposed pump stations. Direct emissions from the proposed construction of the project features would be confined to exhaust emissions of labor transport equipment, and construction equipment (dump trucks, excavators, graders, bulldozers, etc.) similar to the FWO.

Pursuant to the General Conformity Rule, of the Federal Clean Air Act (CAA) as promulgated by the U.S. Environmental Protection Agency (USEPA), a Federal agency must make a General Conformity Determination for all Federal actions in non-attainment or maintenance areas where the total of direct and indirect emissions of a non-attainment pollutant or its precursors exceeds levels established by the regulations. Since Palm Beach, Broward, and Miami-Dade counties are considered by USEPA to be in attainment for all criteria pollutants, the study area is exempt from CAA Conformity Determination requirements. The criteria pollutants, including ozone, are assumed to be consistent with the FWO for planning purposes. Consistent with the FWO, the total increases in air pollutants are relatively minor in relation to the existing point and nonpoint and mobile source emissions in Palm Beach, Broward, and Miami-Dade counties. Impacts from project-related emissions during construction and operations would not significantly impact air quality within the airshed. Short-term loadings of internal-combustion engine exhaust gasses are expected to be negligible and not pose a threat to workers or local populations. Existing permits may need modification to account for the additional operations and emissions, and additional permits will be obtained prior to construction. Because the project is located within a designated attainment area, USEPA's General Conformity Rule to implement Section 176 (c) of the CAA does not apply, and a conformity statement should not be required. Over the long-term, rehydration of peat soils in WCA 3A will capture many more tons of $C0_2$ than would be emitted during construction or as a result of pump operations. All environmental air permits will be acquired for the TSP to ensure all air quality standards are met for proposed pump stations.

C.2.2.12 Hazardous, Toxic, and Radioactive Waste

The FWO and TSP will have similar hazardous, toxic, and radioactive waste (HTRW) conditions in the future with the exception of the lands used for the A-2 Expansion area. Under the FWO condition, the A-2 Expansion area lands will likely continue to be farmed, which will result in the additional application of agricultural pesticides in the cultivated portions of this property and the inadvertent release of petroleum and pesticides in operation and maintenance areas. Conversion of the A-2 Expansion area from sugarcane to an STA would shift 4,155 acres from agricultural land use with wetland soils to higher quality wetlands offering long-term beneficial effects. Limited reports have been completed for the A-2 Expansion area and a portion has not been assessed. A Phase I Environmental Site Assessment (ESA) has been completed for the A-2 Expansion area and is provided in **Annex B**. During the construction of project features, it is possible that undiscovered HTRW contamination could be found consistent with what would be expected during construction of the FWO. Per EC 1165-2-132, the non-Federal sponsor will be required to remediate these sites at their sole expense. There is also the potential for HTRW release associated with the operation of project pump stations; however, with modern facilities and BMPs, this presents a minor risk to the environment.

C.2.2.12.1 Residual Agricultural Chemicals

The USACE HTRW policy (ER 1165-2-132) directs that Construction of Civil Works projects in HTRW-contaminated areas should be avoided where practicable. In September 2011, the ASA(CW) provided an exception to this HTRW policy for CERP Projects (Memorandum for Deputy Commanding General for Civil and Emergency Operations, Subject: Comprehensive Everglades Restoration Plan [CERP]–Residual Agricultural Chemicals, Dated September 14, 2011). If specific criteria are met, this policy memorandum allows residual agrichemicals to remain on project lands and allows the USACE or SFWMD to integrate response actions directly into the construction plan. Consistent with the FWO, the SFWMD requests that the CERP Residual Agricultural Chemical (Ag-Chem) policy be applied to the CEPP PACR.

Consistent with the CEPP PIR, this section was retained to partially fulfill the requirements established in the aforementioned policy for the A-2 Expansion area. Similar to the CEPP PIR, conditional approval of the application of the Ag-Chem policy will be requested from HQ USACE. Final approval will be requested prior to design when it is expected that supplemental information will be available to completely fulfill the policy requirements. Pursuant to paragraph 4 of the policy and prior to beginning construction, the USACE, Jacksonville District will obtain written documentation of regulatory approval(s) for all response actions from SFWMD and enter into an agreement with the SFWMD wherein the USACE will accept and expend funds, contributed by the SFWMD, for performance of the approved response action(s).

Consistent with the FWO, full compliance with the CERP Ag-Chem policy requirements will be provided prior to construction on lands that have impacted soils. The A-2 Expansion area is located immediately west of and abuts the A-2 parcel and is in active sugarcane cultivation. Approximately 50% of the total acreage within the A-2 Expansion area has been assessed in a Phase I ESA with the remaining areas requiring Phase II investigations. Following the A-2 Expansion area regulatory database review, review of historical reports, and site inspections, Phase II assessments per the SFWMD protocol for environmental assessments will be required for properties that have not been assessed and exit audits in accordance with the FDEP guidelines will be required on the previously assessed properties. The Phase I/II ESAs will also be performed as part of the land acquisition process and in coordination with the FDEP Bureau of Waste Cleanup and USFWS Contaminants Section.

a. Residual Agricultural Chemicals

1. <u>Determination that lands were formerly cultivated soils.</u> The A-2 Expansion area is approximately 4,155 acres and is active sugarcane and rice cultivation. The area is immediately west of the A-2 parcel in which agricultural production began around the 1960s.
2. <u>Investigation of the nature and extent of residual agricultural chemicals within the cultivated area of the A-2 Expansion area. The area might be investigated by conducting soil sampling at randomly selected 50-acre grids located within the 4,155 acre site.</u> The 50-acre grid soil samples would be analyzed for organochlorine pesticides (OCPs) by USEPA Method 8081, organophosphorus pesticides plus atrazine by USEPA Method 8141, chlorinated herbicides by USEPA Method 8151, and total organic carbon (TOC) and RCRA 8 metals plus copper by USEPA method 6010/7471 consistent with what was collected on the A-2 parcel.
3. <u>Determination that agricultural chemicals were commercially available products, lawfully applied for their intended purpose, and not spilled and did not result from waste management.</u>

   A Phase I ESA was conducted and a Phase II ESA will be conducted on the site using an environmental protocol approved by the SFWMD, USFWS, and FDEP Bureau of Waste Cleanup (**Annex H**).

4. <u>Availability of alternative lands (why avoidance of land was not practicable).</u> Much of the land in south Florida that is not currently residential, commercial, or industrial was once used for agriculture, even including some areas that now comprise the Everglades National Park. There are few open areas that were not used for agriculture. The requirements for real estate actions generally included the pursuit of willing sellers, termination of leases on state lands, and land exchanges. The SFWMD fulfilled these requirements, while maximizing the use of previously acquired land already

in public ownership and adjacent to existing infrastructure. These factors limited the possible sites. The existing land use on the A-2 Expansion area is predominantly sugarcane. Other than using other agricultural lands in the sub-basin, the A-2 parcel and A-2 Expansion area could be sited in wetlands. Siting storage facilities on wetlands obviously involves adverse impact to wetland habitat. In terms of the potential for presence of problematic concentrations of residual agricultural chemicals, sugarcane lands are considered to be lower risk than turf grass, citrus, or truck crop lands since persistent organochlorine pesticides were generally not applied at high rates during sugarcane cultivation.

5. Project purpose—conversion from agricultural production to an aquatic restoration purpose. The project purpose for the A-2 parcel and A-2 Expansion area is to capture and store releases from Lake Okeechobee and then distribute the water to a new A-2 STA, and the existing STA 3/4 and STA 2 for treatment prior to releasing this water into northern WCA 3A. The project will inundate the land with water for an extended period of time to meet Federal project goals. This purpose is achieved with a 240,000 ac-ft reservoir, which will be inundated with up to 23 ft of water. The A-2 Expansion area will achieve an additional 4,155 acres, which will be contiguous with the A-2 parcel and allow construction of a 6,500-acre STA. Therefore, components on the A-2 Expansion area will require the land conversion from agricultural production to aquatic restoration, which inundates the land with water to meet the Federal project goals.

b. Regulatory Coordination

The SFWMD has conducted several Phase I/II site assessments prior to and since acquiring the A-2 parcel in 1999 (**Annex H**). The USFWS and FDEP review letters for the FWO did not identify threshold concentrations or the potential consequences of detecting elevated concentrations of copper in water, periphyton, or apple snails during initial operations monitoring. The USFWS and FDEP provided the same comments on the A-1 FEB which had similar levels of copper in the cultivated soil. Similar comments would be expected for the A-2 Expansion area. The SFWMD believes that they will be in a better position to discuss threshold concentrations with the USFWS and FDEP prior to construction of proposed project features on the A-2 parcel and A-2 Expansion area.

Similar to the A-2 parcel, the A-2 Expansion area lands will remain in agricultural production for several years until the project features are set for construction at which time the agricultural leases will be terminated. Currently, the A-2 Expansion area immediately west of the A-2 parcel is being investigated. The Expansion area investigation includes the review of historical reports, a regulatory database search, and a site inspection. Based on the initial review, approximately 50% of the total acreage within the A-2 Expansion area has been assessed with the remaining areas requiring Phase II investigations. Because portions of the A-2 Expansion area would be farmed after the Phase II assessments were conducted, exit audits per the FDEP protocol would be required on the previously assessed properties. The areas that have not had Phase II investigations conducted will require Phase II assessments per the SFWMD protocol for environmental assessments.

c. Soils Removed

Testing and Investigations. Additional investigations, similar to those performed for the FWO, proposed for the A-2 Expansion area would generally follow the FDEP and USFWS established protocols.

Hazardous Waste Characteristics. Per Subpart C (40 CFR 261.20 *et seq*.), the four RCRA characteristics of hazardous waste are: ignitability, corrosivity, reactivity, and toxicity. Ignitable wastes readily catch fire and sustain combustion, and when ignited, burn so vigorously and persistently, that it creates a hazard. Corrosive wastes are a liquid and are acidic or alkaline wastes that readily corrode or dissolve flesh, metal, or other materials. Reactive wastes are unstable, readily explode, or undergo violent reactions. Soils would be tested on the A-2 Expansion area for these hazardous waste characteristics.

d. Cost Comparison for Soils Containing Residual Agricultural Chemicals Remaining on Project Lands

The FDEP and USFWS have preliminarily determined that the residual agricultural chemicals found on the A-2 parcel do not present an undue risk to protected resources. Residual agricultural chemicals would be analyzed within the A-2 Expansion area. The residual agricultural chemicals in the A-2 Expansion area are anticipated to be similar to the A-2 parcel since the historical land use for both areas was the cultivation of sugarcane and rice. At this time, the FDEP and USFWS recommended that the SFWMD perform testing of water, periphyton algae, and apple snails for copper during the initial operations period for features on the A-2 parcel. Given that the USFWS has not identified soils requiring removal, no costs can be identified at this time. If the USFWS determines in the future that some A-2 parcel soils or A-2 Expansion area soils have to be removed or isolated, a cost comparison would be prepared.

e. Cost Comparison for USACE Acting as the Construction Agency and Performing the Response Action for the Non-Federal Sponsor

If the FDEP and/or USFWS determine in the future that some A-2 parcel soils or A-2 Expansion area soils have to be removed or isolated, this cost comparison will be prepared as part of complying with the CERP Agricultural-Chemical Policy.

Cost effective analyses for determining if it is cost effective for the USACE to perform the non-RCRA response actions for the SFWMD will be prepared for the A-2 parcel and A-2 Expansion area if and when sufficient information is available. The assumptions used to develop the costs for the construction scenario, where the USACE does not touch impacted soil, will likely be: 1) the SFWMD performs all earth moving construction activities that involve excavating impacted soils, stockpiling impacted soils, blending impacted soils, and placing blended materials; 2) the USACE performs construction actions such as pump foundation excavation of clean limerock, pump station construction, culvert installation, and earth moving construction in areas where impacted soils have either been removed or are covered with a minimum of 6 inches of clean fill; 3) splitting the work between the two agencies does not result in additional costs associated with actual construction activities (i.e., no additional material handling occurs); and 4) the additional cost of having two construction agencies and two contracts, results in an increase in the total amount required for design/engineering and contract supervision/administration. This assessment will be prepared and submitted to HQUSACE for concurrence prior to construction by USACE.

f. Engineering and Other Risks

1. Engineering Risk. The USACE will address risks during design and construction of the project components by: 1) Regulatory review of plans and specifications by the FDEP which is the delegated RCRA authority in Florida; 2) Review of environmental audits and environmental risk assessments prepared for and by the USFWS for potential impacts to Threatened and Endangered Species; 3) Incorporation of appropriate safety and handling specifications into the project bid documents; 4) Review of plans and specifications by the USACE Environmental and Munitions Center for Expertise

(EM CX) prior to contract advertisement; 5) Conducting appropriate supervision and oversight of construction; 6) Conducting confirmation sampling after feature construction, and 7) SFWMD's obtaining final approval of construction actions by FDEP. These safeguards further reduce the risk of future releases or exposure and are consistent with USACE construction standards and requirements.

2. Other Risk. Once constructed, it is possible that man-made actions might disturb the soils containing residual agricultural chemicals if such material is placed within the project features or otherwise remains on the project site. To limit this risk, land use restriction covenants may be incorporated into the property deeds where required by FDEP. The SFWMD shall ensure that land use restrictions if any will not reduce ecosystem restoration benefits, hinder O&M, or interfere with the Project's proper function. Once an approved soil management plan is available, CESAJ environmental specialists and the EMCX (Environmental and Munitions Center of Expertise) will review the plan to determine other risks if any. The results of the CESAJ and EMCX review will be provided to HQUSACE for concurrence.
3. Final Risk Determination. The USACE and SFWMD will prepare a final determination report for the A-2 parcel and A-2 Expansion area to confirm that the overall project risk from impacted soils is low and acceptable. The final determination report will be submitted to HQUSACE prior to construction. For each construction contract managed by the USACE, the SFWMD will be responsible for providing full funding to the USACE prior to contract advertisement for the identified contract specific cost of addressing residual agricultural chemicals.

g. Non-Federal Sponsor Responsibility

Consistent with the FWO, the non-Federal sponsor is 100% responsible for the cost of actions taken due to the presence of residual agricultural chemicals, at no expense to the Federal Government. Any future costs associated with the presence of residual agricultural chemicals at the Federal project site are a 100% non-Federal sponsor cost and responsibility. The costs for characterization of the project lands in preparation for conducting a response action for the residual agricultural chemicals and removal of soils that are hazardous waste shall be included as 100% non-Federal sponsor's responsibility. The Jacksonville District shall not conduct actions to address residual agricultural chemicals for the SFWMD during the operation and maintenance, repair, replacement and rehabilitation (OMRR&R) phase of the project.

C.2.2.13 Noise

The TSP would result in minor and short-term increases in noise during construction as compared with the FWO and a less than significant effect. All of the alternatives include construction of an additional pump station, which would result in long-term, negligible increases in noise.

C.2.2.14 Aesthetics

Short- and long-term minor adverse effects to aesthetics would be expected from the storage and treatment components and the conveyance improvements.

Lake Okeechobee operations, under the TSP, would have long-term minor beneficial effects to aesthetics in the overall study area by improving ecological conditions.

The EAA Storage Reservoir would reduce high volume discharges into the Northern Estuaries resulting in lower suspended solids, increased water clarity, and better maintenance of healthy SAV beds. These beneficial effects would somewhat offset any minor adverse effects from the storage and treatment components and the conveyance improvements.

Short-term effects would be due to the use of heavy equipment during the construction of the reservoir and supporting infrastructure, and along the canals undergoing improvements. Long-term effects would be due to the establishment of a permanent man-made reservoir and STA supporting infrastructure.

The additional increase in water flow to the south would improve the ecological structure, which in turn would improve aesthetic values in southern Florida when compared to the FWO. Although natural areas in southern Florida would continue to be comprised of wetlands, sawgrass marshes, wet prairies, and tree islands, there would be an improved aesthetic value due to re-establishment of hydropatterns and sheetflow throughout the region.

C.2.2.15 Socioeconomics

Except for the anticipated socioeconomic benefits associated with improved environmental conditions in the Northern Estuaries (**Section 6.2.3**), there are negligible socioeconomic impacts between the FWO and TSP.

C.2.2.16 Recreation

In Lake Okeechobee and the Northern Estuaries, the TSP would be expected to have minor beneficial effects on recreation. In Lake Okeechobee improvements from the FWO would be based on improved navigation opportunities. In the Northern Estuaries minor additional benefits would be added to recreation by further reductions in the duration and number of high flow events. The TSP would be expected to enhance recreational opportunities due to better salinity conditions in the Caloosahatchee and St. Lucie estuaries for fish which would subsequently improve opportunities for fishing, boating, and kayaking.

The TSP would also be expected to enhance the outdoor recreation opportunities of the EAA by having a storage reservoir and STA. This would be positive for public access meeting the identified needs according to Florida’s Statewide Comprehensive Outdoor Recreation Plan (SCORP) compared to FWO. Moderate beneficial recreation effects due to the reservoir and STA features would provide increased recreational opportunities including but not limited to fishing, sightseeing, hunting, hiking, biking, and bird watching.

In the Greater Everglades, the TSP would have a negligible effect. Minor and less than significant beneficial effect on outdoor recreation opportunities. Improved hydrology would enhance wildlife populations through improved survival and reproduction.

Short-term impacts to terrestrial mammal hunting (deer, hog, rabbit, etc.) could result from increased hydration in areas that have been drier. However, in the long term without better hydration, peat loss to oxidation and fire would degrade the current habitat further. A substantial decrease in days of low water closures protects the habitat as it results in a significant beneficial decrease to oxidation and the risk of peat soil fires. In these northern drier areas, public access is often accomplished with track vehicles; the improved stages indicated by fewer fire closures would allow public access through the use of airboats instead of track vehicles. **Table C.2.2-4** shows when high and low water would have prompted FWC to evaluate WCA 3 for a high water closure in the FWO and TSP. The table uses the current closure criteria to compare the FWO and TSP, but does not replicate history or forecast FWC decisions. Increases in the number of days and events of high water during the TSP create a negligible increase in closures during the hunting seasons. These increased closures occur in years where a closure during that hunting season would also be expected during the FWO, with the exception of one occasion for two weeks in the period of record. Bird watching and waterfowl hunting should also improve with better hydration throughout the Greater Everglades during the early part of the dry season. Improvements in access and designation of blue and greenway trails will be positive.

In the Southern Estuaries there is no effect on recreation from the FWO. Access to the Southern Estuaries would not change. Effects to existing quality of recreation can be negative or positive depending on location and changes to fish habitat. A Recreation Plan for the TSP is included in **Appendix F**.

Table C.2.2-4. Weeks with High Water Closures for the FWO and TSP Comparisons with Existing Hunting Seasons Displayed for WCA 3

	High Stage Closures over POR (2 Gage avg.[1] > 11.6')			Fire Closures over POR (2 Gage avg. <= 9.16')[2]			Total High Water and Low Water Closures			
Alternative	**Closure Days**	**Closure Events**	**Avg. Closure Duration (Days)**	**Closure Days**	**Closure Events**	**Avg. Closure Duration (Days)**	**Closure Days**	**Closure Events**	**Avg. Closure Duration (Days)**	**% of POR-closure**
FWO	614	18	34.1	203	9	22.6	817	27	30.3	5.5%
C240A	779	22	35.4	115	7	16.4	894	29	30.8	6.0%

[1] 2 Gage avg. is based on cells WCA 3A-2 and WCA 3A-3.
[2] 3A-2 & 3A-3 elevation average = 9.66' NGVD (Closure threshold is 2 gage avg < 9.16.)

C.2.2.17 Land Use

C.2.2.17.1 Wetlands and Uplands

Almost all the future development for the TSP within the study area is expected to occur on lands that are currently or formerly used for agriculture. Like all other alternatives the TSP would shift 4,155 acres from agricultural land use with wetland soils to higher quality wetlands with the conversion of the A-2 Expansion area from sugar cane to an aquatic habitat. The TSP adds higher quality wetland habitat and improved functionality adjacent to the Greater Everglades. Conversion of sugar cane agricultural fields to freshwater wetlands on the A-2 Expansion area would provide additional benefit of carbon sequestration.

C.2.2.17.2 Agriculture

The entire project area consists of lands currently under public ownership. The 14,500 acres in the proposed A-2 parcel are currently in production for sugar cane, and under the FWO these acres would be converted to an STA with wetland habitat. Under all alternatives including the TSP, 6,500 acres of agricultural land would be converted part of an STA with improved wetland habitat. The project features would be placed on 4,155 acres that are currently used to cultivate sugar cane. The TSP would minimize the impacts to agricultural lands while maximizing ecological benefits in a cost-effective manner. In addition, an evaluation has been conducted on the South Dade conveyance system to ensure that existing levels of flood control will be maintained to support agricultural operations in Miami-Dade County. Apart from the conversion of 4,155 acres within the A-2 Expansion, the TSP is expected to have negligible effect on agriculture relative to FWO conditions. As described in **Section 5.2.2.8**, Water Supply and Flood

Control, negligible changes were noted for water stages within the SDCS (**Figure 2.2-58**); therefore, no indirect effects to agriculture within this region are anticipated. Coordination with the United States Department of Agriculture (USDA) and National Resources Conservation Service (NRCS) to meet the requirements of the Farmland Protection Policy Act, is ongoing. When detailed design information that locates each of the plan components is completed, it can then be determined how many acres of unique farmland would be affected.

C.2.2.18 Cultural Resources

The Everglades and associated ecosystems are a nationally significant resource and have been severely impacted by human activities for over a hundred years primarily through drainage practices and agriculture. A review of the Florida State Master Site Files (FMSF) indicate that there are 23,499 recorded cultural resource sites and resource groups within the study area that have a survey determination and/or State of Florida Historic Preservation Office (SHPO) evaluation of other than ineligible for listing with the National Register of Historic Places (NRHP). For this document, the use of the term cultural resources includes significant historic properties that are determined eligible or potentially eligible for NRHP listing, and culturally significant sites.

In conjunction with the NHPA, formal consultation will be initiated with the Seminole Tribe of Florida's THPO; the Miccosukee Tribe of Indians of Florida's NAGPRA Representative; the Florida SHPO; and the Florida Bureau of Archaeological Research after the report is submitted to the ASA(CW). Formal consultation will determine if additional surveys may be needed, specifically during the PED phase, when feature designs are finalized and construction staging areas are identified.

Section 106 compliance with the NHPA will be conducted separately from NEPA and will not be completed during the current feasibility phase of the project; however, it would be complete prior to construction of each feature. For consideration under the NHPA, determinations of potential effects and mitigation of those effects on cultural resources are preliminary and should not be considered final.

Consistent with the FWO, major long-term adverse effects on cultural resources sites 8PB16039 and 8PM16040 would be expected. Mitigation of effects for historic property 8PB16039 would potentially be reduced to no effect. Mitigation of effects for culturally significant site 8PB16040 are unknown. Additional cultural resource surveys are needed on the A-2 Expansion area to determine if culturally significant sites exist.

Pursuant to NHPA implementing regulations, 36 CFR 800.1, where possible, the project design will be modified to avoid impacting significant historic properties and culturally significant sites. Where avoidance is not possible, other mitigation measures will be considered, which could include but are not limited to data recovery excavations. The mitigation measures will be developed in consultation with SHPO, tribal groups and other interested parties as established in implementing regulations for Section 106 of the NHPA.

C.2.2.18.1 Area of Potential Effect

The area of potential effect (APE) for cultural resources differs greatly from the overall study area. For this project, the APE for cultural resources that was not already evaluated in CEPP includes the A-2 Expansion area. The affects to the EAA A-2 parcel, portions of the L-6 levee and associated borrow canal, the L-5 canal, the S-8 Pump Station Complex, portions of the L-4 levee and associated canal, the L-28 Triangle, portions of the Seminole Tribe of Florida's Big Cypress Reservation immediately west of L-28 and north of

I-75, portions of the Miami Canal, WCA 3A and 3B, L-67A and L67C levee, portions of the L-29 levee, the L-67 Ext levee and associated canal, portions of the Old Tamiami Trail, and portions of the L-31N levee, and Everglades National Park have already been evaluated in the Federally authorized CEPP.

C.2.2.18.2 Evaluation Criteria Specific to Cultural Resources

Impacts to cultural resources vary by individual components. Therefore, impact evaluations were based on a review of the individual components not included in the FWO—the A-2 Expansion area—to determine if actions would potentially result in impacts to significant cultural resources (which include sites eligible or potentially eligible for NRHP listing), described below. Avoidance of adverse effects to cultural resources is the USACE and local sponsor's preference, therefore, throughout the planning process consideration was given to reduce or eliminate impacts to cultural resources. Pursuant to 36 CFR 800.1, where possible, the project design will be modified to avoid impacting significant historic properties and culturally significant sites. Where avoidance is not possible, other mitigation measures will be considered, which could include but are not limited to data recovery excavations. The mitigation measures will be developed in consultation with SHPO, tribal groups and other interested parties as established in implementing regulations for Section 106 of the NHPA.

The following significance thresholds have been used in determining whether components proposed for each alternative would result in a significant impact to cultural resources. The use of the term cultural resources includes historic properties eligible or potentially eligible for NRHP listing and culturally significant sites. A cultural resource impact is considered significant if implementation of a component of an alternative would result in any of the following when compared to FWO:

- Result in a change in the significance or eligibility for NRHP, including but not limited to any contributing elements, of a historical resource.
- Result in an adverse change in the significance or eligibility for NRHP of a historic resource.
- Disturb any human remains, including but not limited to those outside of formal cemeteries
- Disturb memorials determined to hold public significance regardless of age.
- Result in adverse changes to sites identified through consultation with the Seminole Tribe of
- Florida and/or the Miccosukee Tribe of Indians of Florida as having cultural significance.

C.2.2.18.3 Comparison of Proposed Action (TSP) and Future Without Conditions

The project schedule (**Section 6.7**) allows for a phased approach to Section 106 compliance, in that each suite of features will be consulted on as they arise. This will ensure that the most up to date information will be considered in the determination of effect. Also, based on final designs or modifications of the project features, additional work may be required for compliance with the NHPA. *While USACE is currently in compliance with the procedural requirements of the NHPA, USACE recognizes that additional consultation and other requirements are not yet complete, but the project will be in full compliance prior to construction.*

Engineering Regulation (ER) 1105-2-100 Appendix C paragraph C- 4(d)(6)(a) states that results of cultural resources investigations conducted during the feasibility phase and if needed, the PED phase will "serve as the basis for formulation of plans for management of historic properties prior to or during the construction and operational stages of projects". At which time, as required under ER 1105-2-100 Appendix C, paragraph C-4(d)(6)(b) the USACE will determine effects to historic properties and any need "to mitigate adverse project effects on National Register and eligible properties" and to "serve as the basis for negotiation of a Memorandum of Agreement (MA) (if no MA has been previously prepared) with the SHPO/THPO and, if appropriate, the advisory council on Historic Preservation (ACHP) specifying actions which will be taken by the Corps of Engineers prior to or during the project construction period to mitigate adverse effects on National Register and eligible properties."

C.2.2.18.4 Draft Preliminary Operations Manual (DPOM)

This component involves the development of a DPOM for each component or feature of the project. The DPOM is included as the **CEPP PACR Annex C.** It should be noted that currently the FWO identified approximately 350 significant or NRHP eligible cultural resource sites, including five districts and one World Heritage site (ENP) recorded within the APE for CEPP. There are also numerous culturally significant properties to both the Seminole Tribe of Florida and the Miccosukee Tribe of Florida within WCA 3 and Everglades National Park. These resources and the effects to them are described in the CEPP PIR Appendix C.

C.2.2.19 Invasive and Native Nuisance Species

The TSP would have a negligible effect for establishment and spread of non-native invasive and native nuisance species, similar to the FWO. Disturbed areas resulting from construction are likely to temporarily influence the recruitment of non-native invasive and native nuisance species. The large number of existing and potential invasive plant and animal species and the often incomplete knowledge of invasive mechanisms for each species create moderate uncertainty in this evaluation. Long-term monitoring in an adaptive management framework is critical to ensure efficient management of the most threatening non-native invasive species in the affected area. Proposed management activities to address invasive species are provided in **Annex G**.

Proposed restoration activities may affect ecosystem drivers that directly or indirectly influence the invasiveness of non-native species. These factors may affect invasive species positively or negatively, depending on the unique characteristics of individual species and the environmental conditions for a given biological invasion (Doren et al. 2009). Many of the areas where features are proposed in CEPP and the CEPP PACR are currently inhabited by non-native invasive and native nuisance species. Construction of the proposed features has the potential to spread the existing non-native invasive and native nuisance species on site as well as introduce new invasive species via contaminated equipment. Disturbed areas resulting from construction are likely to become established with non-native invasive and native nuisance species. The CEPP PIR Appendix C details the effects of CEPP project features on the spread of invasive and native nuisance species into new areas.

The invasive and native nuisance species to consider with the proposed features of the CEPP PACR are consistent with those considered in CEPP for the FEB A-2. Species of concern include Brazilian pepper, torpedo grass, tropical American watergrass, water hyacinth, water lettuce, and hydrilla. The proposed A-2 Expansion area lands are currently agricultural lands. Brazilian pepper exists along the agricultural canals. Once the proposed features are operational, the water levels are likely to inhibit growth and recruitment of Brazilian pepper. All upland sites (e.g., levees) are expected to experience colonization of Brazilian pepper, torpedo grass, paragrass, and other invasive species common in ruderal sites. The proposed reservoir and associated distribution and collection canals would require continual maintenance of floating, emergent and potentially submersed plant species to maintain the function of the canal. It is expected that increased sedimentation in canals would result in succession to large stands of Carolina willow and cattail and this area may require maintenance to achieve target flow rates. Due to eutrophic conditions and variable hydroperiods, many invasive species would aggressively invade and are likely to be costly and difficult to control. Therefore, control efforts focused at maintaining the primary functions of the features are preferred over aggressive eradication efforts typically applied to natural areas. Invasive/nuisance species in this category include, but are not limited to torpedo grass, hydrilla, water hyacinth, and water lettuce. These species have the potential to interfere with surface water conveyance immediately upstream of water control structures. There are many species that could establish both in project features and WCAs. Establishment of these species in the proposed features could be part of an invasion pathway to natural areas downstream (i.e. WCA 3A/3B, ENP). For this reason, diligent monitoring and rapid response control measures for these species would need to be carried out during construction and operations phases. Examples of such species include tropical American watergrass, Wright's nutrush, West Indian marshgrass, Nile monitor, and bullseye snakehead.

There are recreational access points proposed. Access points provide opportunity for the introduction of invasive species. Boats and trailers can serve as a vector for new species introductions.

C.2.2.20 Cumulative Effects

Cumulative effects are defined in 40 CFR 1508.7 as those effects that result from:

> *…the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Cumulative effects for the proposed action were assessed in accordance with guidance provided by the President's Council on Environmental Quality (CEQ). The primary goal of cumulative effects analysis is to determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative effects of other past, present, and future actions. The following summarizes past, present, and projected USACE efforts that cumulatively affect the regional environment of south Florida (**Table C.2.2-50**). In addition, there are efforts underway by other Federal, State, and local agencies, as well as non-governmental organizations, that are too numerous to mention, that are all working towards similar restoration goals. **Table C.2.2-11** shows the net cumulative effects of the various resources which are directly or indirectly impacted. The CEPP PACR is expected to contribute to a net beneficial cumulative impact on the regional ecosystem.

C.2.2.21 Past, Present, and Reasonably Foreseeable Actions Affecting Resources within the Project Area

Prior to drainage and compartmentalization, the Everglades were a shallow wetland conveying water from Lake Okeechobee to the southern coast of Florida. The Everglades Drainage District, encompassing 7,150 square miles, was created in 1907 by Florida Governor Napoleon Bonaparte Broward for the purpose of drainage and reclamation of the Everglades (Light and Dineen 1994). In the early 1900s, the Everglades Drainage District constructed several canals that impacted Lake Okeechobee and the Greater Everglades. By 1917, the West Palm Beach, Hillsboro, North New River and Miami Canals had been constructed (Allison et al., 1948). By 1931, the outlet from Lake Okeechobee to the Caloosahatchee River was improved, and the completion of the St. Lucie Canal east to the Atlantic Ocean provided another way of controlling lake levels. The Bolles and Cross canals became connectors to the four major canals south of Lake Okeechobee bringing the total miles of canal excavated to 440 (Light and Dineen 1994). The Everglades Drainage District also constructed 47 miles of levees around the southern rim of Lake

Okeechobee during this time (Allison et al., 1948). Within a similar time frame (1915-1928) the construction of Tamiami Trail was completed which linked Miami with Naples on the west coast. Hurricanes in 1926 and 1928 shifted attention from Everglades drainage to controlling flooding around Lake Okeechobee. In 1930, the USACE became a major participant with the state (i.e., Okeechobee Flood Control District) in controlling flooding around Lake Okeechobee. Florida agreed to share a portion of the costs to increase discharges from the lake, improve canal works, and reconstruct and enlarge the levees around it (Light and Dineen 1994). The effect of levees on the agricultural area south of Lake Okeechobee was dramatic and sugar cane production was doubled in 10 years between 1931 and 1941. Drainage of the Everglades and the linkage of the east and west coast, promoted urban growth in south Florida and the population escalated from 22,961 in 1900 to 228,454 by 1930 (University of Florida, Bureau of Economic Business Research 2018). During the 1930s and into the 1940s, construction was abandoned and maintenance ceased on Everglades Drainage District works (Light and Dineen 1994).

Although modifications to Lake Okeechobee and the Everglades began in the early 1900s, the greatest influence on the alteration of flow was the Central and Southern (C&SF) Flood Control project, which was originally authorized by Congress in 1948. The C&SF Flood Control project was designed to lower water levels east of the eastern protective levee by 4 to 5 ft (Light and Dineen 1994). Increased flood protection coupled with lowering of the water table east of the levee had a dramatic effect on urbanization and development and acted as a catalyst for a population explosion in south Florida. Between 1952 and 1954 the eastern perimeter levee along the WCAs was constructed from Palm Beach to Dade County to stop sheet flow from the Everglades toward the urbanizing eastern coastal areas (Light and Dineen 1994). Between 1954 and 1959 additional levees (L-1, L-2, L-3, L-4, L-5, L-6, and L-7) were constructed to partition the EAA from the remainder of the Everglades and the old Everglades Drainage District Canals (West Palm Beach, Hillsboro, North New River, and Miami) were deepened within the EAA to provide better flood conveyance from the agricultural area into the WCAs (Light and Dineen 1994).

Between 1960 to 1963 substantial portions of the C&SF Flood Control project were completed. Construction of the levees surrounding WCA 3 was completed by 1963 with the L-67A levee dividing WCA 3 into two compartments, WCA 3A and WCA 3B (Light and Dineen 1994). The L-67A levee (completed 1962) and the parallel L-67C levee (completed 1966) were originally constructed for several reasons, including as a step-down system to reduce seepage to the east to allow for urban and agricultural developments in Miami-Dade County, and to increase storage of water in WCA 3A to provide water supply to an expanding urban population to the east. S-151 and S-31 were also constructed during this time period. These two structures improved the discharge capacity of the Miami Canal to coastal communities (Cooper and Roy, 1991), further exacerbating the unnatural drainage of northern WCA 3A. In an attempt to remedy excessive drainage caused by the Miami Canal, two structures, S-339 and S-340, were built across the Miami Canal in 1980 to block water from flowing directly down the canal, except at times of extreme high water or when increased conveyance capacity is needed to deliver water for the ENP and/or the LEC. Upstream from each structure, water was expected to flow laterally from the canal into the marsh through 100-ft gaps that had been left at 500-ft intervals along the Miami Canal sidecast spoil material. In combination with the northern levees of WCA 3A (L-4 and L-5), the Miami Canal has substantially impacted historical sheetflow and natural wetland hydroperiods. As a result, during wet periods, the natural capability of WCA 3A to store water is lost and the Miami Canal effectively over-drains the area. These hydrologic changes have increased the frequency of severe peat fires and have also resulted in the loss of ridge and slough topography that was once characteristic of the area. Northern WCA 3A has become largely dominated by sawgrass, cattail and scattered shrubs and lacks the structural diversity of plant communities seen in central and western WCA 3A.

Completion of the L-29 levee in 1962 led to ponding in the southern portions of WCA 3A. Exacerbating this problem were the major canal systems (i.e. Miami Canal, L-67A) which accelerate the flow of water from north to south within WCA 3A, drying the north while further ponding the south (Zaffke 1983), especially along the L-67A and L-29. As a result of this ponding, extended hydroperiods and increased water depths led to changes in vegetation communities in which wet prairies were displaced by aquatic slough communities (Zaffke 1983, Tanner et al. 1987). In addition, many tree islands within southern WCA 3A were lost due to increased water depths (Craighead 1971), with many of the remaining islands showing signs of stress. Wood and Tanner (1990) documented the trend in southern WCA 3A toward deep water lily dominated sloughs due to impoundment within the southern end of WCA 3A.

Four control structures located along the L-29 were constructed between 1960 and 1963 (S-12A, S-12B, S-12C, and S-12 D). These structures were used to regulate discharge from WCA 3A to the western part of Shark River Slough (Light and Dineen 1994). Construction of the L-67 Extension levee, extending 8 miles south of Tamiami Trail, was completed in 1967 to facilitate water delivery from WCA 3A to ENP. Completion of the L-67A and L-67C canal and levee system intercepted water that would otherwise flow to WCA 3B. With its impoundment, WCA 3B became isolated from the rest of the Everglades with inflows and outflows limited to rainfall and levee seepage. Within WCA 3B, the ridge and slough landscape has become severely compromised by the virtual elimination of overland sheetflow and has largely turned into a sawgrass monoculture where relatively few sloughs or tree islands remain.

Loss of sheetflow to WCA 3B has also accelerated soil loss reducing elevations of the remaining tree islands in WCA 3B, making them vulnerable to high water stages. With the construction of WCA 3A, WCA 3B and the L-67 Extension Levee, flows to ENP became subject to water supply deficits during the dry season and excesses during the wet season, resulting in a decline in ecological quality.

Among the first Congressional actions to offset adverse impacts to ENP by improving the supply and distribution of water, the Flood Control Act of 1968 provided for modifications to the C&SF Project through the implementation of the ENP South Dade Conveyance System (SDCS). Additional Congressional actions ensued, including the ENP Protection and Expansion Act of 1989, which expanded ENP to incorporate NESRS and the East Everglades into the Park's boundary for protection and restoration of the natural hydrologic conditions within ENP. This Act also provided authorization for development of the Modified Water Deliveries (MWD) to ENP project. The goal of the MWD Project was to improve water deliveries into ENP and, to the extent practicable, take steps to restore the natural hydrologic conditions within ENP. The Water Resources Development Act (WRDA) of 2000 established CERP to provide for the restoration, protection and preservation of the water resources of central and southern Florida, including the Everglades and Florida Bay (USACE 1999).

CERP contains 68 components that include approximately 217,000 acres of new reservoirs and wetlands-based water treatment areas. A number of operational components have also been identified in CERP and will, in most cases, occur in conjunction with related construction features. The operational features in CERP include: a modified Lake Okeechobee regulation schedule; environmental water supply deliveries to the Caloosahatchee and St. Lucie Estuaries; modifications to the regulation schedules for WCAs 2A, 2B, 3A, 3B, and the current rainfall delivery formula for ENP to implement rain-driven operations; modified

Holey Land Wildlife Management Area Operation Plan; Modified Rotenberger Wildlife Management Area Operations Plan; a modification for coastal well field operations in the Lower East Coast (LEC); LEC utility water conservation; and operational modifications to the southern portion of L31 and C-111.

CERP projects would increase the supply of freshwater for the Everglades and south Florida ecosystem. Large areas within the study area would be used to increase water storage resulting from CERP Projects for the overall gain and long term benefit of the regional system. These project features would provide important storage functions and are essential to the overall restoration of the freshwater marshes and the estuaries of the greater Everglades ecosystem. Project components in the area, especially storage, seepage control, and redirection of point source canal flows to overland flow will act to restore more natural freshwater flows to the northern and Southern Estuaries, reduce seepage losses from the Everglades, improve recharge of the Biscayne aquifer, and should result in other beneficial environmental effects.

Construction has begun on the first generation of CERP project modifications already authorized by Congress. These include the IRLS Project, the Picayune Strand Restoration Project, and the Site 1 Impoundment Project. The second generation of CERP projects for Congressional authorization includes the Biscayne Bay Coastal Wetlands Project, Broward County Water Preserve Areas Project, the Caloosahatchee River (C-43) West Basin Storage Reservoir, and the C-111 Spreader Canal Western Project. Some of these projects are implemented or in the implementation process as of 2018. These projects will result in significant environmental benefits to the CERP project area, improving the quantity, quality, timing and delivery of water to the natural system. Further information on the above mentioned CERP projects assumed to be in the future without project conditions are provided in **Section 2** (**Existing and Future Without Project Conditions**) and **Appendix C.1** (**Existing and Future Without Project Conditions**).

Non-CERP projects assumed to be in the future without project condition for CEPP PACR, which incorporate similar restoration goals of improving flow and water quality to the Everglades, include the DOI Tamiami Trail Modifications Next Steps (TTMNS) Project and the Restoration Strategies Regional Water Quality Preliminary Plan (SFWMD 2012), of which the A-1 FEB has been built and being operated, the L-8 FEB is complete and operational (undergoing testing), and the STA 1W expansion is under construction as of 2018. The DOI through the National Park Service (NPS) and ENP completed a study to evaluate the feasibility of additional Tamiami Trail bridge length, beyond that to be constructed pursuant to the MWD Project, to restore more natural water flow to ENP and Florida Bay and for the purpose of restoring habitat within the ENP. The TTMNS project was authorized by Congress in the Consolidated Appropriations Act, 2012. The Restoration Strategies Regional Water Quality Preliminary Plan describes resulting projects developed to address water quality concerns associated with existing flows to the Everglades Protection Area (EPA) to achieve water quality standards established for the Everglades. The SFWMD implemented a technical plan to complete six projects that will create more than 6,500 acres of new STAs and 110,000 ac-ft of additional water storage through construction of FEBs. As described before, some of these projects have been completed or are near completion.

The C&SF Flood Control project has numerous water management structures consisting of culverts, spillways, and pump stations that have specified operating criteria for managing or regulating water levels for Congressionally-authorized project purposes. Regulation schedules have been, and will continue to be, designed to balance multiple, and often competing, project purposes and objectives. Managing for better performance of one objective often lessens the effectiveness of performance of competing objectives. For example, for Lake Okeechobee, higher regulation schedules tend to benefit water supply, but may increase the risk to public health and safety, and can harm the ecology of the lake. By contrast, lower lake schedules may produce lake levels more desirable for the lake ecology and improved flood protection, but reduce water supply potential.

Since April 2008, Lake Okeechobee has been operated in accordance with the 2008 Lake Okeechobee Regulation Schedule (2008 LORS). Prior to the 2008 LORS, Lake Okeechobee operations were managed under the “Water Supply and Environment (WSE) Regulation Schedule” since July 2000. The 2008 LORS operational study was initiated to address high lake levels, high estuarine discharges, estuary ecosystem conditions, and lake ecology conditions that occurred during the 2003 to 2005 time period. The study considered the back-to-back historically significant 2004 and 2005 hurricane seasons’ effects on the recognized structural integrity issues of HHD along with effects to other project purposes. The 2008 LORS was identified to be effective at decreasing the risk to public health and safety, reducing the number of high-volume discharges to the estuaries, and providing critical flexibility to perform water management operations. When it was approved, LORS 2008 was identified as an interim schedule. The USACE expected to operate under the interim schedule until the earlier of (1) implementation of a new Lake Okeechobee schedule as a component of the system-wide operations to accommodate early CERP projects (Band 1 projects) or (2) completion of the modifications to HHD.

In addition to CERP and non-CERP projects previously specified, the FWO condition includes implementation of the Everglades Restoration Transition Plan (ERTP) for WCA 3A, ENP, and the SDCS, which replaced the Interim Operational Plan (IOP) for Protection of the Cape Sable Seaside Sparrow (CSSS). From July 2002 through October 2012, WCA 3A was regulated according to a seasonally varying 8.75 to 10.75 ft, NGVD regulation schedule and the Rainfall Plan (initiated in 1985), as per IOP. The primary objective in implementing IOP was to adhere to a 1999 USFWS Jeopardy Opinion to reduce damaging high water levels within CSSS habitat west of SRS (i.e. CSSS-A). The purpose of IOP was to provide an improved opportunity for CSSS nesting by maintaining water levels below ground level for a minimum of 60 consecutive days between March 1 and July 15, corresponding to the CSSS breeding season. In addition, a secondary purpose of IOP was to allow CSSS habitat to recover from prolonged flooding during the mid-1990s. The ERTP superseded the IOP in October 2012 and is intended to define water management operating criteria for the C&SF project features and constructed features of the MWD and Canal-111 South Dade Projects (C-111 SD) until a Combined Operational Plan (COP) is implemented following completion of the MWD and C-111SD projects. ERTP objectives include improving conditions in WCA 3A for the endangered Everglade snail kite, wood stork and wading bird species while maintaining protection for the endangered Cape Sable seaside sparrow (CSSS) and Congressionally-authorized purposes of the C&SF Flood Control project.

Perhaps the largest and most important reasonably foreseeable future actions not accounted for in the FWO condition are the ongoing feasibility level studies for the Lake Okeechobee Watershed Restoration Project (LOWRP), the Western Everglades Restoration Project, and development of the COP for Modified Water Deliveries and C-111 South Dade projects.

The LOWRP study is scheduled for completion in 2019. LOWRP is a USACE/SFWMD planning study to identify opportunities to improve the quantity, timing, and distribution of flows into the 730-square-mile lake. The project area, where placement of potential features are being considered, covers a large portion of the Lake Okeechobee Watershed north of the lake (see **Figure C.2.2-62**). Objectives for the project include:

- Increase water storage capacity in the watershed, resulting in improved Lake Okeechobee water levels
- Improve the quantity and timing of discharges to the Caloosahatchee and St. Lucie estuaries downstream of Lake Okeechobee
- Restore wetlands
- Improve existing and future water supply.

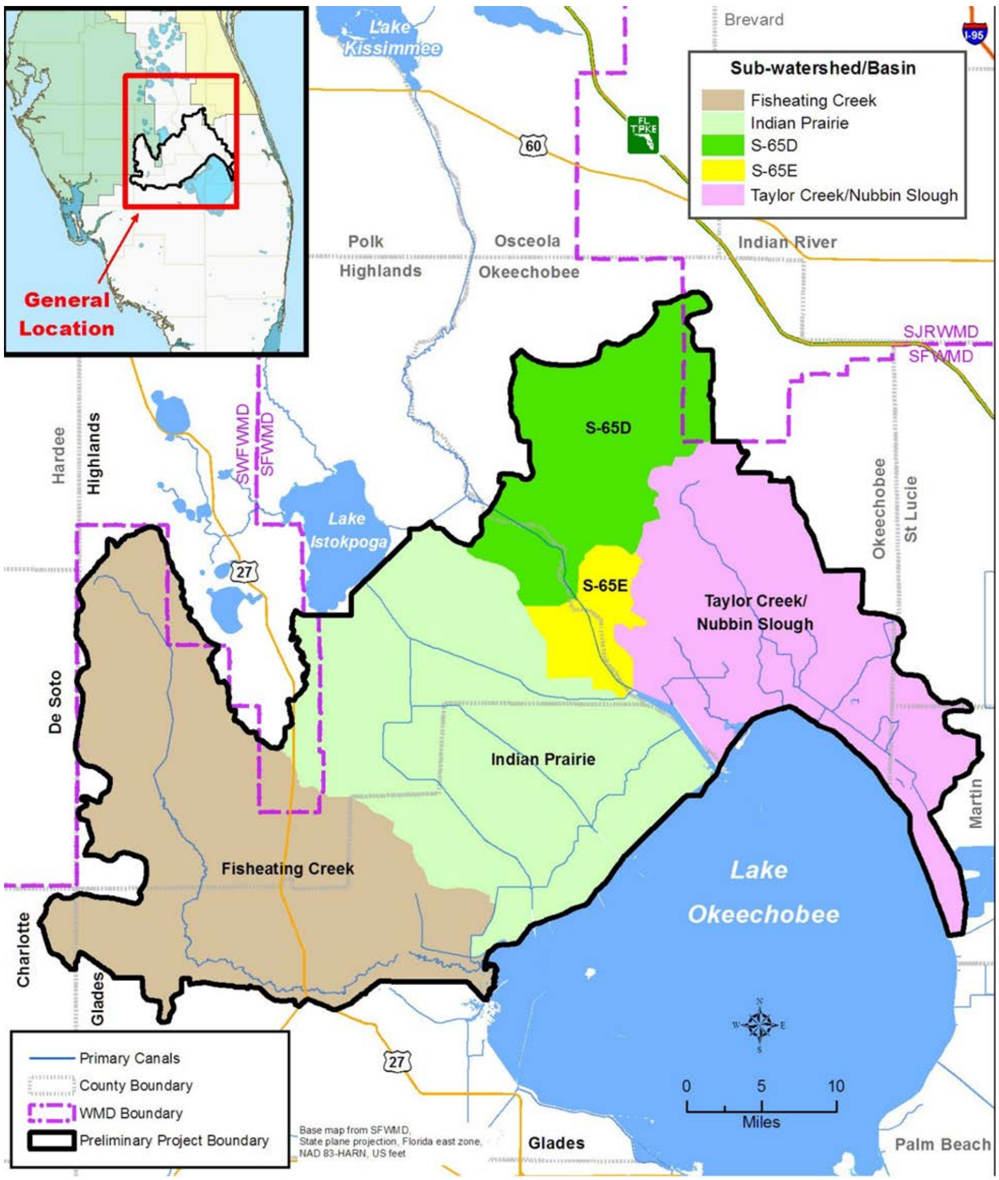

Figure C.2.2-62. Lake Okeechobee Watershed Restoration Project Study Area

As water inflows into Lake Okeechobee frequently exceed outflow capacity, there is often more water in Lake Okeechobee than can be released in order to ensure the integrity of the HHD. At other times, there may be too little water within Lake Okeechobee. Lake levels that are too high or too low, and inappropriate recession and ascension rates, can adversely affect native vegetation, and fish and wildlife species that depend upon the lake for foraging and reproduction. The volume and frequency of undesirable freshwater releases to the east and west lowers salinity in the estuaries, severely impacting oysters, sea grasses, and fish. The USACE and SFWMD plan to complete a LOWRP PIR with a plan to restore the quantity, quality, and timing and distribution of flows into Lake Okeechobee and may include a combination of surface water storage reservoirs, wetland restoration, and aquifer storage and recovery.

The LOWRP will complement authorized and proposed CERP projects to the CEPP PACR TSP to improve conditions in Lake Okeechobee and Northern Estuaries. To demonstrate this, a LOWRP sensitivity analysis was conducted with the TSP of this PACR coupled with the CERP North of Lake Okeechobee Storage Reservoir (Component A) above-ground storage of 200,000 ac-ft and 80 of the CERP Lake Okeechobee Aquifer Storage and Recovery (Component GG) wells to determine additional Lake Okeechobee and Northern Estuary benefits. From an effectiveness standpoint, the CEPP PACR TSP with LOWRP as defined above is very close to achieving the total CERP Goal to reduce damaging discharges to the Northern Estuaries and meets the CERP Goal for flows to the Everglades. This information on performance is summarized in **Table C.2.2-5**.

Table C.2.2-5. Effectiveness of the CEPP PACR TSP with LOWRP in Achieving the CERP Goal for the Northern Estuaries

Metric (36 yr Period of Record*)	CERP Goal	CEPP PACR TSP	CEPP PACR TSP+LOWRP
Estuary Events	81% reduction	63%	86%
Estuary Flows	80% reduction	55%	78%
Flows to the Everglades	Increase of 323,000 ac-ft average annual	97%	99%

* Based on the 36-year modeled simulation period (1965-2000) available from RECOVER

The performance of the CEPP PACR TSP with LOWRP would be a great accomplishment in reducing damaging discharges to the Northern Estuaries considering the reduced number of Lake Okeechobee ASR wells in this analysis relative to CERP. Improvements in lake ecology are also gained beyond the CEPP PACR TSP with storage north of the Lake. In addition to these improvements, two general conclusions can be drawn from this analysis:

1. CEPP PACR TSP and LOWRP benefits are complementary. Although parallel planning efforts may illustrate similar trends between the two efforts, the combined effect of the projects is additive, not coincident.
2. The combination of the CEPP PACR TSP and a LOWRP project can come close to or fully achieve CERP Goals in this part of the system (Lake Okeechobee and multi-purpose performance are also generally consistent or improved compared to CERP).

The sections to follow describe the cumulative benefits that would be expected from complementary features of the TSP and LOWRP; C240LO represents the combination of TSP and LOWRP features.

Lake Okeechobee low and high lake stages would be expected to benefit from the combination of TSP and LOWRP features. Performance measures defined to score extreme low and extreme high lake stage were developed on a 0 to 100 percent scale where 0 is the worst score and 100 is the best score. No conditions (existing, FWO, C240, or C240LO) would be expected to bring extremely low lake stages below 10 ft for an average of 15 weeks per year or more and no stages would ever be expected above 17 ft, the extreme high lake stage. Instead, the C240LO would be move the extreme low and high lake stage closer to the best score; where the CEPP PACR would increase the extreme low standard score to 91.38% compared with the FWO standard score of 88.62%, the C240LO standard score for extreme low lake stages would be expected to be 93.50%. Similarly, the extreme high lake stage would be expected to increase from 92.24% with Alternative C240A to 94.68% with C240LO in place. **Figure C.2.2-63** illustrates the stage duration curve comparing the existing condition (ERAECB) with the FWO, Alternative C240A, and C240LO.

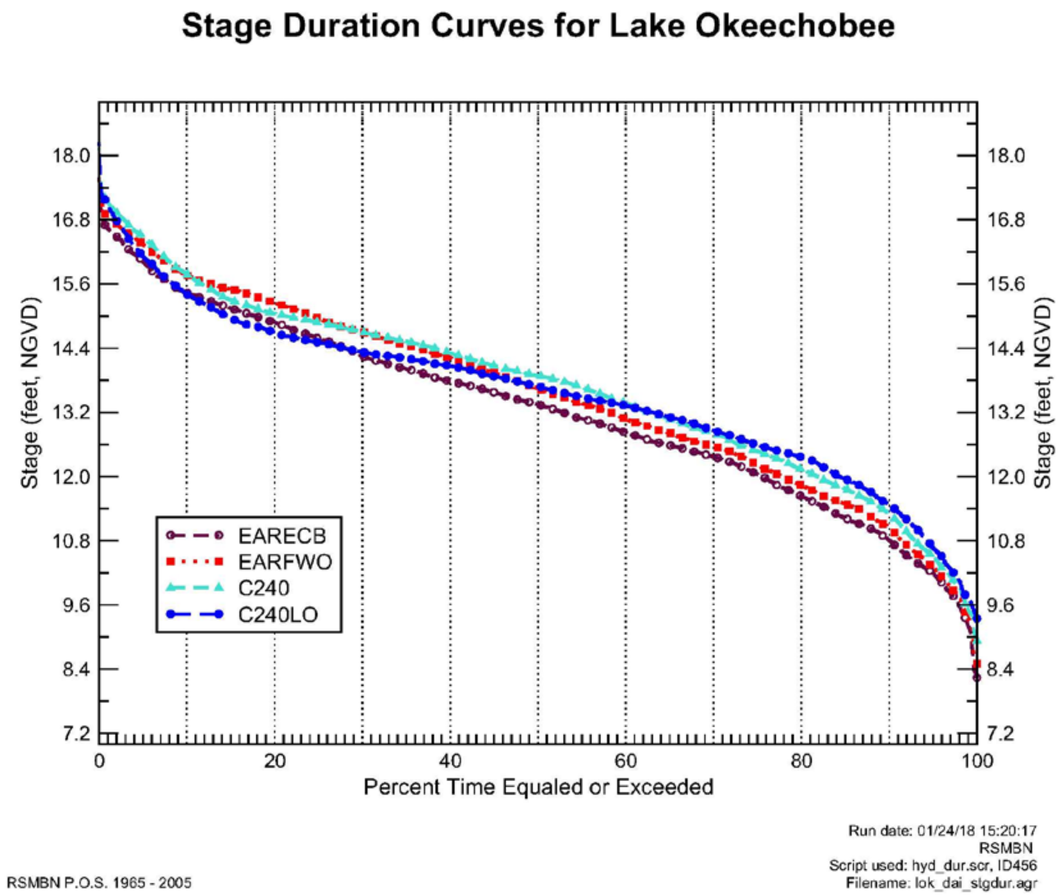

Figure C.2.2-63. Lake Okeechobee Stage Duration Comparing the FWO, TSP (C240) and C240LO

Conditions in the Northern Estuaries would also be expected to move closer to the CERP Goals. **Figure C.2.2-64** and **Figure C.2.2-65** illustrate the decrease in high discharge events into the Caloosahatchee and St. Lucie Estuaries, respectively. The number of times mean monthly flows in the Caloosahatchee Estuary would be expected to exceed 4,500 cfs would be expected to decrease from 39 under existing conditions, 29 in the FWO, 24 in the TSP, to 14 with C240LO (**Figure C.2.2-64**). In the St. Lucie Estuary, the number of times mean monthly flows would be expected to exceed 3,000 cfs would be expected to decrease from 29 under existing conditions, 24 in FWO, 21 in the TSP, to 16 with C240LO (**Figure C.2.2-65**). Further, **Table C.2.2-9** shows a similar decrease in the number of times the salinity envelope criteria would not be met for each estuary.

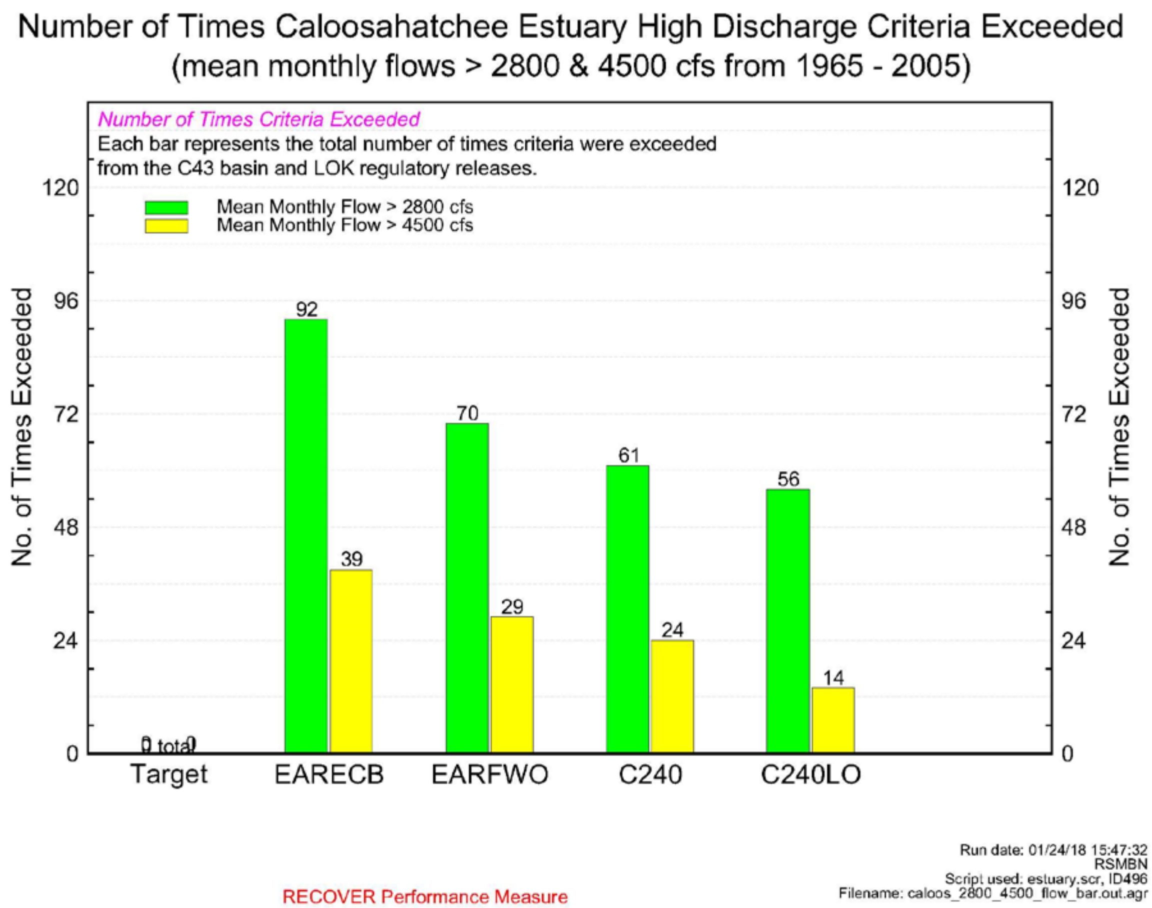

Figure C.2.2-64. Number of Times Caloosahatchee Estuary High Discharge Criteria Exceeded for the ECB, FWO, TSP (Alternative C240A) and C240LO

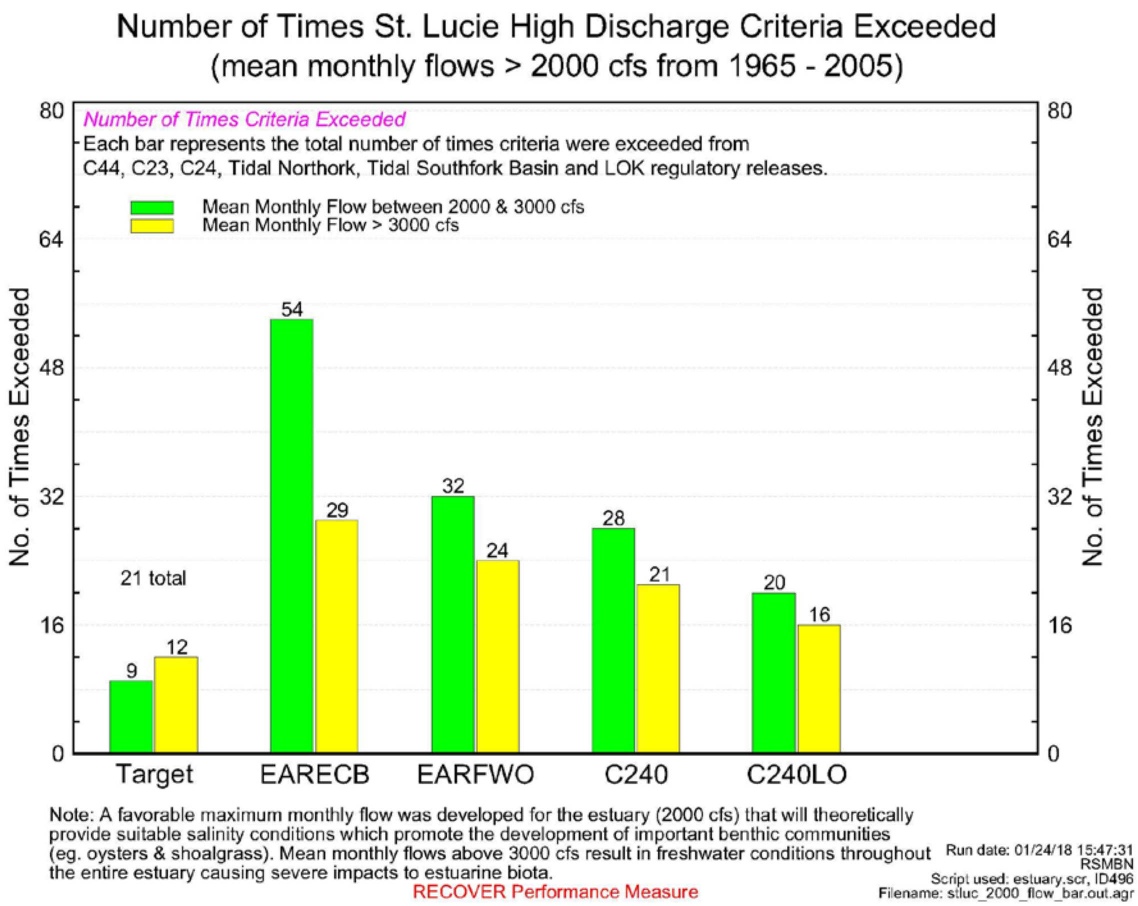

Figure C.2.2-65. Number of Times St. Lucie Estuary High Discharge Criteria Exceeded for the ECB, FWO, TSP (Alternative C240A) and C240LO

Table C.2.2-6. Number of Times Salinity Envelope Criteria Not Met

Estuary	ECB	FWO	Alternative C240A	C240LO
Caloosahatchee Estuary[1]	92	70	61	56
St. Lucie Estuary[2]	70	50	49	43

[1] Number of times flow > 2,800 cfs from C-43 Basin & LOK Regulatory Releases (Jan-Dec)
[2] Number of times 14-day moving average flow > 2,000 cfs

Cutbacks to water supply in the Lake Okeechoochbee Service Area were also used to evaluate the performance of cumulative impacts from the TSP and LOWRP features (**Figure C.2.2-66**). In four of the eight years, C240LO would be expected to reduce the volume of cutbacks from the TSP. The four remaining occurrences would expect similar results between C240LO and the TSP.

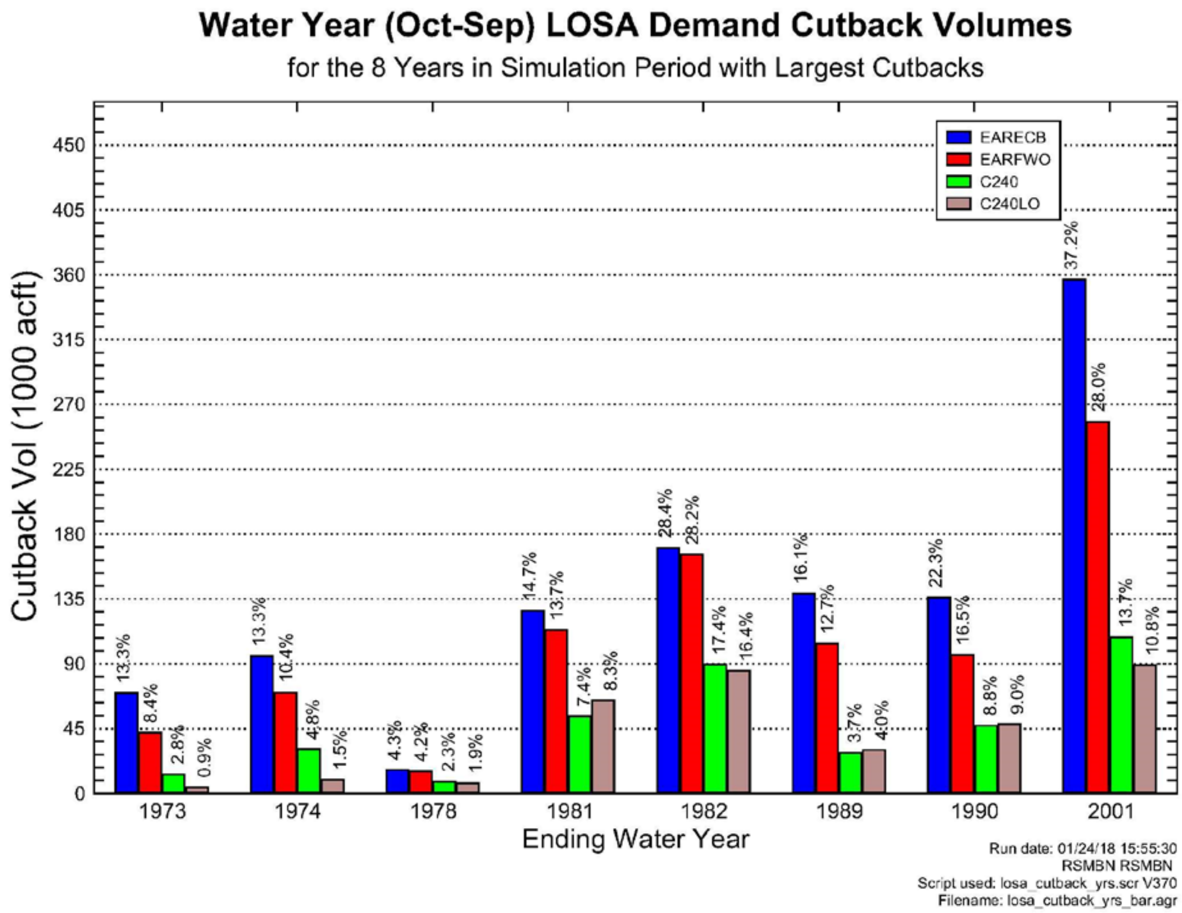

Figure C.2.2-66. Cutbacks in volumes to the Lake Okeechobee Service Area for the Eight Years with the Largest Cutbacks in the Period of Record for the ECB, FWO, TSP (Alternative C240A), and C240LO

Further, the Western Everglades Restoration Project will identify a plan that will improve the quantity, quality, timing, and distribution of water needed to restore and reconnect the western Everglades ecosystem. The project will use a series of water quality treatment, operational changes and engineering opportunities to re-establish sheetflow from the West Feeder Canal across the Big Cypress Seminole Indian Reservation and into BCNP all while maintaining existing levels of flood protection and meeting applicable water quality standards (**Figure C.2.2-67**).

At the south end of the system, the USACE is developing a COP to define operations of the Modified Water Deliveries to ENP and the C-111 South Dade projects, while maintaining the original authorized purposes of the C&SF Project. The COP will result in a comprehensive and integrated water control plan that will replace the previous version of the water control plan (USACE 2012c) for the WCAs, ENP, and South Dade Conveyance System features (**Figure C.2.2-68).** It will revisit the Rainfall Plan and implementation of the rain driven operations that conveys restoration flows from WCA 3A to ENP as well as the regulatory schedule for WCA 3A. Additional information on rainfall drive operation is available in **Section 6.1.3.1** of the CEPP PACR. Rain driven operations are necessary to achieve the CERP goals for Everglades restoration.

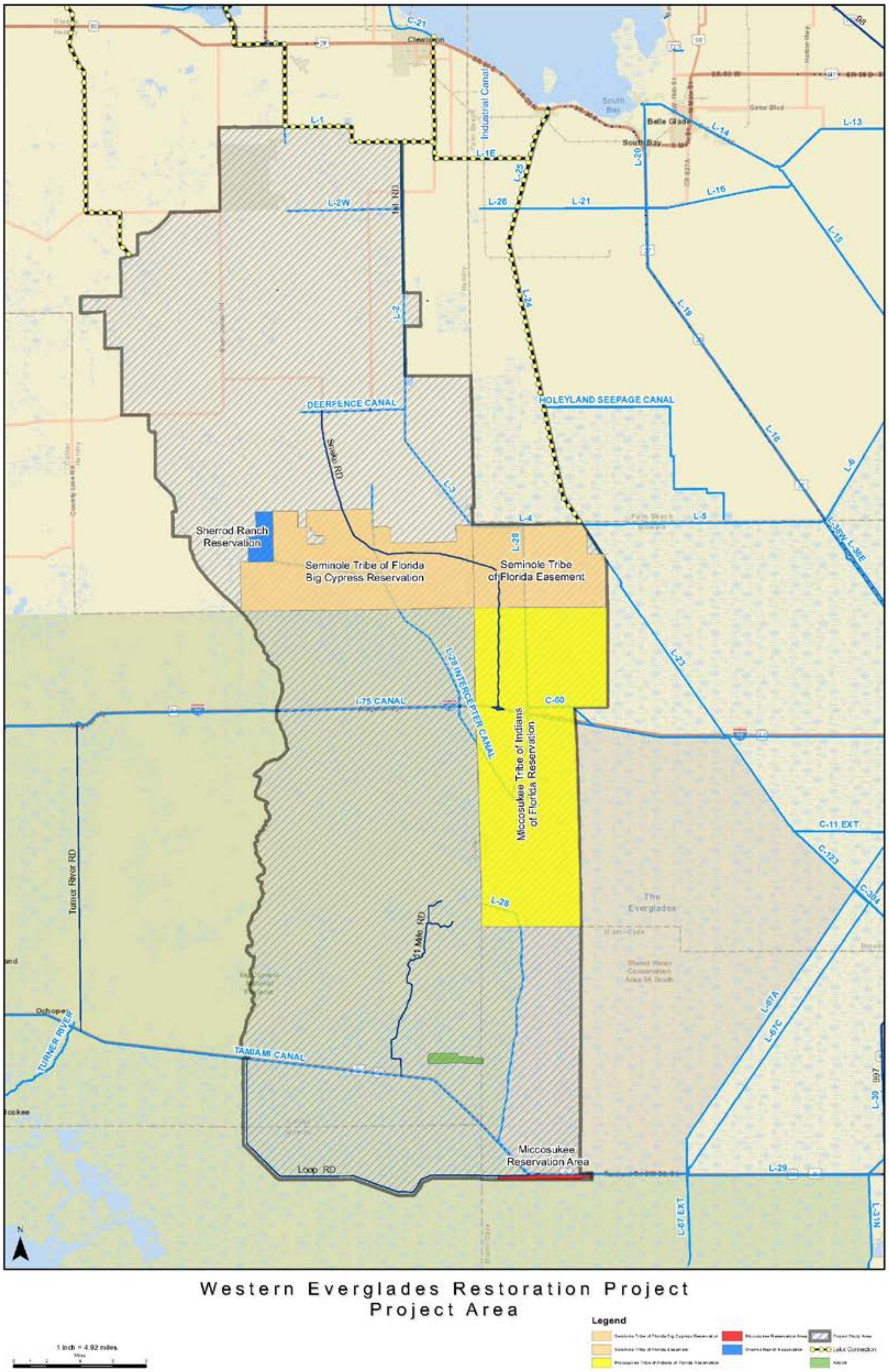

Figure C.2.2-67. Western Everglades Restoration Project, Project Area

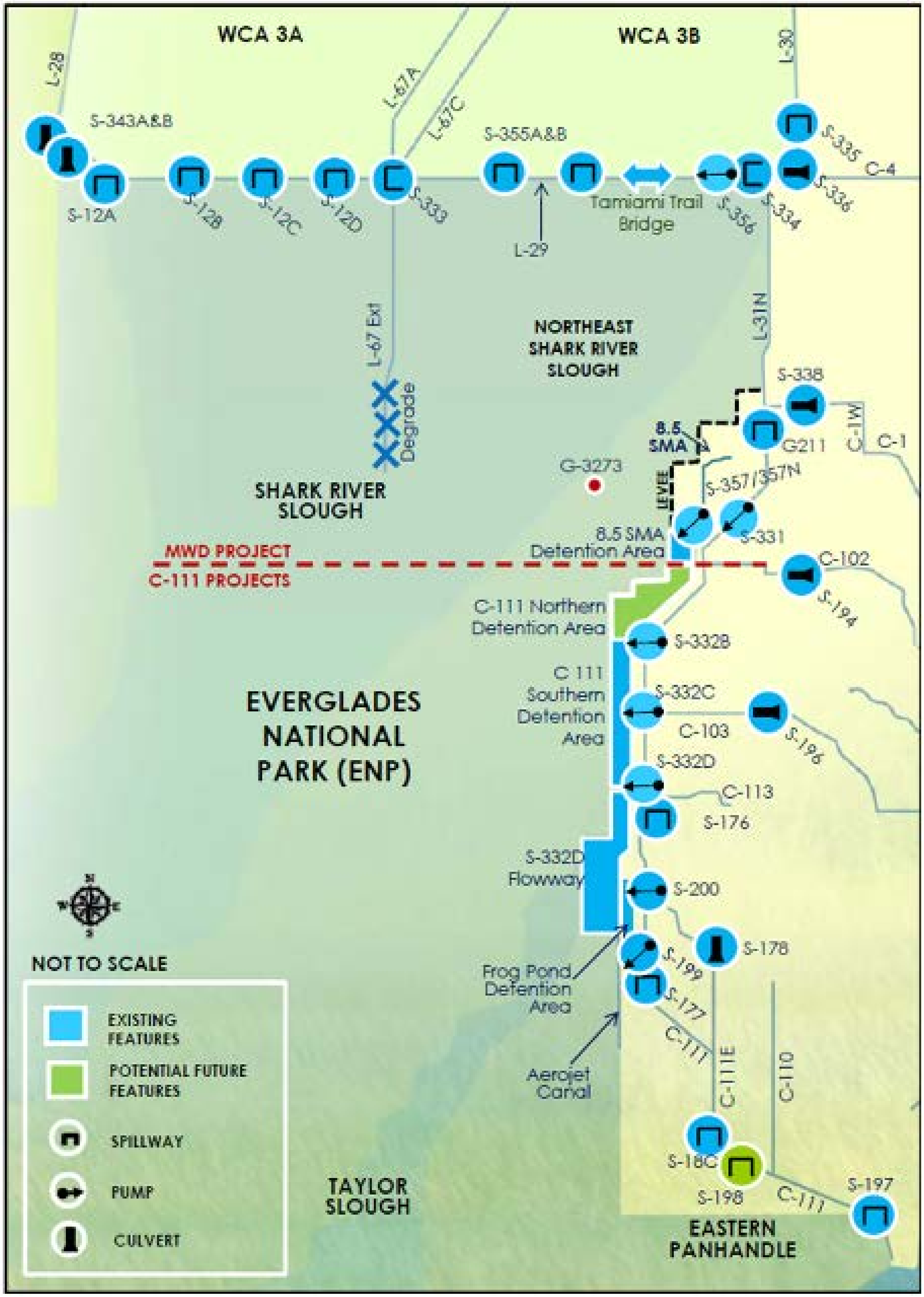

Figure C.2.2-68. Combined Operating Plan

Table C.2.2-7. Past, Present, and Reasonably Foreseeable Actions and Plans Affecting the Affected Area

	Past Actions/Authorized Plans	Current Actions and Operating Plans	Reasonably Foreseeable Future Actions and Plans
Status of Non-CERP Projects	- C&SF Project (1948) - ENP Protection and Expansion Act (1989) - Modified Water Deliveries (MWD) General Design Memorandum (GDM) and Final Environmental Impact Statement (1992)	- MWD 8.5 Square Mile Area General Reevaluation Report (2000) - MWD Tamiami Trail Modifications Limited Reevaluation Report (2008) - MWD 8.5 Square Mile Area Interim Operating Criteria Environmental Assessment (2011) - C&SF C-51 West End Flood Control Project - Kissimmee River Restoration - Seepage Barrier near the L-31 N Levee (Miami-Dade Limestone Products Association)	- Tamiami Trail Modifications Next Steps (TTMNS) Project - SFWMD Restoration Strategies Project - MWD Closeout -- C-11 South Dade Project (Contracts 8 and 9)
Operations Plan for Lake Okeechobee, WCA 3A, ENP and the South Dade Conveyance System	- Water Supply and Environment (WSE) Lake Okeechobee Regulation Schedule (2000) - Interim Operational Plan* (IOP) 2002 to Present	- Lake Okeechobee Regulation Schedule (LORS 2008) - SFWMD LEC Regional Water Supply Plan - Everglades Restoration Transition Plan (ERTP) October 2012 to present*	- LORS 2008 to be replaced by revised Lake Okeechobee Regulation Schedule - SFWMD periodically revises the LEC Regional Water Supply Interim Plan - ERTP to be replaced by Combined Operational Plan to be completed to include MWD and C-111 components.
CERP Projects		Congressional Authorization Received and Construction in Progress:- Biscayne Bay Coastal Wetlands Project - Broward County Water Preserve Areas Project - Caloosahatchee River (C-43) West Basin Storage Reservoir - C-111 Spreader Canal Western Project. - IRLS Project - Picayune Strand Restoration Project - Site 1 Impoundment Project	- Future CERP Projects

***** The 2006 IOP for Protection of the CSSS was the governing regulation schedule for the project area at the start of the CEPP planning process. In addition, existing hydrologic conditions within the project area are a result of IOP operations from 2002 to 2012. Therefore, for planning purposes, the existing condition includes IOP as the operational plan. The current approved operational plan for southern WCA 3A, ENP, and the SDCS as of October 2012 is known as the ERTP. For planning purposes, the CEPP FWO project condition includes ERTP as the operational plan.

Table C.2.2-8. Summary of Cumulative Effects

Hydrology	
Past Actions	Flood and water control projects have greatly altered the natural hydrology.
Present Actions	Federal and State agencies are coordinating on and implementing projects to improve hydrology.
Proposed Action	Additional reductions in high discharge events from Lake Okeechobee to the Northern Estuaries would be realized by the TSP compared to the FWO. Further beneficial hydrologic effects within the Greater Everglades compared to the FWO by way of additional "new water" to facilitate restoration of sheetflow and rehydration of previously drained areas. Improved hydrologic conditions will result from increasing depths and extending hydroperiods in WCA 3A, WCA 3B, and ENP.
Future Actions	Additional CERP projects propose to restore hydrology to more natural conditions (example—LOWRP and WERP).
Cumulative Effect	Although it is highly unlikely that natural hydrologic conditions would be fully restored to pre-drainage conditions in most of the Everglades, improved hydrology would occur. Improved resilience to the overall ecology of the Greater Everglades ecosystem should occur. CERP is expected to improve the quantity, quality, timing and distribution of freshwater flow.
Threatened and Endangered Species	
Past Actions	Water management practices, importation of exotic species, and urbanization have resulted in the degradation of existing habitat function and direct habitat loss leading to negative population trends of threatened and endangered species.
Present Actions	Ongoing efforts have been made by Federal and state agencies to implement projects to improve hydrology within the project area. Ongoing projects have been implemented to maintain CSSS populations. The USFWS recovery plan is used as a management tool.
Proposed Action	Effects on critical habitat would be similar to the FWO; as such the CEPP Adaptive Management and Monitoring Plan has been updated (see **Annex D**).
Future Actions	Ongoing actions would be implemented to maintain threatened and endangered species within the project area. ERTP implementation represents a paradigm shift from single species to multi-species management. ERTP includes performance measures specifically directed at managing water levels and releases for the protection of multiple species and their habitats within the project area.
Cumulative Effect	Habitat improvement, monitoring and management of threatened and endangered species are anticipated to allow populations to be maintained. Improvement of degraded populations is expected to be facilitated by the restoration and enhancement of suitable habitat through efforts to restore more natural hydrologic conditions within the project area.
Fish and Wildlife Resources	
Past Actions	Water management practices have resulted in aquatic vegetation community changes and a resultant disruption of aquatic productivity and function that has had repercussions through the food web, including effects on wading birds, large predatory fishes, reptiles and mammals.
Present Actions	Ongoing efforts have been made by Federal and State agencies to implement projects to improve hydrology within the project area to restore habitat conditions for fish and wildlife resources.

Table C.2.2-8. Summary of Cumulative Effects (continued)

Fish and Wildlife Resources (continued)	
Proposed Action (TSP)	Negligible effects to fish and wildlife resources within Lake Okeechobee, and the EAA would be expected. Further reductions in the number of high discharge events to the Northern Estuaries, above reductions provided by the FWO, are anticipated to improve suitable habitat for key indicator species such as oysters and seagrasses. The TSP would provide additional beneficial effects within the Greater Everglades by sending increased levels of "new water" south above those provided by the FWO. Rehydration within previously dry areas of WCA 3A, 3B, and ENP would increase the spatial extent of suitable habitat for several fish and wildlife resources. Increases in forage prey availability (crayfish, other invertebrates, and fish) would directly benefit amphibian, reptile, small mammal, and wading bird species. Nesting and foraging activities of resident bird species are anticipated to be significantly improved. Although mammals occurring within the affected area are adapted to the naturally fluctuating water levels in the Everglades, there would be minimal incremental effect on mammals currently utilizing upland habitat compared to the effects of the FWO. Further increased freshwater flows to Florida Bay would provide minor incremental improvement in suitable habitat for pink shrimp, juvenile spotted seatrout, sea turtles, manatee and crocodiles among other species.
Future Actions	Some level of improvement to fish and wildlife resources is expected to occur as a result of implementation of projects with the capability of improving the timing, quantity, quality and distribution of freshwater flow to the study area. Hydrologic restoration planned as part of CERP would further improve fish and wildlife habitat.
Cumulative Effect	Habitat improvement efforts are anticipated to benefit fish and wildlife resources.
Vegetation and Wetlands	
Past Actions	Drainage of Florida's interior wetlands, conversion of wetlands to agriculture, and urban development has reduced the spatial extent and quality of wetland resources.
Present Actions	Efforts are being taken by State and Federal regulatory agencies to reduce wetland losses.
Proposed Action (TSP)	Negligible effects to vegetation within Lake Okeechobee and the EAA are anticipated. Further reductions in the number of high discharge events to the Northern Estuaries above those provided by the FWO are anticipated to further improve conditions for oyster and seagrass beds. In the A-2 Expansion area 4,155 acres of agricultural lands would be converted to freshwater wetlands improving the habitat. Additional beneficial effects are anticipated within the Greater Everglades above those provided by the FWO. Additional "new water" would further improve hydrologic conditions within WCA 3A and ENP and would support further reductions in soil oxidation, promoting peat accretion necessary to rebuild the complex mosaic of habitats across the landscape. Increased freshwater flows to Florida Bay would aid to lower salinity levels, benefiting mangrove communities and seagrass beds.
Future Actions	Some level of improvement to vegetative communities is expected to occur as a result of implementation of projects with the capability of improving the timing, quantity, quality and distribution of freshwater flow to the study area. More natural hydrology as part of the CERP would assist in restoring natural plant communities.
Cumulative Effect	While the spatial extent of natural plant communities would not be restored to historic proportions, the quality of vegetative communities would be improved.

Table C.2.2-8. Summary of Cumulative Effects (continued)

Cultural Resources	
Past Actions	Flood and water control projects, conversion of wetlands into agriculture and urban development have had adverse unmitigated effects to cultural resources either directly or indirectly.
Present Actions	Ongoing efforts have been made by Federal and State agencies to implement projects to improve hydrology within the project area, thereby stabilizing the tree islands which are known to have a high potential for cultural resources.
Proposed Action (TSP)	Consultation with stakeholders, including the State Historic Preservation Office, Advisory Council on Historic Preservation, Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida will be initiated by the USACE upon completion of this PACR.
Future Actions	Continued improvement to hydroperiods and sheetflow within WCA 3A, 3B and ENP could reduce soil oxidation, which could stabilize the environment, and this in turn could stabilize islands containing cultural resources.
Cumulative Effect	Cumulative effects to historic properties and culturally significant sites will potentially be long-term adverse effects if not avoided. Mitigation measures for effects to historic properties could potentially reduce the cumulative effect to minor long-term adverse effects. Mitigation measures for culturally significant sites is unknown.
Water Quality	
Past Actions	Water quality has been degraded from urban, suburban, commercial, industrial, recreational and agricultural development.
Present Actions	Efforts to improve water quality from agricultural areas are ongoing. Federal and State projects would contribute to improvements in water quality.
Proposed Action (TSP)	Implementation of the TSP is not expected to significantly affect the water quality of Lake Okeechobee. In the Northern Estuaries, improvements should be seen due to further reductions in high-flow events. The increases in flow to WCA 3A and ENP as a result of the TSP should not affect TP Rule compliance. Over the long-term, adding more flow from the lake that is treated to the water quality based effluent limits (WQBEL) should result in improved water quality within WCA 3 and a reduction in flow- weighted mean total phosphorus concentration entering the Park. Southern Estuaries salinity conditions are expected to be slightly improved by the TSP.
Future Actions	Actions by the State of Florida's Restoration Strategies will decrease nutrient concentration and loadings to the project area. Lake Okeechobee Regulation Schedule update and development of the Combined Operating Plan (COP) for Modified Water Deliveries, Western Everglades Restoration Plan, and the Broward County Water Preserve Areas (BCWPA) Project would also be expected to benefit water quality. Specifically, the BCWPA (Record of Decision signed in 2012, authorized in WRRDA 2014) would reduce storm runoff deliveries to WCA 3 and improve water quality coming across Tamiami Trail.
Cumulative Effect	While anthropogenic effects on water quality are unlikely to be eliminated, water quality is expected to slowly improve over existing and recent past conditions. During detailed planning and design, the USACE and SFWMD are committed to ensuring that project feature implementation will not result in violations of water quality standards.
Water Supply/Flood Control	
Past Actions	Water supply and flood control for agricultural and urban users has benefited from construction and operation of the C&SF project.

Table C.2.2-11. Summary of Cumulative Effects (continued)

Water Supply/Flood Control	
Present Actions	Availability of water from Lake Okeechobee for agricultural users were recently diminished through implementation of LORS 2008. Availability of water for urban and agricultural users were recently diminished through implementation of ERTP. The SFWMD has implemented Restricted Allocation Area Rules to cap users dependent on water supplies from Lake Okeechobee and the regional system (the Everglades).
Proposed Action (TSP)	Water supplies would be expected to provide additional CERP storage or hydrologic improvements to the Everglades and increase water availability.
Future Actions	Future supplies would not change unless additional CERP storage or hydrologic improvements to the Everglades are implemented and increase water availability.
Cumulative Effect	While effects on water supplies are unlikely to improve, water supplies available for agricultural and urban users are expected to remain stable until additional storage mechanisms are implemented.

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APPENDIX C.3
PERTINENT CORRESPONDENCE

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EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
10/20/2017	Chris Kelly	[redacted]	Will Scoping Meeting be televised ?		All public meetings held at the District's West Palm Beach Office will be webcast live and the video and presentation posted on the project website at www.sfwmd.gov/EAAReservoir. Meetings held in Clewiston are video taped and posted after the meeting at the same website.
10/20/2017	Barbara Sykes	[redacted]	Please get this done before it's too late to enjoy what we have left		Thank you for your comment.
10/20/2017	Mary Shabbott	[redacted]	Strongly support project. Very important to the west coast economy and Caloosahatchee Estuary		Thank you for your comment.
10/20/2017	PAUL ROTH	[redacted]	Sanibel resident who supports project; essential to the health of estuary; please move forward asap		Thank you for your comment.
10/20/2017	Alice and Rick Godfrey	[redacted]	Sanibel resident; Please pass the plan, the health of west coast depends on it.		Thank you for your comment.
10/20/2017	Debrann Jaffee	[redacted]	Find a solution send the waters to the Everglades. Stop talking ACT before the state loses revenue & and citizens		Thank you for your comment.
10/20/2017	John Outland	[redacted]	Need to restore the natural southward flow of water thru the remnant Everglades to Florida Bay. In addition to the EAA reservoir(s) we need to remove the flow barriers in the WCAs to enhance flows thru ridge a slough system and bridge more of Tamiami Trail. Have to model in the existing storm water treatment areas in the EAA to store and treat flows from the north and stop back pumping water from the EAA to Lake Okeechobee.		The EAA Reservoir includes the objectives to both mitigate harmful discharges to the northern estuaries as well as provide the additional flow to the greater Everglades as envisioned in the Comprehensive Everglades Restoration Program (CERP). The EAA Reservoir is a planning effort which seeks to modify the shallow water component of the Central Everglades Planning Project (CEPP) to a deep reservoir and necessary water treatment facilities. The CEPP plan includes project features to address your concerns of moving additional water south, removing barriers to flow in WCA3 and Tamiami Trail and increasing flows to Florida Bay. The EAA Reservoir planning efforts includes using the DMSTA model, as required by state law, to identify the necessary treatment facilities to meet all water quality requirements and send additional water south to the Greater Everglades.
10/20/2017	S.R. Maxeiner	[redacted]	We must not delay, postpone, argue, fuss: the need is clear and it is urgent that we proceed.		Thank you for your comment.
10/21/2017	Armand Ball	[redacted]	Please honor the intent of the Florida Senate bill from this year regarding the EAA storage reservoir. The importance of that additional storage area cannot be denied. The river continues to suffer as the result of excessive fresh water flow into the Bay and Gulf. It environmentally damages the Sound and its marine life.		Thank you for your comment.
10/21/2017	Cyndi Lenz	[redacted]	All the oysters in the St Lucie are dead. We need to know this is going to get fixed once and for all. One question- will you be taping these so we can watch?		All public meetings held at the District's West Palm Beach Office will be webcast live and the video and presentation posted on the project website at www.sfwmd.gov/EAAReservoir. Meetings held in Clewiston are video taped and posted after the meeting at the same website.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
10/21/2017	Maureen Tesoro	[redacted]	Please fund the project to restore the Everglades to its natural flow. The lake water does not belong in the San Carlos Bay . Fishing and boating are a big source of revenue that is hurt by the brown water discharges. It's time to restore the flow south, and stop polluting the St. Lucie and Caloosahatchee rivers. Storage south of Lake Okeechobee is needed as part of the overall plan to solve this catastrophic problem. Storage south of Lake Okeechobee is needed as part of the overall plan to solve this catastrophic problem		Thank you for your comment and we understand your concern. One of the primary goals of the EAA Reservoir is to mitigate, to the extent possible, the harmful discharges to the northern estuaries.
10/22/2017	Abe Levy	[redacted]	Please designate the largest possible surface area to receive water directly south of Lake Okeechobee. This could well be on existing state owned and leased lands. I strongly support the use of funds from the document tax that was part of the Florida Forever constitutional amendment to purchase additional lands for this purpose.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
10/22/2017	Mary Lavelle	[redacted]	Be open to the needs of all stakeholders...not just agriculture and real estate developers. Water quality is the basis of life in Florida. Including the Caloosahatchee and the Everglades and the economy of the southwest coast of Florida.		Thank you for your comment.
10/23/2017	Bruce Ritchie	[redacted]	Will modeling results indicating how much land is needed for the reservoir be discussed or released at either of the meetings this week?		Modeling results will be presented at public meetings as model runs are completed. All modeling results are posted on the project website at www.sfwmd.gov/EAAReservoir
10/23/2017	Steve Michaud	[redacted]	Keep the planning and implementation stage on schedule		Thank you for your comments.
10/24/2017	Rae Ann Wessel	[redacted]	Good meeting last night, thank you. When do you anticipate posting the ppt from last night's scoping meeting?		Presentations will be posted for all public meetings within a couple days after the meeting on our District project website, www.sfwmd.gov/EAAReservoir. In addition, all public meetings held at the District's West Palm Beach Office will be webcast live and the video and presentation posted on the project website at www.sfwmd.gov/EAAReservoir. Meetings held in Clewiston are video taped and posted after the meeting at the same website.
10/24/2017	don tupper	[redacted]	Build it now		Thank you for your comment.
10/25/2017	Richard Persson	[redacted]	It was my understanding at that time the previous reservoir design would have a boat ramp, littoral zones to provide spawning areas for fish, and the bottom contours would be left as natural as possible. Also the banks would be earthen and not concrete. I don't see why you are doing this all over again, why waste the time and money. Rick Persson a concerned sportsman.		Recreational opportunities are being evaluated, as well as embankment design, and will consider recreational uses for the project.
10/26/2017	Matthew Schwartz	[redacted]	Will this weeks meetings be televised?		All public meetings held at the District's West Palm Beach Office will be webcast live and the video and presentation posted on the project website at www.sfwmd.gov/EAAReservoir. Meetings held in Clewiston are video taped and posted after the meeting at the same website.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
10/26/2017	Barron Moody	[redacted]	The scope of the EAA reservoir project being initiated as a Post -Authorization Change Report of CEPP should: 1. Include specific accommodation for recreation (which is an objective of C&SFP) including a. 24/7/365 public access to the entire interior footprint, except reasonable exclusions around water control structures b. publicly accessible boat ramp and canoe/kayak launch facilities with adequate parking c. composting toilet d. enhanced bank fishing access e. additional passive recreation features 2. Include adoption of features to enhance fish and wildlife benefits on site in addition to hydrologic benefits a. Littoral areas, both perimeter shelves and interior humps or tables b deep water refugia, a suggested minimum of 10% of the area should remain at least 3 feet deep at mean low stage. c.varied and discontinuous bottom contours (bathymetry) to promote varied depths and vegetation communities at all stages 3. Exclude wave run up steps and extensive armoring of banks and shorelines varied and discontinuous bottom contours (bathymetry) to promote varied depths and vegetation communities at all stages deep water refugia, a suggested minimum of 10% of the area should remain at least 3 feet deep at mean low stage Littoral areas, b. deep water refugia, a suggested minimum of 10% of the area should remain at least 3 feet deep at mean low stage c. varied and discontinuous bottom contours (bathymetry) to promote varied depths and vegetation communities at all stages. 3. Exclude wave run up steps and extensive armoring of banks and shorelines		
10/30/2017	Darrell Brand	[redacted]	Attached is our Rivers Coalition resolution in support of the EAA Reservoir Project	11/3/2017	Thank you for your interest in our project and providing the River Coalition's resolution. I received via your email as well as getting a hardcopy at our meeting on the Tuesday. We look forward to working with you as we continue through the planning process. Mike Albert
10/30/2017	Martha Musgrove	[redacted]	FL Wildlife Federation comments per EAA reservoir-scope and planning		Thank you for your comment and information.
11/2/2017	Elyrosa Estevez	[redacted]	May I please have a link or pdf of the scope of this project: Everglades Agricultural Area Storage Reservoir.	11/6/2017	Emailed response with project website link.
11/2/2017	Jane Holder	[redacted]	I am writing concerning the EAA and the importance of implementing it ASAP. I am enclosing a photo of the filthy, polluted water from the Caloosahatchee as it comes down the Gulf in front of my house in Sanibel. It is completely disheartening to watch this phenomenon knowing what it is doing to the wildlife. In addition, as you travel across the causeway to the mainland there are streams of white soapsudsy looking patches all across the Bay. How long are we going to keep damaging the environment before action is actually taking place? We are not being good stewards. Please help get this moving. Thank you. Jane Holder 3635 West Gulf Dr Sanibel 33957		Thank you for your comment and we understand your concern. One of the primary goals of the EAA Reservoir is to mitigate, to the extent possible, the harmful discharges to the northern estuaries through an expedited process.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/3/2017	J William Louda	[redacted]	Here is a concept that I have been floating around various agencies for about a decade. I call it a solar marsh--these could be done as the whole, part or only on the edges of an STA. I study periphyton in the Everglades and STAs (See Louda et al., 2017 in Microbiology of the Everglades Ecosystem, CRC Press, pp289-349.) and I know that the periphyton and other microalgal communities receive way more light (PFD / Photon Flux Density) that they require since they make enormous amounts of sunscreen pigments. Collocation of a solar energy plant with an STA could generate many jobs to replace any lost by decreasing EAA Ag lands. Since this is to be a "reservoir" you will likely dig it too deep to support subaquatic vegetation (SAV) and emergent plants, so the idea of the solar marsh could then easily fit with the borders of the 'pit' to allow for water cleansing as well as storage. That is, have the riparian edges be the solar marsh. Land is expensive and getting scarce--this could be a great "two-for" or even a "three-for".		Thank you for your comment.
11/3/2017	Roberto Maldonado	[redacted]	In management of the levels, consideration should be given to a wider low to high tolerance to avoid the past years mismanagement that forced the excessive dumping into the river and the low level crisis in the winter. I.e.! too low at the start of the dry season and too high at the end.		Thank you for your comment.
11/6/2017	Anthony Federico	[redacted]	How can I obtain the DMSTA model(s) and runs in xls format that were discussed today?		DMSTA Output can be found under the Model Results FTP link found on the District project website, www.sfwmd.gov/EAAReservoir. Excel files are included in the posted data.
11/6/2017	Alex Gillen	[redacted]	Can you please provide a contact email address for the federal partner for the EAA reservoir project for NEPA scoping communications? Additionally, can you send a physical address and point of contact for the federal partner?		The SFWMD will be working with the U.S. Army Corps of Engineers, South Atlantic Jacksonville District Office.
11/8/2017	Allen Falk Attorney (and multiple others)	[redacted]	Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/9/2017	Malcolm D Brown	[redacted]	Please reconsider to revise the plan to increase the acreage which was not shown on the current STA's report.		Thank you for your comment.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/9/2017	Ed Toston (and others)	[redacted]	Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/9/2017	Leslie Turner	[redacted]	Consider me a deeply concerned citizen. I live in Ft. Myers, FL and am an avid windsurfer, fisherperson, and lover of nature. The current discharges of polluted water from lake Okeechobee during hurricane or rainy seasons is killing our beautiful waterways. This will cost FL and it's citizens untold millions of dollars in lost revenue due decreases in estuary usability from pollution. If we don't take care of our state, no one else will. Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/9/2017	Billy Hinners	[redacted]	As a Stuart resident living on the bank of the St. Lucie River, I'm deeply concerned about our local water quality. I noticed the water quality report recently showed the area near us receiving a "D" grade, which troubles me greatly. I'm eagerly awaiting a good quality implementation of SB-10 which I hope and believe will dramatically improve the situation in the not-too-distant future. I'm sending you this request for some specific steps I hope that SFWMD will take to make us all clear and confident in the path for implementation of SB-10. Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible. Billy Hinners		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/9/2017	Dr. Thomas Poulson	[redacted]	The numbers you have presented so far do not allow for both adequate reservoir storage and needed STAs to clean the water before sending it south. So I would like to see reasonable numbers at your next scoping meeting later this month.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/9/2017	Jillian Nelson	[redacted]	Please update the EEA Storage Reservoir Feasibility Study to show a workable footprint to store and treat at least 240,000 acre-feet of water. This is needed to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. My hope is that you can get this updated information ready for the scheduled November 15-16 scoping meetings. I have read that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed. This size would clean 240,000 acre-feet of water fast enough to prevent treatment being the bottleneck. If SFWMD's estimate is different, please explain why in your next update. Can you also present your plan to locate the acreage needed to make the project work optimally. If you can't update the study in time for the upcoming meetings, please revise the study as soon as possible. Residents on both coasts are relying on you. Please help us find the best solution to this terrible situation.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/9/2017	Joe Borcynski	[redacted]	Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/9/2017	Gail Kleemann	[redacted]	Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible .		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/9/2017	Ryan Toogood	[redacted]	My conservationist friends at Florida Sportsman magazine inform me that more realistic plans utilizing more public land are required in order for the SB10 project. I thus respectfully ask you to: - Revise the SFWMD presentation for the next scoping meetings; - Use the public land available for the STA acreage needed to clean 240k acre-feet of water; - Include realistic reservoir dimensions to ensure a footprint that facilitates the project. I truly hope we can make progress here. Thanks for reading.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/9/2017	CYNTHIA TRUE	[redacted]	The damaging and toxic releases from Lake O are the bane of our existence for Floridians. We are dependent on you to offer a realistic plan. Putting fourth this inadequate plan doesn't help. If ALL the water isn't treated our water table, the tourism industry and the health of the rivers who have been receiving the toxic releases causing algae blooms will continue to be threatened. Only you can fix this. Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/10/2017	Terrence Heaps	[redacted]	I am 63 years old, I was born and raised in South Florida and I have seen the Florida Bay, the St Lucie and the Caloosahatchee estuaries all but collapse in my lifetime. Mr. Bergeron just wrote a piece, saying the Everglades are the most flooded he has ever seen in his lifetime and there is not a single island or hammock out of the water bringing peril to wading birds, hog, deer and Panther……yet the sugar cane fields are bone dry and irrigated perfectly for maximum crop yield. The SFWMD and the State of Florida has an obligation to our fellow citizens, to do anything and everything that is needed to finally try and jumpstart this 20 year old emergency fix for the Glades, that has been stalled by corruption, including acquiring property that we already have the right to purchase and or through eminent domain. We must move the water South and quit killing the fishing & tourism industries on both coasts and the Florida bay. People are literally dying from contact with and exposure to the water, mostly contaminated by the sugar cane fields. The South Florida Water Management District did what we asked: They ran the model to find out how much land we need to store, treat, and send clean water south to the Everglades instead of to our rivers. So why, after the district delivered its presentation on scoping this week, do we still not have a realistic answer? We asked for a number: how many acres? How big is the total footprint for a reservoir that holds at least 240,000 acre-feet (78 billion gallons) and the required stormwater treatment areas (STAs) to clean outflows fast enough not to become a bottleneck that backs up the system when we need it most? After all, the district's modeling shows that increasing acreage for STAs is the key to cutting discharges to the estuaries.		Thank you for your comments and we hear your concerns. The EAA Reservoir project is designed with the primary goals of sending water south to both mitigate damaging discharges to the estuaries and send restoration flows south to the Greater Everglades and Florida Bay. In addition the EAA Reservoir the District is working aggressively on additional projects such as the C-43 Reservoir, IRL South, improvements to the Herbert Hoover Dike, and storage north of the lake among other things. Unfortunately there is no one silver bullet or quick solution to undo the harm that continues to impact the estuaries. However, the District is dedicated to continue to address this issue.
			What we got instead was, Depending on how big the reservoir is, some land might be left over for STAs. And then we got "a reservoir designed to hold between 240,000 and 360,000 acre-feet (as Senate Bill 10 calls for) would likely need to be accompanied by 6,000-9,000 acres of STAs."		
11/10/2017	**Robert J. Berg, Esq**	[redacted]	That's not nearly enough, but even that low-ball estimate can't be wedged into the footprint presented by the district.		Thank you for your comments and we hear your concerns. The EAA Reservoir project is designed with the primary goals of sending water south to both mitigate damaging discharges to the estuaries and send restoration flows south to the Greater Everglades and Florida Bay. In addition the EAA Reservoir the District is working aggressively on additional projects such as the C-43 Reservoir, IRL South, improvements to the Herbert Hoover Dike, and storage north of the lake among other things. Unfortunately there is no one silver bullet or quick solution to undo the harm that continues to impact the estuaries. However, the District is dedicated to continue to address this issue.
11/11/2017	Matthew Fleming	[redacted]	Although its spokespeople mentioned the ability to send an additional 1.3 million acre-feet south in wet years, they showed only a graph of an average year–when we don't have discharges. And it showed that an impossible 20-foot-deep reservoir with only four acres		Thank you for your comments. Each email we receive is read, addressed and included in the Feasibility Report. We heard your concerns and the District is working aggressively to address these issues.
11/11/2017	Terrence Heaps	[redacted]	Here's another example: https://jacquithurlowlippisch.com/2017/11/09/documenting-the-discharges-11-8-17-slr-irl/		Thank you for your comment and information.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/13/2017	Frank Leto	[redacted]	Please revise your presentation for the next scoping meetings, use the public land available for the STA acreage needed to clean 240,000 acre-feet of water, include realistic reservoir dimensions, and show us a footprint that works for the Florida citizens.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/14/2017	Jamie Higgins/NEPA p	[redacted]	I work for the NEPA Program Office at EPA and will be reviewing the EISs for EPA. I learned that there will be an Agency Meeting tomorrow. Could you email myself and Cecelia Harper (cc'd in this email) with the information to participate in the meeting. Having just learned of the meeting, I will be unable to participate in person and would need to participate via webinar.	11/14/2017	The Government Agency Meeting has been postponed till Nov 29th at 9:00am. Part of the reason for the postponement was trying to get the invitee list finalized. Cecelia Harper and Ron Miedema are included on the routing list from EPA and will receive invites when we get them out. The meeting information can also be found on our project website at www.sfwmd.gov/EAAReservoir Thank you, Mike Albert
11/14/2017	Paula House	[redacted]	We have been shocked and dismayed by SFWMD game playing on behalf of some hidden political and not so hidden private interests. The lack of data, the public relations efforts favoring every and any solution that doesn't involve disturbing the EAA or Big Sugar are so transparently political and personal in nature they do not pass the laugh test. To that end, the numbers released on the south storage are not realistic. Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/16/2017	David Preston (and many others)	[redacted]	Dear Governor Scott, Your administration is taking credit for the EAA reservoir--the keystone project in the solution to Lake Okeechobee discharges into the Caloosahatchee and St. Lucie rivers, and to the decline of Florida Bay and the Everglades. But the South Florida Water Management District, whose governing board you appoint, is proposing a reservoir that they know can't be built and can't work. If you want credit for this project, you need to earn it by demanding a viable plan. That means giving this project a big enough footprint to stay true to the intentions of SB10, by storing and treating enough water with enough efficiency to cut the discharges and send clean water south. Experts know that SFWMD's plan doesn't include enough land to do that. Without enough land to clean the reservoir's outflow quickly, treatment becomes a bottleneck that limits the amount of water the system can take in an emergency. It doesn't work when Florida needs it most. The estimation of acreage needed for stormwater treatment areas (STAs) to clean a given amount of water is common knowledge in the engineering community: for Lake Okeechobee's level of pollution, the ratio is approximately one acre for every 20 acre-feet of water (6.5 million gallons). SFWMD engineers applied these principles to the STAs now cleaning agricultural runoff in South Florida. Experts agree that the EAA reservoir will need roughly 13,000 acres of STAs to treat 240,000 acre-feet--far more than the current plan includes, and more than double the 6,000 acre figure cited last night by the district.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
			Maps show enough public land available to expand the EAA reservoir project's footprint without buying more from private landowners--some of whom have reportedly offered to sell. And the law you passed explicitly allows the state to end leases on public land for this project. So SFWMD has the available resources to produce a workable plan--there is no excuse for proposing an impossible design.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
11/16/2017	Keith Moorman	[redacted]	But that is exactly what state employees are doing today. Not only does the plan fail to include enough land to clean water efficiently, it fails to include a buildable reservoir. One proposal calls for a 10,000-acre reservoir holding up to 240,000 acre-feet of water…which would make it 24-feet-deep. With 60-foot-tall berms. And pumps requiring a power plant that practically doesn't exist today. The other proposal at 16-feet-deep isn't any more realistic.		The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.
11/16/2017	Jill Nelson	[redacted]	This plan is science fiction, and SFWMD knows that.		Thank you for your comment.
11/16/2017	Kelly Anne Bryant	[redacted]	By using your authority to demand that state agencies get this project right you, can build a legacy that includes protecting Florida's $20+ billion fishing and boating industries and the 200,000+ jobs that depend on them, along with their share of our $89 billion tourism industry and another 1.1 million jobs. Your actions will also defend Miami's water supply and contain a major public health threat from toxic algae. The district's plans jeopardize all of this.		Thank you for your comment.
11/16/2017	Pauk Kuiper	[redacted]	You have a choice this week to speak out and take ownership of a historic initiative to fix Florida's broken plumbing. Or to remain silent and be branded as a phony opportunist until voters forget you. Please choose to be remembered.		Thank you for your comment.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/17/2017	Alex Gillen	[redacted]	I wanted to confirm the closing date for the scoping comment period for the EAA reservoir project. On the website it states: "NOTE: The scoping comment period ends on Nov. 22, 2017." https://www.sfwmd.gov/our-work/cerp-project-planning/eaa-reservoir Does this mean the scoping comment letters will accepted if they are submitted on Nov. 22, 2017? Thanks so much!		The scoping period extends through all day, Nov 22, 2017. This ends the District's scoping phase of the planning process to incorporate public comments regarding problems, objectives and goals of the project. However, the District will continue to take comments from the public for inclusion into the administrative record throughout the Feasibility Report development.
11/18/2017	Julia M Trujillo	[redacted]	As a concerned environmentalist who has been researching the many stories of the "river of grass", I'm sure we can understand there is great opportunity to help clean it with the sugar industry. I lived the first years of my life in the Everglades with my parents who had jobs in the city. One day while in college English, I learned that the sugar run off from the bleached sugar was so bad, the residue helped create pink flamingos. Years later, while camping and sight seeing I noticed the pink residue was still poisoning the area. Nothing against flamingos, but the cost of bleached sugar compared to regular cane sugar is low, and I don't understand, with all the headway in organic and natural farming, why our natural environment has to be sacrificed for low priced bleached sugar. If you help balance this economy by pricing sugar effectively, I'm sure it can be budgeted effectively, and help in the purchase of dirt and scientific knowledge to help the sugar industry move to a more environmentally friendly solution for all. Although I am not a tribe member, I believe they should be considered carefully when it comes to issues of the everglades. In the past they had to have a lawsuit because people neglected to seek their opinion. While researching, I found a pertinent press release on the environment tab on the following website I believe should be considered: http://www.miccosukee.com/tribe/ Thanks for you time and consideration.		Thank you for your comment and information.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/19/2017	Brady DeGrasse	[redacted]	Hello, my name is Brady. This is very personal for me, so please do not view the use of the form email/letter following first my personal sentiments regarding this matter as less than sincere, heartfelt, or even non-idiosyncratic. When we here in Panama City Beach, FL and surrounding had an unusual Red Tide season that suspiciously coincided with the "wall of doom" (I called it--the tannin, but also toxic, water that flowed from the Caloosahatchee and along the entire coast) that led to the creation of organizations like BullSugar.org, WE also lost a significant number of the Seatrout population that are MY "Keystone or Umbrella Species"--one of the organisms affected that had the first and the most personal impact on me, and the one prompting my ongoing thesis on this issue. Additionally, our scallop season was cancelled in Port St. Joe and much more was lost and suffered that is near and dear to us all. Since that time I have researched, thought and drafted...and thought and drafted...my points and questions as follows--I have much more written on these, but I will take a bullet-point approach for brevity's sake. Whether our local impacts are directly correlated (or worse, a causal relationship exists) is truly moot, as it is quite apparent, objectively and otherwise, that there are many relevant problems, or more aptly, insanities truly with Sugar farming in our state as you know too well I am sure, and perhaps in ways that you may not have considered. So, while I am sure that I do not understand all the "ins and outs" of the Sugar industry vs. Florida Environment situation, until I am thoroughly and sufficiently dissuaded, I strongly believe and would personally like to add the following (this is an ongoing draft, as I participate in this dialogue and hopeful change and as I, too, learn more):		Thank you for your comment.
			1. Our water, wildlife, and people are being harmed by the sugar industry, objectively and inexplicably. 2. Sugar is NOT worth it--there is absolutely NO angle (any economic benefits notwithstanding) to this absolute NON-nutrient having such a negative impact that makes sense to me, principally. 3. The Lobbying processes and impacts behind it all is far worse than Netflix-series-worthy-corrupt. 4. Primarily, 2 family's wealth--the Fanjul's and Motts--Versus Florida, its People, and its Wildlife and Resources is a self-evident imbalance of epic proportions 5. ANY other form of responsible farming (organic, no till, etc) should be demanded or no crop (causing such harm/more than it benefits--back to point no. 2) should be grown anywhere in any way 6. I call Big Sugar and Big Tobacco "evil twins" as my research led to uncovering that the sugar industry LITERALLY used the tobacco playbook (via attacking fat in foods ("non-fat" diet) and many other scapegoats and ways to push various forms of sugar, under many misleading pseudonyms, into the vast majority of processed foods. How. Dare. We. Let. This. Go. On. Best wishes in moving this in the right direction--Florida in it's most Essential, Natural, Alive, and Balanced state for ALL (not a greedy, avaristic, and irresponsible few).		

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/19/2017	Sharon Piergeorge	[redacted]	The poor management of the lake , dikes, canals etc is DESTROYING our beautiful ocean and waterways!!!!!!!! How many times are our beaches going to be closed?!!!!!!! Somebody better do something fast or there is going to be a mass exodus from so fla!!!!!! Please let us have a beautiful ocean for the holidays or our tourists won't come back		Thank you for your comment.
11/20/2017	Sally Lewis (and others)	[redacted]	The Water Resource Law of 2017 outlines specific requirements for the storage and treatment of water in a new reservoir to be built south of Lake Okeechobee. According to some independent experts, you are considering altering the approved plan. As a Florida resident, I strongly request that you follow the bill as written. According to the Water Resource Law of 2017, at least 240,000 acre-feet of water (78 million gallons) must be stored and treated to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. Experts agree that the reservoir will need roughly 13,000 acres of stormwater treatment area to treat 240,000 acre-feet of water. This is far more than is shown in your current plan. There are also some serious questions being raised about your alternatives in terms of depth in one case and power plant output in another. This attempt to change the rules after passage of a bill or amendment is reminiscent of the Amendment 1 experience in 2014. Despite approval by more than 75% of voters, the purchase of large parcels of new land to protect Florida's precious water resources never took place. Instead, the money was redirected to other projects by the state government. You have been tasked with implementing a plan approved by the Florida Legislature. It is your duty to do what the Water Resource Law of 2017 requires. Only by following the plan can we significantly reduce the toxic algae bloom invasion of our waterways. Please do your job and save thousands of citizens from potentially severe health problems.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.
11/21/2017	Lauren Edinger (and o	[redacted]	As a long-time Florida resident, the wife of a fishing charter captain, and avid fisherwoman, I have a vested interest in the EAA reservoir project. As such, I ask that you incorporate the following measures into the design of the EAA reservoir in order to design a reservoir that will provide meaningful benefit to our estuaries: • Run modeling for the EAA Reservoir that takes into account ALL state-owned land in the EAA that may be used for land swaps. • Increase treatment capacity by including additional Stormwater Treatment Areas within the EAA Reservoir project. Thank you for your consideration.		The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/21/2017	Jason Pim	[redacted]	I'm writing to urge SFWMD to complete the modeling for the EAA Reservoir and uphold the timeline AND intent of Senate Bill 10 and the citizens of Florida. The modeling done so far is inadequate in scope and feasibility and does not take into account all state-owned land that could potentially be used. I urge you to honor the wishes of millions of Floridians who have time and time again asked for adequate relief from the discharges, and have yet to see a meaningful solution be put forward. Please take into account all the state-owned land and increase treatment capacity within the EAA Reservoir project.		The District's EAA Storage Reservoir is being designed to provide an annual average flow of approximately 300,00 ac ft into the Greater Everglades. To meet water quality requirements necessary to send this water south the District will be using the DMSTA model as required by state law. Treatment wetlands necessary will include both new STA's and optimizing existing District infrastructure and treatment facilities. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
11/21/2017	Seth Hartt	[redacted]	(SFWMD) started the public planning process for the EAA Reservoir one month ago. initial modeling for the reservoir project failed to include enough land for the project to construct a reservoir that would provide meaningful benefit to our estuaries Please model a reservoir that is both effective at reducing Lake Okeechobee discharges, and cost effective to build. We expect modeling for the EAA Reservoir that takes into account ALL state-owned land in the EAA that may be used for land swaps. It's imperative to increase treatment capacity by including additional Storm Water Treatment Areas within the EAA Reservoir project.		The District's EAA Storage Reservoir is being designed to provide an annual average flow of approximately 300,00 ac ft into the Greater Everglades. To meet water quality requirements necessary to send this water south the District will be using the DMSTA model as required by state law. Treatment wetlands necessary will include both new STA's and optimizing existing District infrastructure and treatment facilities. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
11/21/2017	**Pat Crenshaw**	[redacted]	I am writing this as a concerned citizen but even more so an active fisherman and someone that has enjoyed the water in Florida for 60 over years I am deeply concerned about the effects I see on the fresh water discharges. Areas in Pine Island sound that once had lush beds of turtle grass (the hatchery for so many of our fish) are dying or dead. Much of the oyster bars are the dying or dead. I am afraid if the reservoir is not modeled to reduce lake Okeechobee discharges soon my grandchildren's children won't have even close to the same experiences I have had as a kid. Not even sure how effective this will be with hundreds of us writing you but PLEASE if there is anything, any influence you could have please help.		Thank you for your comments. Each email we receive is read, addressed and included in the Feasibility Report. We heard your concerns and the District is working aggressively to address these issues.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/21/2017	Captain Frank Ventimiglia	[redacted]	Please do something about reducing the discharges from Lake O into the Caloosahatchee. The water in my canal at Bahia Lane in Fort Myers, is unsafe to the human touch, two members of my family broke out into hives wherever the water touched their bodies while fixing a boat lift and the fish we are catching have lesions on them as well. I depend on these waters to support my family and need you to please find a solution to store or divert the stormwaters somewhere safe.		Thank you for your comment.
11/21/2017	Michael Smith	[redacted]	As a concerned citizen for the waters in this great state of ours I am asking you to please. Run modeling for the EAA Reservoir that takes into account ALL state-owned land in the EAA that may be used for land swaps and to increase treatment capacity by including additional Stormwater Treatment Areas within the EAA Reservoir project. It is to my understanding that the SFWMD failed to include enough land for the project to construct a reservoir that would provide meaningful benefit to our estuaries. Senate Bill 10 identified land within the EAA which could be used for land swaps to create a large enough reservoir, coupled with Stormwater Treatment Areas (STAs), to provide a meaningful conveyance of water through the EAA and into the Everglades. The SFWMD did not account for this in the modeling, and instead modeled reservoirs on a smaller tract of land without enough treatment capacity to alleviate discharges. Without sufficient treatment capacity, the reservoir will quickly fill up and will be unable to mitigate discharges. Also in question is the feasibility of constructing the reservoir concepts. One of the concepts calls for a 24-foot-deep reservoir, which would be cost prohibitive to construct and operate.		The District's EAA Storage Reservoir is being designed to provide an annual average flow of approximately 300,00 ac ft into the Greater Everglades. To meet water quality requirements necessary to send this water south the District will be using the DMSTA model as required by state law. Treatment wetlands necessary will include both new STA's and optimizing existing District infrastructure and treatment facilities. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/21/2017	Tomi Sapp	[redacted]	As you are fully aware, we are embroiled in a serious, serious situation for our waters here in South Florida and beyond. After many years of personal outrage, I see there is hope on the horizon, but appropriate, functional and cost-effective models are imperative. I grew up on the Caloosahatchee River, a g-g-granddaughter of Manuel A. Gonzalez, founding father of Fort Myers. I learned to water ski on that river. My family owned the property that became the Edison & Ford homesteads. But the Caloosahatchee has become the sewage canal for big sugar, other farmers and failing septic tanks as it travels on down to the west coast; to the east it's Indian River. This affects the wildlife, the fishing industries, property values and tourism. It also affects quality of life both above and below the surface. We are breeding flesh eating bacteria where there was none before. This has got to stop and you key to this solution. I understand the history of our current situation; when it started and why, but it is time to mitigate and resolve the travesties that are imposed on the good people of this state and the wildlife that is left. I implore you to consider models for the EAA Reservoir that take into account ALL state-owned land in the EAA that may be used for land swaps and to increase treatment capacity by including additional storm water treatment areas within the EAA Reservoir project. Also, please consider natural filtration plantings and any other natural, but effective remedies that can be intelligently implemented. Our future here really is in your hands. Please continue to act with conscience and do the best job you can do.		The District's EAA Storage Reservoir is being designed to provide an annual average flow of approximately 300,00 ac ft into the Greater Everglades. To meet water quality requirements necessary to send this water south the District will be using the DMSTA model as required by state law. Treatment wetlands necessary will include both new STA's and optimizing existing District infrastructure and treatment facilities. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
11/21/2017	Jamie Higgins/NEPA program office/Resource Conservation and Restoration Division	[redacted]	Please find attached EPA's scoping comments for the East Agriculture Area Storage Reservoir EIS. Feel free to contact me should you have questions. Also, I would like to be added to the project email and mailing distribution list.		Thank you for your comment and information. You have been added to the invite list for government agency coordination meetings.
11/21/2017	Tom Southern	[redacted]	c'mon, mode a reservoir that is big enough that the water doesn't have to be so deep……how are marsh plants suppose to live and grow and clean water in ten foot deep lake? Model the size of land actually needed in a WET year, too!!		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. Modeling of facility sizing is performed based over a climatic period of record from 1965 - 2005 and includes both wet and dry years. Facilities are sized based on optimal performance over the full range of hydrologic conditions over the period of record, not just average years.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/21/2017	Stephen M. Moon P.A.	[redacted]	I moved to South Florida in 1982 because I loved the climate, environment and waterways. Since that time I have been involved in the marine industries in one way or another as an attorney specializing in Admiralty and Maritime Law. I am also an avid boater and fly fisherman with little time to enjoy my passions. I toil all day, sometimes seven days a week, with the hope that one day I will be able to enjoy my passions more frequently. My fear of not being able to enjoy my passions later on is rising like the water level of the IRL and Lake Okeechobee. I have seen the impacts on the environment and our waterways caused by discharges from Lake Okeechobee. Each time it occurs it also has an impact on the marine industries which I am also passionate about. Most will agree with me that the Florida lifestyle goes hand in hand with enjoying our beautiful environment and the waterways that provide access to it. Images of people enjoying recreational boating and fishing are what lure many people to our beautiful State each day. This summer season we had a record amount of rainfall. I live on the Indian River and work in an office that overlooks it. I have been amazed at the water level of the river this summer and fall. It’s raining now and I don’t anticipate the water level to drop for some time. What will happen to all of the runoff? What will we tell the next generation about the IRL and our estuaries which can be saved by good stewardship if we fail to take the correct steps now to reverse the damage and prevent further damage?		Thank you for your comment.
			Hull modeling and tank testing is a valuable, cost effective tool in the marine industry. Modeling storm water runoff is also valuable tool. In order for us to maximize the benefit and knowledge gained from this modeling it needs to include more land in the testing. The initial modeling performed on behalf of the SFWMD did not include enough land. I urge you as a steward of this great State to include enough land to provide a meaningful benefit to our estuaries so that the modeling is more about the benefits we can gain from the recommended mitigation projects. Discharges from Lake Okeechobee will always be necessary. We need to handle them in a responsible way so that our estuaries are protected from further loss. Thousands of jobs depend on it. Our health and wellbeing depends on it. The taxpayers do not want to have to repeat the modeling after expensive and time consuming litigation over it or the damage caused to the environment which results from decisions based upon inadequate information. Please insist that all mitigation possibilities are considered so that good decisions can be made now in a cost effective way. Thank you for your consideration and attention to this very important matter.		

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/21/2017	Reid McKinstry	[redacted]	I am writing you as both a concerned citizen and manager of a large fishing tackle company headquartered in South Florida. It has come to our attention that the current modeling of the EAA Reservoir that was passed in SB10 is neither affective at reducing Lake Okeechobee discharges or cost affective. This is troubling and concerning as the discharges affect everything from fishing and citizens health to property value and tourism on both the east and west coast of the state. It is my hopes in writing this that you will consider running a model of the EAA Reservoir that will take into account All state-owned land that could be used for land swaps, and also to increase the capacity by including additional storm water treatment areas within the EAA Reservoir project. It seems very obvious to me a simple fish hooks salesman that a 24ft deep reservoir is extremely cost prohibitive to build and will not affectively solve the problems that the state has entrusted you to fix. Please consider these requests and get back to the drawing board and come up with a solution that fixes our problems. Thank you for your time!		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.
11/21/2017	Dana Ben Kaplan	[redacted]	The South Florida Water Management District (SFWMD) started the public planning process for the EAA Reservoir one month ago. After committing to upholding the timeline laid out in Senate Bill 10, the SFWMD released initial modeling for the reservoir project, but failed to include enough land for the project to construct a reservoir that would provide meaningful benefit to our estuaries. Senate Bill 10 identified land within the EAA which could be used for land swaps to create a large enough reservoir, coupled with Stormwater Treatment Areas (STAs), to provide a meaningful conveyance of water through the EAA and into the Everglades. The SFWMD did not account for this in the modeling, and instead modeled reservoirs on a smaller tract of land without enough treatment capacity to alleviate discharges. Without sufficient treatment capacity, the reservoir will quickly fill up and will be unable to mitigate discharges. Also in question is the feasibility of constructing the reservoir concepts. One of the concepts calls for a 24-foot-deep reservoir, which would be cost prohibitive to construct and operate		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/21/2017	Joan Berry	[redacted]	Since 1934 the Sugar Industry has received a Tax Subsidy and they have done nothing but use our estuaries as their dumping ground. It is time for our government to make them clean up their own mess. Every time a bill has come up to clean up our estuaries, the citizens has pass the bill. However, the STATE does not fund the bill and the estuaries continue to die. Fund these bills, make the Sugar Industries help pay for their mess and get the Federal government to fix the dam. When I purchased my home in Cape Coral I had live Oysters, clean water and was able to fish from my dock. Now, NO Oysters, water is brown and no fish in my channel. This is a big environmental impact and if was anywhere else this would not be allowed to happen. The EPA should have been called in years ago and forced the Sugar Industry to stop dumping and clean up their mess. But, no and we the residents are left with their mess. Sending the water South, witch is the original path and help the everglades. Allowing this will it will take the fresh water South, not into the gulf.		Thank you for your comment.
11/21/2017	Dawn Shirreffs	[redacted]	Attached please find the Everglades Foundation's scoping comments. Please do not hesitate to contact me if you have any questions or if I can assist in any way. Have a very happy Thanksgiving.		Thank you for your comment and information.
11/21/2017	Korina Cornish	[redacted]	I am writing to urge you to please run a model of the EAA reservoir that includes all state-owned land and to increase treatment capacity by adding additional stormwater areas. I was particularly moved to write about this issue because I served as a volunteer wildlife surveyor with the UF IFAS alligator team which, at that time, was working with SFWMD. We would survey the various parks in the middle of the night to track wildlife populations, who was thriving and which species weren't. Obviously, the water quality and the propensity to flooding were key predictors in a situation that had not yet caught media attention. I hope that the SFWMD does right by natural Florida and her citizens by choosing modeling projects that are effective in cleaning our water and cost-effective, both aims being more than attainable		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/21/2017	Pancho Jimenez	[redacted]	I was born and raised in Florida, mostly in the FL Keys and South Florida. I'm a professional yacht captain. My quests notice and complain about the water quality here in the summer. We all know where this is coming from. These wealthy people would rather be in the Bahamas or New England in the summers, avoiding this gross water. This problem and possible solutions have been evident since at least the 1990's when I was attending FIU, but I know the issue is much older than that. The people urging you to restore the River of Grass flow aren't "tree hugging hippies", they are fishermen, business owners, captains and hunters. Please think of the future & release accurate and effective plans to restore the flow to the Everglades and the coastal estuaries. Remember your decisions will affect this state for decades to come. Get on the right side of history, be open and transparent in your deliberations. It's time to restore the flow. Its the right thing to do for tourism, for business, for fishermen and for the citizens and taxpayers of Florida.		Thank you for your comment.
11/21/2017	Barron Moody	[redacted]	1. Consider constructing the alternatives such that any alternative using the full (360,000 ac-ft) footprint delivers more water than the maximum available from the 240,000 ac-ft footprint. 2. Regarding Lake Okeechobee stage duration curves – Future conditions where 15.5' is equaled or exceeded a greater percentage of the time are a bad thing. Please avoid designing alternatives where this occurs. 3. Looking at slide 47 from the 6 November presentation, consider reverse engineering alternatives based on the inflection points on the curve presented on this graph to divert damaging flows of 5100, 4000, 1250 cfs. 4. Consider doing some calculations/estimations on limits to conveyance capacity increases. This should be used to restrain the alternatives considered, there is not much purpose to considering an alternative that uses STA/reservoir combination that requires conveyance increases that are known to be unachievable. 5. Ensure model assumptions that A-1 FEB provides meaningful water quality improvement (treatment) are validated by last year's operations of A-1 FEB. Please provide P concentrations for water entering and being discharged from the A-1 FEB each time it was cycled in the last year. 6. In addition to "Additional flow south" as a metric, we should be looking at "Flow not diverted to Northern estuaries" to help evaluate (screening, sensitivity analysis, etc.) the array of alternatives. 7. During CEPP, alternatives were evaluated for the number of days they would exceed FWC closure criteria for EWMA. We request that the EAA reservoir alternatives in this planning effort likewise be evaluated to ensure that current high water issues are not worsened by these alternatives which are frequently associated with sending more water south.		
11/21/2017	Unknown	[redacted]	Please increase wastewater treatment in all ways possible. This is what we voted for in the past. Thank you		Thank you for your comment.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/22/2017	Micaela Wolfe	[redacted]	How sad is it that we have thought about selling our jet ski that takes us out to the sandbar because we don't want to be touching such filthy water? How sad is it to see the life of the river slowly die off to where you see no animals at all? How sad is it that businesses and homes can't use water front property as a selling point because it smells like sewage? How sad is it that I cannot take my 5 year old out the the Stuart sandbar to play with her daddy and hunt for crabs? It's damn sad. All because people can't come together and find a solution. Here is your moment to fix a broken water system. Here is your moment to change history for the better for once. Use the land south. ALL state owned land! Find more treatment areas. Fix this! Fix this now! Sincerely, Pissed off Florida and a dying ecosystem Delivered via carrier pigeon sent during a knife fight in a crashing helicopter above the Nicaraguan rainforest. Please excuse any curt responses and/or typos.		Thank you for your comment.
11/21/2017	Georgia Jones	[redacted]	Thank you for working on the planning of the new EEA Reservoir so direly needed to restore the flow of releases from Lake Okeechobee South. This reservoir will not only bring the Everglades back to the beautiful, healthy natural wonder God created it to be but also stop the unnatural and devastating releases of chemically-laden, brackish water into the Caloosahatchee and St. Lucie Rivers. Please be certain to purchase enough land to create the reservoir large enough to effectively store and clean the water from Lake O but also store storm water. This will require more land than your agency is currently planning to purchase. This Reservoir is crucial to the future of our State and it's residents. We'll only have one chance to do this right. It's absolutely imperative to buy enough land to make this work! Thank you for doing the right thing.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
11/21/2017	Steve Patton	[redacted]	As a Ft Myers homeowner, 30 vacationer of the state of Florida an avid sportsman I'm sending this email to voice my support for the southern storage reservoir. I watched the Nov 17 planning meeting and I get the feeling politics is still the biggest impediment to making this happen. Many scientific opinions seem to think that the current footprint of this project is too small and cannot work. I believe that the WMD subtext of the Nov 17 planning meeting also left the door open that within framework of SB10 it's possible that this project just isn't feasible. Storage south won't end the damaging freshwater discharges, algae blooms and damage to the Everglades but it will help if planned right. The time is right to get this right and give all of the stakeholders a real solution, not one that just benefits big AG and politicians. Sadly If a project with this type of visibility fails it will become clear to me that the real solution to this problem will not be more politics or science but force or violence. In this political climate I'd be very concerned if I were the reason for the status quo...		Thank you for your comment.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/22/2017	John Cassani	[redacted]	The realization from existing modeling that additional STA treatment areas will be needed with both the 240K acre foot and 360K acre foot options is a critical factor. I hope the SFWMD will explore additional options to achieve relevant water treatment that meets Water Quality Based Effluent Limitations (WQBELS). Meeting such water quality standards will be critical for effective operation of the reservoir. It is also becoming more apparent that in order to fill and empty the reservoir basin multiple times within a single wet season in order to achieve potential downstream demand scenarios, it may be necessary to explore additional options for conveying water to and from the reservoir. Hopefully more efficient conveyance options will be assessed during the next planning phase of the reservoir. Modeling for water quality parameters in addition to phosphorus is encouraged to meet WQBELS that will enable operation of the reservoir as currently planned. I would ask that modeling of stored reservoir water occur for Chlorophyll a, principal nitrogen species, specific conductance and total suspended solids under relevant residency scenarios.		Conveyance of water to the EAA Storage Reservoir is included in our modeling simulations and analysis. Additional conveyance capacity is proposed for both the Norht New River and Miami Canals to bring additional Lake Okeechobee water to the project. Currently, the District is assessing water quality to meet the WQBELS as well as all State and Federal requirements.
11/22/2017	Kellie Ralston	[redacted]	Please find ASA's comments on the EAA reservoir attached. Have a wonderful Thanksgiving!		Thank you for your comment and information.
11/22/2017	Don Lees, PE	[redacted]	I am a new resident to the Cape Coral area and am very concerned about the water quality of the Caloosahatchee River. I have a home on a canal that connects directly to the river and have noticed the clarity of the water decline since late summer. I am trying to learn more about the issues/causes of this water quality deterioration. It appears to be a complicated issue with many sides pointing fingers about the causes. I think it can be boiled down to one simple question. Should we, as residents of the Ft Myers/Cape Coral area, be expected to accept this poor water quality? The answer is obviously, no. I am a retired professional civil/structural engineer and will continue to review the proposals as best I can, to become more informed about the possible solutions to the water quality problems. I understand one of the current issues is modelling of the EAA Reservoir. I am writing this email to ask the SFWMD to model the EAA Reservoir taking into account ALL state owned land in the EAA that may be used for land swaps. In addition, I request that the SFWMD increase the treatment capacity by including additional Stormwater Treatment Areas within the EAA Reservoir project. I am very concerned about the water quality of our south Florida estuaries and will continue to get involved and learn more about the issues so I can constructively contribute to the solutions so that we can all enjoy the clean, clear water I used to see decades ago when I vacationed to the Sanibel area. I am willing to volunteer my time to ensure success of the projects necessary to improve the water quality of our estuaries. I can be reached at 864 616-3189. My email is on this message, but to confirm, it is delees77@bellsouth.net. Let me know if there is anything I can do to help.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/22/2017	Debbie Dye	[redacted]	Re. The new reservoir...use all state-owned land in the EAA for considering land swaps and add storm water treatment areas. I live in Jensen one block from the river. Please do your job!!!!!		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
11/22/2017	Dave Occurrence	[redacted]	I am writing to express support for the conservation of our Everglades ecosystem. We are watching, once again, the drastic impact that storm water collection and subsequent runoff are having on both the Everglades and our two major estuary systems. It is my hope that the SFWMD will do whatever it takes to remedy these issues, as once this damage is done, it is not likely able to be repaired. We are nearing our last chance. Please include in your modeling for the EAA, all possible scenarios, including considering ALL state owned land that could be used for land swaps. It is also crucial that every consideration be given to increasing our water treatment capacity within the EAA. We can't just watch South Florida continue to die off. We see the errors that have been made along the way, and the intelligence is now here to remedy the problems. Please, for the sake of current and future generations...let's do whatever needs to be done to fix this problem.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.
11/22/2017	Rae Ann Wessel	[redacted]	Please find attached SCCFs comment letter on the EAA Reservoir scoping. We appreciate the work by the District to meet the expedited timelines and look forward to continuing to work together to assure the project achieves the best possible outcomes to enhance, restore, and improve conditions in the greater Everglades ecosystem and the northern estuaries.		Thank you for your comment and information.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/22/2017	Alex Gillen	[redacted]	I believe this position is woefully inadequate and ignores the legislative intent of the authors of Senate Bill 10. Essentially, by selecting this project area, SFWMD is saying that the EAA reservoir will offer no benefit to Bathtub beach, the location of toxic-algae waves last summer. It will also mean that a lot of the jobs in Martin, St. Lucie, and Palm Beach Counties that depend on clean water, fish spawning, and fish habitat in and around the St. Lucie won't be considered much as a benefit of the project either. The project area does not appear to include the Sailfish Flats, a clear victim of the discharges. Or our beaches that are well documented recipients of the discharges. This project area essentially says that Martin and St. Lucie counties do not stand to gain a lot with the EAA reservoir. Failing to include Martin, St. Lucie, and Palm Beach counties also will threaten the completion of the project, as the benefits of the project to the community you represent won't be considered much in the NEPA scoping process by the SFWMD. Considering the cost and benefit of this project is an important part of the process that effects the outcome. The benefits to the Caloosahatchee are also shortchanged by the purple line. Dr. Gary Goforth spoke a bit about this issue at the last scoping meeting. You can see Dr. Goforth's remarks from 57:40 - 1:04:10 here: http://sfwmd.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=1817&Format=None. A written version of his concerns are attached. Bullsugar Alliance will be urging the SFWMD to expand the project area to include the adversely affected areas. We hope you can join us in this effort. My apologies in advance for sending a hurried and urgent note. Despite becoming law in May, SB10's public participation did not begin until late October and the scoping process is concluding this week. Such a compressed time-frame leaves little time for reflection for concerned groups and the hardworking career staff of the SFWMD. Please do not hesitate to contact me if we can be of further assistance.		

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/22/2017	Ken Jaros	[redacted]	To date, I appreciate the expedited timeline and the work by the SFWMD for the EAA reservoir project. Following are my suggestions to achieve the objectives in Florida's Senate Bill 10, and CERP: In my opinion and that of other engineers, the proposed plan won't do much to stop the discharges in a wet year. The modeling presented is graphed for an average rainfall year when the project might send 3000,000 acre feet south. Designing this project for an average year is designing it to fail. Please plan and model for a modest wet year of at least 1.3 million acre feet. The proposed reservoir dimensions would need berms approaching 40 plus feet, and require massive pumps to move the water. The design has to be cost effective for federal approval and a reservoir deeper than 12 to 13 feet can't be built or run efficiently enough to qualify. A much larger footprint is needed for the project to be a success. The proposed plan doesn't include enough land to clean the water efficiently and needs much more acreage devoted to STA's. The current modeling undermines the reservoir's purpose and restricts the ability to maximize discharges acting as a bottleneck. Without sufficient treatment capacity, the reservoir will quickly fill up and will be unable to mitigate discharges. It is very important that this publicly funded project commit that water from the lake, not EAA stormwater runoff, be used to fill the EAA reservoir. Currently the capacities of the existing STA's have been devoted to EAA runoff. The EAA should be responsible for cleaning their own runoff on their property, not on our land. The SFWMD must run modeling for the EAA reservoir that takes into account ALL state owned land in the EAA that may be used for land swaps. The modeling must increase treatment capacity by including additional Stormwater Treatment Areas (STA's) within the EAA reservoir project The SFWMD has public land and the authority to use it, so there is no excuse not to model enough treatment. Respectfully submitted, Ken Jaros Cape Coral Florida		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

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11/22/2017	Michael Miller	[redacted]	I am writing on behalf of the Committee of the Islands (COTI), a Sanibel-based political committee that is comprised of over 800 citizens who are deeply concerned about the negative environmental implications of continuing discharges of Lake Okeechobee water into the Caloosahatchee Estuary. We were encouraged by the enactment of Senate Bill 10 and appreciate the District's efforts to comply with the requirements of a post-authorization change report pertaining to the proposed EAA Storage Reservoir. However, we are concerned, based upon material presented in the November 6th scoping update, that present modeling may not be incorporating sufficient land area for the water treatment necessary to permit water flow south in a heavy rain year. The object, of course, is to maximize the amount of treated water that can be sent south into the Everglades and Florida Bay. The hydrologists suggest that about 1,000 acres of water treatment land is required for each 20,000 ac-ft of water stored. We note that the provisions of Senate Bill 10, while prohibiting the use of eminent domain, do specifically allow for land swaps involving state-owned properties. We respectfully suggest that the scoping and modeling be revised to include all practically-available land for water treatment so that sufficient flows to the south of treated water can be achieved. Thanks you for your ongoing efforts.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
	Jay O'Laughlin	[redacted]	As a Martin County resident living close to the southern Indian River Lagoon, I strongly request that you follow the Water Resource Law of 2017, which outlines specific requirements for the storage and treatment of water in a new reservoir to be built in the Everglades Agricultural Area (EAA) south of Lake Okeechobee. To date the District does not seem to have done so. The law calls for at least 240,000 acre-feet of water (78 billion gallons) be stored and treated to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. With a 15-foot deep reservoir, similar to the C-44 Reservoir/STA project currently being constructed in Martin County, 16,000 acres would be needed for the EAA reservoir. For each acre of reservoir in the C-44 project, another 1.88 acres of stormwater treatment area (STA) are under construction. Following this formula, the EAA reservoir will need about 30,000 acres of STAs in order to meet the law's requirements. This total of 46,000 acres is far more than the District has presented to the public so far. I request that the District clearly explain why a reservoir-STA configuration that is significantly different than the C-44 project is being used for the EAA project. As the District engages in modeling efforts in the next few weeks, please include as an alternative a 15-foot reservoir and accompanying STA similar to the C-44 project design. The District may or may not have enough land to do this alternative. In either case the law requires the District to identify land that could potentially be used and/or acquired for the EAA Reservoir/STA to meet the law's requirements. During the scoping sessions in October and November, no information was presented about socioeconomic impacts of the EAA Reservoir/STA project. Perhaps the most important of these is job impacts. I prepared the attached document for The Guardians of Martin County (it is posted on their website, and also on the Rivers Coalition website). I used existing information, as documented in the attachment, to arrive at the conclusion that the EAA reservoir project is a job creator,		Thank you for your comment. The District has performed a literature review of socio-economic impacts and economic benefits associated with mitigating the ecological damage associated with the harmful discharges to the Northern Estuaries and included this information in the Feasibility Report. This information will be submitted to the Assistant Secratary of the Army as they consider the project for approval and subsequent Congressional Authorization.

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			not a job killer as some have claimed: ● Indirect and induced jobs, net effect— For every indirect and induced job lost from land conversion to a storage reservoir, 6.5 permanent indirect and induced jobs would be created during the construction phase when there were 207 temporary indirect and induced jobs for each farm job lost. For every indirect and induced job lost from land conversion to a water treatment area, 4.0 permanent indirect and induced jobs would be created during the construction phase when there were 32.5 temporary indirect and induced jobs for each farm job lost.* In the attached paper there is also information that could be used to estimate job impacts based on the acreage needed for the reservoir and STA: ● Job gains, farmland converted to storage reservoir—For farmland converted to a water storage reservoir, for every 1,000 acres converted there would be 593 direct jobs in construction, plus 829 indirect and induced jobs for a total job impact of 1,422 jobs. These are temporary jobs spread out over the construction phase; following completion of construction, 26 direct permanent jobs would be created to operate and maintain the reservoir (12 direct jobs, with total impact of 24 jobs), and service newly created recreation and tourism opportunities (14 direct jobs, with total impact of 28 jobs).* ● Job gains, farmland converted to water treatment area—For farmland converted to a water treatment area, for every 1,000 acres converted there would be 92 direct jobs in construction, plus 130 indirect and induced jobs for a total job impact of 222 jobs. These are temporary jobs spread out over the construction phase; following completion of		
			construction, 16 direct permanent jobs would be created to operate and maintain the reservoir (2 direct jobs, with total impact of 4 jobs) and service newly created recreation and tourism opportunities (14 direct jobs, with total impact of 28 jobs).* *From page 33 in the attachment. Again using the C-44 Reservoir/STA project in Martin County, the District communicated to the public the employment effects of the project. Indeed, the District's June 2017 video on the project stresses the positive effects of EAA Reservoir/STA construction. I request that he District to do the same thing for the different alternative designs for the EAA Reservoir/STA project		

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11/22/2017	David A. Urich/Responsible Growth Management Coalition, Inc	[redacted]	I was at the Clewiston EAA meeting on 11/15/2017, and gave some input at that time. Here are some attachments that elaborate on those comments. First - I am totally opposed to Deep Well Injection. I feel that some FIFTY such wells in ONE geographic area would be likely to create an aquifer weakness! Also - since they would only operate some four months of the year - the 3/4 of the year DRY wells might be a cause of aquifer collapse. Not to mention that ANY such injected water is DESTROYED! The STATE only cost of an estimated $330 MILLION is not cost effective, in my opinion! Second - The current projected plans would create a very deep reservoir - causing high dirt berms and seeming to be inadequate to meet the needs! From what I hear, the EAA Reservoir should provide some 13,000 acres of STAs to allow treatment of some 240,000 acre-feet of water. When more land is available that is state owned - and some may be made available by willing sellers - it seems mandatory to re-visit the proposed small allotment of land, NOW! Third - While I am all in favor of the work to improve the Hoover Dike - I do not feel THAT should allow higher storage in Lake "O"! That body of water should be treated as a LAKE, in my opinion. That would allow the marsh system to work to treat water with-in Lake "O" and allow return to its ecological functions.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.
			Fourth - I attach a Guest Opinion published by the Fort Myers News-Press on 11/4/2016, entitled "Pull the plug and get water flowing south". There is a REAL problem at the Tamiami Trail in that water is constrained and MORE of the historic flow is needed RIGHT NOW for the Everglades and Fla Bay! I am told that there is a "Las Palmas" EIGHT mile agricultural area on the WRONG side of the dike system protecting the Greater Miami area! This, in addition to the CSS Sparrow are causing the DOI (Department of the Interior) to have to hold back water that would help TODAY's needs! More water should flow via the C-111 Spreader to Taylor Slough for Fla Bay, NOW! And more water is needed down Shark River Slough, as well. We are building a new 2.6 mile Tamiami Trail bridge, when the CURRENT one is not at capacity! The whole WCAs (Water Conservation Areas) stay full - thus backing up the entire system, Please re-visit the current EAA Reservoir plans and increase the amount of land to be utilized!		
11/22/2017	Aaron J. Adams, Ph.D.	[redacted]	Attached please find comments from Bonefish & Tarpon Trust and documents referenced in the comment letter. Please let me know if you have any questions.		Thank you for your comment and information.

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11/22/2017	Deborah Jaros	[redacted]	I appreciate the hard work by the EAA Reservoir planning team of the SFWMD. I attended the public meeting held in Clewiston on Nov. 15, 2017, and am encouraged with the aggressive timeline with which the SFWMD is moving on this. I do, however, have some concerns based on what I heard and what I saw at that meeting. • I am concerned that the modeling being proposed is outdated and inaccurate to reflect the projected performance of the proposed reservoir models. Presented at a meeting was a graph "Number of times Salinity Envelope Criteria NOT Met for the Caloosahatchee Estuary (mean monthly flows 1965-2005)." The obvious question I have is why does this model not reflect the last decade? Have we not had record flows of releases down the Caloosahatchee within that last decade? My concern is that the project team is modeling for an average year of sending 300,000 acre-feet per year south. We need to see a model for the wettest of years, like 2013 and 2017. What would a model like 1.3 million acre feet look like? If the EAA reservoir cannot perform during our wettest times, it is destined to fail. • One of the models calls for a 24 ft. reservoir, which would be cost prohibitive. The plan does not include enough land to be able to efficiently clean the water (stormwater treatment areas). We need more land. A much larger footprint for the project is needed to achieve the objectives of SB 10 and CERP. I urge the SFWMD to aggressively seek willing sellers. What incentives can be offered to these willing sellers that is not being pursued now? What state owned land in the EAA can be used for land swaps which is not reflected in the present models? The models need to begin with, not what we can do with A1 and A2, but what amount of land is needed for the reservoir and the STA's to achieve the environmental benefits that CERP and SB10 seek to achieve. I greatly appreciate the opportunity to express these concerns. It is imperative that the best possible model is presented which will greatly reduce the lake discharges east and west while moving clean water south.		Thank you for your comments. Concerning your first bullet, the period of record that was used for modeling is consistent with what was used in the Central Everglades Planning Project (CEPP). As this project is a Post-Authorization Change Request from the CEPP we are maintaining the period of record analyzed in that effort consistent with Federal Policy. This period of record includes both extreme wet and dry periods. The modeling effort includes analysis and design for weather conditions over the full period of record and does not design the reservoir for annual average years/flows. The annual average, however, is a useful metric for comparing performances across multiple alternatives. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be
11/22/2017	Captain Daniel Andrev	[redacted]	Please see attached letter. Thank you for your consideration.		Thank you for your comment and information.
11/22/2017	Arlene Doran	[redacted]	Senate Bill 10 identified land within the EAA which could be used for land swaps. We need a model that takes those properties into consideration in order to construct a reservoir that will have sufficient capacity and not be cost prohibitive to construct and maintain. Thank you for consideration of these issues.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features.

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11/22/2017	Cara Capp	[redacted]	On behalf of the 62 member organizations of the Everglades Coalition, please find the attached comments on the scope of the EAA Reservoir Project. Many of the groups of the Everglades Coalition have been and will remain actively involved in the planning process; we are united in our commitment to see a fully restored and protected Greater Everglades. Restoration based on sound science must remain a high priority, with particular emphasis on minimizing high-flow damaging releases to the Caloosahatchee and St. Lucie estuaries and sending clean water south to Everglades National Park and Florida Bay. We recognize that planning of the EAA Reservoir is being fast-tracked in accordance with the ambitious timeframe set forth by the Florida Legislature in SB10, and appreciate the hard work being undertaken by staff to bring this project into reality. In the time since these scoping comments were prepared, the District held two additional meetings on 11/15/17 and 11/16/17 that revealed information about the project alternatives that many EVCO member organizations find concerning. Additional comments on these alternatives is forthcoming. Again, we acknowledge with appreciation the workload being undertaken by staff in this effort. We remain committed partners and look forward to working toward our shared goals for restoration of America's Everglades. Members of the leadership team of the Everglades Coalition are copied on this email and would be happy to answer questions or provide more information as needed.		Thank you for your comment and information.
11/22/2017	Reinaldo Diaz	[redacted]	Linked for the record is our scoping letter regarding the EAA Reservoir in PDF: https://drive.google.com/open?id=1MkWTPQ6APo_2UKuW3EbkJFfhBh6AyZft For some reason, I was having trouble emailing the file as an attachment, I received an error message claiming that it's more than 20mb (it's not). So if you can, please confirm that you received it. As usual, let me know if you have any issues or questions.	12/8/2017	Reinaldo, I checked our project inbox and found your email, dated 11/22/2017. I was able to connect to the link provided and will print out your scoping letter and include it with the administrative record. Thank you for your submission and interest in our project. Regards, Mike Albert
11/23/2017	Matthew Schwart	[redacted]	Please see attached comments from South Florida Wildlands Association		Thank you for your comment and information.
12/5/2017	Deb Drum	[redacted]	Jen— Not sure if you are checking emails, and this can wait until after the meeting. I am listening to Jeremy go over the conceptual options for design. Just wondering how restoration of flows to the Holeyland area is being contemplated in this project, or are you all just working around it? We have known for some time that they hydrology of Holeyland is in need of restoration. Seems like an opportunity? Thanks, Deb		Hi Yes am checking. I think we are always looking for opportunities for Holeyland and as we progress we will take downstream areas into account and the effects of these configurations in these areas. We haven't gotten there quite yet but will begin to over this week and next with modeling.

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12/14/2017	Barron Moody	[redacted]	Jeremy, I was disappointed in the answer I received yesterday when I asked for an explanation of a "manifold canal". Please help me understand what this is going to mean on the landscape. How will it be different from other canals I am familiar with, such as L-35B or the C-51? Will it have extensive open connection to the reservoir? Will it have a littoral shelf or armored banks (if so, how)? Barron Moody	12/14/2017	Barron, it's simply a canal that connects both the North New River and Miami Canals to the proposed reservoir. Re: your question of littoral shelves and armoring, our engineering consultant is still working through the details of what the canal will look like. I don't think there will be an open connection to the reservoir from the inflow canal – as there will be an inflow pump station in the canal. Jeremy
11/23/2017	Marvin Patterson	[redacted]	Please run modeling for EAA RESERVOIR that takes into account all state owned land in the EAA that may be used for land swaps. Also increase treatment capacity by including additional stormwater treatment within the EAA RESERVOIR project. Thanks, Marvin Patterson Cape Coral, Fl. 33990		Thank you for your comment. The District is evaluating any potential state owned lands that can be utilized for project features or land swaps. The project will include additional stormwater treatment areas as well.
11/23/2017	Cynthia Eaton	[redacted]	Cynthia Eaton Email: cyn2412@gmail.com 2412 SW Foxpoint Trail Palm City Florida 34990 11/23/2017 Mr. Michael Albert Project Manager South Water Management District cc: Governor Rick Scott Dear Mr. Albert, The Water Resource Law of 2017 outlines specific requirements for the storage and treatment of water in a new reservoir to be built south of Lake Okeechobee. According to some independent experts, you are considering altering the approved plan. As a Florida resident, I strongly request that you follow the bill as written. According to the Water Resource Law of 2017, at least 240,000 acre-feet of water (78 million gallons) must be stored and treated to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. Experts agree that the reservoir will need roughly 13,000 acres of stormwater treatment area to treat 240,000 acre-feet of water. This is far more than is shown in your current plan. There are also some		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

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11/23/2017	Wyler Gins	[redacted]	Please do what is needed to make the greatest impact on lowering discharges down our callosahatchee river and the st Lucie river on the east coast, as well as providing more clean freshwater to Florida bay. Have a wonderful thanksgiving and I pray we can help the future of Florida's estuaries, Everglades and largest freshwater drinking source in South Florida the biscane aquifer. Doing whatever is needed to make the largest positive impact at the lowest possible cost, no mater what special interest groups lobby for, is entirely in your hands. Again, have a great thanksgiving and please do the right thing. Warmest regards, Wyler Gins		Thank you for your comment and your support.
11/24/2017	Ron Sartin	[redacted]	Dear Mr. Albert, Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir's capacity to send water south. If SFWMD's estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay. If you can't update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible. Respectfully, A deeply concerned citizen		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

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Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/24/2017	Sue Cesare	[redacted]	I am concerned about the future of our estuaries, and the cleanliness of our water here in SWFL. PLEASE run modeling for the EAA Reservoir that takes into account ALL state-owned land in the EAA that may be used for land swaps. • PLEASE increase treatment capacity by including additional Stormwater Treatment Areas within the EAA Reservoir project. Thank you, Sue Cesare member: Caloosahatchee Marching and Chowder Society 239-940-3050		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual average flow of approximately 300,00 ac ft into the Greater Everglades. To meet water quality requirements necessary to send this water south the District will be using the DMSTA model as required by state law. Treatment wetlands necessary will include both new STA's and optimizing existing District infrastructure and treatment facilities.
11/25/2017	John Palmquist	[redacted]	Dear Governor Scott,<p>Your administration is taking credit for the EAA reservoir--the keystone project in the solution to Lake Okeechobee discharges into the Caloosahatchee and St. Lucie rivers, and to the decline of Florida Bay and the Everglades. But the South Florida Water Management District, whose governing board you appoint, is proposing a reservoir that they know can't be built and can't work. If you want credit for this project, you need to earn it by demanding a viable plan.<p>That means giving this project a big enough footprint to stay true to the intentions of SB10, by storing and treating enough water with enough efficiency to cut the discharges and send clean water south. Experts know that SFWMD's plan doesn't include enough land to do that.<p>Without enough land to clean the reservoir's outflow quickly, treatment becomes a bottleneck that limits the amount of water the system can take in an emergency. It doesn't work when Florida needs it most.<p>The estimation of acreage needed for stormwater treatment areas (STAs) to clean a given amount of water is common knowledge in the engineering community: for Lake Okeechobee's level of pollution, the ratio is approximately one acre for every 20 acre-feet of water (6.5 million gallons). SFWMD engineers applied these principles to the STAs now cleaning agricultural runoff in South Florida. Experts agree that the EAA reservoir will need roughly 13,000 acres of STAs to treat 240,000 acre-feet--far more than the current plan includes, and more than double the 6,000 acre figure cited last night by the district. <p>Maps show enough public land available to expand the EAA reservoir project's footprint without buying more from private landowners--some of whom have reportedly offered to sell. And the law you passed explicitly allows the state to end leases on public land for this project. So SFWMD has the available resources to produce a workable plan--there is no excuse		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

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			for proposing an impossible design.<p>But that is exactly what state employees are doing today. Not only does the plan fail to include enough land to clean water efficiently, it fails to include a buildable reservoir. One proposal calls for a 10,000-acre reservoir holding up to 240,000 acre-feet of water…which would make it 24-feet-deep. With 60-foot-tall berms. And pumps requiring a powerplant that practically doesn't exist today. The other proposal at 16-feet-deep isn't any more realistic. <p>This plan is science fiction, and SFWMD knows that.<p>By using your authority to demand that state agencies get this project right you, can build a legacy that includes protecting Florida's $20 billion fishing and boating industries and the 200,000 jobs that depend on them, along with their share of our $89 billion tourism industry and another 1.1 million jobs. Your actions will also defend Miami's water supply and contain a major public health threat from toxic algae. The district's plans jeopardize all of this.<p>You have a choice this week to speak out and take ownership of a historic initiative to fix Florida's broken plumbing. Or to remain silent and be branded as a phony opportunist until voters forget you. Please choose to be remembered. John Palmquist Cape Coral		
11/25/2017	Gary Lufriu	[redacted]	Dear Mr. Albert, I congratulate you on your appointment as the EEA Reservoir Project Manager for the South Florida Water Management District (SFWMD). I support your efforts to fully utilize every asset and talent available to you to help resolve our critical water quality issues in South Florida. Thank you!!! As a long time boater in Lee County, I have witnessed firsthand the devastation the releases from Lake Okeechobee to the Caloosahatchee River basin have developed. I boat in Charlotte Harbor and can tell you the impacts from a personal view. The SFWMD started the public planning process for the EAA Reservoir one month ago. After committing to upholding the timeline laid out in Senate Bill 10, the SFWMD released initial modeling for the reservoir project, but it appears that modeling did not include enough land for the project to construct a reservoir that would provide meaningful benefit to our estuaries. Senate Bill 10 identified land within the EAA which could be used for land swaps to create a large enough reservoir, coupled with Stormwater Treatment Areas (STAs), to provide a meaningful conveyance of water through the EAA and into the Everglades. It has been reported that the SFWMD did not account for this in the modeling, and instead modeled reservoirs on a smaller tract of land without enough treatment capacity to alleviate discharges. Without sufficient treatment capacity, the reservoir will quickly fill up and will be unable to mitigate discharges. Also in question is the feasibility of constructing the reservoir concepts. One of the concepts calls for a 24-foot-deep reservoir, which could be cost prohibitive to construct and operate. I respectfully request that the SFWMD re-run the modeling for the EAA Reservoir that takes into account ALL state-owned land in the EAA that may be used for land swaps and that the SFWMD increase treatment capacity by including additional Stormwater Treatment Areas within the EAA Reservoir project. Once again I thank you for your efforts and your consideration of this issue.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/27/2017	Tiffany Grantham	[redacted]	Dear Governor Scott,<p>Your administration is taking credit for the EAA reservoir--the keystone project in the solution to Lake Okeechobee discharges into the Caloosahatchee and St. Lucie rivers, and to the decline of Florida Bay and the Everglades. But the South Florida Water Management District, whose governing board you appoint, is proposing a reservoir that they know can't be built and can't work. If you want credit for this project, you need to earn it by demanding a viable plan.<p>That means giving this project a big enough footprint to stay true to the intentions of SB10, by storing and treating enough water with enough efficiency to cut the discharges and send clean water south. Experts know that SFWMD's plan doesn't include enough land to do that.<p>Without enough land to clean the reservoir's outflow quickly, treatment becomes a bottleneck that limits the amount of water the system can take in an emergency. It doesn't work when Florida needs it most.<p>The estimation of acreage needed for stormwater treatment areas (STAs) to clean a given amount of water is common knowledge in the engineering community: for Lake Okeechobee's level of pollution, the ratio is approximately one acre for every 20 acre-feet of water (6.5 million gallons). SFWMD engineers applied these principles to the STAs now cleaning agricultural runoff in South Florida. Experts agree that the EAA reservoir will need roughly 13,000 acres of STAs to treat 240,000 acre-feet--far more than the current plan includes, and more than double the 6,000 acre figure cited last night by the district. <p>Maps show enough public land available to expand the EAA reservoir project's footprint without buying more from private landowners--some of whom have reportedly offered to sell. And the law you passed explicitly allows the state to end leases on public land for this project. So SFWMD has the available resources to produce a workable plan--there is no excuse for proposing an impossible design.<p>		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.
			But that is exactly what state employees are doing today. Not only does the plan fail to include enough land to clean water efficiently, it fails to include a buildable reservoir. One proposal calls for a 10,000-acre reservoir holding up to 240,000 acre-feet of water…which would make it 24-feet-deep. With 60-foot-tall berms. And pumps requiring a powerplant that practically doesn't exist today. The other proposal at 16-feet-deep isn't any more realistic. <p>This plan is science fiction, and SFWMD knows that.<p>By using your authority to demand that state agencies get this project right you, can build a legacy that includes protecting Florida's $20 billion fishing and boating industries and the 200,000 jobs that depend on them, along with their share of our $89 billion tourism industry and another 1.1 million jobs. Your actions will also defend Miami's water supply and contain a major public health threat from toxic algae. The district's plans jeopardize all of this.<p>You have a choice this week to speak out and take ownership of a historic initiative to fix Florida's broken plumbing. Or to remain silent and be branded as a phony opportunist until voters forget you. Please choose to be remembered.		

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/27/2017	Robert Gibbons	[redacted]	Robert Gibbons Email: Rgibbons5343@comcast.net 5343 SE Miles Grant Road Stuart Florida 34997 11/27/2017 Mr. Michael Albert Project Manager South Water Management District cc: Governor Rick Scott Dear Mr. Albert, The Water Resource Law of 2017 outlines specific requirements for the storage and treatment of water in a new reservoir to be built south of Lake Okeechobee. According to some independent experts, you are considering altering the approved plan. As a Florida resident, I strongly request that you follow the bill as written. According to the Water Resource Law of 2017, at least 240,000 acre-feet of water (78 million gallons) must be stored and treated to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries. Experts agree that the reservoir will need roughly 13,000 acres of stormwater treatment area to treat 240,000 acre-feet of water. This is far more than is shown in your current plan. There are also some		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/28/2017	Jon Page	[redacted]	Dear Mr. Albert,<p>Please update the EEA Storage Reservoir Feasibility Study to show at the scheduled November 15-16 scoping meetings a workable footprint to store and treat at least 240,000 acre-feet of water to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries.<p>I understand that independent experts used assumptions from Restoration Strategies modeling to estimate that 13,000 acres of STAs are needed to clean 240,000 acre-feet of water fast enough to prevent treatment from constraining the reservoir%E2%80%99s capacity to send water south. If SFWMD%E2%80%99s estimate is different, please explain why in your next update, and please also present your plan to locate the acreage needed to make the project work optimally for riverside and lakeside communities and for the Everglades and Florida Bay.<p>If you can%E2%80%99t update the study in time for the upcoming meetings, please respond to tell me why, and revise the study as soon as possible.<P> Respectfully,<p>A deeply concerned citizen		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
11/30/2017	Gloria Sroczynski	[redacted]	Dear Governor Scott,<p>Your administration is taking credit for the EAA reservoir--the keystone project in the solution to Lake Okeechobee discharges into the Caloosahatchee and St. Lucie rivers, and to the decline of Florida Bay and the Everglades. But the South Florida Water Management District, whose governing board you appoint, is proposing a reservoir that they know can't be built and can't work. If you want credit for this project, you need to earn it by demanding a viable plan.<p>That means giving this project a big enough footprint to stay true to the intentions of SB10, by storing and treating enough water with enough efficiency to cut the discharges and send clean water south. Experts know that SFWMD's plan doesn't include enough land to do that.<p>Without enough land to clean the reservoir's outflow quickly, treatment becomes a bottleneck that limits the amount of water the system can take in an emergency. It doesn't work when Florida needs it most.<p>The estimation of acreage needed for stormwater treatment areas (STAs) to clean a given amount of water is common knowledge in the engineering community: for Lake Okeechobee's level of pollution, the ratio is approximately one acre for every 20 acre-feet of water (6.5 million gallons). SFWMD engineers applied these principles to the STAs now cleaning agricultural runoff in South Florida. Experts agree that the EAA reservoir will need roughly 13,000 acres of STAs to treat 240,000 acre-feet--far more than the current plan includes, and more than double the 6,000 acre figure cited last night by the district. <p>Maps show enough public land available to expand the EAA reservoir project's footprint without buying more from private landowners--some of whom have reportedly offered to sell. And the law you passed explicitly allows the state to end leases on public land for this project. So SFWMD has the available resources to produce a workable plan--there is no excuse for proposing an impossible design.<p		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.
			>But that is exactly what state employees are doing today. Not only does the plan fail to include enough land to clean water efficiently, it fails to include a buildable reservoir. One proposal calls for a 10,000-acre reservoir holding up to 240,000 acre-feet of water…which would make it 24-feet-deep. With 60-foot-tall berms. And pumps requiring a powerplant that practically doesn't exist today. The other proposal at 16-feet-deep isn't any more realistic. <p>This plan is science fiction, and SFWMD knows that.<p>By using your authority to demand that state agencies get this project right you, can build a legacy that includes protecting Florida's $20+ billion fishing and boating industries and the 200,000+ jobs that depend on them, along with their share of our $89 billion tourism industry and another 1.1 million jobs. Your actions will also defend Miami's water supply and contain a major public health threat from toxic algae. The district's plans jeopardize all of this.<p>You have a choice this week to speak out and take ownership of a historic initiative to fix Florida's broken plumbing. Or to remain silent and be branded as a phony opportunist until voters forget you. Please choose to be remembered.		
12/1/2017	Alan Farago	[redacted]	Please confirm receipt by District of our November 22 submission from Friends of the Everglades. Thank you, Alan Farago	12/4/2017	Alan – The District is in receipt of the comments submitted on Nov 22 by Friends of the Everglades. Thank you. Georgia Vince

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
12/6/2017	Michel Mercer	[redacted]	michel mercer Email: michellemercier3703@comcast.net 3864 SE Old ST Lucie Stuart Florida 34996 12/06/2017 Mr. Michael Albert Project Manager South Water Management District cc: Governor Rick Scott Dear Mr. Albert, The Water Resource Law of 2017 outlines specific requirements for the storage and treatment of water in a new reservoir to be built south of Lake Okeechobee. According to some independent experts, you are considering altering the approved plan. As a Florida resident, I strongly request that you follow the bill as written. According to the Water Resource Law of 2017, at least 240,000 acre-feet of water (78 million gallons) must be stored and treated to achieve the maximum possible reduction of Lake Okeechobee discharges to the Caloosahatchee and St. Lucie estuaries.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.
			Experts agree that the reservoir will need roughly 13,000 acres of stormwater treatment area to treat 240,000 acre-feet of water. This is far more than is shown in your current plan. There are also some serious questions being raised about your alternatives in terms of depth in one case and power plant output in another. This attempt to change the rules after passage of a bill or amendment is reminiscent of the Amendment 1 experience in 2014. Despite approval by more than 75% of voters, the purchase of large parcels of new land to protect Florida's precious water resources never took place. Instead, the money was redirected to other projects by the state government. You have been tasked with implementing a plan approved by the Florida Legislature. It is your duty to do what the Water Resource Law of 2017 requires. Only by following the plan can we significantly reduce the toxic algae bloom invasion of our waterways. Please do your job and save thousands of citizens from potentially severe health problems. Sincerely, michel mercer		

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
12/8/2017	Fred Macnamara	[redacted]	Dear Governor Scott, Your administration is taking credit for the EAA reservoir--the keystone project in the solution to Lake Okeechobee discharges into the Caloosahatchee and St. Lucie rivers, and to the decline of Florida Bay and the Everglades. But the South Florida Water Management District, whose governing board you appoint, is proposing a reservoir that they know can't be built and can't work. If you want credit for this project, you need to earn it by demanding a viable plan. That means giving this project a big enough footprint to stay true to the intentions of SB10, by storing and treating enough water with enough efficiency to cut the discharges and send clean water south. Experts know that SFWMD's plan doesn't include enough land to do that. Without enough land to clean the reservoir's outflow quickly, treatment becomes a bottleneck that limits the amount of water the system can take in an emergency. It doesn't work when Florida needs it most. The estimation of acreage needed for stormwater treatment areas (STAs) to clean a given amount of water is common knowledge in the engineering community: for Lake Okeechobee's level of pollution, the ratio is approximately one acre for every 20 acre-feet of water (6.5 million gallons). SFWMD engineers applied these principles to the STAs now cleaning agricultural runoff in South Florida. Experts agree that the EAA reservoir will need roughly 13,000 acres of STAs to treat 240,000 acre-feet--far more than the current plan includes, and more than double the 6,000 acre figure cited last night by the district. Maps show enough public land available to expand the EAA reservoir project's footprint without buying more from private landowners--some of whom have reportedly offered to sell. And the law you passed explicitly allows the state to end leases on public land for this project. So SFWMD has the available resources to produce a workable plan--there is no excuse for proposing an impossible design. But that is exactly what state employees are doing today. Not only does the plan fail to include enough land to clean water efficiently, it fails to include a buildable reservoir. One proposal calls for a 10,000-acre reservoir holding up to 240,000 acre-feet of water…which would make it 24-feet-deep. With 60-foot-tall berms. And pumps requiring a powerplant that practically doesn't exist today. The other proposal at 16-feet-deep isn't any more realistic.		Thank you for your comment. The District is honoring the intent of State law and has reached out to landowners in the EAA to find willing sellers. The District is also evaluating any potential state owned lands (in addition to those already identified for inclusion in the project) that may be utilized for land swaps or project features. The District's EAA Storage Reservoir is being designed to provide an annual avergage flow of approximately 300,00 ac ft into the Greater Everglades as identified in CERP. To meet state water quality requirements to send water south into the Everglades Protection Area. The District will be using the DMSTA model as required by state law to identify the amount of additional STA acreage necessary and optimizing existing District infrastructure and treatment facilities. The District is currently considering options for both a 240,000 ac ft reservoir on the A-2 and A-2 expansion lands which would be approximately 23 ft deep and a 360,000 ac ft reservoir on the A-1, A-2 and A-2 Expansion lands approximately 18 ft deep. Berm heights would be finalized during detailed design but are conceptually 32 - 37 feet above existing grade. These depths and heights are consistant with the District's C-43 Reservoir which is currently under construction.

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
12/14/2017	Rae Ann Wessel	[redacted]	Appreciate all the time you all have put into the EAA reservoir project and public meetings. I will not be able to attend or watch the 12/21 meeting so thought I'd share the following thoughts Model optimum sizing • One of the objectives of the alternatives evaluation process is to model sizing options. What we have seen so far provides 2 optional sizes but no context to how much is needed to provide optimal storage. • Constraints south suggest increased storage and treatment capacity would be beneficial to provide surge potential as well for extreme years. • Given that flow throughput is limited by constraints south of the lake it makes sense that we look at what optimum capacity for storage would be so that it can be compared to the modeled capacity you have done for the 240K and 360K footprints. • This will allow you to answer the question just what % performance can be provided just on the 2 footprints. • It will also provide more information about cost of design for things such as shallower reservoir, sure to be cheaper than deeper; larger STAs, better chance to meet water quality QBEL Not enough info on the differences to appreciate benefits • The information presented to date is not detailed enough for me to assess the benefits and drawbacks of the alternatives presented, especially between R360 and C360. and relative to a larger /optimal footprint. • What assumptions were used to show benefits of timing and how is that timing meeting the needs of natural systems vs. water supply interests? • Really concerned about water quality in a deeper reservoir. Just because an engineer can build it does not mean it serves the various interests best. Ex the CSF flood control project!		

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
			• In the C43 reservoir test cells they grew algae and although we needed the water in 2007 the quality was worse than what was in the river. Deeper stagnant water is not functionally beneficial especially without a water quality treatment component. • The suggestions made at a previous meeting about sediment flux and aeration are important considerations for reservoir water quality. Habitat units tapegrass vs. seagrass • Renewing my objection to the use of 450 cfs as a low flow/mfl performance target for the Caloosahatchee. See graph below and MFL Letter we submitted with the City of Sanibel, attached. • • Habitat unit benefit calculation needs to distinguish between tape grass and seagrass. Although salinities have been optimal for tapegrass since June the high CDOM and associated extremely low light penetration have decimated tapegrass growth. Thank you for considering these comments which are offered to be constructive so that all our efforts yield the best projects for achieving project outcomes. Wishing you all a safe and relaxing holiday. Rae Ann Wessel Natural Resource Policy Director Sanibel Captiva Conservation Foundation Tel: 239.731.7559 Email: Rawessel@sccf.org		

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
12/15/2017	Cara Capp	[redacted]	Dear Chair O'Keefe and Secretary Valenstein: On behalf of Captains for Clean Water, Conservancy of Southwest Florida, Everglades Law Center, Florida Oceanographic Society, National Parks Conservation Association, and Sanibel Captiva Conservation Foundation, we have submitted the attached letter on the EAA reservoir to the office of Governor Rick Scott. Our organizations want to express our deep appreciation for the effort by staff at the South Florida Water Management District in recent weeks to develop the array of reservoir alternatives currently on the table. We know that the modelers, engineers, policy personnel, and many others on the District team are putting in tremendous hours and effort to bring this project to reality. Each of us has spent time both in public meetings and in one-on-one conversations with District staff going over the details of the modeling alternatives. We are deeply concerned that the limited array of alternatives identified thus far may not result in a reservoir plan that is cost-feasible and likely to be approved by the Florida Legislature and Congress. Because of the failure to consider reasonable alternatives that rely on additional acreage, the resulting analysis fails to demonstrate whether additional acreage would result in the optimal configuration of the EAA reservoir most likely to meet federal cost-benefit analyses and the funding identified in Senate Bill 10. Our organizations remain committed to the success of this project. We look forward to working with District staff to ensure that a complete array of alternatives is considered, resulting in a final reservoir that meets the project goals for water storage, water quality, and cost feasibility. Any of the copied representatives from our organizations would be happy to provide additional information as needed. Thank you for your consideration.		
12/20/2017	Alex Gillen	[redacted]	Hi Mr. Morrison, In the last EAA reservoir meeting on 12/13/2017, at the 18 minute mark of the video, you mention F.S. 317.1501 with respect to the compliance report mandated by FL law that requires a sign-off of the DEP secretary. I could not find a F.S. 317.1501. Can you, or someone, send me the statutory language you were referencing with a citation to the statute? Many thanks! Best, Alex	12/20/2017	Dear Alex, It is 373.1501 FS. Thank you, Eva Eva B. Vélez, P.E. Everglades Policy and Coordination Division South Florida Water Management District Office 561-682-6672

EAA SR Email Response Summary

Date Rec'd	Name	Email	Comment Summary	Date of Response	Response
12/22/2017	Alex Gillen	[redacted]	Hello, In yesterday's meeting, where amazingly some speakers had prepared remarks for the new format while others where surprised by the new format, I was promised a summary of state owned lands in the EAA would be put in summary form on the website. Can you please provide that on the website and let me know when it is completed? The agreement to do this came from Mr. Collins was reached at the 1:29:00 mark in the meeting on 12/21/2017. http://sfwmd.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=1834&Format=Agenda Many thanks. Alex Gillen	12/22/2017	Dear Alex, Thank you for reaching out. I was happy to see you at our meeting yesterday and appreciate your perspective. You can find the Publicly owned lands within the EAA on our project tracker interactive map - https://sfwmd.maps.arcgis.com/apps/MapSeries/index.html?appid=4d9807e424894aec9e9c1f74d323f17e. You can also view parcel information on our online map application – maps.sfwmd.gov – which allows you to download attribute tables. Please let me know if you need help working with these and I will be happy to walk you through them over the phone. Happy Holidays, Eva Eva B. Vélez, P.E. Everglades Policy and Coordination Division South Florida Water Management District Office 561-682-6672 Cell 772-631-0915 evelezto@sfwmd.gov

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Last Name	First Name	Organization(if any)	Email	Phone
Kennedy Quincy	Irene	Pauese Law Firm	[redacted]	N/A
Ross	Beth	Gunster Law Firm	[redacted]	N/A
Lindstrom	Josh	North Star	[redacted]	[redacted]
Wittman	Chris	Captains for Clean Water	[redacted]	[redacted]
Andrews	Daniel	Captains for Clean Water	[redacted]	[redacted]
Hammon	Audis	N/A	[redacted]	N/A
Hyslope	Hilary	Clewiston Chamber of Commerece	N/A	N/A
Lopez	Pepe	Citizen	[redacted]	[redacted]
Costello	Cris	Sierra Club	[redacted]	[redacted]
Davis	Januyen	Hendry County	[redacted]	[redacted]
Ritter	Gary	FFBF	[redacted]	[redacted]
Interlandi	Lisa	ELC	[redacted]	N/A
De Palma	Celeste	Audubon Florida	[redacted]	[redacted]
Igesias	Ramon	Roland Martin Marina	N/A	[redacted]
Martin	Mary Ann	Roland Martin Marina	N/A	[redacted]
Hawk	S.	N/A	N/A	N/A
Hunter	E.	Hendry County	N/A	N/A
Perry	Al	City of Clewiston	N/A	N/A
Jachman	Cecil	N/A	N/A	[redacted]
Umpierre	Diana	Sierra Club	[redacted]	[redacted]
Haight	Bill	Mac Vivor Causulty	N/A	N/A
Sanchez	Judy	U.S. Sugar	[redacted]	[redacted]
Masgrove	Martha	Fla Wildlife Federation	[redacted]	[redacted]
Pipes	Nyla	One Florida Foundation	[redacted]	[redacted]
Johns	Chris	Lewis, Longman, and Walker	[redacted]	N/A
Shaffer	John	SFWMD	[redacted]	[redacted]
Elsken	Katrina	Okeechobee News	[redacted]	[redacted]
Franklin	Mary	N/A	N/A	[redacted]
Treadway	Tyler	Treasure Coast Newspapers	[redacted]	[redacted]
Shurreffs	Dawn	Everglades Foundation	[redacted]	[redacted]
Brooks	Robert	Captains for Clean Water	[redacted]	[redacted]
Phillip	Phillip	City of Clewiston	N/A	[redacted]
McDavid	Faye	AECOM	[redacted]	[redacted]
Jennings	Gary	American Sport Fishing Assoc.	[redacted]	[redacted]
Gardner	Terry	N/A	N/A	[redacted]
Soto Gardner	Mali	Mayor of Clewston	[redacted]	[redacted]
Powell	Frank	FDEP	[redacted]	[redacted]
Larson	Aric	FDEP	[redacted]	[redacted]

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Last Name	First Name	Organization(if any)	Email	Phone
Betty	Asa	City of Clewiston	[redacted]	[redacted]
Byrd	Emma	Hendry Co. Comm.	[redacted]	[redacted]/A
Davis	Steve	Everglades Foundation	[redacted]	[redacted]
Jarog	Ken	Tarpon Club	[redacted]	[redacted]
Carrozzo	Marisa	Conservancy of SWFL	[redacted]	[redacted]
Perry	Mark	Florida Oceanographic	[redacted]	[redacted]
Perry	Nancy	N/A	N/A	N/A
Duffy	Ryan	U.S. Sugar	[redacted]	[redacted]
Varano	Jay	Everglades Trust	[redacted]	[redacted]
Culp	Debbie	N/A	[redacted]	N/A
Humphries	Clayton	One Florida Foundation	[redacted]	[redacted]
Ganthier	Stanley	FDEP	[redacted]	[redacted]
Susch	Stephanie	N/A	N/A	N/A
Collier	James	Tarpon Club - Reel Anglers	[redacted]	[redacted]
Dougan	Michael & Sharo	Self	[redacted]	[redacted]
Wesspr	Rae Ann	Self	[redacted]	N/A
Du Plooy	Julia	Lake O Alliance	[redacted]	N/A
Elliott	Rebeca	FDACS	[redacted]	[redacted]
Wade	Malcom	U.S. Sugar	[redacted]	[redacted]
Hare	Sandra	Hau Ready Mix	[redacted]	[redacted]
Mitchell	Kimberly	Everglades Trust	[redacted]	[redacted]
Morales	Mariella	Self	[redacted]	[redacted]

10-23-17 Comment Cards

Last Name	First Name	Organization(if any)	Email	Phone	Comment
Soto Gardner	Mali	Mayor The City of Clewiston	[redacted]	[redacted]	Welcome to Clewiston!
Martin	Mary Ann	Roland Martin Marina	N/A	N/A	Talk about ASR & Deep Well Injections
Iglesias	Ramon	Roland Martin Marina	N/A	N/A	Don't lose focus on northern storage

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Gary Ritter	FFBF	25:5	On the last slide, as a point of clarification for me, when you say 240,000 AF of storage plus 360,000 AF of storage? Does that mean there will be a total of 600,000 AF of total storage?	No, let me clarify, there are two storage amounts that are identified by state law, the first the 240k AF of storage necessary treatment and conveyance, the law dictates that area on compartment A2, that's a minimum then it talks about another 360,000 of storage on compartment A1 A2 and any additional treatment features. As we move forward, we will review alternatives the meet the intent of the law that will range from 240,000 to 360,000 of storage plus the necessary treatment features. Hopefully that helps.
			Mike Albert's Presentation on NEPA and Planning Process	
Unknown		39:07	Thank you so much for doing this, it has been 10 year in the making, so after approval on who is constructing the project, USACE or SFWMD? Do you hire a construction company?	I understand it has been 10 long years - interrupted by public
Unknown		40:05	Can we talk about the speed in which this is moving?	Currently the USACE is building the C-44 reservoir on the east side and the WMD is building the C-43 reservoir on the west side on a 50/50 cost-share basis with the Corps. Plus the many water quality treatment features south of the lake currently under construction. There has been quite a bit of progress to date. If you look at all the projects listed there are construction activities happening on all of the projects.
Unknown		41	Will there be anything done for the Caloosahatchee River? We live in Ft. Meyers and we are getting the black water and it's ruining our beaches. Our property values and our health there are problems with that as well.	I understand that 100%. I live on the St. Lucie river as well so I know what it is like. CERP did not contemplate a water quality treatment component for the Caloosahatchee river under the CERP project. It wasn't contemplated at the time. We do understand your concern, the SFWMD is currently working on properties that we already own and working with the local landowners in the 298 District addressing not only water coming from the lake but also the basin's local water quality issues. It is a challenging issue with this program and the local issues to be address. To answer your question to who is doing what, the USACE is working on the East side and the SFWMD is building the C43 reservoir, making this a 50/50 cost share. As the projects move forward we split up the 50/50 partnership.
Unknown		43:3	Property values in Fort Myers and Gulf Coast are being impacted by the discharges.	

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Unknown		43:52	The problem is the water entering the lake, if we don't get northern storage. Problem with the lake is water coming in from the Kissimmee, so it is necessary to start with storage north of the lake, otherwise problems will not be solved. We have to discharge the waters east to west. We are focusing on CERP but we have to focus on the water north of the lake. Thank you.	I appreciate that because like I have said there is no one project that is a silver bullet. There has to be multiple actions and projects to fully address our watershed problems, including storage north of the lake. The are all very important and not one of them alone will fix the challenges we have today. You can check out our website for all the meetings and updates. We do have planning meetings regularly going on with the USACE on storage issues north of the lake. I appreciate you bringing that forward, north of the lake is just as important.
Mark Perry	Florida Oceanographic	45:32	Back in 2002 the District did modeling studies for all the CERP projects and indicated that 47% of lake releases would be taken care of north of the lake and 34% by the EAA storage reservoir. In 2006 we started the reservoir project with phase 1 and in 2012 you reported the A1 and A2 together would be the EAA project. The original yellow book identified 60,000 acres of storage 6 feet deep for 360k acre feed of storage, then other changes were contemplated. Now we have A2 that we are going to work with, that would be 4ft deep for the CEPP, now you are going to change that to a deeper reservoir and you're going to buy additional lands. Hopefully are we going to get a deeper reservoir. 1. Do we still have to use part of A1 to store and treat water to meet 34% reduction in Lake Okeechobee regulatory releases because right now A1 is not taking any lake regulatory releases, in fact we have sent a million acre feet of water. Do we have enough to land to store in A2? 2. Will project also take into account the conveyance from Lake Okeechobee to the reservoir?	Thats a great question and I dont have the answer to that and that is why we are having these meetings. The law says 240 and That is what our feasibility study and modeling will be evaluating; to come up with the most cost effective solution. Yes, I think we need to, it was contemplated in CERP and we need to be sure we will be able to convey the water associated with this project. We will be looking at the benefits of this particular facility with all the previously authorized projects all the way through CEEP, all the things shown on the slides. We will see where we get, the study will identify the most cost effective solution for storage in this general area, that is part of this analysis.
Cris Costello	Sierra Club	49:4	I want to confirm that we are already at public comment there is not going to be any more on the project planning on the agenda?	This is the formal public comment part. There are also public comment cards if you are uncomfortable speaking
			I have simple questions, first is, I am going to read them. Has the District run the model?	No we have not run the model, we are in the process of updating the model with all the current planning. What you will see early on in the public meetings, we are going to establish the existing conditions base, then establish the assumptions and that modeling and a future without this project condition. We are just now gearing up. We need to define the scope, work with the general public for alternatives and then we will light off the model runs and report that information back. The tools the SFWMD uses are the best in the nation. We will be looking at all the different combinations of the storage treatment facilities that are yet to come over the next meetings.

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Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
			Will the results be put on the website	Absolutely, we will have more meetings like tonight and will continually update the website including the material from each meeting.
			If the model results show that there is insufficient land, what's the districts plan to acquire additional land?	We would look at a 360,000 reservoir not just the 240,000 so we will be evaluating both. We are making it aware that if there are willing sellers that would like to sell land for this project in an area that works for this project, we would like to sit with them. There are some lands to the west of A2 in private ownership, those folks have come forward with a willingness to sell. If there are others out there that have property that would make sense for this project we would like to hear from them. We would also like to hear from any that would be interested in swapping. The law states we do not have imminent domain and we need to deal with willing sellers.
			Until you know what the footprint has to be for water quality standards you really can't plan. We would like to see what land parcels are currently owned by the district and could potential be used for SB 10 and we would like to know how the land is currently being used.	Thank you, we will make sure that information is available in a future meeting.
Clayton Humphries	One Florida Foundation	55:39	I would like to put a feather in your hat and compliment you, which I don't think I have ever done. I want everyone in the room to realize no one has ever done this project before and they didn't create this problem. The state of Florida created this problem ourselves, they are just trying to figure out the best way the public wants it done. If you are a business that has ideas how it could be done better, I would approach them. We are facing this together, if you have a better idea, Im sure they would love to hear it.	Thank You

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Mary Ann Martin	Roland Martin Marina and WRAC	56:51	A lot of my colleagues are here today and we have different views but the same problem. We have had record rain falls this year, and it came into Lake Okeechobee. It is over 17ft now and that is critical for us and the residents, businesses, and the wildlife and its ecology. The lake is now the color of a yahoo soda pop, which means the sun cannot get to the grass and the filtration system is shot to hell. 1. If 90% of the water comes from the north, why are we not looking for storage north of the lake to address the incoming dirty water from the Kissimmee? What about deep water injection wells? Why are farmers looking at some of this also so when it's dry they have access to all the water they want. We have all these tools to use and we aren't using them. ASR wells are the salvation of the problem as well as deep injection wells. We can get rid of this water if we have wells, it goes down to the boulder dam and it goes out to the ocean. ASR wells will store water until it is needed it in the dry times. Population grew to 9 million people in south Florida and that's why everyone is concerned now about water and water quality. I speak for the business owners around this lake and all the things that are alive in this lake. This is the second largest lake in the United States and I don't want it to be a reservoir.	Thank You
Unknown		59:37	Can you point to me where the talisman land that was bought in 1998? How many acres was that?	Talisman exchange A1 and A2 are roughly 34,500 acres in total. In the mid-2000's we looking at a deep reservoir the A1 compartment. We were moving forward processing that rock to make aggregate, as a result, we stopped the construction of the deep reservoir and changed our restoration strategy to deal with water quality with a shallow facility. The 2 billion is a part of that, the A1 facility is operational today. Water moves into a flow equalization basin to meter off the water to the STA's to the south, to get a more constant flow. The CERP was the first increment of restoration and of storage south of the lake. Water management designed this facility where we could build off of it for deeper storage later. We can expand on the site which we have already built on and that is currently in operation. The A1 is about 16,500 acres and A2 is about 14,500 acres, together you have 31,000 acres. We own part of the area to the west. The rest is owned by private owners whom we are talking to about acquiring land. This is about 3,500 additional acres.

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John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Rae Ann Wessel	Sanibel Captiva Conservation Foundation	1:04:18	Is there any priority designated to protect the capacity of the storage, wherever that may be for lake inflows over the EAA inflows?	Thats a good question, The Central Everglades Planning Project evaluated on an annual basis the run off that occurs through the system. We will do the same thing with this planning effort. We will look at a period of record. When we go through the evaluations we will need to make sure we are not sending additional flows and causing adverse impacts to existing operations. The accounting will be done in the form of the models and it will all be in the project operating model. The short answer is yes. We have to manage the existing flood control and then will be looking at redirecting it when capacity exists to move it away from the estuaries. That's one of the reasons we are looking at the conveyance aspects. We want to move the water without causing or contributing to adverse flood control impacts.
Diana Impierre	Sierra Club	1:06:32	I love the GIC maps that the District have online. It will be great if there is any additional data that the District can include on these maps in their presentations to insure it is geographically correct.	
			We have climatic changes going on and I am curious as to how you are taking this into account to estimate changes. I would be curious to find out as you present modeling information.	Thank you.
Mark Perry	Florida Oceanographic Society	1:07:54	Conveyance is a key issue, you can have the storage facilities south of the lake. Are we going to talk about conveyance from Lake Okeechobee to the reservoir?	I think we need to, its contemplated in CERP. One of the components was improving the current capacity. If we are going to get water where it needs to go we are going to have to look at any constraints. If we are going to make this kind of investment, we are going to want to use it.
Kimberly Mitchel	Everglades Trust	1:08:57	I want to thank you. I know this is a lot coming at you very fast. We appreciate the seriousness, the speed and the commitment which you all are working under. You recognize it's tough, but you also recognize what is at stake.	Thank you, we have a great team.
Unknown		1:09:49	You say it is going to completed in 30 years but Fort Myers beach area is terrible. Tourist will not let their children in the water and in some cases want their money back. I know you are doing a good job, but I don't know if we have the time to save this areas.	I think it is important to recognize the law that was put in place that realized the seriousness of our problems and has allowed for this project to move forward very quickly with public input. The same thing is happening on the east coast. We understand the severity of the issue, again, going back to the expedited process, it behoves us to work together. Our legislatures have put the correct foot forward.

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John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Ken Jerris	Private Citizen	1:12:40	I have heard multiple times today about storage above the lake. I don't know how much we store above the lake, but it's still going to end up in Lake Okeechobee which means that were going to release that to the east coast and the west coast. The ideal situation is running as much as we can south. You can stock up water all you want, but if we have rains like we have had in the last few years those reservoirs "up there" are going to flood, then they're going to release it at Lake Okeechobee and we'll be right back where we started from. In 2015 scientist got together and got to figure how much land was necessary. Estimates of land require 15% of the EAA, neither eliminating farming, nor harming Glades communities. This amount is less than half of the acreage that US Sugar has offered to sell to the State of Florida. Would you consider them to be a willing seller?	I cannot speak for them, but as part of the record tonight, I would like to better understand where you are quoting from. If we could have that information. Thank you.
			In 2015 number of Scientist got together and conclude that the estimates of land required is 15% of the EAA will be necessary in order to run and store the water to the south. Are additional EAA farmers willing sellers?	I cannot speak for EAA farmers, but I would appreciate information from scientists and references from where you are quoting.
Hillary Hyslope	Clewiston Chamber	1:14:20	I want to commend that the district on trying to stick to science and not emotion. I think you are doing well sticking to the science.	
			Will your modeling have any sort of provisions for the wet seasons that we have. Considering the past couple of years with our rainy seasons, I don't know what this reservoir would have been able to do to be helpful for the discharges. Would it not simply be full and we would still have to release water?	Thats a really good question, we are updating our period of record that we use in our modeling to include the past couple of wet seasons, but it will not be available for this analysis. We use a 40-year period of record that dates back to 1965. There are other heavy rainfall events and droughts, so the period of record that we are using includes those fluctuations and extremes. It takes a lot of infrastructure to mitigate 100% of the discharges from the northern estuaries, we all know storage is important and every little bit helps.
Emma Byrd	Hendry Co. Comm.	1:16:51	Thank you. We understand there are problems and we don't have all the solutions. Why we don't start north of Lake Okeechobee because if my house and roof is damaged, I would start at the top first. We can't store the water before the water comes in, we're going to clean it before it comes south. Even if some of the water will need to be discharged east and west from the lake, but the water will be cleaner if we store it first. I would like to see us start north, that should be the priority for the lake. If we continue to get rain, will there be a place to store the water if we didn't start north.What will happen to the lake then?	I probably should have spent a little more time on the slide with all of the project progress we have made. I don't want it to go unannounced that we have already made good strides dealing with water quality and storage north of the lake. We are just wrapping up expenditures on restoring the Kissimmee river. As a result of that there is about 100,000 AF of storage in that flood plain that's associated with the property the state purchased for that project. There are things being done north of the lake and we are continuing to look north of the lake. We are trying to capture water when there is a lot of rain, set it aside for storage and then bring the water back when it is drier.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Clayton Humphries	One Florida Foundation	1:21:10	With all the talk about north storage tonight, would the district be open to having a discussion meeting held for just that purpose so the public can no longer be in the dark but generate ideas. You guys can converse with the public on what we can do better. I just seems there a lot of people here who are not informed that there are things going on north of the lake. I just think some of the people south dont have the opportunity to make it to those meetings	We just got done with several meetings with interested stakeholders north of the lake. What I can do is keep the website updated with all the information on those meetings. Everyone is invited to the meetings being held for north of the lake.
Unknown		1:23:05	Thank you for having us here. My message is urgency. What kind of planning have you given to the developments that are going in around Orlando? Even if we have a dry year, you may not have what would normally be perceived as a dry year because you are going to have run off.	That is a really good comment, we heard the same in the Lake Okeechobee meeting. We recognize the run off that the land uses.
Martha Musgrove	Florida Water Wildlife Federation	1:24:40	Did The District request the Corps to jointly develop this post authorization?	Yes, we sent an official letter to Corps on August 1st, requesting they participate.
			To get the money for CEEP we have to ask for it. SV10 came with a 200 million appropriation from the state legislature with a lot of things that you cannot do, along with bonding. Bonding is a factor that has got to be used. This is a big project and we need to spread the cost over the generations that will use it. The Governing Board should ask congress to match that $200M Appropriated from the state. If we are going to accomplish something and if we are going to keep the people who are living here, we have to get some money out of congress.	We will note that one down.
			Are there any separate meeting for government officials (like mayor's, state reps) on this project?	Yes I see people from EPA and FL Dept of agriculture and Consumer Services here at this meeting. But because other agencies are not here now doesn't mean that our process doesn't include them.
Diana Impierre	Sierra Club	1:26:46	Regarding the public comment process, I realize you are in a very tight time frame. Me living in Southern Broward I am concerned that none of the meetings will be held south. I recommend some public meetings in Broward and Miami Dade.	While we are talking about the public meetings, there has been a lot of talk about the Okeechobee watershed, you can go to the website and see all the meetings that have been done there. These meetings will also be put on the website.
Gary Ritter	FFBF	1:28:16	How much operational flexibility will you have to actually take advantage a little bit more of the area that you all purchase along the Kissimmee River and store more water there? Especially for water storage in atypical events like Irma.	We do look at every opportunity to maximize our ability to handle excessive rainfall events. We have a system in place for many decades and we used it to the maximum in trying to move water through the system. There are constraints. People live out there and grow produce out there. We looked at every opportunity in our toolbox including temporary pumps to help local drainage. We maximized the use of the facilities up north. We can expect to have rainfall events, that is why we are here tonight to learn how to better manage the system that has afforded us to live here.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Monday, October 23, 2017 | 5:30 pm - 8:00 pm
John Boy Auditorium - Clewiston

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Unknown		1:31:22	Do you have a separate meeting for people that are in our government(like mayors or state representatives)?	We have people here today from the Department Environmental Protection Agencies and the Florida Department of Agriculture Consumer Services. Part of the public outreach is to communicate. There are a lot of governmental and non-governmental agencies that participate in the SFWMD water resource advisory committee, which are the first Thursday of every month. If a particular group is not at these public outreach meetings, it doesn't mean they aren't part of the conversation.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Thursday, October 26, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Last Name	First Name	Organization(if any)	Email	Phone
Diaz	Reinaldo	Lake Worth Waterkeeper	[redacted]	[redacted]
C.	Jenny	Glades Lives Matter	N/A	N/A
Vince	Diane	N/A	[redacted]	N/A
Reynolds	Jennifer	USACE	[redacted]	[redacted]
M'hean-Bunce	Vivien	The Public	[redacted]	[redacted]
Smith	Edward	Florida Dept. of Env. Protection	[redacted]	[redacted]
Ridgely	H.M.	Evans Properties	[redacted]	N/A
Perry	Mark	Florida Oceanographic	[redacted]	[redacted]
De Palma	Celeste	Audubon Florida	[redacted]	[redacted]
Plaia	Ida	Audubon Florida	[redacted]	[redacted]
Cox	Ernie	Family Lands Remembered	[redacted]	[redacted]
Waugh	Leslye	SFWMD	[redacted]	[redacted]
Cox	Michael	Comak Group Inc.	[redacted]	[redacted]
Baker	Daniel	AECOM	[redacted]	[redacted]
Lorch	Justin	N/A	[redacted]	N/A
Harper	Cecelia	US EPA	[redacted]	[redacted]
Trost	Sharon	Anfield Group	[redacted]	[redacted]
Ross	Beth	Gunster	[redacted]	[redacted]
Weller	Chris	FDEP	[redacted]	[redacted]
Johnson	Robert	NPS	[redacted]	N/A
Carpenter	Andrea	Carollo Engineers	[redacted]	[redacted]
Shirrefs	Dawn	Everglades Foundation	[redacted]	[redacted]
Krimsky	Lisa	UF-IFAS	[redacted]	[redacted]
Erskine	James	FWC	[redacted]	N/A
Musgrove	Martha	Florida Wildlife Federation	[redacted]	[redacted]
Santos	Bubba	UWF	[redacted]	[redacted]
Bergalis	Anna	Homeowner	[redacted]	N/A
Capp	Cara	NPCA	[redacted]	[redacted]
Sophie	Joseph	PBC Comm. Melissa McKinlay	[redacted]	N/A
Munilla	Alejandro	MCM	[redacted]	N/A
Keith	Patrick	North Star Contracting Group	[redacted]	[redacted]
Moody	Barron	FWC	N/A	N/A
Taylor	Janet	Glades Lives Matter	[redacted]	[redacted]
Albert	Mike	SFWMD	N/A	561-283-9740
Conner	Mike	Rivers Coalition - Bullsugar - Indain Riverkeeper	[redacted]	[redacted]
Varbro	Jay	Everglades Trust	[redacted]	[redacted]
Saltzar	Maureen	N/A	[redacted]	[redacted]
Behlmer	Tom	FDEP	[redacted]	[redacted]

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Thursday, October 26, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Last Name	First Name	Organization(if any)	Email	Phone
Baker	Bill	FDACS	[redacted]	[redacted]
Esteng	Shannon	DOI	[redacted]	[redacted]
Bertoloth	Lesley	TNC	[redacted]	[redacted]
Ritter	Gary	FFBF	[redacted]	[redacted]
Ranieri	Stacy	The Firefly Group	[redacted]	[redacted]
Wills	Chris	Everglades Trust	[redacted]	[redacted]
Palmatier	Denise	Stanley Construction	[redacted]	[redacted]
Ritter	Jessie	National Wildlife Fed.	[redacted]	[redacted]
Umpierre	Diana	Sierra Club	[redacted]	N/A
Drabik	Jillian	University of Miami	[redacted]	N/A

10-26-17 Comment Cards

Last Name	First Name	Organization(if any)	Email	Phone	Comment
Bergalis	Anna	Homeowner Sewalls Point	[redacted]	N/A	Yuk H2O
Lorch	Justin	N/A	[redacted]		Other than wetland filtering how does this plan deal with water quality issues / how does the plan address supplying the Biscayne Aquifer
Musgrove	Martha	Florida Wildlife Federation	[redacted]	[redacted]	Support - w/ history + water flow target on + 200,000 of flowing south through system

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Thursday, October 26, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Name	Affiliation	Time	Public Comment Summary	Responses
Mike Conner	Rivers Coalition-Bullsugar-Indian Riverkeeper	43:55	Regarding conveyance from Lake Okeechobee to the reservoir, Martin County residents are concerned if the existing canals are sufficient or if more infrastructure will be needed?	We are going to evaluate the existing conveyance system and determine if there will be a need for improvements.
			If there is a need for more conveyance, would that require finding willing sellers of the land bordering those canals?	That is really a good question and the short answer is yes. The law says we have to work on a willing seller basis. We are getting ready to launch modeling and we want to make sure the public is involved and understands it. As we move forward, I am hoping you will continue to participate. When we start looking at the conveyance and carrying capacities we can determine if it is needed and if so, if it is do we have the existing right of way.
Anna Bergalis	Martin County Resident	46:3	Will EAA back pumping continue into Lake Okeechobee after project is completed?	We talked about other projects being constructed and planned that would come into play with this issue. We are planning storage north, south, east and west of the lake. As these and other components come on line, it
Reinaldo Diaz	Lake Worth Waterkeeper	48:52	Has there been significant project changes to the plan that better consider the excessive rainfall that we have been experiencing and help to avoid back pumping?	Irma brought excessive amounts of rainfall and we can expect more. If you look at our past 40-year POR, we have received many tropical events which have been consistent with the type we saw from Irma. We will analyze facilities in a manner that will be as robust as possible to afford us an opportunity to maximize the proposed investment. As we move forward with storage, treatment, decomp, and operational tweaks to identify a better way to operate the system, and as infrastructure comes on, it will help us better control these types of rainfall events. There will still be some storms that come through south Florida that will be localized and will be a challenge from a water management perspective. However, as this project and others are planned and implemented it will significantly improve our ability to manage the water we receive during these types of storms.
Newton Cook		51:2	How many days did back pumping occur from the storm (Hurricane Irma). Think it was about 9 to 12 days and only used to prevent flooding in local areas. Many people believe back pumping occurs all the time, but those of	I don't have that information off hand and I apologize for that, but I will check for the exact answer.
Denise Palmatier	Stanley Construction	52:27	Is all the time between the ASA submittal to congress on 10/01/2018 and congressional authorization on 12/31/2019 needed or could authorization occur sooner?	Yes, by Section 203, they are allowed 180 days for review, but it could go quicker. State law says congressional authorization on or before 12/31/19.
Martha Musgrove	Florida Wildlife Federation	54:09	Please confirm that as we proceed with the reservoir project, will we be able to achieve the Central Everglades Planning Project goal of increasing the flow water south by 200,000 AF?	Yes, Central Everglades Planning Project identifies an additional 210k AF on an annual average basis be redirected south. As we plan storage and treatment, we will look for every opportunity to send water south. CERP had a goal of 300k AF and our goal is to meet or exceed that.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Thursday, October 26, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Name	Affiliation	Time	Public Comment Summary	Responses
Cara Capp	National Parks Conservation Association	56:09	How will this plan move forward without slowing down CEPP?	We are in the process of the developing of a validation (LRR - limited reevaluation report) for the PPA south features in the CEPP. We are starting to develop an LRR with the Jacksonville district to ensure the features identified are correct. In addition, we will be seeking a biological opinion in order to wrap up authority to move forward and implement those south features. Our intentions are in accordance with the current schedule. So as we move forward with the storage in this project we will be checking and coordinating closely with progress on that. Ava - also, we are also moving forward with the of the upgrades on S-333 structure and the relocation of power lines on the Tamiami trail.
Vivien M'hean-Bunce	Resident	1:13:53	This meeting has been most informative and greatly appreciated. In regards to the upcoming planned meetings, will there be any evening opportunities?	We have committed to having an evening meeting in Clewiston and we will take a hard look at possibly having an evening meeting here. As reminder, we are webcasting. Additionally, videos and comments can be sent in. We will arrange to have at least one evening meeting in the near future in West Palm Beach.
Chris Willis	Miami Resident	1:15:54	What time is the October 31 meeting scheduled? (9:00 A.M.)	9:00 A.M in West Palm Beach. Hope you can make it.
Newton Cook		1:16:20	Back pumping is only used for short term flood control operations. The 300,000 AF stated in your presentation is for what period (per year?)	Thank you for your comment on back pumping. Yes, it is 300k on an average annual basis, but realize there will be years when much more water will be sent south and years when less water will be available to send south.
			If SB 10 was already built, would it have prevented discharges to the estuaries from Lake Okeechobee that are happening today?	No, not from this project alone. As mentioned there are 68 projects identified in CERP and no one project is the solution. However, this project will reduce the volume and frequency of undesirable discharges which will help create more resilient estuaries.
Mark Perry	Florida Oceanographic Society	1:20:52	I appreciate the clarity that is being provided that these meetings. The scoping of the EAA project is part of the CEP. It was in the original plan as 60,000 acres to store 360,000 AF. Everyone needs to understand the A2	Thank you.
			The static storage capacity of 360,000 AF is over multiple times a year, it can be filled and drained through the STAs down to Everglades from Lake Okeechobee. The A1 FEB has been used multiple times. Static storage in A1 is 60,000 AF and we moved 538,000 AF in a year, so that is a dynamic storage.	Thank you for your comments.
			A good point was raised about conveyance and how to get water out of the lake down to the facilities. We will be interested in participating in project feature meetings moving forward and I encourage everyone to.	Great. We look forward to your participation on the 31st.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Thursday, October 26, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Name	Affiliation	Time	Public Comment Summary	Responses
Celesta De Palma	Audubon Florida	1:23:05	I appreciate the work that was put into this presentation. When looking at the project try to not only model wet years, but also dry years to help us get a complete picture.	Yes, the models will include evaluations of alternatives during wet and dry periods for the 40 year period of record.
			Is November meeting just going to be a WRAC meeting or a public meeting?	It is not the WRAC meeting. The early November (11/06 to be confirmed) meeting is going to be a public meeting, after we do our configuration so we can report updates on state law which will define the direction of the project.
Mike Conner	Rivers Coalition-Bullsugar-Indian Riverkeeper	1:26:32	Ernie Marks did a great job presenting to the senate subcommittee, his clarity and use of the word dynamic was good.	
			Can we assume that MOD Waters Project will be complete before this project is completed?	When we evaluate this project it is compared to a "future without" condition and we will take all projects like MOD waters into account and evaluate how this deep storage performs with all those other things. They will all be considered as base conditions when we do our modeling.
			The National Park Service seems to refuse water. Is it volume? Is it the quality component?	We are not able to speak on their behalf.
Shannon Esteng	DOI	1:29:08	The mod waters will be done, we're in the middle of operational testing now. The infrastructure is 99% complete and expect to be complete by the spring. We're operational testing now. The 2.6 mile bridge is scheduled for completion by December of 2018. That was for precondition for CEP. Mod waters and the 2.6 mile bridge are by themselves, not all of the infrastructure changes that need to happen to accept new water. That is what is CEP is for. There are other project components that are part of the bigger picture of readying the Central and Southern Everglades even more water.	
			The DOI and the Park refusing to accept water is a myth. It is associated with the problems of delivering water to the park using the existing infrastructure. The existing infrastructure is delivering water in the way that is harmful the Park and the bay. The existing infrastructure is the problem, and restoration is the answer. The Park has never rejected for a water quality reason.	Thank you. On November 6th we'll be talking about base conditions like this.
Anna Bergalis	Martin County Resident	1:33:52	Discharges take place for a couple months at a time. If you're going to have a website. I want to know what the discharges are, where they're coming	Thank you very much and I hope you continue to participate in these meetings.
			Does anyone really know what is in the foam associated with the Lake discharges to the St Lucie?	I understand your concerns and that is why I am so dedicated to what we are doing to find solutions.
			Also my property floods from the Lake discharges.	

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Name	Affiliation	Time	Public Comment Summary	Responses
Dawn Shirrefs	Everglades Foundation	1:37:55	1. We're just really excited to see this is project moving forward. The Everglades Foundation will gladly provide any assistance and resources.	Thank you very much.
Diana Umpierre	Sierra Club	1:38:38	Is there any opportunity for future meetings in the Miami Dade County area?	The need to garner public input is understood. The aggressive schedule limits physical travel. We will be utilizing webinars and we are videotaping all our meetings.
			How much time is there for public review and for 3rd party people to review the modeling before the modeling results start showing to decision makers (like the Governing Board)?	The schedule is in law and we have to follow it. Therefore, things will happen quickly. We are going to develop alternative plans, evaluate those plans and then select a recommended plan that will be documented and be ready to send the report to ASA on March 30. We will utilize all means for 3rd party input including our website to convey all our modeling analysis.
Diana Umpierre	Sierra Club	1:44:12	When will the Governing Board be updated?	Every month up until the report is ready to deliver on March 30.
Cara Capp	National Parks Conservation Association	1:44:51	We understand the ambitious schedule and are happy to be a part of it. If the Governing Board agenda included time certain items, this would be an opportunity to expand public input and help those who need to travel.	
			We really appreciate the joint project objectives and getting the water south. Everglades National Park is here to be part of the team and thank	Thank you.
Lt Col. Jennifer Reynolds	USACE	1:46:24	Expressed COE support to the District and reminded everyone that COE will provide support for this project and other CERP projects, studies and planning efforts will leverage COE staff to maximize public support.	Thank you.
Mark Perry	Florida Oceanographic Society	1:48:15	Expressed appreciation for the USACE and the department of interior. Previous regional modeling was done in 2002. There was a lot of things previously identified in CERP and other projects that are still applicable overall.	Thank you.
Diana Umpierre	Sierra Club	1:44:12	When will the Governing Board be updated?	Every month up until the report is ready to deliver on March 30.
Cara Capp	National Parks Conservation Association	1:44:51	We understand the ambitious schedule and are happy to be a part of it. If the Governing Board agenda included time certain items, this would be an opportunity to expand public input and help those who need to travel.	

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Name	Affiliation	Time	Public Comment Summary	Responses
			How will this plan move forward without slowing down CEPP?	We are in the process of the developing of a validation (LRR - limited reevaluation report) for the PPA south features in the CEPP. We are starting to develop an LRR with the Jacksonville district to ensure the features identified are correct. In addition, we will be seeking a biological opinion in order to wrap up authority to move forward and implement those south features. Our intentions are in accordance with the current schedule. So as we move forward with the storage in this project we will be checking and coordinating closely with progress on that. Ava - also, we are also moving forward with the of the upgrades on S-333 structure and the relocation of power lines on the Tamiami trail.
			We really appreciate the joint project objectives and getting the water south. Everglades National Park is here to be part of the team and thank you for the work.	Thank you.

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Last Name	First Name	Organization(if any)	Email	Phone
Diaz	Reinaldo	Lake Worth Waterkeeper	[redacted]	N/A
C.	Katie	Evermld Media	[redacted]	N/A
Bergalis	Anna	N/A	[redacted]	N/A
Brand	Darrell	Rivers Coalition	[redacted]	[redacted]
Moody	Barron	WRAC - FWC	N/A	N/A
Albert	Mike	SFWMD	N/A	[redacted]
Davis	Steve	Everglades Foundation	[redacted]	[redacted]
Pipes	Nyla	One Florida Foundation	[redacted]	[redacted]
O'Neil	Paul	Citizen	[redacted]	[redacted]
Behlmer	Tom	FDEP	[redacted]	[redacted]
Ryan	Gayle	River Warrior	[redacted]	[redacted]
Jones	George L.	ORCA	[redacted]	[redacted]
Page	Jon	Treasure Coast Democratic Envir. Caucus	[redacted]	[redacted]
Johns	Chris	LLW	N/A	[redacted]
Varano	Jay	Everglades Trust	[redacted]	[redacted]
Mitchell	Kimberly	Everglades Trust	[redacted]	[redacted]
Trost	Sharon	Anfield	[redacted]	[redacted]
Reynolds	Laura	Friends of the Everglades	[redacted]	[redacted]
Gillen	Alex	Bullsugar Alliance	[redacted]	[redacted]
Umpierre	Diana	Sierra Club	N/A	N/A
Zucker	Scott	Audubon Everglades	[redacted]	N/A
Bausch	Joan	FNPS	[redacted]	[redacted]
Musgrove	Martha	FL Wildlife Federation	[redacted]	[redacted]
Plaid	Ida	Audubon, Sierra Club	[redacted]	[redacted]
Young	Mary	Audubon Everglades	[redacted]	[redacted]
Capp	Cara	National Parks Cons. Asm.	[redacted]	[redacted]
Vanlent	Thomas	Everglades Foundation	[redacted]	[redacted]
Perry	Mark	Florida Oceanographic Society	[redacted]	[redacted]
Waugh	Leslye	SFWMD	[redacted]	[redacted]
Shirreffs	Dawn	Everglades Foundation	[redacted]	[redacted]

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Last Name	First Name	Organization(if any)	Email	Phone
Cullen	Wake	N/A	N/A	N/A
Lorch	Justin	N/A	[redacted]	[redacted]
Baker	Bill	FDACS	[redacted]	[redacted]
Demers	Holly	Sen. Negron	[redacted]	[redacted]
Barnett	Ernie	FLC	[redacted]	[redacted]
Montes	Willie	MCSEC	[redacted]	[redacted]
Ross	Beth	Gunster	[redacted]	[redacted]
De Palma	Celeste	Audubon Florida	[redacted]	[redacted]
Ganthier	Stanley	FDEP	[redacted]	[redacted]
Bayler	Don	Town of Davie	[redacted]	[redacted]
M.	Tiffany	N/A	N/A	N/A
Lakwer	Joseph	CDM Smith	[redacted]	[redacted]
Miedema	Barbara	SCGC	[redacted]	[redacted]

10-31-17 Comment Cards

Last Name	First Name	Organization(if any)	Email	Phone	Comment
Bergalis	Anna	N/A	[redacted]	[redacted]	River

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Chad Kennedy	FDEP	23:24	Will the agreement the USCOE has with the USACE require them to have deadlines for review and approval of project submittals to them?	Yes, we are putting together an MOA, which is the framework for the section 203 process. Underneath that MOA there are a series of agreements or series authorizations that have very specific tasks that we're asking that the USCOE do. With those tasks, there are specific deadlines for them to complete that activity, similar to an authorization for work. Each activity will then have a value and deliverable schedule that lists every activity that needs to be completed.
Laura Reynolds	Friends of the Everglades	24:51	In regard to the deepening of A1 and A2, how will these be done while ensuring that Water Quality (WQ) is where it needs to be? I understood that WQ is a last resort issue that would only be changed or touched if the 360,000 AF were exceeded.	The law required the 240,000 AF on A2 and potential for 360,000 AF on A1 and A2, both with the necessary additional WQ treatment features. We have a series of STAs to the south that were used in the planning on the central everglades planning project. As we move forward and evaluate deep storage on A2 and A1 & A2 we will be looking at the timing of those deliveries to see if there are opportunities to use our existing stormwater treatment areas above and beyond what we did in the central everglades planning project. In addition, we will be using the DMSTA model as we try to deliver additional flow to the south and redirect those undesirable discharges that are happening and move them into deeper storage. If there is a need for additional STA,s we will use the DMSTA model to insure that STAs are sized for WQ to be met for the Everglades.
			Is that going to move forward with what you're proposing for this project timeline?	Absolutely, you will see as we move forward we will be evaluating the deep storage features, redirecting those undesirable discharges, moving more water south through the system, and sizing different combinations of the system. This will include additional STAs if our current facilities can't handle the additional water we are sending south.
Alex Gillen	Bullsugar Alliance	27:33	What will be in the report transmitted to the Secretary of the Army (ASA) in March?	The report itself will be a Feasibility Study which will include a project scope and a list of alternatives that are evaluated. It will set up the existing conditions in the future without project conditions and will also include all the evaluations conducted to date to come up with a recommended plan. That recommended plan will have to be able to document the environmental benefits and the cost associated with it. It'll come in the form of a post-authorization change report and will be a document somewhere around a half inch to quarter of an inch thick. It will document and summarize everything happening throughout the planning process to come up with the recommended project plan.
			What does the Secretary do with this report?	When we submit it to the ASA office on March 30, part of section 203 process, the federal government has 180 days to review report. During this time it will be sent to the South Atlantic division in the Jacksonville district for them to review and comment on the document. So by us developing this memorandum agreement with the Corp. and then paying them for their services through these service agreements, we're bringing them in earlier to avoid the ASA receiving a document unexpectedly.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
			What are the Congressional actions and requirements necessary for authorization (i.e. to Committees, WRDA Bill)?	Once the 180 day cycle is complete for review, it will be tied-up in a future WRDA for Congressional consideration. We are hoping the process will continue on a two year cycle for approval, as it has in the past. Approval from Congress will not mean authorization of funding, it will mean authorization of the project and future appropriations would have to come forward from the federal government to meet their responsibilities.
Darrell Brand	Rivers Coalition	30:5	First of all, we support your project fully and I've handed you the resolution. As far as your January 30th date, what body of government do you submit that to (i.e. subcommittee)?	Are you referring to the complete draft report? That's the date that we will have the actual draft authorization change report complete.
			I apologize, I meant January 9th. On January 9th what body of government do you submit that (i.e. subcommittee)?	On January 9th, this will be when the District will be reporting back to the state legislature (includes the House, the Senate, the Governor's office and other oversight committees) on the progress being made on the report.
Alex Gillen	Bullsugar Alliance	32:11	Since A1 and A2 were separate congressionally authorized projects, how does that affect authorization for this project?	That is why we are doing the Post Authorization Change Report. Since Congress already approved the Central Everglades Planning Project that included A1 and A2, we have to go back and ask Congress to approve any changes that we're making.
			Will there be any additional hurdles with congress because of these changes?	No, there will be no additional hurdles. There are different forms of these feasibility that come forward to Congress, and this is just a PACR, which we have done for multiple other projects and is pretty straightforward.
Jon Page	Treasure Coast Democratic Environmental Caucus	33:4	I appreciate everything that your organization is doing. Is the model that was mention necessary for the report in January?	We have a big section of the agenda today set aside for all of our modeling tools, so if we could hold off on answering that and we can come back we would appreciate it.
			When will the model results be available?	
			Will the model determine if there will be sufficient land for project objectives?	
Alex Gillen	Bullsugar Alliance	34:44	Is there anything congress can be doing now to make the District's job easier on this project? (Audience laughing)	We could use more federal funding on predecessor projects from the federal government. I have previously mentioned foundation projects such as, Generation 1 and Generation 2 could really use a constant stream of good funding from Washington to implement these projects that have already been previously authorized.
Reinaldo Diaz	Lake Worth Waterkeeper	35:2	There is a section of WRDA that prioritizes agricultural use over the environment. Is there any way WRDA can be balanced out to give equal priority to the estuaries and the discharges to them?	Not sure I fully understand the question or the linkage that your making. As part of this project we are looking at redirecting those damaging discharges that are currently occurring today and then storing/treating that water and sending it south. This is part of our program and it is well documented in state law.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Mark Perry	Florida Oceanographic Society	43:22	Clarified SB10 regarding the 240,000 AF on A2 and the 360,000 AF on A1 and A2. The question is regarding conveyance from Lake Okeechobee to the A1, A2 and further south. The current capacity of S-351 and S-354 structure that move water from Lake Okeechobee south via NNR and Miami canal is less than 3500 CFS. The conveyance from Lake Okeechobee associated with moving water for storage and further south will need to improve. Will this be done by a new pump station or just improving these structures?	You are right, and those are both very good questions. With that being said, we will be looking at two options. We will be looking at the A1 and A2 with additional treatment because that's what the law says to do. We will also be looking for the most cost effective solution to redirect discharges and send the water.
			Also, will the canal widths need to increase or will they stay the same?	From the canal conveyance standpoint, we will evaluate the carrying capacity of the Miami Canal and NNR. As a result, the structures may have to be improved and the canals may have to be dug deeper or, in some cases maybe wider. We will also have to take a look at the infrastructure that's in place that allows us to move water from the lake into those canals, which will be a part of the analysis.
Diana Umpire	Sierra Club	46:36	Do you have any idea where the STAs might be located?	The first idea is to utilize existing STAs as best we can since we have billions of dollars in investments already . We have yet to take a hard look to where future STAs, if needed, will be located, and the District is looking for public input on this issue. We will go through different configurations and those scenarios will be evaluated for performance and costs.
			Do you feel there will be a need for additional right-of-way associated with canal conveyance?	I do not have a clear answer for that yet without doing an analysis. Evaluation of canal capacity and the possible need for right-of-way expansions will be made as we move forward.
Celeste De Palma	Audubon of Florida	49:17	Clarification on SB10: it allows for flexibility to use A2 for the reservoir and WQ treatment, right?	Correct, so if we are looking at 240 plus additional water treatment features on 360 A2. We are looking for a footprint with different configuration for deep storage and stormwater treatment that makes sense without limiting ourselves.
Laura Reynolds	Friends of the Everglades	51:3	How deep do these reservoirs need to be to hold and deliver this much water and the question is how will the different depths affect the WQ.	At this point it's not known how deep we will have to go for either the 240 or the 360 option because we haven't actually sized the stormwater treatment area. Once we go through that exercise we will have a better understanding of the footprint that will be required.
			Are you looking at any specific lands other than what is shown in the pink square for the STAs?	Yes, the law is pretty specific about the limits in the pink square. Our real estate team is currently negotiating with willing nearby sellers and are seeking additional sellers/trades that we can use in conjunction with current lands. In addition, we have posted on our website and can show you the link to use if you are interested in selling land or swapping land. We continue to publicly announce this. We have indicated at each public meeting that we are seeking additional lands from willing sellers.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Darrell Brand	Rivers Coalition	55:04	I watched your scoping meeting videos and want to thank you for having those videos available right after the meetings. In previous meetings, you mention the WCAs. Are there any areas in the WCAs that have been considered for storage because of the topography (deeper) might work well for that purpose?	The law is very specific. As we look at A1, A2 and additional lands to the west, they all have a similar topography and are adjacent to the natural land. It is important that we build upon what we currently have in close proximity in order to meet the goals and objects of reducing harmful flows to the estuaries. 2. We are going to use whatever we can dynamically. It is about reducing the damaging discharges to the north and sending the water south to the Everglades when it needs to be.
Dawn Shirreffs	Everglades Foundation	57:54	It doesn't appear we know, at this time, which configurations would be best for meeting our goals. I am not sure how we can provide you with feedback yet in a productive way. Will the next presentation be addressing this?	As we move forward and get into the detailed modeling results, we will better understand where the efficiencies are. Take a look at the map and see the canal systems that are going to bring water out of the lake and start thinking of ideas that would be great. On November 6th we will come back and talk about several potential configurations.
Alex Gillen	Bullsugar Alliance	59:45	Please define what a dynamic reservoir is. How dynamic of a reservoir are you talking about? I would assume a more dynamic reservoir would need more STA capacity than a less dynamic reservoir.	Considering the costs of this project, we want to be able to utilize these facilities in a very robust fashion under a wide range of hydrologic conditions. The 240 and 360 are not static volumes. We are going to utilize them by filling and emptying them aggressively, which will provide the robustity that we need. We will be utilizing this and all the other components dynamically to maximize flexibility to meet project objectives. We will look at sensitivities on performance and come up with the most cost effective option on STAs.
Laura Reynolds	Friends of the Everglades	1:02:24	Just to add to this topic, the Friends are very concerned about WQ, so make sure you show a shallower option with more real estate to improve WQ.	We will include that in the record for today as feedback. The law is very specific about the 240 and the 360 and we are going to make sure that with that deep storage, we meet the necessary water quality features and requirements.
Unknown		1:03:20	The law indicates the 240 and 360 are the minimum volumes to be considered and not the only volumes to consider. Will the District look at other amounts to consider beyond these minimums for each of the specific configurations (i.e. more than 240AF on A2)?	That is a good question. and I think we first need to identify the minimum stated in the statute and then take a look at the modeling results, associated costs and benefits before considering alternatives.
			Having a willing seller limits the District to accepting offers from potential landowners. Should the District determine that there is a need or that the project would benefit from additional land purchases, can the District solicit to landowners?	This goes back to what we discussed earlier, that we need to follow the step by step process.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Martha Musgrove	FL Wildlife Federation	1:05:36	The Federation has filed written comments and is very interested in the configuration of A2 and how it dovetails into the Central Everglades Project. In the past, you have made reference to overflow and bypass. We feel that overflow or bypass should be into the Miami Canal, as opposed to Holeyland or Rotenberger (which were bought by state for conservation). The Federation will oppose any negative effects on wildlife that occurs as a result of the release of deeper water storage (from this reservoir) in these tracts. We will defend Holeyland and Rotenberger! The Federation's long time goals also include preserving healthy estuaries and Lake Okeechobee.	Noted. Please stay with us as we move through the process and we will share all the details of the recommended plan once we receive it.
Nyla Pipes	One Florida Foundation	1:08:06	When you explained the term dynamic, does this means dynamic only if all the other potential pieces that this project needs to rely on are in place (like the conveyance canals)? There is lots of mixed information being circulated about this reservoir, like unto itself, it will be able to recycle water up to 80 times a year.	Yes, that is a good point. we will evaluate this project with many other planning projects and components (like CERP and CEPP for example) that have already been authorized. We have to open up the southern part of the system to move the water in order for it to be fully dynamic. Until we model it, we do not know how frequently we can move water through the system and how robustly it is operating.
Scott Zucker	Audubon Everglades	1:11:16	We are struggling to understand what the term "parameters" means. Also, the term "cost benefits." Are these short term benefits, long-term benefits or construction phase benefits? What does the District consider when you say "cost benefits" in terms of this project?	The feasibility study undergoes a federal process to make sure we are federally compliant. The report will include capitol construction costs, long term operation costs and maintenance costs for the facilities that we plan. We will be focusing specifically on what is in state law and we are actively trying to get feedback on possible footprint configuration alternatives to analyze them.
Mark Perry	Florida Oceanographic Society	1:14:23	Dynamic storage issue gets down to the water control plan on how these are operated. For example from August 1, 2015 until October 16, 2016 the A1 FEB moved 530,000 AF through it, even though it only has the capacity of 60,000 AF of static storage. This is an example of dynamic storage. The water control plan is vital to address the objectives of this project like averting discharges from Lake Okeechobee being sent to the estuaries. The dynamic storage is definitely there.	Our water quality treatment areas are performing very well, which is a good thing. The Central Everglades Planning Project is operating dynamically and afforded us the opportunity to deliver an additional 210AF on an average annual basis of new water from the Lake that would normally go to tide. This is an example of where we can use these robustly to the best of our capability.
Unknown		1:18:51	I thought I heard that the reservoir was going to be a static reservoir?	No, we are going to be able to use this system dynamically with the other infrastructure that's in place. This reservoir will work together with all of the other projects to insure it will get rid of unnecessary discharges and deliver water south. This is just one facility that will get us where we need to be over time and can be operated dynamically.
Barron Moody	WRAC-FWC	1:20:46	Features on the south end associated with CEPP are very important for performance measures in the Everglades and must be considered when evaluating benefits. Simply sending water south could be damaging from an ecological and wildlife standpoint if we're unable to deal with constraints that are currently stacking up water.	Agreed, the south projects have been listed and are being considered.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
	Sewalls Point Resident	1:37:45	The water is black and gets blacker every year. I have had a respiratory infection for weeks now and I notice that a few others in the room do as well. This is probably due to all of the foam coming off of the water. Everyone claims that discharges from Lake Okeechobee to the estuaries only happen when there are "emergencies" but there are always natural emergencies that cause the dikes to open and discharges get dispersed for weeks or months at a time. Sugar subsidies as well as corporate sugar representatives have way too much money and the government needs to give it back to the community for health reasons.	This session is specific to the modeling that is going to be conducted. There will always be extreme events, but we are hoping that this sweep of projects will be robust enough to help reduce those negative effects and discharges.
Diana Umpierre	Sierra Club	1:40:20	Thank you a lot. You did an excellent job covering all of the different models that are going to be used and that was extremely helpful. Will the project (meaning the modeling) include downsizing of climate models?	No, it does not include climate models. It is not currently required and our goal is to keep it similar to what was done in Central Everglades since it was already authorized.
			Will there be anyone to be be your second pair of eyes and will double check the modeling work you have done? Even NASA makes mistakes.	There are two levels to that. As our modeling team goes through their processes, there is an internal QA review with independent checks along the way to ensure accuracy and no mistakes are made. Also, as part of the review period after January 30th there will be independent scientific and HDR review where all model results are validated.
Alex Gillen	Bullsugar Alliance	1:43:05	Approximately how long does it take a model to run?	The DMSTA model runs very quickly, usually in less than a day. It's not running the model that takes time, it's refining the operations to make the model achieve what is desired. Essentially, flows from Lake Okeechobee are input and then we need to make the infrastructure work in order to achieve the desired WQ standards as it flows south, so this process will be run several times.
			Are you running one scenario for the A2 and another for A1 and A2 (I mean the DMSTA model)?	As far as the DMSTA alternative model, it will look at a range of different sizing and storage configurations to bring to the team on November 6, 2017 in order to get your feedback on alternatives.
Steve Davis	Everglades Foundation	1:46:39	You mentioned your were going to take the same evaluation approach as used in CEPP. Does this mean that consideration of months and duration of discharges in the estuaries all the way down to salinity projections for Florida Bay are taken into account?	1. Yes, we are looking at the pace of the work and to use the same tools that were used in the Central Everglades. It will definitely include the northern estuaries, because that is what the Senate bill identifies as the primary objective. Due to the pace of the project, I'm not sure if we are going to look at salinity in Florida Bay, but we will look at the greater Everglades where we are putting the flow to see what effect it is having.
			Also, in comparing different scenarios does this include a future without existing base and Alt 4R2? 3. Regarding conveyance from Lake Okeechobee to this facility, will there also be consideration of conveyance south particularly to Blue Shanty Flowway?	We are going to talk about the base lines next.
			Regarding conveyance from Lake Okeechobee to this facility, will there also be consideration of conveyance south particularly to Blue Shanty Flowway?	We will have to see how the alternatives pan out. We know we will be promoting more flows to the south, so one of the evaluation criteria we will have to bring back to this discussion is if the conveyance in the Central Everglades is sufficient.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Jon Page	Treasure Coast Democratic Environmental Caucus		When do you expect to run the DMSTA?	We waited for the scoping meetings to take off so we could start everything formally. We expect to start it this week and next week so we can come back to the November 6, 2017 meeting with preliminary DMSTA runs that will show us different sizing options.
			You mention "damaging discharges." What is a damaging discharge?	The official answer from a project perspective (recover performance objectives defined for CEP and this project) is that they are defined by a certain threshold of discharges to the estuaries based on flow. These thresholds are relatively high, 2000 cfs to the St. Lucie estuary and 2800 cfs to the Caloosahatchee, as defined by the scientific arm of CERP. We do have intermediate thresholds with lower discharges. So the operating protocols for how we release Lake Okeechobee discharges do not stop at the 2000 and 2800 cfs thresholds, while still maintaining the needed base flows for salinity in watersheds.
			You mentioned salinity; however, is phosphorus include in this measurement?	For the purposes of this study we look at phosphorus as it pertains to flows south through the EAA, the STAs and further south. We don't have the tools in this timeframe that address nitrogen or phosphorus for the north estuaries.
			Is there monitoring for phosphorus in Lake Okeechobee?	I am not familiar with monitoring in Lake O. There are 3 state agencies that are dealing with phosphorus issues for the estuaries, although they are not specifically addressed in this plan. These agencies are the District, FDEP and FDAX. They are working with stakeholder input and specifically are looking at TMDLs. Please look at the SFER reports on the District's web site, this and all WQ data for Lake O, the estuaries and much more. Also WRAC covers this too.
Mark Perry	Florida Oceanographic Society	1:52:46	The 41 year POR 1965 to 2005 happens to coincide with a cold phase in the north Atlantic, which means we had less rainfall than would occur in a warm phase. The question is are there any adjustments climatically in the model that account for this cold phase?	We are using 15 years out of the 41 POR (in the late 60's and early 90's) in the modelling to account for a warm phase period.
Alex Gillen	Bullsugar Alliance	2:11:03	What are the assumptions for the regulation schedule for Lake Okeechobee?	The existing condition is LORS, as authorized in the ROD of 2008. The future without is using what is called LORS Plus in planning. It is a modification to the LORS schedule that is within the flexibility of the existing schedule.Note that the diagram says "up to," and we are using that flexibility.
			So in future projections are you going to be using other potential regulation schedules for Lake Okeechobee?	Trying to stay consistent with the central Everglades, we have been working with using LORS and stay within its flexibility.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
	Commissioner	2:12:48	How are the more recent extremely bad years (2013, 2016) for the estuaries being incorporated into the model for the reservoir?	In the planning we start out with the baseline conditions (the 41 year POR discussed), then we do relative comparisons. So we are not necessarily using those specific years you cited but we are using enough years to give us good data. In the 41 year POR we do see some heavy rainfall years with months and months of discharges to the estuaries. So what we do is to look for relative improvements in volumes and duration of discharges during these high events utilizing the project infrastructure.
			How is sea level rise being accounted for?	We are not incorporating sea level rise in these projections
Jon Page	Treasure Coast Democratic Enviro Caucus	2:14:27	In August 2017 TCPalm published an article that showed undue influence from a sugar lobbyist. SFWMD was given an opportunity to respond but didn't. Hopefully your reporting will be extremely objective when dealing with phosphorus pollution in Lake O, unlike some reporting that has been done by US Sugar.	
Steve Davis	Everglades Foundation	2:15:30	I recall conversations about these new operating protocols within the framework of LORS 2008 that were critical to generation additional water that CEPP provides . My question is whether the optimization approach within LORS that your modeling is using will ever be considered to maybe modify the existing LORS operating schedule?	Potentially there will be because there will be new infrastructure that hasn't been considered before in the existing operating schedule. we need to make the entire system function.
Ida Plaid	Citizen	2:16:46	Give my some confidence in your modeling when you are leaving out some important baseline information (Climate change, sea level rise or whatever	That's a very good question. Although we're not doing a detailed study of sea level rise, if we can push more fresh water through the system, it helps to keep salt water at
Diana Umpierre	Sierra Club	2:19:57	When you come up with performance measures and cost benefits, how will you proportion the benefits to the estuaries vs getting more water south? We know that at home, you can only get so much water in and so much water out. Let's make sure we don't put more weight on sending water south versus avoiding discharges.	Both are important, and we will be looking at both. Both are of course identified in law.
Ronaldo Diaz	Lake Worth Waterkeeper	2:25:51	Are the results of the first run of the models going to be presented at the next meeting?	Yes, and as a reminder, there's a great deal of information on our website, you can feel free to reach out to us with comments, and for large files we can provide you with links.
Laura Reynolds	Friends of the Everglades	2:26:36	At the next meeting it would be helpful if you could identify any willing sellers who have come forward and maybe show us on a map where the properties are.	We need to check on our ability to do that. If we can, we will, but that may be considered proprietary information and state law might limit our ability to do this.
Unknown		2:27:25	Will model results give a pretty good sense of the configuration and how much land, so this won't be 60 foot deep?	That is the hope. We'll be running models and sharing them with you.
Mark Perry	Florida Oceanographic Society	2:28:02	The regional model done in 2002 took into account all the components of CERP, even though not all components were done or not yet completed. Will this model take into account only existing features or those that will be complete in a reasonable future time period?	During this screening (first cut of ideas), we will be looking at the infrastructure in 2 ways. First, what could it achieve if you're trying to get CERP like performance and be consistent with CERP. The second way is, if you operated in the current system, what would be the potential performance. We'll be bringing forward both of these but not in the same exact way as before.
Unknown		2:29:48	Where in Doral will next week's meeting be located?	Doral City Hall is the location.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Joan Bausch	FNPS	2:29:48	Are we going to be doing something in groups to discuss alternatives?	As we said, we will have Jeremy look at options combining storage and treatment and bring back ideas to the 11/06 meeting to get input. In the meantime if anyone would like to be forward ideas or recommendations on location of A1, A2 or additional lands to the west, we would like to hear them.
Celeste De Palma	Audubon of Florida	2:33:21	You mentioned the C-111 Spur canal will be only be analyzed in the future conditions without and not in existing conditions. Why not include it in the baseline since it's been operated since 2014?	It a matter of expediency and sensitivity.It would be adding something far south of what is being evaluated for this project. It's a matter of choosing priority resources for people running the DMSTA and project models. In the plan formulation, the primary comparison is between the future without and the project alternatives.
Steve Davis	Everglades Foundation	2:34:35	Regarding evaluation of benefits from top to bottom, one of the great benefits of CEP is that it alleviates discharges to the northern estuaries as well as salinity benefits south to Florida Bay. When considering cost/benefits of this project habitat units based on acres of habitat improvement, I strongly encourage these benefits be included in your cost/ benefits analysis to maintain what was done in CEP.	We understand and agree with your concern on this. It is certainly a very federally unique concept and habitat units is a very regulated process. If you're interested, go to Appendix G of CEP PIR.
Cara Capp	National Parks Conservation Association	2:37:11	NPCA Agrees with Steve Davis' point on habitat units. Please remember that benefits to a National Park, in this case the Everglades National Park, are benefits that Congress looks at with priority.	Thanks.
Diana Umpierre	Sierra Club	2:37:53	It would be extremely beneficial if you could extend the governing board meeting in November to continue this wonderful Q and A on this project. I want the people of Miami-Dade to have this opportunity.	Great, thank you.

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Last Name	First Name	Organization(if any)	Email	Phone
Preston	Allie	Bullsugar Alliance	[redacted]	
Urpt	Peter		[redacted]	
Gillen	Alex	Bullsugar Alliance	[redacted]	[redacted]
Davis	Steve	Everglades Trust	[redacted]	[redacted]
Ross	Beth	Gunster	[redacted]	
DePalma	Celeste	Audubon Florida	[redacted]	[redacted]
Page	Jon	Treasure Coast Democratic	[redacted]	[redacted]
Zucher	Scott	audubon Everglades	[redacted]	[redacted]
Akost	Mike	SFWMD		[redacted]
Bausch	Joan	FNPS	[redacted]	[redacted]
Baker	Bill	FDACS	[redacted]	[redacted]
Wessel	Rae Ann	SCCF	[redacted]	[redacted]
Duke	Dennis	DOI	[redacted]	[redacted]
Cowan	Lauren	Bergeron Land Development	[redacted]	[redacted]
Louda	Dr. Bill	FAU	[redacted]	[redacted]
Perry	Mark	Florida Oceanographic		[redacted]
Brand	Darrel	Rivers Coalition	[redacted]	[redacted]
Ray	Sue	HDR	[redacted]	[redacted]
Moody	Barron	FWC	[redacted]	[redacted]
Monter	Willie	TEDEC	[redacted]	[redacted]
Leonard	Carol Ann	Democrats	[redacted]	[redacted]
Young	Mary	Audubon Everglades	[redacted]	[redacted]
Diaz	Reinaldo	Lake Worth Waterkeeper	[redacted]	[redacted]
Capp	Cara	National Parks Association	[redacted]	[redacted]
Pipes	Nyla	One Florida Foundation	[redacted]	[redacted]
Niemczyk	Sharon	Cardo	[redacted]	[redacted]
Grave		Rivers Coalition	[redacted]	[redacted]
Carrozzo	Marisa	Conservancy of SWFL	[redacted]	[redacted]
Ganthire	Stanley	FDEP	[redacted]	[redacted]
Krimsley	Lisa	UF/IFAS	[redacted]	[redacted]
Zempierre	Diana	Sierra Club	[redacted]	[redacted]
Elliott	Rebecca	FDAC	[redacted]	[redacted]
Schwartz	Matt	South Florida Wetlands	[redacted]	
Trose	Sharon	Anfield Consulting	[redacted]	[redacted]
Musgrove	Martha	FL Wildlife Federation	[redacted]	[redacted]
Varro	Jay	Everglades Trust	[redacted]	
Martin	Drew	Sierra Club		[redacted]
Capone	Laurene	EAA Reserch & Management, Inc.	[redacted]	[redacted]

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Alex Gillen	Bullsugar Alliance	24:50	Does the public have the ability to weigh in on the January 30th draft report?	Yes, as with any feasibility study that includes an environmental impact statement, the report will be sent out for general public and agency review. The public will have the opportunity to read through and comment. We will respond to comments and if the comments make sense are consistent with our goals and with state law, they will be included in the report before it is published as a final. We want to be sure that everyone who makes the time to read through the document and provides comments, that their comments are received by SFWMD.
Joan Bausch		26:00	In regards to (A2 and A1) and the 240 and 360 AF, is that going to be an either or will the total be 600 AF?	It is an either/or. The state law requires us to evaluate both. (inaudible comment, reply - correct)
Ronaldo Diaz	Lake Worth Waterkeeper	26:41	Is there a deadline if we want to include a comment letter to be included in the EIS (environmental impact statement)?	Welcome, good to see you again. the scoping period ends on 11/22/17. If you want to submit written correspondence to be embedded in the document, which is encouraged, please submit before November 22. SFWMD will continue to have interactive sessions throughout the entire process until completion of the project. (Contact info given and contained in slide presentation.)
Alex Gillen	Bullsugar Alliance	27:52	What is the process from November 22nd to January 9th?	Very good question. This will be a very fast paced process. Today we will be sharing some modeling results for the existing conditions base and our future without project condition. We also have some screening analysis that were conducted between now and the time the document is published in draft form. We need to move very quickly to develop an array of alternatives that would move into a more robust analytical evaluation and models. We will then look at the results of those models and compare them to what the future conditions would be without the project and the benefits we are getting from those alternatives. At the same time a cost analysis of the infrastructure and how much it will take to achieve those benefits. We need to prepare a recommended plan to be included in the document to send to congress and ask them to approve. We need to look at these alternatives and see how they will perform and how much they will cost. Based on that information identified a tentatively selected plan that would be identified as the project feature that we would ask congress to approve.
Bill L	FAU	29:35	Are A1 and A2 currently owned by the District right now?	Yes, and this has also been covered in a couple of our previous meetings. The lands that are identified in blue as A1, A2, along the Miami canal and checkerboard shaded areas are all lands that are already in public ownership.

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
		30:21	**Walt Wilcox Presentation**	
Drew Martin	Sierra Club - Volunteer	54:37	One of the big issues is water accumulating in the conservation areas. How are you going to deal with this? Are you going to be able to move significant amounts of water out of the conservation areas during the rainy season, so we can move water further South? We hear the argument that water cannot be moved South because the conservation areas are already flooded.	Refers to graphic. In the current system, the only structure that discharges to the eastern side of Shark River Slough and provides water to move out of Water Conservation Area 3A is a structure called S-333 with a capacity of 1350 cfs. We have been talking about all of the flows that go into the estuaries, EAA canals have a "bottleneck" at the Eastern discharge point. The Central Everglades (CEPP) has called for a number of improvements that would allow improved conveyance, and this is the project we are building on. (references graphic) One of them is to improve the flow of S-333 from 1350 cfs to a 2500 cfs capacity, a significant increase. Another is the Blue Shanty flow-way which has additional structures which flow into the Blue Shanty flow way. We are looking at essentially nearly tripling capacity at the Southern portion of the system under Central Everglades. This allows us to convey more water out of 3A and into Everglades National Park and down towards the Southern estuaries.CEPP already contemplates a number of conveyance improvements. We will have to see as we implement EA storage to see if that conveyance is adequate for our project or of we need to consider other options. CEPP was authorized by congress in 2016 but the federal government has not sent money yet to actually build the components of the CEPP. We must go through a re-evaluation with the Army Corps of Engineers on those features and assumptions that were made at that time and that they are still accurate. While SFWMD is simultaneously working with the Corps on the re-evaluation, the SFWMD is stepping up and looking for opportunities to advance some of the features in the Southern part of the system, like removing the old Tamiami Trail that should improve conveyance in the Western parts of the everglades. More importantly, we are working to develop a Pre-Partnership Credit Agreement with the Army Corps of Engineers so we can move forward with upsizing the S-333 facility to improve ability to get water out of 3A and into NE Shark River
Martha Musgrove	FL Wildlife Federation	58:12:00	1. The CEPP project is very critical to re-establishing a flow-through system, but it may take 10-15 years to get the projects built. Is the model flexible enough to predict as each of those individual segments, when they come on, what is happening to the flow? 2. So by the end of this period we will have a sense of how things will changes over each 5 year increment, as structures are built? 3. For Lake Okeechobee, what baseline schedule you are using? The schedule that is in place now, the schedule anticipated or the optimum schedule?	1. Yes that is envisioned under the CEPP Implementation strategy. It is a grouping of features. 2. We do not. 3. The existing condition we are using is the LORS 08 schedule. The red line (referring to graphic), which is SEP, which is described within the LORS 08 schedule, has flexibility to reduce discharges.

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Mark Perry	Florida Oceanographic Society	1:00:15	Two points to make. 1. If we plan on A2 being a larger storage component through the EA storage reservoir project, than what was being considered in CEPP, then is the capability to increase those flows and amounts (South), because of increased storage capacity and conveyance capacity out of the lake into a component that is deeper? 2. All of the other increments of what is now underway or planned by CERP, are those components being considered as features that will be in-place once the whole system is in place. Two QUESTIONS 1. Are you going to modify CEPP as you go forward to this increased capacity using the EA storage reservoir project? And all of the other components also?	The CEPP post authorization change modification report that we are doing now are on the storage and treatment features North of red line (refers to graphic) on A1 & A2 parcel . The modeling will also address a timing shift to move water when and where it is needed. As we evaluate additional storage and treatment in EAA and modify the CEPP, we will be looking at the other features in the North and South components to be sure that they have the necessary carrying capacity for us to move forward and seek congressional authorization for additional storage and treatment. We are not looking at upsizing facilities more than CEPP has identified. We are looking to redirect the undesirable discharges, store and treat them in a larger facility and improve the seasonal shift of moving water into the Greater Everglades System when it is dry.
Rae Ann Wessel	Sanibel-Captiva Conservation Foundation	1:03:02	Regarding the C43 reservoir performance measures/benefits. You referenced the recover standards, so is the assumption that the low flow need is 450 cfs to receive benefit? As we know from operating the system that isn't nearly enough water to get those benefits. I would put a placeholder in the low flow benefit characterization. You reference the high flow threshold, were you using 2800 cfs? Then with the target being identified at zero for both lake flows and low flows, we do have a need that the C43 reservoir will not meet for downstream flows. How can a placeholder be established for that, because we know that the storage need in the watershed alone is much greater than C43 alone?	The reuse and recover threshold is at 450 and 2800, those are the approved and the same that CEPP used. We are trying to stay in line with the CEPP study in that perspective. We do not operate the reservoir to achieve the 450, we will operate to achieve EST05, a desired salinity regime for the estuaries. So looking at the flow distribution (refer to graphic), there are a number of times flows are greater than 450. That is how we operate the reservoir to achieve desired restoration variability for the salinity regime, not just to maintain the base flow. The metric that is used in the recovery evaluation is the count of the base flow. This project is not looking directly at the base flow, but looking to improve the damaging discharges with the addition of the EA reservoir.
			So even if you change the MFL for the Caloosahatchee, that will not affect this, that will be affected when the Lake Okeechobee regulation schedule, if it is adjusted, will affect this?	The mfl does not affects what we are doing, we are looking for restoration flows.
Marissa Carisso	Conservancy of SW Florida	1:05:46	Can you clarify why the white bar (referring to graphic) that indicates Lake Okeechobee triggered discharges is not currently included and will it be included in future model runs?	When we go through these planning processes we use a RECOVER performance measure that has gone through a scientifically vetted peer review process. I don't know specifics of why this metric has Lake Okeechobee and the basin together and the other metric have them separated. I can point you to the recover documentation so you can see the conceptual basis as to why they are different. Consistent with central everglades, and given the pace this project is moving, we are trying to keep the same metrics that were used CEPP. Knowing what the basin contribution is, we can get a good feel as to how much we are achieving relative to the Lake Okeechobee portion and the discharge challenges.

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Matthew Schwartz	South Florida Wildlands Association	1:07:04	How much "bottleneck" in the flow is caused in the system by limitations in STA capacity? 2. With respect to the reservoir(s), in the modeling, how much consideration is given, that right now, no water from Lake Okeechobee is being sent through the STAs. Maybe a little at the beginning of the season, but I was told it is all basin runoff going into the STAs? 2A. When? If you look at the outflows out of Lake Okeechobee, during the wet season, it's zero to the South. 2B. During the rainy season or dry season? It's only during dry season? So during the wet season when the discharges are occurring, zero water is going South? The point being made is that without the STA to treat the water from Lake Okeechobee, all of these reservoirs are doing is create small versions of dirty Lake Okeechobee water. So, seems like this discussion should be much more about STA capacity.	No, I don't think that's accurate. We have observed in recent years there has been a lot of Lake water that has been sent south through the STAs - during the dry season. It's very complicated. I don't mean to defer the question, but we'll get into this during the next portion of the presentation. You're setting up our next segment which is about the STAs. I actually appreciate the lead-in.
			With respect to the reservoir(s), in the modeling, how much consideration is given, that right now, no water from Lake Okeechobee is being sent through the STAs. Maybe a little at the beginning of the season, but I was told it is all basin runoff going into the STAs? 2A. When? If you look at the outflows out of Lake Okeechobee, during the wet season, it's zero to the South.	
			During the rainy season or dry season? It's only during dry season? So during the wet season when the discharges are occurring, zero water is going South? The point being made is that without the STA to treat the water from Lake Okeechobee, all of these reservoirs are doing is create small versions of dirty Lake Okeechobee water. So, seems like this discussion should be much more about STA capacity.	
Cara Capp	National Parks Conservation Association	1:09:45	At a recent WRAC meeting it was said that this project would not benefit Florida Bay because Everglades National Park (ENP) won't take any water. However, DOI has stated that the only impediment to taking more water is the lack of restoration infrastructure and that the park desperately needs and wants to take the water and will take it as soon as they can. I assume your "future condition" includes things like Mod Waters, the next 2.5 mile Tamiami Trail bridge. Can the you address how much water ENP will be able to take/need once these CEPP components are in place?	This project's goal, like the CERP goal is to be able to get 300,000 af of additional water across the to the central Everglades, an additional 90,000 or 100,000 af on an annual basis.
Nyla Pipes	One Florida Foundation	1:11:45	On a average annual basis do we know how much water will be flowing south during a wet season?	The next part of our presentation will address this question.
		1:12:17	**Jenn Leeds Presentation**	

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Darrell Brand	Rivers Coalition	1:23:50	As far as the data being looked at, it appears to stop in 1999 or 2003, or 2005, why are there not more current years data being used?	Our model simulations initially look at a certain period of record (1965-2005; 41-year POR) and updated real time data is added to the simulation in 5-year periods. Because of our time constraints for this project, we will not be able to add to it.
Alex Gillen	Bullsugar Alliance	1:25:43	Is the balance of the 300,000 annual average af going South and the 360,000 af capacity of the reservoir being reserved for EAA irrigation purposes?	The reservoir has 360,000 af capacity, but it will be operated dynamically. 300,000 af is what will be processed by the reservoir/STA. It's not going to be filled to capacity once and then released. For example just like in CEPP, in which 200,000 af of water was protected for the natural system, this project will also be looking to deliver more water for the natural system. Our alternatives analysis and associated model runs will be considering the natural system. Also remember the 300,000 is an average annual number, flows can fluctuate. Reservoir volume is not a static volume.
Steve Davis	Everglades Foundation	1:29:34	Given the importance of the Pre-CERP Baseline as a condition, I am curious to see how this model baseline data compares to actual data? Also does this analysis for baseline consider the LOERS schedule or Lake Okeechobee schedule that was in existence pre-CERP?	The pre-CERP baseline represents data before the CERP federal authorization (December 2000). The 2005 RECOVER document that Jennifer referenced to has all the assumptions from pre-CERP built into it. Note that our comparisons for this project are made to current conditions and the project without them.
			How does the actual data compare to simulated data?	It gets a little complicated, because of other changes that have been made on the ground since the 65-99 period of rain. So our tools are looking at what our project would have done in past history.
Drew Martin volunteer	Loxahatchee Sierra Club	1:33:12	It appears your modeling is done on an average annual basis, but the real purpose of the system is to work during extremes, that is when it is needed. For an extreme wet event when things are getting stirred up and affecting water quality with high TP, and possibly overflowing and damaging the STAs during the event. How does all that affect your through-put?	We summarize averages so we can help describe in the public process what is happening. When we run the models we do account for year by year variabilities, not just the annual average number. The next portion of the presentation is running the dynamic model of stormwater treatment. We run the simulation with all of the variability and we check each year in terms of water quality standards and are we meeting the WQBELs.
Scott Suker	Audubon Everglades	1:35:37	My concern is dry years. You mentioned that in CERP that water, if needed, will also go to the EAA area. I am wondering if you have created a formula which you have decided (averagely) how much water will go to the EAA when needed vs. how much will flow south and into ENP?	Not in this project. In the CERP, a formula was considered for the natural system and agricultural water supply also. The goal of the project is to move water in a more natural flow.
Mark Perry	Florida Oceanographic Society	1:38:13	Thank you for explanation. The original CERP guidance was 1/3 of water available would be used for agriculture and basin runoff and 2/3 for the environmental demands/needs. Are you going to follow that guidance? What I'm hearing is that the guidance is to look at overall flow demand and rainfall to benefit the system overall and we just don't know what or how much of CERP guidance will be followed yet.	We do not have that answer yet. We have to get to our alternatives and model them before we can address that.

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Commissioner Heard	Martin County Board of Commissioners	1:39:28	Do STAs have finite life cycles?	In CEPP we identified the costs and maintenance of the STAs, we used a 50-year cycle period before we have to get into an STA and remove accretion of sediment build up. Short answer, yes. Sediment builds up and must be removed and restored with new plant life.
Diana Umpire	Sierra Club	1:40:58	At some point are we are going to have specific goals in mind that will drive the performance measures. I need to clarify that there are two main purposes. One to reduce harmful discharges to the northern estuaries and the second sending more water South to the natural system. So I think it is important to clarify that if there is water for auxiliary benefits should not affect the main purposes of this project.	The two main goals and objects of this project are to reduce harmful flows to the estuaries and increase CEPP flows South with increased storage, but there is a water supply element identified in law.
Cara Capp	National Parks Conservation Association	1:42:50	The savings clause will not be based on existing conditions baseline, is that correct?	The savings clause is an assessment that occurs on the tentatively accepted plan. Once the plan is identified, the checks that are used for the savings clause typically look at a number of conditions, including the future without the existing condition and pre surp baseline. The screening is designed to identify any impact to users as a result of the project. All of that will also be documented in the feasibility study and documented under state law in the 1501 compliance report to be sure nothing has contributed to adverse effects to existing legal users.
Rae Ann Wessel	Sanibel Captiva Conservation Foundation	1:44:53	Have you established what kind of conveyance modifications would be needed in the North New River and Miami canals? What form would that take? (Deepening or widening).	Really good questions. Carrying capacity of the canals will addressed later in the presentation.
			Is the EAA reservoir going to have a restriction to going dry or is the design criteria going to keep x-amount of water?	We will try to keep some water in reservoir at all times for water refugia purposes, to be sure aquatic life can survive.
Matthew Schwartz	South Florida Wildlands Association	1:46:00	Reservoirs can also be used for public water supply, I assume this to be true?	I would not assume that the storage will provide additional water supply for public utilities. (inaudible in background) As we go through this planning process, we are going to identify water for the natural system and water for other needs. Stay with us throughout this process, and when we get to the recommended plan and identify the water for the natural plan, we can identify other water related needs.
			Why are you building reservoirs instead of just building more STA? What's the purpose of the reservoir if the ultimate goal is to get clean water south?	The storage facility gives us the ability to store water, when available in wet season and have it available during the dry season. You can go back and look at the restudy which identified QQTD (quantity,quality,timing and distribution) The "T" was changing the timing of and carrying the water forward to the dry season.

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Alex Gillen	Bullsugar Alliance	1:49:24	1. How is the savings clause quantified? 2. Is that similar for drainage as well?	1. Typically we look at the worst 8-years in the POR (period of record) to be sure we are not causing/contributing to water shortages. 2. Yes, we must look at the timing and distribution of water and evaluate canal capacity to insure we can move necessary volumes for flood control purposes. We are also looking at canal conveyance to avoid any additional issues as well.
Mary Young	Audubon Everglades	1:51:46	Do the characteristics of additional flow south in CERP figure take this year into account? Because we had more intense hurricanes and flooding this year. Is it possible to add this year into these model runs?	Analog years are 95/98 with super ninos that created a lot of water in the system. We feel that the 36-year POR does characterize very wet and very dry years. Periodically we do update the models with newer data, and we are currently in process on that, but because of this project schedule, we will use the 36-year POR. These models do include a lot of variability and years of heavy rain, October 1995.
			Walt DMSTA Presentation	
Unknown		2:06:57	Are these DMSAT slides going to be on your website?	Yes; via FTP.
Cara Capp	National Parks Conservation Association	2:06:05	Are your project alternatives going to be at different points on these two axis, you are going to model a handful of them and see the benefits/costs of each? How many alternatives will you be willing to run?	We want your all recommendations, but we need to do this fairly quickly. Typically we want to run a "couple" alternatives for each project?
Alex Gillen	Bullsugar Alliance	2:10:15	The goal of this legislation is to reduce estuary discharges. STA performance is going to dictate how much that can happen. Which will correspond with water going to Florida Bay. What is the definition (number) of the right amount of treatment or water to go South?	From a water quality standard, we know what the standard is and is well defined. We have calculations for phosphorus levels. All of these model runs achieve these standards. The CERP framework envisioned 360,000 af storage reservoirs that would promote 300,000 af on average of additional flow South primarily in the dry season. This project is under that CERP framework.
			Can we try this in a wet year?	This includes wet years, which can provide much higher flows above the 300,000 acre feed.
Charles ?	Rivers Coalition	2:13:56	The flow routing diagrams make it clear that the canals are shared facilities and the water in the carnal are from everywhere in the system. The original CERP reservoir was designed to be a shared facility. Now SB10 describes it as a single source reservoir, to stop estuary discharges and send safe Lake Okeechobee water south through the canals. How do we going to determine that as much water that left Lake Okeechobee entered the reservoir? If this ends up being a shared facility we will actually decrease the ability to decrease discharges East and West as we bring in more water from local runoff and other sources. How do we verify that the same amount of water that comes out of the lake goes into the reservoir?	The modeling does measure how much water is leaving Lake Okeechobee and reaching the facilities. Once we know how much the STA can process, we then set the STAs up as an environmental water supply targets. They then pull the water that is needed through the facilities and send water to the Everglades, which is consistent with what CERP envisioned.
			Are the depths of the reservoirs used here going to be at 12 feet?	Depths will always vary, we are achieving 360,000af of storage. Depending on the footprint available for the reservoir, the depth will vary.

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Matthew Schwartz	South Florida Wildlands Association	2:17:51	Regarding the huge swath of U.S. Sugar land South of Lake Okeechobee and North of A2, could you consider modeling some natural restoration in that area (like wetland restoration) in that area and how that would help/impact project goals?	We will be constant with CERP and state law. State law indicates we are limited to willing sellers. We have a link on our website available to willing sellers to give us their information in confidentiality. We are not going to be analyzing additional lands. The goals of this project are to reduce the undesirable discharges.
Lisa	Everglades Law Center	2:20:48	At what point in this process are we going to look at additional acreage to optimize the best chances of sending water south (which could include more STAs) of sending clean water south without building a unfeasibly deep reservoir? This goes to the question of the need for additional lands. I don't read state law to limit lands but it does talk about optimization.	We must stick to state law requirements and that analysis. We are going to gather as much information as possible and analyze. That information will documented into a feasibility study and report to the house and senate in January. This is very specific as to what we are being asked to analyze. This is a two step process, the first step is to evaluate what we have now.
Reinaldo Diaz	Lake Worth Water Keeper	2:24:15	Comment: There is a lot of mis-information coming out from opponents of this project, so sharing information is vital.	Thank you will continue to do our best and share what we have.
Darrell Brand	Rivers Coalition	2:25:06	I know that you have been publically soliciting willing sellers. How has the willing seller program going?	It is a confidential process. We have been contacted by a number of landowners in the EAA. The first step is evaluate if and how these potential lands would serve project needs.
Alley Preston	Bullsugar Alliance	2:27:15	Is it going to be possible to model a wet year to the specific number of acres used for treatment, so that treatment will not become the bottleneck?	Yes, at any point on this graph accommodates a wet year. This is designed to accomodate water quality standards in a wet or dry year.
Mark Perry	Florida Oceanographic Society	2:27:55	Would the existing STAs and future restoration strageties expand the STA footprint acreage for the reservoirs and goals of this project?	Yes, we are assuming we will use both the new and proposed STAs. The flows out of those resiviors are not only going to the new STAs, but the exisitng STAs as well. (Inaudible) Additional water would be coming in from the lake, in the same way the CERP identified, more water in the dry season consistant with the CERP goal, with proper timing to maintain water quality standards. The dynamics of the STAs are dependant on where and when in rains, not on how large the STAs are.
Bill L	FAU	2:33:25	Will this be a dyke feature (i.e. above ground)? For the STAs, I'm not only concerned this phospherous, but with sulfur and it's driving on methyl-mercury.	Yes, this will be above ground. 2. A TMDEL has been done by FDEP for methyl mercury and it recognizes a huge atmospheric deposition on a global scale. Please contact FDEP to learn more on this issue.
			Are there any best practices about the water that is feeding the STA, like you can't send the water to us because there is too much sulfur?	A TMDEL has been done by FDEP for methyl mercury and it recognizes a huge atmospheric deposition on a global scale. Please contact FDEP to learn more on this issue.
Alex Gillen	Bullsugar Alliance	2:35:37	In a extreme wet year, how much water will be sent south? What is the necessary amount of land needed for treatment of these flows?	Hydrology changes year to year, the design we are trying to identify is the design that works for all conditions. So if you're in a wet year, 1995 is a good example, between the EA and additonal lake water there was 3 million af total water accommodated by the reservoirs/STAs. The graphs accomodate that design conditon.
Martha Musgrove	FL Wildlife Federation	2:38:00	If you sized everything for the 360,000 af, would the existing STAs be adequate to reach the desired WQ standard? And if not how many more acres of STAs would be needed?	This depends on how much flow. To achieve 360,000 af of storage 9,000 more acres of STA would be needed to treat this volume
			Canal Conveyance Presentation	

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Alex Gillen	Bullsugar Alliance	3:01:50	Is safety of the Lake Okeechobee dyke considered in terms of adequate Southern conveyance?	Yes, as you add storage or infrastructure anywhere, it adds to the conditions in operating the lake and damn safety modification in the process.
Mark Perry	Florida Oceanographic Society	3:03:40	A new independent canal might be another consideration to make. If you were to achieve capacity in the canal conveyance capacity and Lake Okeechobee structures for maximum flow, would you then need additional pump capacity (7500 cfs) to bring them to the reservoir?	Pumps have not been designed. Evaluations of what would be needed are being made.
Drew Martin	Sierra Club	3:05:05	Regarding other users utilizing these canals during extreme wet times, they will be using these canals to 100%, so that no additional flows will be available from Lake Okeechobee when these users are filling them. I assume the savings clause will not be used during these times. So I feel both the canal capacity will have to be increased as well as limits on the amount other users can discharge. Is the District considering paying these users to keep water on their lands to increase capacity and the opposite during dry times?	In evaluating the timing and distribution of flows, the project goal is certainly to redirect the undesirable discharges to estuaries and send more water South. We will be looking at a range of flows and the associated costs and benefits associated with various flow increments up to the 7500.
Mark Perry	Florida Oceanographic Society	3:12:46	Question being raised to Mark Perry about a third outlet. The USACE had the idea of a third canal back in the 1950s. However CERP 2000 WORDA is what we have now and this doesn't contemplate that.	First I don't think CERP raised this issue (I need to double check). Probably not the most cost affective choice. The Corp in the 1950's had this concept however 2000 WORDA did not go back to this.
Steve Davis	Everglades Foundation	3:15:24	0.07% appears to be a very rare event when your talking about daily flows, however if you look at just this year, 2-days in June that capacity would have been needed.	During the planning process additional conveyance will be looked at and evaluated on a cost/benefit basis.
Alex Gillen	Bullsugar Alliance	3:16:48	Is the goal Zero Backpumping when considering canal capacity?	Yes
			Is the amount of drainage coming off the EAA into these canals during these wet periods being taken into consideration?	
Diana Umpire	Sierra Club	3:17:33	Sierra Club would prefer a larger storage option so the natural system could have more water. Please explore different alternatives that could make this cost effective.	Thank you.
Barron Moody	WRAC- FWC	3:19:30	It appears if you want to move the graph to the left that would improve the handling of combined flows to the South, then it seems like you'll need to increase capacity about 4,000 cfs.	Yes, but remember this is just the initial assessment and further details will address this better.
Matthew Schwartz	South Florida Wildlands Association	3:20:44	In your presentation were you only talking about the North New River and Miami Canals from Lake Okeechobee to the reservoirs and nothing about increased capacity South from there, correct?	For this project we are only evaluating additional canal conveyance from the lake to the reservoirs.
			How did the A1 FEB do this year, was it hurting for any water? Did you need extra canal capacity for it?	I don't have the data here but it can be made available to you. But generally it has even working well. And yes CEPP is very important for southern flow.
Dennis	Previously with the Corps	3:24:53	The more outlets you can put on the Lake, the better chances for success of the goal of reduced discharges to the estuaries and protect the dyke.	Thank you.

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Name	Affiliation (if provided)	Time	Comment Summary	Comment Response
Rae Ann Wessel		3:26:15	Do we know how the old CERP baseline numbers compare to our needs today given we have had 20 years growth?	As Walt indicated, we update the POR data regularly and also we are using the best info available to date (which are an update from what was in CERP).
			Given the ASR north of Lake O is much constrained as compared to what was in CERP, are we going to capturing some (or model different scenarios) of those numbers that CERP thought was going to captured in the ASRs?	333 ASR wells were identified and evaluated under CERP and are still only being discussed, bottom line yes, there still is a storage needs north and south.
Bill L	FAU	3:29:50	I Don't like ASRs.	Noted
Diana Umpire	Sierra Club	3:31:40	What about the increased conveyance in the canals bringing water south from the reservoirs/STAs, how is that going to be done?	Our project area storage and treatment features to the north. We are building on CEPP and we will be relying on all this other infrastructure that will be part of it.

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Last Name	First Name	Organization(if any)	Email	Phone
Urich	Dave		[redacted]	[redacted]
Roland	PD	340 W Venture Clewiston		[redacted]
Ross	Beth	Gunster	[redacted]	[redacted]
Iglesias	Ramon	Roland Martin Marina		
Godsey	Asa	City	[redacted]	[redacted]
Godsey	Betty	City		
Wilson	Lisa	BCC-Vice Mayor McKinley	[redacted]	[redacted]
Cassani	John	Calusa Waterkeeper	[redacted]	[redacted]
Schwartz	Holly			[redacted]
Jackson-Moore	Tammy	Guardians of the Glades	[redacted]	[redacted]
Batalli	Raul	H.G. Sunday News		
Wesser	Rae Ann	SCCF	[redacted]	[redacted]
Kennedy-Quincy	Irene	PLF	[redacted]	
Ruhl	Lori			[redacted]
Pipes	Nyla	One Florida Foundation	[redacted]	[redacted]
Wade	Malcolm	U.S. Sugar	[redacted]	
Jards	Ken			
Jaros	Deb			
Copp	Roger	water science association	[redacted]	[redacted]
Martin	Mary Ann	Roland Martin Marina	[redacted]	[redacted]
Ritter	Gary	FFBF	[redacted]	[redacted]
Sherreffs	Dawn	Everglades Fan	[redacted]	
Umpierre	Diana	Sierra Club	[redacted]	
Carrozzo	Marisa	Conservancy of SWFL	[redacted]	[redacted]
Duffy	Ryan	US Sugar	[redacted]	[redacted]
Sanchez	Judy	US Sugar	[redacted]	[redacted]
Capp	Cara	NPCA	[redacted]	[redacted]
B.	Kevin		[redacted]	

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Name	Affiliation (if provided)	Time	Public Comment Summary	Response
Raul Batalli	Everglades Southern News	22:33	The question is, have you tested the procedures as you went along? Have you had an example in recent years where you went through this process? Also, have you stepped back and looked at reality and did it work? How did you test it and how did things work out? The theoretics is amazingly complicated. But does it work? And how does it adapt to changing conditions as years go by?	Yes, that's a great question. All of our models are developed to try and represent the system that we are trying to emulate. Our models go through a rigorous process of historical validation, so we take all the observed historical data and as we develop these models, we build all the computer algorithms. We run it with a historical period of simulation and we compare how our models perform over that historical period to what actually happened to to replicate flows through the system. This way we are able to have confidence of what's happening in the system. When we go into planning we don't have that historical data because we are projecting projects that are not on the ground. This has been in place for several decades. The A1FUB is a really good example in the recent planning. We did the planning modelling with the same group of people who supported this project in 2010 under what the district calls the "restoration strategies program" and we ran computer models with different configuration footprints to see what can potentially store water, treat water and send it down into the everglades and we proposed the footprint which is now constructed. We are seeing results consistent with that modeling and the benefits were realized. This is the same approach that has been in the planning process for the last several decades. Very good performance and even better water quality.
John Cosanni	Calusa Waterkeeper	25:45	Does your existing model assume all the assumptions in SEP and second generation SER projects? Are you making assumptions of things that won't be completed for a long time and on different timelines? Does this model make assumptions?	That's a good question and I think it is good to clarify. First is the existing condition, which is all structures and agriculture around Lake Okeechobee and how it exists today. Second, is our future without projects. A look ahead if all our projects are in place to see what it would look like in the future. So, we have current vs. taking no action (which is not an option) and our contemplated actions with additional benefits - above and beyond those other projects that have already been authorized.
Unknown		28:10	How much uncertainty are you comfortable with the project, model assumptions, etc? These are expensive projects way down the road.	There is always uncertainty. The good news is we are working in a manner very similar to the federal process. We assume projects that have already been authorized by congress go into our future without project condition. As we look at our current system it gives us a good feeling about the robustness of what we are proposing. Are we going to get benefits as a lift for both in the current system and future system.

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Name	Affiliation (if provided)	Time	Public Comment Summary	Response
Ray Martin	Martins Marina	40:42	With the modeling you need to address when there is too much water in Lake Okeechobee. Do you consider all the future potential growth on both coasts when modeling and increased runoff?	Yes, future land use projections are considered in the modeling. There is a difference between current and future conditions. You can go to our website to see assumptions and tables for all models.
Raul Batalli	H.G. Sunday News	42:11	Have you considered cleaning the "dirty sediment" at the bottom of Lake Okeechobee before this project is put in place? Have you compared costs of doing this first? What would the consequences be for possible chemical reactions?	High Lake Okeechobee phosphorus concentrations are considered in the model. We are very confident we can process the lake water without damaging the STA's. Also, we do have a plan for Lake Okeechobee when water levels are low (i.e. cost effective treatment of exotics) and FDEP also has a plan dealing with P levels in the Lake Okeechobee watershed. We are already working on this and there is a plan in place to improve the water quality. A Base and Management Action Plan.
Maryann Martin	Roland Martin Marina	45:39	It is hard to tell if all this restoration is just a pipe dream and if it will work. Are we invading areas mother nature says is not going to work? I know what works and that is to treat Lake Okeechobee as a lake and not a reservoir. Right now the lake level is too high. The governor told us to get the water back to the right level - 15 ft. but now we are going back up! Are we holding water in the chain of lakes or are we letting it out to accommodate the lakes to the north. I call that adversity and we need to share adversity with these lakes. We've got to preserve the habitat. Your talking about water quality and I'm taking about habitat, because without habitat you'll never have water quality. You'll lose your grass, fish can't spawn, birds can't nest. Mother Nature needs a place to be and if we have all these holding places what's left? We want to preserve our lake. The best way to clean this lake up - and the cheepest way - is to set it on fire. And you can't set this lake on fire at 16.8 or at 16 ft. You've got to get down low. If it goes dry we can burn it and get those natural seabeds back. The best way to save this lake is to set it on fire so natural vegetation will re-establish. We had a chance this year, but we didn't get the permits. No way to dredge the lake. Please don't overlook this. Let the river heal - but I don't see that happening. We need to flush this laske out.	We appreciate that and that's why we are doing what we are doing. We understand the unintended consequences associates with the system that is built. We do look at the system as a whole. We need to operate the system in a better manner that we are today, especially during high rainfall. We are moving a lot of water to the east and a lot to the west. We are maximizing out what we do with the existing system during the wet season.

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Name	Affiliation (if provided)	Time	Public Comment Summary	Response
Gary Ritter	FFBF	51:50	Walter - another excellent presentation. You make complicated information for the layperson very understandable. I've always had a hard time wrapping my mind around a future without project condition because when I think of that I don't think about all of the other restoration projects being in place, but its actually just the opposite. It's all the projects that are in place and that "without" always throws me off. Regarding the future without condition, do you have an idea now through the modeling effort that when everything is in place, how much water it will hold, is the system dynamic and will it be able to flow south?	Yes, and you are actually setting up the next portion of the presentation. We achieve about 2/3 of what CERP envisioned for these flows. We will spend the next several slides talking about this and what the flow looks like.
Nyla Pipes	One Florida Foundation	53:22	To respond to Maryann Martin, regarding getting rid of the water as fast as we can. Midway Rd. in Ft. Pierce is unbelievably flooded. If it keeps raining, water has to continue to move into Lake Okeechobee with no alternative. As long as it keeps raining we will continue to have a hard time.	No response given.
Unknown		54:30	Regarding uncertainty in QBELs, have you modeled things other than phosphorus, for example chlorophyll? (Reply) Also, there are other key water quality parameters that create exceedances in existing water quality standards and should be modeled that way.	The QBEL we are trying to achieve is the phosphorus standard for the design of the STA. A planning constraint is phosphorus. We would love to have follow up conversations about water quality.
Cara Capp	National Parks Conservation Association	56:50	Are you going to look at modeling different alternatives within the 240 and 360 sets after looking at future conditions?	A great setup for the next portion of the presentation.
	Jennifer Leeds Presentation			
Unknown		1:09	The use of the term "carry over" is a good term and gives the whole system more flexibility. How many of these "carry over" components will be built in the system? How many do you need?	That's a good question. Over time we've been building them and we have two under construction (east & west) and are planning for north and south. There is planning happening for many storage projects. One project won't solve everything, we need multiple projects. The 68 different components include storage, water quality treatment, conveyance and changes in operation.
Unknown		1:10	When all this is done, you're going to have the most complex water management system in the world. As far as all the impurities in the water itself, are we going to monitor them?	The system we have in place now is extremely complex and we are adding to it in order to improve the way it is managed. Ava, we already do have the extensive monitoring your referring to. Please reference our website.
Asa Godsey	Clewiston resident	1:11	The common sense approach to me is to operate water levels in the Lake in a consistent and healthy manner or it will never survive, no matter what else is being done. The only way we will have a healthy system and water levels is to have a healthy habitat.	It's just not one project that will help us. The Lake Okeechobee watershed restoration project is trying to mitigate water coming down from the upper chain and to help manage water levels, but we need storage east, west, south and north. We want to get these projects in place as quickly as possible. We are trying to build infrastructure to manage the entire system. Storage is a key part of that and that's why we are here tonight.

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Name	Affiliation (if provided)	Time	Public Comment Summary	Response
Ken Jeross	Ft. Meyers resident	1:19	A spillway on the south end of Lake Okeechobee would be the best feature to help operate Lake Okeechobee as a lake and not a reservoir. This has the capacity to move the same amount of water coming in from the north, but since this will not be done storage is the only answer. We are drowning in Ft. Myers and the dark water is killing our grasses. Whatever is north will come south. We need to pop the drain.	No response given.
Dave Urik	Responsible Growth Management Coalition	1:36	Concern about what he calls "Pull the Plug" or getting water south of Tamiami Trail. All these projects are important, but getting the water south will address the full system and this needs to be accomplished. We need to strengthen the dyke.	The Water Management District is moving ahead of any federal action to removing several miles of Tamiami Trail and an additional structure at S-333.
Diana Umpierre	Sierra Club	1:39	Please go over again the new material presented at this meeting.	The firt concept was the 240K acre foot with STA in the southwest corner. The second concept would be that same facility, but moving STA to the southeast corner. The third is to achieve additonal storage reservoirs.
Roseanne Wessel	Sanibel Captiva Conservation Foundation	1:41	Does the 16,000 acres shown in your slide include the STA expansion area? I thought A2 was 16,000 acres without the expanded STA area.	Good catch! We have to use the affected area. Rule of thumb is 10% of land is required for infrastructure.
			Did I hear you correctly that the reservoir depth is 24 feet?	On the 240,000 acre concept it is 24 ft. deep.
			Where would the water come in from the Miami and NNR canals? Will any of it first flow into an STA and then the reservoir?	We would want to maximize the performance and use them all together, so it varies on how you would optimize the process.
			What percentage of the water is coming from Lake Okeechobee vs. the surrounding EAA land?	Possibly 800,000AF and adding 300,000AF
			How do we prioritize that water from the lake is getting into these facilities because of competition from the EAA?	The system will work together, just as that water goes south today.
Cara Capp	National Parks Conservation Association	1:47	How is the modeling going to answer questions of how much land may be needed to accomplish goals and objectives? Are you moving forward with the amount of land you currently have and making the best possible outcome? In other words will the models be run with the lands in ownership right now?	We need to maximize to meet CERP goals. Ava, we have to take two steps to meet the CERP goal. We are optimizing to meet the law and the CERP goal with the project. We will continue to look at the concepts.
Gary Ritter	FFBF	1:50	How far below land surface elevations do you think you'll have to go in order to achieve the 24 foot depth in the reservoir? I am concerned with high ground water tables. That's a lot of water.	It is, but we're not there yet, today's step is to get concepts down. Once that occurs then we can build the concepts into models and flush out details.
Nyla Pipes	One Florida Foundation	1:52	There is a big divide between what is possible and what is feasible. Suggests to come back in next public meeting with a clear understanding of what is feasible under a cost/benefit analysis.	This is State law and we will do this regardless. All of this will be done in detail.
Kevin Brown		1:54	What if federal funding doesn't come through?	If we receive no funding, then delays will have to happen.
			If funding does comes through and the project goes through BUT is not successful in terms of exceeding flow limits, what would come next?	We can't "store" our way out of this but the dynamics talked about will give us the opportunity to greatly improve operations, reduce how long and how many events would happen.

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Name	Affiliation (if provided)	Time	Public Comment Summary	Response
Tammy Jackson Moore	Guardians of the Glades	1:58	With the completion of this project, will there still be discharges to the estuaries - east and west?	In years like this year, yes. But we can do a lot to improve how many we send to the estuaries.
Marissa Carossa	The Conservancy of South Florida	2:00	In going through your modeling process, have you identified a specific ratio of STA to reservoir that would be optimal?	Configurations change, this is difficult to nail down because options give you different optimals. If you go to our website you can see the different ranges.
			What are you basing the phosphorus loading estimates on?	They are based on historic data - a ten year average.
Ken Jeross	Ft. Meyers resident	2:03	First, I want to thank you all. The EAA is a business and has best management practices. What if the standard was changed? Wouldn't it be better if the EAA farmers had to clean their water before it is discharged into the Everglades.	The treatment we are talking about is new water coming from the lake. Ava, the EAA BMP is not a voluntary program and is regulated.
Unknown		2:07	Conveyance efficiency will be so important to avoid bottlenecks with 68 components.	It's a very complicated system. Yes, we manage water in south Florida, where there is very little topography to work with.
Dave Urik	Responsible Growth Management Coalition	2:08	Where is Disney in treating their water before it gets into the Kissimmee?	Disney and any development has to meet environmental resource rules. There are water quality targets administered by FDEP as an example.
			How much money have they put into that?	
Maryann Martin		2:11	Keep the farms, keep the soil, don't sell outer lands to development. We have to preserve our lands. The dirt absorbs the water. Preserve our agriculture!	I was hoping to get some feedback on our configurations but with that said, this was a good dialogue.

Everglades Agricultural Area Storage Reservoir Meeting
Wednesday, November 16, 2017 | 6:00 pm - 8:00 pm
SFWMD - West Palm Beach

Last Name	First Name	Organization(if any)	Email	Phone
Johns	Chris	LLW	[redacted]	
Jones	George L.	ORCA	[redacted]	[redacted]
Hauquilz	Daryl	WGI	[redacted]	
Maron	Drew	Sierra Club	[redacted]	[redacted]
Perry	Mark	FOS	[redacted]	[redacted]
Moody	Barron	FWC-WRAC		
Trost	Sharon	Anfield Group	[redacted]	[redacted]
Palmer	Dirk		[redacted]	[redacted]
De Palma	Celeste	Audubon Florida	[redacted]	[redacted]
Shaffer	John	SFWMD	[redacted]	[redacted]
Clark	Betsey	C4CW	[redacted]	[redacted]
Rodriguez	Joseph E.	Specialty Construction Services	[redacted]	[redacted]
Hauquitz	Bret		[redacted]	[redacted]
Diaz	Reinaldo	Lake Worth Waterkeeper	[redacted]	[redacted]
Todd	Ken	Palm Beach County	[redacted]	[redacted]
Albert	Mike	SFWMD		[redacted]
Schwartz	Matt	South Florida Wildlands	[redacted]	[redacted]
Gofornt	Gary	Florida Oceanographic	[redacted]	[redacted]
Ross	Beth	Gunster	[redacted]	[redacted]
Ngwira	Jeannine	FAU	[redacted]	[redacted]
Ganthier	Stanley	FDEP	[redacted]	[redacted]
Young	Mary	Audubon Everglades	[redacted]	[redacted]
Johnson	Neil	Stantec	[redacted]	[redacted]
Williamson	Donald	C4CW	[redacted]	[redacted]
Balar	Bill	EDACS	[redacted]	[redacted]
Varano	Jay	EV Trust	[redacted]	[redacted]
Mihean-Bunce	Vivien		[redacted]	[redacted]
Snyder	Roy	Audubon Everglades	[redacted]	[redacted]
Gillen	Alex	Bullsugar Alliance		
Page	Jon	PECTC	[redacted]	[redacted]
Ryan	Gayle	River Warrior TCDEC	[redacted]	[redacted]
Williams	Keith	Saul Ewry Arnstein and Lem, LLC	[redacted]	[redacted]
Bausch	Joan	FNPS	[redacted]	[redacted]
Bausch	Tom	Martin County Conservation Alliance	[redacted]	[redacted]
Strainer	Kim	C4CW		
Interlandi	Lisa	ELC	[redacted]	

11-16-17 Comment Cards

Last Name	First Name	Organization(if any)	Email	Phone	Comment
Ryan	Gayle	TC Environmental Caucus	[redacted]	[redacted]	A lady wrote me, she was from H2O in Jupiter. Contracted Hookworm from walking in the ocean. We need medical documentation of all symptoms. Martin Health already asks all patients if there have gone in the water. I posted that the West Palm Beach water dirty from run off and dischange from Lake "O". We have had over 12 deaths from the bacteria. *Please send me the video/source so I can share the webcast?

Everglades Agricultural Area Storage Reservoir Meeting
Wednesday, November 16, 2017 | 6:00 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Comment Summary	Response
Mark Perry	Florida Oceanographic Society	25:16	How does this project work with Section 203 of WRDA (as amended)? Is it part of the 50/50 cost share with CERP, or will it not be cost shared until further authorization happens?	The 203 process is out of the naormal framework for us. It requires us to establish a memorandum of agreement with the Army Corps of Engineers to review our document and to do things that we can't do, such as government to government consultations with tribal nations and with NOAA. The goals and objectives, though, are the same as those of CERP.
Matthew Schwartz	So FL Wildlands Association	28:33	Regarding the requirement that this project will nit interfere with existing legal users (ag and municipalities), The Governing Board has the ability to use water from CERP projects as a water supply to legal users; howeve,r can the reverse be also applicable? Can the District then use the additional storage created by these projects for a water supply to existing users? The concern is that during times of drought, the Basis of Review allows legal users to receive water from these project features.	We have two goals: to make sure we don't adversely affect users AND to protect the water for the natural systems. There are water shortage rules in place that apply to legal users. We'll see the modeling results as we go along, but the bottom line is that the water must be protected for natural systems.
Alex Gillen	Bullsugar Alliance	33:13	Section 3 of SB 10 (EAA lease agreement) says the District is authorized to negotiate an amendment (or termination) on lease agreements for use as part of the EAA Reservoir project. 1. Is there land currently being leased to private entities in the EAA that is owned by the District? 2. How is the District utilizing this provision in law with these tenants?	The short answer is Yes and Yes. Ray Palmer of the Real Estate Group explained that almost all of the district owned land is leased, with leases set to terminate by March 2019. On state-owned land, the State will work with tenants on those leases.
Celeste De Palma	Audubon Florida	35:15	CERP talks about flow south. Will you be consistent with water flow not only with central but also south Everglades?	We're working to make sure the features of the south flow have the necessary structures to handle the capacity. So far we believe they can.
Drew Martin	Loxahatchee Sierra Club	37:12	There is a concern that at the time that you most want to capture water is the time when we already have too much water and vice versa. Isn't this a dilemma?	Everything about managing water in Florida is complicated, but the answer is no. Our goal is to protect the water for the natural systems.
Alex Gillen	Bullsugar Alliance	38:16	In regards to NEPA Scoping Process has the project area been defined?	Yes, and there are slides available on our website for you to review.
Presentation on Plan Formation and Baseline Modeling				
Reinaldo Diaz	Lake Worth Waterkeeper	52:13	Regarding the 450 cfs flow rate shown for the Caloosahatchee, a lot of experts he works with feel that flow rate should be substantially higher. How would the model results change if you run these flow at 800 cfs?	We haven't modeled the run at 800 cfs, but the C-43 reservoir affects the Caloosahatchee more that this project will do.
Mark Perry	Florida Oceanographic Society	54:21	Please clarify: the Future Without includes "without the EAA storage reservoir," and future modeling with project will then pick up on the reservoir. Is that the case?	Yes, that is the case. The Future Without is the starting point, and there will be future modeling for comparing our alternatives.
Gary Goforth	Florida Oceanographic Society	57:43	Does the baseline condition modeling address the impacts to the more th It zan three dozen endangered and threatened species in the estuaries?	Right now we are reproducing how the hydrologic function works today. When we run alternatives, then we can quantify benefits if time permits within the CERP timeline. There will be sections in the report that will document these considerations.

Everglades Agricultural Area Storage Reservoir Meeting
Wednesday, November 16, 2017 | 6:00 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Comment Summary	Response
			Does the baseline condition modeling address the economic impacts to water based businesses in the estuaries? It seems to be a flaw in the analysis if these aren't taken into consideration.	
Alex Gillen	Bullsugar Alliance	1:04:28	Gary Goforth is right that quantifiable benefits to the estuaries should be quantified in this report.	Thank you, we'll take these concerns back with us.
Drew Martin	Loxahatchee Sierra Club	1:05:06	One of the biggest issues with the baseline is discharges of fresh water, eliminating all salinity from the system over brief periods of time. Does the baseline consider the damage that could occur when eliminating salinity, even if for only a short period of time?	Our planning goal is to eliminate Lake O discharges to the estuaries in duration and magnitude. We'll be coming back to you with alternatives and options.
Gail Ryan	Stuart Resident	1:06:35	We need medical documentation of all the diseases occurring from these discharges. There have been 12 deaths since 2013. I appreciate these forums to be able to talk with you.	Thank you. We appreciate feedback about some of the unintended consequences of actions. We hope you'll help us improve this plan and get it authorized.
Bret Hofwitz	Citizen	1:10:49	This project is only one small step in responding to these discharges to the estuaries. More needs to be done, People to contact their legislators to keep the pressure up so more can be done.	Thank you.
John Page	Treasure Coast Democratic Enviro Caucus	1:11:37	Martin County residents need to be vocal in this process now.	Thank you.
Mark Perry	Florida Oceanographic Society	1:23:36	Explain how in some years there will be up to 1.3 million AF of additional flow across the red line. What is that trying to achieve in relation to the 300,000 acre feed?	300,00 acre feet was on an Annual Average basis as identified by CERP. It is not a static number. It will fluctuate. The 1.3 was a very wet year, for example.
Alex Gillen	Bullsugar Alliance	1:26:30	Do you need more STAs to go from 1.5 to 3 million?	We are designing to handle all of those years for differing STAs, not just for an average.
Matthew Schwartz	South Florida Wildlands Association	1:27:12	Can you verify that 800,000 AF went threw the A1 FEB this year or was that 400,000 per year over 2 years, and was almost all EAA basin runoff. So will the modeling also address how much more STA will be needed for water quality purposes?	In Water Year 2016 about 200,000 AF from Lake O went through the FEB. In the next part of our modeling, we will be looking at necessary water treatment features.
Initial Concepts Presentation				
Joan Bash	FNPS	1:42:28	My recommendation is the option of putting the STA on the west side of A2 going into the Miami Canal	Thank you.
Lisa Interlanti	Everglades Law Center	1:43	Where does the 300,000 Annual Average AF come from?	The 300,000 figure does come from CERP.
			Can the District look at much more robust alternatives like different STA and/or reservoir sizing options	In regard to other options, we are recommending that we try to achieve what CERP has suggested.
			On a 10,000 acre reservoir, is it feasible for it to be 24 ft deep?	Yes, 24 feet is a deep reservoir. We've been asked to evaluate a 10,000 acre reservoir . We are doing tha,t and we will present our analysis and make our recommendations.
			If not, from an engineering and construction perspective, how to we get to the analysis of the acreage needed to build a feasible project that	
Barron Moody	WRAC-FWC	1:47:42	Does the reservoir acreage always assume to be the same depth or does that change as the reservoir size may change?	On the graph, the relationship between volume and acreage is shown. The volume is assumed to be the same; the acreage varies. The depth will vary depending on what flow you choose.

Everglades Agricultural Area Storage Reservoir Meeting
Wednesday, November 16, 2017 | 6:00 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Comment Summary	Response
			Although we are looking to be consistent with USACE planning requirements, an added value would be gained if public recreational access is considered.	You make a great point about recreational access. We will be addressing recreational access in the plan.
Matthew Schwartz	South Florida Wildlands Association	1:51:01	Habitat enhancement would be a good thing to work into the plan also.	I appreciate your comments. We know, and we've tried to make clear, that there is no one silver bullet. Even with all of CERP we won't eliminate all discharges. We need all the parts of this project to make a difference. Stay with us and let us know if the bar graphs we present make things any clearer.
			It would be very helpful if the South Florida Water Management District could try to summarize flows into and out of Lake Okeechobee, flows to estuaries, and flows into the STA in one place, on one sheet of paper, so the lay person can get a better understanding of the flow numbers. Perhaps a common denominator like cf or af or gallons would be more understandable.	
			I do not believe this project will completely solve the discharge/estuary problem; the volume is too great to affect discharges, and people are going to be disappointed if they think it will.	
Mark Perry	Florida Oceanographic Society	1:56:20	In the original yellow book and the original design of the A1 and A2 reservoirs, STA 3/4 was the only STA component, so there was no additional STA component. Why can't water be routed to STA 5/6, which are underutilized, and maybe the additional 6,000 acres of new STA may not be needed?	We definitely intend to use the exisitng infrastructure and the investments the State has made in those facilities.Remember that the original water quality target was 50 ppb; now it's 10. We know that we need additional storage; we'll use it from within the footprint, as State law says.
Gary Goforth	Florida Oceanographic Society	2:01:01	Great work has been done in a short period of time. But three suggestions; Look at the concept to add an additional spillway and associated canal south of Lake Okeechobee at about 16,000 cfs capacity to be used for Lake water.	We appreciate your suggestions, and we've taken your written suggestions on these items.
			Have an independent canal to be used for multiple purposes.	
			Make an explicit hydraulic connection to the western basins.	
Drew Martin	Loxahatchee Sierra Club	2:05:24	SB 10 does not give the District enough room to do what is needed. You need a lot more land to do what you need to do. The real problem is not just storage; it is the STAs and cleaning the water quickly, especially when flows are highest. The Modeling should take into account the fact that the water that is being moved is dirty. Another good idea is to pay farmers to hold mopre water on their lands..	We're still analyzing and modeling, so it's premature to say whether we have enough land to do what we need to do. Let's get all of the data and go from there. Note that a public-private partnership that would allow payment to farmers is not compatible with a federal project.
Alex Gillen	Bullsugar Alliance	2:09:08	There is an estimate of 6000 acres of STA in scenario 1 and 9000 acres in scenario. Why the difference? Is there an advantage to the 360,000 you show?	With the 360,000 AF, we are losing the Flow Equalization Basin, and that makes the difference. We can't say whether there is an advantage to the 360,000 at this point. Let's get more details and look at the results of the analysis before we decide. Tthanks for your additional comments. We have captured them and will take them into consideration.

Everglades Agricultural Area Storage Reservoir Meeting
Wednesday, November 16, 2017 | 6:00 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Comment Summary	Response
			I don't read the bill to limit the amount of land. There are still options like leases and willing sellers. For the project to move forward, consider more land rather than height. Can there be a legislative fix with a tweak to SB 10?	
			There should be a consideration of the Lake spillway idea for safety.	
Mark Perry	Florida Oceanographic Society	2:14:50	Why would we not go back to the 2006 and 2012 tentatively selected plan, that has already been modeled and worked on to meet the goals and objectives for this project? It allows for going out and finding additional land as needed.	Thank you, that's good information and we'll take that back for consideration.
Barron Moody	FWC	2:16:36	Previous graphs have shown that additional conveyance is needed. They had inflection points that people would find helpful in anaylzing the options. Can they be shown again?	We're on an aggressive time schedule and we have to pick and choose what to present at each meeting. All of our information, including those graphs, are on our website, and we welcome you to access them at any time.

Everglades Agricultural Area Storage Reservoir Meeting
Tuesday December 5, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Last Name	First Name	Organization(if any)	Email	Phone
Allady	Kumar	Radise International	[redacted]	[redacted]
Brand	Darrell	Rivers Coalition	[redacted]	[redacted]
Trost	Sharon	Anfield Consulting	[redacted]	[redacted]
Todd	Ken	PBC	[redacted]	[redacted]
McLean-Bunce	Vivien		[redacted]	[redacted]
Carrozzo	Marisa	Conservancy of SWFL	[redacted]	[redacted]
Preston	Allie	Bullsugar	[redacted]	[redacted]
Gillen	Alex	Bullsugar Alliance		
Ganthier	Stanley	FDEP	[redacted]	[redacted]
Lugo	Nicola	Surfer Magazine	[redacted]	[redacted]
Shirreffs	Dawn	Everglades Foundation	[redacted]	
Baush	Tom	Martin County Conservation Alliance	[redacted]	
Moody	Barron	FWC WRAC		
Grande	Charles	RCDF	[redacted]	
Mitchell	Kimberly	Everglades Trust	[redacted]	
Musgrove	Martha	The Wildlife Fed	[redacted]	
De Palma	Celeste	Audubon Florida	[redacted]	
Martin	Drew	Lox Group Sierra		
Umpierre	Diana	Sierra Club	[redacted]	
Downer	Charles	ES Army ERAC	[redacted]	
Preston	David	bullsugar.org	[redacted]	
Stelmock	Greg	RADISE International	[redacted]	[redacted]
David	James	St Lucie Co. IRC Mgnt Conf	[redacted]	[redacted]
Albert	Mike	SFWMD	[redacted]	[redacted]
Wessel	Rae Ann	SCCF	[redacted]	
Drabile	Jillian	University of Miami	[redacted]	
Johns	Chris	Lewis, Longman & Walker		
Capp	Cara	NPCA	[redacted]	[redacted]
Andrews	Daniel	Captains for Clean Water	[redacted]	[redacted]
Behlmer	Tom	FDEP	[redacted]	[redacted]
Wittmann	Kevin	USACE	[redacted]	[redacted]
Baker	Bill	FDACS	[redacted]	[redacted]
Plaia	Ida	Audubon	[redacted]	[redacted]
Shaffer	John	SFWMD	[redacted]	[redacted]
Jones	George C.	ORCA	[redacted]	[redacted]
Harper	Ceclia	EPA	[redacted]	[redacted]
Niemeyer	Nicole	SFWMD	[redacted]	[redacted]
Zucker	Scott	Audubon Everglades	[redacted]	[redacted]
Young	Mary	Audubon Everglades		
Davis	Steve	Everglades Foundation	[redacted]	[redacted]
Varamo	Jay	Eveglades Trust	[redacted]	[redacted]
Elliott	Rebecca	FDACS/OAWP	[redacted]	[redacted]
Bausch	Joan	FNBC	[redacted]	[redacted]

12-5-17 Comment Cards

Last Name	First Name	Organization(if any)	Email	Phone	Comment
Preston	David	bullsugar.org	[redacted]	[redacted]	Modeling should include potential land acquisition via lease termination swap willing seller etc
David	James	St Lucie Co. IRC Mgnt Conf	[redacted]	[redacted]	Use of aeration for through put management ie. Prevention of organic accumulation and recycling

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Tuesday, December 5, 2017 | 5:30 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Cara Capp	National Parks Conservation Association	33:58	Concerns have previously been voiced about depth of reservoir not only from the perspective of being technically possible but also cost effective and whether it will get congressional approval.	It's important to note how we calculate the results and benefits of this project. We take into account the habitat units and the costs of each configuration to tell us what benefits will actually accrue. We will be developing that piece of the report.
			What are the prospects of ending the leases on land that the District currently owns and leases?	There are 3 components: TIITF lands or State lands, private lands and District owned lands. District owned lands leases expire in March 2019. State owned lands also have leases expiring in 2019, and we're trying to work out the end of those leases. Private land leases end in 2019 as well, and we are negotiating with those lease holders.
Martha Musgrove	FL Wildlife Federation	38:29	How will the District handle the Miccosukee lawsuit with the District and EPA, where it was promised that A1 would be a giant STA?	Water Quality and addressing the WQBEL is part of this project. As we move through this meeting, we'll be reminding everyone of what we're proposing to be sure that we meet these water quality requirements. The District has kept updated communications with EPA on this issue.It's too early to understand the impact of all of the consent orders, but we continue to meet with EPA and keep them updated.
Jim David	IRL Counsel Mgmt Conference	43:17	Nutrient loading into (and out of) Lake Okeechobee is too high. A deep reservoir built south of Lake Okeechobee will accumulate organics and nutrients just as occurs in Lake Okeechobee. My recommendation is that the District also consider the carbon (eutrophication) problem and include aeration (to oxidize the organics) in the reservoirs that would help the efficiency of the STAs. There is currently new technologies that could help to accomplish this.	Thank you. That's great information.
			Walt's Modeling Presentation	
Jim David	IRL Counsel Mgmt Conference	1:11:07	Is the reservoir going to be lined? If not are you modeling the groundwater impacts?	Seepage is considered in modeling and design.
			Did you include any recycling of nutrient loads from the organic settlement?	Settling rates are considered in modeling and the DMSTA has a recycling component.
Dave Preston	Bullsugar Alliance	1:14:54	What are the Water Allocations for this project? For example in CERP, about 1/3 of the water was going to agriculture and 2/3 to water resources. Is it the same for this project?	That's a very good question. On the graph that you're looking at on the screen, the red line has no assumptions about agriculture draws. It shows how to achieve Everglades Restoration. The water comes through, is stored and cleaned, and is sent south. Our goal here is, regardless of what else is happening, the Everglades gets what it needs.
Darrell Brand	Rivers Coalition	1:19:56	I'm glad you explained that red line to those of who are laymen. Is it adjustable?	No, there are 3 flow paths or transepts. The line doesn't move.
Celeste De Palma	Audubon Florida	1:22:12	Thank You for the public involvement in the planning process in order to help in getting a project that will be federally authorized.	Thank you very much.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Tuesday, December 5, 2017 | 5:30 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
			Jeremy McBryan's Presentation	
Barren Moody	FWC	1:37:22	What is the advantage in the 360 alternatives to have levees and such between A1 and A2 rather than having it one continuous facility?	First off, components shown may not necessarily be final, but there are advantages to having these components (i.e.wind-wave run-up issues). A2 may even need to add a sub-compartmental feature to deal with wave run up too.
Drew Martin volunteer	Sierra Club	1:39:13	How are you going to determine the operational efficiencies of the STAs? 2.Will STA efficiency change under different circumstances, such as pulsing or gradual release? 3. I also suggest there be a north/south slopping on the reservoirs so some embankments are less severe from a wildlife utilization perspective.	The DMSTA models are accounting for various and changing efficiencies with the ultimate goal of meeting WQ standards.
			Will STA efficiency change under different circumstances, such as pulsing or gradual release?	
			I also suggest there be a north/south slopping on the reservoirs so some embankments are less severe from a wildlife utilization perspective.	
Rae Ann Wessel	SCCF	1:42:14	Is there WQ data that shows a difference in WQ from the Miami Canal and the NNR Canal? I guess I was assuming that water from these canals would first go into a new STA before going into the reservoirs. that would keep the water cleaner in the reservoirs. Can you talk about any gravity movement of waters vs "pumping"?	Based on our experience, current thought is to have a reservoir as first inflow and the STAs downstream of them, but we can take that thought about an upstream STA into consideration. Inflow pump stations are needed to bring water as high as it needs to be, but once the water is in a reservoir, we have more options and there will be opportunity for gravity movement of water.
Dawn Shirreffs	Everglades Foundation	1:46:04	I'm unsure what you meant by, in some scenarios, having to bring water in from the southern canal. What is the rationale there?	We're leveraging as much of our existing infrastructure as possible. So we could perhaps use the existing 370 and 372 pump stations for efficiency. They just happen to be located to the south of the reservoirs.
Jim David	IRL Counsel Mgmt Conference	1:47:32	Regarding the eutrophication issue, it has an associated plankton blooms issue. Has the model addressed these blooms or will they affect efficiencies of how you will be moving water through the system?	We don't have modeling tools for accounting for algae blooms, but we are getting expert advice about water and soil interfaces to consider in our modeling.
			Have you considered serpentine water through the STAs to improve efficiency much like they do in other wetland treatment systems?	We use compartmentalization rather than serpentine flow to address the issues you're talking about. In our two decades of operations of STAs we have accounted for and gained knowledge of efficiencies through operational experience and the use of compartmentalization structures and "softer compartmentalization" through the use of emergent vegetation. You'll see the compartmentalization in future drawings.
Barren Moody	FWC	1:51:02	Do these components include all the conveyance capacity improvements that will be needed for project or will that be handled in alternative construction?	Yes, they do. The next round of modeling will include more detail to insure we have enough conveyance capacity to achieve the estuary benefits. The number will probably be smaller than CERP's.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Tuesday, December 5, 2017 | 5:30 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Rae Ann Wessel		1:52:23	Have you looked at dry conditions like we had in 2007 and 2012, what duration and levels you get, and what kind of conditions you end up with? How will you keep water in the STAs when needed?	Yes, the modeling accounts for dry times We can stop releasing as needed, and there is storage in the reservoirs for local systems. WE are trying to manage the entire regional system and keep everything in balance.
Daniel Andrews	Captains For Clean Water	1:55:06	Regarding options for swapping lands, where would that fit into the timelines for congressional authorization? Does that have to be done by Congress or the State, or is that something the District can do?	Lands are identified in State law. We'll be sending our report to federal agencies at the end of March and would like to have an update on land swaps and leases when we submit to the CORP.
Scott Zucker	Audubon Everglades	1:56:35	The existing STAs have been great in attracting wildlife. Is the planning process for this project configurations taking into account of what may be optimal for wildlife?	As of now, this is not a primary driver, but as the document is developed, those considerations will be incorporated.
			Susan Gray Ecological Benefits Presentation	
Drew Martin volunteer	Sierra Club	2:08:23	Thank you for a good presentation, but I have concerns about the great amount of seagrass die off happening now in the estuaries and the fact even one storm event can wipe everything out. The problem is there are conflicting needs in the estuaries (i.e. dry periods that result in concentrated pools for bird opportunities on concentrated pools of fish, but at the same time Florida Bay and Biscayne Bay need more fresh water). How are you going to model these to meet the divergent and sometimes conflicting needs?	All systems have a natural and seasonal cycle. They're not always in conflict.
Jim David	IRL Counsel Mgmt Conference	2:10:14	I would like for you to add sediments as part of the habitat that is analyzed for the purpose of measuring restoration, remediation and improvements when possible, including Lake Okeechobee. People aren't really seeing this---the bottom of Lake Okeechobee is dead, it's toxic. There are lots of ways to reduce organic loading.	Thank you. Notice Step 4 on the slide. We're building on SEPP. New habitat units will be the difference between the planning for the previous plan and the plan we are currently developing.
			Matt - Presentation on Cost Estimates and Federal Processes	
Dave Preston	Bullsugar Alliance	2:34:53	Is there a similar reservation for drainage for this project?	No, but there is the requirement to meet the existing level of service on flood control.
Jim David	IRL Counsel Mgmt Conference	2:35:20	Point of Clarification: I represent St Lucie County, not the IRL Council Management Conference. What you're doing is appropriate, but look deeper into the causes of nutrient loading. My comments are intended to help your cause.	Thank you.
			Matt Next Steps Summary	
Diana Umpierre	Sierra Club	2:40:20	Is there a possibility that you might need to ask legislators for extra time?	The time frames are written in State law, and that is the time frame that we are moving toward. We will have reports ready to send on their due dates.
Joan Bausch	FNPS	2:41:59	As I read the documents, it seems that Congressional Authorization is slated for 2019. Is that true?	State law identifies December 2019 for Congressional approval. We are moving forward with that understanding.

Everglades Agricultural Area Storage Reservoir Meeting
Wednesday December 13, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Last Name	First Name	Organization(if any)	Email	Phone
Zucker	Scott	Audubon Everglades	[redacted]	[redacted]
Ganthier	Stanley	FDEP	[redacted]	[redacted]
Capp	Cara	NPCA	[redacted]	[redacted]
Ross	Beth	Gunster	[redacted]	[redacted]
Niemeyer	Nicole	SFWMD	[redacted]	[redacted]
Varamo	Jay	Everglades Trust	[redacted]	[redacted]
Diaz	Reinaldo	Lake Worth Waterkepper	[redacted]	[redacted]
Martin	Drew	Lox Group		[redacted]
Schwartz	Matt	South Florida Wildlands	[redacted]	[redacted]
Drum	Deb	Martin County Govt	[redacted]	[redacted]
Hinners	Billy		[redacted]	
Basulto	Albert	Brown and Caldwell	[redacted]	[redacted]
Moody	Barron	FWC		
Perry	Mark	Florida Oceanographic		
Treadway	Tyler	TCPalm.com	[redacted]	[redacted]
Pipes	Nyla	One Florida	[redacted]	[redacted]
Musgrove	Martha	Fla Wildlife Federation	[redacted]	[redacted]
DePalma	Celeste	Audubon Florida	[redacted]	[redacted]
Wessel	Rae Ann	SCCF	[redacted]	[redacted]
Harper	Cecelia	US EPA	[redacted]	[redacted]
Baker	Billy	FDACS	[redacted]	
W.	Chris	Captains for Clean Water	[redacted]	
Young	Mary	Audubon Everglades	[redacted]	[redacted]
Davis	Steve	Everglades Foundation	[redacted]	[redacted]
Behlmer	Tom	FDEP	[redacted]	[redacted]
Snyder	Roy	ASE		[redacted]
Evans	James	City of Sanibel	[redacted]	[redacted]
Bausch	Joan	FNPS	[redacted]	[redacted]
Dixon	Michael	Engel/ Sefcri	[redacted]	[redacted]
Umpierre	Diana	Sierra Club		
Carozzo	Marisa	Conservancy of SWF	[redacted]	[redacted]
Andrews	Daniel	Captains for Clean Water	[redacted]	[redacted]
Preston	Allie	Bullsugar	[redacted]	[redacted]
Plaia	Ida	Audubon Sierra Club	[redacted]	[redacted]
Sherieffs	Dawn	Everglades Foundation	[redacted]	[redacted]
Johns	Chris	LLW	[redacted]	
Gillen	Alex	Bullsugar Alliance		
Denham	David	Florida Trail Assoc	[redacted]	[redacted]
McLean-Bunce	Vivien		[redacted]	[redacted]
Buanlo	Benny	Evergaldes Guides Assoc	[redacted]	[redacted]
Ryan	Gayle	River Warrior	[redacted]	[redacted]
Barnett	Ernie	WLA	[redacted]	[redacted]
Trost	Sharon	Anfield	[redacted]	[redacted]

12-5-17 Comment Cards

Last Name	First Name	Organization(if any)	Email	Phone	Comment
Dixon	Michael	Southeast Florida Coral Reef Initiative	[redacted]	[redacted]	EAA leases should include increases (if renewed at all)to cover cost of land swap/aqusition SEFCRI should be consulted for reef impact from discharges

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Wednesday, December 13, 2017 | 5:30 pm - 8:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Celeste De Palma	Audubon Florida	29:26	What is the status of looking at those lands how does that fit in to the project timeline? Just for clarification you are talking about the TIF owned lands outside of that footprint? When I looked at the interactive map, I added up the land and it's like 10,000 acres and some of those lands are better situated than the lands further down south for irrigation purposes. If I were a land owner and you approached me would you be interested would be a different conversation than if your willing come forward. I want you to succeed and I want you to maximize your opportunities. I don't know if that is something you are working on and we are just not hearing it.	There is no additional progress at this time from what was presented last public meeting. All the lands within the footprint of A2 are leased both private and state leases. The private lands leases are expected to expire at the same time. We are working with the state and the lessees for a plan to utilize the land for the project. I think we have taken a look at some of the lands that are outside of the footprint to see if there is opportunity to incorporate them in what we are doing. The lands that are further to the north, those could be available for a potential swap if there were someone interested. SFWMD has been very aggressive reaching out to those parties. To date we have not had a lot of yes's. We have made it easy for interested sellers on our website. I think we are aware of that, we have always talked about potential land swaps. Our realestate folks are working aggressively and getting what's identified in law and reaching out to others.
Alex Gillen	Bullsugar Alliance	34:09	How much land outside the footprints does the state or the District own in terms of acres? Is this the final increment of Component G? But is this a close out of component G, is this the final part of component G.	Don't know number off the top of my head. All lands that the district owned lands in the EAA are dedicated to projects at this point. The state does have leases within the EAA but could not tell you the number and all of the lands are all encumbered but subject to being looked at. We are trying to concentrate on this footprint to see if it will work. We are looking at the others as fallbacks. What we have been talking about all along is consistent with state law, making sure we follow protocols under the CERP programs. Which means environmental and policy compliance. We take project plans forward we use the yellow book as our guiding principles associated with those plans. What we have done is established those flow targets that were identified through the modeling aspects and looked at that as our goal. We are trying to achieve the goals and objectives in CERP. I would say it is the next increment of CERP and if we can satisfy the goals and objectives of component G in CERP, this would be the last increment under the CERP umbrella.

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Cara Capp	National Parks Conservation Association	37.08	I had to pipe up, when Mr. Palmer said we are trying to look at this footprint to see if it will work before we look at other options, that really peaked my interest because our allied organizations are having significant concerns. Modeling for the central everglades planning project included an option for deep storage and treatment on A2 similar to the alternatives that we will see today. However that plan was too expensive to pass the cost benefit analysis. NPCA is very concerned that none of these alternative will yield a cost viable that will move forward with approval. I have heard the cost are not part of the initial analysis, I struggle to understand how we would know what is cost feasible without seeing the costs. Do you have information that you are not sharing that hints that these deep storage plans are going to be cost feasible. What we are seeing so far, we are not and that is a significant concern.	We will have cost information, by January 9. I will talk a little bit about step one and step two on the cost feasibility. Things are moving very quickly, we went from screening to more detailed modeling and as a result, STA's shifted in sizing a little bit. We go in and look at infrastructure and then we get a good feel for what it is going to take and modify that configuration. In addition the cost information will be in the report for January 9th. People are concerned about the reservoir height and whether its implementable, I think we can engineer anything. We talked about a two step process, we need to take the report to the state and give them the information. That's step one, once we get through that process, and that report we will hopefully get direction on how to proceed. We do know we get additional benefits for deep storage in the central everglades planning project, no doubt about it. I will let you know when we were working the central everglades planning project we made a decision to move forward a project that was about 2 billion and we wanted to make sure that got authorized by congress. Central everglades picked up those undesirable discharges that I would call the low hanging fruit, they did a really good job of reducing some of the discharges. As you go and plan these other projects, you know having to harvest those higher magnitude longer durations that CEEP didn't get. And in order to do that you're dealing with larger volumes that happen over a longer period of time, it drives you to the need for additional storage. The storage is expensive, if we are going to get to where we need to be in CERP we will have to have this additional storage on the landscape. The features that are going to provide the benefits are going to be more expensive. We are moving very fast, as information comes together we present it with opportunity to comment.
Martha Musgrove	Florida Wildlife Federation	43.29	You have not touched on the EPA lawsuit in which your lawyers dedicated the A1 Reservoir to meet the demands of the EPA for 70,000 additional acres for water treatment. Will this plan succeed both your storage needs and your water treatment needs? Is there 70,000 acres that can be solely used for treatment to settle that lawsuit? It makes a difference how deep the water is as to how much treatment you get.	When it comes to the lawsuit the A1 facility is part of our restoration strategy. The 240 configuration doesn't do anything with A1 it leaves it as a flow equalization basin consistent or shallow storage, consistent with restoration strategies. The 360 converts the A1 to storage, there will have to be reconciliation if a 360 where to move forward.

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Rae Ann Wessel	Sanibel Captiva Conservation Foundation	45.12	Are we still just looking at 4 model run options, A-D? Has the District looked at the cost of converting A1 that has already been constructed and working as an F.E.B. the cost of converting that versus the purchase of lands that would extend? In other words I would think there would be a cost consideration that would be considerable. That would seem pretty fundamental in evaluating the 240 and 360. It would just be a matter of making that deeper and higher walls. In terms of what was presented this morning is then would the bottleneck in moving water the STAs capacity? In terms of the 240 versus the 360 your still moving the same amount of water , Im going to the Q-Bell and trying to understand how, if you store more water, what is the limitation and it would seem like your flow through with the Q-Bell would be one of the constraints. You have removed the manifold canal on the northend, I'm curious what that functionally does. Do you have cross sections to help us visualize in terms of what this looks like in terms of cross section profile.	1. No I haven't agreed to that, we are following the law and evaluating the 240 and 360 and necessary WQ treatment and conveyance and utilizing the modeling to get the benefits that would be achieved to the northern estuaries and the greater Everglades include in our report to state legislature on 01/09/17 2. Wait for Walter to answer
Lisa Interlanti	Everglades Law Center	54	I believe the alternatives we saw today are very narrow NEPA requires you to look at a broad range of alternatives. I look at these and I see two alternatives using 240,000 acre feed and two using 360,000 acre feed and of those, and of those there almost identical. You are basically are comparing two alternatives and I feel like that is not broad enough. We don't have any idea whether what we are looking at are cost feasible at all, I feel like it is impossible to analyze this. Regarding the purchase of outside lands. How many offers has the District made to purchase. The district cannot rely on someone to come forward and sell their land out of the goodness in their heart. I'm concerned you're setting yourself up for failure. Failure in terms of cost effective, failure that the legislature and ultimately failure that congress would approve. If you had more land for this project would you use it? The law requires you to look at that so submit the optimal configuration. Not having eminent domain in now way limits your analysis for optimization, that does not translate into I cannot look at any alternative. If it makes a better project to use more land, than what I would do is identify that alternative, include that additional land and bring that back to the legislature and say this is the optimal project, we have some problems with it.	As we move this project forward, we have to make sure this project is consistent with all applicable laws. The law does not give us eminent domain authority in this area. One of the reasons we have been so successful implementing all of the CERP projects to date through all the water resources acts including our gen 1 and gen 2 and the CEEP projects. The next increment of water that we need to manage is a tuff and expensive increment to manage. Those events that are left over after CEEP are of much larger volume and duration. Thank you

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Marissa Carozzo	Conservancy of SW Florida	1.00.4	Looking at optimal configuration, so far the modeling has been limited to the 4 options. If modeling hasn't been done yet at what point in this process will that analysis be completed. If we are going to look at exploring lands outside of those footprints, whether through land swaps or acquisitions, at what point would that need to be completed. Could you go into the criteria by which you determine is most appropriate for a project of this nature, how do you decide whether to go with a reservation versus restricted allocation area.	This is a step 1 and step 2 process, we are meeting the intent of the law with the 240 and the 360. We are going to prepare all that information we have been working on over the last several months. We are going to report to the legislature on our findings. The next step is to get the feedback on what we have evaluated. We are meeting the intent of SB 10 and the configurations we are evaluating. I'm not going to speak for our state legislatures, we are going to provide a report with our findings on January 9th and go from there. Thats a really good question and if there are existing rules that are in place, as an example in the central everglades project that's a good example for the water that this will create. We look at the regional water availability rule that is already in place that limits increases in allocation for consumptive or irrigation uses. That puts a cap on the amount of water that can be withdrawn from that area. As new water is generated by this project, that rule is already in place so the water would be stored and treated and moved across the red line would already be protected under existing state law.
Daniel Andrews	Captains for Clean Water	1.04.34	You have agreed that a larger footprint could possibly make this project more effective? Im wondering if it would be strategically more beneficial to do that modeling now, that way when you show your report they see that we have these options but, if we had additional lands we could have these benefits. There's a graph showing STA expansion and an area of the reservoir and the amount of water being able to flow south and it's just a steady line that goes up. I think with the people we have in this room pushed for SB10. You would have the support of the people in this room to advocate that we do need additional lands and that may be beneficial. Is there any possibility way you can run that modeling on the large tract of land to see if it would work.	I haven't agreed to that, what I said is we are following what is documented in the law, we are evaluating a 240 and 360 water quality and convenience, we are going to look at it from a modeling perspective that will give us the benefits that are achieved to the northern estuaries and the everglades system. We are going to come up with the most cost effective design aspects that we possibly can and we are going to conduct a cost benefit analysis on the alternative and include that in our report to the legislature on January 9th.
			Walt Wilcox Model Presentation	
Matthew Schwartz	South Florida Wildlands Association	1.44.55	When you were talking about presenting your findings to the legislature, I want to know a little more about that. How is that going to happen, is there going to be some kind of technical committee that's going to be able to sift through this material and explain it to our senators and house members to be able make some sense of this and to have an intelligent conversation with you and the public who knows quite a bit about this.	We have talked all along about doing this evaluation, looking at the benefits that the model output provides us. Susan is going to go through the habitat unit calculations that are standard with the core process that measure the ecological benefits. Then a cost benefit analysis. That information will all be in the report.

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Billy Hinders	Homeowner	1.46.53	1. Was the possibility of using additional lands part of your praydo analysis? 2. There could be other models with additional land that would have helped any of the ones you selected by your praydo analysis? 3. From an engineering perspective what pros and cons would you see from the possibility of using additional lands	1. The praydo analysis was specific to the operational constraints. 2. We have analyzed the scenarios that were previously presented. 3. I am not going to speculate on that at this point
Tom McViker	Dept of Agriculture	1.48.01	Im impressed with the benefits shown for the water supply options, did you or will you try that option for the 240 k reservoir? It might be worth doing for the support.	At this point we have only done that on the 360 but the plan forward is always dynamic. It's not in the current plan. Thank you
Drew Martin	Sierra Club	1.48.42	I appreciate your work and I don't want you to feel like a pinata. I have concerns about things like a 23 foot reservoir being extremely expensive. The other problem is a 23 foot reservoir is going to impact water quality, there isn't going to impact water quality. There isn't going to be the ability for the water to circulate in there and that's going to be a problem. Performance and operations is going to drive this system in your modeling. In order to get this type of performance, you would have to have an empty reservoir when you have a really heavy rain event and a really full reservoir in a really dry event. Water quality, when you have severe weather conditions your STA's are going to degrade in performance. I worry with the constraints of you not being able to buy additional land and even if you couldn't buy the land, if you could lease if for water. You could accomplish more than the expense of a 23 foot reservoir.	We include operations in the modeling including certain elements (like el Niño). We do not try to tune or hyper-manage every event to get the best possible outcome but as they would be operated in the real world. Don't want to box ourselves in based on the uncertainty of real events, as we have seen. That information as the draft operating manual is included in the legislative report. Also keep in mind the C-43 has areas inside it that hold water as deep as 23 feet.
Mark Perry	Florida Oceanographic Society	1:53:42	Regarding deeper storage vs what was discussed earlier about optimization, the law requires that in the best interest of the public, the acquisition of additional lands or termination of EAA leases as necessary should be considered. This should be the modeling, thinking outside the current project footprint areas for optimization purposes and using lower depths in reservoirs as now modeled. More STAs are needed, perhaps not within this footprint. Regarding conveyance, hopefully the 300,000 AF average annual flow can be coming from Lake Okeechobee and not from the basin. Are we considering the basin runoff currently being treated by the STAs as part of the 300,000 AF and is there enough conveyance capacity for both?	For this project plus downstream CERP, 1200 cfs appears to achieve CERP performance and conveys water away from estuaries objectives. Suggestion: everyone should read at least the executive summary of the CEPP document (goals and objectives) before we meet again. This would help to connect the various pieces involved.
Nyla Pipes	One Florida Foundation	2:00:02	There has been much discussion here about costs. One thing that should be looked at when discussing building deeper vs additional lands is the expense of terminated leases, the value of the land, and then the additional projects components needed for the land. Is this going to be looked at? Can you present at least present some cursory numbers next meeting to show this?	1.You're right on the mark. You're not just buying land; you're buying a business. And then you have to pay for the infrastructure that you put on that land. We have not looked at it in detail yet, but the factors you noted are right on. Thank you.

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Diana Umpire	Sierra Club	2:01:48	I agrees with the comments and questions raised about only modeling the lands you are certain to have and not additional lands. You're modeling based on land you are certain to have, but what about models that show how much land you would actually need for optimal configuration? The question raised was why not utilize the modeling to figure out how much land all together will be needed for optimal configuration. 1. My question is how has the District applied the principles of Adopted Management to make sure more water is sent south? I'm concerned about when you get this completed, with climate change, there will be even more stresses. 2. How do you propose to optimize the performance of the expanded STAs without FEBs?	1. Please realize that the whole CERP process includes an adaptive management plan. The CEPP plans also have this process included. We update plans regularly consistent with new goals and objectives. Be sure to read the CERP executive summary; it will give you information necessary for understanding where we are and what we're planning. 2. With all of these model runs, there is a supporting DMSTA component included, plus we are able to rely on our overall STA operational experience.
Chris Wittman	Captains for Clean Water	2:07:32	Regarding land swaps for expansion of the existing footprint, can we develop on option for expanded footprint? Since we are assuming we will be able to utilize the existing A1 footprint for the project, why not do the same for additional lands (i.e. we have this much land we can possibly swap for better optimization). Maybe we could have a footprint outside of A1 and A2. Maybe the reservoir could be expanded and used as an STA. What would be the best case scenario for a land swap? 2. We do know we have state lands available for a swap if we have a willing seller, so why not move forward to the Legislature with a plan that would be an option if a willing seller comes forward?	1. The law actually identifies A1, A2 and also additional lands to the west. In accordance with state law, we have to manage additional purchases and/or land swaps through willing sellers. There are conditions of the law that have to be met. I don't want to move forward with any assumptions that we have land that we don't have. We've done our due diligence and have to meet conditions within the law. 2. Until these willing sellers come forward, and until that scenario of willing sellers comes through, we are moving ahead consistent with the law.
Mike Dickson	Anglers Coolers	2:13	Your approach to the legislative report is only a minimal project that as I understand is dictated by state law. Within the process of evaluation this current footprint can ultimately be evaluated on a cost basis, this does seem very minimal to do. He feels assessing the additional lands should not be a lot of extra work and will allow the legislature see the benefits of additional lands.	Thank you very much.
			Also he asked if current leases could be modified to increase lease assessment then the money could be used in future planning. Will cost impune the process? Will this help to serve the ultimate goal?	
Barron Moody	WRAC-FWC	2:16	1. I was hoping to see in the model presentation the closing criteria involving the everglades complex that was in CEPP. 2. Regarding Tom McVikers comment and considering the limited time we have to model, can we get a "Best Professional Estimate" are we going to realize benefits to water supply? 3. What does a manifold canal look like on the ground? Will it have hi-con activity between the reservoir and the canal? Are boaters going to be able to navigate these to access the WCAs?	1. Yes, regarding closing criteria, we will be taking a hard look at this when evaluating performance. That will be done as part of this particular analysis. 2. The 240 water supply component (that we don't have) may have the opportunity to improve the environmental benefits. 3. The manifolds are basically structures: canals that allow you to bring water in and out of the facility. We encourage you and everyone here to come to WRAC Recreational meeting on 12/18, where this will be discussed.

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Alex Gillen	Bullsugar Alliance	2:17	We appreciate you giving us the opportunity to ask a lot of questions. Regarding looking for legislature decisions on how to proceed and some of the comments made by Senate President Negron that reservoir project is fully funded. When you presentation your optimal presentation, that doesn't sound very optimal, what do you expect them to say?	I can't really read the minds of others. But I am optimistic. When we look at the results this project is given from an environmental perspective, like Ava said, we should be celebrating. This is not just one individual project that will provide all the relief that we need to the northern estuary. It's a combination of the 68 components from CERP that will that will provide. There will also be other projects over time. From the legislative standpoint we are there. We've made a lot of progress in a short period of time. Everything is building on next increment.
Mike Collins		2:22	I feel that one thing that is being forgotten here is that CERP never considered eliminating all the discharges to the estuaries as the goal. The natural system does not work that way and the goal all along has been to reduce the volumes and frequencies, while not trying to achieve the "all perfect." "all inclusive" everything. The second part is to get to a point where we can find a way to achieve some of the goals, improve productivity and reducing discharges. What I see he encourages me that we may be on the right path.	Thank you, Mike.
Deb Drum	Martin County	2:24	I'm thrilled to see the improvement in the St. Lucie Estuary and am very happy for all the work you are doing. So thank you for that. Like others, we are concerned about the realities of implementing this big plan and how the struggles we've had in the past translates to the future. In the Holeyland area, I recall that because of all the infrastructure around it and its influences, the vegetation within the Holeyland has been really impacted (i.e. 40 foot tall willow trees). I suggest we look at whether Holeyland might need restoration flows like treated water from STA 3/4 (but not turned into an STA). Why not look at that as a possibility?	We did look at this in CEPP and there were a lot of different opinions. But considering the expedited time frame, we will try the keep flows there consistent with CEPP. I'm not aware of any issues with exotics as a result of projects we are doing on the periphery. When we implement our projects we will try to restore natural systems as much as we possibly can. Martha Musgrove - it was sidelined because we didn't want to see Holeyland used as an STA or a reservoir and we want to keep in isolated. It is sufficiently large that it is sustainable within itself and we can proceed once other structures are up.
Ben Blanco	Fishing Guide ENP	2:28	I drove three hours to be here today from the keys. Florida Bay is dying, our voice is dying, my business is dying. Florida Bay has not been mentioned once today so I am not celebrating. Voices for Florida Bay are being lost now and this project does not address our issues. We can't get the water there. There are always excuses like too much red tape. 1. Are you considering the needs of Florida Bay for water and the infrastructure needed to get water there? 2. This seem to be working in reverse, for example do we know how much fresh water Florida Bay needs during the dry season to sustain itself?	Thank you so much for coming all the way from Monroe County. 1. Yes CEPP does send some water into Florida Bay but there are other projects and infrastructure improvements being considered that purpose (SFER Program Projects). What has happened over the decades in Monroe the headwaters have been cut off from development. We are putting in place infrastructure that keeps water in the natural system. This project has a contribution factor for it. We need to manage that seepage and direct the natural water back to Florida Bay. 2. Great question. We are monitoring and looking at salinity. As we move forward we will be looking for more opportunities to get water into the everglades system. If there a benefits we'll want to document them.

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Lisa Interlanti	Everglades Law Center	2:34	Thank you and I want to respond briefly to what Ava said. Although there are great benefits that these alternatives and the models do show, but we do not know if they will be cost feasible. There may be other options which could also be evaluated that may be beneficial and less costly and the District is not looking at them. The reason you are not seeing balloons is that the District is refusing to see alternatives that the vast majority of the public that has spoken out at these meeting as asked you to consider in a gentle way leading up to this point. We have asked for this process - to look at the cost/benefits of additional lands and a larger footprint. We can't jump on board because there are so many unanswered questions. The District must be more aggressive on willing sellers. You need to ask. We may be artificially limiting ourselves with the 300,000 Annual Flow. Does the Corps limit to this flow?	I was hoping we could end that last one there on a high note, but I heard you. We've heard it again. And we are moving forward consistent to State law.
			Susan Gray's Presentation on Habitat Units	
Barron Moody	WRAC-FWC	2:45	I am concerned that Lake Okeechobee Performance measures are not included in this. If there are benefits or bad effects to the Lake, they should be included in this process. 2. When we hold the lake about 15.5 for as long as we have the everglades sees a 60 day window until we are impacted. We are past 200 days now. You are overlooking less extreme highs and lows for longer timeframes.	For these alternatives, we have not seen any significant effects on the Lake stage/duration curves. 2. The everglades and habitat units will be discussed in the meeting next week.
Alex Gillen	Bullsugar Alliance	2:47:42	1. In the estuaries figure, what does the yellow represent? 2. Why is the yellow limited to just those areas? Don't the discharges impact the other side (like the beaches on the eastern coast that have had toxic outbreaks)?	1.) The number of acres of potential habitat. 2.) We have another map for the St. Lucie. I'm not sure I can answer your question but I know these are the areas tied to the salinity envelope. We realize that things can be pushed beyond this. We have spoken to people about water moving out into the Atlantic and are collecting documents which we will include in our reports in relation to economic impacts and would like to invite the gentleman from Florida Bay to give us information as well.
Ben Blanco	Fishing Guide ENP	2:50	Where is a similar map for Florida Bay? There's at least 50,000 acres negatively influenced by all of this.	The Greater Everglades Performance Measures will be looked at in progress to be reported on next week. We do not have the information and are still crunching through the numbers. The question is have seen an influence on Florida Bay and are still assessing that data.
Unknown		2:51:08	Why are you considering box cut channel within the caloosahatchee as potential habitat for restoration of oysters or seagrasses?	We are looking at a range of species and are also looking upstream and downstream. We have to factor in salinity. Do we have the correct habitat?

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Name	Affiliation (if provided)	Time	Public Comment Summary	District Response
Mark Perry	Florida Oceanographic Society	2:52:00	Salinity is one factor when evaluating H.U. but there are other things like turbidity are also factors in how sea grasses are affected. Sea grasses are very vulnerable. When we consider the lift that you have modeled for, you are NOT considering the losses of habitat that are happening and the associated cost analysis.	There are a lot of different factors that go into the the lift numbers. If there are other factors affecting our benefits analysis, please provide to us so we can use in this federal process. It's important to document this and we will include good, technically sound.
			The real thing that people want to see is how much reduction in discharges will these projects provide.	The Estuary Performance Measures slide shows this and the benefit to the area. You can access this on the FTP site.
Scott Suker	Audubon Everglades	3:01	Granted all the benefits being presented here are good, we are not addressing any potential ecological impacts to the actual AREA that project components are being built on. we are talking about tens of thousands of acres. What is the effect here - for our homes, for our lots. Does the modeling take these areas into account?	It goes back to the standard protocols and the standard process' of habitat units in the federal process. It's up to us to add this into the report. The economic impact will have to be analyzed.
Steve Davis	Everglades Foundation	3:03:54	There is a need to remain consistent with the Habitat Units all the way down to Florida Bay. There are means and a tool to look at salinity and Habitat Improvements in Florida Bay that were already used for CEPP. Refer to Habitat Unit spreadsheet. I strongly encourage incorporation of that tool in this approach.	Thank you very much.
Rae Ann Wessel	Sanibel Captiva Conservation Foundation	3:05	Since we are using a performance measure on the Caloosahatchee for low flows (450) which is insufficient for recover, tis skews the results and that higher flows are actually needed. 1. Could you provide an assessment for higher flows for example if you were looking at 700 minimum flow to see how that compares? 2. Not clear about the R360 performance vs. C360 shows improvement in Habitat Units. Is it a timing issue? That piece is missing and and I have nothing to ground them too.	Operational timing is so important. It gives you additional benefits in wet and dry conditions because it allows you to operate the resivosis more effectively. That's the information behind it. It's really an operational shift in timing. More water available in the lake, more water available to meet low flow targets.
Gail Ryan	Martin County Resident	3:10	This is directed to the people who are not here. I'm very confused about damaging discharges while they are still allowing them to happen. I say, Terminate EAA leases and use these lands for the benefit of the estuaries. We've had 13 deaths since 2013. This is directed to the Army Corps of Engineering.	Thank you for sharing your frustrations. I think we're on a path of where we need to be.

Everglades Agricultural Area Storage Reservoir Meeting
Thursday December 21, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Last Name	First Name	Organization(if any)	Email	Phone
Gardener	Mali	City of Clewiston	[redacted]	
Busins	Stephanie	Hendry Co. School Board	[redacted]	
Greer	Josh		[redacted]	
Behlmer	Tom	FDEP	[redacted]	[redacted]
Wallace	Rev Patricia	CYCI:Guardians of the Glades	[redacted]	[redacted]
Musgrove	Martha	Fla Wildlife Fed	[redacted]	[redacted]
Plaia	Ida	Audubon of Everglades	[redacted]	[redacted]
Diaz	Reinaldo	Lake Worth Waterkeeper	[redacted]	[redacted]
Mitchell	Kimberly	Everglades Trust		
Drum	Deborah	Martin County	[redacted]	[redacted]
Elliott	Rebecca	FDAS/OAWP	[redacted]	[redacted]
Chamberlin	James M.	BBT	[redacted]	[redacted]
Jolin	Elizabeth	Monroe County FL/Florida Bay	[redacted]	[redacted]
Harper	Cecelia	US EPA	[redacted]	[redacted]
Welbourn	Joe	Carbon Marine, Tampa	[redacted]	[redacted]
Welbourn	Joseph	Carbon Marine, Tampa		[redacted]
Ryan	Patrick	Star Quarries	[redacted]	[redacted]
Davis	Steve	Everglades Foundation	[redacted]	[redacted]
Palmatier	Denise	Stanley Consulting	[redacted]	[redacted]
Basulto	Albert	Brown and Caldwell	[redacted]	[redacted]
Van Lent	Thomas	Everglades Foundation	[redacted]	[redacted]
Trost	Sharon	Anfield Group	[redacted]	[redacted]
Len	Cynthia	Glades Lives Matter		
Parris	Mary	Glades Lives Matter		
Gordon	Wonda	Glades Lives Matter		
Stewart	Bobby	Glades Lives Matter		
Moody	Frank	Glades Lives Matter		
Diley	Otis	Glades Lives Matter		
Brooks	Art	Glades Lives Matter		
Connolly	Hugh	Glades Lives Matter		
H.	Denzil	Glades Lives Matter		
Hamilton	Julius H.	Guardians of the Glades		
Kyles	Joe	Mayor of South Bay		
Jackson-Moore	Tammy	Guardians of the Glades	[redacted]	
Wilson	Steve	Mayor of Belle Glade		
Anderson	Pastor	Guardians of the Glades		
Sasser	J.P.	Former Mayor Pahokee		
Moody	Barron	FWC		
Cook	Melton			
Mauri	Emily	bullsugar.org	[redacted]	
Preston	Allie	Bullsugar	[redacted]	
Houdesheh	Craig C.		[redacted]	
Johns	Chris		[redacted]	
Umpierre	Diana	Sierra Club		
Ganthier	Stanley	FDEP	[redacted]	[redacted]
Andrews	Daniel	Captains for Clean Water	[redacted]	[redacted]
McGuire	Kayla	Captains for Clean Water	[redacted]	
Capp	Cara	NPCA	[redacted]	[redacted]
Pipes	Nyla	One Florida Foundation	[redacted]	[redacted]
Crawford	Mattie	Guardians of the Glades	[redacted]	[redacted]
Albert	Mike	SFWMD		
Martin	Drew	Lox Group - Sierra Club	[redacted]	

12-21-17 Comment Cards

Last Name	First Name	Organization(if any)	Email	Phone	Comment
Conner	Mike	Self Employed Fishing Guide	[redacted]	[redacted]	In all due respect, your change in the final scoping meeting format resulted in a total diversion from the purpose of meeting. This was unproductive.
Sasser	J.P.	Former Mayor of Pahokee	[redacted]		speak
Baush	Joan	FNPS	[redacted]	[redacted]	Would a model of shallower reservoir with a bigger footprint be useful to compare costs to current choices modeled

Everglades Agricultural Area Storage Reservoir Scoping Meeting
Thursday, December 21, 2017 | 9:00 am - 12:00 pm
SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Comment Summary	Response
			Walt Wilcox Presentation	
			Susan Gray Presentation	
Martha Musgrove	FL Wildlife Federation	1:01:37	On the last slide - 360 C - you said it was fully consistent with CERP. How does it mesh with CEPP project? Does it change the proportions of water? Does it flood Conservation Area 3A? How does it mesh there? So we are adding water supply?	First understand that in CEPP there were water supply benefits, so there is nothing new here. We are building upon CEPP and converting the shallow storage with deeper storage, operating this alt. with consistent with CERP. Our presentations today all showed the environmental/ecological performance and water supply benefits with all the alts. One reason is because you can keep water in the lake earmarked for the natural system.
			Does that presume that the Lake remains on the LORS schedule?	The modeling done here utilized a lake operation that has been optimized, that builds upon the schedule used in CEPP and allows movement of water from the lake to move south.
Newton Cook		1:05:37	The district has a done an incredible job. I have supported these reservoir projects for 15 years as they were and as they are today. There are numbers that have been presented for Florida Bay regarding the annual increases. Florida Bay people are worried about the plus numbers. What is the total capacity of the structures at the south end of the Lake today? How long would it take to feed a 360 AF reservoir - 20 to 25 days? What will you do with the other 24,000 cfs during those 20 days, where do think it will go? We don't worry during dry or normal periods. Filling a reservoir is only 8 inches off the Lake, and since everything else is full, the reservoir is going to sit like a duck pond and the estuary is going to get bombed. We must send this water north of the Lake and take it to the sea.	
Drew Martin	Loxahatchee Sierra club	1:09:00	Thank you for all your work. The 60 day period that you have picked to show how it will be reduce flow to the estuaries. I think you need a shorter period of time. Please do a 30, 15 and 10 day evaluation in modeling. I suggest you add the additional timeframes into your monitoring. If you could adjust the irrigation regimen in crops, (I don't know if that is allowed under this bill) but if farmers could change some of the crops would that adjust the amount of water and the flows? Thank you and happy holidays.	Just want to clear up that we do look at 14 days on the St. Lucie and the Caloosahatchee is on a monthly moving average. The duration is how the oyster population is sustainable over a period of time with other factors also considered (i.e. temperature and how healthy the population was to start with). Field observations and focused experiments have shown that If the oyster population is healthy to start with, flow regimes of 2000 on the St Lucie and 2800 on the Caloosahatchee impact the salinity, dropping them but still could be sustainable from 45 to 60 days. If it goes below 5, they start to die. What we want to find out is while we are reducing these discharges to the estuaries, what is doing in terms of sustainability of these ecosystems. We did show incremental improvements from beyond what CEPP achieved. CEPP had 36 high discharge events and these alt projects reduced them to 20, 24 and 21 events.

Everglades Agricultural Area Storage Reservoir Scoping Meeting
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Name	Affiliation (if provided)	Time	Comment Summary	Response
Kimberly Mitchell	Everglades Trust	1:12:50	I would like a copy of the specific reductions by the implementation of this project.- you give numbers but say this is with all the other things that you are doing, this is the total. 1. But can you answer the question that without any of the other things, what will the reduction mean for the estuaries? You don't have the numbers. What we are doing is redoing CEPP. 2. What is the differential by these changes? I want to understand the differential between the original CEPP was going to reduce and what the new version will reduce. We are at a little bit of a loss to see your numbers. 3. How did you come up with the cost with specific breakdowns? Conveyance, building the reservoir, treating dirty water, etc. 4. Did you use the same methodology that the Corps uses?	1-3 I don't have now but be can get that information Walt - the placemat summaries do show the cumulative but the individual P.M.s that Susan and I used showed the individual alts compared to CEPP. Ava - All our summary slides will be posted to our web site, including the cost breakdowns and how they are broken down by components. 4. Yes
JP Sasser	former City of Pahokee Mayor	1:07:54	I want to remind everyone about the construction that started 10 years ago happening in the EAA and environmentalists sued to stop it…delaying Everglades restoration. This year SB10 was approved, Everglades Foundation praised it, at the same time they unleashed their paid attack dogs. Here we are again and the environmentalists are here to protest again, demanding more land, showing their personal vendetta for agriculture. They say the current EAA is too deep and thy want to increase its footprint. But on their web site they said the C43 was critical to the success of CERP. Plus the C43 is deeper than these proposed EAA reservoirs. Shame on them for their hypocrisy and for trying to take our land and our jobs.	No response
Alex Gillen	Bullsugar	1:20:21	I don't know anyone in my community, in Stuart, that is against jobs and folks in the Glades community. I love sweet corn and vegetables and I am for you guys as well. We are not against you all. I can tell you that personally. So I'm sorry if that is the perception. If you would like to get coffee or a bite to eat I would like to do that. As far as the process today, the 13 word agenda didn't do a lot. I feel ambushed. If I had known I couldn't ask questions till now I wouldn't have come. My first question is: did the Corps sign the agreement to participate in this process and is the Corps here? Are they going to be here?	We are working with the Corps on a different path from the typical process where we have a master agreement where we are the local sponsor and the Corps is the lead.. Because of the time frames and SB10 we did are using section 203 of WORDA that has a 2-step process. Step 1 is the MOA (she was cut-off from Alex Gillen at this point). The Corps is not here today but we are still working through finalizing the Scope of Work with the Corps (which is the 2nd step of section 203) and until that gets done, they cannot come to these public meetings.
			Has there been any alternative modeled for the conveyance features?	Yes we made sure that ramping down the conveyance number to 1200 while not negatively affecting the estuaries and would achieve the desire benefits for them.

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SFWMD - West Palm Beach

Name	Affiliation (if provided)	Time	Comment Summary	Response
			Last week we talked about state owned lands…how many state owned lands are there in the EAA leased to private entities? Do we have that number? The land is not being considered in the foot print - are these public lands? Do these land exclude the Holeyland and Rottenberger? Is it possible to put a little summary on the website to help avoid confusion?	Steve Collins - there are 13,000 acres of state owned trustee land approximately 1200 acres of this is in the project footprint. Yes they exclude Holeyland and Rottenberger.
			How dynamic is this reservoir going to be?	Very, there will be water being moved through the facility almost all the time.
			Did anyone hear or read Sen Negron's letter to Ernie Marks. In the future it would be really great if we could beef up the agenda and also publish the slides in advance. This shift in format really changes the way we go about it.	Yes Mr Marks responded to his letter today.
Janet Taylor	Former County Commission and Glades Lives Matter	1:28:10	I will stick to what is pertinent. I'd just like to say thank you for all your hard work, thank you for sticking to the limitations of SB10. And for working with both sides on this issue. A plan that will decrease the discharges and save our land. If there is any indication that they want to buy more land I will come back.	Thank you
Elizabeth Jolen	Monroe County, representing Florida Bay Forever	1:29:01	I have been watching the public hearings and have been alarmed at the absence of Florida Bay in the slides, so I had to come to make sure we're on it. Thank you for including us in your analysis. I would like to compliment you on making this a public process. We have to elevate our knowledge of how we learn about how water is managed. It is challenging. Iam overwhelmed by these slides. Thank you for listening to public comments. One of the challenges I have is I don't feel like they are being compared to an optimal configuration. If you had a golden pen and could create anything, which I think our SB10 asked for us to do, what does that look like and how does that compare to what we're seeing today? I think it would help me to understand what it is we're actually getting within the constraints of the state-owned lands. If you can do that before Jan 9th that would be great. That is a real challenge I see in this process.	No response

Everglades Agricultural Area Storage Reservoir Scoping Meeting
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Name	Affiliation (if provided)	Time	Comment Summary	Response
Cara Capra	National Parks Conservation Association	1:30:44	I think that in the past week the tone and dialogue in these meetings have shifted a bit. We have concerns, that we expressed in our letter to the District and the Governor, that the 5 alternatives only represent 2 footprints and they don't represent a fully complete array of alternative to satisfy NEPA. NEPA challenges the agencies to search for the optimal configuration, understand what it takes and the array of costs. I don't think that the 2 footprints satisfy NEPA. Also concerned that the Corps isn't here. I kept waiting to see the Corps folks. Wanting a project that gets congressional approval and knowing NEPA compliance is an important part of that. We deeply want this plan to succeed, good for every community throughout the state. And people come first, always. We want to see that best project for the people of Florida. We need to understand all of the alternatives completely.	No response
Tammy Jackson More	Guardians of the Glades	1.33.07	It's disheartening to hear that there is conversation and talk about additional lands being used. We've always known this issue is about a land grab. During the legislative session we worked hard to have a seat at the table, and we thought we came up with a compromise but before the ink was dry there was conversation about taking additional agricultural lands where glades people work and make their livelihood. There is a public process that has to be followed. These conversations about taking land are being had without the public being involved. We are not professional protestors. Just know our eye is on this. We are glad we had a bill that was agreed upon that identified the lands needed for this project. We will make certain our voices are heard. It is about protecting our community.	No response
Steve Wilson	City of Belle Glade Mayor	1:35:15	I am not here to try to challenge all the experts or scholars from a scientific approach. But I will go toe to toe with anyone when it comes to a humanistic approach. People's lives matter. Digressed to tell a story about listening to school children singing "It's a Wonderful World." During the going back and forth to Tallahassee we discovered there were communities and cities against each other and we prayed we could come up with something we could all live by. SB10 was that compromise we all agreed to. Stay focused on SB10. It's a wonderful world if we live and work together.	No response

Everglades Agricultural Area Storage Reservoir Scoping Meeting
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Name	Affiliation (if provided)	Time	Comment Summary	Response
Kimberly Mitchell	Everglades Trust	1:37:23	I hear the Glades community people. But I think there are things that are still missing. We worked very hard on SB10 to come up with solutions to these discharges. The state of Florida endured a long periods of time state of emergency this year. SB10 is very specific. It didn't delineate a footprint. It gave an idea where to go. However it also said the goal is to be optimal in the way this reservoir is going to work. Meaning reduce discharges and get water down to Florida Bay. One of the new configurations includes more water to sugar. But we just compromised to send water to the Everglades. This is not being anti-farmer, I don't even know what that is. I hate that we use these words that split us up. We use these incendiary words that split us. If we go back to what SB10 says, we are looking for the optimal configuration for 240 AF. We are not talking about taking more land, buying more land. That would be great if there were willing sellers. 1. What about Prideland, for example. The leases are supposed to be terminated. What has DEP said to you and what conversations have you had on this? That's almost 4,000 acres of the peoples land. Do we have an answer on that? I can't imagine that you can't see the need for more land for treatment. Whether you call it an STA or a larger reservoir. We need more storage south, we need more storage north, not less. Climate is warming. Our planet is warming. Florida needs more water. If we want to protect and defend the agricultural community then we have to work together to see the bigger picture. Not pitting one against one another. I wish I could make you believe that's how we feel - we are not anti-folks from the Glades, not anti-farmer. We are not even anti-sugar although they are really irritating. We just need them to work together and move out of the way a little bit. There is land that can be swapped. I hope that my words reach some of you, all of you especially the District.	To the extent the lands would be needed, we would be happy to contact and work with DEP. But we have not seen the need for these lands yet.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Molly Gardner	Mayor of Clewiston	1:42:47	Thank you for serving. Back in 2008 we heard "take the land". Now this past year – "flood their communities", "remove the levy". The job we have to do is very difficult. When you hear comments of take their land, flood their towns – those are incendiary comments and we know there are underlying forces that do want to see agriculture taken out of the EAA, that do want to see our towns decimated. We are going to stand up and speak. SFWMD has done their job. I am not a scientist. I'm not the expert. But I want CERP (the Feds) to pay 50%. I want the Feds to pay for that. We're all taxpayers, we want to see our money used as efficiently as possible. You've followed the confines of SB10 with no more land taken out of production. We need to stay focused on that. We need to quit spending money and then having to stop a project (i.e. 2007 reservoir) . Don't waste any more money. Be accountable for the taxpayers in the district. Hoping it's going to be a wonderful world but one of the issues we all have in common is the water. Primarily we need to address the issue of the water coming in from the north. The water quality and the water quantity coming into Lake O from the north. We wouldn't be having this conversation if we could address the flows coming into our Lake. The destruction of Lake O because of too much water coming in from the north. Lake O does not produce the water. It is coming from the north, this issue needs to be fast tracked.	No response

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Janet Taylor	Former County Commission and Glades Lives Matter	1:46:54	When we talk about taking the land, would the yellow shirts please stand up. These yellow shirts are Glades Lives Matter. We are proud to be here. When we talk about Sen. Negron's letter, after I read the letter, I said they are coming for our land. When they tell you it's not about the money…it's about the money. When the coastal elites and radical environmentalists try to tell us that building a reservoir south of the lake was not about taking our land… it IS about taking our land. Here's the proof, just 7 months ago we all agreed - on all sides - to build the reservoir south of Lake O. We all agreed on the amount of land to be used, the type of land to be used and the exact location. Passed the legislation. Everyone got a pat on the back. The Governor signed the bill. Since then the SFWMD moved heaven and earth to get community input and put together a plan for building this reservoir. Then earlier this month, all hell broke loose with the radical group of professional environmental protesters, Bullsugar, began filling up inboxes saying this won't work. They want our land. This is not about water quality and quantity. The water coming off of our farms is cleaner than when it came onto our farms. 98% of the water that comes into the Lake comes from the north, not from the Glades. This reservoir redo is about taking more land, destroying our communities, displacing our families and ruining our local economy by ending farming on the most fertile soil on the earth. The word is out. The motives are exposed, Bullsugar you are exposed again. We ask that you join us to fix the most vulnerable population protection structure in America - the Herbert Hoover dike. Join us in advocating for water storage treatment north of the Lake and at the source of all the pollution. None of these solutions will give them their true prize – our land – but they will make our water cleaner, our economy stronger and keep pour communities together and whole.	No response
Josh Greer	Fishing guide from Port Charlotte	1:51:52	I am a fishing guide. I'm not a coastal elitist. I'm a fourth generation Floridian and I am not against agriculture. Most of my family and friends make their living off of agriculture. I don't want to get into an argument about this. I'm not a scientist. I want to commend the district on what they are doing. I want to encourage the district to do whatever they can to get water to the Everglades. To stop the discharges to the east and west. Those discharges are killing my economy and my communities. Encourage the district to do everything possible. Please get that water south.	no response

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Stephanie Busen	School Board of Hendry County	1:54:06	I want my school kids to understand what the District has done to comply with SB10. The calls to take the land were an unwarranted threat to our children's future. I applaud the district for taking such a science-based approach and not engaging in dramatic narrative. Thank you for being a model of how science can and should guide public policy. In our schools we teach our kids to use the scientific method. This is a process that will create an informed hypothesis – so they can make an informed determination. I am pleased to see these models being practiced here. The process has been scientifically sound. Thank you for setting a great example for our students.	No response
Joe Welburn	Carbon Marine, Tampa	1:56:10	I own a small manufacturing company. I travel the entire state. I go through the Glades community. I supply products that are sold to the recreational fishing market. Nobody in the fishing community wants to see the glades folks suffer. We have to take a holistic approach to what's the solution. We are dealing with a dam that was built a long time ago before people understood the impact. I have customers internationally and they say they won't come to Florida because all they see are messages about discharges and bad water quality We have all seen the maps of Florida - they don't say Orlando - they see Disney. Now they see Florida as algae and pollution. These people are going to Belize and other places - and they are not coming to Florida. The are not coming here for recreational fishing. (Starts crying) This is how I feed my family. It's really hard to see how the special interests have driven these stakes into our communities and all they care about is money. When the special interest gets involved in public land, it gets distorted and convoluted and then we end up fighting each other. We are losing when the narrative every day is how bad the water is. I come here to help personify - how are we going to fix it. I'm not an expert on negotiations, or the experts in this battle, but I do know the sugar cartel controls the dialogue, controls what we see, hear and feel. It controls who is in the room. They benefit from land leases. They have an alternative business in C51 basin they are trying to get going. If you have a major stakeholder like the sugar cartel and you can do quid pro quo exchanges and work with them. This isn't a zero sum game, there doesn't have to be a loser. We can all win. We can get an end result that solves the problems. We have to get algae and discharges out of the news to help with tourism. People aren't coming to our state because of controversy about the discharges. We have a bad dam. We have to do something with it. As it	Joe made a lot of good points. One of them was about land swamps. I wanted to make it clear that the District is open to any process that make any land become available to incorporate into the project.

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Name	Affiliation (if provided)	Time	Comment Summary	Response
Diana Umpierre	Sierra Club	2:11:00	Regarding the leased lands, SB 10 did ask to terminate those leases. The concept was to use those lands for this project. I don't understand where that is at. 1. I would like to know whether you have done everything you can to maximize those lands. 2. The Everglades Foundation has scientists that I think have done alternative evaluations I think that have been presented to you. Now my personal comments (not Sierra) I used to work here. Its hard being here wearing my other hat. What hurts is when I hear things that are not true. Remember who I am. If there was evil behind Sierra Club I would not be working for them. Please get to know the organization and what they're fighting for. They are fighting for social justice. Not many environmental organizations do that. We support Black Lives Matter. They are not being treated like white privileged people are. We fight for coal communities. There is some sugar cartel money that is sending flyers to your homes to tell you things that aren't true. I appreciate what the District is doing. But it is our right to challenge you.	First FYI, we have some mapping capabilities for you from our web site. As far as the state lands issue and the modeling scenarios that Walt described. The 240 and the 360 "buckets" and the STAs and the conveyance features buckets. I'd like to make clear that when those buckets get input into models, they spit out the benefits to the estuaries and to the south. We take that information and think how can we put them into geometry (configurations, costs and affective use of lands). So where we fit it is the next piece. I want to make sure everyone understands that we have modeled what we were supposed to. Cost effectiveness means that if we have potential land swaps, they must be located where they can be affectively used, not so far away that more money would have to be spent to incorporate them into the project.

Bonefish & Tarpon TRUST

135 San Lorenzo Ave.
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33146

November 22, 2017

Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road,
MSC 8312
West Palm Beach, FL 33406

Subject: Everglades Agricultural Area Storage Reservoir Feasibility Study, NEPA Public Comment

Bonefish & Tarpon Trust is a 20 year old science-based conservation organization that is focused on improving management of coastal fisheries and the habitats upon which the fisheries depend. Though our focus is on the fish species that comprise the flats fishery – bonefish, tarpon, permit, and snook – our science and conservation work also applies to other coastal species and fisheries. Indeed, we regularly collaborate with state and federal resource management agencies, sharing our data to help improve management. We are also an angler-based organization in that we engage and represent the tens of thousands of people who participate in and rely upon the recreational fisheries for their livelihood.

This letter shares BTT's views pursuant to the National Environmental Policy Act (NEPA) II relevant to the South Florida Water Management Districts ongoing work to build the blueprint for the EAA reservoir.

Item 1: The study area proposed for the EAA storage reservoir feasibility study must be much larger (Slide 10, https://www.sfwmd.gov/sites/default/files/documents/pres_2017_1023_eaa_res_scoping_meeting.pdf).

The impacts of freshwater discharges into the Caloosahatchee River and St. Lucie River are much greater in geographic extent than the rivers themselves. The impacts on the east coast extend well into the Indian River Lagoon and the Atlantic coastline. On the west coast, Matlacha Pass, Pine Island Sound, and adjacent Gulf of Mexico waters and habitats are heavily impacted. These impacts are both direct, whereby the altered freshwater flows and their contents kill habitats (e.g., seagrass) and associated fauna, and indirect, whereby changes to ecological function have cascading effects. Attached for reference is a scientific article on the broad effects of alterations of freshwater flows on estuarine ecology (Sklar and Browder, 1998). Moreover, many species exhibit ontogenetic movements that mean the 'local' effects of freshwater flow alterations have system-wide effects. Attached for reference is an article on the effects of flow alterations on the diet of snook, an economically important fish species (Adams et al. 2009), which likely has population-level impacts due to the effects on growth and survival. One can assume similar effects on other species that depend upon estuarine habitats for portions of their life histories, such as tarpon and red drum.

Similarly, the portion of Florida Bay included in the proposed study area is insufficient. Given the ecological links between Florida Bay and the wider Florida Keys, the study area should extend at least to Marathon. BTT data from an ongoing acoustic telemetry study on tarpon, for example, demonstrate connectivity between most portions of the Florida Keys and Florida Bay and the Everglades, not to mention between Florida Bay, the Everglades, southwest Florida, and the east coast of Florida. Indeed, tarpon tagged in Florida have been detected in the Chesapeake Bay.

This wider geographic scope must be applied to all aspects of the feasibility study.

Item 2. The feasibility study must include measures of the effects on economically important fish species.

The recreational saltwater fishery of Florida has an economic impact that exceeds $7.6 billion per year. The annual economic impact of the recreational fishery in the Everglades region is nearly $1 billion (see attached Fedler 2009). Moreover, these species – tarpon, snook, red drum, bonefish, and others – are mesopredators, so assimilate the ecological processes within the system. In other words, the health of these fish populations is a good indicator of the health of the system. Given that an ongoing BTT-funded study demonstrates that the Florida Bay and wider Keys bonefish population has suffered an extreme decline since the 1980s, bonefish will make a good proxy for ecosystem health for Florida Bay and the Florida Keys. Similarly, the other species listed above respond to freshwater flow alterations in the Florida Everglades (e.g., Boucek and Rehage 2013, attached).

Item 3. The feasibility study must include examination of what we term Legacy Effects.

Immediate Effects from freshwater flow alterations include direct mortality (e.g., seagrass, oysters, fish kills) and avoidance movements (i.e., fishes depart an area due to salinity changes). Legacy Effects are impacts that remain after drastic salinity changes, such as hypersalinity in Florida Bay due to insufficient freshwater flows or freshets in the Caloosahatchee and St. Lucie Rivers due to freshwater discharges. Such effects include loss of seagrass and oyster reef habitats, contaminant load of sediments, residence time of nutrients. For example, how long will it take for seagrasses in Florida Bay, Caloosahatchee River, Matlacha Pass, Pine Island Sound, St, Lucie River, Indian River Lagoon to recover and provide suitable fish habitat? How long will the excess nutrients from freshwater discharges remain and thus maintain eutrophic estuarine ecosystems?

Item 4. The feasibility study must include large scale assessments of impacts to seagrass, oysters, and other foundational species, estimates of recovery rates, metrics for evaluating recovery, and methods for restoration. The timeframes of these studies should be closely tied to expected changes in freshwater flows that result from the construction of the EAA reservoir and other CERP objectives.

Sincerely,

Aaron J. Adams, Ph.D.
Director of Science and Conservation

2336 SE Ocean Blvd
STE 172
Stuart, FL 34996

November 22, 2017

Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406
EAAreservoir@sfwmd.gov

Re: Everglades Agricultural Area Reservoir Project Scoping

Dear Mr. Albert,

This letter is pursuant to the National Environmental Policy Act (NEPA) scoping process for the Everglades Agricultural Area (EAA) reservoir planning process being conducted pursuant to Senate Bill 10 (SB10). Please find comments and instructions below. Compliance with NEPA by South Florida Water Management District (SFWMD) dictates your cooperation.

Project Area:
Please add all of St. Lucie, Martin, Lee, and Palm Beach Counties to the project area for the EAA reservoir project. The proposed project area being used for the EAA reservoir is inadequate and is not consistent with the intent of Senate Bill 10. The project area does not include most of St. Lucie, Martin or Lee counties, but these areas are the adversely affected areas SB10 was intended to remedy. To not include Hutchinson Island, Bathtub Beach, Stuart Beach, Fort Myers Beach, Sanibel Island, and the Pine Island Aquatic Preserve in the project area is at odds with the intent of SB10. Failure to include these areas in the project area will harm the cost benefit calculation of the project by failing to consider benefits to these harmed areas and in turn, harm the likelihood the project is completed.

Please also extend the project area southward to include Marathon and Key West. Fish spawning in Florida Bay is impacted by freshwater flows from the Everglades, which will increase as result of the EAA reservoir project. Fish spawning in Florida Bay impacts the economic and ecological environments to at least Key West. By including Key West and Marathon in the project area, proper accounting of the human effects to the environment can be considered.

Please confirm and publish your confirmation that the attached Central Everglades Planning Project project area map somehow does not include the areas referenced above. This map seems to be at odds with the notion that the proposed SB10 project area is consistent with CEPP. Even if it were, this consideration would arbitrary and inconsistent with SB10 if it does not include the adversely affected areas SB10 was designed to remedy.

Available Lands:
SB10 allows for the termination of leases of property owned by the SFWMD in the EAA. Section 3(a) of the bill states: “The district and the board are authorized to negotiate the amendment or termination of leases on lands within the EAA for exchange or use for the EAA reservoir project.” SFWMD to date has presented and considered designs that do not fully utilize

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this feature of the bill. As a result, SFWMD has failed to exhaust options to implement this project in a reasonable way that ensures the intent of the bill is met and that good value to taxpayers is achieved. It is very disappointing that leadership of the SFWMD and in the Governor's office is content to fail the people of Florida and the Florida Legislature by not exhausting all possible options allowed by SB10 in designing this project.

Please analyze and produce publicly a list of all SFWMD owned lands leased to commercial interests in the EAA. For every parcel owned by the district and leased to private entities in the EAA, please include the acreage and location of the parcel, the legal name of the lessee, and a detailed accounting of how the SFWMD considered the use of theses lands in the EAA reservoir as instructed by and in accordance with the Florida Legislature via SB10.

SB10 allows for the purchase of lands from willing sellers to be used in the EAA reservoir. Based on the design configurations presented by SFWMD to date, it does not appear that these options have been exhausted or considered in developing a configuration of land for the reservoir and treatment footprint. Please consider expanding the footprint for the reservoir and treatment to include lands available for the project from acquisition of property or termination of leases. Please publish your findings.

Additionally, drawing from my conversations with SFWMD staff at scoping meetings and presentation information, it also does not appear the SFWMD is reading the legislation correctly by constraining analysis to two scenarios. I can only conclude this is a deliberate sabotage of SB10 and the EAA reservoir, as the SFWMD most likely has legal counsel that is capable of understanding the unambiguous language of SB10 does not limit configurations as the SFWMD is contending. Again, the failure of leadership in following the law at the State level is troubling and extremely disappointing.

Please see, consider, and report findings on the state owned land in the EAA leased to commercial interests and available to be used for the EAA reservoir project on the attached map. Please address why this publicly owned land has not been included in the EAA reservoir footprint.

Project Objective and Purpose:
To be consistent with the legislative intent of SB10, the project purpose must be to stop the discharges to the maximum extent possible and to rehydrate Florida Bay.

Different footprint configurations:
Please consider designs with reservoirs no higher than 14 feet. For the minimum capacity of 240,000 acre feet, please model with at least 13,000 acres in stormwater treatment areas. Please publish your findings.

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Jobs Affected:
Please consider the jobs affected in Martin, Lee, Monroe, Hendry, Palm Beach, St. Lucie Counties as a result of this project. Please include direct, indirect, and induced jobs. Please publish your findings.

Health impacts of toxic algae:
Please consider the human health impacts resulting from toxic-algae discharges. Please also consider the human health impacts of toxic algae in Lake Okeechobee to the communities south of the Lake that use lake water for their drinking water supply. Please study and conduct analysis of the human health impacts from eating marine animals exposed to toxic algae, as occurred last summer in Lake Okeechobee and the St. Lucie River. Please study and conduct analysis of the human health impacts from swimming in toxic algae, as occurred last summer in Lake Okeechobee and the St. Lucie River. Please address the effects of toxic algae on the commercial catfish industry in Lake Okeechobee. Please include analysis regarding what is being done to address the health concerns from eating Lake Okeechobee fish exposed to toxic algae. Please publish all of your findings from these studies.

Species:
Please consider and study the impact of this project to all state and federal threatened, endangered, and species of special concern in the updated project area, and the effects on the habitat from the discharges within the project area. Please document in the study how the habitat of the marine species in the northern estuaries will benefit from reduction of discharges. Specifically, please consider the use of the St. Lucie Estuary and Indian River Lagoon by the Smalltooth Sawfish. Please consider how discharges affect the Bigmouth Sleeper in the St. Lucie River. Please consider how discharges affect the worm reefs near the St. Lucie Inlet. Please publish your findings for all of these items.

Sailfish Flats:
The Sailfish Flats are located in Martin County off of Sailfish Point on Hutchinson Island. The Sailfish Flats are directly in the path of the discharges and should be considered in the study area. Please study the benefit to the Sailfish Flats as a result of a reduction of discharges. Please include in your analysis the economic and ecological benefit to the community as a result of a healthy Sailfish Flats. Please include what species use the Sailfish Flats for foraging and spawning and how they will benefit from a reduction of discharges. Please publish your findings.

Bathtub Beach:
Bathtub Beach is located in Martin County on Hutchinson Island. The proposed project area for the EAA reservoir does not include Bathtub Beach in the project area for the feasibility study. This is hard to believe, as waves of toxic algae on Bathtub Beach were a driving factor in the passage of SB10. To not include Bathtub Beach in the study area is to say that Bathtub Beach will not benefit from the creation of the EAA reservoir. A failure of relief for Bathtub Beach would appear to directly defy the intent of the passage of SB10. Please include Hutchinson Island in the study area for this project. Please consider the ecological and economic benefits to Bathtub Beach from the reduction of discharges. Please publish your findings.

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Conveyance:
Please model dedicated conveyance to the EAA reservoir. Please include in the analysis a scenario where the combined capacity of the dedicated conveyance is equal to the capacity of the C-43 and C-44 canals combined. Please include in your analysis how a third outlet will affect the safety of the Herbert Hoover Dike and the communities located south of Lake Okeechobee. Please include information and analysis regarding the legal requirement for dams to include a spillway. Please consider the economic value dedicated conveyance would provide to the dam safety work. Please publish your findings.

Home Values:
Please analyze the effects of toxic discharges to local government tax base as a result of the discharges in Martin, Lee, St. Lucie, and Palm Beach Counties. Please publish your findings.

Dike Safety:
Please examine whether the Herbert Hoover Dike will be safer with dedicated conveyance to the EAA reservoir. Please publish your findings.

Please address risk factors for the Herbert Hoover Dike overtopping with water levels at 15.5 feet, as occurred with Hurricane Wilma. Please publish your findings.

Biscayne Aquifer:
Please consider the effects of the EAA reservoir project to recharging the Biscayne Aquifer. Please publish your findings.

Lake Okeechobee Regulations Schedule:
The bill instructs the SFWMD to ask the U.S. Army Corps of Engineers to reconsider the Lake Okeechobee Regulation Schedule. Please consider how the EAA reservoir would function with different regulation schedules. Specifically, consider a scenario where human health is the highest priority for managing Lake Okeechobee. Please publish your findings.

Please study the effects to the health and sustainability of Bass and Crappie fishery when Lake Okeechobee levels are increased above 16 feet. Please publish your findings.

Agricultural jobs:
Please analyze and document the effect on agricultural jobs as a result of the EAA reservoir project. Please publish your findings.

Prior EAA reservoir EIS/PIR:
In 2006, the federal sponsor published a Draft EIS and PIR for the EAA reservoir. These documents considered many fundamental concerns for planning the EAA reservoir. Please consider *all* the scenarios and considerations presented and considered in the “Central and Southern Florida Project Everglades Agricultural Area Reservoirs Revised Draft Integrated Project Implementation Report Environmental Impact Statement February 2006” located here: http://141.232.10.32/pm/projects/project_docs/pdp_08_eaa_store/revised_draft_pir/022206_eaa_pir_mainbody.pdf and attached to this submission.

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Conclusion:
Thank you for considering these matters. I apologize in advance that this letter is not more comprehensive and better thought out. Thanksgiving is tomorrow, everyone is tired, and the last month of presentations have had more plot twists than a bad movie.

We appreciate the hard work of the career staff of the SFWMD. We recognize this is a tough assignment and the timeframe is challenging for everyone. But so too are the discharges, which is why delay is no longer an option.

We are willing and available to work with you and provide technical assistance to further this project. Please do not hesitate to contact me if we can be of further assistance.

Sincerely,

Alex Gillen
Bullsugar Alliance

CC: Lt. Col. Jennifer Reynolds, U.S. Army Corps of Engineers
Sen. Pres. Joe Negron and Ms. Lisa Vickers

RECEIVED 11·7·17

The undersigned landowners in the Everglades Agricultural Area (EAA) represent the landowners that own more than 2,500 acres of land in that region. For the reasons stated below, the undersigned landowners do not support any governmental acquisition of additional farm lands south of Lake Okeechobee to solve issues that are being caused north of Lake Okeechobee and in Martin County. We are not willing sellers of our property to the government.

Water reservoirs south of Lake Okeechobee simply cannot store enough water to stop the discharges from Lake Okeechobee when our region is inundated from heavy rains.

- In 2016 alone, more than 2.9 million acre-feet of water entered Lake Okeechobee from the north resulting in 2.5 million acre-feet being discharged east and west from Lake Okeechobee. Combined with an additional 2.8 million acre-feet of local basin run off in the Caloosahatchee and St. Lucie watersheds, the total discharges to the estuaries exceeded 5 million acre-feet during 2016. With this immense volume of water, it's impossible to store our way out of this problem.
- Even if a reservoir south of Lake Okeechobee was constructed at a cost of multi-billions of dollars, 93% of the total discharges to the estuaries would still have occurred this year. Furthermore, during these wet conditions, constraints in the Everglades would not allow more water to be sent south creating a full reservoir with no place for the water to go.

Buying more land does not fix the problem.

- Additional land in public ownership would not have prevented this year's algae outbreak in Martin County and isn't the long-term solution. No local, state or federal agency that has seriously studied South Florida's complex water issues is calling for the purchase of Everglades Agricultural Area land as part of any strategies for solving our region's water challenges.
- The EAA is NOT the cause of the algae blooms that occurred in south Florida estuaries. Studies have determined that nutrients from local sources, including ageing septic systems, in the coastal communities are the primary cause of harmful algal blooms in the Indian River Lagoon. We support Governor Scott's initiative to provide 50/50 cost share grants for septic to sewer conversion in this region.
- Data from the South Florida Water Management District shows that communities south of Lake Okeechobee only contribute 3 percent of the water to the Lake yet those calling for EAA land to be bought want our communities to be 100 percent of the solution.

Farmers in the Everglades Agricultural Area have been working to restore the Everglades for more than two decades.

- EAA farmers have supported the passage of key legislation at the state and federal levels including seeking state and federal appropriations to build critical projects found in the Everglades Forever Act and the Comprehensive Everglades Restoration Plan (CERP).
- EAA farmer's commitment to Everglades restoration has gone much further than simply supporting government efforts.

- Farmers south of Lake Okeechobee have adopted innovative, nutrient-reducing farming solutions known as Best Management Practices (BMPs) resulting in a long-term average reduction of nutrients entering the Everglades Protection Area by 55%. Over 3,000 metric tons of phosphorus has been prevented from entering the Everglades through these on-farm practices 100% paid for at the land owners expense.
- Our BMPs, developed with the University of Florida and regulated by the South Florida Water Management District, have helped to ensure that 100 percent of the water in Everglades National Park and more than 90 percent of water in the approximately 2.4 million acres of the rest of the Everglades Protection Area is meeting the stringent 10 parts per billion standard for phosphorous.

Water quality improvements on our lands are 100 percent paid for by EAA farmers.

- In addition to our property taxes, EAA farmers pay an additional "agricultural privilege tax" of $25 per acre to fund regional Everglades water quality projects. This tax has raised more than $240 million for Everglades restoration in addition to the more than $200 million that we have spent funding research and on-farm water clean-up efforts.
- The more than $400 million contributed by farmers is more than any other private group – environmental groups included – has committed to Everglades restoration in history.

Farmers south of Lake Okeechobee have seen over 120,000 acres of their farmland purchased by the state.

- Since Everglades restoration efforts began in earnest in the 1990s, three sugar mills have closed costing the Glades region hundreds if not thousands of good paying jobs.
- These restoration features have improved water quality and flows into the Everglades.
- Storage south of the Lake has never been contemplated to be the solution for the Lake Okeechobee discharges. In CERP, as well as in CEPP, the EAA reservoir is primarily intended to provide water to the Everglades with ancillary benefits to the estuaries.
- CERP always envisioned underground water storage around the Lake as the solution to the Lake discharges.

While a reservoir south of Lake Okeechobee would do little to provide relief to the coastal estuaries, there is a solution – build the CERP projects authorized since 2000, including the recently authorized Central Everglades Planning Project (CEPP).

- Develop and implement the projects north of Lake Okeechobee to capture, store, and treat the water <u>before</u> it enters the Lake.
- There are also dozens of approved federal and state projects, specifically designed to fix the plumbing around Lake Okeechobee, that are pending and awaiting funding. These projects, once completed, will help to reduce the frequency of the discharges from Lake Okeechobee.

It's up to all of us to do our part to finish restoring the Everglades and fixing Lake Okeechobee. Plans to buy land with little to no benefit to environmental restoration only serve as a distraction. By staying focused on the science, we can ensure reaching the goal we started more than two decades ago can become a reality.

U.S. Sugar

1

Robert H. Buker, Jr.

Big B Sugar Corporation 2

Robert J. Underbrink

Glades Sugar Farms 3

James M. Shine, Jr.

Roth Farms, Inc. 4

Raymond R. Roth, Jr.

Florida Crystals Corporation

Alfonso Fanjul

5

J. Pepe Fanjul

Eastgate Farms

6

Alex Tiedkte

Hundley Farms, Inc. 7

John L. Hundley

SBG Farms, Inc.

Robert H. Buker, Jr.

Star Ranch Enterprises, Inc.

8

Justin G. Sobie

Star Farms Corporation

Justin G. Sobie

Trucane Sugar Corporation

10

Alfonso Azqueta

Wedgworth Farms, Inc.

9

Dennis Wedgworth

Frances L. R. Hand

Frances L R Hand

Frances L. R. Hand

Homer J. Hand

Homer J Hand

Homer J. Hand

November 14, 2017

Mr. Ernie Marks, Executive Director South
Florida Water Management District
3301Gun Club Road West Palm Beach, FL
33416

Dear Mr. Marks:

In response to inquiries by the South Florida Water Management District pursuant to Chapter No. 2017-010, Laws of Florida, the undersigned landowners of more than 2,500 acres in the Everglades Agricultural Area (EAA) reaffirm our previous letter stating that we are not willing sellers of our farmland to the government.

Farmers in the EAA are committed to and have been a part of a collaborative process to restore the Everglades for more than 20 years. Over the last two decades, farmers south of Lake Okeechobee have met stringent water-quality standards and at the same time we have lost more than 120,000 acres of productive farmland to the government for restoration. Taking further farmland out of production would have devastating economic effects on our farming communities and eliminating more of the nation's most productive farmland would dramatically reduce our local food supply.

Chapter No. 2017-010, Laws of Florida provides a step-by-step process to use land already in public ownership to optimize the Congressionally approved Central Everglades Planning Project storage reservoir in the EAA under very tight planning and authorization timeframes. We are confident that the storage and treatment goals outlined in the law will be achieved on the existing identified public lands.

The EAA is a treasure for Florida generating over $3 billion in economic activity. The region is the nation's largest grower and supplier of winter vegetables, including sweet corn, radishes, green beans, lettuce and other leafy greens. We are also the Southeast's largest producer of rice and the nation's top producer of sugarcane. The undersigned landowners are committed to continuing to supply American tables with homegrown fruits, grains, vegetables and sweeteners that are grown in the most environmentally sustainable way possible.

Florida wouldn't be what it is today without the farms that grow wholesome, delicious food and we want to ensure that our productive farmland continues to supply homegrown foods for Americans.

Sincerely,

U.S. Sugar

Robert H. Buker, Jr.

Florida Crystals Corporation

Alfonso Fanjul

J. Pepe Fanjul

Big B Sugar Corporation

Robert J. Underbrink

Eastgate Farms

Alex Tiedkte

Glades Sugar Farms

James M. Shine, Jr.

Hundley Farms, Inc.

John L. Hundley

Roth Farms, Inc.

Raymond R. Roth, Jr.

SBG Farms, Inc.

Robert H. Buker, Jr.

Mr. Ernie Marks, Executive Director
South Florida Water Management District
November 14, 2017

Star Ranch Enterprises, Inc.

Justin G. Sobie

Star Farms Corporation

Justin G. Sobie

Trucane Sugar Corporation

Alfonso Azqueta

Wedgworth Farms, Inc.

Dennis Wedgworth

Frances L. R. Hand

Frances L. R. Hand

Homer J. Hand

Homer J. Hand

cc: Mr. Dan O'Keefe, SFWMD Governing Board Chairman
Mr. James Moran, SFWMD Governing Board Member
Mr. Sam Accursio, SFWMD Governing Board Member
Mr. Rick Barber, SFWMD Governing Board Member
~~Mr. Federico Fernandez, SFWMD Governing Board Member~~
Mr. Clarke Harlow, SFWMD Governing Board Member
Ms. Melanie Peterson, SFWMD Governing Board Member
Mr. Brandon Tucker, SFWMD Governing Board Member
Mr. Jaime Weisinger, SFWMD Governing Board Member

Friends of the Everglades
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Visit us online at www.everglades.org

November 22nd, 2017

Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406
EAAreservoir@sfwmd.gov

Re: Everglades Agricultural Area (EAA) Reservoir Project Scoping

Dear Mr. Albert:

On behalf of Friends of the Everglades, founded in 1969, we submit the following comments on the scope of the Everglades Agricultural Area (EAA) Reservoir Project.

The EAA reservoir project has been a crucial component of CERP since the bill's passage in 2000 and remains one of the project's key missing components. Friends of the Everglades has been a strong advocate for increased storage since the 1990's, provided federal and state water quality standards are met. This storage is necessary both to diminish the frequency of discharges from Lake Okeechobee to the coastal estuaries in high-rainfall years and to provide for the water needs of the natural Everglades system.

In the wake of catastrophic Lake Okeechobee discharge induced algal blooms in the coastal estuaries accompanied by a simultaneous seagrass die-off in Florida Bay, the legislature passed Senate Bill 10 in 2017. This bill called for the development of a reservoir to alleviate these damaging discharges and send water south to the Greater Everglades.

Project Requirements:

In order to prove effective, an EAA reservoir must achieve the following:

- *Adequate Water Storage Capacity*: The reservoir system must be capable of adequately storing and treating a **minimum** of 240,000-acre feet of water and up to 360,000-acre feet if required to meet federal and state water quality standards,
- *Adequate Water Quality*: The reservoir/STA system established by this plan must be capable of cleansing the highly polluted water within the minimum legal criterion of 10 parts per billion P. Absent this capacity, water will remain unavailable to the natural systems of the Everglades.
- *Adequate Water Conveyance Capacity*: The EAA reservoir plan must be accompanied by improvements in the canal infrastructure which links the waters of Lake Okeechobee to the reservoir.
- *Delivery to the Natural System*: Under both CERP and the guidelines established in SB-10, a minimum amount of 240,000-acre feet of water must be reserved for transfer to the natural systems of the Everglades downstream of the project.

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Points of Concern:

- We believe a significantly larger project footprint is required for both the reservoir and its accompanying STAs. The purpose of an EAA Reservoir and STAs is to provide a pathway for water to flow south from Lake Okeechobee and the EAA into the Everglades system. Without sufficient treatment capacity to bring this water to acceptable legal criterion, the reservoir will quickly fill up in the wet years when it is needed most and coastal discharges will have to resume.
  - The 6,000-9,000 acre Storm-water Treatment Area footprint proposed by Mr.Wilcox would prove grossly insufficient for this purpose. The District has not provided any assessment or detail about private land ownership, lands swaps, exchanges, or outright purchases that will be necessary to provide adequate surface area for treatment.
  - The SFWMD should take reservoir depth into account. Salt water intrusion from beneath the project would become a significant concern under conditions of a vast unlined reservoir, up to 24 feet in depth over limestone that contains occlusions and pathways to the underlying aquifer. Areas of high salinity in the surficial aquifer system in this area have been identified and mapped by several studies (See appendix for map)[i,ii]. Saline contamination could also render the water unfit for transport into the greater Everglades. This problem is yet another symptom of the overly- limited project footprint under consideration.
- The SFWMD has failed to produce results of a flow and storage model including treatment. The major function of this project as established in the language of SB-10 is to mitigate discharges and serve the water needs of the Everglades system. It is imperative that the district take treatment into account, as that will prove the chief bottleneck for sending water south and achieving the project's purpose.
- The models relied upon by the SFWMD thus far are not based on the high-rainfall years in which this project's capacity to store, treat, and transfer water is most vital to the project goal of mitigating coastal discharges.
- We are also concerned district representatives have stated that "while they embrace increasing southern flows to the Greater Everglades as a project objective, time constraints may prevent staff from fully analyzing flows to Florida Bay and Everglades National Park". This is a major source of concern, as the transfer of this water to the natural system is amongst the chief aims of the overall project Recent studies indicate that the Everglades system may require more water than previously supposed, especially as the system begins to struggle with the impacts of sea level rise[iii,iv]. Failure to calculate benefits to the Everglades system resultant from this project is not acceptable.

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Moving forward

In order to achieve the project requirements it is imperative that the SFWMD provide an accurate assessment of necessary acreage and identify a desired footprint that allows for treatment to acceptable water quality criteria for transfer south.

Reservoir depth should be a factor in the planning process. A deep reservoir could prove highly costly and has the potential bring up a cone of salty water. Such a scenario would fundamentally undermine the projects capacity to meet water criteria standards. Further study should be carried out to determine whether any proposed reservoir runs this risk of unintended saline pollution as a result of upwelling.

Adequate Stormwater Treatment Area extent should also be considered realistically. The capacity of the project to reduce discharges and provide water to the Everglades hinges largely upon the capacity to quickly treat water for transfer south.

The SFWMD has a variety of instruments which it can use to reach the **necessary footprint to achieve the project requirements**, **including land swaps, exchanges and purchases from private sellers.** Without accurate assessment of the land acreage necessary to fulfill the above project requirements, a billion dollar plus taxpayer project wil fail. The EAA reservoir project has suffered derailment and failure in the past, we cannot allow that to happen again. The SFWMD must also take the necessary time and investment to model benefits to the greater Everglades system as a result of the proposed project.

For the good of the Everglades, the state and the future of our children we must make sure that the failures of the decade prior are not repeated. Friends of the Everglades is happy to work with and help the SFWMD to ensure a successful implementation of the EAA reservoir. Allow science to guide this process, not politics.

Please contact us to discuss the issues we have raised. 786-543-1926 or via e-mail: lreynolds@conservationconceptsllc.org

Sincerely,

Laura Reynolds

Laura Reynolds, project consultant

CC: Friends of the Everglades Conservation Chairman, Alan Farago and President Connie Washburne

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References:

[i] Reese, Wacker, & Others, 2009, Hydrogeologic and Hydraulic Characterization of the Surficial Aquifer System, and Origin of High Salinity Groundwater, Palm Beach County, Florida

[ii] Parker, G.G., Ferguson, G.E., Love, S.K., and others, 1955, Water resources of southeastern Florida, with special reference to the geology and ground water of the Miami area: U.S. Geological Survey Water-Suppy Paper 1255, 965 p.

[iii] Lorenz, 2017, Recent Changes in Nesting Patterns of Roseate Spoonbills Suggest Adaptation to Sea Level Rise And Climate Change, GEER

[iv] Johnson, 2016, "New Report Calls for Forward-Looking Analysis and a Review of Restoration Goals for the Everglades, http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=23672

[V] Sea-Level Rise In Everglades National Park, NPS https://www.nps.gov/ever/learn/nature/cceffectsslrinpark.htm

[VI] Reese, Wacker, 2009, Hydrogeologic and Hydraulic Characterization of the Surficial Aquifer System, and Origin of High Salinity Groundwater, Palm Beach County, Florida

Appendix:

Figure1:
Maps Showing Chloride Concentreation in ground water at different depths in the Everglades
(Parker, Ferguson, Love & Others, 1955)

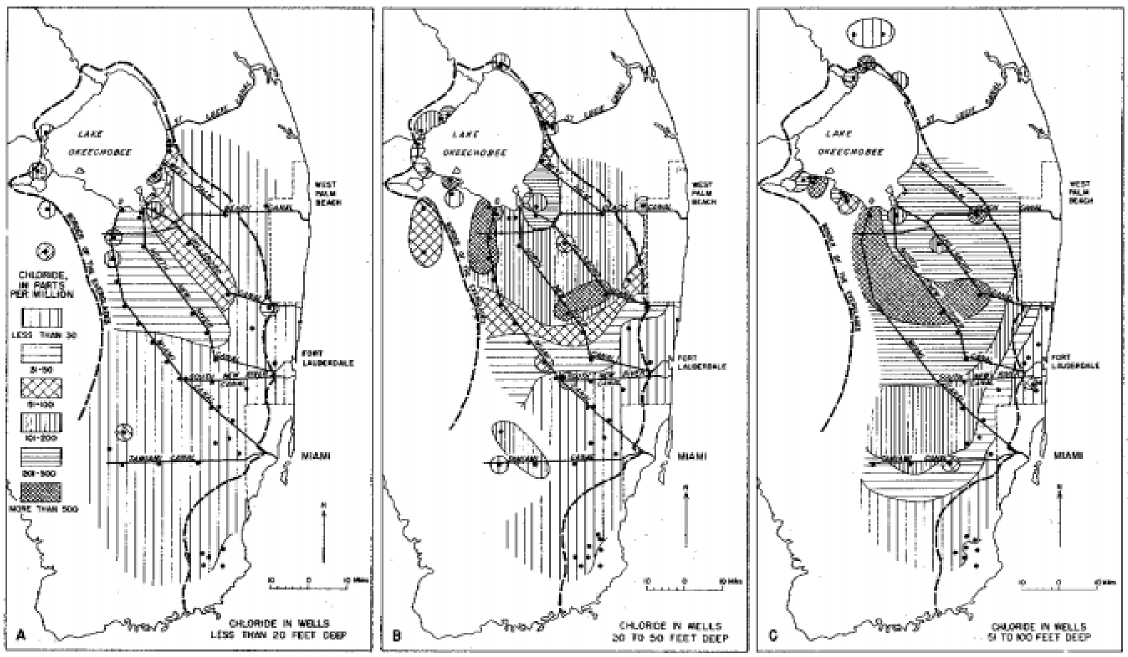
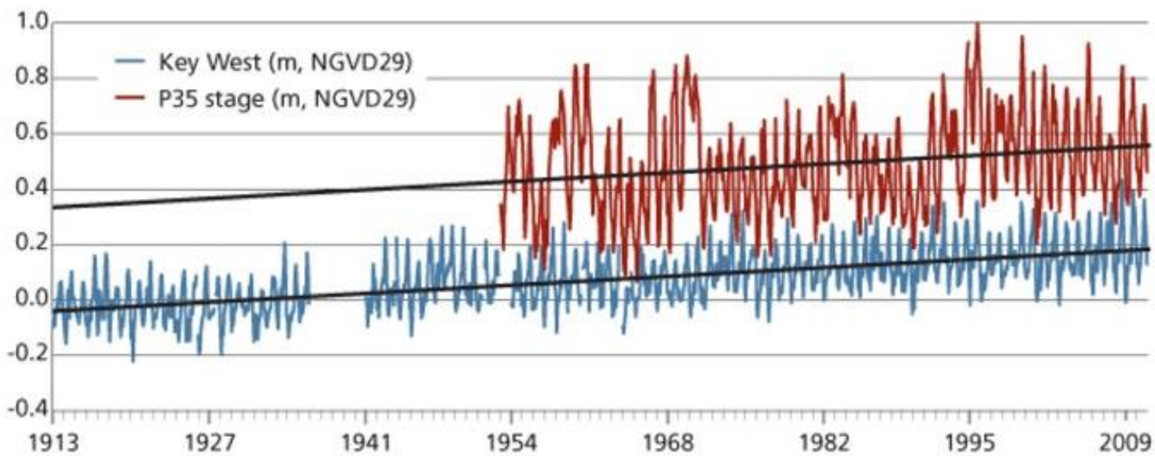


Figure 221. —Maps showing chloride concentrations in ground water at different depths in the Everglades; *A*, wells less than 20-ft deep; *B*, wells 21–50 ft deep; *C*, wells 51–100 ft deep.

Figure 2:

The rate of water-level rise in a marsh in the park is similar to the rate of sea-level rise measured in Key West. The black line is the trendline for the timeseries.



Captains for Clean Water * Conservancy of Southwest Florida
Everglades Law Center * National Parks Conservation Association
Florida Oceanographic Society * Sanibel-Captiva Conservation Foundation

December 15, 2017

Governor Rick Scott
State of Florida Capitol
400 South Monroe Street
Tallahassee, FL 32399-0001

Re: Everglades Agricultural Area Reservoir

Dear Governor Scott:

The undersigned organizations remain committed to the health and restoration of America's Everglades and the northern estuaries. We supported Senate Bill 10 and have remained engaged hrough the rigorous schedule of public meetings and workshops that have taken place since the Everglades Agricultural Area (EAA) reservoir planning kickoff in late October of this year. We commend South Florida Water Management District (District) staff for the extensive public outreach and tremendous workload being undertaken to meet the ecological goals and project timelines outlined in the legislation.

To date, the District has presented alternatives to construct water storage and treatment based solely on land in state ownership within the A-1 and A-2 parcels and the A-2 expansion area. We believe that identification of the optimal reservoir configuration, as required by SB 10, must not be confined to only existing state-owned lands but should instead identify the necessary acreage and configuration of storage and treatment that best meets ecological goals in the most cost-effective manner. We are concerned that the limited array of alternatives identified thus far may not result in a reservoir plan that is both cost-effective and likely to be approved by the Corps of Engineers and Congress.

The National Environmental Policy Act (NEPA) requires the consideration of a broad range of alternatives and requires decision-makers to "rigorously explore and objectively evaluate all reasonable alternatives." (40 CFR 1502.14 (a)). This analysis is considered "the heart of the environmental impact statement, and should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public." (40 CFR 1502.14) The alternatives identified thus far are highly similar and are artificially constrained to only include the existing A-1 and A-2 lands, and thus could fall short of the broad array of alternatives contemplated by NEPA.

Because of the failure to consider reasonable alternatives that rely on additional acreage, the resulting analysis fails to demonstrate whether additional acreage would result in the optimal configuration of the EAA reservoir most likely to meet federal cost-benefit analyses and the funding identified in Senate Bill 10. The inclusion of alternatives that incorporate additional acreage would allow an analysis of shallower storage options with greater acreage available for water quality treatment which we believe is likely to increase ecosystem benefits in a more cost-effective and efficient manner.

We urge you to direct the District to consider further reasonable alternatives that rely on additional acreage and to identify the optimal configuration for the EAA Reservoir Project, without limitation to land in public ownership. Doing so will demonstrate to the Florida Legislature and the public how the state will meet the intent of Senate Bill 10 to achieve the goals of water quality and storage capacity while meeting federal cost-benefit analysis and planning process requirements. The District must identify the acreage of additional land needed to achieve this result in time for the January 9, 2018 report to the Legislature.

The undersigned groups remain fully supportive of accelerating the EAA Reservoir Project and are committed to working with the District to identify the optimal configuration to ensure the success of this critically important project.

Sincerely,

Captain Daniel Andrews
Captains for Clean Water

Marisa Carrozzo
Conservancy of Southwest Florida

Lisa Interlandi
Everglades Law Center

Mark Perry
Florida Oceanographic Society

Cara Capp
National Parks Conservation Association

Rae Ann Wessel
Sanibel Captiva Conservation Foundation

CC: Secretary Noah Valenstein, Florida Department of Environmental Protection
Chair Daniel O'Keefe, South Florida Water Management District Governing Board

November 21, 2017

Michael Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406
EAAreservoir@sfwmd.gov

Re: Everglades Agricultural Area Reservoir Project Scoping

Dear Mr. Albert:

The Everglades Foundation (Foundation) recognizes the tremendous undertaking that is required to meet the deadlines laid out in Senate Bill 10 (SB 10) and commend the South Florida Water Management District's (SFWMD) efforts and progress to date. The Foundation submits the following scoping comments for the Everglades Agricultural Area (EAA) Reservoir Project Post Authorization Change Report.

1. Project Footprint: Under SB 10, the District is charged with evaluating the optimal configuration of the EAA Reservoir Project to meet a specified minimum acre-feet of storage and achieve water quality standards. SB 10 provides the District with flexibility in assembling the lands needed for the project by authorizing land purchases from willing sellers, early termination of leases on state-owned lands, and land swaps. SB 10 does not require that the reservoir be built *on* or confined *within* the A-2 parcel. Instead, the law speaks more broadly to the *use* of the A-2 for the project as a whole, which includes the necessary water quality features to ensure water delivered to the Everglades meets water quality standards. To ensure a more cost-effective configuration is not inadvertently excluded, the project scope should not be limited to A-1, A-2 and lands adjunct to A-2.

2. Project Goals: SFWMD has thoughtfully outlined the dual project purposes of the EAA reservoir as reducing harmful discharges to the northern estuaries and delivering clean fresh water flow to the Everglades system. The Foundation enthusiastically supports these objectives and requests that the EAA reservoir be modeled and optimized to meet these project purposes. In particular, the

addition of a deep storage reservoir should lead to a large increase in freshwater flows to the Everglades and Florida Bay above what was already anticipated from the Central Everglades Project (CEP). Recognizing the important role of Lake Okeechobee operations in delivering benefits in CEP, the Foundation encourages expansive and transparent operations and baseline conditions be included and analyzed in the development of alternatives.

The Foundation looks forward to continuing to work with the SFWMD to ensure a successful EAA Reservoir Project is developed and the subsequent Post Authorization Change Report is authorized prior to the adjournment of the 115th Congress.

Sincerely,

Dawn M Shirreffs

Dawn Shirreffs
Senior Policy Advisor

Everglades Coalition

November 22, 2017

Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406
EAAreservoir@sfwmd.gov

Re: Everglades Agricultural Area (EAA) Reservoir Project Scoping

Dr. Mr. Albert:

On behalf of the 62 member organizations of the Everglades Coalition committed to the protection and restoration of America's Everglades, we are pleased to submit the following comments on the scope of the Everglades Agricultural Area (EAA) Reservoir Project.

<u>Background</u>

The EAA Reservoir is an integral component of the Comprehensive Everglades Restoration Plan (CERP), which will help solve Florida's ongoing water crisis while restoring a globally unique and invaluable ecosystem. Florida's coastal waters have long been on the brink of ecological collapse. Billions of gallons of water continue to be discharged from Lake Okeechobee to the St. Lucie and Caloosahatchee estuaries, wasting valuable freshwater that is vital to Florida's environment and economy. The extreme freshwater discharges have upset the natural salinity balance in the estuaries needed for oysters, seagrasses, and other aquatic species to survive. The discharges have also carried high levels of nutrients and sediments, causing and contributing to harmful algae blooms, smothering native vegetation, and harming fish and coastal birds. The estuaries' famously clear coastal waters have turned dark brown and green, driving away tourists, damaging businesses, and reducing home values. Scientists have detected harmful bacteria in some areas, making the water dangerous for contact with people, pets, and livestock.

At the same time, insufficient freshwater flow to the Southern Everglades caused a substantial seagrass die-off in Florida Bay in 2015 that resulted in the loss of more than 50,000 acres of seagrass in Everglades National Park. The once blue waters looked like pea soup and negatively affected recreational and commercial fishing as well as other water related activities that bring tourists to the Florida Keys. If solutions are not implemented quickly, the prediction for Florida Bay is an even deeper collapse.

Increasing storage throughout the Everglades watershed is key to getting the water right on the north and south end of the ecosystem. With storage projects west and north of Lake Okeechobee already in the planning phase, and given these ongoing emergency conditions, the Everglades Coalition strongly supports advancing the EAA Reservoir project to provide relief to the ecosystem as envisioned in CERP in 2000. As we work toward our joint goals of providing relief to the Caloosahatchee and St. Lucie Estuaries while delivering more freshwater to Everglades National Park and Florida Bay, member organizations of the Coalition stand ready to facilitate the implementation of Senate Bill 10 (SB10) by working in partnership with the South Florida Water Management District (District) and remaining closely engaged in the planning process.

Project Objectives and Scope

As relayed to the public at meetings on October 23, 2017 and October 26, 2017, we strongly agree with the District's dual objectives of reducing discharges to the northern estuaries while identifying storage, treatment, and conveyance south of Lake Okeechobee to increase freshwater flows to the Everglades. Working toward these goals jointly will lead to a holistic solution for the entire Greater Everglades, rather than segmenting regional impacts and seeking only regional solutions. Using the study area identified for the Central Everglades Planning Project (CEPP) ensures that the wide range of the ecosystem, from Lake Okeechobee to Florida Bay, is included in the scope of work and potential benefits received.

However, we have serious concerns over the limited scope of calculating ecosystem benefits as the project advances. At the October 31, 2017 meeting, staff shared that while they embrace increasing southern flows to the Greater Everglades as a project objective, time constraints may prevent fully analyzing flows to Florida Bay and Everglades National Park. Leaving these ecosystem benefits out of calculated benefits would be a disservice to the project, the Everglades, and the Florida Keys.

The District adopted CEPP as its guiding principle in developing the modeling for the EAA Storage Reservoir project, which is appropriate as the EAA Reservoir is intended to be authorized as a Post Authorization Change Report to CEPP. In order to stay consistent with CEPP, reservoir planning should incorporate and adopt the CEPP purpose and need, which is: "to improve the quantity, quality, timing, and distribution of water flows to the Northern Estuaries, central Everglades (Water Conservation Area 3 [WCA 3] and Everglades National Park [ENP], and Florida Bay while increasing water supply for municipal and agricultural users. (CEPP PIR, ES-1)." As such, the Everglades Coalition strongly urges the District to ensure that ecological benefits to Everglades National Park and Florida Bay are included in EAA Reservoir analysis.

Process and NEPA Compliance

Listed among the constraints presented at public meetings in October is the need for compliance with the National Environmental Policy Act (NEPA). We agree that compliance with all requirements of NEPA as well as other applicable federal laws is critical for this planning process, as Section 203 of WRDA, under which this project is being developed, requires the Secretary of the Army, prior to recommending the project for approval, to determine if the study, and the process under which the study was developed, comply with all Federal laws and regulations applicable to feasibility studies of water resources development projects. To accomplish this objective, we urge the District to work closely with the U.S. Army Corps of Engineers to identify, outline, and make publicly available all federal compliance requirements to ensure that they are met in a timely manner.

Priorities and Assurances Moving Forward

As EAA Reservoir planning advances, the Everglades Coalition wants to ensure that the project provides maximum benefits throughout the ecosystem with particular emphasis on the following:

- Water Quality: As has been stated by District staff and leadership, meeting state and federal water quality standards is paramount for this and all other CERP projects. We look forward to analyzing the results of District modeling to understand the project configuration that will maximize storage and conveyance south while meeting water quality standards to ensure that clean water is delivered to the Southern Everglades and Florida Bay.

- Water for the Natural System: Per legislative guidelines set forth in SB10, and in compliance with CERP goals, we understand the reservoir will achieve at least 240,000 acre feet of water storage. It is paramount that this amount of water is the minimum amount dedicated for the natural system. This volume of water, and more, is needed for Everglades National Park and Florida Bay. Accordingly, alternatives that provide greater quantities of water storage with the necessary water quality treatment should also be evaluated.

- Maintain Progress: Both state and federal agencies have committed to keeping the Central Everglades Project -- particularly CEP South components that will bring direct benefits to Everglades National Park -- on track. Indeed, the state's funding request with intent to advance expansion of the S-333 structure and removal of Old Tamiami Trail show that opening up the southern end of the system to accept more new water remains a priority. Maintaining forward momentum on CEP, additional bridging of Tamiami Trail, construction completion and operation of ModWaters, C-111 South Dade, and C-111 Spreader Canal, are all critical to achieve the ecosystem benefits outlined by the Florida Legislature in SB10.

- Assessment of Needed Land: As alternative development and modeling move forward, the critically important issue of the acreage required to achieve project goals will need to be resolved. We urge the District to not limit its evaluation of alternatives to lands currently in state ownership, but instead to focus its evaluation on alternatives that provide the greatest environmental benefits and to move quickly to identify how much additional land will be needed to develop a cost effective project and achieve the storage and water quality goals outlined by the Florida Legislature and CERP.

- Conveyance Capacity: To maximize effectiveness, the EAA Reservoir Project requires conveyance improvements from Lake Okeechobee to the site of the reservoir. We recommend the District evaluate cost-effective conveyance improvements that achieve the highest reduction in discharges possible.

<u>Partnership and Next Steps</u>
As the EAA Reservoir advances, the Everglades Coalition is committed to staying at the table as an active partner with the District and other state and federal agencies. We appreciate the numerous and open public forums that have already taken place and are scheduled for the weeks ahead. We look forward to working with the District team and state leadership toward our shared goals for Everglades restoration and health for Florida's estuary communities.

Sincerely,

Mark Perry, EVCO Co-Chair   Michael Baldwin, EVCO Co-Chair

CAPTAINS FOR CLEAN WATER

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November 22, 2017
Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406
Transmitted by email: EAAreservoir@sfwmd.gov

Re: Everglades Agricultural Area (EAA) Reservoir Project Scoping

Dr. Mr. Albert:

This letter is submitted on behalf Captains for Clean Water to comment on Scoping for the EAA Reservoir project. Captains for Clean Water is a grassroots organization founded by fishing guides and outdoorsmen who were passionate about stopping the destruction caused by Lake Okeechobee discharges. We appreciate the SFWMD's acceptance of the aggressive timeline laid out in Senate Bill 10, and look forward to seeing this project through to completion.

The discharges from Lake Okeechobee affect areas well outside of the planning area highlighted in SFWMD's scoping slides. Please expand this area to include all of Lee and Martin Counties, and extend the line offshore to the Line of Demarcation. The seagrass, oyster beds and nearshore reefs in these areas have been negatively impacted by discharges and should be considered in the planning process as they are crucial to the existence of the sportfishing and tourism industries in these areas. The water bodies most affected by discharges via the Caloosahatchee are San Carlos Bay, Matlacha Pass and Southern Pine Island Sound, but all are currently excluded from the study area.

The Caloosahatchee and St. Lucie estuaries are crucial to the tourism, real estate and sportfishing industries of the surrounding communities. Please consider expanding the footprint of the EAA Reservoir to provide a greater capacity to convey water to the Everglades during the wet season. Current SFWMD modeling concepts only take into account using the A2 parcel and the A2 expansion, but the project could provide significantly greater benefits if modeled on a larger tract of land (and would cost less to construct and operate.) Land swaps may be used with other state-owned lands as specified in Senate Bill 10, possibly in conjunction with land from willing sellers within the EAA.

Harmful discharges impact the Caloosahatchee and St. Lucie Rivers during periods of heavy rain. Please consider adding additional Stormwater Treatment Areas to increase the filtration capacity of the project so the reservoir project can be more effective during the wet season, which is when the Caloosahatchee and St. Lucie Rivers experience the most devastation due to discharges.

We appreciate the work by the District to meet the expedited timelines and thank you for your consideration of our comments. Please do not hesitate to contact us if we can provide you technical assistance in support of your work on this important project.

Sincerely,

Daniel Andrews
Executive Director

Florida Oceanographic Society

890 NE Ocean Blvd
Stuart, FL 34996-1627
(772) 225-0505
FAX: (772) 225-4725

November 22, 2017

Mr. Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406
Transmitted by email: EAAreservoir@sfwmd.gov

Re: Everglades Agricultural Area (EAA) Storage Reservoir Project Scoping Comments

Dear Mr. Albert:

The following comments are provided on the scoping for the EAA Storage Reservoir Project.

Project Purpose & Objectives:

We acknowledge that this project is moving forward quickly and the feasibility study is being done in coordination with the U.S. Army Corps of Engineers (USACE) so that the project remains within the federal authorities of the Comprehensive Everglades Restoration Plan (CERP) and also that the post authorization change report may be moved through the USACE process in order to maximize the potential features of the project. We also acknowledge that you are following the Florida State Law Chapter 2017-10, approved May 9, 2017, where the Florida Legislature declared that an emergency exists regarding the St. Lucie and Caloosahatchee estuaries (Northern Estuaries) due to the high-volume freshwater discharges to the east and west from Lake Okeechobee. The Legislature also declared in this law that increasing water storage is necessary to reduce the high-volume damaging discharges from the Lake to the estuaries while restoring the hydrological connection to the Everglades. Your stated Project Opportunities and Objectives are clear and follow the State law to 1) Reduce the high-volume freshwater discharges from Lake Okeechobee to the Northern Estuaries, 2) Identify storage, treatment and conveyance south of the Lake to improve flows to the Everglades system and 3) Reduce ongoing ecological damage to the Northern Estuaries and Everglades System. We are in agreement with these objectives.

Project Features and Operation:

The original CERP vision for the EAA Storage Reservoir project called for a 360,000 acre-foot storage reservoir, improvements to Miami and North New River Canals in the EAA to convey Lake water south and to work with other CERP projects to significantly reduce the damaging discharges to the Northern Estuaries. You indicated that the projected annual increase in Lake flow south due to CERP at approximately 300,000 acre feet (AF) per year and that the EAA Storage Reservoir Project would perform "dynamically" sending several times the static storage volume south, up to 1.3 million AF/year. We agree with maximizing the dynamic operations of the EAA Storage Reservoir project to provide this maximum because the recent 10-year average Lake Releases to the Northern Estuaries is about 840,000 AF, with high years at 2,160,000 AF. We believe you should model for the maximum dynamic storage possible. A clear example is the operation of the A-1 Flow Equalization Basin (FEB) at 60,000 acre-feet of static storage was able to process an inflow volume of 538,000 acre-feet, Aug 2015-Oct 2016. It was also interesting that the inflow concentrations of Phosphorus was 88 ppb and the outflow concentrations were 21 ppb resulting in a Phosphorus load reduction of 86% (SFWMD 11-10-16).

The Initial Storage Concepts presented at the November 16, 2017, scoping meeting included a 10,000 acre reservoir on A2 and A2 Exp with a 6,000 acre STA for the 240,000 ac-ft storage concept. We believe this will result in a 24-ft deep reservoir that may be cost prohibitive. The 360,000 ac-ft Storage Initial Concept using A2, A2 Exp and A1 is better and will maximize the storage capacity at a shallower depth and using both of the State lands available directed by the legislation. The 360,000 ac-ft Storage alternative also better aligns with the original CERP project.

Also in the Initial Storage Concepts presented at the November 16, 2017, scoping meeting, the proposed Stormwater Treatment Areas (STAs) were shown to be in the footprint of the A1 and A2 lands. We believe you should model the water quality treatment for the 360,000 ac-ft Storage alternative using STAs <u>outside</u> of the A1 and A2 footprint. Also, you should factor into the modeling the Phosphorus load reductions which may occur in the reservoir like those in the A-1 FEB described above. This may also be accomplished using the existing 6 STAs (57,000 acres) owned and operated by the State which already treat water from the Lake releases and EAA basin runoff. In Water Year 2015 the total treatment volume in the STAs was 1,364,000 acre-feet with 585,000 acre-feet from the Lake. The outflow Total Phosphorus concentration that year was the lowest achieved in over 21 years of STA operations (SFWMD 8-13-15). Also you should model achieving the water quality treatment for the EAA Storage Reservoir Project using STA 5/6 as it is hydraulically underutilized and adjacent to the A1, A2 & A2 Ext. project configuration. Consistent with the 2015 University of Florida report recommendations, you should also model the utilization of the state-owned Holey Land and Rotenberger Wildlife Management Areas.

As to conveyance, the current Concepts presented were not clear but you should model alternatives with large enough capacities to handle the maximum flows (1.3 million AF/year) that are being planned for. Besides increasing the capacities of the Miami Canal and North New River Canal you should also plan to increase the structure capacities of the S-354 and S-351. Alternatively, a new outlet with a new conveyance canal located between the Miami and North New River Canals would add operational flexibility and may provide cost benefits to the Herbert Hoover Dike rehabilitation. The HEC-RAS Modeling of Conveyance you presented at your meeting on November 6, 2017 showed initial conveyance assessments for CERP design (increase of 7500 cfs over current capacity). Current maximum capacity at S-354 and S-351 are 1440 cfs and 1500 cfs which are not adequate for the flow necessary to achieve a substantial outlet to move Lake water south. The current maximum capacities at S-308 and S-77 are 7300 and 9300 cfs respectively so we need to have a large equivalent capacity to move water south to the EAA Storage Reservoir Project.

It is critical to include the economic and ecologic impacts of destructive Lake releases to the estuaries. Ignoring these would explicitly prejudice the evaluation and decisions against the estuaries. *The current approach presented during the Scoping Meetings underestimates the benefits to estuaries due to the reservoir; as a result, a more beneficial larger reservoir will likely be deemed to have insufficient benefits to outweigh the costs.* Your alternatives analyses must include the impacts and benefits to the Northern Estuaries. Existing analyses show that there approximately 75,000 jobs and $3.8 billion per year in related businesses associated with the estuaries. A 2015 Florida Realtors study estimated losses in real estate values approaching $1 billion as a result of the devastating 2013 Lake discharges to the estuaries. A total increase in real estate value within the estuarine communities of $19 billion has been projected as a result of the EAA reservoir project (Clemson University 2017). We believe the cost/benefit analyses must also include the economic value of water lost to tide (estimated at an average of over $800 million per year), human health impacts associated with harmful algae, and ecological impacts to the critical habitat and the nearly three dozen endangered and threatened species. Excluding consideration of the impacts of Lake discharges and benefits of the EAA Reservoir to the communities around the estuaries explicitly prejudices the selection project against those alternatives that most benefit the estuaries. This would be in direct conflict with the stated objectives of the project and the intent of the 2017 legislation.

Thank you for your consideration of these comments and we look forward to actively participating in the planning process of the EAA Storage Reservoir Project.

Sincerely,

Mark D. Perry

Executive Director

January 18, 2018

Governor Rick Scott
Executive Office of the Governor
400 S. Monroe St.
Tallahassee, FL 32399-0001

Dear Governor Scott,

We have serious concerns about the recent news reports indicating there is a small but vocal group of activists threatening to derail the progress being made on the Everglades Agricultural Area reservoir, which will help the discharges impacting the coastal estuaries and continue Everglades restoration without needlessly harming our Glades communities. We urge you to see these concerns for what they really are: a land grab attempt by a group of activists who have repeatedly shown nothing but disdain for our rural farming communities south of Lake Okeechobee.

Last legislative session, the Everglades Foundation and its affiliated groups pushed a 60,000-acre land grab on the Florida Legislature and ignored the true economic devastation it would have on our communities. We appeared before Senate committees in Tallahassee and filled an auditorium in Pahokee to share our concerns with Senate President Joe Negron. Our voices were heard, and the bill was amended to use existing state-owned land that could store and treat the same amount of water without destroying jobs and our local economies.

As part of Senate Bill 10, the South Florida Water Management District was required to provide a status report on the development of a post authorization change report required for the federal authorization necessary to build a reservoir on the existing A-1, A-2, and adjacent parcels. The district has the option to consider other land "if necessary." But based on the district's status report, it is able to accomplish all of Senate Bill 10's storage and treatment goals on the specific lands identified in SB 10 and the district determined that acquisition of additional lands is not necessary.

The concerns being raised by environmental organizations over these models are totally baseless. The district scientists and engineers have the most data and experience available to be able to design and build these projects, along with more than 20 years of similar Everglades projects, many of which these same organizations opposing the EAA reservoir project have supported.

The reservoirs designed by the district are expected to cost $1.3 billion to $2.1 billion. Attempting to acquire more land to build a larger reservoir and treatment project will cost even more while likely not providing any additional benefits.

Under Executive Director Ernie Marks' leadership, the district has managed to comply with an extremely aggressive timeline and strict requirements for the storage and treatment goals established by Senate Bill 10. Every single reservoir configuration modelled by the district meets the goal of 240,000 to 360,000 acre-feet of storage and the water quality treatment performance necessary.

The environmental activists that sought to fast track the EAA reservoir should be claiming victory instead of coming up with arbitrary and unfounded concerns over this project. As representatives of the Glades communities, we appreciate your commitment to following the science and standing up for our communities.

Sincerely,

Mali Gardner, Mayor of Clewiston
Steve Wilson, Mayor of Belle Glade
Keith Babb, Mayor of Pahokee
Joe Kyles, Mayor of South Bay
JP Sasser, Former Mayor of Pahokee
Janet Taylor, President of Glades Lives Matter
Tammy Jackson-Moore, Co-Founder of the Guardians of the Glades
Desmond Harriott, President, Glades Area Ministerial Association
Pastor Robert Rease, St. John First Baptist Church Belle Glade
Bishop Kenny Berry, Grace Covenant Church Belle Glade
Pastor Albert Polk, Sugar 900AM and Casual Corner (C.B. Fashions)
Jeff Smith, pastor of the First United Methodist church and member of Clewiston Ministerial Association
Regina Bohlen, Director of the Pahokee Chamber of Commerce
Melanie Grimes, Director of the Belle Glade Chamber of Commerce
Hillary Hyslope, Executive Director of the Clewiston Chamber of Commerce
Jose “Pepe” Lopez, President of Clewiston Rotary
Julia du Plooy, Lake Okeechobee Business Alliance
Mary Ann Martin, Mary Ann & Roland Martin Marina
Ramon Iglesias, Mary Ann & Roland Martin Marina

CC: Ernie Marks, Executive Director of the South Florida Water Management District
Dan O’Keefe, Governing Board Chair of the South Florida Water Management District

January 22, 2018

Mr. Daniel O'Keefe, Governing Board Chairman
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406

Re: District progress toward implementation of SB10, EAA southern storage

Dear Chairman O'Keefe:

The Florida Farm Bureau Federation has been following and participating in the District's work to meet the intent of SB10, EAA southern storage. Our policy supports the Everglades Restoration Programs throughout the Lake Okeechobee Region as long as it's based on sound science and engineering. Under the leadership of Ernie Marks, District staff has maintained these principles in coming up with the best possible alternatives necessary to meet the requirements of SB10 as well as achieving the Central Everglades Restoration Project goal of increasing flows to the Everglades.

The Florida Farm Bureau Federation fully supports the efforts and direction of the District to date in meeting the legislative mandate of SB10 and staying the course with the project timelines. However, we are concerned with recent rhetoric from various environmental organizations that are questioning the District's science and lobbying for more land.

We support the continuation of agricultural production in south Florida and the partnership agriculture has forged with the State of Florida and the Federal Government throughout the Everglades Restoration process. With that said, we are confident the current alternatives will be adequate to meet the intent of SB 10 without the need to purchase additional productive agricultural land in the EAA.

Thank you and the District staff for your commitment to sound science while keeping this project on a fast track to completion. As always, we look forward in continuing to work with the District Board and staff on Everglades Restoration throughout south Florida.

Sincerely,

Gary Ritter
Assistant Director of Government & Community Affairs
Florida Farm Bureau Federation

Rivers Coalition
Save Our River! Stop the Discharges!
P.O. Box 2627, Stuart, FL 34995 772-225-6849

RIVERS COALITION RESOLUTION

Supporting The Everglades Agricultural Area Storage Reservoir Project

WHEREAS, the northern estuaries and Florida Bay are dying due to the destructive discharges from Lake Okeechobee; and

WHEREAS, the Florida Everglades and its associated estuaries are an internationally unique ecosystem, a national treasure and a significant economic driver for Florida's economy; and

WHEREAS, the citizens of Florida and Martin County, in overwhelming majority, voted to support the Florida Water and Land Conservation Initiative, Amendment 1; and

WHEREAS, additional land is needed to "flow" water during the dry/rainy season and eliminate harmful discharges from Lake Okeechobee to the Caloosahatchee and St. Lucie rivers and provide water supply for the natural system; and

WHEREAS, acquisition of key parcels as needed - completes the "River of Grass Flow"; reduces harmful freshwater discharges from Lake Okeechobee; improves the delivery of cleaner water to the Everglades; protects water supply interests; and supports a healthier ecological environment for Lake Okeechobee and the associated estuaries; and

WHEREAS, The mission of the Rivers Coalition is to fight for a safe, healthy and ecologically balanced St. Lucie River Estuary and Indian River Lagoon, natural resources that are vital to the economy and quality of life of Martin County and the Treasure Coast.

Therefore be it resolved:

The Rivers Coalition represents 94 organizations with over 300,000 members that live along, work, or otherwise benefit from the St Lucie River and Estuary, and the Indian River Lagoon. For more than 90 years our region's economy has been sacrificed as the government-sponsored dumping grounds of polluted Lake Okeechobee water for the benefit of areas south of the lake.

We wholeheartedly support -The Water Resources Law of 2017 (Laws of Florida, Chapter 2017-10, Senate Bill 10) which directs the expedited design and construction of a water storage reservoir in the Everglades Agricultural Area (EAA) to provide for a significant increase in southern storage to reduce high-volume discharges from Lake Okeechobee.

This large dynamic reservoir will be the centerpiece of activities to store, clean and convey Lake water south. These activities will help reduce the damaging discharges and restore the historic flow to the Everglades and Florida Bay as envisioned in CERP.

DULY PASSED AND ADOPTED THIS 26th day of October, 2017 by its members and presented to South Florida Water Management by the Rivers Coalition Leadership Team:

Darrell Brand, George Jones, Jim Moir, Jacqui Thurlow - Lippisch & Mark Perry

SCCF
Sanibel-Captiva Conservation Foundation

November 22, 2017

Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406
Transmitted by email: EAAreservoir@sfwmd.gov

Re: Everglades Agricultural Area (EAA) Reservoir Project Scoping

Dr. Mr. Albert:

This letter is submitted on behalf of the Sanibel Captiva Conservation Foundation to comment on Scoping for the EAA Reservoir. We appreciate that this project is on an accelerated time line and look forward to staying actively involved in this project.

Project Objectives
The objective of the EAA reservoir project in both CERP and Florida's Senate Bill 10, passed in 2017, is to reduce harmful, high volume discharges from Lake Okeechobee to the northern estuaries by identifying storage, treatment, and conveyance south of Lake Okeechobee to increase needed freshwater flows to the Everglades.

In the larger context Everglades restoration requires additional storage and treatment throughout the greater Everglades ecosystem for ecosystem health and to meet increasing water supply demands as the state's population grows. Considering the limited resources available it is critical that the process prioritize moving forward with CERP projects designed to work in concert with each other to achieve restoration. We fully support the Corps of Engineers eliminating the evaluation of deep well injection as part of CERP planning efforts, as it was not contemplated in CERP and raises numerous issues that will detract from and complicate evaluation of the EAA reservoir project.

Storage Needs
Harmful estuary discharge volumes to the Caloosahatchee in recent years have ranged from 2.5 to 3.2 million acre feet (AF) of water with approximately half of the excess volumes, on average, originating from the lake vs. the Caloosahatchee watershed. Based on the public presentations to date, the project proposes to move between 300,000 to 1.3 million AF of water south through dynamic operation of the EAA reservoir depending on conditions. We understand that this capacity will help reduce unwanted discharges to the Caloosahatchee, but is not designed to eliminate them as additional watershed storage capacity is needed to address excess flows during wet periods.

The EAA reservoir project specifically states the obligation to meet existing level of service for water supply and flood protection and reasonable assurance that adverse impacts on flora and fauna will not occur. We wish to emphasize that it is equally critical for the health of the estuaries as it is for Lake Okeechobee, that the lake be operated and managed as a "lake" to provide the ecological functions that protect and preserve the marsh lake habitat. To achieve this goal, lake water levels need to be managed between 12.5 - 15.5 ft, even as fortification of the Herbert Hoover Dike is completed.

To date two reservoir capacities in the EAA have been assessed; a reservoir of 240,000 AF and 360,000 AF. In the presentations it was revealed that a reservoir of 240,000 AF on the A2 parcel would necessitate reservoir water depths of 24 ft. We have grave concerns that this depth, even with 6,000 to 6,500 acres of STA would present operational and water quality challenges. We understand that the direction from the legislature is to prioritize use of state owned lands and seek willing sellers to acquire additional lands. We urge the District to not constrain modeling to current state owned lands but suggest that the modeling effort determine the amount of land needed for reservoirs and STAs to provide the greatest environmental benefit. Identifying a target for land needed based on achieving project benefits will provide a more cost effective project.

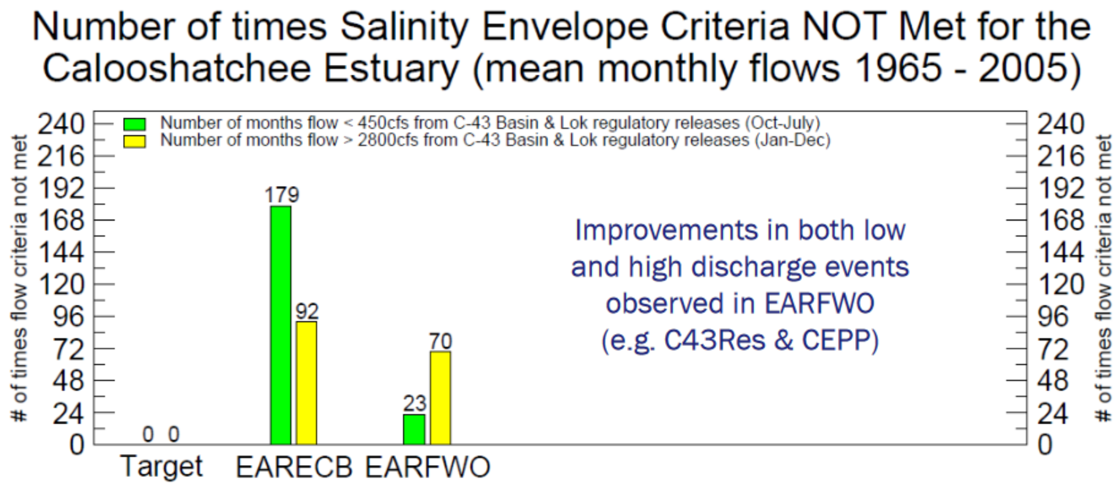
To achieve the objective of moving water south out of Lake Okeechobee and reducing harmful estuary discharges, it is critical that this publicly funded project commit and prioritize that water from the lake, not EAA stormwater runoff, be used to fill the EAA reservoir. This is important as current capacities of the STAs have been monopolized by EAA agricultural runoff.

In conformance with CERP and project goals it is also critical to identify how water in the EAA reservoir is disbursed and prioritized for natural system needs of the Everglades and Florida Bay.

Project Ecological Performance Modeling
The model outputs used in the presentations to show ecological improvements to the Caloosahatchee are based on a flawed RESTORE performance measures of 450 cfs for low flow needs to sustain estuary health. That flow target has in fact resulted in the permanent loss of over 1,000 acres of freshwater tapegrass habitat in the upper estuary and compression of the low salinity zone downstream of the WP Franklin Lock (S-79).

Real-time, monitoring data and observations of estuary salinity responses to flow have documented this disparity over the years and most recently from December 2016 through May 2017. Observations from monitoring of the salinity/flow relationship shows that flows of 360 to 630 cfs were insufficient to meet even the MFL harm standard of 10 psu at the Fort Myers Yacht basin and flows of 730 cfs were needed. This real time analysis agrees with the results of a study by FGCU[(1),] contracted by the SFWMD, that found flows of 450 cfs are insufficient to prevent habitat compression and loss of the low salinity zone downstream of the Franklin Locks.

[(1)]*The responses of turbidity, CDOM, benthic microalgae, phytoplankton and zooplankton to variation in seasonal freshwater inflow to the Caloosahatchee Estuary (Final Report to SFWMD* Tolley, S.G., D. Fugate, M.L. Parsons, S.E. Burghart, E.B. Peebles [2010]).



The above graph from the presentation attributes improvements to Caloosahatchee estuary low flow conditions from the C43 West Basin Reservoir that we believe is overly optimistic and not realistic. As the C43 West Basin Reservoir is not within the scope of the EAA reservoir project, and could be misleading, we request that this information not be included in presentations on the EAA reservoir project performance benefits.

We appreciate the work by the District to meet the expedited timelines and look forward to continuing to work together to assure the project achieves the best possible outcomes to enhance, restore, and improve conditions in the greater Everglades ecosystem and the northern estuaries.

Sincerely,

Rae Ann Wessel, Policy Director
Sanibel Captiva Conservation Foundation

January 25, 2018

Dan O'Keefe
Chairman, Governing Board
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

Dear Chairman O'Keefe:

The American Sportfishing Association (ASA) greatly appreciates and supports the efforts of the South Florida Water Management District (District) Governing Board and staff to expedite planning and construction of the Everglades Agricultural Area Storage (EAA) Reservoir south of Lake Okeechobee (Lake) through your leadership on Everglades restoration and your ongoing involvement in the implementation of Senate Bill 10 from the 2017 Legislative session.

ASA is the nation's recreational fishing trade association and represents sportfishing manufacturers, retailers, wholesalers, and angler advocacy groups, as well as the interests of America's 46 million recreational anglers, over 3 million of whom reside in or visit Florida to fish. ASA also safeguards and promotes the social, economic, and conservation values of sportfishing in America, which result in a $115 billion per year impact on the nation's economy. In Florida, the Fishing Capital of the World, this translates into a significant $9.6 billion economic engine supporting over 128,000 jobs and makes clean waters, abundant fisheries and access to both in the State of paramount importance to our industry.

As you know, restoring the historic southerly flow of clean water from the Lake to Florida Bay (Bay) is a primary goal of Everglades restoration. It is critical to reducing the frequency and volume of releases to the Caloosahatchee and St. Lucie Rivers as well as for maintaining proper salinity and water quality conditions in the Bay. Once completed, restoration will mitigate the associated detrimental environmental impacts these systems currently experience from altered flows; therefore, ASA supports completion of all restoration projects as quickly as possible.

Providing water storage south of the Lake through the EAA Reservoir is an important component of the Comprehensive Everglades Restoration Plan (CERP). Expediting the completion of this project in conjunction with the Central Everglades Planning Project would increase water flow to the south and reduce the need for releases to the northern estuaries.

As the District works towards a final proposal for the reservoir, we urge consideration of the option that would provide the maximum amount of benefit in

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reducing harmful discharges to the estuaries and restoring historic flows, while also moving forward as expeditiously as possible. There are many important factors at play, including necessary federal action, and any delays will result in more unacceptable harm to the environment and our community.

ASA supports your efforts and those of the Governor and the Legislature to develop and fund this meaningful reservoir within the aggressive timelines of SB 10 and will continue to advocate for timely approval and appropriation of the EAA Reservoir and all Everglades restoration projects by our federal partners. Thank you for your commitment to the restoration of Florida's Everglades.

Sincerely,

Kellie Ralston

Kellie Ralston
Florida Fisheries Policy Director
American Sportfishing Association

November 22, 2017

Mike Albert
Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406

Dear Mr. Albert:

The American Sportfishing Association (ASA) appreciates the opportunity to provide scoping comments on the Everglades Agricultural Area Reservoir (EAA) Project. ASA strongly supports the expedited planning and construction of this water storage and treatment project south of Lake Okeechobee and the South Florida Water Management District's (SFWMD) commitment to meeting the timelines set forth in Florida Statute.

ASA is the nation's recreational fishing trade association and represents sportfishing manufacturers, retailers, wholesalers, and angler advocacy groups, as well as the interests of America's 46 million recreational anglers, over 3 million of whom reside in or frequent Florida. ASA also safeguards and promotes the social, economic, and conservation values of sportfishing in America, which result in a $115 billion per year impact on the nation's economy. In Florida, the Fishing Capital of the World, this translates into a significant $9.6 billion economic engine supporting over 128,000 jobs and makes clean waters and abundant fisheries in the State of paramount importance to our industry.

Restoring the historic southerly flow of clean water from the Lake to Florida Bay (Bay) is a primary goal of Everglades restoration and is critical to reducing the necessity for and the frequency and volume of releases to the Caloosahatchee and St. Lucie Rivers as well as for maintaining proper salinity and water quality conditions in the Bay. Once completed, restoration will mitigate the associated detrimental environmental impacts these systems currently experience from altered flows.

Providing water storage south of the Lake through the EAA Project is an important component of the Comprehensive Everglades Restoration Plan. Project options currently under consideration, including varying reservoir and stormwater treatment areas (STAs) sizes as well as conveyance modifications, will eventually provide significant reductions in Lake releases to the estuaries. We encourage the exploration of the appropriate component scales that maximize storage and treatment and can be constructed cost effectively. We look forward to the upcoming modelling results to provide more specific project comments, but strongly urge the

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consideration of recreational access throughout the planning process, with boating and fishing incorporated as primary activities. We also support the development of suitable habitat, including suitable littoral zone and bottom contours, to provide for vibrant fisheries wherever possible in the project.

The American Sportfishing Association appreciates your consideration of our input and looks forward to working with you as the EAA project moves forward.

Sincerely,

Kellie Ralston

Kellie Ralston
Florida Fishery Policy Director
American Sportfishing Association

From:	Matthew Schwartz
To:	EAAreservoir
Subject:	South Florida Wildlands - Comments on EAA Reservoir
Date:	Wednesday, November 22, 2017 11:56:35 PM
Attachments:	South Florida Wildlands Comments EAA Reservoir.docx

Please see attached comments.

Matthew Schwartz
Executive Director
South Florida Wildlands Association
P.O. Box 30211
Fort Lauderdale, FL 33303
954-993-5351 (cell)

SOUTH FLORIDA WILDLANDS ASSOCIATION

P.O. Box 30211
Ft. Lauderdale, FL 33303

November 22, 2017

Mike Albert, Project Manager
South Florida Water Management District
3301 Gun Club Road, MSC 8312
West Palm Beach, FL 33406

Dear Mr. Albert:

South Florida Wildlands appreciates the opportunity to submit these comments regarding the "Everglades Agricultural Area Storage Reservoir Project."

South Florida Wildlands was founded in March of 2010 to protect wildlife and wildlife habitat in the Greater Everglades. We have weighed in on numerous aspects of Everglades restoration over the years and were able to attend two of the planning meetings on the reservoir project.

As we have expressed in various communications to the public and with your agency, South Florida Wildlands strongly favors natural restoration of the Everglades which maximizes the return of wetlands to the original floodplain of the Kissimmee-Everglades-Okeechobee ecosystem. That applies not only to the area south of Lake Okeechobee where the EAA reservoir is to be built, but also to the various basins north, south, east and west of the lake. When government entities and environmental groups discuss the need to "store, treat, and convey water" we firmly believe that "nature knows best." Every acre of wetlands restored in the lands surrounding Lake Okeechobee improves both the water coming into the lake – as well as the quality of the water leaving it. Plan 6 (see summary here: https://goo.gl/Uj1ro4) would be our environmentally preferred solution for the portion of the system immediately south of the lake.

South Florida Wildland also supports all efforts to expedite "Mod Waters" and move water through the current impediments that exist in the levees and Tamiami Trail at the southern end of the man-made system. It is clear to us from our own fieldwork in Water Conservation Areas 3A and 3B, that a woefully insufficient amount of water is able to pass through the southern levee, the Tamiami Canal, and Tamiami Trail en route to the Shark River Slough, Taylor Slough, Florida Bay, and the Gulf Coast of Everglades National Park to allow that magnificent ecosystem to function as it once did. Both the park and the estuaries are simply dying as a result of a lack of fresh water.

However, as Matt Morrison from your agency has explained at the meetings, neither Plan 6 nor any other alternative that doesn't include some combination of reservoir and STA is open for discussion at this time. The Florida legislature has passed SB 10 and your agency is now looking for comments on how land available to that project should be utilized. With that in mind, we make the following points:

1. The SB 10 reservoir was sold and passed as a solution to the damaging discharges that exit Lake Okeechobee through the St. Lucie and Caloosahatchee River/Canals and which plague the system with algae-producing nutrient-laden water during periods of heavy rainfall. Not only is the volume of water enormous during those events – but the quality of water is also terrible. The water pours into Lake Okeechobee after passing through literally millions of acres of dense cattle and agricultural lands in the Kissimmee River floodplain as well as places like Indian Prairie, Nubbins and Taylor Sloughs. Those locations are also some of the highest in phosphorous in the entire system. And storms churn up the lake and lake bottom itself – and its enormous stored volumes of stored agricultural waste in the water column and bottom substrate – feeding algae blooms and bringing more nutrients to the St. Lucie and Caloosahatchee estuaries.

In the last public meeting on this topic, we cited 24,000 cfs as the flow of water into Lake Okeechobee after Hurricane Irma passed through our region. That was agreed to be accurate by staff present. That works out to something in the order of 50,000 acre-feet of water per day. According to the SFWMD, the entire "rebuilt" system is going to be designed to treat and convey south some 300,000 acre-feet of water annually – or approximately six days of water at that rate of flow coming into the lake during the post-Irma rain event. Granted that is not a usual flow of water, but even compared to the normal annual flows of water which currently pass through the lake and out to the estuaries (and heavy rain events are predicted to become more and more the norm as climate change sets in and our atmosphere warms and holds increasing quantities of water vapor as a result), the SB 10 project is literally going to be a drop in the bucket. Even if the reservoirs, STAs, Everglades Agricultural Area, and Water Conservation Areas were near bone dry at the onset of a period of heavy rain – an impossibility – the system (with or without SB 10) would likely be unable to store and treat the flows of water which enter the system (and which currently are mainly discharged through the canals to the estuaries) from a significant portion of the Florida peninsula during even a typical year – let alone one with heavy rainfall. Only a flowway which mimics the unlimited capacity of the historic Everglades to transport water from the center of the state to places like Florida Bay, Biscayne Bay, and the Ten Thousand Islands would be capable of accomplishing that.

2. During the discussions at the meetings, it became increasing clear that the limiting factor in moving water through the system was the throughput capacity of the STAs. Without that function, a reservoir is just a "mini-me" of Lake Okeechobee with all of the same problems – or worse due to size and stagnation – in terms of water quality. So even if one were to disagree with our first point above by stating that the reservoirs are meant to work as "dynamic storage" and not static – meaning water moves from the reservoir or reservoirs into STAs before moving south – the capacity of current and future STAs to "move water south" (given the footprint available to build them) is woefully insufficient to move and treat anywhere near the volume of the water currently passing through the St. Lucie and Caloosahatchee on an annual basis into the estuaries.

3. As stated above, our first choice by far for Everglades restoration is the flowway and a return to natural wetlands throughout the system. In addition to correcting water woes – it actually creates wetlands wildlife habitat along the way. We also regret that the likely location for the SB 10 reservoir is exactly in the middle of the floodplain once (theoretically) earmarked for the Plan 6 flowway. However, as these are scoping comments for the project that the legislature and the SFWMD has placed on the menu (and there currently is no other restaurant in town – not due to what is possible but to what politicians - not scientists - have decided) South Florida Wildlands recommends maximum STA and minimum reservoir with whatever final land parcel is available for the project. In other words – in the

balance between STA and reservoir which has been the subject of the recent meetings - we would favor the minimum-sized reservoir necessary for feeding water into the maximum sized STA or STAs. That configuration would favor the largest flow of clean fresh water possible into the Everglades and estuaries south of the project area.

However – it is important and essential to point out again that the Everglades south of the project area is not hurting for lack of water during and after heavy rain events. South basin rainfall and discharges from the EAA is usually more than enough to bring the current system south of the lake to absolute capacity. Water cannot be released because of the need to keep the urban area dry enough to discharge water from seasonal rain events. Likewise, the Miami, New River and other canals which drain the urban area cannot be used for the same reason – they are essential to keeping an urban area dry for the more than 6 million residents – and many tourists and visitors – who reside in the area. If the canals are filled with discharged water, they have no available capacity to drain the Lower East Coast Metropolitan Area. Therefore, we again stress the absolute need to move as quickly as possible to get water moving from WCAs 3A and 3B into the Shark River Slough and Everglades National Park. There is no point in this entire SB 10 project if water cannot be successfully moved in that direction.

4. During the last meeting and in personal communications with SFWMD staff, South Florida Wildlands stressed the need for the agency to provide a layperson-friendly data page on water moving through the entire system. Interested visitors to your extensive site should be able to see at a glance how much water is moving into Lake Okeechobee, how much water is moving out through the canals to the estuaries, how much water is entering the EAA, STAs, the Miami River, New River, and other canals, etc. And without having to go to multiple pages and data sets. The whole ball of wax summarized in a couple of easy-to-read pages. It's not rocket science and it shouldn't look that way to a public anxious for information on that important topic.

South Florida Wildlands should also not be in a position of having to explain to the public that SB 10 is no more than a very partial solution to the discharges plaguing the communities at the receiving end of waters coming from the lake through the St. Lucie and Caloosahatchee canals. Your agency is well-aware of that unfortunate fact. Simply put, the data that your office has from its many monitoring stations should provide a concise summary of inflows and outflows throughout the entire system. With that understanding from the public, you will also likely receive better suggestions on how to correct the problems which plague the system. And receive much more buy-in from the changes that you do adopt.

Thank you for your consideration of these comments – submitted quickly just before Thanksgiving. Best wishes to you and your family for the holiday.

Best regards,

Matthew Schwartz
Executive Director
South Florida Wildlands Association
P.O. Box 30211
Fort Lauderdale, FL 33303
954-993-5351 (cell)

Miccosukee Tribe of Indians
of Florida

Business Council Members
Billy Cypress, Chairman

Roy Cypress Jr., Assistant Chairman
Jerry L. Cypress, Treasurer

Talbert Cypress, Secretary
Petties Osceola Jr., Lawmaker

January 8, 2018

Mr. Ernie Marks, Executive Director
South Florida Water Management District
B-1 Headquarters Building
3301 Gun Club Road
West Palm Beach, Florida 33406

RE: Discrimination in Water Management Decisions/EAA Reservoir Chapter 2017-10

Dear Mr. Marks:

This letter is in response to the Florida's recent legislation known as Chapter 2017-10, aka the Everglades Agricultural Area (EAA) Storage Reservoir. The Tribe was first briefed concerning the EAA Storage Reservoir by your agency's staff on November 20, 2017. No other agency even bothered to contact the Tribe despite their trust responsibility. Since the initial briefing, the Tribe has participated in at least four other briefings and has watched the EAA Storage Reservoir plan develop. The Miccosukee Tribe Business Council has met to discuss this plan and expresses the following concerns to be relayed to the Florida Legislature at your January 9th update.

The Miccosukee Tribe, and Tribal lands located in Water Conservation Area 3A (WCA-3A), have been devastated by several decades of discriminatory water management decisions taken by both the State of Florida and the federal government. These discriminatory actions take several forms involving quantity, quality, distribution and timing of water deliveries. Numerous lawsuits filed by the Tribe have been necessary to protect our lands and yet the discrimination continues. The Tribe had to fight to establish 10 parts per billion of Total Phosphorous as a numeric criterion to protect the Everglades waters. The State and farmers fought us at every turn. The State fought against establishing NPDES permits to regulate the point source discharges entering the Everglades. Instead of embracing these permits as a tool to control the pollution, the State chose to fight the permits. Once the permits were required by the courts, the District and DEP were forced to establish permits but the NPDES permits they issued were extremely lenient and absolutely full of loopholes. More litigation was necessary. As a result, the State passed the Everglades Forever Act (EFA). The EFA authorized compliance schedules and variances and non-enforcement of existing water quality violations which constituted an illegal change in water quality standards. EPA sided with the polluters. The courts once again determined that the Tribe

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was correct and ordered the State meet water quality standards. Furthermore, the Tribe has had to engage in litigation to stop the damaging practices of back pumping into Lake Okeechobee and more litigation to stop single-species management of the Cape Sable Seaside Sparrow (CSSS) which results in flooding Tribal lands in WCA-3A and the degradation and elimination of large portions of tree islands on tribal lands. And the list goes on.

This past year, the Florida legislature has passed the Chapter 2017-10 as a direct response to the nationwide attention given to algae blooms in specific areas of the state. This new piece of legislation requires that the EAA Reservoir compartment A-2 be converted to 240,000 acre-feet of storage and/or the A-1 and A-2 Reservoirs be converted to 360,000 acre-feet of storage. This law would divert highly polluted and environmental damaging waters from the northern estuaries and send that polluted water south into the EAA, where it will eventually be passed onto Tribal lands in WCA-3A. Clearly, the purpose of the legislation is to reduce the high volume of polluted water from being discharged into the northern estuaries. While we do advocate for "shared adversity", it seems that time after time the only adversity is that which is imposed upon Tribal lands in WCA-3A. The Tribe **objects** to the requirement that the water storage must be located in the EAA. Water storage north of Lake Okeechobee makes much more sense. The requirement for southern storage was a blatant attempt to force the purchase of sugar industry land; something pushed by environmentalists. Naturally, the farmers objected and the end result was language prohibiting the use of eminent domain being added to the bill.

The simple fact of the matter is that shallow water "Flow Equalization Basins" (FEBs) provide a critical water quality benefit that an 18 or 23 foot deep water reservoir **cannot** provide. By requiring the SFWMD to use the FEBs, and not acquire more land except land from "willing sellers", the Florida legislature has made a purposeful and conscious decision to further degrade federally protected Tribal lands in WCA-3A. This legislation also violated court ordered commitments made to the Tribe by the State.

You may recall, it was the Miccosukee Tribe that filed litigation which forced the SFWMD to build the FEBs in the first place. Once built and functioning, significant water quality benefits were the result. On June 5, 2012, the State advised EPA Region IV Administrator that the Restoration Strategies Plan (which rely on the use of FEBs) represented "a significant historic milestone toward restoring America's Everglades" and that the FEBs provide for a "comprehensive set of projects that will ensure the District fully achieves the stringent water quality requirements". The State filed the Restoration Strategies Plan with the federal court on June 7, 2012 and represented to the court that the State would utilize the A-1 Reservoir as a FEB. On July 9, 2012 the State further represented to the court that the Restoration Strategies Plan provides for the State "to construct 110,000 acre-feet of new water storage in the form of Flow Equalization Basins". The State said that it was committed "to rigorous and enforceable technical plan (that) comports with this Court's directives, satisfies the requirements of the CWA and will resolve this case". The current proposed EAA reservoir erodes those commitments and may be interpreted to violate the Court's Order which was based on those commitments. On August 15, 2012, the State and DEP signed OGC Consent Order 12-1148, as a pre-requisite for issuance of FDEP NPDES Permit FL0778451-001 GL7A/RA, which authorize the discharges from the STAs. That Consent Order requires specific acres of FEBs and requires their construction by certain deadlines. In other words, the discharges from the STAs were only authorized because of the commitment to build and operate the FEBs; which Chapter 2017-10 now requires to be changed.

The Miccosukee are left with no other choice than to believe that the State of Florida's commitments and statements to the court mean nothing. Promises to meet stringent water quality standards have been broken. Discharge permits are violated. Yet the District maintains that they are meeting stringent State Water Quality Standards. Perhaps it is because the State uses the "4 Part Test" which relies on two "network of stations" in impacted vs unimpacted parts of the Everglades. By averaging clean water quality sites near the marsh interior with dirty water quality sites at the points of canal discharge, the actual scope of the pollution problem is obscured. The 2018 South Florida Environmental Report acknowledges, "Annual geometric mean TP concentrations for individual interior marsh monitoring stations ranged from less than 2.0 μg/L in some un-impacted portions of the marsh to 850 μg/L at sites that are highly influenced by canal inputs". In the same report, Figure 3A-8 shows a bright red dot on at the location of the S-190 structure, indicating that total phosphorous regularly exceeds 50 μg/L; however, the data table on page 3A-24 shows the geometric mean of all stations averaged together and ... Viola! The problem is solved. The table indicates that total phosphorous inflows to WCA-3A are only 19.6 ppb once the magic averaging is done. And when the District puts out their "News Release" to the public, the big red dot at the S-190 structure (and other problematic data points) are missing altogether! These "News Releases" sound like Fake News to the Tribe. When these obvious discrepancies are brought to the attention of the District in public meetings (Tribal Annual Meetings, Task Force Meetings, WRAC Meetings, etc.) our staff is told that the data points are not shown out of respect to the Tribe. How insulting! This is **not** the Tribe's data that we object to being excluded from your reports; it's **your own data** that you purposefully hide from public disclosure. The impacts of these damaging discharges to Tribal lands are visible from space! Anyone can go to Google Earth and look at the area south of the L-28 Interceptor (L-28I) Canal and see the impacts of discriminatory pollution of Tribal lands. The next red herring that is always thrown up is that it's the Tribal cattle pastures that cause the problem. This is a lie. Zoom in on Google Earth and please observe the existence of two levees, one on each side of the L-28 Interceptor Canal. The presence of those levees precludes any contribution of water from tribal lands including the cattle pastures. The Miccosukee Tribe does not contribute one drop of tributary flow to the L-28I canal – which discharges into the heart of our reservation. Similarly, the L-28 Canal is blocked by a weir at I-75, and another earthen plug at the terminus of the L-28 canal. Obviously, these red herring arguments are only designed to divert attention from the fact that Western Basin pollution is being dumped on Tribal land by the States discriminatory water control practices. The State has steadfastly slow-walked any requirement for STAs in the Western Basins. The Tribe has complained about the cattails at the "Tip of the Triangle" for over three decades (30 years). Sir, the time is now to create STA boundaries on a map. Let's begin to implement real solutions to these long standing water quality problems.

The Miccosukee Tribe acknowledges that the District is planning to construct a 6,500 acre STA **if** the 240,000 acre-ft reservoir option is chosen and an 11,500 acre STA if the 360,000 acre-ft reservoir is chosen. However, we notice that the District is not committing to discharge water from those STAs at 10 ppb TP or less; nor are they committing to meet Tribal Water Quality Standards – which are immediately downstream of the STA discharges. Continued violation of Tribal Water Quality Standards will no longer be tolerated. The State should plan for discharges that protect the "entire waterbody" as required by the Clean Water Act. To the Miccosukee Tribe that means the State must require compliance at the point of discharge into the marsh – in order to protect all of the Everglades, including meeting Tribal Water Quality Standards at the Tribal boundary.

In 1991 the State and federal government entered a Consent Decree in the federal Everglades lawsuit. The State committed to reduce the total load of phosphorous entering WCA-1 by 85% and reduce the phosphorous load entering the Everglades Protection Area (EPA) by approximately 80% from the base period. The base period had 205 metric tons and an 80% reduction results in an annual phosphorous limit of 41 metric tons. The 2018 Everglades Consolidated Report indicates, at Figure 3A-10, that the EAA discharged 34 metric tons of phosphorous into the EPA in 2017. However, the 9 metric tons of phosphorous which was discharged for "Water Supply and Flood Control" was not shown as entering through the EPA. Let me ask this simple question: If the 553,000 acre-ft of water containing the 9 metric tons of phosphorous didn't pass through the EPA (and isn't being counted against the 41 ton limitation), exactly how did the District get the water to Miami? Is there some secret pipeline we are not aware of? The 34 metric tons and the 9 metric tons both pass through the EPA and should be counted to provide an accurate picture of the total load.

The Tribe supports the Comprehensive Everglades Restoration Plan (CERP) and we fully recognize that CERP calls for more water to be sent through the WCAs into the Everglades National Park (ENP) and into Florida Bay. In fact, it is exactly because a healthy Everglades needs more clean water – not less – that we are opposed to wasting water with the use of Deep Well Injections, and we are opposed to damaging estuary releases. Everglades Restoration simply requires more clean water. The Tribe also realizes that more water will bring more phosphorous load. It may be impossible to meet the 1991 load reduction requirements after CERP is fully implemented, 30+ years after the signing of the Consent Decree. It seems to us that the EAA Reservoirs will certainly not meet the load reduction requirements of the Consent Decree.

Since the STAs were designed using the DMSTA model and an annual average increase of water flow of 300,000 ac-ft was used in the DMSTA calculations; what happens during wet years when the Everglades receives as much as 1.3 Million ac-ft of water? These proposals from the District provide no assurances that they will not by-pass the untreated water. This unanswered question tells the Tribe that the discriminatory practice of destroying Tribal Everglades will continue. The Tribe is tired of always having its land used to treat other polluter's discharges. We expect the State to fully treat the water before it is discharged into the Everglades.

The State is planning to flush between 300,000 ac-ft and 1.3 Million ac-ft more water through the WCAs either through the implementation of CERP or the new EAA Storage Reservoirs. The State must fix the problem of flows across Tamiami Trail first. Currently, the Corps of Engineers and the SFWMD can put water about six times faster into WCA-3A than they can release into Everglades National Park (ENP). Each year the discriminatory flooding of Tribal lands occurs. 2017 water year was particularly damaging to Tribal tree islands and wildlife in the Everglades. Starting in June 2017 and lasting until January 2018, six months of persistent flooding existed on Tribal lands. This is totally unacceptable. The State and federal agencies are killing the Tribe's homelands, our beloved Everglades. This is not "Shared Adversity"! The ultimate insult to the Tribe happened during the days leading up to Hurricane Irma making landfall. Anticipating further flooding, the Tribe asked for flood control pumps and we were denied. The Tribe was told to seek flood relief from FEMA **after** the flooding of their homes had occurred. The very agencies who denied flood pumps are the ones who pumped flood waters into Tribal lands causing widespread damage.

The answer to flooding WCA-3A is not to push more water south. The answer is to construct Central Everglades Planning Project (CEPP). The projects designed to de-compartmentalize the

Everglades and move more water across Tamiami Trail must take priority over building deep water reservoirs which will only result in more flooding and NOT restore the Everglades! The single-species management practices of closing the S-12 gates must stop. Water cannot continue to be stacked on Tribal lands. Blockages south of the S-12 structures must be removed if the District and Corps of Engineers ever hope to increase flows out of WCA-3A. The L-67A, L-67C levees and L-29 levees hold the water back and prevent the Tamiami Trail "Bridges to Nowhere" from achieving their stated goal. ENP refused to allow the cleaning of the culverts. The Corps of Engineers ignored their responsibility to maintain the culverts (similar to their current refusal to maintain the S-12 structures). Consequently, the failure to maintain the culverts under Tamiami Trail was used as an excuse to justify building the bridges. Now that the first mile of bridging is complete we note that there is very little flow under the bridge. The upstream levees remain and the downstream vegetation remains. The bridges are a total waste of taxpayer money. Meanwhile, Tribal tree islands are completely submerged for 6 months out of the year. No other entity is required to endure 6 months of discriminatory flooding.

The Miccosukee Tribe has watched devastating water management decisions cause irreversible damage to Tribal Everglades in WCA-3A, which is the **last** vast expanse of sawgrass Everglades left in existence. The Tribe has been forced to file numerous lawsuits with the State and federal agencies; always with the ultimate goal of protecting our homeland, the Florida Everglades. The Tribe will continue to monitor the progress of your planning efforts on the EAA Storage Reservoir. Our message to you is simple: Do not flood Tribal Everglades and clean the water before it enters the Everglades.

Sincerely,

Billy Cypress
Chairman

cc. Business Council
Mr. Drew Bartlett, DEP
Mr. Trey Glenn, Region IV EPA
FL Senator Joe Negron
Florida Legislature
COL Jason Kirk, COE
Shannon Estenoz, DOI
Pedro Ramos, Superintendent ENP

quality criteria were observed for five parameters: dissolved oxygen (DO), alkalinity, pH, specific conductance, and turbidity. Similar to previous periods, these excursions were localized to specific areas of the EPA, and all these parameters exhibited excursions in previous water years.

For WY2017, a summary of excursions of the DO, alkalinity, pH, specific conductance, and turbidity criteria, as well as the status of pesticides, phosphorus, and nitrogen within the EPA, is presented below:

- Due to excursions of the site-specific alternative criterion (SSAC), DO was classified as potential concern for the interior portions of LNWR, WCA-2, and WCA-3, and concern for interior portions of ENP. Inflow, outflow, and rim canal monitoring locations were assessed using the current Class III water quality standard. Inflow portions of LNWR, WCA-3 and ENP, as well as outflow portions of WCA-2 and WCA-3, were classified as concern, while WCA-2 inflow was classified as potential concern. Outflow of LNWR was classified as no concern and LNWR rim portion was classified as minimal concern.
- Alkalinity was categorized as minimal concern for LNWR interior when assessed against the updated Class III state standard, and pH was categorized as minimal concern in LNWR interior and LNWR rim canal.
- Specific conductance was categorized as potential concern for LNWR inflow and minimal concern for LNWR rim canal, WCA-2 inflows, and WCA-2 interior.
- No exceedances of total ammonia nitrogen or iron were observed in the EPA.
- Turbidity was categorized as minimal concern for ENP interior.
- No pesticides or pesticide breakdown products exceeded their respective toxicity guideline concentrations or state water quality standards. However, several pesticides or pesticide breakdown products were detected at levels above their method detection limit (MDL), including 2,4-D (dichlorophenoxyacetic acid), ametryn, atrazine, diuron, imidacloprid, and metribuzin.
- TP concentrations were highest in WCA-3 inflow and lowest for ENP inflow. Annual geometric mean inflow TP concentrations ranged from 8.3 micrograms per liter (µg/L) for ENP to 19.6 µg/L for WCA-3. Annual geometric mean TP concentrations at interior regions ranged from 4.4 µg/L in ENP to 8.9 µg/L in WCA-2. Annual geometric mean TP concentrations for individual interior marsh monitoring stations ranged from less than 2.0 µg/L in some unimpacted portions of the marsh to 850 µg/L at sites that are highly influenced by canal inputs. Of the interior marsh sites, 71 percent exhibited annual geometric mean TP concentrations of 10.0 µg/L or less, with 79 percent of the marsh sites having annual geometric mean TP concentrations of 15.0 µg/L or less throughout the larger ambient monitoring network.
- Annual geometric mean inflow and interior orthophosphate (OP) concentrations were less than 2.0 µg/L for all areas of the EPA.
- Similar to previous years' reporting, the five-year (WY2013–WY2017) results for the TP criterion assessment indicate that unimpacted portions of each WCA passed all four parts of the compliance test. In contrast and as expected, impacted portions of each water body failed one or more parts of the test. The impacted portions of the WCAs routinely exceeded the annual and five-year network TP concentration limits of 11 µg/L and 10 µg/L, respectively.
- An impacted TP rule station, LOXA140 transitioned to the unimpacted network during WY2017.

2018 DRAFT
South Florida Environmental
Report

2018 South Florida Environmental Report - DRAFT

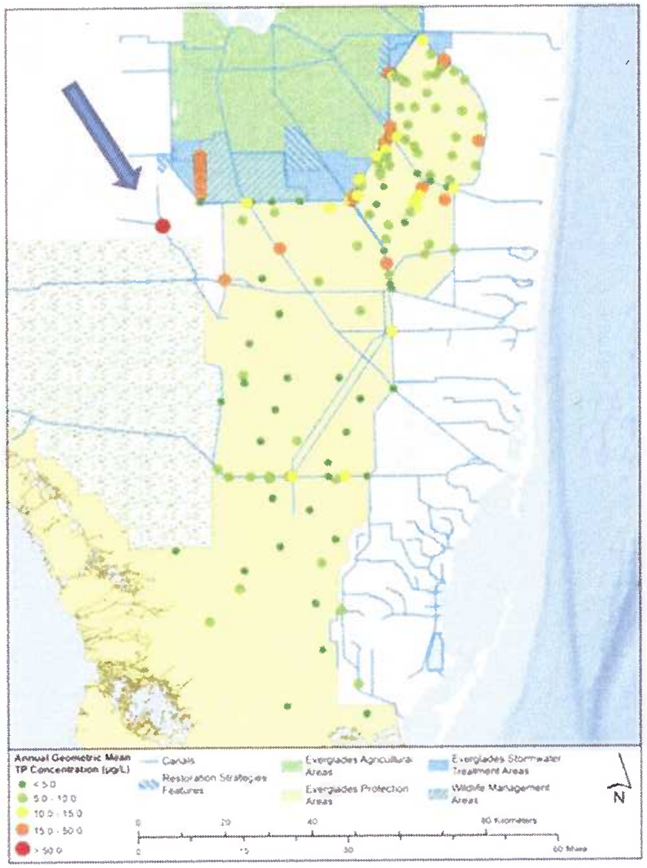


Figure 3A-8. Annual geometric mean TP concentrations for all classifications for WY2017 at stations across the EPA.

Table 3A-3. Summary statistics of TP concentrations (µg/L) for the Baseline (WY1979–WY1993), Phase I (WY1994–WY2004), and Phase II (WY2005–WY2016) periods, and WY2017.

Region	Class[a]	Water Year Period	Sample Size	Geometric Mean	Geometric Standard Deviation	Median	Minimum	Maximum
LNWR	Inflow	1979-1993	413	134.3	6.8	139	14	872
		1994-2004	1588	46.7	6.1	44	6	799
		2005-2016	1298	32.9	5.6	27	3	870
		2017	154	19.1	4.3	19.3	9.5	42
	Interior	1979-1993	381	13.7	5.3	12	<2	424
		1994-2004	1493	7.9	3.7	6	2	80
		2005-2016	3819	9.7	4.1	8	2	574
		2017	344	8.4	3.7	8	3	40
	Outflow	1979-1993	323	63.8	6.4	68	8	674
		1994-2004	276	41.6	5.7	39	6	392
		2005-2016	225	21.8	5.2	18	6	245
		2017	15	11.2	3.8	11	9	17
	Rim	1979-1993	96	84.5	6.3	89	22	473
		1994-2004	479	67.5	6	68	2	263
		2005-2016	400	38.8	5.9	31	10	817
		2017	48	17.8	4.2	18	11	43
WCA-2	Inflow	1979-1993	451	80.2	6.4	82	6	1,030
		1994-2004	719	37.9	5.8	43	8	392
		2005-2016	1242	17.2	4.6	16	6	245
		2017	157	12.9	3.9	12.5	7	36
	Interior	1979-1993	2001	20.2	6.6	16	<2	3,180
		1994-2004	1810	16.3	5.8	12	<2	5,662
		2005-2016	2974	10.0	4.4	9	<2	278
		2017	243	8.9	4	6	3	46
	Outflow	1979-1993	577	24.6	5.8	25	<2	403
		1994-2004	435	14.7	4.8	14	2	199
		2005-2016	614	10.8	4	10	3	72
		2017	43	9.4	3.8	9	4	23
WCA-3	Inflow	1979-1993	1263	43.1	6.5	47	<2	933
		1994-2004	1994	32.2	5.8	32	2	679
		2005-2016	3106	22.2	5.2	21	3	1206
		2017	400	19.6	4.8	18	4	144
	Interior	1979-1993	592	10.4	5.5	10	<2	438
		1994-2004	1909	8.2	4.2	8	<2	310
		2005-2016	2587	6.2	3.6	6	<2	180
		2017	174	4.8	3.1	5	<2	24
	Outflow	1979-1993	1316	11.1	4.5	11	<2	246
		1994-2004	1308	8.1	3.9	8	2	140
		2005-2016	3745	10.6	4	10	3	390
		2017	395	9.5	3.8	9	3	33
ENP	Inflow	1979-1993	1629	10.1	4.4	10	<2	246
		1994-2004	1884	7.2	3.8	7	2	297
		2005-2016	5666	8.6	3.8	8	2	1,020
		2017	721	8.3	3.6	8	2	33
	Interior	1979-1993	505	7.7	4.7	7	2	521
		1994-2004	938	5.2	3.8	5	<2	117
		2005-2016	1353	4.6	3.3	4	<2	291
		2017	124	4.4	3.3	4	<2	35

a. Inflow and outflow values only utilize data when structures are flowing.

SFWMD defines
"Meeting Water Quality Standards"
with the 4 Part Test

PHOSPHORUS CRITERION ACHIEVEMENT ASSESSMENT

An evaluation to determine achievement of the TP criterion was performed consistent with assessment protocol presented by Payne et al. (2007), and the four-part test outlined below and specified in the FDEP's Water Quality Standards for Phosphorus within the Everglades Protection Area, referred to as the TP rule (Section 62-302.540, F.A.C.). Achievement of the TP rule is assessed for networks of impacted and unimpacted, spatially explicit monitoring locations in WCAs (i.e., LNWR [WCA-1], WCA-2, and WCA-3). Achievement of the phosphorus criterion is different for ENP than the established TP criterion for the EPA. As acknowledged by Section 62-302.530(4)(c), F.A.C., achievement of the TP criterion is assessed according to methods set forth in Appendix A of the Settlement Agreement (Case No. 88-1886-CIV-MORENO) until the Settlement Agreement is amended or terminated. Reports and supporting information related to TP assessments consistent with Appendix A of the Settlement Agreement can be found at http://www.sfwmd.gov/toc.

Achievement of the TP criterion is assessed by a four-part test for each WCA using two networks of stations: impacted and unimpacted. The parts of the achievement test are as follows:

1. The five-year geometric mean averaged across all stations is less than or equal to 10 μg/L.
2. The annual geometric mean averaged across all stations is less than or equal to 10 μg/L for three of five water years.
3. The annual geometric mean averaged across all stations is less than or equal to 11 μg/L.
4. The annual geometric mean at all individual stations is less than or equal to 15 μg/L.

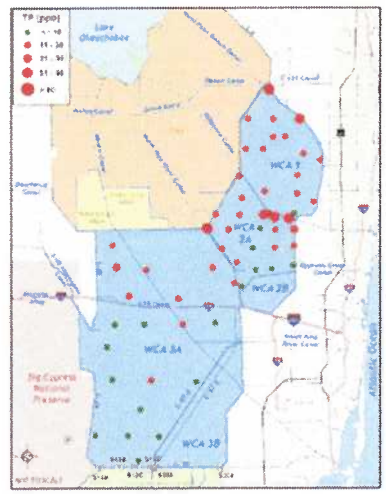
sfwmd.gov

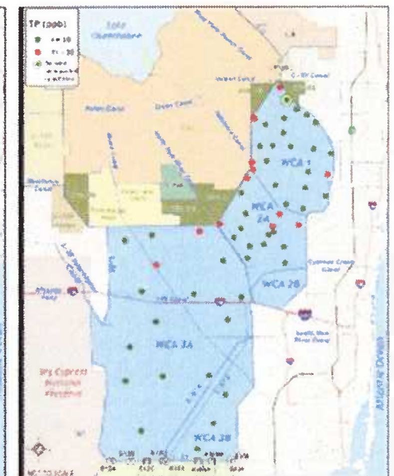
NEWS RELEASE

Dec. 12, 2017

Water Quality in the Everglades Improves Year-Over-Year

Latest data shows Everglades Stormwater Treatment Areas had their best performance year ever in 2017 as Gov. Rick Scott's $880 million Restoration Strategies Plan continues to further improve water quality





Click on the map to see a larger version showing the total phosphorus concentration of Everglades water measured in the Water Conservation Areas between 1979 and 1983. Most of these monitoring stations now meet the state's stringent water quality standards.

Click on the map to see a larger version showing the total phosphorus concentration of Everglades water measured in the Water Conservation Areas between 2013 and 2017. The monitoring station highlighted in yellow transitioned to being "unimpacted" in Water Year 2017.

Everglades Protection Area
LOAD REDUCTION REQUREMENTS

Base Period = 205 Metric Tons
80% Reduction = 41 Metric Tons

2017 Load to WCAs from EAA=
34 Metric Tons

Excluding Discharges for Water
Supply & Flood Control =
9 Metric Tons

Does not count Load from Non-
ECP Basins =
20 Metric Tons

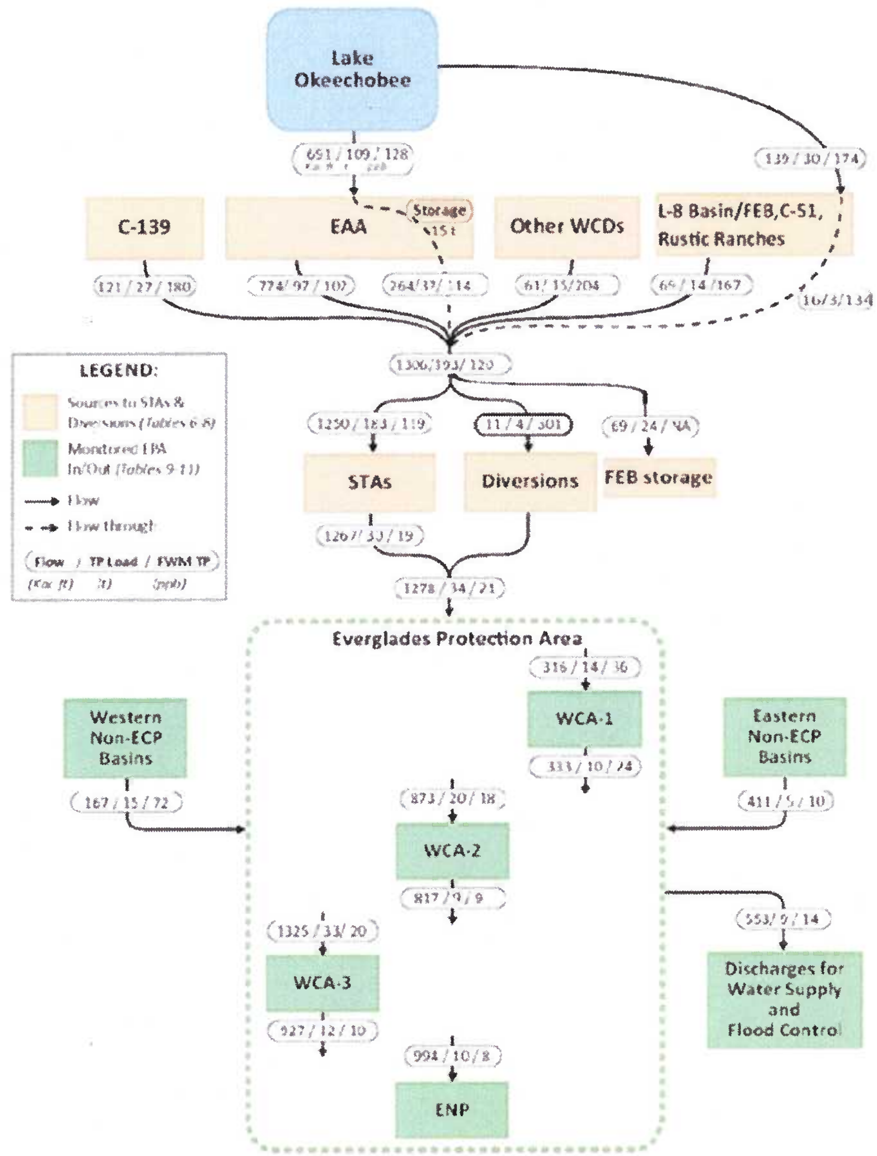
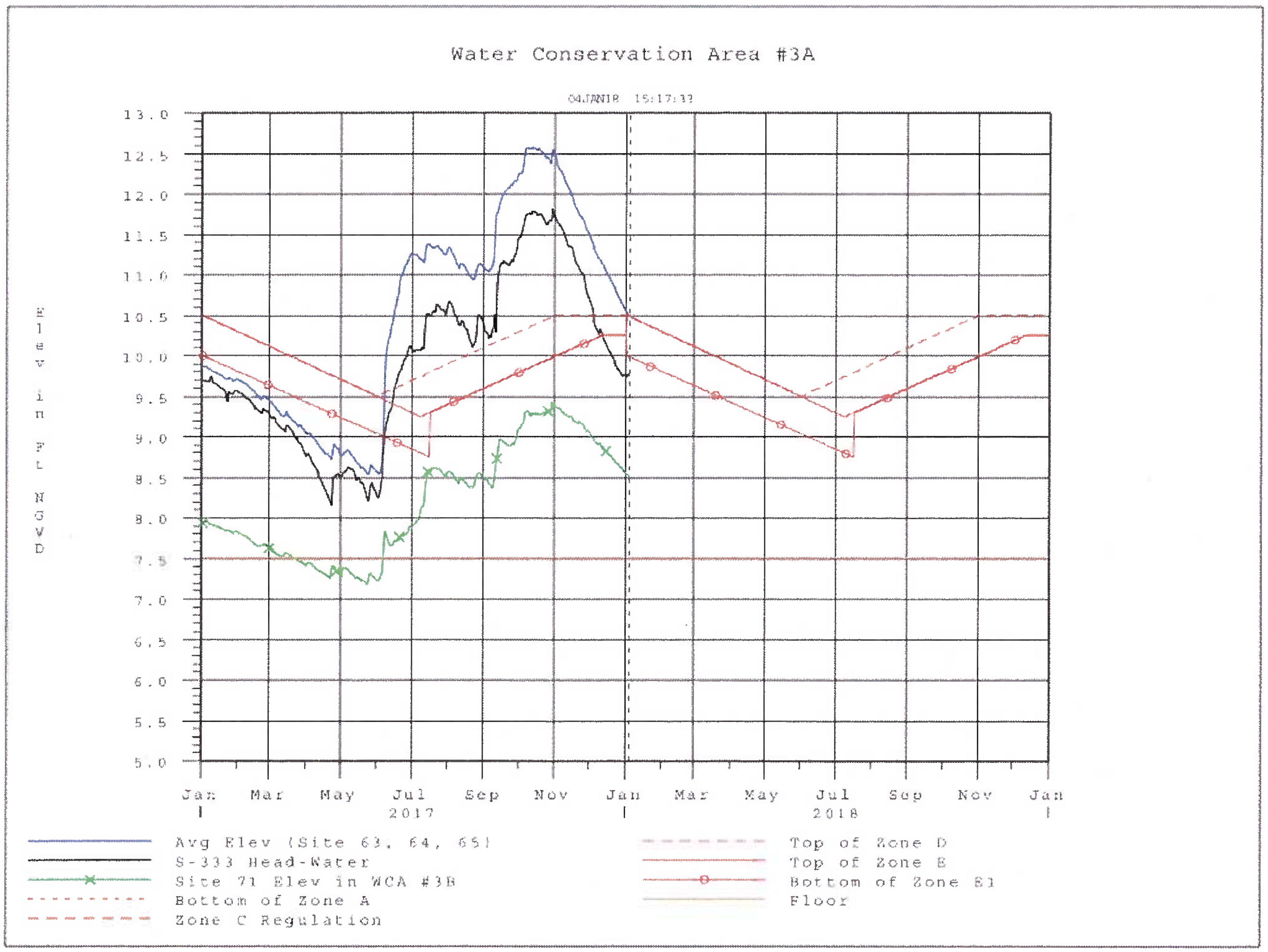


Figure 3A-10. Five-year (WY2013–WY2017) average annual flows (1,000 acre-feet [Kac-ft]), TP loads (metric tons [t]), and flow-weighted mean (FWM) TP concentrations (µg/L or parts per billion [ppb]) to the STAs and diversions from inflow tributaries and across the EPA. (Note: WCD = water control district and ECP = Everglades Construction Project. Tables referred to in the legend are in Appendix 3A-5.)

Six Months of Discriminatory Flooding



SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE
AH-TAH-THI-KI MUSEUM

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM

30290 JOSIE BILLIE HIGHWAY
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CLEWISTON, FL 33440

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MUSEUM PHONE: (863) 902-1113
FAX: (863) 902-1117

THPO WEBSITE: WWW.STOFTHPO.COM
MUSEUM WEBSITE: WWW.AHTAHTHIKI.COM

TRIBAL OFFICERS

MARCELLUS W. OSCEOLA JR.
CHAIRMAN

MITCHELL CYPRESS
VICE CHAIRMAN

LAVONNE ROSE
SECRETARY

PETER A. HAHN
TREASURER

December 5, 2017

Mr. Armando Ramirez, Tribal and Federal Affairs Liaison
Office of Everglades Policy & Coordination
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406
Office: 561-682-6684
Mobile: 561-629-6974

Subject: Everglades Agricultural Area Storage Reservoir Feasibility Study, Palm Beach County, FL
THPO Compliance Tracking Number: 0030203

Dear Mr. Ramirez,

The Seminole Tribe of Florida – Tribal Historic Preservation Office greatly appreciates your invitation to the November 17th meeting and for providing us a briefing on the Everglades Agricultural Area Storage Reservoir Feasibility Study ("EAA"). While we understand that there will be opportunities to consult with the lead Federal agency (the U.S. Army Corps of Engineers) through the NEPA and Section 106 processes as this project proceeds, we wanted to provide the South Florida Water Management District ("SFWMD") with some initial comments. We hope that you will keep these comments in mind as you work through your process.

Our concerns for the possible impact the EAA project could have on any cultural resources that might be present within the project area fall into two general categories.

1. Primary or direct effects: these would include effects that directly result from ground disturbing activities such as land clearing, reservoir construction, construction of water conveyance and control structures, etc.

2. Secondary effects: these include the effects on water levels downstream of the reservoirs/storm water treatment areas that result from the project (i.e., will the project result in additional inundation of tree islands, cultural resources in Everglades National Park or other areas).

In order to address these concerns the Tribe wants to make sure that project areas/areas of potential effects have been adequately surveyed for cultural resources and that any downstream effects have been modeled and assessed for possible adverse impacts.

This is just an initial assessment of the EAA project and may change over time. We have provided a courtesy copy of this letter to the USACE in order to assist them in their consultation with the Tribe at the appropriate time. Please continue to update us on this project as you approach or reach some of your target dates and feel free to contact us with any questions or concerns.

Respectfully,

Bradley M. Mueller

Bradley M. Mueller, MA, Compliance Supervisor
STOF-THPO, Compliance Review Section
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440

Office: 863-983-6549 ext 12245
Fax: 863-902-1117
Email: bradleymueller@semtribe.com
Web: www.stofthpo.com

cc: Paul Backhouse, THPO Officer & Director of Museum
Anne Mullins, THPO Assistant Director
Stephan Walker, Lewis Longman & Walker
Michelle Diffenderfer, Lewis Longman & Walker
Kim Taplin, USACE
Robin Moore, USACE

---------- Forwarded message ----------
From: "**Manley Fuller**" <wildfed@gmail.com>
Date: Thu, Feb 8, 2018 at 12:27 PM -0500
Subject: EAA Reservoir
To: "Marks, Ernie" <emarks@sfwmd.gov>

Dear Ernie fyi

Re. Discussion of an EAA Reservoir

The Florida Wildlife Federation would like you to know that we support an Everglades Agricultural Area reservoir as proposed in the Comprehensive Everglades Restoration Plan and the Central Everglades Planning Project to prevent and/or reduce deleterious discharges to the St. Lucie and Calososahatchee Rivers and to sustain a restoration flow of water south through the Water Conservation Areas and, as needed into Everglades National Park.

FWF is cognizant of the need to act quickly to meet the timelines set out by the Army Corps of Engineers for submitting proposals to be included in the next WRDA authorization and funding bills. However, FWF urges the South Florida Water Management District to acknowledge the necessity of meeting established water-quality standards for the Everglades Protection Area. The SFWMD should address water-quality issues in the sizing and design of the reservoir and planning for attendant projects that operationally "come on-line" in tandem with the reservoir.

In pursuit of that goal, we support the termination of leases on state-owned land within the Everglades Agricultural Area that can be used in a treatment/filtration system or converted to STAs. We strongly oppose proposals to convert the Holey Land and Rotenberger Wildlife Management Areas into STAS.

Sincerely yours,

Manley Fuller President Florida Wildlife Federation
Martha Musgrove Florida Wildlife Federation Regional Director

Manley K. Fuller, President
Florida Wildlife Federation
PO BOX 6870
Tallahassee, FL 32301
(850) 656-7113 (Office)
(850) 942-4431 (Fax)
www.fwfonline.org (Website)
wildfed@gmail.com

MARTIN COUNTY
BOARD OF COUNTY COMMISSIONERS
2401 S.E. MONTEREY ROAD • STUART, FL 34996

Telephone: 772-221-1357
Fax: 772-288-5432
Email: eciampi@martin.fl.us

DOUG SMITH
Commissioner, District 1

ED FIELDING
Commissioner, District 2

HAROLD E. JENKINS II
Commissioner, District 3

SARAH HEARD
Commissioner, District 4

EDWARD V. CIAMPI
Commissioner, District 5

TARYN KRYZDA, CPM
County Administrator

SARAH W. WOODS
County Attorney

TELEPHONE
772-288-5400

WEB ADDRESS
http://www.martin.fl.us

February 20, 2018

Ernie Marks
Executive Director
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

VIA EMAIL

RE: Martin County Support of the Everglades Agricultural Area Southern Reservoir

Dear Mr. Marks,

On behalf of the Martin County Board of County Commissioners, I am writing to voice our support of Senator Joe Negron's letter to the South Florida Water Management District dated December 14, 2017 (attached). Martin County is one of the primary communities impacted by the broken plumbing of the greater Everglades. Although we recognize that the Everglades Agricultural Area (EAA) Reservoir is but one piece of a large and complex puzzle to reduce damaging freshwater discharges to the St. Lucie Estuary, it is imperative that the project foundation be inclusive of realistic and implementable components.

We encourage the State of Florida and the Army Corps of Engineers (ACOE) to coordinate extensively and immediately on whether the EAA reservoir options presented by the Water Management District are realistic and able to receive approval from the ACOE.

Martin County has long advocated for all components of the Comprehensive Everglades Restoration Plan (CERP) that will benefit all south Florida counties through a restored Everglades, secured water supply, and protected communities. We will continue to do our part with local projects and infrastructure investments that will clean up our local water quality. We are all intrinsically linked to the larger ecosystem, and so we must all consistently work in the same direction for any of our individual efforts to collectively result in the mammoth shift needed to get the water right.

Sincerely,

Edward V. Ciampi, Chairman
Martin County Board of County Commissioners

Cc: Martin County Board of County Commissioners,
Taryn Kryzda, County Administrator

adm2018L189.docx

THE FLORIDA SENATE
SENATOR JOE NEGRON
President

December 14, 2017

Director Ernie Marks
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406

Dear Director Marks,

First, let me thank you and your staff at the South Florida Water Management District for the efforts you have put into making the Everglades Agriculture Area (EAA) reservoir a reality. I am impressed by the commitment the District has made in planning the reservoir and the transparency the District has demonstrated by tracking its progress on its website and holding numerous public meetings. I was also heartened by your recent editorial in the TCPalm where you reiterated your commitment to see this project through completion.

I have a concern that the initial modeling may be unnecessarily constrained by using a limited footprint or that utilizing the A-1 parcel might trigger the need to renegotiate the restoration strategies consent decrees. The bill, now law, anticipates use of the A-2 and potentially the A-1 parcel and lands to the west of the two parcels. The law also emphasizes termination of leases, land swaps, and land acquisition if additional land is necessary for the EAA reservoir project. What I hope to see from the District is a proposal that is workable, that we can make a reality as expeditiously as possible to decrease the need for harmful discharges to the estuaries. If the District needs to be flexible with the footprint to put an effective reservoir plan into action, I hope it will consider using any additional land available, if necessary. It was our goal as the Legislature to give the District the tools it needs to develop a plan that is realistic and will ultimately receive approval from our partners in the federal government.

Because of the law's emphasis on meeting the necessary water quality requirements, I anticipate that an agreement with the federal government can be reached if the A-1 parcel is repurposed for the EAA reservoir including water quality treatment features. I know water quality modeling has been an integral part of your planning work to date, and I commend you and your staff for that. If the consent decrees require any modification, I would urge the District to start those conversations early so that those revisions can be made contemporaneously with the development of the reservoir.

Again, I thank you and your staff for taking the first steps in undertaking this historic project. I look forward to your report on the status of the post-authorization change report in January. I am optimistic that with continuing efforts like those that have been put forward to date, we will make this project a reality and see an end to the catastrophic effects that excessive discharges from Lake Okeechobee have had on our estuaries and local communities.

Sincerely,

Joe Negron

CC: Senator Rob Bradley, Chair of the Senate Committee on Appropriations and the Senate Committee on Environmental Preservation and Conservation

From: Higgins, Jamie [mailto:Higgins.Jamie@epa.gov]
Sent: Friday, February 23, 2018 4:41 PM
To: Albert, Michael <malbert@sfwmd.gov>
Cc: Higgins, Jamie <Higgins.Jamie@epa.gov>; Scheidt, Dan <Scheidt.Dan@epa.gov>; Harper, Cecelia <Harper.Cecelia@epa.gov>; Militscher, Chris <Militscher.Chris@epa.gov>; Zapata, Cesar <Zapata.Cesar@epa.gov>; Militscher, Chris <Militscher.Chris@epa.gov>; Mancusi-Ungaro, Philip <Mancusi-Ungaro.Philip@epa.gov>
Subject: EAA Storage Reservoir ATR

Dear Mr. Albert:

Thank you for the February 16th, 2018, invitation to participate in the South Florida Water Management District's (District) Agency Technical Review (ATR) team for the Central Everglades Planning Project (CEPP) Post Authorization Change Report, and Draft Feasibility Study and Environmental Impact Statement. This project review is being conducted under the authority provided by Section 203 of the WRDA of 1986 which authorizes non-federal interests to undertake feasibility studies of proposed water resources development projects for submission to the Secretary of the Army for review and further action.

The U. S. Environmental Protection Agency (EPA) attended the kick off meeting and appreciates the effort that has gone into the development of the options for this project. The EPA supports CEPP and the stated purpose of further improving the quantity, timing, quality and distribution of water flows from Lake Okeechobee to the Caloosahatchee and St. Lucie Estuaries, the Greater Everglades, Everglades National Park and Florida Bay while maintaining flood control and water supply needs.

While we are not providing technical comments on the report at this time, the U.S. EPA will continue to support the CEPP efforts in partnership with the SFWMD and will continue to participate in the process leading up to the submittal of the report to the Secretary of the Army. Upon acceptance of the report by the U.S. Corps of Engineers and subsequent sharing with EPA, we will then be authorized to provide comments through the lead Federal agency during the NEPA review process.

Sincerely,
Jamie Higgins

National Environmental Policy Act (NEPA) Program Office
Resource Conservation Restoration Division
Region 4, Environmental Protection Agency

61 Forsyth Street, NW
Atlanta, GA 30303
404-562-9681

City of Sanibel ◈ Sanibel Captiva Chamber of Commerce ◈ Sanibel Captiva Conservation Foundation Ding Darling Wildlife Society ◈ Conservancy of Southwest Florida ◈ Everglades Foundation ◈ Audubon Florida Everglades Trust ◈ Friends of Arthur R. Marshall Loxahatchee National Wildlife Refuge ◈ South Florida Audubon Society ◈ Audubon of Martin County ◈ Audubon of the Western Everglades ◈ St. Lucie Audubon Society Tropical Audubon Society ◈ Committee of the Islands ◈ SE Volusia Audubon ◈ Audubon of Southwest Florida Snook and Gamefish Foundation ◈ Pelican Island Audubon Society ◈ Backcountry Fly Fishers

March 7, 2018

Daniel O'Keefe
Governing Board Chair
South Florida Water Management District
3301 Gun Club Road,
West Palm Beach, FL 33406
Sent electronically

Re: Everglades Agricultural Area Reservoir

Dear Chairman O'Keefe:

The undersigned organizations commend the South Florida Water Management District (District) staff for their efforts to design the EAA Reservoir per Sec. 373.4598, F.S. (2017 Senate Bill 10). Staff should be specifically recognized for their dedication to keep the public involved every step of the way by providing multiple updates and opportunities for public input during the expedited planning process.

We write in support of submitting the proposed EAA Reservoir Tentatively Selected Plan (TSP) that will be presented to the South Florida Water Management District Governing Board this Thursday and submitted to the U.S. Assistant Secretary of the Army, Civil Works (ASA) on March 30. Whereas the hydrological benefits outlined in the TSP are significant in achieving reduction of harmful discharges to the Caloosahatchee and St Lucie estuaries and increasing freshwater flows to the southern Everglades, we would like to reiterate the importance of ensuring that these benefits go hand-in-hand with the State's commitment of achieving long-term water quality goals in the Everglades. To that end, we appreciate seeing your commitment for meeting the Water Quality Based Effluent Limit (WQBEL) codified in the 3/5/18 Florida Department of Environmental Protection Secretarial Order and understand that this will accompany the report to the ASA.

The EAA Reservoir is an integral component of the Comprehensive Everglades Restoration Plan. Affected organizations have remained engaged through the rigorous schedule of public meetings that have taken place since the EAA Reservoir planning kickoff in late October of 2017. It is exciting to see the EAA Reservoir approach this milestone with the ecological benefits for the estuaries and the Everglades.

We thank you for your commitment to America's Everglades. We stand ready to continue working with you in partnership to achieve a Chief's Report for inclusion in the 2018 Water Resource Development Act for Congressional Authorization.

Sincerely,
Signatures waived to expedite delivery

Kevin Ruane, Mayor
City of Sanibel

John Lai, President & CEO
Sanibel and Captiva Chamber of Commerce

Rae Ann Wessel, NR Policy Director
Sanibel Captiva Conservation Foundation

Mike Baldwin, President
J.N. "Ding" Darling Wildlife Society

Eric Eikenberg, CEO
Everglades Foundation

Rob Moher, President and CEO
Conservancy of Southwest Florida

Elinor Williams, President
Friends of Arthur R. Marshall Loxahatchee National Wildlife Refuge

Grant Campbell, Director of Wildlife Policy
South Florida Audubon Society

Eva Ries, Chapter President
St. Lucie Audubon Society

Erin Clancy, Conservation Director
Tropical Audubon Society

Donald Picard, President
SE Volusia Audubon

Marjorie Levine, Director
Snook and Gamefish Foundation

Kimberly Mitchell, Executive Director
Everglades Trust

Celeste De Palma, Director of Everglades Policy
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Michael Miller, President
Committee of the Islands

John A. Nelson, President
Audubon of Martin County

Richard Baker, Ph.D., President
Pelican Island Audubon Society

Mimi Wolok, Executive Director
Audubon of the Western Everglades

Dan Van Norman, President
Audubon of Southwest Florida

Ed Tamson, Director
Naples Backcountry Fly Fishers

CC: Governor Rick Scott
FDEP Secretary Noah Valenstein
SFWMD Executive Director Ernie Marks
SFWMD Governing Board Members

APPENDIX C.4
ENVIRONMENTAL COMPLIANCE INFORMATION

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C.4 COMPLIANCE WITH ENVIRONMENTAL LAWS, STATUTES, AND EXECUTIVE ORDERS

This appendix documents required compliance with specific Federal acts, Executive Orders (E.O.), and other applicable environmental laws. The following sections provide a summary of environmental compliance with each Act, E.O., or applicable law.

C.4.1 Anadromous Fish Conservation Act

Anadromous fish species would likely not be affected by the proposed project. The National Marine Fisheries Service (NMFS) provided a Programmatic Biological Opinion for the Comprehensive Everglades Restoration Plan to the U.S. Army Corps of Engineers (USACE) on December 17, 2013.

C.4.2 Archaeological Resources Protection Act 1979

The Archaeological Resources Protection Act (ARPA) works to protect and preserve historical and cultural resources of Federal lands, including Indian lands, through a permit system authorizing scholarly study and excavation of cultural properties, as well as provide sanctions for unauthorized use, removal, or damage to any archaeological resource (16 United States Code [U.S.C.] §§ 432-33; 36 Code of Federal Regulations [CFR] Part 296). The term *resource* includes human remains, pottery, basketry, bottles, weapon projectiles, rock carvings and paintings, tools, structures or portions thereof, graves, skeletal remains (16 U.S.C. § 470bb[1]). Resources of "recent" origin (less than 100 years) are not protected by ARPA (*U.S. v. Shivers*, 96 F.3d 120). The Central Everglades Planning Project (CEPP) Post Authorization Change Report (PACR) is in compliance with ARPA and will continue to comply throughout construction and operation.

C.4.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act, enacted in 1940, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. While areas of foraging habitat utilized by bald eagles may be within the project area, impacts to these areas are not likely to adversely affect this protected species. The project would be in compliance with this Act upon review of this document and associated Biological Assessment (BA) by the U.S. Fish and Wildlife Service (USFWS).

C.4.4 Clean Air Act

The existing air quality within South Florida is considered good. Section 176 (c) of the Clean Air Act requires that Federal agencies assure that their activities are in conformance with the Federally approved Clean Air Act state implementation plans for geographical areas designated as "non-attainment" and "maintenance" areas under the Act. The proposed project is not located within a "non-attainment" area since there are none within the State of Florida. The only new potential source of air pollution as a result of this project would be from construction of pump station(s). Pursuant to rule 62-210.300(3)(a)(21)(b), operations staff would be required to determine if stations would be exempt from air permitting or if an air general permit would be required. Upon this determination, the project would be in compliance with this Act.

C.4.5 Clean Water Act of 1972

The project would achieve full compliance with this Act upon issuance of a Water Quality Certification (WQC) under Section 401 from the State of Florida. A Section 404 (b)(1) evaluation has been prepared (see **Section C.4.37**). The project may require dewatering permits and National Pollution Discharge Elimination System (NPDES) permits depending on means and methods of construction. All required permits would be obtained prior to construction activities. All State water quality standards would be met. Water quality is expected to improve with the proposed project. In compliance with this Act a WQC would be obtained from the State of Florida and any required NPDES permits and updated Section 404(b) analysis would be completed prior to construction.

C.4.6 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

The official Coastal Barrier Resources System (CBRS) maps were reviewed and the CEPP PACR project does not fall into any designated CBRS areas. There are no designated coastal barrier resources in the project area that would be affected by the proposed project. These Acts are not applicable to this project.

C.4.7 Coastal Zone Management Act of 1972

The South Florida Water Management District (SFWMD) has considered the enforceable policies of the State of Florida's Coastal Management Program (FCMP) as requirements to be adhered to in addition to existing Federal agency statutory mandates. The proposed project would be consistent to the maximum extent practicable with the enforceable policies of Florida's approved Coastal Zone Management program. This project would be in compliance upon review of this document by the State of Florida and issuance of a WQC. In a letter dated October 11, 2013, from the Florida Department of Environmental Protection, the State determined that the USACE's Draft Project Implementation Report (PIR) and Environmental Impact Statement for CEPP is consistent with the FCMP. To ensure the CEPP PACR's continued consistency with the FCMP, the concerns identified for CEPP by the reviewing agencies must be addressed prior to project implementation. The State's continued concurrence will be based on the activities' compliance with FCMP authorities, including Federal and State monitoring of the activities to ensure their continued conformance, and the adequate resolution of issues identified during this and subsequent regulatory review. In compliance with this Act and obtaining State of Florida concurrence, the SFWMD would be in compliance with the Coastal Zone Management Act at the time of construction.

C.4.8 Endangered Species Act of 1973

Upon submittal of the PACR to the USACE, it is expected that they will initiate consultation under Section 7 of the Endangered Species Act (ESA). See **Annex A** for the complete list of Federally listed species and critical habitat provided in the BA that was prepared for this project.

For the authorized CEPP project, formal consultation was initiated with USFWS on August 5, 2013, with completion of the BA. The USACE received a Request for Additional Information (RAI) from USFWS on September 4, 2013. The USACE provided a Supplemental Technical Analysis in Response to USFWS' RAI for CEPP on October 24, 2013. On December 13, 2013, the USACE changed its request from formal to early consultation. The USACE entered formal consultation with USFWS on the Everglade snail kite (*Rostrhamus sociablis plumbeus*) and its designated critical habitat, Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) (CSSS) and its designated critical habitat, wood stork (*Mycteria americana*), and Eastern indigo snake (*Drymarchon corais couperi*). A Programmatic Biological Opinion (BO) was received on April 9, 2014, which clearly states that further consultation will be needed when more specific project details are finalized during preconstruction, engineering, and design (PED). While this document does not authorize incidental take of three endangered avian species (snail kite, CSSS, and wood stork), it does describe the anticipated effects based on current information. Upon completing ESA Section 7 consultation for each Project Partnership Agreement, USACE will undertake the agreed-to avoidance and minimization measures and implement any required terms and conditions (TCs). When USACE is closer to constructing phases of the project that will affect listed species, USFWS will provide separate consultation document(s) that may authorize incidental take and provide applicable reasonable and prudent measures (RPMs) and TCs. The preliminary conclusion is that the CEPP-authorized project is not likely to jeopardize the continued existence of the species listed above and is not likely to adversely modify critical habitat, where designated. The Programmatic BO concurred with the USACE's determination of "May Affect," but is not likely to adversely affect the Florida panther (*Puma concolor coryi*), West Indian manatee (*Trichechus manatus*) and its critical habitat, American crocodile (*Crocodylus acutus*) and its critical habitat, deltoid spurge (*Chamaesyce deltoidea* ssp. *deltoidea*), Garber's spurge (*Chamaesyce garberii*), Small's milkpea (*Galactia smallii*), and tiny polygala (*Polygala smallii*). Furthermore, the USFWS concurred with all the "No Effect" determinations made by the USACE in regard to the applicable threatened or endangered species that are found in the CEPP action area.

Incidental take was not provided for the Everglade snail kite, CSSS, and wood stork; however, take is anticipated on these three species. Take will be enumerated when a final BO is required for each phase of CEPP and CEPP PACR implementation. Incidental take of the Eastern indigo snake is likely during construction and operation, particularly construction of the A-2 Reservoir and A-2 STA. The amount of take would include 18,000 acres currently in sugar cane and row crops that would become inundated and mostly unusable to indigo snakes.

Although the Programmatic BO does not specify RPMs and TCs for the three avian species, endangered species monitoring costs include a conservative estimate of potential required monitoring based on information provided by USFWS to ensure the costs were captured. Estimated endangered species monitoring costs are $3,351,000 preconstruction, $37,830,000 during the construction period, and the operations and maintenance (O&M) cost will be approximately $2,030,000 annually.

A programmatic ESA Section 7 consultation for the Comprehensive Everglades Restoration Plan (CERP) was prepared on March 15, 2013, to evaluate potential effects of CERP, including the authorized CEPP, on listed species and designated critical habitat under the NMFS' purview. The USACE provided a Programmatic BA for the CERP to NMFS on July 2, 2013. NMFS provided a Programmatic BO for the CERP to the USACE on December 17, 2013, that includes CEPP in compliance with this Act and ongoing consultation throughout the PED and construction phase as appropriate.

C.4.9 Estuary Protection Act of 1968

The proposed project would provide increased opportunities to redirect water that is currently discharged to the Caloosahatchee and St. Lucie Estuaries for flood control purposes, allowing for the re-establishment of oyster and sea grass populations that are important for providing water quality and habitat functions within the Northern Estuaries. The project would increase flows from Southern Everglades National Park to Florida Bay and result in favorable changes to salinity levels to improve conditions for key species such as seagrasses, seatrout, pink shrimp, and crocodiles. The proposed project is in compliance with the goals of this Act.

C.4.10 Farmland Protection Policy Act of 1981

Coordination with the U.S. Department of Agriculture (USDA) and National Resources Conservation Service (NRCS) to meet the requirements of the Farmland Protection Policy Act (7 U.S.C. § 4201) will occur once the CEPP PACR is submitted to the Assistant Secretary of the Army for Civil Works . Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land is also used as cropland, pastureland, rangeland, forest land, or other land, but cannot be used as urban built-up land. According to 7 CFR 657.5, unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. These lands are not used in producing feed, food, fiber, forage, and/or oilseed crops. Almost all land in central and southern Florida used for agricultural production has been designated unique farmland. Coordination with NRCS was done during the planning phase, and NRCS concluded that it would defer to PED due to the large footprint of the project action area and the relatively smaller construction footprint in order to more accurately determine the level of acres affected. The CEPP PACR contains several components, and when detailed design information becomes available, it can then be determined how many acres of unique farmland would be affected. The NRCS will then complete Form AD 1006 to inventory the loss of acres of unique farmland from agricultural production. It is anticipated the project will be in full compliance with the Act at the time of construction

C.4.11 Federal Water Project Recreation Act of 1965, As Amended

The effects of the proposed action on outdoor recreation have been considered and are presented in **Appendix F**. The CEPP PACR recreation plan identifies, evaluates, and addresses the impacts of CEPP implementation on existing recreational use within the South Florida ecosystem and identifies and evaluates potential new recreation, public use, and public educational opportunities. Continued recreation planning would be performed during detailed project engineering and design. This project would not adversely affect existing recreational opportunities. This project is in compliance with the goals of this Act.

C.4.12 Fish and Wildlife Coordination Act of 1958, As Amended

The central objective of the Fish and Wildlife Coordination Act is to allow for equal consideration of wildlife resources. The project is in compliance with the goals of this Act and is consistent with previous efforts coordinated with the USFWS. For the purposes of the CEPP PACR, coordination with the USFWS will occur after the report has been submitted to the Assistant Secretary of the Army for Civil Works.

C.4.13 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq., Public Law [PL] 104-208) reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of Essential Fish Habitat (EFH). Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with the NMFS regarding the potential effects of their actions on EFH. NMFS provided a Programmatic BO for CERP to the USACE on December 17, 2013.

C.4.14 Marine Mammal Protection Act of 1972

West Indian manatees inhabit the coastal and major inland waters of south Florida including Central and Southern Florida Project canals. Manatees are not expected to be adversely affected by the proposed project. A determination of not likely to adversely affect was made in the draft BA (**Annex A**). Incorporation of the safeguards used to protect threatened and endangered species during construction and operation would protect West Indian manatees within the area. The project is in compliance and will be in full compliance with the Act at the time of construction.

C.4.15 Marine Protection, Research and Sanctuaries Act

This Act is not applicable. Ocean disposal of dredged material is not proposed as a part of the tentatively selected plan (TSP).

C.4.16 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (MBTA) is a United States federal law for the protection of migratory birds. Migratory birds are likely to occur within the TSP footprint prior to and after implementation. The project would employ protection measures during the construction and operation of the TSP to ensure compliance with the MBTA.

C.4.17 National Environmental Policy Act of 1969

This Act encourages public participation and comment on Federal projects and requires agencies to cooperate with other Federal agencies and State and local governments, and to involve public stakeholders. Initial public coordination of this project began with holding public meetings throughout the planning process (**Appendix C.3**). Ten public scoping meetings were held: two in Clewiston and eight in West Palm Beach. Updates were also provided at SFWMD Governing Board meetings and Water Resources Analysis Coalition Meetings. An inter-agency meeting was held on November 29, 2017. All public meetings were noticed in the Florida Administrative Register.

C.4.18 National Historic Preservation Act of 1966 (Inter alia)

The proposed project is in compliance with the National Historic Preservation Act, as amended (PL 89-665). As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations at 36 CFR Part 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act, as amended (PL 93-29); Archeological Resources Protection Act (PL 96-95); American Indian Religious Freedom Act (PL 95-341);

E.O. 11593, 13007, and 13175; the Presidential Memo of 1994 on Government to Government Relations; and appropriate Florida statutes. Consultation with the Florida State Historic Preservation Officer (SHPO), appropriate Federally recognized tribes, and other interested parties will be initiated upon submittal of the CEPP PACR to the Assistant Secretary of the Army for Civil Works. Any additional project-specific surveys for cultural resources and site evaluations will be conducted during the PED phase of the project. National Register-eligible properties were taken into account while planning this undertaking. Native American Graves Protection and Repatriation Act, As Amended

Federal agencies must make an inventory of all Indian human remains and funerary objects in its possession and control, attempt to identify the affiliated tribe, and repatriate the items to the appropriate group. This Act also applies to inadvertent discoveries, in that there is a required delay in the disturbance of a site containing human remains until consultation with affiliated tribes is accomplished. The proposed project is in compliance.

C.4.19 Resource Conservation and Recovery Act, As Amended By the Hazardous and Soils Waste Amendments of 1984; CERCLA, As Amended by the Superfund Amendments and Reauthorization Act of 1966; Toxic Substances Control Act of 1976

Hazardous, toxic, and radioactive waste (HTRW) surveys would be conducted as required. The removal and excavation as described in the proposed action is not expected to result in the discovery or generation of HTRW materials. The proposed action would involve ground disturbances.

C.4.19.1 USACE – Comprehensive Everglades Restoration Policy – Residual Agricultural Chemicals, USACE-ASA-CW Policy, September 2011

To address the issues presented by low-level residual agricultural chemicals present on CERP project lands, the Assistant Secretary of the Army for Civil Works provided a policy memorandum on September 14, 2011. This policy was incorporated into the formulation of the proposed project and is discussed in **Appendix C.2.2.12**.

C.4.20 Rivers and Harbors Act of 1899

The proposed project would not obstruct navigable waters of the United States. The project has been subject to public notice and other evaluations normally conducted for activities subject to this Act. The proposed project is in compliance with the goals of this Act.

C.4.21 Submerged Lands Act of 1953

The proposed project would reduce damage to freshwater flows to the Caloosahatchee Estuary and the St. Lucie Estuary and provide freshwater overland flow to Florida Bay that would ultimately benefit the ecological habitats that occur on submerged lands of the State of Florida. No construction is expected on submerged lands; therefore, the project is in compliance with the goals of this Act.

C.4.22 Wild and Scenic Rivers Act of 1968, As Amended

There are no designated wild and scenic river reaches within the project area that would be affected by project-related activities. This Act is not applicable.

C.4.23 E.O. 11514, Protection of the Environment

E.O. 11514 directs Federal agencies to “initiate measures needed to direct their policies, plans, and programs so as to meet national environmental goals.” The objectives of the project are focused on environmental protection. The project is in compliance with the goals of this E.O.

C.4.24 E.O. 11593, Protection and Enhancement of the Cultural Environment

E.O. 11593 directs Federal agencies to provide leadership in preserving, restoring, and maintaining the historical and cultural environment of the Nation. Agencies of the executive branch of the Government (hereinafter referred to as “Federal agencies”) shall (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, (2) initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people, and (3), in consultation with the Advisory Council on Historic Preservation (16 U.S.C. 470i), institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures and objects of historical, architectural or archaeological significance. The project is in compliance with this E.O.

C.4.25 E.O. 11988, Flood Plain Management

E.O. 11988 directs Federal agencies to avoid siting projects in floodplains and to avoid inducing further development of flood-prone areas. The project is not a development but rather a restoration action. Commitment of lands to project restoration would preclude such development. The proposed action would help restore and preserve the natural and beneficial uses of the floodplain. The project would be operated in a manner that would not increase flooding of private property. The project is in compliance with the goals of this E.O.

C.4.26 E.O. 11990, Protection of Wetlands

E.O. 11990 directs Federal agencies to avoid developing and locating projects in wetlands. The proposed project area is located within freshwater wetlands. The nature of this project is that it involves operations in wetlands, and no other practicable alternative to locating this project in avoidance of wetland exists. The objectives of the project are focused on environmental protection. A net functional benefit to wetlands within and adjacent to the project area is expected. The project is in compliance with the goals of this E.O.

C.4.27 E.O. 12962, Recreational Fisheries

E.O. 12962 requires the evaluation of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries. Effects to recreational fisheries would be positive as a result of decreases in damaging regulatory releases from Lake Okeechobee to the Northern Estuaries. The proposed project has the potential to improve recreational fisheries in Florida Bay and southwestern coastal estuaries and provide slight improvements in recreational fisheries in the Caloosahatchee and St. Lucie Estuaries. This project is in compliance with the goals of this E.O.

C.4.28 E.O. 12898, Environmental Justice

E.O. 12898 directs Federal agencies to provide full participation of minorities and low-income populations in the Federal decision-making process, and further directs agencies to fully disclose any adverse effects of plans and proposals on minority and low-income populations. There was sufficient public input to feel confident that scoping was successful and that the breadth of the potential impacts were communicated and understood by the public. During scoping and subsequent public meetings, no subjects or issues were presented as possible environmental impacts that may be disproportionate toward minority and/or low income populations. The objectives of the project are focused on environmental protection. Implementation of the project would benefit all population groups by providing restoration of wetlands and other natural resources within the project area. The CEPP PACR would provide benefits to quality of life by improving the estuarine environment and contribute to hydrological and water quality improvements in the historic Everglades. The project would improve the quality of human life by providing improved estuarine conditions for fish and wildlife. It would translate into aesthetic and economic benefits for sport fishing and other recreational communities. No home owners would be displaced by the project.

The project would not result in adverse human health or environmental effects. The project would not disproportionately adversely affect any minority or low-income population. The low-income populations and minority populations are not disproportionately located within the region of influence of the proposed action. The proposed activity would not (a) exclude persons from participation in, (b) deny persons the benefits of, or (c) subject persons to discrimination because of their race, color, or national origin, nor would the proposed action adversely impact "subsistence consumption of fish and wildlife." Therefore, the project is in compliance with this E.O.

C.4.29 E.O. 13045, Protection of Children

E.O. 13045 requires each Federal agency to “identify and assess environmental risks and safety risks [that] may disproportionately affect children” and ensure that its “policies, programs, activities, and standards address disproportionate risks to children that results from environmental health risks or safety risks.” The proposed project would not result in environmental health risks or safety risks that may have a disproportionate effect on children. Children would not be in the vicinity of any of the construction operations, and activities should not have an impact on children. The project is in compliance with the goals of this E.O.

C.4.30 E.O. 13089, Coral Reef Protection

There are no hardground or coral reef communities located within the proposed project site or the nearshore waters affected by the project. The project is not expected to adversely impact coral reefs or coral reef resources. This E.O. is not applicable.

C.4.31 E.O. 13122, Invasive Species

The proposed project has the potential to allow expansion of exotic and/or invasive species due to construction and operational changes to the current water management system. Construction measures to reduce the spread of exotic and/or invasive species would be included in the contract specifications. A nuisance and exotic vegetation control plan has been prepared and is included in **Annex D**. The objectives of the plan are to prevent and/or reduce the establishment of non-native species within the project area. The project is in compliance with the goals of this E.O.

C.4.32 E.O. 13175, Consultation and Coordination with Indian Tribal Governments

E.O. 13175 sets forth fundamental principles to guide agencies in formulating and implementing policies that have tribal implications. The E.O. sets forth policymaking criteria to which agencies must adhere to the extent permitted by law. These principles an policymaking criteria apply to an agency's "regulations, legislative comments or proposed legislation, and other policy statements or actions" that have "substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes" (Sec.1[a]). Tribal consultation is expected to commence upon submittal of the CEPP PACR to the Assistant Secretary of the Army for Civil Works.

C.4.33 E.O. 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

Migratory and resident bird species have been observed within the project area and are likely to use available habitat for foraging, nesting, and breeding. The proposed project is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The proposed project is expected to benefit migratory birds by improving habitat and increasing availability of forage species (amphibians, fish, aquatic, and invertebrates) for wading birds. The project is in compliance with the goals of this E.O.

C.4.34 Presidential Memorandum on Government-to-Government Relations with Native American Tribal Governments of 1994

This memorandum directs the Federal Government to operate within a government-to-government relationship with Federally recognized Native American tribes. The head of each executive department and agency shall be responsible for ensuring that the department or agency operates within a government-to-government relationship with Federally recognized tribal governments. Each executive department and agency shall apply the requirements of E.O. 12875 ("Enhancing the Intergovernmental Partnership") and E.O. 12866 ("Regulatory Planning and Review") to design solutions and tailor Federal programs, in appropriate circumstances, to address specific or unique needs of tribal communities. Tribal consultation is expected to commence upon submittal of the CEPP PACR to the Assistant Secretary of the Army for Civil Works.

C.4.35 Seminole Indian Lands Claim Settlement Act of 1987

The Florida Indian (Seminole) Land Claims Settlement Act of 1987 directed the SFWMD, the State of Florida, and the Seminole Tribe of Florida to execute an agreement for the purposes of resolving tribal land claims and settling the lawsuit filed by the Seminole Tribe of Florida, which involved certain land claims within the State. Agreements to resolve tribal land claims were executed between the three parties, which included conveyance of land and payment of consideration to the tribe, and implementing legislation by the Congress of the United States and Legislature of the State of Florida. An agreement known as the Water Rights Compact (Compact) was executed among the State of Florida, SFWMD, and the Seminole Tribe of Florida. The Compact specifically defined tribal water rights. This Compact was adopted into Federal and State law. It includes a series of provisions establishing the Tribe's rights and creating several "entitlements" to water for each of the Tribe's reservations. Water supply deliveries to the Seminole Tribe of Florida's Big Cypress and Brighton Reservations within the CEPP study area are not significantly affected by CEPP. Any "modeled" decreases in water supply deliveries would not be expected under real-world conditions due to the Compact requirements. Complete performance summaries for water supply to the reservations is included in **Appendix C.2.2**. This project is in compliance with this Act.

C.4.36 Compliance with Florida Statues

The State of Florida has enacted several laws pertaining to implementation of CERP projects. These include amendments to Section 373.026 (8) Florida Statute (F.S.), which establish a requirement for the SFWMD to submit a report for review and approval by the Florida Department of Environmental Protection (FDEP) prior to formal submission of a request for authorization from Congress and prior to receiving an appropriation of State funds for construction and other implementation activities (except the purchase of lands from willing sellers); the enactment of Section 373.1501 F.S., which establishes the intent of the Florida Legislature with respect to CERP and the criteria for FDEP approval and the procedures to be followed by the SFWMD and FDEP for submitting and reviewing requests for approval; the enactment of Section 373.1502 F.S., which establishes permitting requirements and a process for the submittal, review, and issuance of certain regulatory permits for CERP projects; and the enactment of Section 373.470 and Section 373.472 F.S., establishing the "Save Our Everglades Trust Fund" funding and reporting requirements and procedures for distributions from the trust fund.

The SFWMD's State Compliance Report addressing the criteria for approval listed in Section 373.1501 F.S. is included in **Annex B**. In addition to the above-described statutory requirements, other sections of Chapters 373 (Water Resources) and 403 (Environmental Control) of the Florida Statutes include requirements that may apply to various aspects of CERP project planning and implementation. In particular, Chapter 403 F.S. and the administrative laws adopted in accordance with Chapters 373 and 403 F.S. contain the requirements for facilities that involve the discharge or potential discharge of pollutants to surface and ground waters and the discharge of air pollutants, including facilities regulated under the Federal Clean Water and Safe Drinking Water Acts and the Federal Clean Air Act. Based on the information contained in this PACR, the TSP complies with the applicable provisions of the Florida Statutes. A detailed explanation of how the project complies with the applicable requirements for CERP projects contained in the Florida Statutes can be found in **Annex B**.

In May 2017, Florida Governor Rick Scott signed legislation that provides more than $1 billion to increase water storage south of Lake Okeechobee as part of an effort to reduce harmful lake discharges to the Caloosahatchee and St. Lucie Estuaries. The Water Resources Law of 2017 (Laws of Florida, Chapter 2017-10, Senate Bill 10) directs the expedited design and construction of a water storage reservoir in the Everglades Agricultural Area (EAA) to provide for a significant increase in southern storage to reduce high-volume discharges from Lake Okeechobee. A project component of the CERP, the reservoir would be designed to hold at least 240,000 acre-feet of water and include water quality features necessary to meet State and Federal water quality standards. The law requires the SFWMD to meet certain timelines for implementing the project. See **Table C.4-1** for the Senate Bill 10 Checklist.

Table C.4-1. Senate Bill 10 Compliance Checklist

Task Title	Task Description	Required Completion Date	Completed
Negotiate leased lands	*SFWMD is authorized to negotiate the amendment or termination of leases on SFWMD lands within the EAA for the reservoir.*	N/A	✓
Identification of leased lands and privately owned lands for project	*SFWMD to identify 3,200 acres of leased lands owned by SFWMD or the state and 500 acres of privately owned land for the project.*	May 9, 2017	✓
Request PACR development	*SFWMD will request that U.S. Army Corps of Engineers (USACE) jointly develop a Post Authorization Change Report (PACR) for CEPP to include EAA Storage Reservoir.*	July 1, 2017	✓
Request PACR development	*SFWMD and USACE execute memorandum of agreement for technical assistance under Section 203 of Water Resources Development Act (WRDA).*	N/A	✓
Contact lessees and private landowners	*SFWMD shall contact the lessors and landowners for its interest in acquiring land for the project.*	July 31, 2017	✓
Contact TIITF	*SFWMD to request Trustees of the Internal Improvement Trust Fund (TIITF) to terminate or amend any leases for lands necessary to implement the project.*	July 31, 2017	✓
Water quality standards	*Total acreage necessary for additional water treatment may not exceed amount reasonably required to meet state and federal water quality standards.*	N/A	✓
Water quality standards	*SFWMD shall use the latest version of the Dynamic Model for Stormwater Treatment Areas and other modeling tools in the planning of the reservoir.*	N/A	✓
Development of PACR initiated	*Development of a PACR must begin by Aug. 1, 2017.*	Aug. 1, 2017	✓
Status report to Legislature	*SFWMD must report to the Legislature on status of Senate Bill 10 compliance.*	Jan. 9, 2018	✓
Request extension	*SFWMD may request a time extension to complete the PACR study at the time of the progress report.*	Jan. 9, 2018	**Not necessary**
Submit PACR to U.S. Congress	*PACR must be completed, approved by the USACE and submitted to U.S. Congress for approval*	Oct. 1, 2018	**TBC**
SFWMD requests initiation of PIR	*Request for a Project Implementation Report (PIR) must be initiated unless Florida Legislature approves extension of the Oct. 1, 2018 and Dec. 31, 2019 deadlines.*	Oct. 1, 2108 *or* Dec. 31, 2019	**TBC**
Congressional authorization	*U.S. Congress must approve the PACR, thereby authorizing the EAA Storage Reservoir Project.*	Dec. 31, 2019	**TBC**
Request the Corps to re-evaluate LORS	*SFWMD shall request USACE to expedite the re-evaluation of Lake Okeechobee Regulation Schedule (LORS).*	N/A	**TBC**

C.4.37 CLEAN WATER ACT SECTION 404(B)(1) EVALUATION

PREFACE

This document is a programmatic Section 404(b)(1) Evaluation for the CEPP PACR. As such, it addresses, at a general level, the potential environmental effects of the wetland and aquatic ecosystem alterations expected from dredge and fill and the construction of the structural components of the recommended plan. Subsequent site-specific Section 404(b)(1) evaluations are intended to be done for individual project components, or groups thereof, in sufficient detail for final decision making and for full compliance with the Section 404(b)(1) guidelines and NEPA requirements. This 404(b)1 evaluation should be sufficient to qualify for, and in the event that subsequent decisions render the project in compliance with, coverage under Section 404(r) of the Clean Water Act and exempt from State and Tribal WQC.

C.4.37.1 Location

The study area (**Figure C.4-1**) for the CEPP PACR encompasses the Northern Estuaries (St. Lucie River and Estuary [including Indian River Lagoon] and the Caloosahatchee River and Estuary), Lake Okeechobee, a portion of the EAA, the Water Conservation Areas (WCA), Everglades National Park (ENP), and the Southern Estuaries (specifically focused on Florida Bay).

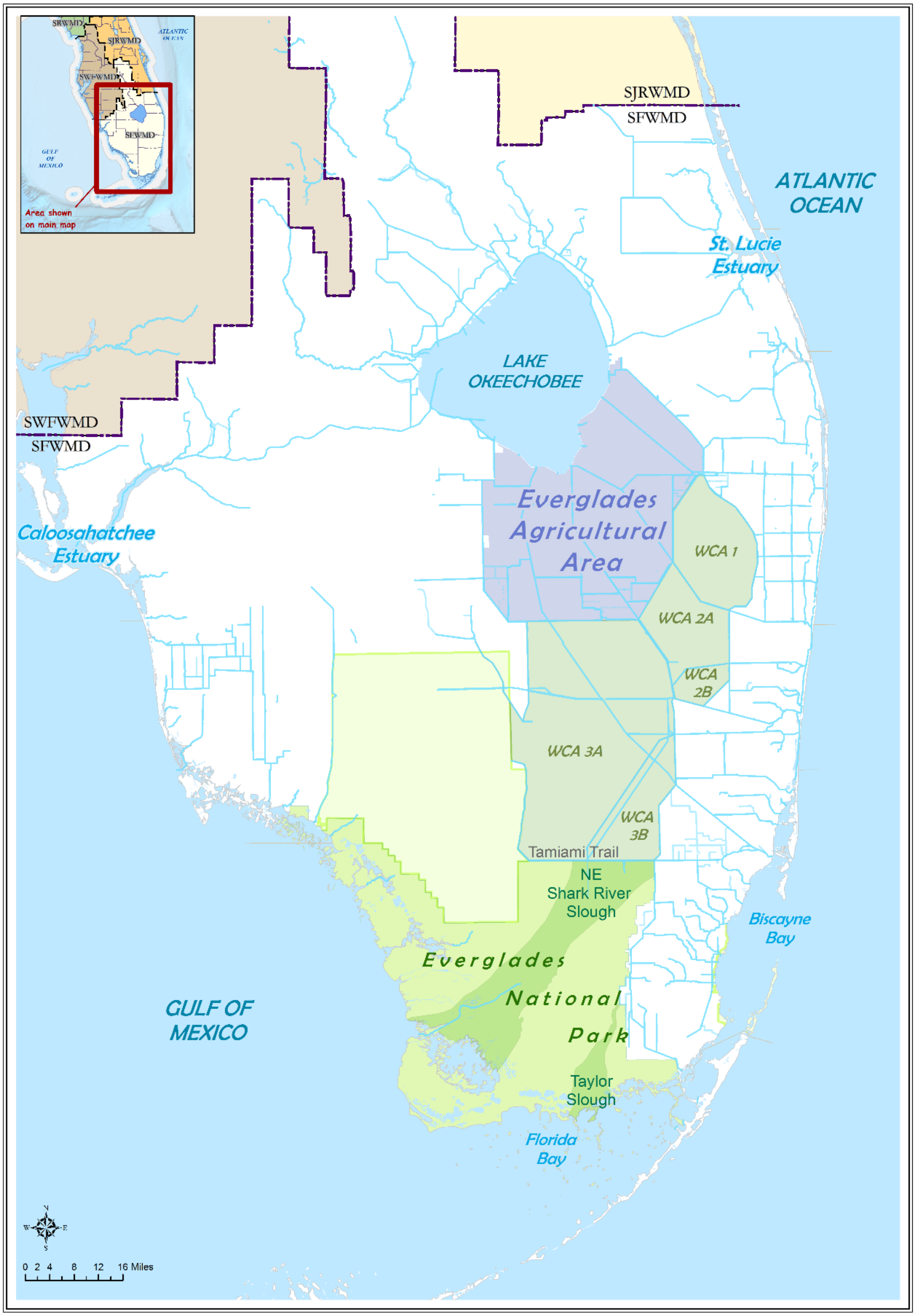

Figure C.4-1. Project Area Map

C.4.37.2 Project Description

C.4.37.2.1 Plan Features

The components of the TSP include improved conveyance, storage reservoir, and stormwater treatment area (STA) components along with water control structures and a pump station.

Storage and treatment of new water will be possible with the construction of a 10,500-acre, above-ground storage reservoir and 6,500-acre STA. The reservoir will accept a portion of the Lake Okeechobee water currently discharged to the estuaries. This Lake Okeechobee water is diverted to the A-2 Reservoir via the North New River and Miami Canals. The preliminary design includes an intake canal along the northern boundary of the parcels between the two canals for operational flexibility.

While some refinements were made within the operational flexibility available in the 2008 Lake Okeechobee Regulation Schedule (LORS), assumptions ultimately extended beyond this flexibility due to adjustments made to the tributary/climatological classifications. Additional information and documentation of these assumptions are found in the **Appendix A** (Engineering) of the CEPP PACR.

C.4.37.3 Authority and Purpose

The CERP was approved in Section 601 of Water Resources Development Act (WRDA) of 2000. The authority for the preparation of CEPP PACR is contained in Section 601(d) of the WRDA of 2000. The USACE and the SFWMD have executed a design agreement for the design of elements of the CERP and South Florida Ecosystem Restoration project (Design Agreement, May 2000). The direction and guidance for the development of CEPP and the CEPP PACR are contained within the CERP Master Program Management Plan (MPMP), which was developed and approved by USACE and SFWMD for the purposes of describing the framework and processes to be used for managing and monitoring implementation of CERP. This CEPP PACR has been prepared by the SFWMD for submittal to the Assistant Secretary of the Army for Civil Works for review, approval, and subsequent transmittal to Congress for authorization under Section 203 of the WRDA of 1986, as amended. Pertinent background information on the CERP and the CEPP, which represents a significant increment of CERP implementation, is provided in **Section 1.0** of the Main Report**.**

The Central and Southern Florida (C&SF) Flood Control Project, as constructed, had unintended adverse impacts to the Greater Everglades including the Northern Estuaries, WCA 3, ENP, and Florida Bay. Historically, freshwater flowed southward from Lake Okeechobee to Florida Bay from surface (sloughs, transverse glades, and overland from through wetlands) and groundwater sources and resulted in a mosaic of vegetative communities as well as a narrower range of salinity fluctuations in Florida Bay than exist today. While historic conditions sustained healthy and extensive ecological communities (ridge and slough, wet prairies, tree islands, sawgrass prairies, mangrove communities, and seagrass beds), these communities have been degraded under the managed system. The purpose of CEPP PACR is to improve the quantity, quality, timing, and distribution of water flows to the central Everglades (WCA 3 and ENP).

C.4.37.3.1 General Characteristics of Material

The soils in the Everglades are primarily composed of peats and mucks. Deep, clean sands characterize the area east of the Everglades and south of Lake Okeechobee, while wet, gray or grayish-brown, sandy soils underlain by sandy clay cover the area west of the Everglades. The peat and muck soils, which are dark brown to nearly black, cover approximately 90 percent of the area being considered in the study area. They were formed in marshes or swamps by the partial decay of plant materials, with some admixture of mineral soil in the case of muck. Peat, by definition, consists of 65 percent or more organic material with relatively little mineral matter. Muck, on the other hand, consists of 25 to 65 percent plant material mixed with sand, silt, and clay. The peat and muck soils may differ from each other in the kind of plant material that they contain, in the corresponding depths, and/or in the nature of the underlying material. The peat and muck may rest directly on limestone or on an intermediate layer of sand or marl. The highly organic soils have been divided into four types: Okeechobee muck, Okeelanta peaty muck, Everglades peaty muck, and Everglades peat. A fifth type of organic soil, which is not extensive in the area, is Loxahatchee peat. Where peat is encountered in the borrow area, it would be removed and not used as construction material.

The material may be reused or would be disposed of offsite in a Class 1 landfill. Soil testing would be conducted to better define the soil characteristics and as a result of that soil testing, other disposal options may be pursued.

C.4.37.3.2 Timing and Duration of Discharge

Installation timing of the project features has yet to be determined. The time and duration of discharge would be further defined during the detailed design phase.

C.4.37.3.2.1 Substrate Elevation and Type

The natural topography of the area is nearly flat with slopes less than 2 percent, with the exception of the unnatural features (e.g., canals and levee; see **Table C.4-1**).

C.4.37.3.2.2 Sediment Type

The substrate at the installation site, including EAA, the WCAs, and ENP, is calcium carbonate limestone rock overlain with peat and muck soils.

C.4.37.3.2.3 Physical Effects on Benthos

No adverse impacts to benthic organisms are anticipated other than displacement of those organisms in the construction footprint of the proposed project. Highly prolific organisms are expected to quickly re-establish in the natural wetlands restored through improved hydrology.

C.4.37.3.3 Water Circulation, Fluctuation, and Salinity Determination

An ecological monitoring plan (**Annex D**) has been developed to monitor hydrology, water quality, and associated changes within the project area.

C.4.37.3.4 Suspended Particulate/Turbidity Determinations

Best management practices would be used to minimize the suspension and transport of soils, levee materials, and roadway materials into water adjacent to or downstream of the construction area including use of sediment controls, turbidity screens, or sediment blockages for adjacent wetlands.

In general, any short-term impacts to water quality associated with construction of the project would be ameliorated by construction sequencing, best management practices for erosion and sedimentation control, and monitoring during construction.

C.4.37.3.5 Contamination Determinations

From the 1920s through the 1960s, most of the land parcels incorporated in the project footprint were cultivated for agricultural use. A few parcels continue to be farmed; however, crops and/or cultivation practices have changed dramatically. Residual pesticide contamination associated with past and present crop production can be detected in the soils on many of the parcels; albeit, at concentrations that are not likely to present unacceptable risks to human health or environmental receptors. For parcels that are frequently inundated under present hydrologic conditions, the proposed project is not likely to significantly increase the risk of environmental harm associated with the fate and transport of the residual contamination. For parcels that are not frequently inundated under present hydrologic conditions, the proposed project may increase the risk of environmental harm associated with the fate and transport of residual contamination. Additional HTRW investigations may be conducted to determine what project top soils might require isolation (by encapsulating in levee berms) to minimize the risk of contaminant bioaccumulation or mobilization.

C.4.37.3.6 Aquatic Ecosystem and Organism Determinations

No long-term adverse impacts on aquatic organisms are anticipated. Wetland and estuarine ecosystems are expected to greatly improve because of implementation of the TSP. The proposed project is not expected to cause or contribute to violations of State Water Quality Standards, jeopardize the existence of any Federally endangered or threatened species, nor impact a marine sanctuary. No significant degradation is expected, and all appropriate and practicable steps would be taken to minimize impacts.

C.4.37.3.6.1 Effects on Plankton

No adverse impacts to plankton are anticipated. Concentration of freshwater diatoms should increase, at a minimum, in a narrow zone associated with water deliveries into ENP.

C.4.37.3.6.2 Effects on Benthos

No adverse impacts to benthic organisms are anticipated other than displacement of those organisms in the construction footprint of the proposed project. Reduction of freshwater flows to the Caloosahatchee Estuary and the St. Lucie Estuary and an increase of freshwater flows to Florida Bay would provide improved habitat for the benthos.

C.4.37.3.6.3 Effects on Nekton

There should be no adverse impacts to freshwater swimming aquatic organisms, including fishes, during construction. Additionally, no adverse impacts are expected downstream in the waters of Florida Bay and the adjacent coastline. Estuarine fish species most likely to occur in these areas include the small forage species, such as killifish (*Cyprinodon* spp. and *Fundulus* spp.), mosquito fish (*Gambusia affinish*), juvenile sciaenids (*Leiostomus* spp.), silversides (*Atherinidae*), and mullets (*Mugil* spp.). Larger secondary consumers include gray snapper (*Lutjanus griesus*), tarpon (*Megalops atlantica*), snook (*Centopomus* spp.), red drum (*Sciaenops ocellatus*), and spotted seatrout (*Cynoscion nebulosus*). Freshwater deliveries through ENP would provide improved habitat and nursery opportunities for fishes in downstream estuaries connecting coastal wetlands to the bay.

C.4.37.3.6.4 Effects on Aquatic Food Web

Periphyton forms the base of the food web within the project area. Implementation of the project is expected to increase periphyton mat biomass and productivity throughout the site as well as freshwater diatoms. Other than minor, temporary impacts within the construction footprint of the proposed spreader channels, no adverse impacts to the aquatic food web are anticipated.

C.4.37.3.6.5 Effects on Special Aquatic Sites

C.4.37.3.6.5.1 Hardground and Coral Reef Communities

There are no hardground or coral reef communities located within the proposed project site or the nearshore waters affected by the project. Corals found within the waters of Biscayne Bay are outside of the area of potential effect.

C.4.37.3.6.5.2 Sanctuaries and Refuges

Biscayne National Park and a portion of ENP are downstream of the project area and are recognized as tropical marine environments of national significance well known for their productive reef ecosystems that play a critical role in the dynamics of the larger Florida Keys reef ecosystem. The project is intended to improve the quantity, timing, and distribution of water delivered to Florida Bay and should not have a negative effect on the sanctuaries and refuges.

C.4.37.3.6.5.3 Wetlands

The dominant vegetation community in the region is a matrix of sawgrass prairie with tree islands. At the lowest elevations near the coast, mangroves replace the freshwater wetlands. The transition zone between the mangroves and the freshwater prairie is a needle rush-salt grass zone on the freshwater side and stunted scrub mangrove on the coastal side. As a result of the project, approximately 233 acres of wetlands, currently in agriculture production, would be removed by construction and excavation activities. This loss is considered minimal and is not anticipated to have any adverse effects. The proposed project is anticipated to provide positive ecological benefits, including improving hydroperiods and hydropatterns in WCA 3A and ENP, by improving the quantity, timing, and distribution of water delivered to the downstream estuaries, Florida Bay, and other receiving waters.

C.4.37.3.6.5.4 Mud Flats

There are no mud flats within the construction footprint or areas impacted by the proposed project.

C.4.37.3.6.5.5 Vegetated Shallows

Submerged aquatic vegetation (SAV) is present throughout the nearshore waters. The trend shows the following species in order from the shoreline to the deeper waters: widgeon grass (*Ruppia maritime*), turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), and Johnsons seagrass (*Halophila johnsonii*). Reduction of freshwater flows to the Caloosahatchee Estuary and the St. Lucie Estuary and an increase of freshwater flows to Florida Bay would provide improvements to SAV.

C.4.37.3.6.5.6 Riffle and Pool Complexes

There are no riffle or pool complexes within the project footprint and none should be impacted by the proposed project.

C.4.37.3.6.6 Threatened and Endangered Species

There are 32 Federally listed threatened and endangered species potentially present in the project area. A BA is included within **Annex A** to document potential effects to threatened and endangered species. Consultation is expected to start once the CEPP PACR has been submitted to the Assistant Secretary of the Army for Civil Works.

C.4.37.3.6.7 Determination of Compliance with Applicable Water Quality Standards

CEPP PACR will comply with water quality standards applicable to the project and adjacent waters. Proposed features are located in and adjacent to waters designated as Class III by the State of Florida. In accordance with Florida Administrative Code (F.A.C.) Rule 62-302 ("Surface Water Quality Standards"), the use classification of Class III waters is "Recreation, Propagation, and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife." In addition to the minimum and general criteria for surface waters found in Section 62-302.500(1) F.A.C., there are numerous water quality criteria for specific parameters for Class III waters listed in Section 62-302.530 F.A.C. Although the TSP is not expected to affect most of the parameters listed in this rule, certain parameters (e.g., turbidity, dissolved oxygen and nutrients) listed in the criteria may be affected by construction and operations activities. The construction and operation of the proposed project components would comply with Federal and State water quality standards.

C.4.37.3.7 Potential Effects on Human Use Characteristics

C.4.37.3.7.1 Municipal and Private Water Supply

No municipal or private water supplies would be adversely impacted by the implementation of the project. Refer to **Section 4** of the Main Report and **Appendix C.2.1** for additional information pertaining to CEPP PACR water supply analyses.

C.4.37.3.7.2 Recreational and Commercial Fisheries

The proposed project would benefit recreational and commercial fisheries through salinity improvements within the Northern and Southern Estuaries.

C.4.37.3.7.3 Water-Related Recreation

Water-related recreation would be improved by project features and the associated recreation plan. Further detail is included in **Appendix F**.

C.4.37.3.7.4 Aesthetics

The proposed project would not affect the aesthetics of the project area, as the project site is in the EAA and surrounded by agriculture and mining operations or other natural lands within the Everglades Protection Area.

C.4.37.3.7.5 Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

The project would enhance environmental conditions at these types of sites within the project area. For more information, refer to **Section C.4.37.3.6.5.2, Sanctuaries and Refuges.**

C.4.37.3.8 Essential Fish Habitat

C.4.37.3.8.1 Essential Fish Habitat in the Area

The project area includes two distinct regional estuarine and nearshore coastal systems: the Southern Estuaries, including Biscayne Bay and Florida Bay, and the Northern Estuaries, including the Caloosahatchee River and the St. Lucie Estuary.

The Southern Estuaries, a shallow estuarine system (average depth less than 3 feet), comprise Biscayne National Park and a large portion of ENP. Florida Bay is the main receiving water of the Greater Everglades, heavily influenced by changes in timing, distribution, and quantity of freshwater flows into the Southern Estuaries. Lake Okeechobee discharges into the two northern estuaries. The St. Lucie Canal feeds into the St. Lucie Estuary, and the Caloosahatchee Canal/River feeds into the Caloosahatchee Estuary to the west.

C.4.37.3.8.1.1 Biscayne Bay and Florida Bay

The Southern Estuaries contain EFH for corals, coral reef and live bottom habitat, red drum (*Sciaenops ocellatus*), penaeid shrimps (*Penaeus* spp.), spiny lobster (*Panulirus argus*), other coastal migratory pelagic species, and the snapper-grouper complex. Species generally present in the southern estuaries region include brown shrimp (*Penaeus aztecus*), pink shrimp (*Penaeus duorarum*), white shrimp (*Penaeus* sp.), spiny lobster, stone crab (*Menippe mercenaria*), gulf stone crab, red drum, Spanish mackerel (*Scomberomorus maculatus*), and gray snapper (*Lutjanus griseus*). EFH in the Southern Estuaries are composed of seagrasses, estuarine mangroves, intertidal flats, the estuarine water column, live/hard bottoms, and coral reefs.

C.4.37.3.8.1.2 Caloosahatchee River

The Caloosahatchee River Estuary contains EFH for juvenile brown shrimp, juvenile gray snapper (*Lutjanus griseus*), smalltooth sawfish (*Pristia pectinata*), juvenile pink shrimp, adult and juvenile red drum, adult and juvenile Spanish mackerel, and juvenile stone crab. Downstream habitats include oyster reefs and seagrass beds (submerged aquatic vegetation).

C.4.37.3.8.1.3 St. Lucie Estuary

The proposed project is within the jurisdiction of the South Atlantic Fishery Management Council (SAFMC) and is located in areas designated EFH for wormrock, live bottom habitat, the American oyster (*Crassostrea virginica*), pink shrimp, white shrimp, brown shrimp, Florida red drum, grouper (*Epinephelus* spp.), gray snapper (*Lutjanus griseus*), white grunt (*Haemulon plumieri*), red porgy (*Pagrus pagrus*), spiny lobster, and the snapper-grouper complex. In addition, the nearshore hardbottom habitat outside of the St. Lucie Estuary is designated Essential Fish Habitat-Habitat Areas of Special Concern (EFH-HAPC) for the snapper-grouper complex.

C.4.37.3.8.2 Assessment of Effects on Hardground and Coral Reef Communities

This project is not expected to affect coral reef or hardbottom communities in the project area. There are no coral reefs or hardbottom communities located within the proposed project site or the nearshore waters affected by the project. Corals found within Florida Bay and Biscayne Bay are outside the area of potential effect.

C.4.37.3.8.3 Assessment of Effects on Sanctuaries and Refuges

Biscayne National Park and a portion of ENP are downstream of the project area and are recognized as tropical marine environments of national significance well known for their productive reef ecosystems that play a critical role in the dynamics of the larger Florida Keys reef ecosystem. The proposed project is intended to improve the quantity, timing, and distribution of water delivered to Florida Bay.

C.4.37.3.8.4 Assessment of Effects on Wetlands

The dominant vegetation community in the region is a matrix of sawgrass prairie with tree islands. At the lowest elevations near the coast, mangroves replace the freshwater wetlands. The transition zone between the mangroves and the freshwater prairie is a needle rush-salt grass zone on the freshwater side and stunted scrub mangrove on the coastal side. As a result of the project approximately 233 acres of wetlands, currently in agriculture production, would be removed by construction and excavation activities. This loss is considered minimal and is not anticipated to have any adverse effects. The proposed project is anticipated to provide positive ecological benefits, including improving hydroperiods and hydropatterns in ENP by improving the quantity, timing, and distribution of water delivered to the downstream estuaries, Florida Bay, and other receiving waters.

C.4.37.3.8.5 Assessment of Effects on Mud Flats

There are no mud flats within the construction footprint or areas impacted by the project.

C.4.37.3.8.6 Assessment of Effects on Vegetated Shallows

SAV is present throughout the nearshore waters. The trend shows the following species in order from the shoreline to the deeper waters: widgeon grass (*Ruppia maritime*), turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), and Johnsons seagrass (*Halophila johnsonii*). Reduction of freshwater flows to the Caloosahatchee Estuary and the St. Lucie Estuary and an increase of freshwater flows to Florida Bay would provide improvements to SAV. Without operational changes and/or active pumping, the project is not anticipated to have any effect on SAV.

C.4.37.3.8.7 Assessment of Effects on Riffle and Pool Complexes

There are no riffle or pool complexes within the project footprint and none should be impacted by the project.

C.4.37.3.9 Assessment of Effects on Plankton

No adverse impacts to plankton are anticipated. Concentration of freshwater diatoms should increase, at a minimum, in a narrow zone associated with water deliveries into ENP.

C.4.37.3.10 Assessment of Effects on Benthos

No adverse impacts to benthic organisms are anticipated other than displacement of those organisms in the construction footprint of the project.

C.4.37.3.11 Assessment of Effects on Nekton

There should be no adverse impacts to freshwater swimming aquatic organisms including fishes during construction. Additionally, no adverse impacts are expected downstream in the waters of Florida Bay and the adjacent coastline. Estuarine fish species most likely to occur in these areas include the small forage species such as killifish (*Cyprinodon* spp. and *Fundulus* spp.), mosquito fish (*Gambusia affinish*), juvenile sciaenids (*Leiostomus* spp.), silversides (*Atherinidae*), and mullets (*Mugil* spp.). Larger secondary consumers include gray snapper (*Lutjanus griesus*), tarpon (*Megalops atlantica*), snook (*Centopomus* spp.), red drum (*Sciaenops ocellatus*), and spotted seatrout (*Cynoscion nebulosus*). Freshwater deliveries through ENP would provide improved habitat and nursery opportunities for fishes in downstream estuaries connecting coastal wetlands to the bay.

C.4.37.3.12 Determination of Effects on Essential Fish Habitat

The overall benefit to the regional system is expected to be far greater than the localized adverse effects. The restoration of hydrology of the Greater Everglades ecosystem and the increase in spatial extent of protected wetland acreage in the region would produce extensive cumulative beneficial effects. These beneficial effects are expected to substantially outweigh the cumulative adverse effects produced by the aquatic ecosystem alterations that may be necessary to construct some of the project components.

C.4.37.4 Determination of Cumulative Effects on the Aquatic Ecosystem

The overall benefit to the regional system is expected to be far greater than the localized adverse effects. The hydrologic restoration of the Greater Everglades ecosystem and the increase in spatial extent of protected wetland acreage in the region would produce extensive cumulative beneficial effects. These beneficial effects are expected to substantially outweigh the cumulative adverse effects produced by the aquatic ecosystem alterations that may be necessary to construct some of the project features.

C.4.37.5 Determination of Secondary Effects on the Aquatic Ecosystem

No adverse secondary impacts on the aquatic ecosystem would occur as a result of the construction. During construction, the sites would be contained with sedimentation barriers. Erosion would be controlled by appropriate erosion control techniques. Sedimentation would be controlled during construction. An ecological and water quality monitoring plan would be implemented during and after construction and specific environmental commitments, engineering and design commitments, and operational commitments would be incorporated to avoid, minimize, and/or mitigate for adverse effects.

C.4.37.6 Findings of Compliance or Non-Compliance with the Restrictions on Discharge

C.4.37.6.1 No significant adaptations of the guidelines were made relative to this evaluation.

C.4.37.6.2 At the time of the project planning phase, no practicable alternatives exist that meet the study objectives involving discharge of some small fill into waters of the United States.

C.4.37.6.3 At this time, no practicable alternatives exist that have less adverse impact on the aquatic ecosystem without presenting other significant adverse environmental consequences. The alternatives all have overwhelming beneficial impacts.

C.4.37.6.4 The discharge of fill materials is not anticipated to cause or contribute to violations of any applicable State water quality standards for Class III waters or Outstanding Florida Waters where applicable. The discharge operation is not anticipated to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

C.4.37.6.5 The placement of fill materials in the project area is not anticipated to jeopardize the continued existence of any species listed as threatened and endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

C.4.37.6.6 The placement of fill material is not anticipated to result in significant, adverse effects on human health and welfare, including municipal and private water supplies; recreational and commercial fishing; and plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife is not anticipated to be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity, and stability and recreational, aesthetic, and economic values are not anticipated.

C.4.37.6.7 Based on the guidelines, the proposed discharge site for the discharge of fill and/or dredged material is specified as complying with the requirements of these guidelines.

C.4.38 Coastal Zone Management Act Consistency Statement

FLORIDA COASTAL MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES

Central Everglades Planning Project Post Authorization Change Report
St. Lucie, Martin, Okeechobee, Glades, Hendry, Palm Beach, Broward, Miami-Dade, Monroe, Collier, Lee and Charlotte Counties

Enforceable Policy. Florida State Statues considered "enforceable policy" under the Coastal Zone Management Act (www.dep.state.fl.us/cmp/federal/24statutes.htm).

Applicability of the Coastal Zone Management Act.
The following table summarizes the process and procedures under the Coastal Zone Management Act for Federal Actions and for non-Federal Applicants.*

Item	Non-Federal Applicant (15 CFR 930, subpart D)	Federal Action (15 CFR 930, subpart C)
Enforceable Policies	Reviewed and approved by NOAA (in FL www.dep.state.fl.us/cmp/federal/24statutes.htm)	Same
Effects Test	Direct, Indirect (cumulative, secondary), adverse or beneficial	Same
Review Time	6 months from state receipt of Consistency Certification (30-days for completeness notice) Can be altered by written agreement between State and applicant	60 Days, extendable (or contractible) by mutual agreement
Consistency	Must be Fully Consistent	To Maximum Extent Practicable**
Procedure Initiation	Applicant provides Consistency Certification to State	Federal Agency provides "Consistency Statement" to State
Appealable	Yes, applicant can appeal to Secretary (NOAA)	No (NOAA can "mediate")
Activities	Listed activities with their geographic location (State can request additional listing within 30 days)	Listed or Unlisted Activities in State Program
Activities in Another State	Must have approval for interstate reviews from NOAA	Interstate review approval NOT required
Activities in Federal Waters	Yes, if activity affects state waters	Same

* There are separate requirements for activities on the Outer Continental Shelf (subpart E) and for "assistance to an applicant agency" (subpart F).
** Must be fully consistent except for items prohibited by applicable law (generally does not count lack of funding as prohibited by law, 15 CFR 930.32).

Coastal Zone Consistency Statement by Statute/Enforceable Policy

CHAPTER 161, F.S., BEACH AND SHORE PRESERVATION

Coastal areas are among the state's most valuable natural, aesthetic, and economic resources; and they provide habitat for a variety of plant and animal life. The state is required to protect coastal areas from imprudent activities that could jeopardize the stability of the beach-dune system, accelerate erosion, provide inadequate protection to upland structures, endanger adjacent properties, or interfere with public beach access. Coastal areas used, or likely to be used, by sea turtles are designated for nesting, and the removal of vegetative cover that binds sand is prohibited. This statute provides policy for the regulation of construction, reconstruction, and other physical activities related to the beaches and shores of the state. Additionally, this statute requires the restoration and maintenance of critically eroding beaches.

Response: The proposed plans and information would be submitted to the state in compliance with this chapter. No work is proposed seaward of the mean high water line and would not affect shorelines or shoreline processes.

CHAPTER 163, PART II, F.S., INTERGOVERNMENTAL PROGRAMS: GROWTH POLICY, COUNTY AND MUNICIPAL PLANNING: LAND DEVELOPMENT REGULATION

The purpose of this statute is to provide for the implementation of comprehensive planning programs to guide and control future development in the state. The comprehensive planning process encourages units of local government to preserve, promote, protect, and improve the public health, safety, comfort, good order, appearance, convenience, law enforcement and fire prevention, and general welfare; prevent the overcrowding of land and avoid undue concentration of population; facilitate the adequate and efficient provision of public facilities and services; and conserve, develop, utilize, and protect natural resources within their jurisdictions.

Chapter 163, Part II Intergovernmental Programs: Growth Policy; County and Municipal Planning; Land Development Regulation
Enforceable policy includes only:

Sections 163.3164 Local Government Comprehensive Planning and Land Development Regulation Act; definitions;

.3177(6)(a) requiring a future land use plan element designating proposed future general distribution, location, and extent of the uses of land for residential uses, commercial uses, industry, agriculture, recreation, conservation, education, public buildings and grounds, other public facilities, and other categories of the public and private uses of land.

(10)(h). public facilities and services needed to support development shall be available concurrent with the impacts of such development in accordance with s. 163.3180. [see .3180(2)(a-c), (5)(a&c), (6), and (8); below].

(10)(l). consider land use compatibility issues in the vicinity of all airports in coordination with the Department of Transportation and adjacent to or in close proximity to all military installations in coordination with the Department of Defense.

(11)(a). innovative approaches to development which may better serve to protect environmentally sensitive areas, maintain the economic viability of agricultural and other predominantly rural land uses, and provide for the cost-efficient delivery of public facilities and services.

(11)(c). maximize the use of existing facilities and services through redevelopment, urban infill development, and other strategies for urban revitalization.

.3178(1) local government comprehensive plans restrict development activities where such activities would damage or destroy coastal resources, and that such plans protect human life and limit public expenditures in areas that are subject to destruction by natural disaster.

(2)(d-j); studies, surveys, and data; be consistent with coastal resource plans prepared and adopted pursuant to general or special law; and contain:

(d) A component which outlines principles for hazard mitigation and protection of human life against the effects of natural disaster, including population evacuation, which take into consideration the capability to safely evacuate the density of coastal population proposed in the future land use plan element in the event of an impending natural disaster. The Division of Emergency Management shall manage the update of the regional hurricane evacuation studies, ensure such studies are done in a consistent manner, and ensure that the methodology used for modeling storm surge is that used by the National Hurricane Center.

(a) A component which outlines principles for protecting existing beach and dune systems from human-induced erosion and for restoring altered beach and dune systems.

(b) A redevelopment component which outlines the principles which shall be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise.

(c) A shoreline use component that identifies public access to beach and shoreline areas and addresses the need for water-dependent and water-related facilities, including marinas, along shoreline areas. Such component must include the strategies that will be used to preserve recreational and commercial working waterfronts as defined in s. 342.07.

(d) Designation of coastal high-hazard areas and the criteria for mitigation for a comprehensive plan amendment in a coastal high-hazard area as defined in subsection (9). The coastal high-hazard area is the area below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model. Application of mitigation and the application of development and redevelopment policies, pursuant to s. 380.27(2), and any rules adopted thereunder, shall be at the discretion of local government.

(e) A component which outlines principles for providing that financial assurances are made that required public facilities will be in place to meet the demand imposed by the completed development or redevelopment. Such public facilities will be scheduled for phased completion to coincide with demands generated by the development or redevelopment.

An identification of regulatory and management techniques that the local government plans to adopt or has adopted in order to mitigate the threat to human life and to control proposed development and redevelopment in order to protect the coastal environment and give consideration to cumulative impacts.

.3180(2)(a-c), (a) Consistent with public health and safety, sanitary sewer, solid waste, drainage, adequate water supplies, and potable water facilities shall be in place and available to serve new development no later than the issuance by the local government of a certificate of occupancy or its functional equivalent. Prior to approval of a building permit or its functional equivalent, the local government shall consult with the applicable water supplier to determine whether adequate water supplies to serve the new development will be available no later than the anticipated date of issuance by the local government of a certificate of occupancy or its functional equivalent. A local government may meet the concurrency requirement for sanitary sewer through the use of onsite sewage treatment and disposal systems approved by the Department of Health to serve new development.

(b) Consistent with the public welfare, and except as otherwise provided in this section, parks and recreation facilities to serve new development shall be in place or under actual construction no later than 1 year after issuance by the local government of a certificate of occupancy or its functional equivalent. However, the acreage for such facilities shall be dedicated or be acquired by the local government prior to issuance by the local government of a certificate of occupancy or its functional equivalent, or funds in the amount of the developer's fair share shall be committed no later than the local government's approval to commence construction.

(a) Consistent with the public welfare, and except as otherwise provided in this section, transportation facilities needed to serve new development shall be in place or under actual construction within 3 years after the local government approves a building permit or its functional equivalent that results in traffic generation.

(5)(a&c),

(a) ... planning and public policy goals may come into conflict with the requirement that adequate public transportation facilities and services be available concurrent with the impacts of such development. ... in urban centers transportation cannot be effectively managed and mobility cannot be improved solely through the expansion of roadway capacity, that the expansion of roadway capacity is not always physically or financially possible, and that a range of transportation alternatives is essential to satisfy mobility needs, reduce congestion, and achieve healthy, vibrant centers.

(c) ... developments located within urban infill, urban redevelopment, urban service, or downtown revitalization areas or areas designated as urban infill and redevelopment areas under s. 163.2517, which pose only special part-time demands on the transportation system, are exempt from the concurrency requirement for transportation facilities. A special part-time demand is one that does not have more than 200 scheduled events during any calendar year and does not affect the 100 highest traffic volume hours.

(6) a de minimis impact [on a transportation facility] is consistent with this part.

(8) When assessing the transportation impacts of proposed urban redevelopment within an established existing urban service area, 110 percent of the actual transportation impact caused by the previously existing development must be reserved for the redevelopment...

(f)

.3194(1)(a); After a comprehensive plan, or element or portion thereof, has been adopted in conformity with this act, all development undertaken by, and all actions taken in regard to development orders by, governmental agencies in regard to land covered by such plan or element shall be consistent with such plan or element as adopted.

.3202(2)(a-h); Local land development regulations shall contain specific and detailed provisions necessary or desirable to implement the adopted comprehensive plan and shall as a minimum:

(a) Regulate the subdivision of land.

(b) Regulate the use of land and water for those land use categories included in the land use element and ensure the compatibility of adjacent uses and provide for open space.

(c) Provide for protection of potable water wellfields.

(d) Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management.

(e) Ensure the protection of environmentally sensitive lands designated in the comprehensive plan.

(f) Regulate signage.

(g) Provide that public facilities and services meet or exceed the standards established in the capital improvements element required by s. 163.3177 and are available when needed for the development, or that development orders and permits are conditioned on the availability of these public facilities and services necessary to serve the proposed development. Not later than 1 year after its due date established by the state land planning agency's rule for submission of local comprehensive plans pursuant to s. 163.3167(2), a local government shall not issue a development order or permit which results in a reduction in the level of services for the affected public facilities below the level of services provided in the comprehensive plan of the local government.

(h) Ensure safe and convenient onsite traffic flow, considering needed vehicle parking.

.3220(2)&(3).

(2) (a) The lack of certainty in the approval of development can result in a waste of economic and land resources, discourage sound capital improvement planning and financing, escalate the cost of housing and development, and discourage commitment to comprehensive planning.

(b) Assurance to a developer that upon receipt of his or her development permit or brownfield designation he or she may proceed in accordance with existing laws and policies, subject to the conditions of a development agreement, strengthens the public planning process, encourages sound capital improvement planning and financing, assists in assuring there are adequate capital facilities for the development, encourages private participation in comprehensive planning, and reduces the economic costs of development.

In conformity with, in furtherance of, and to implement the Local Government Comprehensive Planning and Land Development Regulation Act and the Florida State Comprehensive Planning Act of 1972, it is the intent of the Legislature to encourage a stronger commitment to comprehensive and capital facilities planning, ensure the provision of adequate public facilities for development, encourage the efficient use of resources, and reduce the economic cost of development.

Response: The proposed project has been coordinated with various Federal, state and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the environment.

CHAPTER 186, F.S., STATE AND REGIONAL PLANNING

The state comprehensive plan provides basic policy direction to all levels of government regarding the orderly social, economic, and physical growth of the state. The goals, objectives, and policies of the state comprehensive plan are statewide in scope and are consistent and compatible with each other. The statute provides direction for the delivery of governmental services, a means for defining and achieving the specific goals of the state, and a method for evaluating the accomplishment of those goals.

Response: The proposed project has been coordinated with various Federal, state and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the environment.

CHAPTER 252, F.S., EMERGENCY MANAGEMENT

The state of Florida is vulnerable to a wide range of emergencies, including natural, technological, and manmade disasters and this vulnerability is exacerbated by the tremendous growth in the state's population, especially the growth in the number of persons residing in coastal areas, in the elderly population, in the number of seasonal vacationers, and in the number of persons with special needs. This statute directs the state to reduce the vulnerability of its people and property to natural and manmade disasters; prepare for, respond to and reduce the impacts of disasters; and decrease the time and resources needed to recover from disasters. Disaster mitigation is necessary to ensure the common defense of Floridians' lives and to protect the public peace, health, and safety. The policies provide the means to assist in the prevention or mitigation of emergencies that may be caused or aggravated by the inadequate planning or regulation of facilities and land uses. State agencies are directed to keep land uses and facility construction under continuing study and identify areas that are particularly susceptible to natural or manmade catastrophic occurrences.

Response: This project is a restoration project and provides increased ability to store water in the natural system during hurricanes or floods. All structures will be built to Federal and state standards. This project would be consistent with the efforts of the Division of Emergency Management.

CHAPTER 253, F.S., STATE LANDS

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) is vested and charged with the acquisition, administration, management, control, supervision, conservation, protection, and disposition of all lands owned by the state. Lands acquired for preservation, conservation and recreation serve the public interest by contributing to the public health, welfare and economy. In carrying out the requirements of this statute, the Trustees are directed to take necessary action to fully: conserve and protect state lands; maintain natural conditions; protect and enhance natural areas and ecosystems; prevent damage and depredation; and preserve archaeological and historical resources. All submerged lands are considered single-use lands to be maintained in natural condition for the propagation of fish and wildlife and public recreation. Where multiple-uses are permitted, ecosystem integrity, recreational benefits and wildlife values are conserved and protected.

Chapter 253 State Lands

No lease of the type covered by this law shall be granted, sold, or executed south of 26° north latitude off Florida's west coast and south of 27° north latitude off Florida's east coast.... After July 31, 1990, no oil or natural gas lease shall be granted, sold, or executed covering lands located north of 26°00'00" north latitude off Florida's west coast to the western boundary of the state bordering Alabama ... or located north of 27°00'00" north latitude off Florida's east coast to the northern boundary of the state bordering Georgia ....

Response: The proposed project would conserve, protect, restore and enhance natural conditions within state lands. This project would make a positive contribution to preserving water, fish and wildlife, cultural, and wetland resources within the State of Florida and therefore, complies with the intent of this chapter.

CHAPTER 258, F.S., STATE PARKS AND PRESERVES

The statute addresses the state's administration of state parks, aquatic preserves, and recreation areas, which are acquired to emblemize the state's natural values and to ensure that these values are conserved for all time. Parks and preserves are managed for the non-depleting use, enjoyment, and benefit of Floridians and visitors and to contribute to the state's tourist appeal. Aquatic Preserves are recognized as having exceptional biological, aesthetic, and scientific value and are set aside for the benefit of future generations. Disruptive physical activities and polluting discharges are highly restricted in aquatic preserves. State managed wild and scenic rivers possess exceptionally remarkable and unique ecological, fish and wildlife, and recreational values and are designated for permanent preservation and enhancement for both the present and future.

Response: The proposed project includes constructing a storage reservoir and STA on the state-owned lands in the Everglades Agricultural Area. The reservoir would capture approximately 240,000 acre-feet of water that is currently being discharged from Lake Okeechobee to tide in the St. Lucie and Caloosahatchee Estuaries. The water would be stored and treated to improve water quality prior to be discharged south into the Greater Everglades.

The St. Lucie Estuary is a designated Estuary of National Significance and Outstanding Florida Water. The North Fork of the St. Lucie River is a state aquatic preserve and part of Florida's "Save Our Rivers" program. The Indian River Lagoon is part of the National Estuary Program and an aquatic preserve. The proposed Reservoir would improve delivery of water to the St. Lucie Estuary and Indian River Lagoon by reducing the frequency and volume of high level flows from Lake Okeechobee, thus reducing the potential for impacts to estuarine and nearshore biota.

The Caloosahatchee River and Estuary are at the head of a vast estuarine and marine ecosystem that includes aquatic preserves managed by the State of Florida (e.g., Matlacha Pass, Estero Bay, and Pine Island Sound Aquatic Preserves), the Charlotte Harbor National Estuary Program, and the J. N. Ding Darling National Wildlife Refuge (NWR) Complex which includes the Caloosahatchee, Matlacha Pass, Pine Island, and Island Bay NWRs; along with numerous other state and local parks and recreation

areas. The aquatic preserves are also outstanding Florida water bodies. The proposed reservoir would reduce the frequency and volume of high flows from Lake Okeechobee, thus reducing the impacts of low salinities on the estuarine and nearshore biota. The proposed project area includes state-owned lands in Water Conservation Areas (WCA) 3. The proposed project features act to rehydrates northern WCA 3A thereby increasing the spatial extent of wetlands. Additional project features of the previously authorized CEPP will aid to reconnect WCA 3B and Everglades National Park, providing enhancement of sheetflow and restoration of historic ridge and slough landscape features.

Everglades National Park and the Florida Bay National Marine Sanctuary are within the project area and contain productive estuarine and wetland ecosystems that include aquatic preserves along with local parks and recreation areas. The aquatic preserves are also outstanding Florida water bodies. The proposed project would improve freshwater delivery to coastal wetlands and adjacent estuaries and redistribute flow to salt water wetlands and nearshore bay areas and result in favorable changes to salinity levels. The impacts to the aquatic resources are anticipated to be beneficial for key species such as seatrout, pink shrimp, and crocodiles. Biscayne National Park is at the headwaters of historic creeks and productive estuarine and marine ecosystems, including aquatic preserves, along with local parks and recreation areas. The Biscayne Bay Aquatic Preserves are Outstanding Florida Waters. The proposed project would not affect the delivery of water to Biscayne Bay.

The proposed project would help enhance environmental conditions at state parks or aquatic preserves in the region. The proposed project would comply with the intent of this chapter.

CHAPTERS 259, F.S., LAND ACQUISITION FOR CONSERVATION OR RECREATION

The statute addresses public ownership of natural areas for purposes of maintaining the state's unique natural resources; protecting air, land, and water quality; promoting water resource development to meet the needs of natural systems and citizens of this state; promoting restoration activities on public lands; and providing lands for natural resource based recreation. Lands are managed to protect or restore their natural resource values, and provide the greatest benefit, including public access, to the citizens of this state.

Response: The potentially affected property is currently in public ownership. These chapters do not apply.

CHAPTERS 260, F.S., FLORIDA GREENWAYS AND TRAILS ACT

A statewide system of greenways and trails is established in order to conserve, develop, and use the natural resources of Florida for healthful and recreational purposes. These greenways and trails provide open space benefiting environmentally sensitive lands and wildlife and provide people with access to healthful outdoor activities. The greenways and trails serve to implement the concepts of ecosystem management while providing, where appropriate, recreational opportunities such as horseback riding, hiking, bicycling, canoeing, jogging, and historical and archaeological interpretation.

Response: The potentially affected property is currently in public ownership. This project is in compliance with the intent of this Chapter.

CHAPTER 267, F.S., HISTORICAL RESOURCES

The management and preservation of the state's archaeological and historical resources are addressed by this statute. This statute recognizes the state's rich and unique heritage of historical resources and directs the state to locate, acquire, protect, preserve, operate and interpret historical and archeological resources for the benefit of current and future generations of Floridians. Objects or artifacts with intrinsic historical or archeological value located on, or abandoned on, state-owned lands or state-owned submerged lands belong to the citizens of the state. The state historic preservation program operates in conjunction with the National Historic Preservation Act of 1966 to require state and federal agencies to consider the effect of their direct or indirect actions on [significant] historical and archeological resources. These resources cannot be destroyed or altered unless no prudent alternative exists. Unavoidable impacts must be mitigated.

Response: Upon submittal of the PACR to the Assistant Secretary of the Army's Office for Civil Works, it is expected that they will initiate consultation under Section 106 of the National Historic Preservation Act with the State Historic Preservation Officer, the Miccosukee Tribe of Indians of Florida, and the Seminole Tribe of Florida and would meet all responsibilities under Chapter 267.

CHAPTER 288, F.S., COMMERCIAL DEVELOPMENT AND CAPITAL IMPROVEMENTS

The framework to promote and develop general business, trade, and tourism components of the state economy are established in this statute. The statute includes requirements to protect and promote the natural, coastal, historical, and cultural tourism assets of the state; foster the development of nature-based tourism and recreation; and upgrade the image of Florida as a quality destination. Natural resource-based tourism and recreational activities are critical sectors of Florida's economy. The needs of the environment must be balanced with the need for growth and economic development.

Response: The proposed project would be compatible with tourism for this area and therefore, is consistent with the goals of this Chapter.

CHAPTER 334, F.S., TRANSPORTATION ADMINISTRATION

The statute addresses the state's policy concerning transportation administration. It establishes the responsibilities of the state, the counties, and the municipalities in the planning and development of the transportation systems serving the people of the state and to assure the development of an integrated, balanced statewide transportation system. This is necessary for the protection of public safety and general welfare and for the preservation of all transportation facilities in the state.

Response: No public transportation systems would be impacted by this project.

CHAPTER 339, F.S., TRANSPORTATION FINANCE AND PLANNING

The statute addresses the finance and planning needs of the state's transportation system.

Response: No public transportation systems would be impacted by this project.

CHAPTER 370, F.S., SALTWATER LIVING RESOURCES

This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and to conduct scientific, economic, and other studies and research.

Response: The proposed project would help improve ecological conditions in the estuaries. Implementation of the project would provide direct positive impacts on saltwater resources within the Caloosahatchee Estuary and St. Lucie Estuary by reducing the frequency and volume of high level flows from Lake Okeechobee and improve the salinity balance. This will benefit seagrass, oysters, fish, and wildlife. Implementation of the proposed project would provide direct positive impacts on saltwater resources within Florida Bay and adjacent southwestern coastal estuaries by redistributing freshwater runoff from the watershed to provide a more natural and historic overland flow through transverse glades and existing coastal wetlands that will reduce hyper-saline conditions and improve the overall salinity balance. This course of action would provide benefits for key species such as seatrout, pink shrimp, and crocodiles as well as seagrass, fisheries and wildlife. Based on the overall impacts, the project is consistent with the goals of this chapter.

CHAPTER 372, F.S., LIVING LAND AND FRESHWATER RESOURCES

This chapter establishes the Game and Freshwater Fish Commission (now called the Florida Fish and Wildlife Conservation Commission) and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions that provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The proposed project would have a long-term beneficial effect on freshwater aquatic life and wildlife. The proposed project would increase the foraging opportunities for wading birds and other wildlife within the proposed STA. The project would have a long-term beneficial effect on freshwater aquatic life and wildlife within the Caloosahatchee River and St. Lucie River through attenuation of peak high flows during the wet season thus improving the salinity envelope for these species. The proposed project would rehydrate WCA 3A, 3B and Everglades National Park, add wetland habitat, and is expected to improve conditions for apple snails, fish, amphibians, alligators, and wading bird species throughout much of the Greater Everglades. Implementation of the proposed project would provide direct positive impacts on saltwater resources within Florida Bay and adjacent southwestern coastal estuaries by redistributing freshwater runoff from the watershed to provide a more natural and historic overland flow through transverse glades and existing coastal wetlands that would reduce hyper-saline conditions and improve the overall salinity balance. The proposed project is consistent with the intent of this chapter.

CHAPTER 373, F.S., WATER RESOURCES

The waters in the state of Florida are managed and protected to conserve and preserve water resources, water quality, and environmental quality. This statute addresses sustainable water management; the conservation of surface and ground waters for full beneficial use; the preservation of natural resources, fish, and wildlife; protecting public land; and promoting the health and general welfare of Floridians. The state manages and conserves water and related natural resources by determining whether activities will unreasonably consume water; degrade water quality; or adversely affect environmental values such as protected species habitat, recreational pursuits, and marine productivity.

Specifically, under Part IV of Chapter 373, the Department of Environmental Protection, water management districts, and delegated local governments review and take agency action on wetland resource, environmental resource, and stormwater permit applications, which address the construction, alteration, operation, maintenance, abandonment, and removal of any stormwater management system, dam, impoundment, reservoir, or appurtenant work or works, including dredging, filling and construction activities in, on, and over wetlands and other surface waters.

Response: The proposed project includes constructing a storage reservoir and STA on the State-owned lands in the Everglades Agricultural Area. The reservoir would capture approximately 240,000 acre-feet of water that is currently being discharged from Lake Okeechobee to tide in the St. Lucie and Caloosahatchee Estuaries. The water would be stored and treated to improve water quality prior to being discharged south into the Greater Everglades. The additional water that was previously lost to the Atlantic Ocean and Gulf of Mexico would flow southward, rehydrating historic marshes, providing enhancement of sheetflow and restoration of historic ridge and slough landscape features, and improving groundwater recharge.

The proposed project incorporates restoration components primarily intended to benefit freshwater wetlands and estuarine resources by distributing freshwater flows through WCA 3A, WCA 3B and Everglades National Park. The goals and objectives of this project are to improve habitat conditions for native wildlife species. Impacts of this project have been detailed within an Environmental Impact Statement and in the Section 404(b)(1) Clean Water Act Evaluation (Appendix C.4.3.2). This project is in compliance with the intent of this Chapter.

The SFWMD is the state agency responsible for implementing this statute. The SFWMD has coordinated planning efforts to ensure compatibility with established policies. The project is consistent with the goals of this chapter.

CHAPTER 375, F.S., OUTDOOR RECREATION AND CONSERVATION LANDS

The statute addresses the development of a comprehensive multipurpose outdoor recreation plan. The purpose of the plan is to document recreational supply and demand, describe current recreational opportunities, estimate the need for additional recreational opportunities, and propose the means to meet the identified needs.

Response: The potentially affected property is currently in public ownership. This project is in compliance with the intent of this Chapter.

CHAPTER 376, F.S., POLLUTANT DISCHARGE PREVENTION AND REMOVAL

Regulating the transfer, storage, and transportation of pollutants, and the cleanup of pollutant discharges is essential for maintaining the coastal waters, estuaries, tidal flats, beaches, and public lands adjoining the seacoast in as close to a pristine condition as possible. The preservation of the seacoast as a source of public and private recreation and the preservation of water and certain lands are matters of the highest urgency and priority. This statute provides a framework for the protection of the state's coastline from spills, discharges, and releases of pollutants as a result of the transfer, storage, and transportation of such products. The discharge of pollutants into or upon any coastal waters, estuaries, tidal flats, beaches, and lands adjoining the seacoast of the state is prohibited. The statute provides for hazards and threats of danger and damages resulting from any pollutant discharge to be evaluated; requires the prompt containment and removal of pollution; provides penalties for violations; and ensures the prompt payment of reasonable damages from a discharge. Portions of Chapter 376, F.S., serve as a complement to the national contingency plan portions of the federal Water Pollution Control Act.

Response: The contract specifications would prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and would require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan would be required.

CHAPTER 377, F.S., ENERGY RESOURCES

The statute addresses the regulation, planning, and development of the energy resources of the state. The statute provides policy to conserve and control the oil and gas resources in the state, including products made therefrom and to safeguard the health, property and welfare of Floridians. The Department of Environmental Protection (DEP) is authorized to regulate all phases of exploration, drilling, and production of oil, gas, and other petroleum products in the state. The statute describes the permitting requirements and criteria necessary to drill and develop for oil and gas. DEP rules ensure that all precautions are taken to prevent the spillage of oil or any other pollutant in all phases of extraction and transportation. The state explicitly prohibits pollution resulting from drilling and production activities. No person drilling for or producing oil, gas, or other petroleum products may pollute land or water; damage aquatic or marine life, wildlife, birds, or public or private property; or allow any extraneous matter to enter or damage any mineral or freshwater-bearing formation. Penalties for violations of any provisions of this chapter are detailed.

Chapter 377 Energy Resources
Not approved as enforceable policy: Sections 377.06, .24(9), and .242(1)(a)5. All deal with regulation of oil and gas resources**.**

Response: This project does not involve the exploration; drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

CHAPTER 379, F.S., FISH AND WILDLIFE CONSERVATION

The framework for the management and protection of the state of Florida's wide diversity of fish and wildlife resources are established in this statute. It is the policy of the state to conserve and wisely manage these resources. Particular attention is given to those species defined as being endangered or threatened. This includes the acquisition or management of lands important to the conservation of fish and wildlife. This statute contains specific provisions for the conservation and management of marine fisheries resources. These conservation and management measures permit reasonable means and quantities of annual harvest, consistent with maximum practicable sustainable stock abundance, as well as ensure the proper quality control of marine resources that enter commerce.

Additionally, this statute supports and promotes hunting, fishing and the taking of game opportunities in the State. Hunting, fishing, and the taking of game are considered an important part in the state's economy and in the conservation, preservation, and management of the state's natural areas and resources.

Chapter 379 Fish and Wildlife Conservation.
Not approved as enforceable policy: Sections 379.2551 and .362.

379.2511? [no 379.2551 shown] Lease of state-owned water bottoms for growing oysters and

clams. 379.362 Wholesale and retail saltwater products dealers; regulation.

Response: The goals and objectives of this project are to improve habitat conditions for native wildlife species. This project is in compliance with the intent of this Chapter.

CHAPTER 380, F.S., LAND AND WATER MANAGEMENT

Land and water management policies are established to protect natural resources and the environment; and to guide and coordinate local decisions relating to growth and development. The statute provides that state land and water management policies, to the maximum possible extent, be implemented by local governments through existing processes for the guidance of growth and development and that all the existing rights of private property be preserved in accord with constitutions of this state and of the United States. The chapter establishes the Areas of Critical State Concern designation, the Florida Communities Trust as well as the Florida Coastal Management Act. The Florida Coastal Management Act provides the basis for the Florida Coastal Management Program which seeks to protect the natural, commercial, recreational, ecological, industrial, and aesthetic resources of Florida's coast.

Chapter 380 Land and Water Management

Not approved as enforceable policy: Section 380.23(3)(d). [consistency review of] Federal activities within the territorial limits of neighboring states when the Governor and the department determine that significant individual or cumulative impact to the land or water resources of the state would result from the activities.

Response: The proposed project incorporates restoration components primarily intended to benefit freshwater wetlands and estuarine resources by decreasing damaging discharges to the estuaries and redistributing freshwater flows through WCA 3A, WCA 3B and Everglades National Park. This includes the installation/construction of a storage reservoir and STA. The goals and objectives of this project are to improve habitat conditions for native wildlife species. Impacts of this project have been detailed within an Environmental Impact Statement. This project is in compliance with the intent of this Chapter.

CHAPTER 381, F.S., PUBLIC HEALTH: GENERAL PROVISIONS

The statute establishes public policy concerning the state's public health system, which isdesignated to promote, protect, and improve the health of all people in the state.

Chapter 381 Public Health: General Provisions
Enforceable policy includes only Sections 381.001, .0011, .0012, .006, ,0061, .0065, .0066, and .0067.
381.001 Legislative intent; public health system.
381.0011 Duties and powers of the Department of Health.
381.0012 Enforcement authority.
381.006 Environmental health.
381.0061 Administrative fines.
381.0065 Onsite sewage treatment and disposal systems; regulation.
381.0066 Onsite sewage treatment and disposal systems; fees.
381.0067 Corrective orders; private and certain public water systems and onsite sewage treatment and disposal systems.

Response: This project would not affect the state's public health system and therefore, this Chapter is not applicable.

CHAPTER 388, F.S., MOSQUITO CONTROL

Mosquito control efforts of the state are to achieve and maintain such levels of arthropod control as will protect human health and safety and foster the quality of life of the people, promote the economic development of the state, and facilitate the enjoyment of its natural attractions by reducing the number of pestiferous and disease-carrying arthropods. It is the policy of the state to conduct arthropod control in a manner consistent with protection of the environmental and ecological integrity of all lands and waters throughout the state.

Response: The proposed project would not further the propagation of mosquitoes or other pest arthropods and with the restoration of sheetflow, standing water would be reduced, thus potentially reducing the propagation of mosquitoes. This project is in compliance with the intent of this Chapter.

CHAPTER 403, F.S., ENVIRONMENTAL CONTROL

Environmental control policies conserve state waters; protect and improve water quality for consumption and for the propagation of fish and wildlife; and maintain air quality to protect human health and plant and animal life. This statute provides wide-ranging authority to address various environmental control concerns, including air and water pollution; electrical power plant and transmission line siting; the Interstate Environmental Control Compact; resource recovery and management; solid and hazardous waste management; drinking water protection; pollution prevention; ecosystem management; and natural gas transmission pipeline siting.

Chapter 403 Environmental Control
Not approved as enforceable policy: Section 403.7125(2) and (3).

(2) The owner or operator of a landfill ...shall establish a fee, or a surcharge on existing fees or other appropriate revenue-producing mechanism, to ensure the availability of financial resources for the proper closure of the landfill.

(1) An owner or operator of a landfill ... may provide financial assurance to the department in lieu of the requirements of subsection (2).

Response: A draft Environmental Impact Statement addressing project impacts has been prepared and would be reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures would be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources would occur. The project complies with the intent of this chapter.

CHAPTER 553, F.S., BUILDING AND CONSTRUCTION STANDARDS

The statute addresses building construction standards and provides for a unified Florida Building Code.

Chapter 553 Building and Construction Standards.
Enforceable policy includes only Sections 553.73 and .79.

553.73 Florida Building Code.

553.79 Permits; applications; issuance; inspections.

Response: A draft Environmental Impact Statement addressing project impacts has been prepared and would be reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures would be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources would occur. Water Quality Certification would be sought from the State prior to construction. The project complies with the intent of this chapter.

CHAPTER 582, F.S., SOIL AND WATER CONSERVATION

It is the state's policy to preserve natural resources; control and prevent soil erosion, prevent floodwater and sediment damages and to further the conservation, development and use of soil and water resources, and the disposal of water. Farm, forest, and grazing lands are among the basic assets of the state; and the preservation of these lands is necessary to protect and promote the health, safety, and general welfare of its people. These measures help to preserve state and private lands, control floods, maintain water quality, prevent impairment of dams and reservoirs, assist in maintaining the navigability of rivers and harbors, preserve wildlife and protect wildlife habitat, protect the tax base, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state.

Response: Project construction and implementation would include appropriate erosion control plans and measures to ensure compliance with the intent of the chapter.

CHAPTER 597, F.S., AQUACULTURE

The statute establishes public policy concerning the cultivation of aquatic organisms in the state. The intent is to enhance the growth of aquaculture, while protecting Florida's environment. This includes a requirement for a state aquaculture plan which provides for the coordination and prioritization of state aquaculture efforts, the conservation and enhancement of aquatic resources and which provides mechanisms for increasing aquaculture production for the creation of new industries, job opportunities, income for aquaculturists, and other benefits to the state.

Response: The proposed project does not include aquaculture activities, and therefore, this Chapter does not apply.