

NATURAL RESOURCES DEPARTMENT MEMORANDUM

Draft

DATE: February 9, 2009

TO: City Manager Judie Zimomra

FROM: Natural Resources Director Robert K. Loffin Ph.D.

RE: Ongoing City of Sanibel Initiatives on Water Quality

The following outline summarizes recent and ongoing City actions related to water quality. These initiatives involve support of restorative projects and legislation, meetings and communication with agencies and elected representatives, water quality monitoring, public education, advocacy and fund raising. Due to the extensive efforts of Council and staff on this complex and far-reaching issue, this summary by no means all-inclusive.

LAKE OKEECHOBEE AND PROPOSED U.S. SUGAR LANDS PURCHASE

Proposed U.S. Sugar Lands Acquisition and Southern Flow-way Design

The City has supported this historic acquisition as revised by the South Florida Water Management District (SFWMD) to include lands only (not facilities such as production plants). This is the only potential project on the table that will have the capacity to handle the critically important 1-1.5 million acre feet of water storage originally proposed to be stored by Aquifer Storage and Recovery (ASR), a now unfeasible proposal. Without this additional storage, the estuaries of the Caloosahatchee and St. Lucie Rivers will continue to face destructive releases of polluted freshwater from Lake Okeechobee for the foreseeable future. Both staff and Council are actively advocating economically viable acquisition plans and are now attending the first workshops that will provide input to SFWMD on the future design and footprint of flow-way, water quality treatment and storage on both U.S. Sugar and other agricultural lands south of the Lake. The City has issued a position statement concerning this proposal highlighting the following priority issues: 1) Following acquisition, SFWMD should retain at least 80% of the current U.S. Sugar land holdings in the S-4 Basin and the Disston Water Control District for the purposes of water treatment and storage before discharge into the Caloosahatchee, instead of swapping or utilizing them for other purposes; 2) The State needs to work with the local communities that may be adversely affected economically by agricultural conversion to develop alternative opportunities and employment in ways that do not add to the nutrient or other pollutant issues for the Lake, connected rivers or the Everglades. This includes rejecting any proposed inland port location that would impede restoration plans or result in additional blockage of water movement to the south.

Status

The City is taking an active role in this process, attending meetings, networking with numerous agencies and providing input for future plans. The acquisition is still in negotiations and a closing date has not been finalized.

Lake Okeechobee Regulation Schedule (LORS)

Completed in 2008, LORS08 is the current plan used by the U.S. Army Corps of Engineers to manage water levels in Lake Okeechobee. Since 2005, the City has been represented on the Planning Development Team (PDT) for the formulation this schedule. This is the best opportunity for the City to provide input on lake management and affect release decisions. In fall 2008, input from the City was instrumental in reducing impacts to the local estuary following Tropical Storm Fay.

Status

City staff continues to participate in bi-weekly (or weekly, during wet periods) Lake Okeechobee management teleconferences with the Corps and numerous stakeholders. Staff intends to pursue continued representation as a new PDT is established in 2009 for the next LORS revision.

Northern Everglades Interagency Team

As a part of the Team, the City has actively participated in prioritizing water quality and water storage projects north of Lake Okeechobee and establishing best uses for local, state and federal funding to improve water quality and increase water storage. This effort is critical as most of the water and nutrients flowing into Lake Okeechobee originate in the Kissimmee River Basin to the north.

Status

Organizations active in this program include the SFWMD's Lake Okeechobee Water Resources Advisory Committee (LOWRAC) and numerous additional stakeholders and agencies. Staff attends update meetings and tracks progress regularly.

Herbert Hoover Dike Repair

The City has consistently supported emergency repair of the dike surrounding Lake Okeechobee, which is currently in poor condition and potentially subject to failure. The threat of dike failure and the potential flooding of surrounding communities has been used as a reason to release massive quantities of polluted freshwater into the Caloosahatchee River. Timely repairs to the dike will enable water managers to maintain higher water levels in the Lake and reduce the frequency of destructive releases.

Status

The Corps is currently making repairs to those areas in the worst condition, but complete repairs may take many years without increased federal funding. The current economic stimulus efforts may provide a potential source of new funds.

Lake Okeechobee Protection and Restoration Initiatives

Restoration of the once great Lake Okeechobee is a complex undertaking that includes multiple jurisdictions overseeing numerous projects, both planned and ongoing. The City is actively supporting and providing input on these projects, including: restoration of the oxbows and wetlands

of the Kissimmee River; increased water storage and treatment of waters flowing into and out of the Lake; advocacy of enhanced flow-ways and conveyance south (see first item regarding proposed U.S. Sugar lands acquisition); establishment and implementation of strict Total Maximum Daily Loads (TMDL) for Lake tributaries; increased regulation and stormwater treatment for existing and proposed agricultural operations and developments along Lake tributaries; polluted sediment removal; and adjacent wetland and buffer lands acquisition and restoration.

Status

Most components of this complex effort are moving forward. Final land acquisitions were recently completed for the Kissimmee River oxbows, initiation of lake muck removal was facilitated by drought conditions in 2007, and compliance with Agricultural Best Management Practices (BMPs) has been increasing.

CALOOSAHATCHEE RIVER BASIN

Caloosahatchee/Northern Everglades and Estuaries Protection Plan

In January 2008, as part of the Northern Everglades and Estuaries Protection Plan, the SFWMD Governing Board approved the Caloosahatchee River Watershed Protection Plan (CRWPP). The protection plan has three components that are geared towards improving the health of the estuary: 1) watershed construction projects, such as construction of stormwater treatment areas, reservoirs, etc.; 2) a pollutant control program aimed at reducing nutrient inputs; and 3) research and water quality monitoring. Staff participated extensively with both the CRWPP Working Group and the Research and Monitoring Working Group. The City recommended five projects, supported by City Council, that would provide the best “bang for the buck” in terms of water quality and water storage benefits to the Caloosahatchee and the estuary. Three of the five projects recommended by the city were incorporated into the “preferred plan” that was approved by the Governing Board.

Status

The plan was sent to the Florida legislature in January 2008 and is awaiting approval and funding.

Caloosahatchee TMDL Establishment and Implementation

The Florida Total Maximum Daily Load (TMDL) Program is a state program required by section 303(d) of the Federal Clean Water Act. It requires that states list all waterbodies that do not meet state water quality standards for their designated use as “impaired” and prioritize restoration efforts based on the level of impairment. Florida’s TMDL program is broken up into five basins. Due to the geographic location of Sanibel, we are primarily concerned with basins two and three, Charlotte Harbor and the Caloosahatchee, respectively. In December 2008, a TMDL of 3,800 metric tons/yr (approx. 8.4 million lbs/yr) of total nitrogen was proposed for the tidal Caloosahatchee. This load is based on a target that would provide adequate light protective of seagrasses in San Carlos Bay. Staff was extensively involved in development of the Caloosahatchee basin TMDL and reviewed and commented on all modeling and other technical documents. The Florida Department of Environmental Protection (DEP) is in the initial stages of developing the Charlotte Harbor basin TMDL and has recently updated their list of “verified impaired waters”.

Status

City staff has been working with DEP to reconfigure watershed boundaries on the island and recently completed uploading all existing water quality data into STORET, the DEP and EPA

water quality storage and retrieval system used for assessing waterbodies' compliance with state water quality standards.

City and Regional Planning Council Basin Nutrient Reduction Initiatives

The City is leading a grass-roots effort to reduce nutrient pollution in the Caloosahatchee Basin by increasing control over major local pollution sources including fertilizer, sewage and stormwater run-off. At the regional level, the Southwest Florida Regional Planning Council (SWFRPC) is encouraging counties and municipalities in the basin to coordinate with state regulatory agencies to address excess fertilizer use, poorly managed and operated package sewer treatment plants, inadequate septic systems, and stormwater management systems that discharge polluted run-off within their jurisdictions (for additional details on this effort see the Regional Urban Water Quality section at the end of this document).

Sanibel was the first governmental entity in the basin to establish a city-wide fertilizer ordinance, requiring a comprehensive public and contractor education plan and a substantial enforcement effort. Education efforts included an educational brochure, DVD, and website numerous presentations to homeowner's associations and civic groups, contractor certification courses, and point-of-sale displays. City staff are also developed nutrient reduction and lake management improvement recommendations for the island's three golf courses. Course managers recently adopted the City's recommendations and are implementing improvements.

Sanibel is one of the first barrier island communities in Florida to recognize the inadequacy of package plants and septic systems for sewage treatment in coastal sandy soils and is nearing completion of an island-wide central sewage treatment system at a cost of over \$70 million. The recent purchase of the failing Sanibel Bayous package treatment plant and its connection to the City's central sewer system is an excellent example of the continuing effort to complete this multi-year project and reduce point source pollution to local waters. Further nutrient reduction benefits can also be achieved when former package plant sites are restored to natural habitats, such as the ongoing wetlands restoration at the former Sea Oats package plant site.

Additional project and legislative initiatives include support for the new water quality treatment area recently purchased in a joint venture between Lee County and the South Florida Water Management District, restoration of Lake Flirt and historic river oxbows, use of filter marshes to treat stormwater run-off prior to discharge, and the acquisition and restoration of remaining wetlands in the watershed.

Status

The City continues to pursue nutrient reduction initiatives on a variety of fronts and support the work of the SFRPC. Fertilizer education and enforcements efforts are ongoing. Following two recent fish kills at the Dunes, staff is working with the course management to accelerate improvement actions. Legislatively, the City continues to monitor potential fertilizer regulations by the State and to oppose any attempt to pre-empt local government from establishing their own fertilizer regulations. Additionally, with funding and permits in place, staff is currently obtaining bids for the restoration of the former Sea Oats package plants site.

WATER QUALITY MONITORING AND RESEARCH

Baseline Data Collection and Analysis

The City is entering its 7th year of collecting monthly estuarine samples in San Carlos Bay, the Gulf of Mexico and Pine Island Sound as part of the Charlotte Harbor National Estuary Program (CHNEP) monitoring grid. The sampling protocol for this program includes collecting samples and direct measurements of multiple parameters including nitrogen, phosphorus, chlorophyll, dissolved oxygen, pH, salinity, fecal coliform bacteria, light penetration, and turbidity. In addition, interior waterways of the island including the Sanibel River and other island waterbodies are tested monthly for similar parameters under the state's National Pollution Discharge Elimination System (NPDES). The City assisted in funding the Sanibel-Captiva Conservation Foundation's (SCCF) River and Estuary Coastal Observing Network (RECON) and coordinates with the SCCF Marine Laboratory on many aspects of water quality monitoring. The RECON water quality monitoring stations have been instrumental in providing real-time conditions of local waterbodies to the Corps and SFWMD and these data have been used effectively to alter Lake release schedules to protocols less damaging to the lower Caloosahatchee River and estuaries. Additional ambient water quality testing for the TMDL, Healthy Beaches, stormwater monitoring and other programs is being done in Sanibel waters by Sanibel Utilities, FDEP, the Lee County Health Department, Lee County and Florida International University among others.

Status

City staff developed and maintains a map of the surface water quality monitoring locations on and around Sanibel. Additionally, staff has recently completed and presented to Council the San Carlos Bay Water Quality Monitoring Status and Trends Report 2002-2008 (a summary of the last 6 years of CHNEP data) and provided an update to Council on the status of the Sanibel River.

Event Response Sampling

As a result of "No-Swimming" advisories issued by the Lee County Health Department for some Sanibel beaches in 2007, the City established and implemented an event response bacterial and nutrient sampling protocol that was conducted by the state certified Lee County Environmental Laboratory. These sampling results were instrumental in suggesting some potential local sources of fecal contamination which are now being acted upon by the City, Lee County and FDEP. Sampling includes testing for *Enterococcus* and fecal coliform bacteria as well as total nitrogen at 22 sites including Sanibel and Captiva waters.

Status

This established protocol will be followed in the case of future events. An advanced DNA molecular analysis technique that includes collecting 1-5 samples near the suspected source and analysis using the PCR method for DNA markers of human *Enterococcus faecium* and human fecal *Bacteroidetes* is also recommended for future sewage source tracking efforts.

Health Related Bacterial Sampling

The City quickly responded to citizen concerns regarding potential health affects of massive piles of red drift algae that accumulated on our beaches in 2006 and the first 5 months of 2007. To assess the human health risk of red drift algae, specifically the presence of human pathogenic bacteria, water and algae samples were collected at 5 locations (Blind Pass Beach, Bowman's Beach Park, Tarpon

Bay Beach, Lighthouse Beach and Dixie Beach). Samples were quantitatively analyzed for *Enterococcus*, fecal coliform, *Campylobacter*, *Clostridium*, *Salmonella*, *Staphylococci*, and *Vibrio*. The only potential human pathogen found at levels of concern were of the genus *Vibrio*. Of the 75 *Vibrio* species known to inhabit Florida marine waters, only 3 are known to be human pathogens. The city contracted with Dr. James Oliver from the University of North Carolina to conduct additional sampling to determine if pathogenic *Vibrio* species were present in the algae, water, and sediments at the same five beach locations. Following sampling and analysis of the data by both Dr. Oliver and the Lee County Health Department, no specific *Vibrio* threats were discovered. Nevertheless, City-issued press releases reminded beachgoers to use common sense and avoid decaying masses of algae both on the beach and in the water.

Status

The City is prepared to initiate additional testing of algae, sediments and local waters for human pathogens if future events warrant.

Legislative Initiatives regarding Human Health

The City is seeking action from the State Legislative Delegation to enhance the Florida Healthy Beaches Program and FDEP's oversight of package sewer treatment plants. Initiatives include strengthening the Healthy Beaches Program by requiring follow-up investigation by FDEP to locate the fecal bacterial source(s) that resulted in a "no-swimming" advisory. Additionally, Sanibel is advocating that deficiencies and/or water quality issues found at package sewage treatment plants be reported to local governments within 3 miles of the plant.

Status

Legislation drafted as a result of this effort did not make it to rule making during the 2008 legislative session. The City continues to actively support this legislation and is working to see it passed in 2009.

Algae Monitoring and Research

As a result of massive accumulations of red drift algae on Sanibel beaches in 2006 and 2007, the City responded with a multi-dimensional effort to develop a response to and understand the cause(s), extent, and potential impacts of the algae bloom. One component of this effort was to investigate actions taken by other communities that have been faced with similar macroalgal blooms affecting local beaches. City staff conducted site visits to the islands of Oahu and Maui, as these islands had recently had very similar challenges with extreme algal deposits on local beaches. Staff was able to meet with local natural resource managers and assess algae removal operations, both on the beaches and in offshore waters. A detailed report from this fact-finding trip is posted on the City's H2O Matters website. The City also initiated a local study of the algae bloom, documenting its nearshore locations and density using underwater video with SCUBA verification. As a result of these efforts, the City applied for and received a FDEP permit to test several techniques for mechanical clean-up of algae on the beach should massive deposits return. Additionally, in April 2007, the City posted a request for a comprehensive algae research project that would investigate the primary locations for algal growth, biology and growth cycles of common species, factors driving algal movement in the water column, nutrient sources contributing to bloom events, decaying algae on the beach and the fate of its breakdown products, etc. A review team of expert biologists including City, US Fish and Wildlife Service (USFWS), FDEP, and Lee County staff selected the best of the four submitted proposals and awarded a 2-year contract to a research team from Florida Gulf Coast University

(FGCU), funded equally by the City, Lee County, the Tourist Development Council and the West Coast Inland Navigation District. The City also received a grant from the USFWS to study the effects of drift algae on shorebirds and sea turtle nesting (ongoing research by SCCF biologists).

Status

Contractors have been secured to experimentally test the environmental compatibility of six algae clean-up methods as a result of a City-generated Request for Proposals in Spring 2007. This work is on hold until algae returns to Sanibel beaches in sufficient quantities to trigger a clean-up. In addition, the 2-year FGCU research project is currently underway. An update to City Council is planned for March 2009.

ADDITIONAL CITY ACTIONS REGARDING WATER QUALITY

Public Education and Advocacy

The City's H2O Matters website continues to provide updated information on the effects of the 2004-2005 freshwater releases from Lake Okeechobee and provides tools for individuals to assist in the statewide efforts to effect necessary change to the water management infrastructure and management protocols. Newsletters, videos, DVDs, press releases, mass mailings, public hearings and legislative and agency head meetings in Tallahassee, Jacksonville, West Palm Beach and Washington D.C. have all been used by the City to educate the public and decision makers on this critical issue and influence governmental policy. Additionally, the City is continuing its extensive effort to educate the public regarding the City's fertilizer regulations, including staff presentations at homeowner's association meetings and other civic groups, educational pamphlet distribution and extensive compliance checks and enforcement actions.

Comprehensive Everglades Restoration Plan (CERP)

The City is actively seeking to accelerate certain projects within CERP. Particularly important is promoting those parts of the project that will enable more water to flow south from Lake Okeechobee, including "Mod-Waters" (bridges and larger culverts under Tamiami Trail/US 41) and "Decomp" (decompartmentalization of water conservation areas) components. Projects that increase water storage for Lake Okeechobee waters are also of critical interest to reduce wet year releases into the Caloosahatchee. Efforts include support for federal funding such as the Water Resources Development Act (WRDA) and subsequent appropriations by Congress and regular coordination of efforts with other involved agencies and environmental entities.

Sanibel River Monitoring and Research

For several years, the Sanibel River has been classified as an "impaired" waterbody under the FDEP TMDL program. City staff have been working on establishing a nutrient budget and determining the source(s) of nutrients contributing to impairment in advance of the State established TMDL. Following the completion of the 5 year status and trends evaluation prepared by staff, additional research is now being conducted. The City contracted with the Charlotte Harbor Environmental Center to conduct a stable isotope nutrient source analysis of the River. The final report has been received and is being evaluated for future implementation of improvements. Staff have also been working in all parts of the Sanibel River drainage basin to improve the island's stormwater

management system including the use of spreader swales, filter marshes, improved pollutant filtration technology and BMPs.

Additional Efforts and Participation in Water Quality Related Meetings not already described above:

- South Florida Water Management District (SFWMD) Lake Okeechobee Water Resources Advisory Committee (LORAC)
- SFWMD Water Resources Advisory Committee
- Caloosahatchee - St. Lucie River's Corridor Advisory Committee
- Southwest Florida Watershed Council –as Board member-Board meetings, Natural Resources Committee, and regular meetings
- South Florida Water Management District Governing Board
- Florida DEP Total Maximum Daily Loads (TMDL) Program meetings for Group 2 (Charlotte Harbor) and Group 3 (Caloosahatchee)
- DEP Designated Uses and Classification Refinement Policy Advisory Committee
- Southwest Florida Feasibility Study Water Quality Sub-team
- SFWMD Caloosahatchee Partners for Restoration
- Sanibel Algae Management Task Force
- Lee County Coastal Advisory Committee – as member
- Charlotte Harbor National Estuarine Program Technical Advisory Committee
- Senator Burt Saunders Environmental Summit
- University of Florida/Lee County Extension Fertilizer Evaluation Forum
- Florida Department of Health Harmful Algal Bloom Symposia
- START (Solutions to Avoid Red Tide)--and other red tide related meetings, workshops and presentations
- Scientific Review Panel and Lower West Coast Watersheds Subcommittee
Regarding SWFL Regional Planning Council Fertilizer Resolution
- Lee County Division of Public Works Algal Turf Scrubbers Seminar
- University of Florida IFAS Best Management Practices for Lawns and Landscapes
- Florida Consumer Fertilizer Task Force Meetings—and document review
- Lee County EROC and Division of Natural Resources
Meetings and Panel Discussions concerning the Proposed Professional Landscape and Fertilizer Management Practices Ordinance

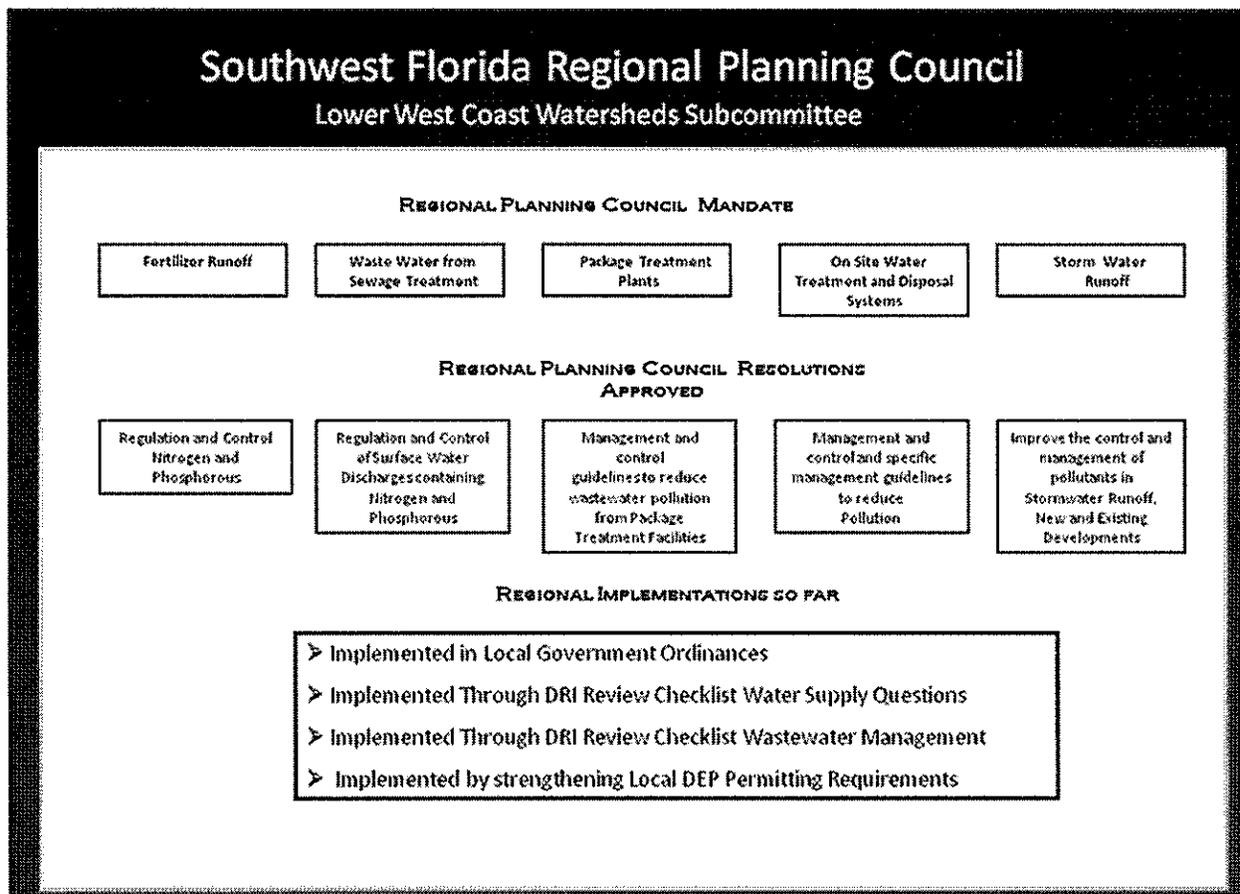
REGIONAL URBAN WATER QUALITY

The Lower West Coast Watershed Subcommittee was formed by the Southwest Florida Regional Planning Council, with a mandate to focus on those pollutant sources which were caused primarily by urban runoff. Those pollutant sources would include

- Fertilizer Runoff, by regulation and control of Nitrogen and Phosphorous
- Waste Water from Sewage Treatment Facilities
- Management and Control of Package Treatment Facilities
- Management and Control Guidelines for Septic Systems
- Improve the control and management of pollutants in stormwater runoff

The county and City Legislators of the six southwest counties of Florida unanimously approved of all these resolutions and agreed that they would form the basis of local ordinances and would provide the basis of a Basin Management Plan to combat local TMDL issues.

THE PROCESS



REGIONAL URBAN WATER QUALITY ACTIONS TO DATE

Adopted Resolution	Key Actions Taken	Implemented by....	Important progress	Benefits to be Derived
Fertilizer Resolution	Ordinances being introduced throughout SW Florida	City and County Legislators	Ordinances in most municipalities throughout SW Florida	Reduce nitrogen and Phosphorous runoff to water bodies
Wastewater Resolution	New permitting requirements being introduced being prepared by DEP Major recommendations Included in Development Regional Impact Check List	All Local municipalities All major developers seeking regional and state approval	New facilities need to conform to more rigid requirements Existing facilities should plan to upgrade to advanced waste water treatment requirements	Reduce nitrogen from being released into rivers
Wastewater Package Plant Resolution	New permitting requirements being introduced by DEP Major recommendations Included in Development Regional Impact Check List Healthy Beach Bill being introduced into State Legislation	All local municipalities All major developers seeking regional and state approval	No new package plants to be permitted on barrier islands , bay islands, sound islands or the like	Reduce nitrogen and other contaminants from being released into water way and on to our beaches
Onsite Wastewater Systems Planning, Treatment and Management Resolution	New permitting requirements being introduced by DEP Major recommendations Included in Development Regional Impact Check List	All local municipalities All major developers seeking regional and state approval	No new onsite waste water treatment systems to be permitted on barrier islands, bay islands, sound islands or the like	Reduce nitrogen from being released into water ways
Stormwater Resolution for New Development and Re-Development	Major recommendations Included in Development Regional Impact Check List	All local municipalities All major developers seeking regional and state approval	Manage waste water onsite and reduce and resource consumption Water managed no more runoff than in natural state	

SUMMARY

- **All municipalities in Southwest Florida have by approving the five key LWSB resolutions have accepted that these will be taken under consideration in drafting rules and ordinances to curb pollution in their cities and counties**
- **All developments of significant regional impact must comply with revised DRI checklist, which now include the key resolution recommendations before receiving endorsement by the SWFRPC as an important step in obtaining state approval with DCA**
- **Several key permitting rules have been strengthened by Florida DEP as a result of resolution approval**
- **The SFWMD have agreed to review several of their permit regulations to align with the key recommendations of the five approved resolutions**
- **Important fertilizer ordinances have been approved by most municipalities in Southwest Florida**
- **It is widely agreed among SWFRPC members that the process used will be the basis of future Estuary Management Plans for this areas TMDL program**

LAKE OKEECHOBEE INFORMATION SHEET

Updated February 2009

ORGANIZATIONS INVOLVED

SFWMD South Florida Water Management District

USACOE United States Army Corps of Engineers

FDEP Florida Department of Environmental Protection

USFWS U.S. Fish and Wildlife Service

FWCC Florida Fish and Wildlife Conservation Commission

LOWRAC Lake Okeechobee Water Resources Advisory Commission (SFWMD)

SWFRPC Southwest Florida Regional Planning Council

CHENP Charlotte Harbor National Estuary Program

SCCF Sanibel-Captiva Conservation Foundation

THE PROGRAMS

CERP Comprehensive Everglades Restoration Plan

December 2000

- Designated 68 projects to address water supply and hydropatterns in the Everglades

Acceler8

October 2004

- Provides a mechanism to speed up water storage projects contained in CERP

LOER Lake Okeechobee & Estuary Recovery

October 2005

- More Immediate projects to improve Lake Okeechobee water quality and relieve estuaries

LORSS Lake Okeechobee Regulation Schedule Study

November 2005

- The Corps established a Planning and Development Team (PDT) which the City participated in to design and implement a new Lake O Regulation Schedule that would overall keep the Lake at a lower level to protect communities around the Herbert Hoover Dike, reduce damaging releases to the estuaries and improve the ecology of the Lake itself. Supported by a Supplemental Environmental Impact Statement (EIS) completed in 2008, the existing schedule developed as a result of this process is now known as LORS08 (Lake Okeechobee Regulation Study 2008)

CRWPP Caloosahatchee River Watershed Protection Plan

January 2008

- As part of the Northern Everglades and Estuaries Protection Plan, the SFWMD Governing Board approved the Caloosahatchee River Watershed Protection Plan (CRWPP). The protection plan has three components that are geared towards improving the health of the Caloosahatchee estuary.

MORE ACRONYMS

AMO Atlantic Multi-decadal Oscillation

- A cooling/warming cycle in the Atlantic Ocean that affects rainfall patterns in the Eastern US. The AMO cycle presents roughly 30-year periods of slightly drier weather in Florida, followed by 30 years of slightly wetter weather.

ASR Aquifer Storage and Recovery

- The process of recharge and storage of water in an aquifer system during times when water is plentiful and recovery of the stored water during times when it is needed.

BMP Best Management Practice

- Management techniques that reduce pollutant loading from an industry or land use.

C-43 Reservoir

- Acceler8 project, designed to provide water storage along the Caloosahatchee River (C-43) in Hendry County, west of LaBelle (maximum storage 160,000 acre feet water at a depth of 12-16 feet), in place by 2011; needs an STA (see below)

DECOMP

- Project to restore flow south through decompartmentalization of water conservation areas

DWI Deep Well Injection – has potential to send large volumes of Lake Water far underground

EAA Everglades Agricultural Area

MOD-WATERS

- Project to restore flow south by installing bridges and larger culverts under the Tamiami Trail/US 41

MFL Minimum Flows and Levels

NPDES National Pollution Discharge Elimination System

RECON River and Estuary Coastal Observing Network

SAV Submerged Aquatic Vegetation

S77, S79 Water Control Structures

- Moore Haven Water Control Structure (S-77), Franklin Lock and Dam (S-79)

STA Stormwater Treatment Area

- Large, man-made wetlands designed to remove pollutants from stormwater runoff

STORET

- FDEP and EPA water quality data storage and retrieval system

TMDL Total Maximum Daily Load

- Maximum amount of a pollutant that a water body can receive and still meet water quality standards

VEC Valued Ecosystem Component- Caloosahatchee VECS include oysters, seagrass and speckled seatrout

WCA Water Conservation Area

- Three areas located in the western portions of Palm Beach, Broward, and Dade Counties. The WCAs make up the largest remnants of the original Everglades (1,337 sq miles). The area, together with Everglades National Park, preserves about 50 percent of the original Everglades.

WRDA Water Resources Development Act

WSE Water Supply and Environment Schedule

- Used by USACE and SFWMD to manage water levels in Lake O, approved in July 2000, will most likely be amended following LORSS process.

Where does Lake O water, phosphorus go? (1996-2005 data)

<u>H₂O</u>	<u>P</u>	
44%	26%	Caloosahatchee Estuary
23%	29%	Agriculture
20%	30%	St. Lucie Estuary
13%	14%	To the Everglades STAs

- Net inflow to Lake Okeechobee in the past 2 years has been 6 feet (~2.7 million acre-feet) in summer.
- During the past 3 years, ~ 2.3 million acre feet of water have been released from Lake Okeechobee.
- The TMDL for phosphorus in the Lake is 140 tons/year.
- An average of 700 tons of phosphorus have entered the Lake in the last 2 years.

Releases

- From 1965-1994, regulatory discharges from Lake O averaged 320,000 acre-feet annually. From 1995-2005, regulatory discharges averaged 1,175,000 acre-feet annually.
- The WSE for Lake O, adopted in 2000, simulated Lake O inflows and outflows for the period 1965-1995, nearly all of these data from the AMO dry cycle. These simulations drastically underestimated Lake O inflows in the subsequent AMO wet cycle that began in 1995.
- There is a need for an additional 1,000,000 acre-feet of water storage to properly manage maximum flow from Lake Okeechobee.
- In 10 days, a Level 1 pulse release to the Caloosahatchee River can lower the lake 0.07 ft. (average of 1,600 cfs/day); a Level 2 release can lower it by 0.10 ft. (average of 2,300 cfs/day); and a Level 3 by 0.13 ft. (average of 3,000 cfs/day).
- In 10 days, a Level 1 pulse release to the Caloosahatchee River *and* the St. Lucie canal can lower the lake 0.10 ft.; a Level 2 release can lower it by 0.14 ft.; and a Level 3 by 0.18 ft.

Effects of Releases on the Caloosahatchee Estuary

- 450 cfs: Minimum mean monthly flow required to maintain salinity envelope for MFL.
- 450 - 2800 cfs: Favorable minimum and maximum mean monthly flow that provides suitable salinity conditions for the development of important benthic communities (e.g. oysters and submerged aquatic vegetation).
- 2800 – 4500 cfs: Mean monthly flow range causing low damaging salinity and excessive nutrient loads in the seaward portion of the estuary.
- 4500 cfs: Mean monthly flows above which cause low damaging salinity and excessive nutrient loads in downstream marine bays. Nutrient loading sufficient to cause algae blooms both inshore and offshore.
- We believe releases to the Caloosahatchee River should not exceed of 800 cfs average over a 30 day period as measured at S-79 during the dry season (November-May), and 2800 cfs average over a 30 day period at S-79 during the wet season (June-October).