# Audubon Florida ● Audubon of Southwest Florida Collier County Audubon Society ● Hendry-Glades Audubon Society ● Peace River Audubon Society

September 27, 2012

Linda Hoppes, AICP, Lead Planner
LWC & LEC Water Supply Plan Manager
SFWMD Water Resources Division
Water Supply Planning
Via email: lhoppes@sfwmd.gov

**RE: Audubon comments on the Lower West Coast Water Supply Plan 2012 Update**

Dear Ms. Hoppes:

On behalf of Audubon Florida and its 14,000 acre Corkscrew Swamp Sanctuary in Lee and Collier Counties, and the Southwest Florida Audubon chapters, including Peace River Audubon Society, Audubon of Southwest Florida, Hendry-Glades Audubon Society, and Collier County Audubon Society (collectively, "Audubon"), we write to share our joint comments and recommendations on the August 15, 2012 draft of the 2012 update of the Lower West Coast Water Supply Plan. Audubon has participated in the public workshops, for which we appreciate the opportunity, and we have reviewed the updated plan in detail.

Audubon recognizes water supply planning is critical to achieving the necessary balance between water supply of urban and agricultural needs without harming the primary obligations to sustaining the natural ecosystems on which all other water uses depend. Another facet of balance is the often conflicting goals of water supply and flood protection. Perhaps most significantly, these balancing efforts are made most challenging and vital by the contexts of greater Everglades restoration, and the foreseeable impacts of climate change and its consequent sea level rise and shifts in weather patterns (droughts, storms, evaporation, etc.). In response, Audubon recommends proactive water supply planning strategies and tools which seek landscape restoration and water conservation benefits en route to sustainable water supplies for the full spectrum of users, including the natural system.

Audubon's specific comments and recommendations include:

● **Lake Okeechobee is not a future source of increased water supply**: Throughout the Lower West Coast Water Supply Plan (LWCWSP), there are repeated references to anticipation of additional water supply options from Lake Okeechobee once Hoover Dike repairs are completed, possibly as early as 2022. Audubon strongly objects to this suggestion that Dike repairs will allow storage of significantly greater water volumes. While there may be some additional flexibility once the repairs are complete, the Lake must be managed as the treasured ecosystem it is, and not a water supply reservoir. The Central and Southern Florida Project Comprehensive Review Study ("Restudy", 1999) determined the ideal Lake stage envelope as between 12.5 feet and 15.5 feet, for many vital ecological reasons. Additionally, the Army Corps of Engineers has firmly objected to any requests to raise Lake levels, even hypothetically after Dike repairs.

Therefore, Audubon recommends deletion of anticipation of significant additional water supply capability from the Lake on the many pages it is found, using the following standard edit to page 77 (similar references and edits are also found on pages iii, xi, xii, and 165):

> **Summary of Water Source Options**
> Overall, this plan update reconfirms the recommendation of the 2005–2006 LWC Plan Update to continue the diversification of water supply source options, such as use of the FAS, ASR, reclaimed water, and appropriate water conservation, which is discussed in the following section. The future water demands of the LWC Planning Area can continue to be met through the 2030 planning horizon with appropriate management and continued diversification of water supply sources ~~and completion of the necessary repairs to the Lake Okeechobee Herbert Hoover Dike~~. Additional storage may become available after the completion of necessary repairs to the Lake Okeechobee Herbert Hoover Dike, as long as Lake Okeechobee lake levels are effectively managed to support the Lake's ecosystem.

Additional language should be inserted that explains the role of Lake Okeechobee as an ecosystem rather than a reservoir. We offer the following suggestions:

Appendix H, pg 271:

> **2008 LAKE OKEECHOBEE REGULATION SCHEDULE**
> Lake Okeechobee is a central component of the Central and Southern Florida Flood Control Project (C&SF Project) and an interconnected regional aquatic ecosystem. It serves multiple functions including flood control, agricultural and urban water supply, fulfilling Seminole Tribe of Florida water rights, navigation, recreation, and fish and wildlife preservation and enhancement. As such, operation of the lake affects a wide range of environmental and economic issues. Lake operations must carefully consider the entire and sometimes conflicting purposes of the C&SF Project. In 2008, the USACE implemented an interim regulation schedule for Lake Okeechobee that addressed concerns about the integrity of the Herbert Hoover Dike and protecting the ecology of Lake Okeechobee by reducing the frequency of high water events.
>
> The dike provides key flood control for developed areas around the lake. The 2008 Lake Okeechobee Regulation Schedule (2008 LORS) regulates the lake approximately one foot lower than previous regulation schedules. Additional information regarding 2008 LORS can be found in the *Central and Southern Florida Project Water Control Plan for Lake Okeechobee and Everglades Agricultural Area* (USACE 2008a) *and the Draft Supplemental Environmental Impact Statement on the Lake Okeechobee Regulation Schedule, Lake Okeechobee, Florida* (USACE 2008b).
>
> As treasure of our ecosystem, Lake must be managed as a lake and not a reservoir. The Restudy (1999; the Central and Southern Florida Project Comprehensive Review Study) identified five performance measures for Lake Okeechobee hydrology, of which one was a spring water level recession

declining from ~15 feet to ~12 feet[i]. The authors noted that the spring recession, "…is the only [performance measure] that relates to seasonal variation in lake levels and that variation is…critical for a healthy ecosystem" (page IV-11). The Restudy's spring recession was further refined into a performance measure now termed the "Stage Envelope," that describes the ecologically-preferred zone that is within six inches of the graphed line between 15.5 feet to 12.5 feet from annual wet to dry seasons, respectively.

Stages between 15.5 and 12.5 feet were selected because this range creates the most benefit to Okeechobee's littoral zone (the marsh community where rooted plants grow). The single most important factor in determining the character of the marsh community is water level fluctuations. Shallower parts of marsh systems thrive with annual drydowns whereas plants in deeper marsh zones are adapted to very infrequent drydowns. Thus, the Stage Envelope between 12.5 to 15.5 feet matches the contours of Okeechobee's marsh[ii]. And although the Stage Envelope is a desirable average, it is beneficial to have inter-annual variation[iii], and occasional excursions, especially drawdowns near 11 feet once a decade or so[iv].

● **Caloosahatchee River and Estuary Minimum Flows and Levels, and Water Reservation**: The River's Minimum Flows and Levels (MFL) Recovery Plan needs expansion beyond just the C-43 Reservoir – the LWCWSP needs to identify this important objective of adding contributing elements of the Caloosahatchee River Watershed Protection Plan, Aquifer Storage and Recovery exploration where geology and budget priorities support it, and dispersed water management and wetland restoration projects. Also:

- Audubon agrees that data collection is necessary to determine whether to update the River's MFL, including due to sea level rise and better quantified basin flows, but the LWCWSP, on page 61, should also include the anticipated outcome of an overdue update of the MFL as allowed by Florida Statute 373.0421(3).

- Audubon also supports an effective Water Reservation for the C-43 West Reservoir CERP project now, and as better data and more basin storage options become available, a future wider basin Water Reservation for the Caloosahatchee River and Estuary. We believe the 2012 LWC update should include a timetable to institute this second phase of a water reservation that protects Caloosahatchee River and Basin water beyond the water protected for the C-43 Reservoir CERP project.

● **Water Conservation Strategies Must Be More Proactive**: There is no good technical reason for permitting any utilities or local governments to allow more than one day per week of landscaping irrigation year round. Citing vague re-use water technical issues confuses the public and sends a very mixed message on water conservation.

● **Climate Change and Consequent Sea Level Rise and Weather Adversity**: LWCWSP does not address sea level rise adaptation planning and strategies adequately – utility infrastructure vulnerability and flooding risks will increase greatly, with corresponding budget impacts that don't appear sufficiently considered. Adaptation strategies to consider: 1) wetland restoration with reestablishment of overland flows; 2) wellfields move inland; 3) elimination of coastal public and private wells; 4) coordination with Army Corps and Regional and Local Planning Agencies using appropriate modeling and land use strategies to retard saltwater intrusion, use

flood control infrastructure to its fullest advantages, and allow for natural coastal ecosystems to migrate inland.

Again, Audubon appreciates the opportunity to participate in the workshops and planning process for this update of the LWCWSP. We recognize the significant work and planning that has gone into this effort. We ask for your consideration of our comments and recommendations as the District revises the Plan in response to public input and review. Comprehensive water supply planning is integrally tied to natural resource protection and restoration, which is fundamental to the sustainability of both human communities and greater Everglades ecosystems.

Sincerely,

Brad Cornell
Southwest Florida Policy Associate
Audubon Florida
bcornell@audubon.org

Carl Veaux
President
Audubon of Southwest Florida
info@audubonSWFL.org

Alan Keller
Conservation Chair
Collier County Audubon Society
ackeller298@comcast.net

Margaret England
President
Hendry-Glades Audubon Society
sta5birding@embarqmail.com

Larry Behrens
President
Peace River Audubon Society
President1@peaceriveraudubon.org

[i] Havens, K., L. Manners, and R. Pace. 1999. Priority hydrologic performance measures for Lake Okeechobee. Pages IV-9 to 15. In Central and Southern Florida Project: Comprehensive Review Study, Vol. II. USACE, Jacksonville.

[ii] Havens, K. E, and D. E. Gawlik. 2005. Lake Okeechobee conceptual ecological model. Wetlands 25: 908-925. a detailed peer-reviewed document of water levels and marsh plant and animal communities on Lake Okeechobee.

[iii] Florida Fish and Wildlife Conservation Commission. 2003. Management of Lake Okeechobee and Associated Estuaries. Lake Okeechobee and Associated Estuary Issue Team.

[iv] Havens, K. E., D. Fox, S. Gornak, and C. Hanlon. 2005. Aquatic vegetation and largemouth bass population responses to water-level variations in Lake Okeechobee, Florida (USA). Hydrobiologia 539:225–237; LORS 2007 Biological Opinion. USFWS.

**From:** DUrso, Chris [Chris.DUrso@charlottefl.com]
**Sent:** Wednesday, September 05, 2012 1:48 PM
**To:** Hoppes, Linda
**Cc:** Couture, Terri
**Subject:** CCU Babcock Ranch WUP

Linda,

As per our conversation, below is language specific to CCU's Babcock Ranch WUP that should be useful for the update.

Thanks

Chris J. D'Urso
Development Coordinator
Charlotte County Utilities
25550 Harborview Road, Unit 1
Port Charlotte, FL 33980
941.883.3530 Phone
941.764.4319 Fax

chris.durso@charlottefl.com
http://www.CharlotteCountyFL.com

---

WUP Summary:

Pursuant to the 2005 Interlocal Planning Agreement between MSKP III, Inc, the Florida Department of Community Affairs, Lee County, and Charlotte County, the Development Agreement Between Board of County Commissioners of Charlotte County, Florida and MSKP III, Inc., and Paragraph 33 entitled "Water Resources of the State Contract," Charlotte County was authorized to apply for a Water Use Permit from the State Lands of Babcock Ranch provided that the withdrawal of water by Charlotte County is solely for public water supply purposes and not for wholesale or retail sale outside Charlotte County. Under these authorizations, Charlotte County applied for the water use permit with SFWMD in 2007 and was issued the 20-year permit (# 08-00129-W) in December 2011 from SFWMD for 3 MGD of raw water as a secondary public water supply.

Because the water supply from Babcock Ranch is a groundwater supply, it provides the desired water supply diversity, consistent with State of Florida Conjunctive Use objectives. As a secondary supply for CCU this source would eliminate the need for the County to purchase water from other PR/MRWSA members at higher rates, and would relieve stress placed upon the natural systems of the area during the minimum flow levels in the Peace River. Additionally, there are no anticipated environmental impacts associated with this use as the water is proposed to be withdrawn from the highly-confined Floridan aquifer. Order-of-magnitude cost estimates for development of the Babcock supply are provided in the table below. Capital costs include construction of the Floridan wells, treatment and storage facilities, delivery system, and concentrate disposal. Annual operations and maintenance (O&M) costs include labor, chemicals, power, membrane replacement, maintenance materials and spare parts, and sampling and monitoring.

**Babcock Ranch Cost Estimate Summary**

| Raw Yield (MGD) | Finished Yield (MGD) | Capital Cost | Cost/Finished 1,000 Gallons | Annual O&M in 2009 Dollars/1,000 Gallons | Capital & O&M Cost/1,000 Gallons[(1)] |
|---|---|---|---|---|---|
| 12.5 | 10.0 | $161M | $3.76 | $1.09 | $4.85 |

| | | | | | |
|---|---|---|---|---|---|
| 5.0 | 4.0 | $71M | $4.16 | $1.09 | $5.25 |
| 3.0 | 2.4 | $57.5M | $5.59 | $1.09 | $6.68 |

urce: Charlotte County Utilities, 2012

Includes annualized capital costs at 5.7% interest and 20 years plus annual O&M divided by an sumed average daily flow of 10 MGD, 4 MGD, or 2.4 MGD respectively.

---

Collier County
Public Utilities Division

September 27, 2012

Ms. Linda Hoppes, AICP, Lead Planner
LWC & UEC Water Supply Plan Manager
SFWMD Water Resources Division
Water Supply Planning
lhoppes@sfwmd.gov

**Re: Collier County Public Utilities Division Staff Comments on the draft Lower West Coast Regional Water Supply Plan**

Dear Ms. Hoppes:

The Collier County Public Utilities Division (Collier County) appreciates the opportunity to provide the following comments on the South Florida Water Management District's (SFWMD's) draft Regional Water Supply Plan (RWSP) for the Lower West Coast. Collier County supports this water supply planning process and recognizes the substantial effort of SFWMD and regional stakeholders in formulating this draft RWSP. These comments are respectfully submitted with a shared commitment to protecting water resources and identifying cost-effective solutions to regional water supply challenges.

Based on our review of the draft Lower West Coast RWSP, we have identified certain incorrect statements that need to be revised as well as a few other topics we believe merit enhanced discussion. First, the draft plan contains a few instances of incorrect information regarding Collier County's utility operations. Second, the draft plan should include additional discussion of innovative utility management strategies that can help meet Lower West Coast water supply challenges and enable long-term, sustainable reliance on traditional water sources for public water supply.

*The RWSP includes incorrect information regarding Collier County's utility operations.*

The draft RWSP includes a section entitled "Public Water Supply Utility Summaries." This section of the plan profiles the Collier County Water-Sewer Department. The profile for Collier County incorrectly states that the utility reuses 86% of its reclaimed water. Over the last five years (2007-2011), Collier County's beneficial reuse has increased to 92%. The profile also appears to omit Collier County's supplemental well field. SFWMD permit #11-00052-W allocates 603 MGY from the Tamiami Aquifer and 1,278 MGY from the Water Table Aquifer.

This permit expires on January 8, 2013 and is currently being processed for renewal. Lastly, the "Projects Summary" portion of the utility profile omits Collier County's Livingston Road ASR project. Collier County presently has a permit to cycle test this ASR well (ASR Permit #11-02767-W) and has long-term plans to use the ASR system to address seasonal variability in reclaimed water demand. While the ASR permit concerns the use of the Upper Floridan aquifer, Collier County is also exploring the feasibility of using the non-drinking water aquifer at its Livingston Road facility. Collier County respectfully requests that this information be corrected in the draft RWSP.

*The RWSP should include additional discussion of incentivizing utility water management actions that benefit the water resource.*

The draft RWSP plan presently does not discuss several water management policies and actions that could benefit water resources in the region as well as promote sound infrastructure investments by Collier County. As you know, Collier County has invested substantial public resources in its public water supply system, including the development of brackish water supplies, the reuse of reclaimed water, and aquifer storage and recovery. Collier County also continues to rely on traditional sources of freshwater, particularly including the Tamiami Aquifer, to serve its customers with sustainable and cost-effective potable water. Because the Tamiami Aquifer is a designated source of limited availability, Collier County's allocations from the Tamiami Aquifer have been limited to five-year water use permit durations. Collier County's infrastructure investments to support freshwater withdrawals, however, are made for 20-year durations. Thus, there is a tension between permit durations and infrastructure investments. SFWMD could alleviate this tension by developing additional innovative policies to promote the effective use of existing water resources and to better recognize those utility management decisions that benefit traditional water resources.

The draft plan should include a discussion of the policies developed by the statewide Reclaimed Water Policy Workgroup. Collier County has supported and participated with SFWMD in the Reclaimed Water Policy Workgroup over the past three years. This workgroup recommended new incentive policies to promote the reuse of reclaimed water.[1] The workgroup recommended the use of "substitution credits" in resource limited areas to promote increased availability and distribution of reclaimed water to replace existing withdrawals of the limited resource. The workgroup also recommended

[1] The Reclaimed Water Policy Workgroup issued a final report on May 7, 2012. This report includes a detailed discussion of substitution credits and impact offsets. *See* Reclaimed Water Policy Workgroup, *Final Report of the Reclaimed Water Policy Workgroup*, 11-14 (2012), available at http://www.fweauc.org/PDFs/Reclaimed_Water_Workgroup_Issues_Final_Report.pdf.

a statewide policy of "impact offsets," which is the use of reclaimed water to offset harmful impacts from withdrawals. Both of these policies were codified in 2012 Laws of Florida, Ch. 150, and the Florida Department of Environmental Protection (FDEP) is presently amending Chapter 62-40, F.A.C., to incorporate the impact offsets and substitution credits policies. These new incentive policies promote reclaimed water management strategies that provide the greatest benefit to the water resource and facilitate sustainable, cost-effective reliance on traditional water supplies by public water supply utilities. Collier County respectfully requests that the draft RWSP include an analysis of these new incentive policies to meet the region's water supply challenges.

In addition to including analysis of the "impact offsets" and "substitution credits" policies, Collier County also recommends that SFWMD include a discussion of other actions that can facilitate sustainable use of traditional water sources, such as the Tamiami Aquifer, in the Lower West Coast. For instance, Collier County relies on brackish water supplies for nearly 60% of its potable water supplies. Collier County is able to use these brackish supplies due to significant public investments in reverse/osmosis treatment. Collier County's use of brackish supplies not only reduces direct demands on the Tamiami Aquifer and other sources of limited availability, but it also creates indirect benefits, because these brackish waters are converted to fresh waters and then often used for irrigation and other activities that recharge freshwater sources. Collier County respectfully requests that the draft RWSP recognize these benefits and encourage public utility water management decisions that enable sustainable, long-term usage of traditional sources, including sources of limited availability.

Lastly, Collier County respectfully requests that the draft plan explore the potential for utilities to partner with agriculture, so that agriculture can rely less on traditional water supplies and enable traditional potable water supplies to still be used for public water supply. These partnerships could include replacing traditional groundwater sources with reclaimed water or collaborative water conservation initiatives where utilities and agriculture are able to maintain conserved water through extended permit durations. According to the draft RWSP, agriculture is the largest water consumer in the Lower West Coast Planning area, and agricultural water use far exceeds all other users combined. The plan also indicates that while public water supply utilities are being pushed to more expensive sources, agriculture continues to primarily rely on traditional freshwater sources. Innovative collaboration between agricultural users and public water supply utilities carries great potential for conserving traditional water supplies, and Collier County requests that SFWMD explore such opportunities in the draft RWSP.

Collier County appreciates the opportunity to provide these comments on the draft RWSP for the Lower West Coast. We look forward to continuing to collaborate with the SFWMD on the water supply planning process and to achieving our shared goals of resource protection and sustainable public water supply.

Respectfully submitted,

G. George Yilmaz, Ph.D., P.E., P.H., R.E.P.
Administrator

CC: Scott Teach, Deputy County Attorney

Mark Elsner, Administrator
Water Supply Development Section, SFWMD

David Childs, Esq., Hopping Green & Sams

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.

*Protecting Southwest Florida's unique natural environment and quality of life ... now and forever.*

September 28, 2012

Linda Hoppes
LWC Water Supply Coordinator
South Florida Water Management District
2301 McGregor Blvd.
Fort Myers, FL 33901

**RE: South Florida Water Management District Draft 2012 Lower West Coast Water Supply Plan**

Dear Ms. Hoppes:

The Conservancy of Southwest Florida, on behalf of our 6,000 members, submits the following comments on the South Florida Water Management District (SFWMD) Draft Lower West Coast Water Supply Plan (LWCWSP). The Conservancy's mission to protect Southwest Florida's unique natural environment recognizes the vital importance of careful water supply planning within the region to ensure quality of life for residents, as well as the preservation of the important ecological attributes of the region. As we have submitted comments in the past regarding the 2012 update to the LWCWSP, we remain concerned with several aspects of the update which remain unaddressed, despite our prior recommendations.

**LWCWSP Should Include Natural Systems as a Use Category for Planning Purposes**

In order to accurately quantify the level of water supply and demand for the LWC, Natural Systems must be considered a user for planning purposes in the water use modeling for the region. Relying on regulatory mechanisms to account for Natural System use is not an adequate solution, as there is no established timeline for meeting these regulatory goals.

Ensuring natural system requirements are met entails quantifying the amount of water needed and presenting it in the same way in which the other use categories are included in Chapter 2. This will facilitate a greater understanding of how all these various use categories interact within the LWC planning area, and also ensures the same level of importance is assigned to the Natural System supply as is bestowed upon the other use categories.

This is done in the Southwest Florida Water Management District (SWFWMD) Regional Water Supply Plan, where seven use categories are identified (as opposed to six) to include Environmental Restoration. This natural systems category is described as "Environmental

restoration comprises quantities of water that may need to be developed and/or existing quantities that need to be retired to facilitate recovery of natural systems to meet their established MFLs."

Since South Florida has many systems that are in need of protection beyond what is typically thought of as those requiring restoration, a more comprehensive term such as "Natural Systems" would seem more appropriate for our region. Therefore, the Conservancy highly recommends that the SFWMD adopt a similar approach to be utilized by the SWFWMD to incorporate Natural Systems as an additional use category in the LWCWSP.

**LWCWSP Should Include Updated Caloosahatchee MFL and MFL Recovery Strategy**

There is abundant scientific evidence that the current Minimum Flow and Level (MFL) established for the Caloosahatchee is insufficient to protect the river from dangerous salinity fluctuations. The fact the currently inadequate MFL continues to be exceeded on a yearly basis does not exempt the SFWMD from establishing an MFL for the Caloosahatchee which is scientifically supported as protective of the river. According to SFWMD staff on November 2, 2010, two and a half additional years of tidal in-flow data was needed to complete the study of the estuary and establish an updated MFL. Therefore, instead of a projected update to the MFL in 2017, the LWCWSP should include an expedited timeline in which the MFL is updated within the next year based upon the scientific evidence already collected. For example, within the SFWMD Caloosahatchee River Watershed Protection Plan document, it states:

> "3.2.2.2 Insufficient Flows from the Caloosahatchee River Watershed
>
> Drainage, loss of storage in the watershed, and urban and agricultural demands for water have decreased dry season flows to the Caloosahatchee Estuary. At times, discharge from the Caloosahatchee River to the downstream estuary ceases entirely and salt water intrudes upstream, with salinities at S-79 often exceeding 10 ppt. These high salinities cause the mortality of brackish water organisms that ordinarily live in this region of the estuary. During such dry periods, a flow of 450 cfs at S-79 is required to maintain salinity less than 10 ppt in the estuary upstream of Fort Myers (SFWMD, 2003a and b; Chamberlain & Doering, 2004; Chamberlain, 2005), which protects SAV and other organisms from salinity-induced stress and mortality."

Additional support for revising the MFL includes the following:

- "Therefore, a minimum flow of 300 from S-79 is not enough. Greater frequencies of flows are needed from S-79 that approaches 500 cfs in order to achieve the intended salinity goals."
- "During low flow conditions the entire system is drier than normal and the downstream contribution is much lower than 150-200 cfs, so 300 cfs at S-79 is insufficient to achieve the MFL salinity criteria."

Therefore, based upon the above cited evidence, there is no justifiable reason that 450 cfs is not being used in this planning document and we request it be revised accordingly.

Likewise, the LWCWSP includes a Caloosahatchee MFL Recovery Strategy that continues to rely solely on the C-43, which is demonstrably deficient to provide enough flow to meet the existing 300 cfs MFL. Non-local projects like those in the Caloosahatchee River Watershed Protection Plan and SFWMD dispersed water management projects, as well as the revisions to the Adaptive Protocols and other means to meeting the MFL should be included in an updated MFL recovery strategy.

We urge SFWMD staff to not further defer putting best available science already available to good use in revising the MFL to 450 cfs for planning purposes, as well as updating the MFL strategy to include other opportunities both operationally (such as the proposed Adaptive Protocol revisions) and through allocation for meeting the natural system needs of the Caloosahatchee River and Estuary.

**Plan Should Not Include Any References to Higher Lake Okeechobee Levels**

The current lake regulation schedule upper limits are not only for flood protection due to the poor condition of the dike, but also critical for maintaining the lake as a natural system unto itself. The current levels operate the Lake at what has been determined as the proper ecological level. Utilizing the Lake as a reservoir by depositing an additional foot of water into Lake Okeechobee for meeting consumptive use needs is not appropriate and would cause significant negative ecological consequences to the Lake in the form of submerged aquatic vegetation (SAV) die-off, as well as adverse impacts to the species that depend on SAV, like the snail kite.

Additionally, it is entirely premature to include such a tenuous proposal in the LWCWSP when neither the environmental community nor other key stakeholders, such as the US Army Corps of Engineers (ACOE), have agreed upon it. An additional foot of water in the Lake as a water supply source for meeting current and immediate projected consumptive use needs should not be included in the LWCWSP. Therefore, any references to raising the upper lake level limit should be removed from this plan before it is finalized.

**Plan Should Utilize More Realistic Residential Water Use Projections**

THE LWCWSP states per capita use in the planning area is 151, down from the previous 2006 plan of 176 (25 gallons less per person per day). This is less attributable to water conservation and more due to the year 2005 being utilized in this plan as the base year for calculating per capita use; a year when we had numerous hurricane and tropical storm events which created larger than normal rainfall and thus, lower than average irrigation needs. This plan document needs to use more realistic per capita numbers that reflect actual per capita usage in normal climatic conditions.

We request that the SFWMD revisit and revise these projections, to ensure the Plan does not create an overly optimistic conservation number that leaves the planning area without enough water allocation to meet actual residential usage and natural system needs.

**LWCWSP Should Include a More Equitable Distribution of Water and More Robust Agricultural Need Projections**

Agricultural projections in LWCWSP have increased since the last update to the Plan - despite a decrease in total acreage - due to estimated conversions to more water intensive crops, such as hydroponics and berries. The Ag demand estimates are twice that of all other users combined, and the Conservancy strongly recommends more robust scientific modeling be conducted to determine a more accurate demand projection. Simply surveying the Ag community for their own estimates is not a sufficiently reliable metric on which to base water allocations.

Meanwhile, the environmental community's projected water use needs for natural systems are not being considered, nor quantitative scientific data that already exists to support such environmental needs. The outcome is therefore one of serious inequity. Before the LWCWSP update is adopted, the Conservancy recommends the SFWMD ensure a more robust demonstration of actual agricultural needs is included as well as more detailed conservation requirements. In addition, we recommend the inclusion of more meaningful placeholders in this Plan for all natural systems.

**Conclusion**

The Conservancy of Southwest Florida appreciates the opportunity to comment on the draft LWCWSP update. We recognize the efforts of SFWMD staff in this complicated endeavor, and hope the environmental community's remaining concerns with the Plan can be addressed expeditiously before the update is adopted. Thank you for your consideration of our comments. Please feel free to contact me at (239) 262-0304 x250 with any questions pertaining to our letter.

Sincerely,

Jennifer Hecker

Director of Natural Resource Policy

Will not be on 6B today

September 12, 2012

*VIA EMAIL*

CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.

1450 Merrihue Drive
Naples, Florida 34102
239.262.0304
www.conservancy.org

Dear SFWMD Governing Board Members:

I am writing on behalf of the Conservancy of Southwest Florida and our 6,000 members in regards to your discussion tomorrow on the Lower West Coast Water Supply Plan (LWCWSP). We ask for your consideration of our following comments.

Plan Should Include Updated Caloosahatchee MFL and MFL Recovery Strategy

The current draft LWCWSP relies on the same deficient Minimum Flow and Level (MFL) and MFL Recovery Strategy. We have been told that the MFL could not be revised until tidal basin data is collected but when we met with SFWMD staff on November 2, 2010 about the status of that effort, we were told that they had 2 years of tidal basin inflow data and only needed 2.5 years more. Therefore, by staff's account, we should be nearing the last few months of data collection. Now, this plan states the MFL will not be revised until 2017; an unacceptable delay. We already have abundant science and real world data already to support 450 as a conservative but more suitable MFL placeholder for planning purposes. For example:

- "Subsequent analysis and documentation (including SFWMD, 2003b; Chamberlain & Doering, 2004) estimated that about 450 cfs is required from S-79 to ensure the minimum flows and levels salinity criteria is achieved under most downstream tidal flow conditions." [1]
- "Therefore, a minimum flow of 300 from S-79 is not enough. Greater frequencies of flows are needed from S-79 that approaches 500 cfs in order to achieve the intended salinity goals."[2]
- "during low flow conditions the entire system is drier than normal and the downstream contribution is much lower than 150-200 cfs, so 300 cfs at S-79 is insufficient to achieve the MFL salinity criteria."[3]

Therefore, there is no justifiable reason in our view that 450 cfs is not being used instead in this planning document, and we request it to be revised accordingly.

Likewise, the LWCWSP includes a Caloosahatchee MFL Recovery Strategy that continues to rely solely on the C-43, which we know is deficient to even provide enough flow to meet the existing 300 cfs MFL. This is completely unacceptable, and together with the lack of revising the MFL evidences a lack of political will to address the current and future need for supplemental flows from Lake Okeechobee to augment the C-43 in meeting the MFL for the river. Non-local projects like those in the Caloosahatchee Watershed Protection Plan and District dispersed water management projects, as well as the revisions to the Adaptive Protocols and other means to meeting the MFL should be included in an updated MFL recovery strategy.

We urge the Governing Board to direct staff tomorrow to not further defer putting best available science already available to good use in revising the MFL to 450 cfs for planning purposes, as well as updating the MFL strategy to include other opportunities both operationally and through allocation for meeting the natural system needs of the Caloosahatchee River and Estuary.

---

[1] Caloosahatchee River Watershed Protection Plan Section 3.4.2 (September 2009)
[2] NE-3 Caloosahatchee Estuary Salinity Envelope (September 9, 2005)
[3] Final Caloosahatchee River (C-43) West Basin Storage Reservoir PIR and Final EIS (September 2007)

Plan Should Not Include Any References to Higher Lake Okeechobee Levels

The current lake regulation schedule upper limits are not only for flood protection due to the dike condition, but also critical for maintaining the lake as a natural system unto itself. Putting an additional foot of water into the Lake, and utilizing it as a reservoir for meeting consumptive use needs is not appropriate and would cause significant negative ecological consequences to Lake Okeechobee (ex. submerged aquatic vegetation die off) and to the species that depend on it (ex. snail kites). It is not acceptable to sacrifice any natural system. Additionally, it is entirely premature and speculative to put such a tenuous proposal, which the environmental community and other key stakeholders such as the US ACOE have not agreed upon, as a water supply source for meeting current and immediate projected consumptive use needs. Therefore, any references to raising the upper lake level limit should be removed from this plan, and we request that you direct staff to do so tomorrow.

Plan Needs to Utilize More Realistic Residential Water Use Projections

THE LWCWSP states that per capita use in the planning area is 151, down from the previous 2006 plan of 176 (25 gallons less per person per day). This is less a factor of water conservation and more due to the year 2005 being utilized in this plan as the base year for calculating per capita use; a year when we had numerous hurricane and tropical storm events which created higher than normal rainfall and thus, lower than average irrigation needs. This plan document needs to use more realistic per capita numbers that reflect actual per capita usage in normal climatic conditions, if not pick a more conservative drier year. We request you direct staff to revisit and revise these projections, to ensure we do not create an overly optimistic conservation number that leaves us without enough allocation to meet real residential usage and natural system needs.

Conclusion

It is not lost on us that the agricultural projections have increased in this LWCWSP despite having fewer and fewer acres in production – apparently based on a survey of the agricultural community as to what their projected water use will be. Meanwhile, the environmental community's projected water use needs for natural systems are not being considered, nor quantitative scientific data that already exists to support such environmental needs. This creates a severe inequity where one user essentially is granted their wish list while the other is being deprived almost completely. We look to the Governing Board to rebalance these interests to create a fairer and more equitable distribution of water - through ensuring a more robust demonstration of actual agricultural needs as well as more agricultural conservation requirements, and the inclusion of more meaningful placeholders in this Plan for all natural systems. Thank you for your time and consideration of our comments, and please feel free to contact me at (239) 262-0304 x250 should you wish to discuss further.

Sincerely,

Jennifer Hecker

Jennifer Hecker
Director of Natural Resource Policy

# Everglades Coalition


1000 Friends of Florida
Arthur R. Marshall Foundation
Audubon of Florida
Audubon Society of the Everglades
Audubon of Southwest Florida
Caloosahatchee River Citizens Association/ Riverwatch
Clean Water Action
Clean Water Network
Collier County Audubon Society
Conservancy of Southwest Florida
Defenders of Wildlife
Ding Darling Wildlife Society
Earthjustice
Environment Florida
The Environmental Coalition
Everglades Coordinating Council
Everglades Foundation
Everglades Law Center
Florida Conservation Alliance
Florida Defenders of the Environment
Florida Keys Environmental Fund
Florida Native Plant Society
Florida Oceanographic Society
Florida Wildlife Federation
Friends of the Arthur R. Marshall Loxahatchee Wildlife Refuge
Friends of the Everglades
Hendry Glades Audubon Society
Izaak Walton League Florida Division
Izaak Walton League Florida Keys Chapter
Izaak Walton League Mangrove Chapter
Izaak Walton League of America
Last Stand
League of Women Voters of Florida
Loxahatchee River Coalition
Martin County Conservation Alliance
National Audubon Society
National Parks Conservation Association
National Wildlife Federation
National Wildlife Refuge Association
Natural Resources Defense Council
The Ocean Conservancy
The Pegasus Foundation
REEF RELIEF
Sanibel-Captiva Conservation Foundation
Save It Now, Glades!
Sierra Club
Sierra Club Broward Group
Sierra Club Calusa Group
Sierra Club Central Florida Group
Sierra Club Florida Chapter
Sierra Club Loxahatchee Group
Sierra Club Miami Group
The Snook and Gamefish Foundation
South Florida Audubon Society
Tropical Audubon Society
The Urban Environment League
World Wildlife Fund


## Everglades Coalition Resolution Urging the SFWMD Water Supply Plan Updates to Protect Water for the Environment and Encourage Water Conservation

WHEREAS, the Everglades ecosystem, spanning from the Kissimmee River Valley to Florida Bay, is a significant national resource and international treasure,

WHEREAS, restoration of the Everglades has commenced to return the abundance of wildlife once found in the Everglades, to recover thousands of acres of marshes and estuarine habitat, and to benefit Florida and National Parks and ecosystem-based economies,

WHEREAS, the National Research Council recently reported that many of the Everglades ecosystem attributes most directly influenced by hydrologic factors continue to decline,

WHEREAS, while we await progress from Everglades restoration, our ecosystems require adequate amounts of water to sustain habitats and temper further ecological deterioration,

WHEREAS, the South Florida Water Management District 2012 water supply plan updates for the Lower East Coast and Lower West Coast articulate the agency's strategy for the next twenty years to update rules, operations, and demand management to protect water for ecosystems in the Everglades,

WHEREAS, the purpose of the SFWMD water shortage management plan is to protect water resources from harm and to assure the equitable distribution of available water resources among all water users including natural systems during times of water shortage,

WHEREAS, the natural systems must be protected from harm under Florida law and should be acknowledged and accommodated as such.

*Therefore, be it resolved:*

1. The Everglades Coalition, with 57 organizations dedicated to protecting and restoring America's Everglades, hereby urges the SFWMD to update the LEC and LWC Water Supply Plans to develop and update rules, plans, and operations to prioritize natural systems for restoration and protection from harm, including the establishment and updating of MFLs, MFL recovery and prevention strategies, water reservations, and Restricted Area Allocation Rules, to increase protections for Lake Okeechobee, Biscayne Bay, the Water Conservation Area, Everglades National Park, Florida Bay, the Caloosahatchee Estuary, the Loxahatchee River, and other waterbodies. These solutions must offer both immediate and long-term benefits.

2. The Water supply plans should be updated to improve water management during water shortages and protect water resources from harm. The SFWMD should focus on improving demand management, especially in agricultural areas, to cause no harm to water resources during droughts that exceed the severity of a one in ten year event, as mandated by law. Water conservation efforts should be prioritized.

Approved 7/27/12

Dawn Shirreffs
National Co-Chair
954-961-1280 x 205
dshirreffs@npca.org

Jennifer Hecker
State Co-Chair
239-262-0304 x 250
jenniferh@conservancy.org

**From** Shea, Eric M **Date** Friday, August 24, 2012 2:39:15 PM
**To** Hoppes, Linda
**Cc**
**Subject** RE: August 28 Lower West Coast workshop

Hi Linda,

I was looking through the document and I identified a minor glitch in the FPL language. In Chapter 6, page 135,there is a sentence that reads "FPL utilizes an assessment method generation and cooling technologies most appropriate for site-specific conditions, including water supply and wastewater disposal. " I believe we need to add the language **incorporating or which incorporates** between method and generation. I know it is a small detail in this large document.

Thanks,

Eric M. Shea
Florida Power & Light Company
Juno Environmental Services
Office (561) 691-2993
Cell (561) 354-8907
Eric.M.Shea@fpl.com

---

**From:** Hoppes, Linda [mailto:lhoppes@sfwmd.gov]
**Sent:** Friday, August 24, 2012 2:15 PM
**To:** Hoppes, Linda
**Subject:** August 28 Lower West Coast workshop

Hi Lower West Coast Stakeholders:

At this time, the District is still planning on having the August 28 Lower West Coast Water Supply Plan Update workshop. A final decision will be made on Monday contingent upon weather conditions.

Linda

*Linda Hoppes, AICP, Lead Planner*
*LWC & UEC Water Supply Plan Manager*
*SFWMD Water Resources Division*
*Water Supply Planning*
*lhoppes@sfwmd.gov*
*(561) 682-2213*

**From:** Sarah Catala [scatala@hendryfla.net]
**Sent:** Tuesday, August 28, 2012 8:55 AM
**To:** Hoppes, Linda; Koehler, Lisa
**Cc:** Shane Parker; Kimberly Arnold; Myra Johnson
**Subject:** Hendry County Comments/Concerns

Linda:

Hendry County has the following comments/questions/concerns on the SFWMD Lower West Coast Water Supply Plan:

- The PWS demands for Hendry County as a whole (Cities of LaBelle and Clewiston included) shown in the SFWMD LWCWSP are about half of those shown for unincorporated Hendry County only in the County's 2010 10-Year Water Supply Facilities Work Plan for the period from 2010-2020. In short, the SFWMD is predicting much lower demands than the County did a couple years ago. (Table A-8 in Appendix A of the SFWMD LWCWSP)
- The SR-82 (Gardinier) Mixed Use Development is not mentioned. This was included in the 10-Year WS Facilities Work Plan with on-site supply or FGUA as the provider. Has the status of this project changed such that it should not be included in the SFWMD plan? West Hendry is listed in the plan although assigned no population or demand since "the service area is not defined."
- No projects shown for Port LaBelle Utilities through 2030. Is the County okay with this? (page 154 of LWCWSP main text)
- Growth within the PWS service area is low in Hendry Co. from 2005-2030: 11% vs. 79% for Glades County during the same period (these #s are all "growth" based on finished water demand). Most of the growth for Hendry Co. comes from domestic self supply (DSS), with 91% growth from 2005 to 2030. In comparison, Glades has 41% growth in DSS. The overall growth rate in Glades is also higher: 37% in Hendry vs. 60% in Glades (Tables A-5 and A-6). Did someone from the County coordinate with anyone at the SFWMD in determining these numbers? I was wondering why there are such differences between the two counties.
- The plan does not seem to acknowledge any of the large proposed developments currently undergoing SFWMD permitting, like South LaBelle Village and Belle Landing.
- Glades County has both more golf course and landscape self supply acreage listed than Hendry from 2010 through 2030 (Tables A-10-12 in Appendix A).

Kim Arnold from Johnson Engineering will be following up with you on these comments today as staff cannot attend the workshop.

Thanks,

Sarah A. Catala
Associate Planner, Hendry County
Office: 863.675.5240
Fax: 863.674.4194
scatala@hendryfla.net

**Mailing Address**:
PO Box 2340
LaBelle, FL 33975

**Physical Address:**
640 South Main Street

LaBelle, FL 33935

---

**From:** Hoppes, Linda [mailto:lhoppes@sfwmd.gov]
**Sent:** Monday, August 27, 2012 10:39 AM
**To:** Hoppes, Linda
**Subject:** The District will be conducting the August 28 Lower West Coast Water Supply Plan Workshops in Naples and Ft. Myers as scheduled

Hi Lower West Coast Stakeholders:

The District is going forward with the August 28 Lower West Coast (LWC) Water Supply Plan workshops in Naples and Ft. Myers as scheduled.

The LWC Water Supply Plan Update Draft Appendices document is being posted on the Lower West Coast website and will be available by close of business today and the link is listed below:

http://my.sfwmd.gov/portal/page/portal/xweb%20-%20release%203%20water%20supply/lower%20west%20coast%20plan

We look forward to seeing you at the workshop(s) tomorrow.

Linda

*Linda Hoppes, AICP, Lead Planner*
*LWC & UEC Water Supply Plan Manager*
*SFWMD Water Resources Division*
*Water Supply Planning*
*lhoppes@sfwmd.gov*
*(561) 682-2213*

We value your opinion. Please take a few minutes to share your comments on the service you received from the District by clicking on this link.

LEE COUNTY
SOUTHWEST FLORIDA

239-533-8109

BOARD OF COUNTY COMMISSIONERS

John E. Manning
*District One*

Brian Bigelow
*District Two*

Ray Judah
*District Three*

Tammy Hall
*District Four*

Frank Mann
*District Five*

Karen B. Hawes
*County Manager*

Michael D. Hunt
*County Attorney*

Diana M. Parker
*County Hearing Examiner*

September 28, 2012

Ms. Linda Hoppes, Planner-Lead
Water Supply Planning Unit
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

**RE: Lee County's Comments on the Draft 2012 Lower West Coast Water Supply Plan Update**

Dear Ms. Hoppes:

Please accept this letter as Lee County's (the "County") comments on the South Florida Water Management District's ("District") above referenced draft of the 2012 Lower West Coast Water Supply Plan Update ("2012 Plan"). Additionally, attached are comments to specific sections of the 2012 Plan.

## I. Role of Regional Water Supply Planning

The 2012 Plan serves as a planning document for future water resource and water supply development projects, many of which have both direct impacts and benefits to the Caloosahatchee River and Estuary ("CRE"). An environmental water supply, of sufficient quantity and quality, is critical to the health and viability of the CRE. Fresh water supply for the CRE is critical for stable populations of flora and fauna. These flora and fauna serve as critical habitat and provide habitat functions for threatened and endangered species.

By law, when existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period (20 years), the District must development a plan to address this water supply gap. The total capacity of the projects included in the plan shall take into account water conservation and other demand management measures, as well as water resources constraints, including adopted minimum flows and levels (MFLs) and water reservations. As a result, the 2012 Plan must consider the needs of the natural systems, quantify those needs, and develop plans and strategies that meet those needs within the 20 year planning cycle. This includes identifying water which may become available, identifying projects or actions to supply water and develop underlying technical data and information for such efforts. Unfortunately, the 2012 Plan falls short of these obligations established by Florida law.

## II. Summary of Lee County's Comments

The following comments are essentially a resubmittal of previous comments that have been provided to the District in writing and during public meetings and workshops. It is our understanding that the District has committed to addressing these comments on the 2012 Plan in writing prior to its adoption by the Governing Board.

Again, the County's overarching goals which should be addressed by the 2012 Plan are:

- Establishment of Demand Estimates and Projections for Environmental Restoration. These Demand Estimates and Projections would include quantities of water necessary to facilitate recovery of CRE natural system to meet its established Caloosahatchee River MFL.

- An initiative to identify and quantify the amount of existing water that may be available from the Caloosahatchee River watershed and the Lake Okeechobee watershed to meet the Caloosahatchee River MFL demand.

- An approach which considers a long-term, step-wise or phased process to achieve the Caloosahatchee River MFL based on examination of certain existing permitted uses and shifting those uses to new sources.

- Identification of the projects to capture, store and treat water providing both water quality and water quantity for the benefit of the CRE. While the C-43 Reservoir is the lynchpin of Caloosahatchee MFL Recovery Strategy, there is no assurance that this project will be realized.

- A process describing how water reservations can encompass water that becomes available within the Caloosahatchee River and Lake Okeechobee watersheds for the benefit of the CRE.

## III. Caloosahatchee River MFL and Recovery Strategy

The focal point of Chapters 3 and 4 and Appendix G is the lack of surface water availability and insufficient storage capacity to meet the needs of the CRE. The current freshwater sources are not adequate to protect the natural system needs in Lee County.

To be sure, protection of our precious natural and water resources is critical to Lee County and its residents, as well as to our tourism industry. While the economic impact of the tourism industry can be measured in dollars and cents, we also benefit from the quality of life to which a healthy ecosystem contributes.

Central to a healthy ecosystem in Lee County is the protection and restoration of the CRE. The lack of freshwater flows during the dry seasons causes significant harm to the CRE and its threatened and endangered species and their habitats. Since its adoption in 2001, compliance with the Caloosahatchee River MFL has consistently not been achieved, resulting in high and harmful salinity levels. Thus, it is imperative that the 2012 Plan include a robust MFL Recovery Strategy that addresses the need to provide for sufficient environmental water supplies for the CRE.

Unfortunately, the draft MFL Recovery Strategy in the 2012 Plan fails to adequately address these needs. Most notably, the elements of the MFL Recovery Strategy fail to meet the standards set forth under Florida Statutes, 373.041. As part of a regional supply plan, the District shall implement a recovery strategy which ***includes the development of additional water supplies and other actions to achieve recovery to the MFL as soon as practicable.*** Further, the recovery strategy shall include ***phasing*** or ***a timetable*** which allow for the provision of sufficient water supplies for all existing and projected reasonable-beneficial uses.

Under the 2012 Plan, the Recovery Strategy relies solely on the C-43 Reservoir and the associated rule development for a Water Reservation for this project. Simply stated, this is not enough. In no way do we intend to diminish the value of the C-43 Reservoir, but all chips are in on a project that under the most optimistic circumstances will not to come to fruition for another 15 years. By any measure, this is not practicable. Within this timeframe, there are numerous interim projects and "other actions" that can be implemented in order to take steps towards recovery. In fact, under Florida Statutes, 373.041(2), such steps shall be set forth in the recovery strategy in a "phasing or timetable" that allows for sufficient water supplies. A proper plan under Florida Statutes, 373.041(2) shall fill in this 15 year gap with other phased actions and/or a timetable containing these actions that can be practicably implemented to move towards achievement of the MFL.

Again, the 2012 Plan simply cites the C-43 Reservoir and the associated Water Reservation rule development. There is no time frame at all for implementing C-43 Reservoir.[1] This is not compliant with Florida Statutes, 373.041(2) and highlights the need for interim actions and contingency plans.

---

[1] *The Recovery Plan does indicate that the C-43 Reservoir Water Reservation rule will be adopted in 2012.*

There are several other actions that the District can and must include in the 2012 Plan and the Caloosahatchee River MFL Recovery Strategy. In fact, the 2012 Plan already mentions several other actions under the "Other Non-MFL Planned Improvements Section" that must be included in the Recovery Plan. These actions include:

1. **Environmental Restoration Demands Estimates and Projections-** The 2012 Plan must include among the other water use categories, demand estimates and projections for environmental restoration. Specifically, the quantities of water necessary to facilitate recovery of the CRE natural system to meet its established Caloosahatchee River MFL must be estimated. Under Florida law, natural systems must be treated equally with existing legal users. Thus, the 2012 Plan must include environmental restoration among the other water use categories (agriculture, public/domestic, industrial, etc.) along with its associated demand estimates and projections. It is axiomatic that a proper plan must first set the goals, and then develop the actions and strategies necessary to meet these goals. How can the District properly plan to meet the goal of restoring the CRE natural system without first quantifying that goal? Additionally, including demand estimates and projections for environmental restoration fits in line with the Florida Department of Environmental Protection's goal of improving the consistency among Water Management Districts' water supply planning.[2]

2. **Water Reservation for the Caloosahatchee River and Estuary-** As we have pointed out during the development of the Water Reservation rule for the C-43 Reservoir, the CRE is in need of a Water Reservation that identifies and reserves from consumptive use the amount of water necessary for the protection of the CRE and ensure compliance with the MFL. In fact, the 2005-2006 Plan included such an action on page 51:

> "The SFWMD is also in the process of establishing an initial water reservation for the Caloosahatchee River and Estuary. This effort will focus on determining the volume, duration and timing of existing flows required to protect fish and wildlife resources within the Caloosahatchee River and Estuary. Under this program, all presently existing legal uses of water will be protected so long as the use is not contrary to the public interest (Section 373.223(4), F.S. The first draft of the initial water reservation criteria is expected by early 2007."

[2] Southwest Florida Water Management District's 2010 Regional Supply Plans include demand estimates and projections for environmental restoration.

However, the 2012 Plan no longer includes this action. Why has this initiative been removed? At minimum, the 2012 Plan must include a comprehensive and holistic initiative to be undertaken by the District that properly locates and quantifies additional surface water in the Lake Okeechobee and the Caloosahatchee River watersheds that can be made available to reserve for the protection of the CRE and ensure compliance with the MFL. This action item would quantify and make available "new water" through reduction in permitted use, expired permits, changes in land use, public lands acquisitions, projects, operational changes or any other means throughout the Lake Okeechobee and the Caloosahatchee watersheds. Recently, the District estimated that nearly a half of an inch of Lake Okeechobee water will become available through reduced or terminated water in the Lake Okeechobee Service Area. This new water must be considered for future reservation in the Recovery Plan. Additionally, the Recovery Plan must include an initiative to account for similar new water in the entire Lake Okeechobee and the Caloosahatchee River watersheds. The absence of the Water Reservation for the CRE is perplexing considering its previous inclusion in the 2005-2006 Plan and its consideration by the District Governing Board as recently as December 2011. At this point, to simply write off the Water Reservation for the CRE in the 20 year cycle is simply short sighted planning.

3. **Adaptive Protocol and Additional Lake Okeechobee Operation Changes**- The recent development of the proposed "Water Supply Augmentation" highlights the ability of the District to change Lake Okeechobee operations in order to create more water in an effort to comply with the Caloosahatchee River MFL. The major source of the water supply for the CRE is Lake Okeechobee and during the dry seasons, the Lake is the only source that can provide the amount of water necessary for the Caloosahatchee River MFL. Such operational changes must be an element in the Recovery Plan.

4. **Additional Storage**- The "Other Non-MFL Planned Improvements" Section of the 2012 Plan states that Dispersed Water Management "has made over 137,000 ac-ft of retention available throughout the Northern Everglades." This program represents an opportunity to store water for the CRE in both the Lake Okeechobee and the Caloosahatchee River watersheds. Such water could be identified and reserved for the CRE as described above. Water farming offers the same opportunity. These additional storage options must be an element of the Recovery Plan.

The Caloosahatchee Basin Storage/Treatment Projects (C-43 Reservoir Phase I and Lake Hicpochee Habitat Restoration) have the benefits of storage. Such storage should be quantified and included as potential phase of the Recovery Plan.

The Lake Okeechobee Watershed Protection Plan Storage identifies the "creation of 900,000 to 1.3 million ac-ft of storage north of the lake through a combination of aboveground

reservoirs, underground storage, and alternative water storage projects on public and private lands." This huge amount of water nearly doubles the amount of water necessary to fully protect the CRE. Why is this storage not considered available for the CRE?

5. **Lake Okeechobee Herbert Hoover Dike Repairs**- The Herbert Hoover Dike repairs are anticipated to be completed within the planning cycle. It is possible that the repairs could create incremental increases in the Lake's operating levels. These incremental increases may be completed prior to the completion of the C-43 Reservoir. Increases in operational levels that maintain the ecology of the Lake can lead to additional water made available for the CRE and must considered the Recovery Plan.

6. **Financing Strategies for C-43 Reservoir**- Because the C-43 Reservoir is dependent upon Congressional action, the Recovery Plan, at minimum, should include additional financing strategies that may fast track this project. By law, the Plan Update must include potential funding sources such as those available under the RESTORE Act, National Oceanic and Atmospheric Administration's Natural Resources Damage Assessment Process (NRDA) and any other potential funding sources must me fully explored.

## IV. Lack of MFL Violation Information

The 2012 Plan does not include details on previous MFL violations and anticipated future violations. The 2012 Plan should clearly set forth the severity of the problem by identifying how many violations and when these violations occurred since the adoption of the Caloosahatchee River MFL. Why is this information not included in the 2012 Plan?

## V. Caloosahatchee River MFL Update

New information has revealed that the current minimum mean monthly flow of 300 cubic feet per second is not protective of the estuarine ecology of the CRE. Thus, even if the C-43 Reservoir is completed, the 170,000 acre-feet of storage from this project will fall far short of the amount of water necessary to fully protect the CRE. It is imperative that the Recovery Plan include the additional actions described above to ensure the flows necessary to create salinity conditions that support a sustainable population of submersed aquatic vegetation in the CRE.

## VI. Conclusion

The 2012 Plan fails to meet the statutory obligation of a regional water supply plan due to the Recovery Plan's sole reliance on the C-43 Reservoir. The Recovery Plan must account for the time prior to construction of the C-43 Reservoir and the possibility that the project will not be

constructed by providing for interims steps and contingency planning. Furthermore, the C-43 Reservoir alone will not remedy the deficient fresh water supply for the CRE. As stated above, this project will only add a fraction of the water necessary for recovery of the CRE. Thus, additional actions and projects are needed in the Recovery Strategy.

In the Order approving the Lower East Coast Regional Water Supply Plan, the District recognized "the importance of contingency planning if the recommended water resource development ... components prove to be insufficient to meet the identified environmental protection...demands."[3] The contingency planning process should identify alternative actions and solutions to address any changed conditions, including additional water resource development projects. The County believes that similar contingency planning and interim steps, including the actions discussed above, must be provided for in the 2012 Plan in order to provide for the necessary environmental water supplies for the CRE, as well as other critical natural systems in Lee County.

Sincerely,

Division of Natural Resources

Roland Ottolini, P.E.
Director

[3] *In the Matter of: Approval of Lower East Coast Regional Water Supply Plan, Order No. SFWMD 2000-117 DAO WU, September 14, 2000.*

## Hoppes, Linda

**From:** Bruce Weinstein [brucemiu@gmail.com]
**Sent:** Friday, September 28, 2012 2:39 PM
**To:** Hoppes, Linda
**Subject:** Comments to LWCWSP

Linda

Great plan. I learned a great deal about the activities in the region. My only comments to the planning document are the following:

Page 59 (page 83 of 222) the last paragraph describes the types of water stored in ASR wells and does not include potable water which is the most common water stored in ASR wells.

Page 67 (page 91 of 222) has an insert that defines Brackish Groundwater and states it is water with dissolved salts above 250 mg/l and less than 19,000 mg/l. I am surprised that the definition of brackish groundwater starts at 250 mgl of TDS. I don't recall ever seeing groundwater with less than 250 mg/l TDS which would make almost every groundwater well brackish except for some very concentrated ones which I guess are saline or brine. The secondary standard for potable water is 250 mg/l for chloride and TDS is 500 mg/l which would imply potable water is brackish (although the definition given is for brackish groundwater). Anyway, I just thought the definition with the 250 mg/l was possibly an error.

I am out of the office today. If you need to contact me you can call my cell phone 239-784-2728

Regards

Bruce Weinstein
Marco Island Utilities

**1567 Hayley Lane, Suite 202**
**Fort Myers, FL 33907**
**Tel. 1 239 481 6494**
**Fax 1 239 481 6393**

Schlumberger
WATER SERVICES

**VIA ELECTRONIC MAIL ONLY**

September 28, 2012

Ms. Linda Hoppes, AICP
Lead Planner
LWC & UEC Water Supply Plan Manager
South Florida Water Management District
West Palm Beach, FL 33406

RE: Comments on Draft 2012 Lower West Coast Water Supply Plan Update

Dear Ms. Hoppes:

Thank you for the opportunity to provide input on the South Florida Water Management District's 2012 Lower West Coast Water Supply Plan Update (2012 Plan Update). Please find three comments below.

**1. Traditional Fresh Groundwater Supplies for Rural Areas**

One of the primary water supply issues identified in the 2012 Plan Update is that "increased withdrawals from the surficial aquifer system (SAS) and freshwater portion of the intermediate aquifer system (IAS) are generally limited due to impacts". Similar language is found throughout the 2012 Plan Update that states traditional fresh groundwater supplies of the "region" or "LWC Planning Area" are inadequate to meet projected water demands. This language is too encompassing and is not particularly valid in large rural areas of the LWC planning area (e.g., Charlotte, Hendry, and eastern Collier), portions of which have an abundance of fresh (traditional) groundwater supplies that can be developed in accordance with SFWMD criteria. The push on existing and future rural communities to develop alternative water supplies is unnecessary and economically burdensome given the availability of traditional fresh groundwater supplies. Alternative water supplies are costly and not always necessary. Please note that Governor Scott recognized the economic needs of these same rural areas through Executive Order No. 11-81, which designated Hendry County and the Immokalee area in Collier County as Rural Areas of Critical Economic Concern. Consideration should be given to the creation of a subplanning area in which the SFWMD recognizes the availability of traditional fresh groundwater supplies in these and possibly other rural areas. These areas are commonly agricultural with existing SFWMD water use permits allocating traditional fresh groundwater supplies for crop irrigation. While water use permits cannot be directly transferred from one land use type to another, the conversion of

these lands from agriculture to another land use results in a surplus of traditional fresh groundwater supply for the new land use.

**2. The 2012 Plan Update is a Plan – Not a Mandate**

Alternative water supplies are clearly an important water supply option in urban areas where water demands are high and potential impacts may exist. However, the 2012 Plan Update should not be misconstrued as a mandate to develop alternative water supplies. Section 373.709(7), Florida Statutes states that:

> *Nothing contained in the water supply development component of a regional water supply plan shall be construed to require local governments, government-owned or privately owned water utilities, special districts, self-suppliers, regional water supply authorities, multijurisdictional water supply entities, or other water suppliers to select a water supply development project identified in the component merely because it is identified in the plan.*

It is recommended that Section 373.709(7), Florida Statutes, be cited in the Executive Summary and in sections titled "Legal Authority and Requirements" or "Water Supply Planning" in Chapter 1. Please note that Chapter 7 of the 2012 Plan Update incorrectly cites this particular subsection of the Florida Statutes. There also appears to be vague and incomplete reference (page 18 of the 2012 Plan Update) to the March 23, 2012 memorandum from Mr. Greg Munson, FDEP Deputy Secretary for Water Policy and Ecosystem Restoration, which states, "water supply development projects included in water supply plans have undergone initial screening for feasibility and have a likelihood of being permittable". Inclusion of only this portion of the memorandum has the potential to promote permitting of only those water supply development projects listed in the 2012 Plan Update. Page 18 of the 2012 Plan Update should also include that portion of the memorandum which states, "water suppliers are not required to choose a water supply development project identified in a regional water supply plan" or again make full reference to Section 373.709(7), F.S.

**3. Mid-Hawthorn Aquifer**

The SFWMD should identify goals in the 2012 Plan Update to better understand the Mid-Hawthorn aquifer, particularly in the southern portion of the Lower West Coast planning area (e.g., Collier County), which locally contains brackish water. The Mid-Hawthorn is cited in SFWMD Technical Publications (Wedderburn et al, 1982: SFWMD Tech Pub 82-1) as being complex and local workers have identified different zones that are hydraulically separated. There are clear differences in the character of the Mid-Hawthorn aquifer across the Lower West Coast planning area. For example, wells constructed in this unit in Collier County (locally termed Hawthorn Zone I) typically flow at land surface due to artesian pressure at rates of 1,000 gallons per minute or more and produce brackish groundwater. In Lee County, the Mid-Hawthorn aquifer is a low yielding unit with fresh groundwater and water levels

Schlumberger WATER SERVICES

several tens of feet below land surface. The lack of understanding has resulted in a reluctance to permit use of the Mid-Hawthorn for withdrawals or storage in the southern portion of the Lower West Coast planning area, sometimes due to a perception that such use will impact Mid-Hawthorn aquifer users 30 to 40 miles away in western Lee County. Opportunities for use of the brackish portion of the Mid-Hawthorn aquifer for water supply or aquifer storage and recover should not be hindered due to mischaracterization of the aquifer.

Thank you again for the opportunity to provide input on the draft of the 2012 Plan Update. We are available to assist you further and answer any questions you might have regarding these comments. Please call me if it would benefit you to meet to discuss any of them.

Sincerely,

David L. Hoffman, P.G.
Hydrogeologist
Schlumberger Water Services USA Inc.

## Hoppes, Linda

**From:** Jim Beever [jbeever@swfrpc.org]
**Sent:** Wednesday, October 03, 2012 1:55 PM
**To:** Hoppes, Linda
**Subject:** RE: Lower West Coast Water Supply Plan Comments due to the District this Friday, September 28, 2012
**Attachments:** Climate change comments for the LWCWSP.docx

I have been in the field working on my WQFAM project and have now had time to respond to e-mails. Attached is my language to help improve and strengthen the Climate Change section of the LWCWP document. Depending on what parts you decide to use I can provide the citations sources or you can find them at http://www.swfrpc.org/content/Natural_Resources/Ecosystem_Services/Vulnerability_Assessment_Final.pdf

Thank you

Jim Beever
Southwest Florida Regional Planning Council
1926 Victoria Avenue
Fort Myers, Florida 33901
Telephone (239) 338-2550 ext 224
Fax (239) 338-2560
E-mail: jbeever@swfrpc.org
Website: http://www.swfrpc.org/

**From:** Hoppes, Linda [mailto:lhoppes@sfwmd.gov]
**Sent:** Monday, September 24, 2012 10:52 AM
**To:** Hoppes, Linda
**Subject:** Lower West Coast Water Supply Plan Comments due to the District this Friday, September 28, 2012

Hello Lower West Coast Stakeholders,

This is a friendly reminder that any comments you may have regarding the DRAFT 2012 Lower West Coast Water Supply Plan Update are due this Friday, September 28, 2012. The link for the three documents (planning, appendices and support) is listed below:

http://www.sfwmd.gov/portal/page/portal/xweb%20-%20release%203%20water%20supply/lower%20west%20coast%20plan

Again, thanks for your participation and support.

Linda

*Linda Hoppes, AICP, Lead Planner*
*LWC & UEC Water Supply Plan Manager*
*SFWMD Water Resources Division*
*Water Supply Planning*
*lhoppes@sfwmd.gov*
*(561) 682-2213*

Climate change comments for the LWCWSP.

Southwest Florida is currently experiencing climate change. The natural setting of southwest Florida coupled with extensive overinvestment in the areas closest to the coast have placed the region at the forefront of geographic areas that are among the first to suffer the negative effects of a changing climate. More severe tropical storms and hurricanes with increased wind speeds and storm surges have already severely damaged both coastal and interior communities of southwest Florida. Significant losses of mature mangrove forest and low salt marsh, water quality degradation, and barrier island geomorphic changes have already occurred. Longer, more severe dry season droughts coupled with shorter duration wet seasons consisting of higher volume precipitation have generated a pattern of drought and flood impacting both natural and man-made ecosystems. Even in the most probable, lowest impact future climate change scenario predictions, the future for southwest Florida will include increased climate instability; wetter wet seasons; drier dry seasons; more extreme hot and cold events; increased coastal erosion; continuous sea level rise; shifts in fauna and flora with reductions in temperate species and expansions of tropical invasive exotics; increasing occurrence of tropical diseases in plants, wildlife and humans; destabilization of aquatic food webs including increased harmful algae blooms; increasing strains upon and costs in infrastructure; and increased uncertainty concerning variable risk assessment with uncertain actuarial futures.

Maintaining the status quo in the management of aquatic ecosystems in the face of such likely changes would result in substantial losses of ecosystem services and economic values as climate change progresses. In the absence of effective avoidance, mitigation, minimization and adaptation, climate-related failures will result in greater difficulty in addressing the priority problems identified in the LWCWSP.

This vulnerability study examines the current climate and ongoing climate change in southwest Florida along with five future scenarios of climate change into the year 2200. These scenarios include:

1) a condition that involves a future in which mitigative actions are undertaken to reduce the human influence on climate change (Stanton and Ackerman 2007),

2) a 90% probable future predicted by the Intergovernmental Panel on Climate Change (IPCC 2007b),

3) a 50% probable future predicted by IPCC,

4) a 5% probable future predicted by the IPCC, and

5) a "very worst" future in which no actions are taken to address climate change (Stanton and Ackerman 2007). This fifth scenario also corresponds with some of the other worst case scenarios postulated by scientists who think the IPCC estimations are under-estimated (USEPA CRE 2008).

This report also assesses significant potential climate changes in air and water and the effects of those changes on climate stability, sea level, hydrology, geomorphology, natural habitats and species, land use changes, economy, human health, human infrastructure, and variable risk projections, in southwest Florida. Among the consequences of climate change that threaten ecosystem services, the most serious involve interactions between climate-dependent processes and human responses to those climate changes.

Depending upon the method of prioritization utilized, some climate change effects will be experienced and can be compensated for in the relative near-term. Other effects with longer timelines will be more costly in habitat impact or human economic terms. There are a number of planning actions that, if undertaken now, could significantly reduce negative climate change effects and their costs in the future while providing positive environmental and financial benefits in the near term.

There are crucial areas where adaptation planning and implementation will be needed in order to avoid, minimize and mitigate the anticipated effects to the natural and man-altered areas of southwest Florida. Some effects, such as air temperature and water temperature increases, will be experienced throughout the region. Others, such as sea level rise and habitat shifts, will occur in specific geographic and clinal locations. In the course of the project 246 climate change management adaptations were identified (Beever et al. 2009) that could be utilized to address the various vulnerabilities identified for the region. Future adaptation plans will identify the management measures best suited for each geographic location.

Monitoring of the effects and results of climate changes will be necessary to assess when and where adaptive management needs to be and should be applied. A critical goal of this monitoring is to establish and follow indicators that signal approach toward an ecosystem threshold that, once passed, puts the system into an alternative state from which conversion back is difficult to impossible. The likely effects of climate change, particularly tropical storms, drought and sea level rise, on southwest Florida ecosystems and infrastructure development are too great for policymakers, property owners, and the public-at-large to stand by and wait for greater evidence before considering strategies for adaptation. It is essential to plan and act now to avoid, mitigate, minimize, and adapt to the negative effects of climate change, and to examine the possibilities of providing benefits to human and natural systems by adapting to the changing planet.

## Altered Hydrology

### Known Hydrologic Changes and Events that Have Occurred

Sea levels in Florida are expected to eventually rise to the degree that saltwater intrusion will threaten the aquifers that currently supply much of Florida's drinking water in low-lying areas. This problem will be exacerbated by increased withdrawals of water for the anticipated increase in Florida's population.

Shallow coastal aquifers are already experiencing saltwater intrusion. The freshwater Everglades recharge Florida's Biscayne aquifer, the primary water supply to the Florida Keys. As rising water levels submerge the land, the low-lying portions of the coastal Everglades will become more saline, decreasing the recharge area and increasing saltwater intrusion (IPCC 2007c). The

South Florida Water Management District (SFWMD) already spends millions of dollars per year to prevent Miami's Biscayne aquifer from becoming brackish (Miller et al. 1989).

Gulf Coast ecosystems are linked by the flow of water from the uplands through freshwater lakes, rivers, and wetlands to the coastal and marine systems downstream. Vast wetland areas of the region require periods of flooding to maintain healthy habitats and sustain food webs. While there remains uncertainty about how global warming will affect rainfall, stream flow, soil moisture, and overall water availability, human consumption of water resources is almost certain to increase as a result of the region's population growth.

Water resources are affected by changes in precipitation as well as by temperature, humidity, wind, and sunshine. Thus, changes in stream flow tend not just to reflect, but to magnify changes in precipitation. Water resources in drier climates tend to be more sensitive to climate changes, and, because evaporation is likely to increase with warmer climate, lower river flows and lower lake levels could be expected, particularly in the summer. If stream flow and lake levels drop, groundwater also could be reduced.

A critical factor in Florida's development, especially in southern Florida, has been availability of freshwater. Although south Florida receives an annual average of 54 inches of rain, annual evaporation sometimes can exceed this amount. Rainfall variability from year to year is also high, resulting in periodic droughts and floods. Competing demands for water — for residences, agriculture, industry, and for the Everglades and other natural areas — are placing stress on south Florida's water resources.

**Potential Future Climate Changes**

Rising air and sea temperatures combined with a rising sea level will change future hydrology. By 2200, the mean sea level is estimated to rise over 177 inches (14.74 feet), inundating most of Monroe County and two-thirds of Miami-Dade County. The Everglades south of I-75, including the Everglades National Park, will no longer be a freshwater ecosystem, causing a catastrophic environmental change for the species inhabiting that area. The incalculable effects on freshwater flows put surface water supplies throughout southern Florida at risk but three main changes can be expected (Stanton and Ackerman 2007). Flooding will result from changes in the intensity of precipitation and will cause stream bank erosion. Changes in the frequency of precipitation and increases in evaporation will cause drought. The sea level rise, lower water levels in the surface and groundwater result in salt water intrusion.

Increases in precipitation, including heavy and extreme precipitation events, affects all land surfaces and receiving water bodies. Precipitation is expected to increase five to 10% over the levels of the 20$^{th}$ century. The altered timing of seasonal hydrologic changes will affect coastlines and wetlands. An increase of freshwater in rivers and estuaries will lead to more severe sediment-loading and flash flooding that results in damage to fish and wildlife resources, human infrastructure, and human safety. Changes in timing of the dry and wet seasons change the flow of pollutants and will affect river discharge balance (University of Washington 2007; USNOAA 2008; SCCP 2005; FOCC 2009; USEPA CRE 2008).

Rising sea temperatures are also expected to increase the frequency of droughts and floods, causing changes to hydroperiod and to water quantity especially during dry periods. The changing timing of seasonal temperature cycles may also disrupt the hydrologic run-off cycle (Peterson et al. 2007). Changes in the volume and intensity of precipitation contribute to erosion, flooding, and run-off at coastlines. Drought from decreased precipitation will cause lower stream flows and result in erosion and subsidence of stream banks (UWCSES 2007; USNOAA 2008; USEPA CRE 2008).

Water constraints are a major threat to the future of Florida's agriculture, by far the biggest user of water. Even the new proposals for sugar cane-based bioethanol will require continuing massive flows of water for irrigation. Changes, even slight ones, in rainfall patterns and amounts may change the agricultural yields of rain-irrigated crops and silviculture directly. Rainfall pattern deviation may alter the spread and severity of plant diseases, pests, and rates of decomposition. Groundwater-irrigated crops are affected as well, due to the variation in water recharge cycles. Changes in rainfall patterns change soil moisture levels which could result in increasing the need for irrigation from groundwater or alternative surface water sources in some areas (Mulkey 2007; Fiedler et al. 2007; USNOAA 2008; FOCC 2009; USEPA CRE 2008).

The agricultural, natural, and cultivated landscape will be negatively affected by the droughts caused by increased atmospheric temperatures. Plant, animal and human communities will suffer from the lowered water tables and deep aquifers. Less water in rivers and reservoirs increases the water supply demands. Subsequent water stress will result in a higher mortality rate for those plant, animal, and human communities from the lack of sufficient water resources (USNOAA 2008; USEPA CRE 2008).

The increased salinity of riverine and estuarine ecosystems is an effect of drought. Increased penetration of saltwater from upstream tidal movement of marine waters will truncate isohaline ecotones. Pollutants from urban runoff are expected to be more concentrated in freshwater systems due to lower water levels. Increased water temperatures and reduced dissolved oxygen will occur as a result of shallower streams. Marine exotics will spread and some freshwater exotics will be advantaged while native species suffer (University of Washington Center for Science in the Earth System 2007; USNOAA 2008; USEPA CRE 2008).

Rising sea levels will lead to increased saltwater infiltration into aquifers, particularly since water levels in the aquifers are dropping and freshwater recharge is diminishing. Groundwater supplies, which provide most of the state's drinking water, will tend to become brackish. Rising sea levels will also block the traditional water flow through the Everglades ecosystem, which is slowly being reconstructed at great expense. Eventually, if sea levels continue to rise, surficial aquifers throughout the state will be threatened with salt water intrusion into community water supplies (Freed et al. 2005; Dausman and Langevin 2005).

Conservation of water uses measures including grey-water recycling and cistern collection. While these measures may offset some of the future water use demand, they have their own environmental consequences, including discharge of nutrient laden waters for irrigation,

increases in breeding loci for *Anopheles* mosquitoes, and more difficult accommodation for future population increase.

New water supplies will increasingly mean new investment in more expensive alternative sources. New reservoirs are being built wherever possible, including underground storage of freshwater in some cases. Wastewater treatment is becoming a growing industry in the state. Many areas have access to brackish groundwater but, while traditional ground and surface water supplies often cost less that $1 per 1,000 gallons, desalination of brackish water can cost up to $3 per 1,000 gallons (American Membrane Technology Association 2007). The drawbacks of desalination include creating large volumes of waste water and requiring large amounts of energy. With the reverse osmosis process, used in almost all existing plants, 100 gallons of brackish water is turned into about 75 gallons of useable water and 25 gallons of brine which is often pumped underground (Reeves 2007). The energy requirements of the process are great as well because such high pressure is require to properly force water through thousands of fine-mesh filters. A reliance on desalination would increase the demand for electricity, which in turn would increase the demand for cooling water in power plants, creating a loop. Despite this technology, it's still less expensive to pipe in freshwater from the mainland (Reid 2007).

The state's first large-scale ocean desalination plant was built for Tampa Bay Water, a regional authority in one of the most water-scarce regions. It has been plagued by technical problems, multi-year delays, and financial overruns, reaching a cost of $158 million by the time it began operation in 2003. The plant hoped to reach its design capacity of 25 MGD of freshwater, with water costs of a little over $3 per thousand gallon, by the end of 2007 (Barnett 2007; Reid 2007). In view of these problems, no one else in Florida is rushing to build a similar facility.

While the Tampa Bay plant is large compared to previous desalination efforts, it is small compared to Florida's water needs. To meet the growth in the demand for water through 2050 (as projected above), 186 Tampa-sized plants would be needed — more than one new plant coming on line every three months from now through 2050.
In short, there are no feasible supply-side options for providing this much water; most of the gap will have to be filled by conservation and reduction in demand.

Even under the best of circumstances — under the rapid stabilization scenario, with minimal damages due to climate change — Florida's economic and demographic growth is headed for a collision with the lack of additional water. The Florida Department of Environmental Protection (FDEP) projects an increase in water requirements of 22 percent by 2025 (FDEP 2007b). Looking farther ahead, if agricultural water use remains constant, since there is little land for agricultural expansion, and if all other water uses grow in proportion to population, then by 2050 the state would need 12,800 million gallons per day (MGD) of freshwater (Stratton and Ackerman 2007). This is a 57 percent increase over water use in 2000, a quantity that appears to be impossible to provide from existing freshwater sources. At the current cost of desalination, $3 per 1,000 gallons (see above), the additional water needed by 2050 would cost almost $6 billion per year — if it were available. Groundwater supplies are already encountering limits. The water level in the Floridan Aquifer has been dropping for decades (Marella and Berndt 2005); it can no longer meet the growing needs of many parts of the state. Meanwhile, the state has turned down Miami-Dade County's request for a big increase in its withdrawals from the Biscayne Aquifer,

which is also under stress; the county will instead be forced to invest in expensive alternatives such as a high-tech wastewater disinfection plant (Goodnough 2007). Surface water supplies are limited in most areas, and will be further constrained in south Florida by the long-term effort to restore the Everglades ecosystem. Floridians, therefore, can look forward to more intensive conservation efforts, such as strict limits on lawn watering, combined with promotion of alternative vegetation that requires less water than a grassy lawn.

Meeting Florida's water needs will be challenging, even in the absence of climatic change. The business-as-usual climate scenario will make a bad situation much worse, with average temperatures rising by 10°F, rainfall decreasing from 54 to 49 inches per year, and sea levels rising by almost four feet over the course of the twenty-first century.

Hotter, drier conditions will increase the demand for water for irrigation and other outdoor uses, while at the same time decreasing supplies. Surface water flows will be diminished by the decreased rainfall and increased evaporation. Groundwater supplies will also gradually diminish, as less rainfall and more evaporation means less water percolating down through the soil to recharge the aquifers. The decreased rainfall will not be uniform and predictable from year to year; rather, there will be more frequent droughts, resembling the conditions of 2001 and 2007. With water levels in Lake Okeechobee and elsewhere dropping under drought conditions, the water supplies for much of south Florida, and much of the state's agriculture, are at risk.