



Southeast District
Surface Water Ambient Monitoring
Ecosummary

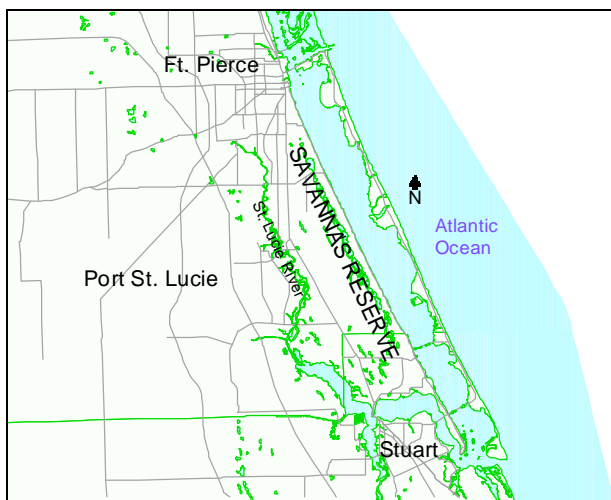
Savannas State Reserve

St. Lucie and Martin Counties
March, 1997



The Savannas State Reserve is a 4,600-acre, ten mile long managed environmental area extending from Fort Pierce to Jensen Beach in St. Lucie and Martin counties. The Reserve includes the best remnant of Florida's east coast savannas.

During the last 15 years, land has been purchased to protect the Reserve through state and local preservation plans. These purchases will eventually total 6,000 acres at a cost in excess of \$20 million.



A Vulnerable Marsh Ecosystem

Historically, nearly all the water entering the Savannas marsh was from rainfall. Accordingly, the water in the Reserve is low in nutrients and other dissolved substances. Such ecosystems are classified as “oligotrophic”. Over the thousands of years the Savannas has existed, a unique assemblage of plants and aquatic animals developed which thrives in the oligotrophic marsh system. Because the waters of the Savannas are so pure, the introduction of even small amounts of pollution can have drastic effects.

Stormwater and the Savannas

Beginning in the 1950's, the area west of the Savannas began to be developed from natural pine flatwoods into residential communities. The first major development in the Savannas ecosystem area was the Indian River Estates subdivision created by General Development Corporation. Indian River Estates was designed to achieve drainage and flood control by discharging runoff directly into the Savannas without treatment.

Subsequently, the western drainage basin has been further developed. Newer developments such as East Port St. Lucie use the Savannas for stormwater disposal. Due to changes in laws and increased environmental concern, East Port St. Lucie was required to construct an advanced stormwater treatment system.

Stormwater runoff carries a high concentration of certain pollutants. Among these are phosphorus which promotes plant growth. Addition of phosphorus to wetlands (e.g., the Everglades) has been shown to alter the kinds and amounts of plants that grow there. These changes in water quality and the plant community result in changes in aquatic animal community. Thus additions of stormwater alter the unique character of the Savannas marsh ecosystem.

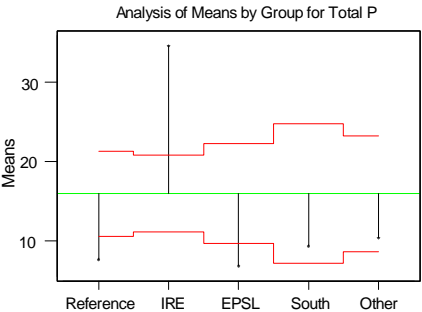
Examples of Stormwater Effects on Savannas Biota

In cooperation with the National Oceanic and Atmospheric Administration, the FDEP Ambient Monitoring Program carried out a study (*Stormwater Impact on the Savannas State Reserve*: in press[Ⓢ]) to investigate the effects of stormwater on the Savannas ecology. This study found that sampling sites within the Savannas fell into five groups of shared biological similarity.

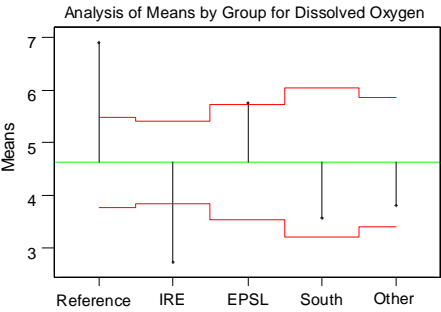
[Ⓢ] A report of the Florida Department of Community Affairs, Florida Coastal Management Program, pursuant to National Oceanic and Atmospheric Administration Award No. 96-CZ-15-13-00-16-030. The views expressed therein are those of the authors and do not necessarily reflect the views of the State of Florida, NOAA or any of its subagencies. March, 1997

In the following Analysis of Means graphs, the green central line denotes the overall mean (average); points beyond either red line denote significant differences with 95% confidence. The labels along the bottom refer to the 5 groups of sites:

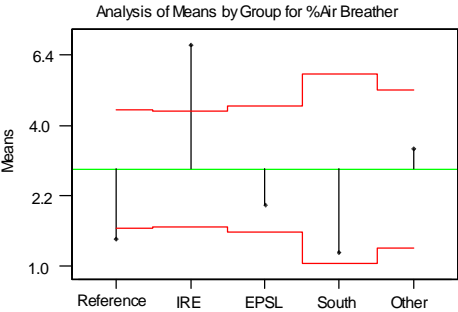
- Reference - natural
- IRE - near Indian River Estates
- EPSL - near East Port St. Lucie
- South - sites near Jensen Beach
- Other - the remaining sites



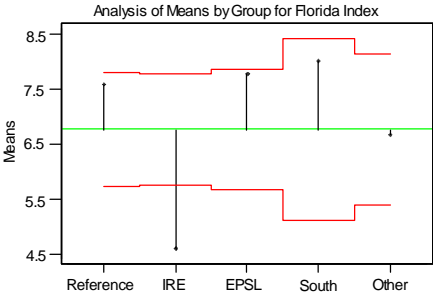
Total phosphorus is highest near Indian River Estates (IRE) which has no stormwater treatment. Increased phosphorus “fertilized” the Reserve, promoting undesirable growth of nuisance plants. These plants, such as cattail, are not normally present in the Savannas. The resulting profusion of plants increased leaf litter and other plant detritus. This debris consumes oxygen as it decays.



Thus, dissolved oxygen is lowest in the Savannas near Indian River Estates. As a result of these changed conditions, some organisms indigenous to the Savannas no longer survive in this area.



In these areas of low dissolved oxygen, organisms capable of breathing air have a distinct advantage. This altered species community of the Savannas is an example of violations of state rules due to stormwater impact on the Reserve’s aquatic biota.



The preceding graph shows that Florida Index is lowest near Indian River Estates. The Florida Index is a measure of the number of species considered to indicate good water quality. Adjacent to Indian River Estates the number of clean water organisms is low.

East Port St. Lucie possesses a modern stormwater treatment facility. Although less affected than near Indian River Estates, the Savannas ecosystem is so fragile that treated stormwater from East Port St. Lucie had a measurable effect on water quality. A few of the samples from the East Port St. Lucie stormwater outfalls indicated relatively high levels of phosphate were released to the Savannas particularly during heavy rain events. An invasion of nuisance vegetation (e.g., cattails) near the outfalls was observed following the development of East Port St. Lucie.

Recommendations

Biological communities in the area of the Savannas adjacent to Indian River Estates are degraded due to the introduction of untreated stormwater. St. Lucie County, in cooperation with the South Florida Water Management District and FDEP, is exploring ways to retrofit this subdivision with adequate stormwater controls.

The area adjacent to the East Port St. Lucie stormwater outfall remains relatively unimpacted. However, to avoid further encroachment of nuisance plant species and other undesirable changes due to releases of nutrients, the existing stormwater treatment system should be regularly maintained.

For Further Information

Contact Greg Graves or Doug Strom of the Southeast District of the Florida Department of Environmental Protection, Surface Water Ambient Monitoring Program, at 561/871-7662.

Direct Internet email to:
GRAVES_G@WPB1.DEP.STATE.FL.US
STROM_D@WPB1.DEP.STATE.FL.US