



# GROWTH AND CONFLICT MANAGEMENT

## NATURAL RESOURCE ISSUE: LAKE OKEECHOBEE WATER QUALITY AND IMPACTS TO THE FLORIDA EVERGLADES

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The natural resource issue for this first session was the conservation and restoration of Lake Okeechobee and its watershed. We also discussed larger-scale issues related to upstream (Kissimmee chain of lakes) and downstream (Everglades) components of Lake Okeechobee, as most water resources in South Florida are hydrologically connected. The result of this connectivity, is upstream land uses can and do impact areas downstream. At present, the phosphorus load entering Lake Okeechobee varies between 500 and 600 metric tons per year. Historically, most phosphorus came from sub-



Lake Okeechobee, north side.

basins dominated by agriculture; however, today the land uses within the watershed are changing. It is hoped that by 2015, the phosphorus load entering the lake will be about 140 metric tons, which is equal to an in-lake target phosphorus concentration of about  $40 \mu\text{g L}^{-1}$ . This was legislatively mandated by the Lake Okeechobee Pro-

tection Act of 2000. Some of the topics discussed during the first session included:

- historical aspects of how the Okeechobee-Everglades landscape functioned (hydrologically)
- how it presently functions
- present impacts on water quality due to land practices and changes in land uses
- stakeholders involved in the restoration and management of water and its quality within the Okeechobee watershed and Florida Everglades water storage and supply.

## NRLI WELCOME AND INTRODUCTIONS

### NRLI FELLOWS

The first introduction was: quick! We sketched a map of the USA (with a very LARGE Florida), Europe, and Africa with tape on the ground. The group, without any prior personal introductions,

tried to collaborate to do this task. We succeeded, but there was a lot of initial confusion and hesitation.

We then introduced ourselves to the group by walking around the map, while telling and showing the group where we grew

up, our first natural resource job, our current employment, and describing a scent that reminds us of home. This introduction instantly brought the group together. People were surprised to see how much of our life experiences over-

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### NRLI TEAM LEADERS

Roy R. Carriker  
Bruce Delaney  
Jonathan Dain  
Marta Hartmann  
Robert M. Jones  
Burl F. Long  
Tom Taylor

### 2006 NRLI FELLOWS- Class VI

Dan Armstrong  
Curtis Brown  
Sarah Carte  
Scott Christmas  
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Ed Dunne  
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### Session I Summary

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## NRLI WELCOME AND INTRODUCTIONS CONT. PAGE 1

lapped.

Dr. Burl Long (NRLI project team) formally welcomed the participants to the 2006 Florida Natural Resource Institute (NRLI). He gave us a brief history of the program and described how it evolved during the last six years.

Next, we wrote out and discussed our expectations of the NRLI experience. Generally, participants want to develop personal skills to help collaborate and facilitate

growth management within in Florida and promote the wise use of natural resources.

### WHAT IS NRLI?

Dr. Roy Carriker (NRLI project team) presented an overview of NRLI. He outlined the fundamental concepts and the NRLI template for increasing collaboration between stakeholders in an effort to draw consensus on natural resource issues. He described the NRLI process through an example of multiple competitive stakeholders using a recreational public

forest. This example illustrated how a consensus was agreed upon by stakeholders. The subsequent successful zoning and management of forest resources is now being implemented by the forest managers.



Burl Long, NRLI Team Leader.

## EVERGLADES RESTORATION

Dr. Boyd Gonsalus (South Florida Water Management District) presented detailed aspects of some of the restoration efforts for the Kissimmee chain of lakes, Lake Okeechobee, and the Everglades. Most of the restoration efforts are components of the Comprehensive Everglades Restoration Program (CERP). The CERP hopes to restore and preserve the Everglades system and enhance and maintain water supplies. It was recently allocated eight billion dollars from Congress to do so. To fast track some of the restoration projects being undertaken within CERP, the ACCELER8 program was devised. As the name suggests, there are eight major programs that include storm water treat-

ment areas, reservoirs, and wetland restoration regions. Dr. Gonsalus stated that the ACCELER8 projects hope to achieve 50% of the total amount of water storage required under CERP.

Key issues and challenges faced by CERP and ACCELER8 include:

- Recent frequent hurricanes have dramatically increased Lake Okeechobee water levels
- Fragile dykes on the southern end of the lake
- It appears impossible to clean or manage the internal load issue of the lake, as lake sediments are easily suspended, increasing water column phosphorus concentrations and turbidity
- By 2025, the population in the Orlando/Kissimmee area is expected to increase by 80%
- Relatively low-impact agricultural lands costing \$3,000-15,000 per acre are being bought by developers and transformed into high-impact residential areas selling for up to \$350,000 per parcel
- Potential increased demand for freshwater from urban areas such as Miami and Ft. Meyers for freshwater
- Adoption of Best Management Practices (BMP) by upstream farmers, developers, homeowners, and businesses to reduce further pollution
- Increased land prices limit the amount of land that can be purchased by conservation agencies and the CERP, thereby limiting landscape water storage
- Soils in the northern part of the watershed are saturated with phosphorus

# NATURAL RESOURCE ISSUE: ACTIVITIES IN THE OKEECHOBEE WATERSHED

Friday was our field day and stakeholder panel discussion. We first went to the Butler Oaks Dairy, where we met Mr. Pat Miller from UF/IFAS Extension and Dr. Martin Adjei from the UF/IFAS Ona Research Center. Dr. Adjei showed us experimental plots where IFAS is researching the effectiveness of improved forage production as a means to remediate phosphorus impacted sites. In short, the research has concluded that some improved (tame) pasture grasses have the potential to remove phosphorus from phosphorus saturated soils. If these grasses are then cut for hay and sold to regions outside the area, or even better still outside the watershed, farmers may be able to reduce the current high levels of phosphorus levels in soils.

We later met with Ben Butler who described the history of their dairy, some of the dairy practices, and the waste management systems being implemented. Butler Oaks Dairy is a family operation started by Ben Butler's grandfather. The dairy has since been split between the grandfather's children and managed as separate family businesses. Butler Oaks Dairy has started to implement BMPs using cost share programs to help reduce phosphorus loads entering Lake Okeechobee. One of the more innovative farm-scale programs collects farm runoff in a pond and the waters from this pond are treated with iron/aluminum

sulfate. Suspended phosphorus bonds to the aluminum/iron sulfate and sinks out of solution. The settled solid can be later dredged from the pond, as a method of phosphorus removal from water.



Ben Butler (left) and B. Long (right) at Butler Dairy waste treatment site.

Aside from pollution issues, one of the more pressing concerns facing Butler Oaks Dairy is population growth and the conversion of agricultural land to residential and urban areas. Recently, a ranch neighboring the Butler property was sold. Even with the combined wealth of all the Butler family dairies, they could not afford to outbid developers for this land and it will be developed into ranchettes. To reduce pressure from developers to sell, the Butler Oaks Dairy has started an ambitious project to increase its profits, double its herd, and contain nearly all its waste. The keystone is a new milking/feeding barn that will employ technology to capture and clean nearly all the farm's cow manure and urine, drastically reducing the potential for pollution.

After our dairy tour, we had lunch at Lake Okeechobee and later spoke with Dr.

Mitch Flinchum of the UF/IFAS, Everglades Research Center. He gave us an overview of some of the ongoing IFAS programs being conducted in the watershed in an effort to reduce phosphorus loads to Lake Okeechobee. One of our own NRLI participants, Dr. Ed Dunne, also works on one of the projects. He described some of the research, which evaluates the phosphorus storage capacity of natural and constructed wetlands as a potential BMP to help reduce phosphorus entering the lake.



Butler Dairy.

## LEADERSHIP SKILLS

At the UF/IFAS Okeechobee extension office, NRLI Fellows developed a list of leadership qualities and prepared for the stakeholder panel discussion. Jon Dain (NRLI project team) encouraged NRLI Fellows to share stories of where they showed some leadership skills. From the stories, we wrote down a list of leadership characteristics and qualities that included prioritizing, ability to take risk, and facilitating communication.



Dr. Adjei, UF/IFAS Ona Research Center.



Drs. Mitch Flinchum and Ed Dunne, UF/IFAS.



Jon Dain, NRLI Team Leader.

## SESSION I PANEL DISCUSSION: LAKE OKEECHOBEE HAS “YOOHOO” CONSISTENCY

Stakeholder panelists included Bo Griffin, Director of Florida Department of Agriculture and Consumer Services Lake Okeechobee Water Quality Program; Bob Rydzewski, General Manager of MacArthur Dairy; Don Fox, Head Biologist Florida Fish and Wildlife Conservation Commission on the lake; Frank Marsocci, lake governing board member, citizen activist, private business man; and Gary Ritter, Senior Biologist South Florida Water Management District. Collectively, the stakeholders had over 100 years of experience in the Lake Okeechobee watershed. Panelists compared the appearance of Lake Okeechobee water to the chocolate drink “Yoo-hoo.” This was an analogy for the suspended organic sediments in the water column, which have increased turbidity to a secchi-disk depth—a measure of lake visibility/clarity—of less than 20 cm.

**Lake Okeechobee lake visibility/clarity is measured at a secchi-disk depth of less than 20 cm.**



Panel members for Session I.

**Farmer Concerns:** The panelists discussed their interests in and concerns for the Lake Okeechobee watershed and the programs and strate-

gies for restoring Lake Okeechobee. Bo Griffin described the Lake Okeechobee Protection Plan (LOPP), which was initiated through 2000 Florida state legislation. The goal of the LOPP is to reduce the total maximum daily load from 600 metric tons per year to 140 metric tons per year by 2015. Agriculture operators share between 75 and 87.5 percent of the costs of this reduction.

Mr. Bob Rydzewski emphasized the difficulty that dairy farmers face in covering increasing costs to meet environmental regulations. He explained that dairy products are commodities that farmers have no ability to increase the market prices that they receive for them. Nineteen of the 40-50 farmers that were present in the watershed in the 1980s sold their dairies to a state buy-out program (Dairy Rule) in 1985, due to the financial risks associated with operating dairy farms in the area. The closing of these farms had a negative impact on the local economy.

**Fish and Wildlife Concerns:** Don Fox introduced the importance of recreational and fishing industries to the local and state economy. Recreational and fishing amenities have contributed an average of \$100 million to the annual economy. In addition to saturated nutrient loads, increased turbidity and water levels result in an

unhealthy lake ecosystem for fish and wildlife populations. Turbidity—in addition to making the lake look like “Yoo-hoo”—limits sunlight for vegetative growth. Under these conditions, bacteria growth has replaced the natural phytoplankton community needed to provide the base for a healthy food chain in this aquatic ecosystem. The black crappie fish population has dramatically declined. This has subsequently reduced commercial fishing fleets from about 500 to eight boats, effectively destroying this industry.

**Water Consumption:** As a citizen activist and business person who benefits from a healthy lake system, Frank Marsocci highlighted the bond debt issue that has accumulated from attempts at pollution control and clean-up. To manage the debt and continue clean up efforts, he suggested bringing the debt to market and limiting use of water from Okeechobee to consumers.

**Current Priorities:** Gary Ritter described some of the lake history that influenced the increased pollution and rise of phosphorus concentrations during the last 30 years. This is mainly due to land use changes within the watershed. For example, in the mid 1900s natural and fully-functional ecological systems occupied 60% of the watershed. Currently, only 41% of

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the area consists of natural systems. Urban and agricultural uses make up the remaining 59% of the area. In 1971, the Kissimmee River was channelized. Both of these developments have contributed to the pollution of Lake Okeechobee, as less land is available to store water prior entering the lake. The following three goals were given as a priority to manage lake pollution:

- Reduce phosphorus load through BMPs.
- Regulate storm water to supplement positive impacts of BMPs.
- Reduce lake concentrations (and internal loading) from past growth and land management.

**Growth Management**

**Needs:** Panelists discussed questions with NRLI Fellows about how development and growth increased demands on the lake. Market rates for

five acre parcels are reported to be up to \$60,000 per acre. Dairy farmers have been the main land-use group required to pay for pollution controls. Increased land prices can offer immediate economic returns to farmers, causing many farmers to sell their land to developers. Although cow/calf ranches and dairy farms can be non-point pollution sources, the panel seemed to agree that agricultural impacts may be more easily managed than 60,000 homes, which are also a potential non-point pollution sources. Additionally, the increasingly popular ranchette of two to ten acres will require different growth management strategies and a strong political will to set and hold regulations that reduce their impacts. The stakeholders emphasized that strategic long-term planning has not been a part of culture in the Okeechobee area. For example, impact fees are not part of Okeechobee County's comprehensive plan. An

environmental resource development planning process, which works on a base principle stating that land-use changes show no additional increase in phosphorus loads, was suggested as a potential regulatory means to address future development impacts.

Given the complexity of the issues; the alphabet soup of voluntary and regulatory programming; and the impact that pollution has on farming, recreation, fish and wildlife, and consumers, the panel expressed mixed feelings about realizing short and long term improvements in lake health. For example, one panel member suggested that if all external loads were cut off from entering the lake, it may take 200 years or more for the lake to recover back to its natural state. However, optimism was expressed for reducing phosphorus loads from the watershed to the lake.



UF/IFAS 4-H Camp  
Clover Leaf  
Lake Francis, Seabring, FL



Bonfire venue: NRLI Session I  
networking.



Dan Armstrong, Fellow, leads  
feedback session.

## PRACTICUM OVERVIEW: BEGIN BY DETERMINING ISSUES AND STAKEHOLDERS

Bruce Delaney (NRLI project team) introduced us to the practicum and outlined that during the course of NRLI, a fellow could work independently or within a group to complete the practicum. The main objective of the practicum is to put what we learn during the sessions into practice. Some of the more successful past projects have included the facilitation of conflicting stakeholder

groups for effective management of natural resources.

Later, Jon Dain facilitated a summary session of the stakeholder panel discussion, to identify main issues and stakeholders of Lake Okeechobee growth management. We split up into groups, and each group identified main issues of concern and stakeholders. Most of the issues and stakeholders

identified were similar, although some issues were unique to certain groups. This exercise not only reaffirmed the complexity and far reaching scale (i.e. local, state, national, and international) of the natural resource issue in Okeechobee, but also the diversity of thinking within and between groups.



Small group break-out session.

## NRLI FELLOW FEEDBACK: HILARIOUS!

The members feedback panel led us through participatory games and a mock stakeholder panel they designed. They were truly hilarious and gave a light but insightful review of the first NRLI session.

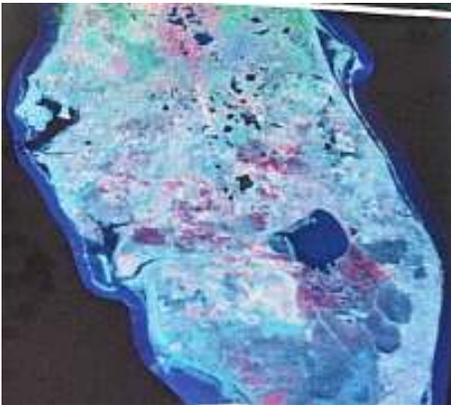
### Games

- Know a fellow
- Smell an issue
- Twist the issue
- Draw and tell



Fellows and team leaders participate in feedback sessions. Can you match each photo to the feedback games listed on the left in the article?

We're on the web:  
<http://nrli.ifas.ufl.edu>



## Florida Population in 2030

Dr. Rod Clouser (UF/IFAS) presented facts and figures on aspects of Florida and its growth between the years 2004 and 2030. They included:

- 34.5 million acres of land in Florida
- 1100-1200 miles of coastline in Florida; 600 of these miles are populated
- About 75% of population (12 million) live within 15 miles of coast
- About 12% of the population live at the poverty line
- Of the four hurricanes that occurred in 2004, a total of 45 billion dollars worth of damage was caused; however, it re-

sulted in little impact on growth or tourism

- Florida's 2005 population is 17.5 million
- An additional eight million people visit the state as tourists annually
- Florida is estimated to experience 79.5% growth, the third largest percent of growth in the US, between 2004 and 2030
- Florida's projected 2030 population is estimated to be 30 million

During the presentation, we again split up into groups. Each group was given a topic of growth management. We then identified some of the main issues and potential solutions to deal with the issues. Topics

included:

- Water allocation and political representation
- Law enforcement and jails
- Infrastructure and how to pay
- Elderly and youth
- Land use and their monetary values
- Affordable housing.

Group members found this exercise useful, as we discussed many topics that we would normally not directly address within our daily routines. It served to reaffirm the complexities of growth management and the need for an integrated holistic approach to the management of natural resources.