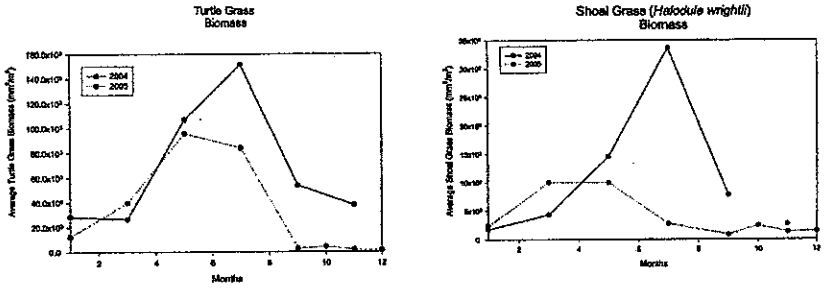
9. **OLD BUSINESS**
   6. Education Component Update
      a. Final Draft of Issue #2 H2O Matters

THE ATTACHED IS A MOCK-UP OF THE H2O NEWSLETTER. ONCE COUNCIL HAS APPROVED THE CONTENT MERRIBETH FARNUM WILL MAKE THE CHANGES AND COUNCIL WILL SEE THE REVISED ISSUE BEFORE YOU ADJOURN

Sickened Seagrasses



2004-2005 Seagrass Biomass in lower Caloosahatchee Estuary and San Carlos Bay. Credit for the datalgraphs should go to Jaime Greenawalt, Research Associate

Paragraph on history MBF Dr Loflin to surrounding Sanibel define our island community. The quality of our waters, and the marine life within, is now at risk because of massive and prolonged water discharges from Lake Okeechobee into the Caloosahatchee River. These discharges contain heavy nutrient loadstracks: I) through publidefine our island community. The quality of our waters, and the marine life within, is now at risk because of massive and prolonged water discharges from Lake Okeechobee into
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We're Asking For Your Help

You can help make our message to the Governor and other key leaders very clear by sending a postcard. We've included a tear-off postcard to the Governor that you can sign, add a stamp, and mail. We've also provided contact information for two other important people who need to hear from you:

Carol Wehle, Executive Director
SFWMD 3301 Gun Club Road,
W. Palm Beach, FL 33406

Colonel Robert M. Carpenter,
District Commander U.S.Army
Jacksonville District Corps of
Engineers, _____

701 San Marco Blvd., Jacksonville, FL 32207

Thank you for taking the time to help save our estuaries.

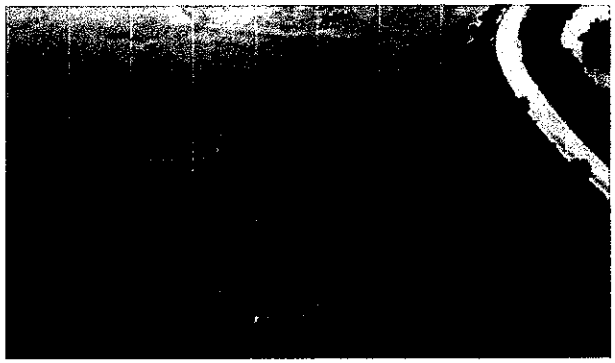
Water releases from Lake Okeechobee into the Caloosahatchee River are causing severe damage to SW Florida estuaries. Using marine seagrasses as a gage, the impacts from excessive releases are alarming.

As citizens, we are asking that you force the U.S.Army Corps of Engineers and SFWMD to change the release schedule so that releases NEVER exceed an average of 800 cubic feet per second in a pulse release in winter months and 2,800 cubic feet per second in summer months as measured at the Franklin Locks.

Changes are needed NOW while there still may be an opportunity for seagrasses to recover. Any delay at this point will be devastating.

_____
SIGNATURE

Algae Invasion



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You can help push key leaders into action. Simply sign and tear off the attached postcard, add a stamp, and mail it to the Governor's office.

Place Stamp Here

Governor Jeb Bush
The Capitol
Tallahassee, FL 32399-0001

Printed on 10% PCW recycled paper using soybean ink

City of Sanibel
800 Dunlop Road
Sanibel, FL 33957

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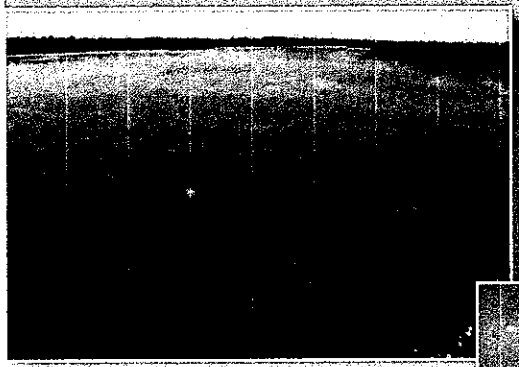
March 2006 Visit the City of Sanibel Website at www.mysanibel.com Issue 2



Refuge Devastated

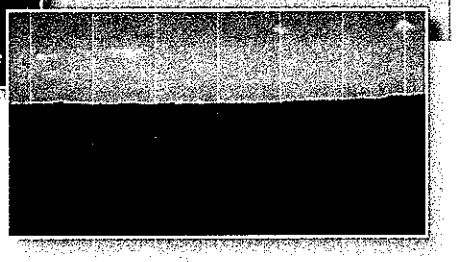


Photo captions for both photos gos here. hore on Sanibel beaches in Fall '05. a severe red tide algal bloom killed h a severe red tide algal bloom killed h a severe red tide algal bloom killed h a severe red tide algal bloom killed h a severe red tide algal bloom killed h a severe

Impacts to the J.N. 'Ding' Darling National Wildlife Refuge

The J.N. "Ding" Darling National Wildlife Refuge, one of the jewels of Sanibel, is threatened by an extensive algae bloom that ensued recent high-volume freshwater releases from Lake Okeechobee. The refuge contains over 6,400 acres of mangrove forest, submerged seagrass beds, cordgrass marshes, and West Indian hardwood hammocks, which is home to over 220 bird species. Currently, green filamentous algae covers many of the seagrass beds and sand flats that wildlife depend on as foraging areas. Fresh water releases from Lake Okeechobee have affected the salinity and nutrient levels in the waters throughout the Refuge and could have long-term impacts on seagrasses and compromise fish and bird populations for which the refuge is famous.

Refuge staff fear that the algae that is currently blanketing hundreds of acres of seagrasses could have long-term consequences on fish and bird populations that attract over 850,000 visitors annually. The dense mats of algae covering seagrass beds, which reduce sunlight, could potentially destroy them displacing fish or lowering dissolved oxygen concentrations in the water resulting in fish kills. A loss of fish could devastate bird populations, the refuge's main attraction.

Oyster Beds

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Front Page

Headline: Refuge

Impacts to the J.N. 'Ding' Darling National Wildlife Refuge

The J.N. "Ding" Darling National Wildlife Refuge, one of the Jewels of Sanibel, and the second most visited Refuge in the U.S., is threatened by an extensive algae bloom that followed recent high-volume freshwater releases from Lake Okeechobee. The refuge contains over 6,400 acres of mangrove forest, submerged seagrass beds, cordgrass marshes, and West Indian hardwood hammocks, and is home to over 220 bird species. Currently, green filamentous algae covers many of the seagrass beds and sand flats that wildlife depend on as foraging areas. Fresh water releases from Lake Okeechobee have affected the salinity and nutrient levels in the waters throughout the Refuge and could have long-term impacts on seagrasses that could compromise fish and bird populations for which the refuge is famous.

Local biologists fear that the algae that is currently blanketing hundreds of acres of seagrasses could have long-term consequences on fish and bird populations that attract over 850,000 visitors annually. The dense mats of algae covering seagrass beds, which reduce sunlight, could potentially destroy them displacing fish or lowering dissolved oxygen concentrations in the water resulting in fish kills. A loss of fish could devastate bird populations, the refuge's main attraction.

Also on Box on Front Page

Oyster Industry Suffering

Scientists indicate that due to excessive freshwater releases this past summer and fall, ALL of the oysters at the mouth of the Caloosahatchee River near Shell Point and upriver from that point ARE DEAD. Details inside.

Sickened Seagrasses

Seagrass beds represent a major submerged aquatic habitat within the Caloosahatchee Estuary providing food and shelter for a myriad of marine and estuarine organisms, however these highly productive ecosystems are being altered by excessive freshwater flows from Lake Okeechobee. Recent high-volume discharges down the Caloosahatchee have triggered massive algal blooms reducing sunlight to the seagrass beds throughout San Carlos Bay and have lowered the estuary's salinity or salt content. These changes in estuarine conditions can greatly reduce productivity of seagrass beds by reducing their ability to provide critical food and shelter to other estuarine organisms that depend on them.

Seagrasses serve several important ecological roles including providing food or shelter for thousands of marine organisms (including invertebrates, fish, water fowl, sea turtles,

and manatees). Seagrass beds help prevent coastal erosion by binding sediments with below-ground root systems and by reducing wave energy and the speed of underwater currents. The three most common seagrasses in waters surrounding Sanibel include Turtle grass (*Thalassia testudinum*), Shoal grass (*Halodule wrightii*), and Manatee grass (*Syringodium filiforme*).

Effects of Excessive Nutrient Loading on Seagrasses

Large spread algal blooms, similar to those that we are currently experiencing, are a very negative side effect of excess nutrients delivered to coastal waters. Many algae are microscopic, such as single-celled phytoplankton that are measured during water quality sampling runs as chlorophyll-a. Larger and colonial "macroalgae" species may be easily seen by the naked eye and may be either free to drift with the tide or be attached to other organisms or bottom features such as rocks. Many species of algae have lower light requirements than seagrasses, so algal growth is typically limited by the availability of nutrients in the water column. Increased numbers of "microalgae", or phytoplankton, often give the water an opaque, greenish appearance. A bloom of macroagae may result in piles of rotting "seaweed" on the bottom in coastal waters or on the beaches. Such undesirable increases in algae indicate that the system is undergoing human-induced eutrophication or an unnaturally rapid buildup of organic matter and nutrients.

In coastal systems, as in many other ecosystems, primary production is often limited by the availability of nutrients. Of all the essential nutrients, nitrogen and phosphorus most often limit the growth of primary producers such as algae. Nitrogen is a key component in chlorophyll, the green pigment in primary producers that absorbs sunlight during photosynthesis. The South Florida Water Management District (SFWMD) staff has established chlorophyll-a resource-based targets of 20 μg/l (micrograms per liter). The Florida Impaired Waters Rule states that an estuary is impaired if the annual mean chlorophyll-a concentration is greater than 11 μg/l. These targets are anticipated to be achieved if Total Nitrogen (TN) concentrations are equal to or less than 1.0 mg/l (milligram per liter) and Total Phosphorus (TP) concentrations of less than or equal to 0.15 mg/l are achieved. The current nutrient levels in the estuary ranges from 1.085-1.65 mg/l TN and 0.121-0.14 TP. According to SFWMD biologists, current TN concentrations in the estuary exceed the Florida Department of Environmental Protection's target and in part may explain the reason for algaebloom occurrences.

Increased amounts of phytoplankton or macroalgae may indirectly lead to the loss of seagrass. Increased amounts of algae remove a large percentage of the sunlight that would otherwise reach seagrasses for photosynthesis. This lack of suitable light penetration into the water column is probably the major cause of damage to seagrasses.

Effects of Salinity on Seagrasses

In addition to the indirect nutrient effects that result in reducing light to seagrasses, high freshwater releases from Lake Okeechobee can directly reduce the salt content or salinity in the estuary. These reductions in salinity can affect the growth and overall productivity of seagrasses. The optimum salinity range for shoal grass is between 20-35 parts per thousand (ppt) of salinity and the optimum range for turtle grass is between 24-35 ppt. SFWMD models for the Caloosahatchee show that flows greater than 2,800 cfs can lower salinities to 6 ppt upstream of Shell Point, which lower shoal grass densities in the lower estuary and flows greater than 4,500 cfs put salinity values at 20ppt or below in San Carlos Bay affecting turtle grass densities.

Impacts to seagrass habitat often have widespread impacts because they provide important habitat for other estuarine and marine organisms. As seagrasses are lost, animal numbers may decline because they rely on seagrasses for protection from predators or because they rely on plants and animals within these ecosystems for food. These animals include commercially valuable invertebrates (such as stone crab, blue crab, shrimp, clams and snails), and other smaller animals that are important in the diet of numerous fish species.

Effects of Excessive Freshwater Releases on Oysters

The eastern oyster (*Crassostrea virginica*), which is found in the lower Caloosahatchee Estuary, provides food and physical habitat that is utilized by other organisms for refuge and foraging sites. In addition, oysters have the ability to filter out pollutants and particulate matter from the water column, therefore improving water quality. A single individual oyster has the ability to filter up to 8 gallons of water per hour. Due to their important role in the estuarine ecosystem, they have been identified by the South Florida Water Management District as a "Valued Ecosystem Component". Excessive freshwater releases from Lake Okeechobee during during any time of the year but especially summer months, a period when oysters are spawning, are harmful to both adult and juvenile oysters. River flows between 500-2000 cfs will have been found to result in optimum salinities (~15-25 ppt) for oysters and sustain and enhance oyster populations in the Caloosahatchee Estuary. Recent communications with Dr. Volety indicate that due to excessive freshwater releases this past Summer and Fall, all of the oysters at the mouth of the Caloosahatchee near Shell Point and upriver from that point are dead.

References:

Chamberlain, R.H. October 4, 2005 SFWMD Staff Memo: Provisional Caloosahatchee Estuary Algae Bloom and Chlorophyll-a Performance Measures.

Hauxwell, J., C. Jacoby, T.K. Frazer, and J. Stevely. 2001. Nutrients and Florida's Coastal Waters: *the links between people, increased nutrients and changes to coastal aquatic systems*. Florida Seagrant Technical Publication SGEB-55. University of Florida, Gainesville, Florida. 9 pp.

National Research Council.2000. Clean Coastal Waters-Understanding and Reducing the Effects of Nutrient Pollution. National Academy of Sciences. Washington, D.C. 405 pp.

Volety, A.K. and S.G. Tolley. 2003. Effects of seasonal and water quality parameters on oysters (*Crassostrea virginica*) and associated fish populations in the Caloosahatchee River- Interpretive/Final Report. Florida Gulf Coast University, Ft. Myers, Florida. 59 pp.

On back:

The issue will also include a tear-off Postcard to Governor, along with contact information to send a similar message to U.S. Army Corps Colonel Robert Carpenters and SFWMD Executive Director Carole Wehle:

Suggested Postcard text:

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