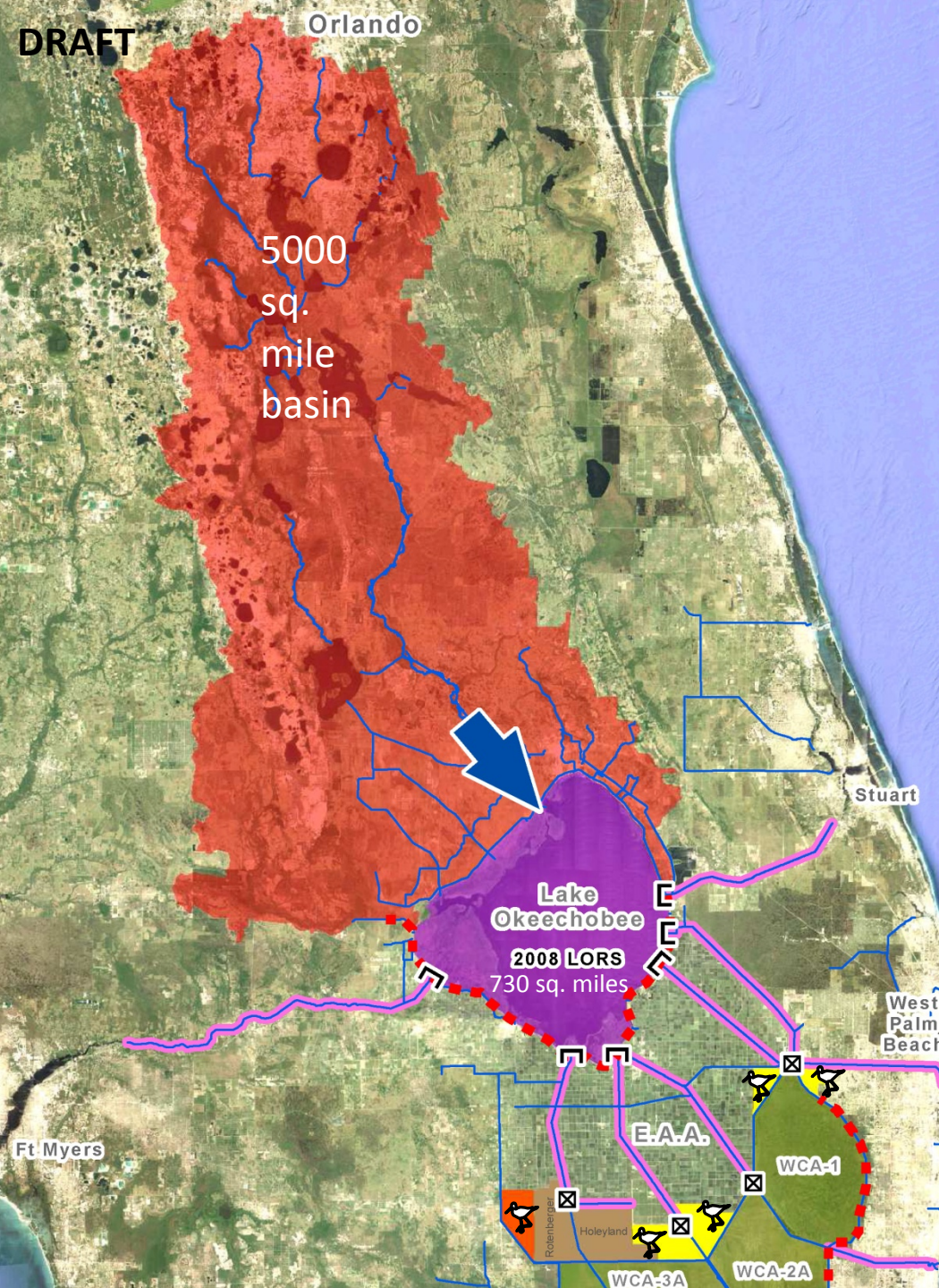


The C&SF Project was designed by the USACE to provide safe water storage in Lake Okeechobee by construction of the Herbert Hoover Dike with high stage safety relief through discharges primarily to the Caloosahatchee and St Lucie Estuaries. Recent efforts to protect the estuaries have highlighted the difficulty in diverting significant amounts of lake water to the south during wet years when the estuaries have been stressed.

In other cases more recent impediments, such as water quality or wildlife considerations inhibit the flow.



LAKE OKEECHOBEE

The largest constraint is the weather!

Limited ability to reduce the water that is coming into the Lake from the North

5000 sq. mile basin draining into 730 sq. mile Lake

Current storage in the basin is approximately 147,000 ac-ft (equivalent to ~3-4 inches in Lake Okeechobee)

Lake stage rises and falls with the major weather systems affecting Florida

Options for moving water out of the Lake are severely constrained on where you can and cannot send water

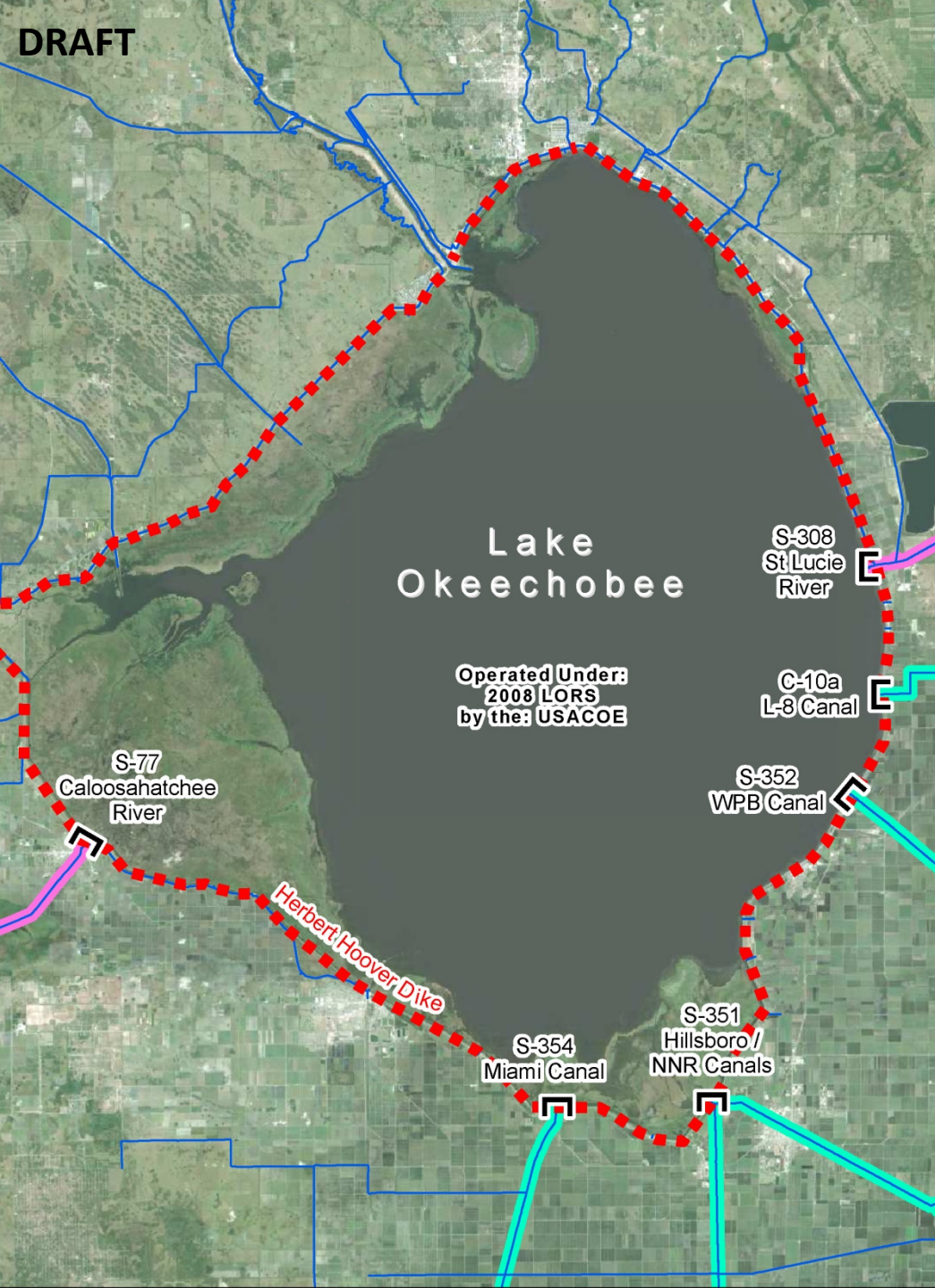
Storage of water North of the Lake provides the flexibility to meet environmental and water supply needs in the entire Lake Service Area and reduce Lake O stages requiring east-west discharges

Current Initiatives:

Completion of Kissimmee Restoration will provide ~130,000 ac-ft of additional storage

Active Dispersed Storage program designed to hold more water in the basin

Implementation of Lake Okeechobee Watershed Planning for Storage and Treatment North of the Lake



US Army Corps of Engineers 2008 LORS (Lake Okeechobee Regulation Schedule):

Herbert Hoover Dike—dam safety issues at high levels create risks to human life & safety. Deficiencies in the dike led to development of 2008 LORS

Risk assessment determined that repairs to dike must be complete before increases in lake stage, even temporary, will be possible.

There is NO current flexibility in the schedule that would allow temporary relief from high discharges to the estuaries that occurred in 2013. The dam safety issue drove the need to move water out of the Lake to avoid safety risk

2008 LORS must also consider the ecology of Lake Okeechobee

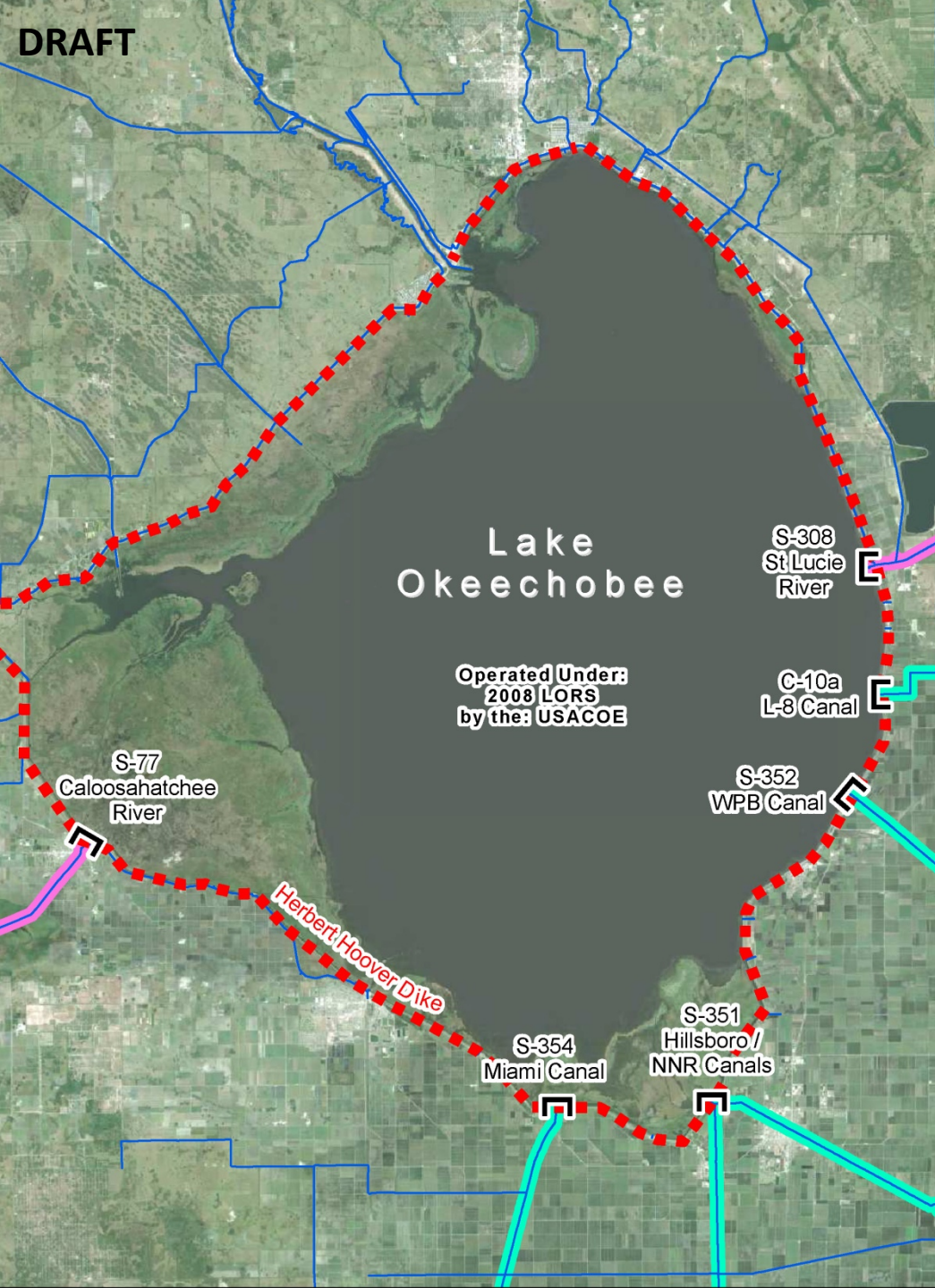
At lower lake levels, water supply for urban water utilities, environmental needs and permitted agricultural uses must be met.

Current Initiatives:

USACE Completion of Herbert Hoover Dike Repairs

It is expected that when the dike repairs are complete, the Corps would consider a new regulation schedule that incorporates more flexibility to balance all the affected interests downstream of the Lake, the Lake itself, and reduce the discharges to the estuaries.

DRAFT



STRUCTURE CAPACITY:

Trying to move water out of Lake Okeechobee



Water leaving the Lake must pass through structures that have a maximum capacity that varies depending on upstream and downstream conditions

The existing structures are not sufficient to pass high volumes from the Lake to the Everglades

The four structures to the south have a peak capacity of 6,000 cfs while the northern inflow is as high as 40,000 cfs, and these southern structures are not generally available for this use during wet periods

The total discharge capacity to the Caloosahatchee (9,000 cfs) and St. Lucie (7,000 cfs) (as designed during Central & Southern Florida Flood Control Project) is less than half of what flows into the lake during wet periods and require local basin flows to be discharged first.

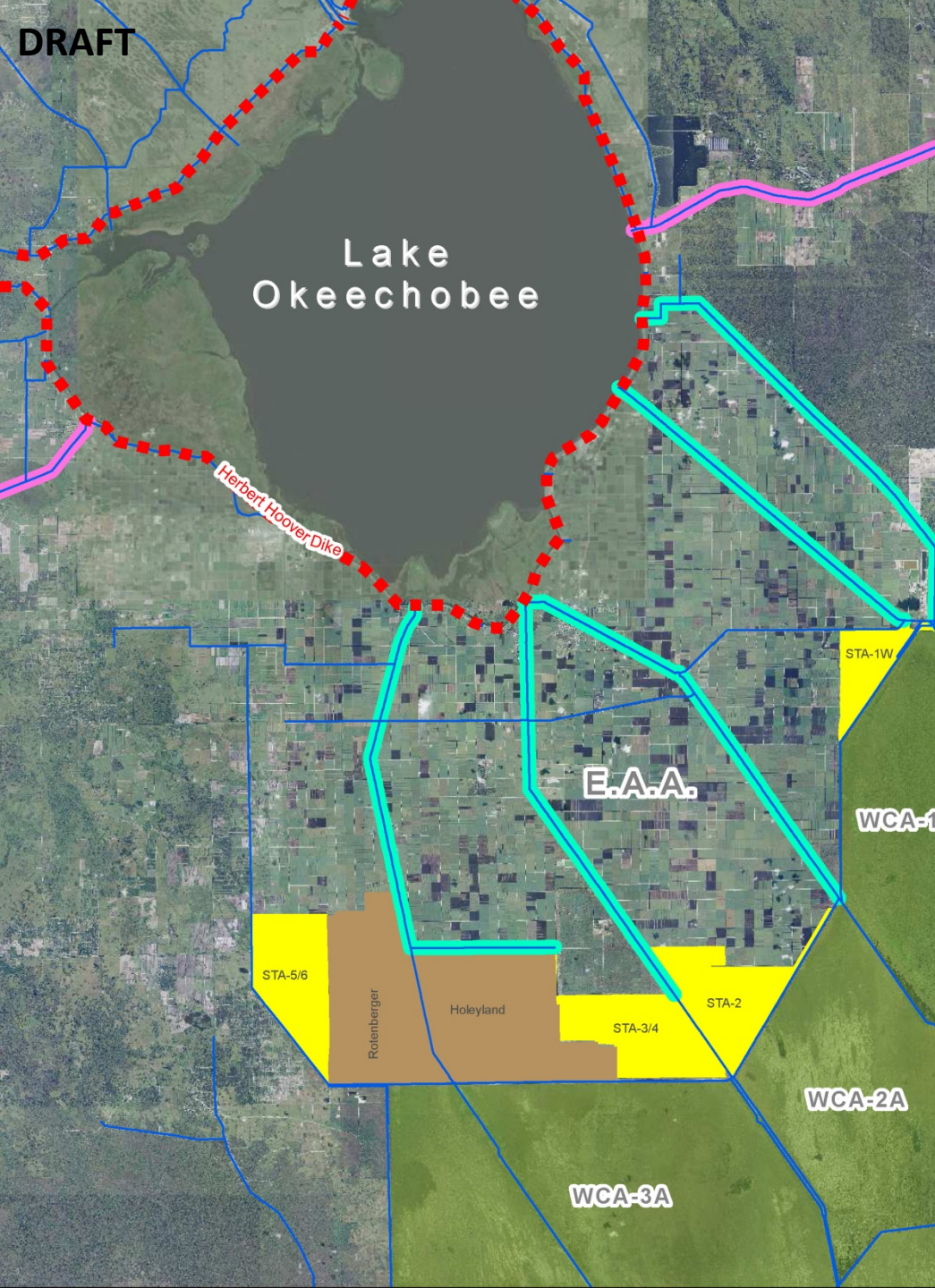
Building new high capacity structures through the Herbert Hoover Dike would be costly, and numerous downstream constraints must still be resolved.

Current Initiatives:

Construct the C-44 Reservoir/STA , C-43 Reservoir, Lake Hicpochee and various Dispersed Storage and water farming projects

Implementation of Lake Okeechobee Watershed Planning for Storage and Treatment North of the Lake

Coordination of Lake Releases south when capacity is available



CANAL CONVEYANCE

Moving water through the existing canals:



EAA canals have multiple purposes; they provide both flood control and water supply

At times, the canal capacity is completely taken up with local basin runoff (rainfall), or the canals must be drawn down in advance of a forecasted storm.

At other times, meeting the legally permitted water supply needs take up the entire canal capacity, leaving none to deliver additional Lake water to the Everglades

Making large releases from the Lake to the Water Conservation Areas (WCAs) would require a significant enlargement of the primary EAA canals.

People, businesses and cities in the EAA must be protected under any plan to move additional water through the system

Similar constraints to moving water through the Caloosahatchee and St Lucie outlets occur at high flow rates.

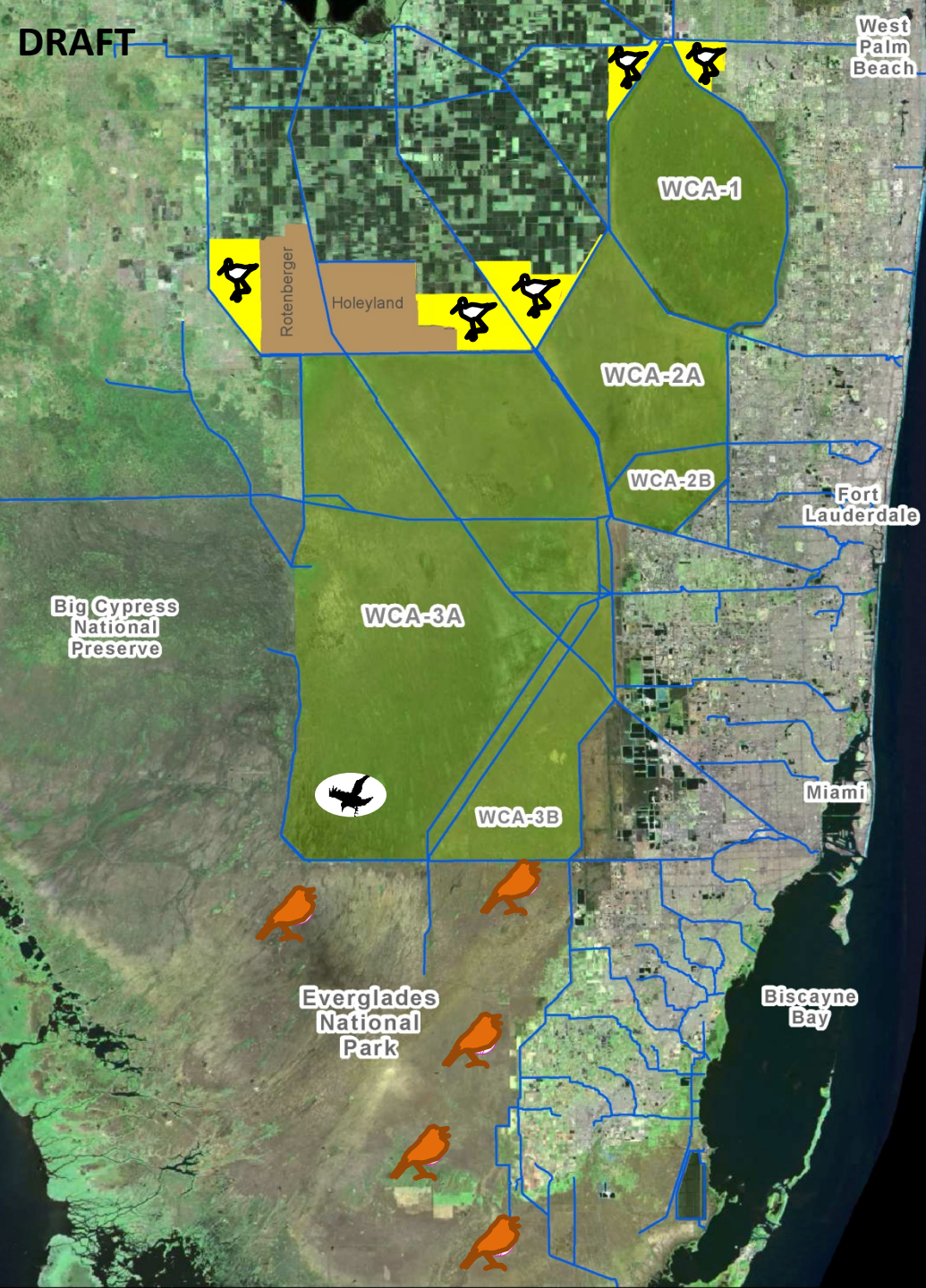
Current Initiatives:

Restoration Strategies (Construction EAA A1 FEB, L-8 FEB, expansion of Bolles Canal)

Coordination of Lake Releases South when capacity is available

Implementation of Central Everglades Planning Project

DRAFT



SPECIES PROTECTION:



The Migratory Bird Treaty Act (MBTA) protects nesting birds under federal authority separate and in addition to the Endangered Species Act (ESA).

This presents a major constraint on the operations of the Stormwater Treatment Areas (STAs).

Migratory birds nesting in the STAs limit how much water we can process before moving it south

The US Fish and Wildlife cannot give the SFWMD authority to move water over nests. Putting water in the STAs could be a potential violation of federal law.

The Endangered Species Act has led to very strict limits on hydrologic changes in key areas of the Everglades.

In the case of the Cape Sabal Seaside Sparrow, too much water in the southern Everglades is the problem.

This constrains how much water can be stored in the WCAs and sent south to the Park.

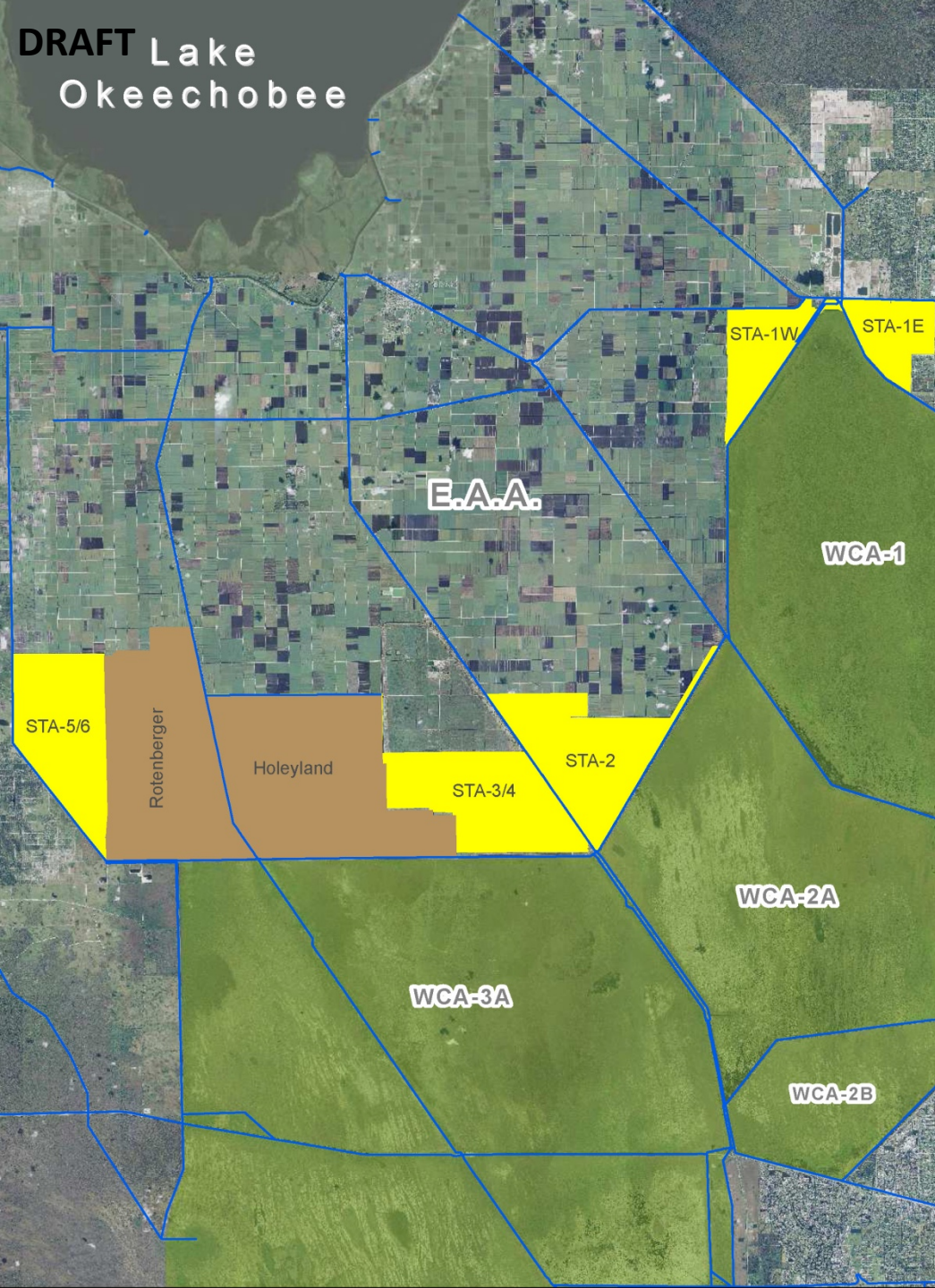
Current Initiatives:

Operation of STA's to keep water levels high enough to discourage nesting at critical elevations

Continued development of Aviation Protection Plans with FWC and FWS

Implementation of Central Everglades Planning Project

Operation of Mod Waters and C-111 South-Dade projects



STORMWATER TREATMENT AREAS: LIMITED TREATMENT CAPABILITY

STA

The STAs are necessary to meet state and federal water quality regulations. They are required by state law and Federal Court rulings.

STAs were not designed to treat significant amounts of water from Lake Okeechobee

Sustained large Lake releases to the south result in water depths and nutrient loading that could cause substantial damage to the STAs.

The South Florida Water Management District (SFWMD) attempts to avoid substantial damage by limiting STA inflows, or in the event of extreme storm events, by temporary diversion of untreated water around the STA.

The performance of the STAs must be held within very strict limits specified in Federal and state law.

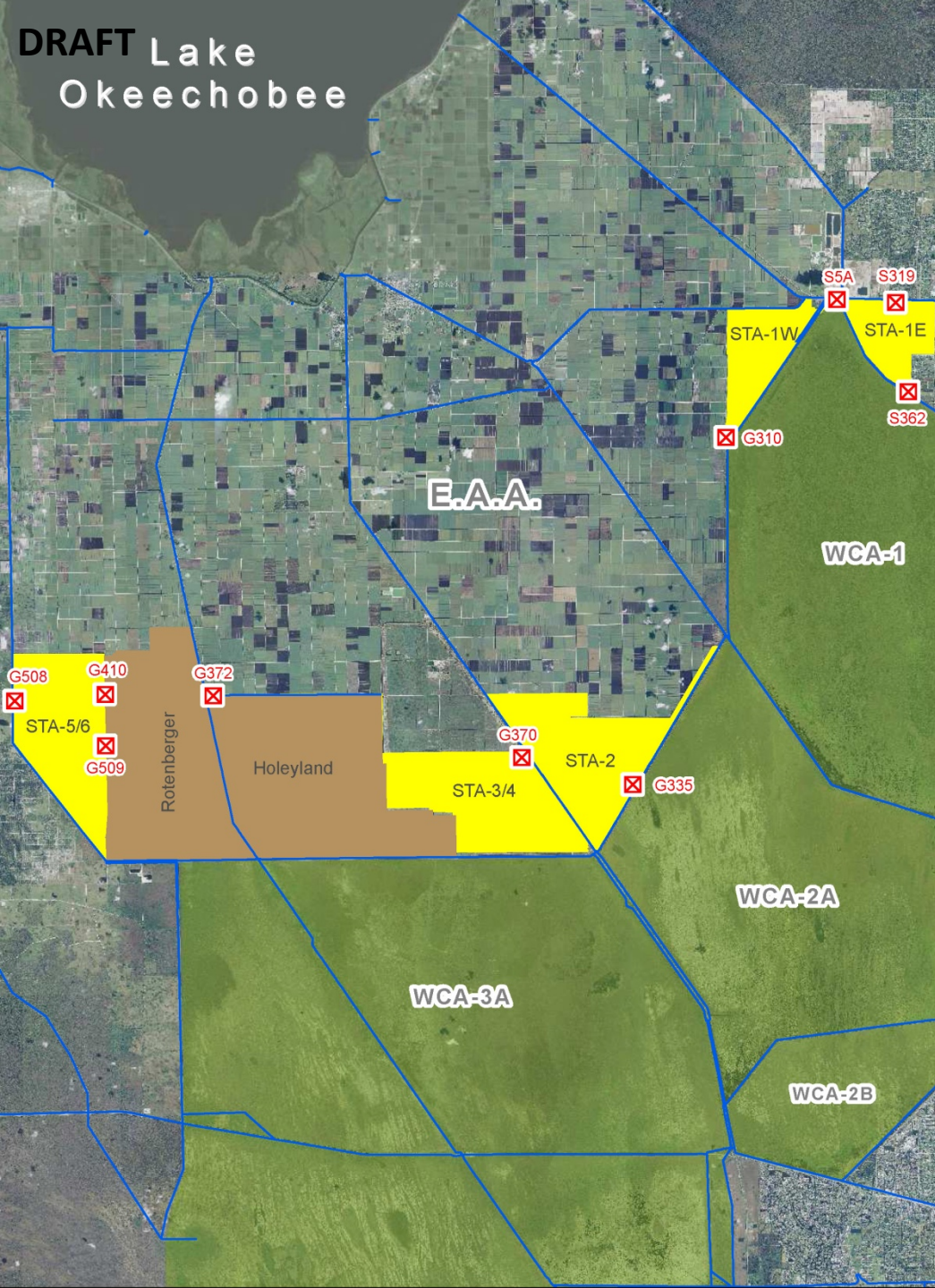
CERP anticipated storage north of the Lake plus ASR, to store water to deal with the excess water from north of the lake.

Current Initiatives:

Restoration Strategies is expanding treatment capacity of 57,000 acres of STA to 64,300 acres

Implementation of low flow delivery and treatment within existing STA's through out the entire year

Connection of STA 5/6 for treatment of Lake Water



PUMP CAPACITY:



The capacity of the pumps needed to move water is a hard constraint on how much water can be moved through the EAA and STAs

Every drop of water has to be pumped from the EAA into the STAs and then it has to be pumped again to the Water Conservation Areas (WCAs).

These pumps were designed as flood control structures during the Everglades Forever Act in the early 1990s.

There are limits on how much water you can move in and how much you can move out.

Both the structural changes and operational costs associated with moving significant Lake releases to the Everglades would be costly.

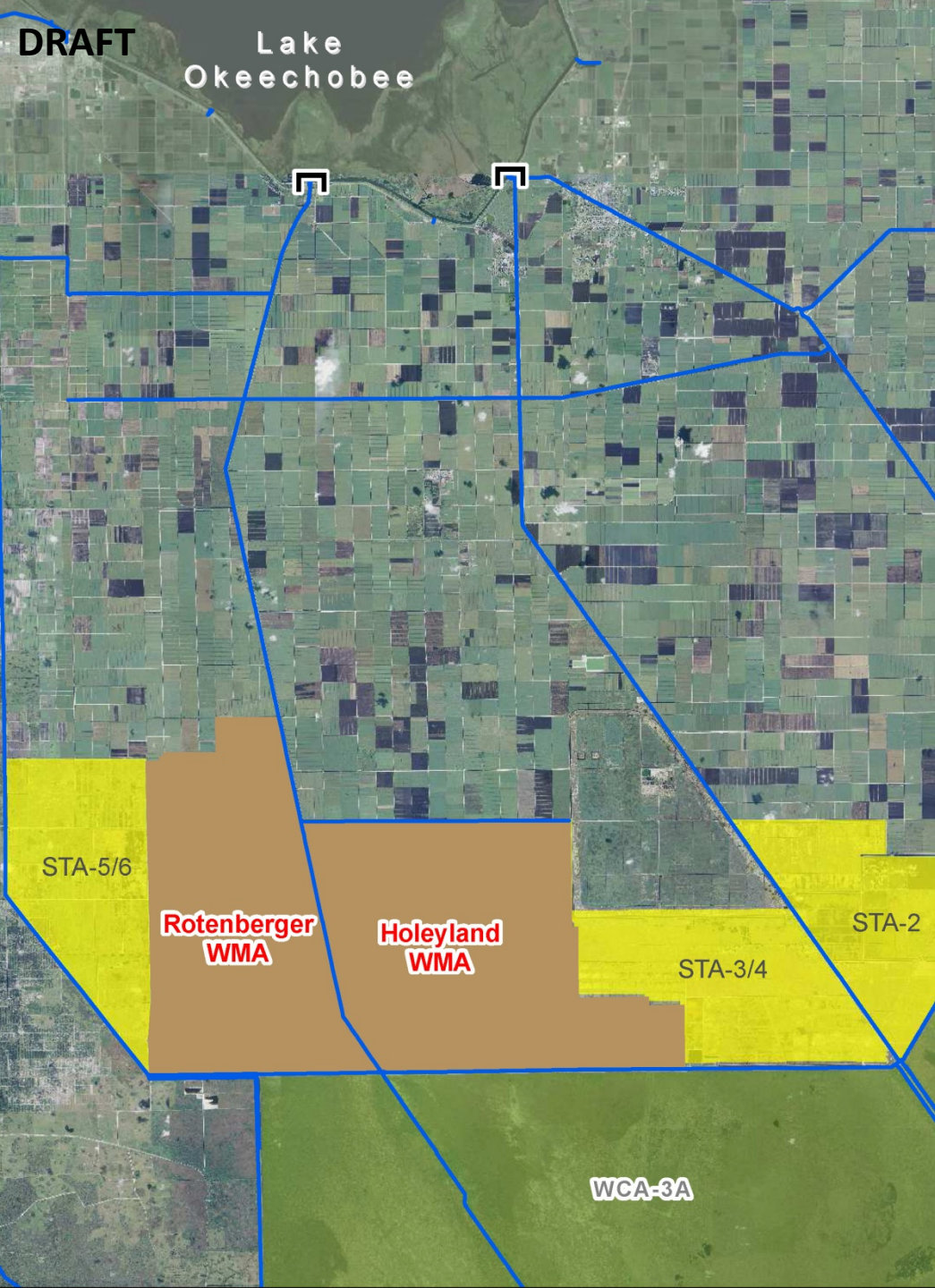
Current Initiatives:

District expanded pumping capacity in EAA as part of STA 2 build-out

Investigation on construction of smaller environmental delivery pumps for better operational control during low flows

Implementation of Restoration Strategies

Implementation of Central Everglades Planning Project



WILDLIFE MANAGEMENT AREAS

Between the STAs and WCA's

WMA

These areas have a different State-regulated operating regime.

Preventing excessive high water periods in areas in consideration of furbearing animals, enable water recession and ascension conducive to wading bird foraging.

Limited on how much water you can put in and how much water you can take out.

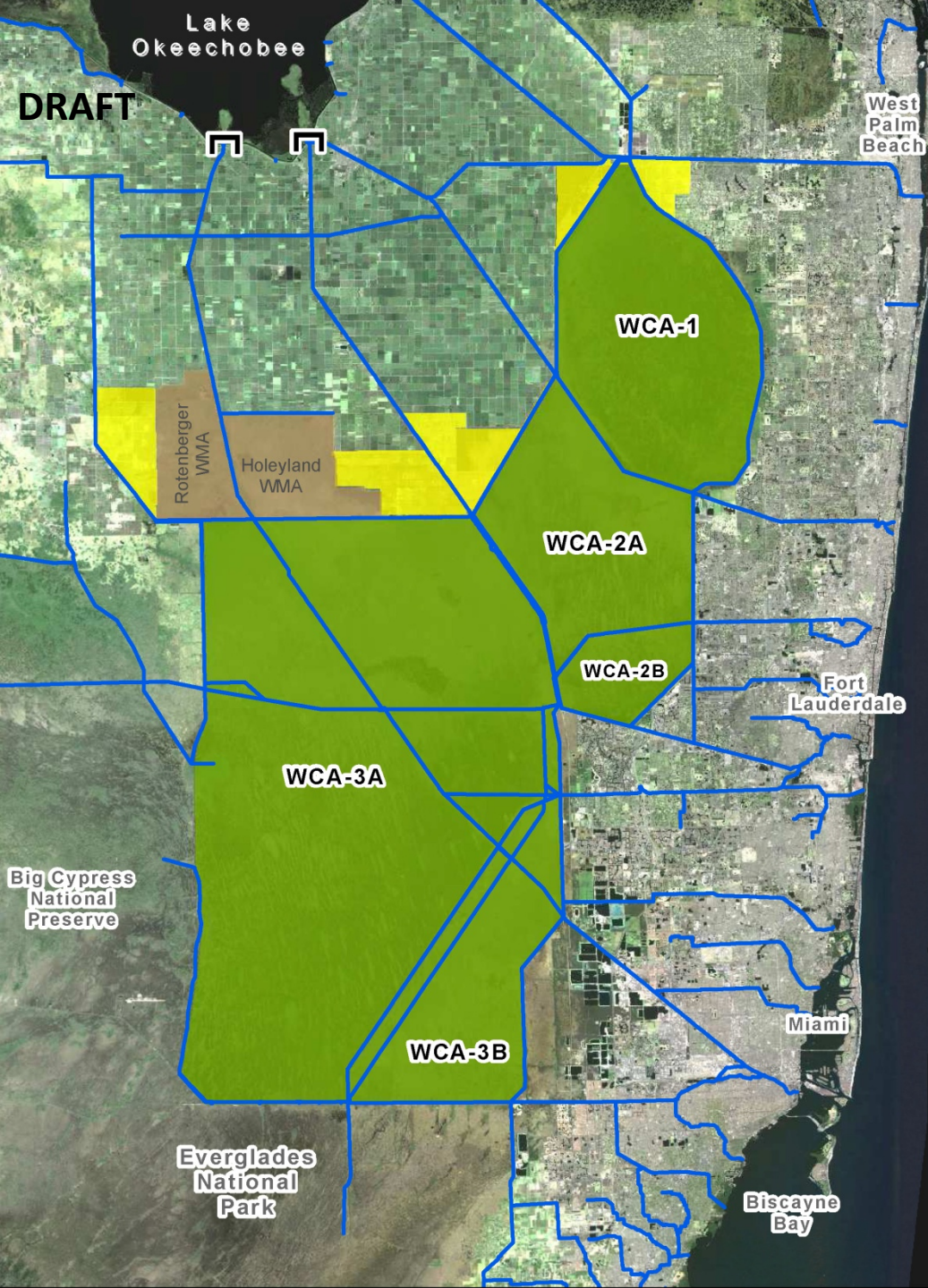
These areas are not currently used to take untreated water during Lake outflow events.

Current Initiatives:

Through legislative funding in 2015 installed new pumps to allow treated water to be placed in Holeyland

Developing jointly with FWC optimized regulation schedules for the Holeyland and Rotenberger Wildlife Management Areas

Investigating discharge structure modifications to improve hydro patterns in Holeyland WMA



WATER LEVEL LIMITATIONS:

WATER CONSERVATION AREAS (WCAs)

WCA

There are Federal water regulation schedules for each Water Conservation Area. When the water level is above schedule in a WCA, no Lake water can be brought in.

The WCAs cannot be treated solely as reservoirs. Each one has its own ecological conditions and together are major components of Everglades Restoration.

High water periods in the WCA areas must be limited to avoid harm to the full range of wildlife species that are protected in the Everglades and to reduce further degradation of tree island vegetation.

High water periods in the WCA prevents significant water from being diverted to the Water Conservation Areas during years when the Lake is making high releases to the coast.

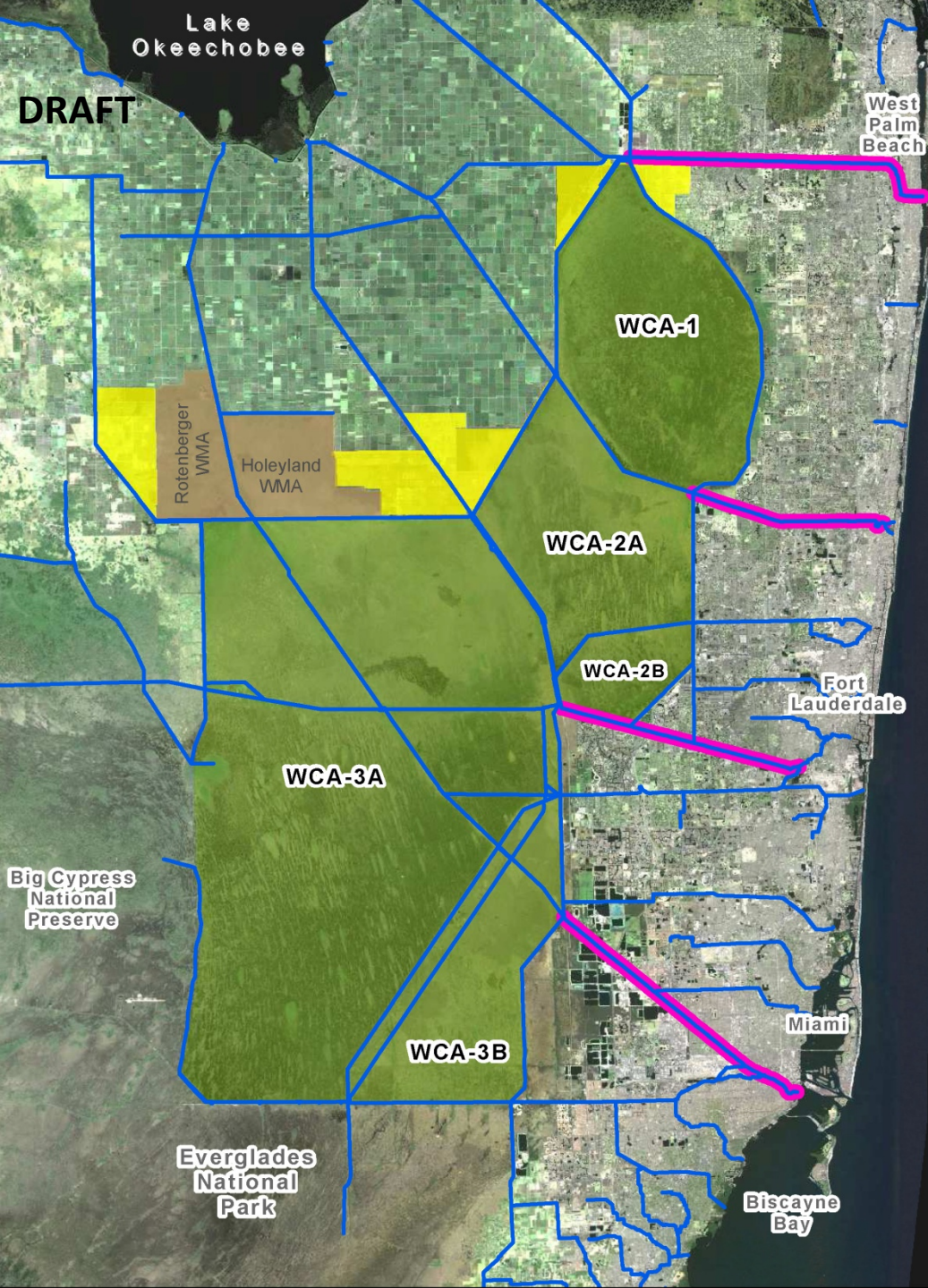
Snail kite and wood stork: These endangered species depend on the habitat within the WCAs in the short term based on the hydrology of each year and in the long term based on the plant and animal communities that support them.

Unnatural variations of water levels, higher or lower, have a detrimental effect on cultural resources. This concerns both the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida.

Water Conservation Areas have a huge impact on coastal urban water supply in Palm Beach, Broward and Miami/Dade Counties

Current Initiatives:

Implementation of the Central Everglades Planning Project provides greater ability to move water out of the WCAs as water is moved into the WCAs from Lake O discharges south.



LOWER EAST COAST (LEC): CANAL CONVEYANCE:

These canals are used to provide the legal flood control and water supply for the local areas similar to the Kissimmee River, St. Lucie and Caloosahatchee River and the EAA. They are also routinely used to recharge the local urban aquifer.

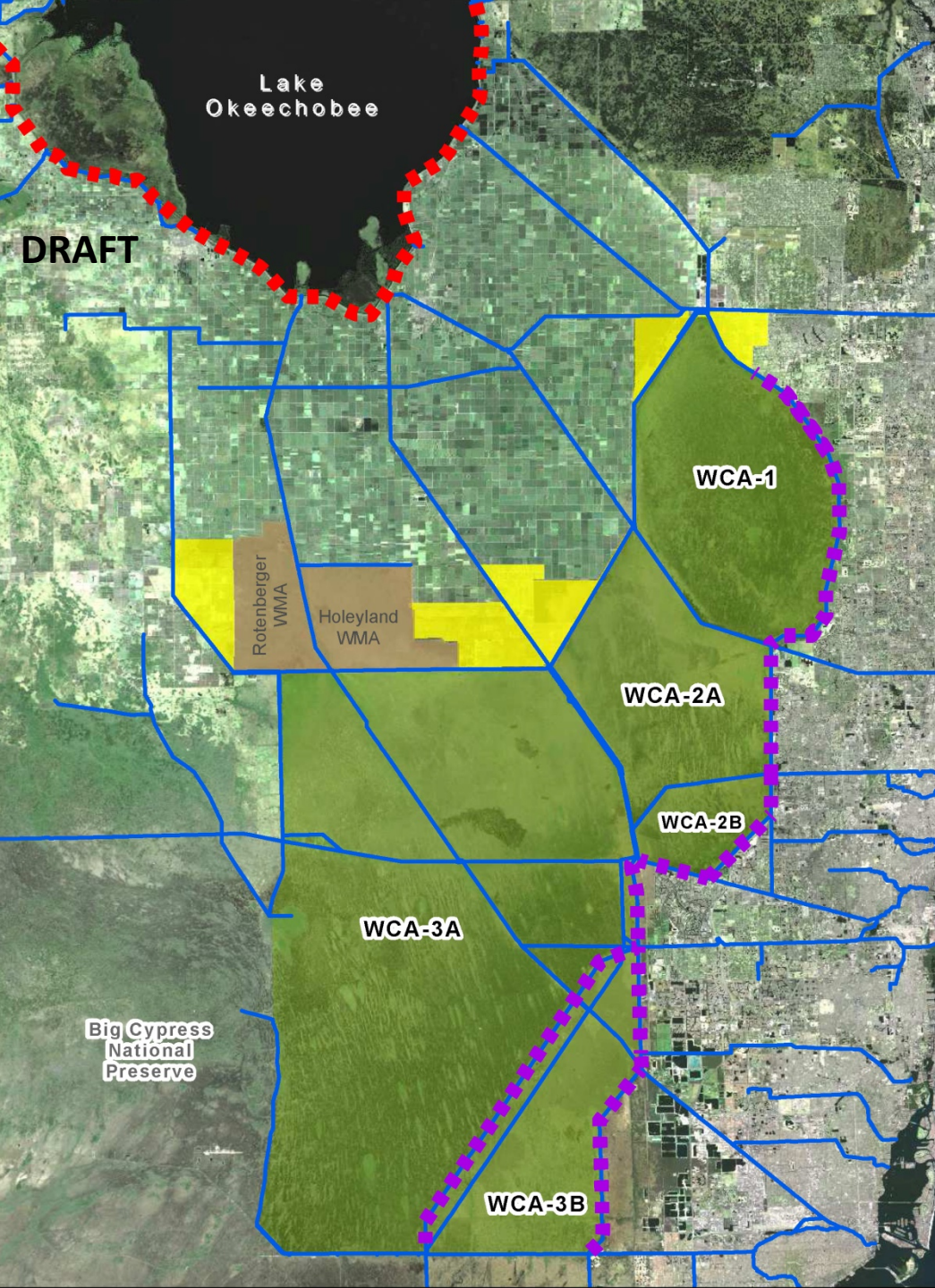
During extremely wet periods in the Everglades, they are also used to release water from the WCAs, but they are small canals with very limited capacity for this use.

These canals priority are to move flood control waters to the ocean to protect 5.5 million people in Palm Beach, Broward and Miami-Dade counties

Like every other area, local property must receive primary flood control before water can be moved from the WCAs.

Current Initiatives:

CERP Projects (Site 1 Impoundment, Broward County Water Preserve Areas)



LEVEE SAFETY:

East Coast Levee
■ ■ ■ ■ ■ ■ ■ ■ ■ ■

The East Coast Protective Levee is the main barrier between the Water Conservation Areas and the urban coastal population.

WCA levee heights were designed/built based on maximum expected water levels in the Water Conservation Areas.

High inflow from the Lake during wet periods was not anticipated in the design of any of the WCA levees.

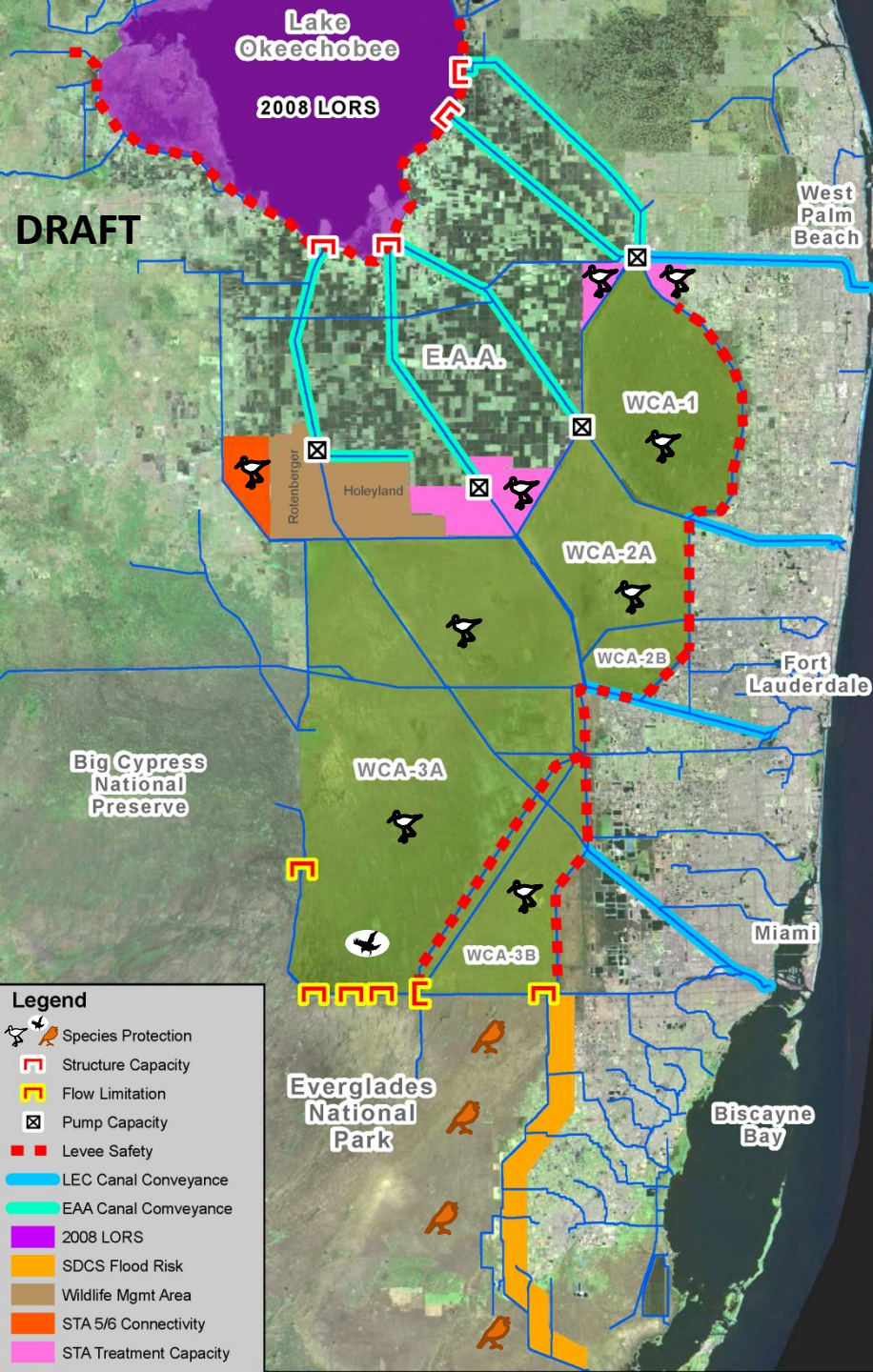
The regulation schedule for WCA-3A was lowered several years ago to address safety concerns.

A lower regulation schedule means less room for additional water from the Lake.

With rainfall, stages in the WCAs can change very quickly.

Current Initiatives:

\$20 million has been invested in this levee over the last several years to ensure it meets FEMA and flood control requirements.



FLOW LIMITATIONS:

For environmental reasons, a canal south of the S-12s that would have allowed large amounts of water from WCA3-A into ENP was never built. Not building it was a good thing for the Everglades, but it restricted how much water can go south.

Three major constraints to moving water south into Everglades National Park have been documented:

- Conveyance restrictions imposed at the S-12 structures
- Conveyance restrictions imposed by the Old Tamiami Trail
- The limited ability to flow water into the east side of the Park.

In addition there is an Endangered Species challenge in the Park, the Cape Sabal Seaside Sparrow.

The Sparrow restricts the operations of the S-12A and S-12B structures. They are shut down, one in November and one in January, through July 15, a period when large Lake releases are often made.

Two emergency projects have been pursued to incrementally improve the first two constraints:

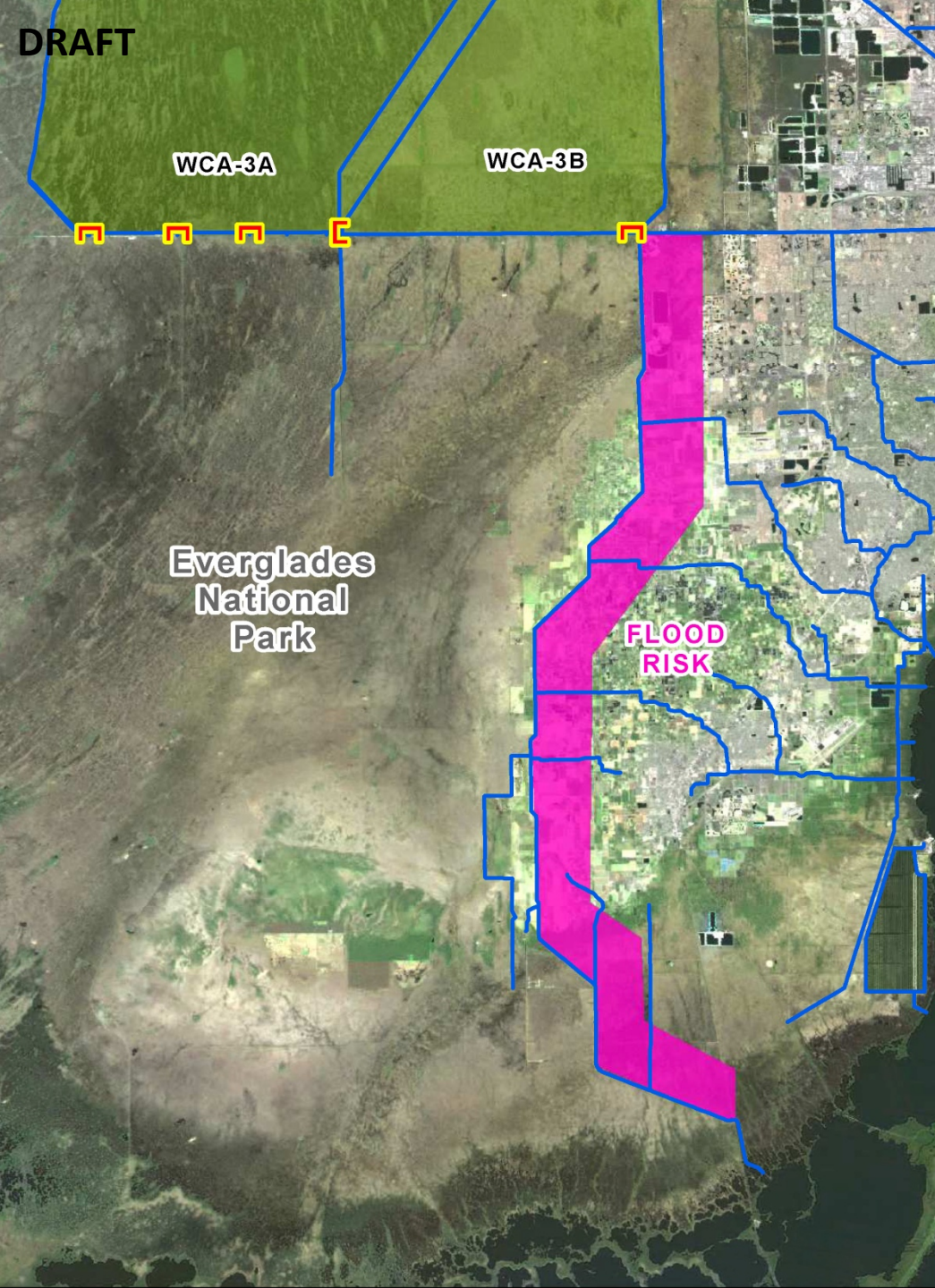
- Removing vegetation at S-12A and S-12B
- Cutting a new gap in Old Tamiami Trail

A federal process is underway to begin limited flow into the eastern section of the Park. This will be a multi-year effort and does not include the prospect of major releases from the Lake.

This inability to move water out of the south end causes the water to stack up in the WCAs and stops the flow of water moving south.

Current Initiatives:

- Continuation of the Decomp Physical Model Study
- Implementation of Comprehensive Everglades Planning Project
- Complete Removal of Old Tamiami Trail
- Implementation of Tamiami Trail Next Steps (2.6 mile Bridge)
- Operation of Mod Waters and C-111South-Dade projects



FLOOD RISK:

South Dade Conveyance System

A primary mission of the C & SF Project is flood control. Many of the canals, levees and pumps were built, and still must be operated, for that specific purpose. As more water is sent to Everglades National Park, facilities have to be in place to make sure flooding is not made worse for the private property east of Everglades National Park.

This is a key constraint on the design and operation of the Modified Water Delivery and C-111 Projects. These projects were not designed with an assumption of significant additional water coming through the Everglades from Lake Okeechobee.

Groundwater seepage from the Park is a chronic, existing problem, and significantly more water would only add to the challenge.

Current Initiatives:

Completion of Contract 8 & 9 of C-111 South-Dade

Operation of Mod Waters and C-111 South-Dade projects

Investigation of potential additional protection features to further isolate agricultural/urban area from ENP hydrology

DRAFT

Lake
Okeechobee

C-139 Basin

Everglades Agricultural Area

C-139
ANNEX

STA-5/6

Rotenberger
WMA

Holeyland
WMA

STA-3/4

STA-2

STA-1W

STA-1E

WCA-1

WCA-2A

WCA-2B

WCA-3A

WCA-3B

Big Cypress
National
Preserve

Everglades National Park

PHOSPHORUS REQUIREMENTS FOR THE EVERGLADES PROTECTION AREA



Maintenance of state water quality standards is crucial to the ecology of the WCAs and Everglades National Park

Legal requirements to reduce phosphorus levels in discharges and achieve water quality standards:

1992 (and amendments) Settlement

Agreement/Consent Decree (Appendix A &B)

Appendix A—Everglades National Park

Appendix B—Loxahatchee National Wildlife Refuge

1994 (and amendments) Everglades Forever Act

Numeric phosphorus criterion throughout the EPA marsh/WQBELS

Projects to achieve and maintain water quality standards:

EAA and C-139 BMP Program (from 1996)

STAs (1994-2012)

Restoration Strategies Expanded STA/FEB (from 2013)

Integration with Federal Projects:

Modified Water Deliveries

CERP Projects (CEPP)

Settlement Agreement & State Phosphorus Requirements:

WCA-1 (Wildlife Refuge, Federal)

Settlement Agreement Appendix B and

State Phosphorus Rule (10 ppb)

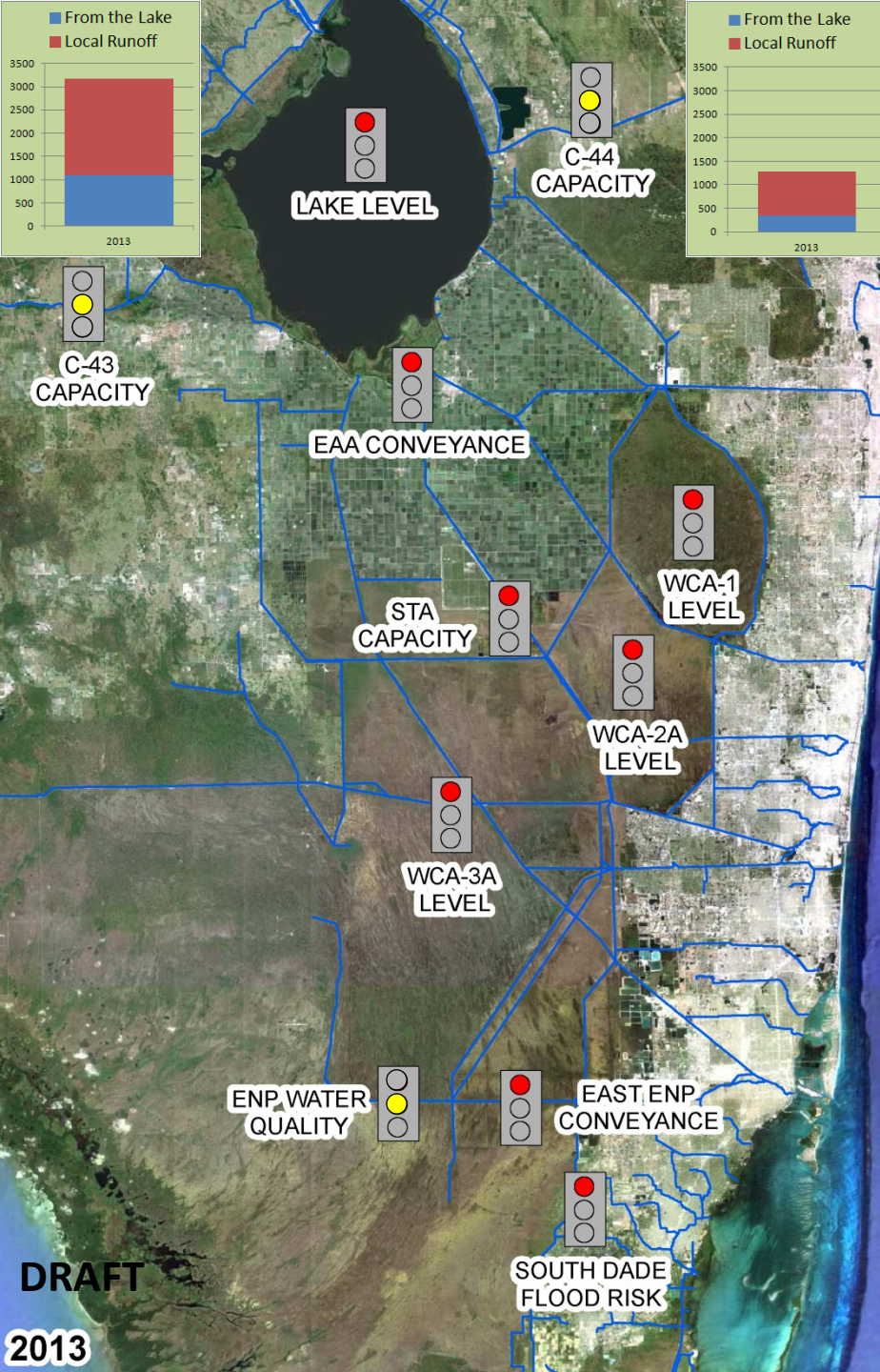
WCA-2 & WCA-3

Settlement Agreement does not apply

State Phosphorus Rule (10 ppb)

Everglades National Park

Settlement Agreement Appendix A (Appendix A also adopted the State Phosphorus Rule in the Park, 10 ppb)



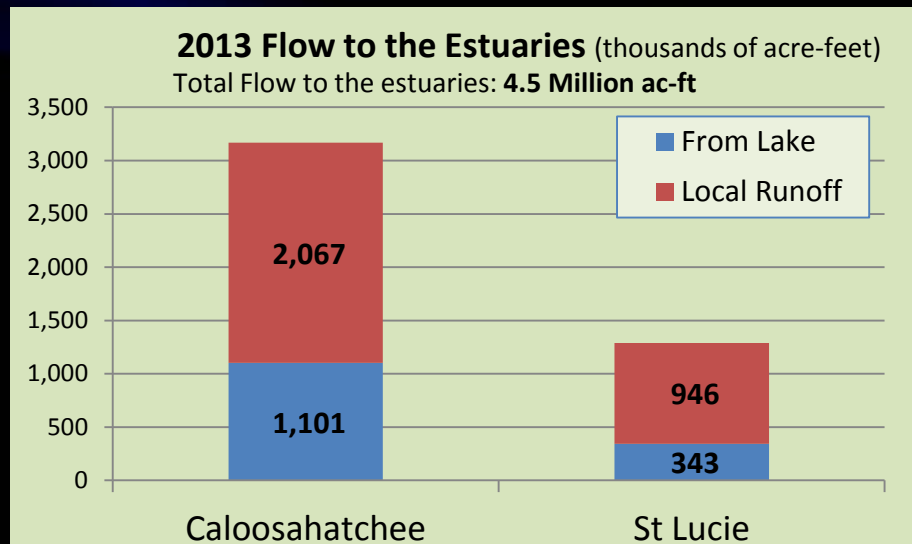
Constraint Status – 2013

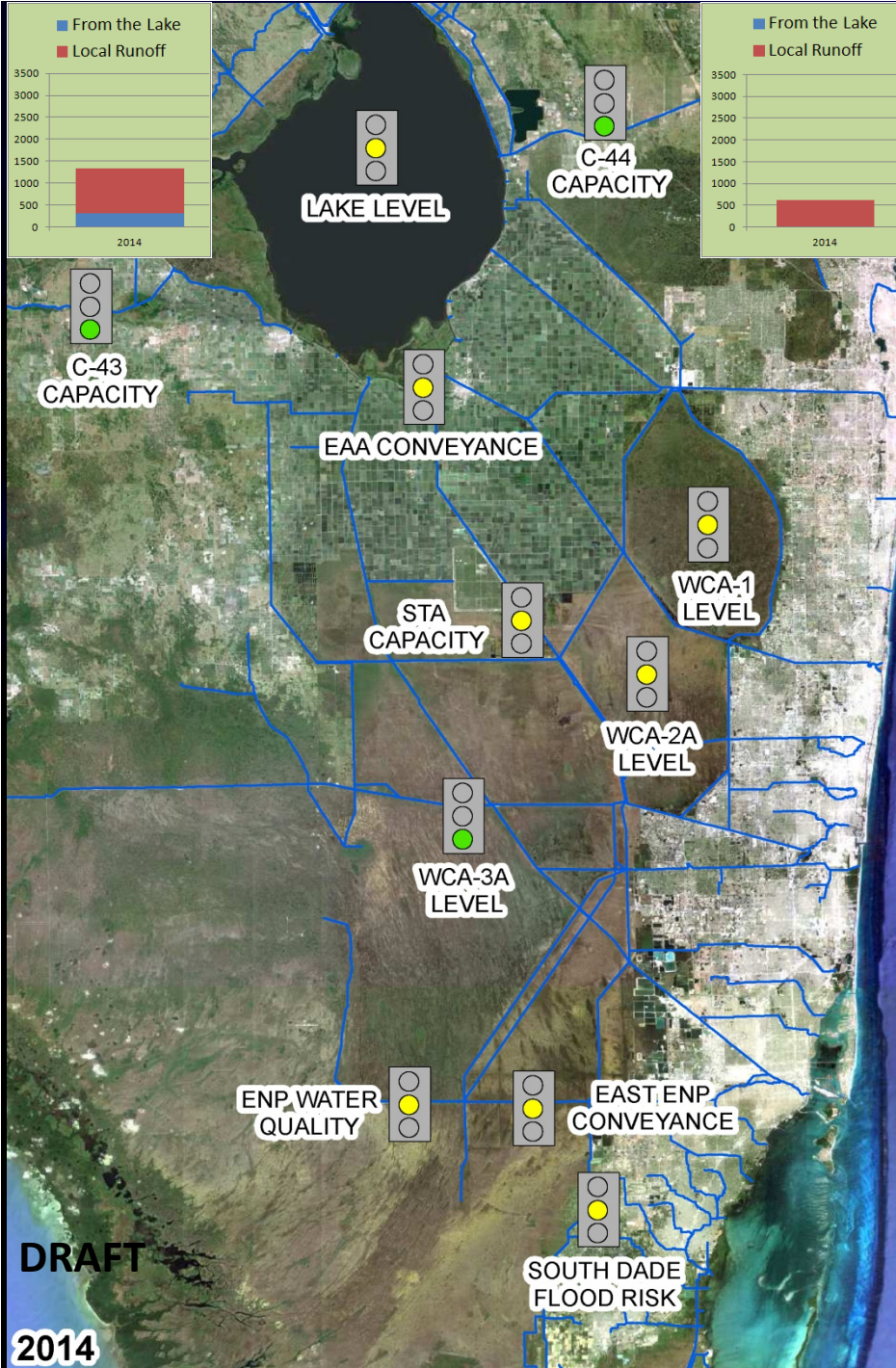
Much higher than average rainfall was recorded early in the wet season of 2013.

The upstream watershed produced very high inflow to the lake causing a rapid rise in lake level. At the same time excessive rain to the south led to deep water in the Everglades that threatened extended harm to the ecology.

The constraints described in the previous pages significantly prevented sending flow to the south from the lake. This reflects the reality of how constrained the system was designed for water management.

The conveyance capacity to the coastal estuaries were the only option to prevent potentially dangerous high levels in Lake Okeechobee.





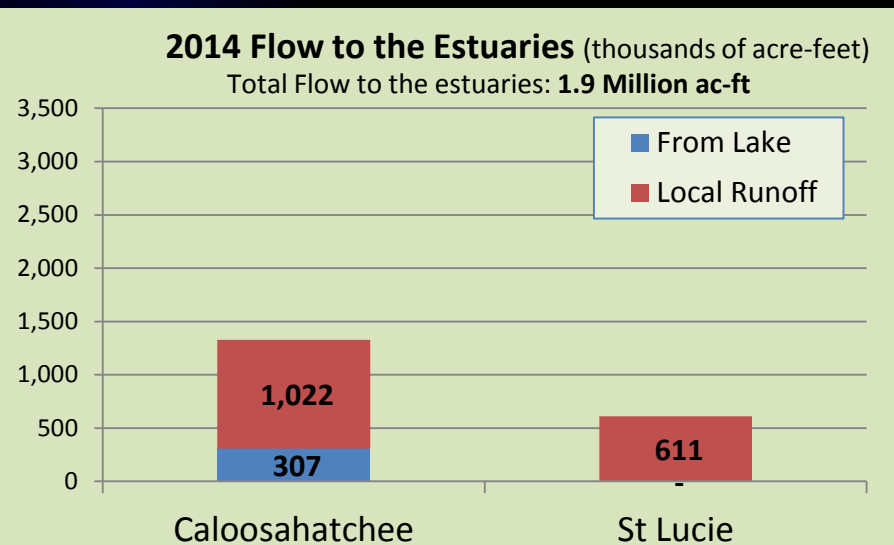
Constraint Status – 2014

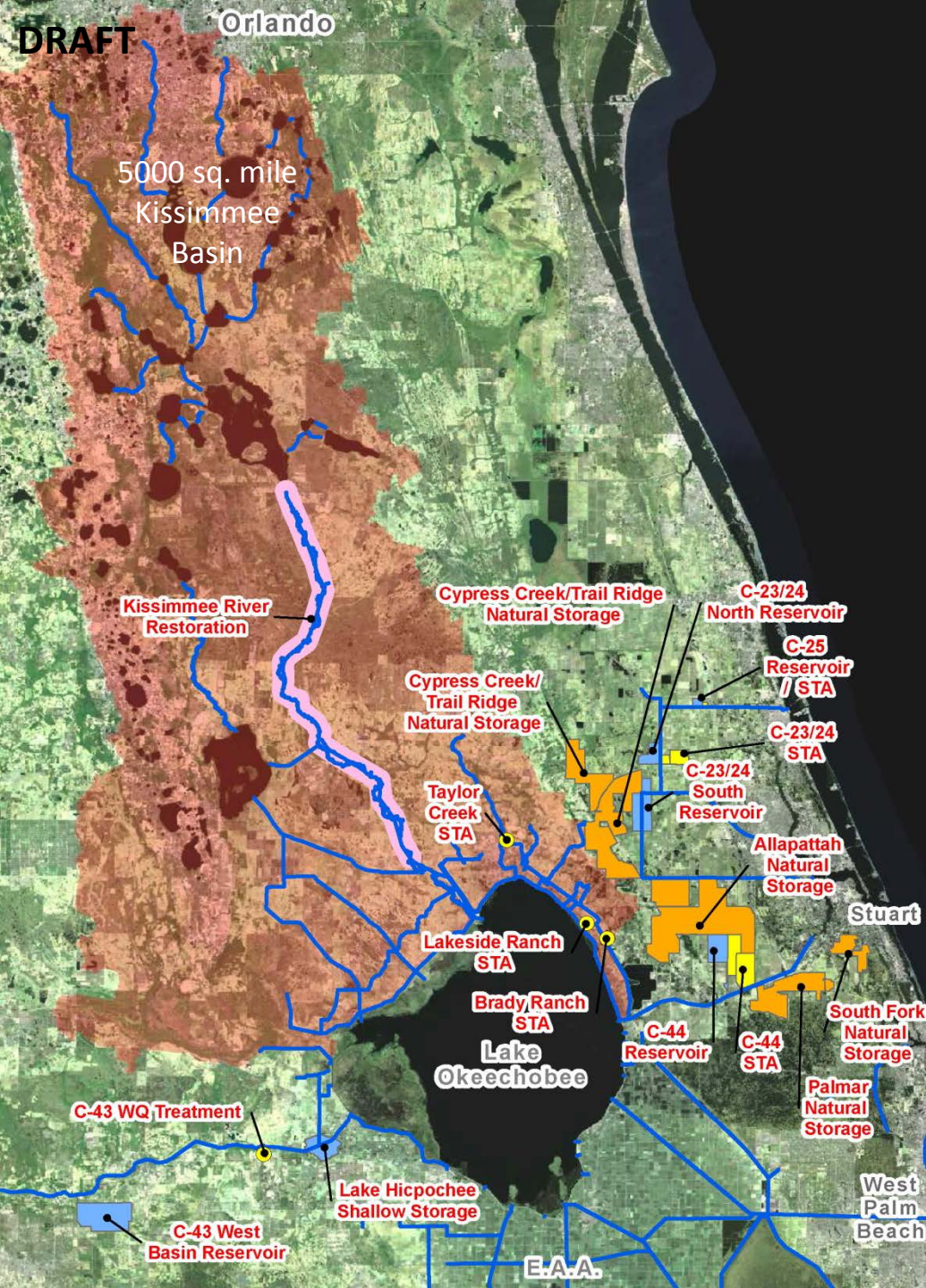
Rainfall conditions in 2014 were much closer to normal throughout the system.

While the lake stage was slightly higher than desirable for part of the year, conditions allowed most of the regulatory flow from the lake to be sent south.

The conveyance conditions through the EAA and the STAs were carefully monitored by the District and significant volumes were diverted south without jeopardizing the STAs or the Everglades.

The District was able to move small volumes of Lake O water through the STAs throughout the wet season without degrading water quality treatment within the STAs. The level in WCA-3A remained below the threshold for direct releases into south Miami-Dade so the flood risk there was manageable.



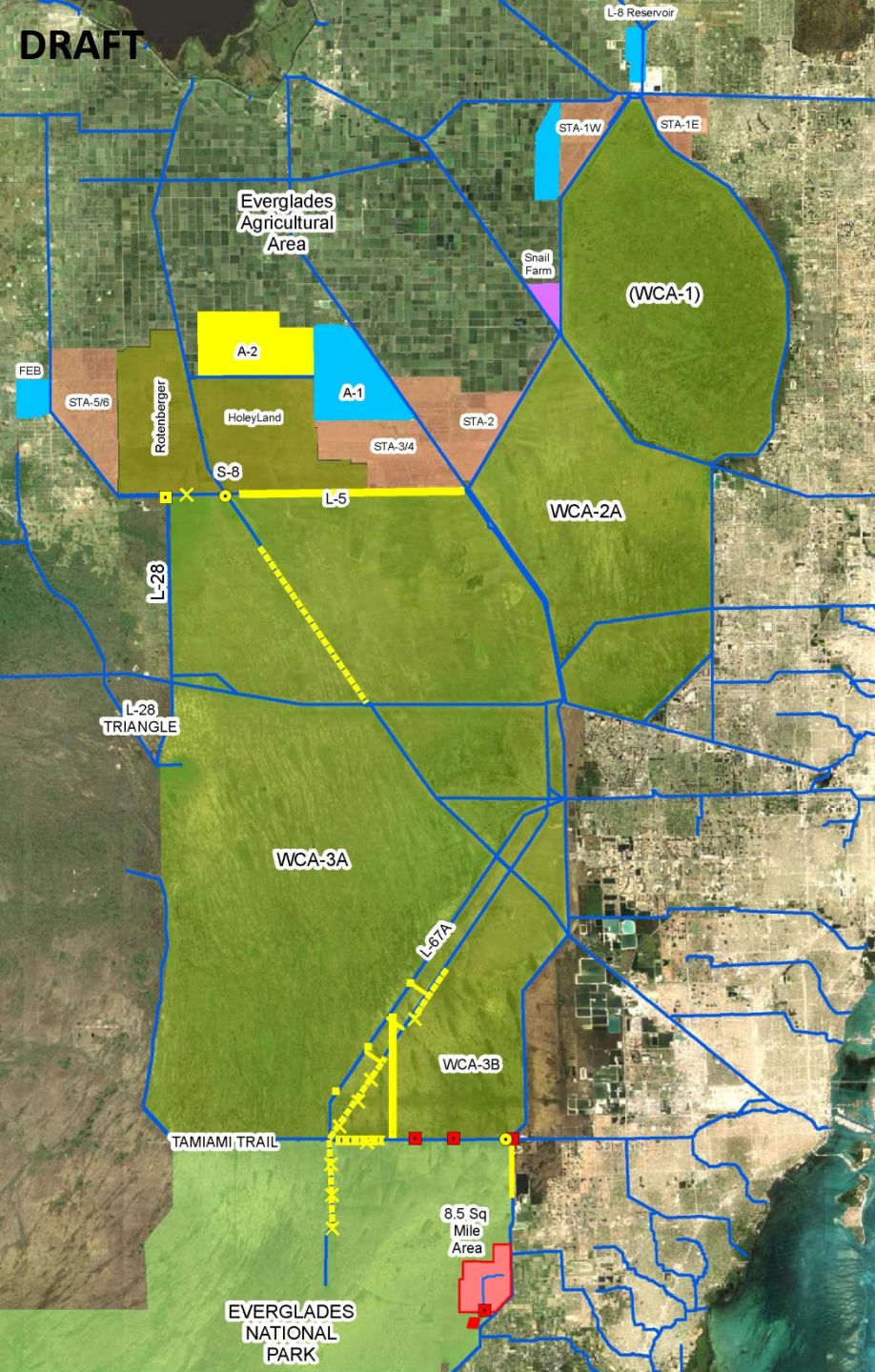


Projects in the Queue: Northern Everglades and Estuaries

The **Kissimmee River Restoration** is a \$615 million project that is nearing completion. It will add significant temporary storage in the flood plain during wet periods and reduce the nutrient loading into the Lake. The Taylor Creek, Lakeside Ranch and Brady Ranch STAs are additional projects either built or underway to improve water quality.

The **Indian River Lagoon CERP Project** is a mammoth \$2 billion suite of projects that includes the C-44 Reservoir and STA as well as up to 80,000 acres of natural storage areas.

The **C-43 Reservoir** is another CERP project authorized in 2014 that is expected to cost in excess of \$600 million and store 170,000 acre-feet of local runoff and Lake Okeechobee releases. This will reduce the high discharge flows to the estuary and provide a reliable source of dry season flow to meet the Minimum flow to the estuary.



Projects in the Queue: South of the Lake

Three major projects that are necessary to consistently move excess Lake water to the south are either underway or in process. When completed an annual average of 210,000 acre-feet of Lake water can be sent south.

The Restoration Strategies Project (shown in aqua) is an \$880 million project so runoff from the EAA, and a limited amount of Lake water, can meet final water quality standards. The project is scheduled to be fully operational in 2029.

The Modified Water Deliveries Project (shown in red) is essentially complete but will not be fully operational until 2020.

The Central Everglades Project (shown in yellow) has a cost estimate of \$1.9 billion and is necessary to move additional water south. The plan has been approved by the USACE, but not authorized by Congress. Full operation is forecast in the 2030-2040 time frame.

SUMMARY

- The system has been designed to send Lake Okeechobee water east and west to the Atlantic Ocean and the Gulf without hydrologic constraints
- Numerous hydrologic, ecologic and legal constraints can make it impossible to send lake water south when Lake Okeechobee stages are high and the estuaries are receiving high discharges
- In normal years, some water can be sent south when the various constraints allow it
- Until the Modified Water Delivery Project, Restoration Strategies plan and CEPP are built, no significant amounts of additional lake water can be sent south during wet years
- When those projects are built, an additional average of 210,000 acre-feet can be sent south, but only when the constraints allow it
- Additional strategies to move water south in concert with addressing the problems of the Northern Everglades, Lake Okeechobee and the estuaries must be developed in the future.