

# River of Grass Restoration Reserve

To the ***RIVERS COALITION***  
Martin and St. Lucie Counties, Florida

Karl Wickstrom and Forest Michael, 2009

Release 1  
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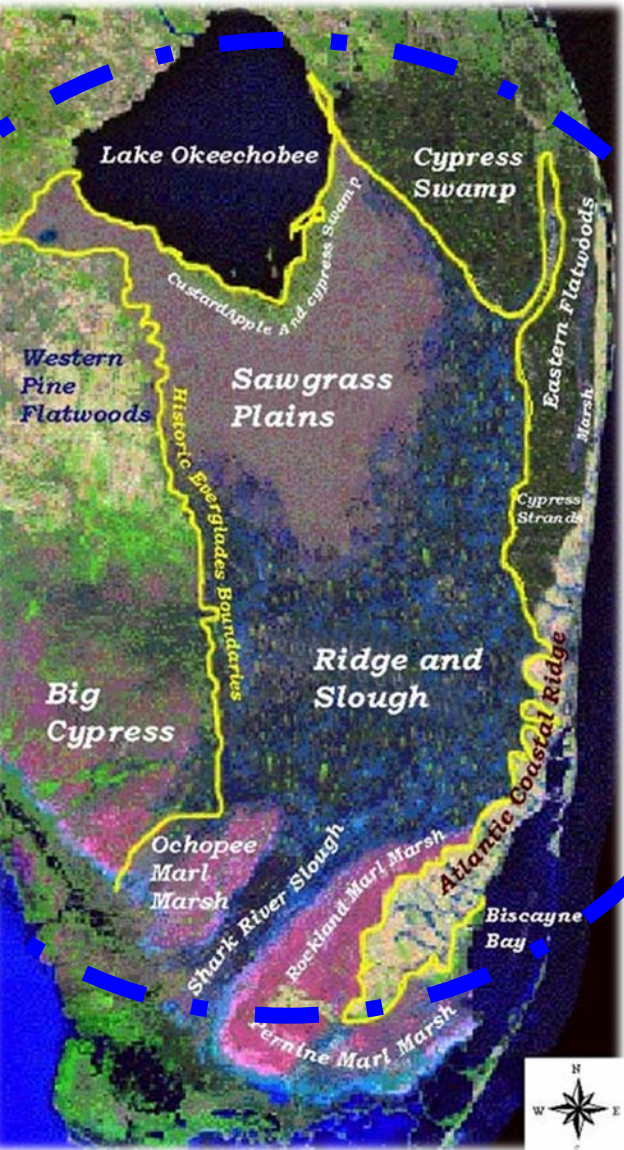


# Maximum Benefits for All

**The River of Grass Restoration Reserve** is a concept to transform most of U.S. Sugar Corporation's drained fields into a huge public system of wetlands and waterways, providing a multitude of benefits for the environment, lake communities and for the general public.



*River of Grass Restoration Reserve approach images (from other sources)*



Historic Ridge and Slough diagram, NOAA

## River of Grass Restoration Reserve - *Vision*

- Remove the “compartments” that fragment the Everglades;*
- Restore the ecology and flow south in affordable and systematic steps, with maximum water quality filtering;*
- Remove estuarine impacts with a lake storage flowway, and public access for stronger communities, jobs and quality of life.*



- Rivers Coalition Board



- Everglades Foundation Board



- Florida Oceanographic Society Board



Florida Sportsman Founder



# Openers Column: Proposing a Unique New Reserve

**“February 2009** The people of Florida have a truly amazing opportunity. Purchase 180,000 acres of overdrained and tainted sugar land in order to restore Mother Nature’s long lost River of Grass. That’s a dream we’ve nurtured for a half-century.

The Deal to buy US Sugar’s property will reconnect Lake Okeechobee to the Everglades, save the estuaries from horrendous discharges, rebuild groundwater systems and reduce phosphorous fertilizer pollution by hundreds and hundreds of tons. Those benefits alone are more than enough to justify the buy, at a price that will be viewed as a can’t-miss bargain compared to the public good. And we’d suggest this icing on the cake:

## *The River of Grass Restoration Reserve*

This new Reserve could transform the immense property (the size of many state parks combined) into a natural wonderland, while at the same time provide vitally needed basic benefits of the Missing Link flowway. **Imagine a network of waterways offering all kinds of public uses such as:**



- Many miles of canoe and kayak access
- Nature trails rarely enjoyed anywhere
- World-class birding drawing millions
- Extraordinary freshwater fishing
- Duck hunting supreme in certain areas
- Vistas of Glades life in large scale
- Important educational centers

# Openers Column...Proposing a Unique New Reserve

*continued...*

**Lake communities could benefit in many ways. It could be a significant part of a needed economic program to aid folks on the south side of the lake.** The Reserve idea hatched after we visited Guana Reserve just north of St. Augustine. Guana covers 55,000 acres and offers many of the same features envisioned for the River of Grass Reserve. Take a look at [www.nerrs.noaa.gov/GTM](http://www.nerrs.noaa.gov/GTM).

**It's exciting to think of the possibilities. First, of course, we must acquire the sugar land.** There are naysayers picking at details of the purchase. The hidden hand of certain agricultural interests is in the background. And some observers worry that U.S. Sugar owners will make an undeserved bundle in the deal.

Actually the price equivalent to \$7,000 an acre is something the public can live with, especially considering that there is no real alternative. The contract closing is slated for later this year.

**Get it done, we say, and tie in the Restoration Reserve that would gain world wide appeal and significance. “**

**- - Karl Wickstrom**





## **Experience – Forest Michael, Communities, Greenways and Blueways**

Project Management, Master Planning and Landscape Architecture; including multiuse greenway, blueway and community experience, with a strong ecotourism design emphasis; previous service to the Florida Greenways Commission and Recreational Trails Council for FDEP.

**Lake Okeechobee, Florida National Scenic Trail and Blueway** (70 mi. FDOT Dist. 1, FDEP, SFWMD, USACE, BIA, Seminole Tribe, Glades, Hendry, Okeechobee)

**Florida Keys Overseas Heritage Trail, Blueway and Byway** (106 mi.; FDEP, FDOT, SFWMD, NPS, Monroe County, Clean Florida Keys, Inc.)

**Big Cypress National Preserve Trailheads** (NPS, and Agency and Florida Partners)

**Babcock Ranch Greenway and Transit** (Kitson Babcock, FDOT, Lee and Charlotte)

**Sustainable Okeechobee Village and Waterfront** (Okeechobee County, USACE, FHREDI, FDOT, FDCA, City of Okeechobee, others)

**Tamiami Trail National Scenic Byway** (FDOT Dist.1, NPS, ENP, BCNP)

**Cross Florida Greenway Landbridge** (FDOT, FDEP, Marion County, FTA)

**Central Florida Loop Greenway and Blueway** (300 mi. initiative; FDEP, FDOT, Multiple counties and cities; recipient of Governor Chiles' Official Greenway Proclamation)

**Genius Reserve, Restoration** (Genius Foundation, Rollins College/1000 Friends Award)

**Florida Greenways Commission** (FGC Central FL Task Force Chair, and FRTC/FDEP)

**Winter Springs Town Center & FNST** (FDEP, FDOT, USDA, Florida Forever Grant)

**Community and Greenway Plans Nationwide** (Received the national planning award from the USAF Center for Environmental Excellence and AETC as a contractor for the USACE)

**River of Grass Restoration Reserve /Lakes Concept** (Current initiative)

**Caloosahatchee Riverway Concept** (Current initiative for multiuse water storage/quality)

**Caloosahatchee Riverwatch Board** (Current Member)

**Caloosahatchee's Billy's Creek Watershed Plan** (Current initiative)

**Clewiston Waterfront and Stormwater Plan** (Current initiative)

# This is the right time...

**2008, US GAO, NSF:** the restoration is not working!

**2008, Government:** Everglades and economic restoration are beginning a “greener” chapter.

**2009, Economy:** avoid more highly expensive “re-builds.”

**2009, Sustainability:** governmental and private incentive for green businesses.

**2009, Floridians:** planning the purchase for the River of Grass restoration.

**2009, FDEP, SFWMD:** beginning a “new planning process” for the River of Grass flowway – Alternatives by June.

*River of Grass Restoration Reserve approach images (from other sources)*





# “Restoration Reserves”

**A traditional and sustainable approach to land and water management**  
(Comprehensive Management Plans address all intrinsic resources, operations, management and capital programs, and public participation).

**Guana Restoration Reserve, FL**

<http://www.gtmnerr.org/>

(FDEP, FL State Parks, SJRWMD, NOAA;  
*Positive Florida model*)

**Pinelands National Reserve, NJ**

<http://www.nps.gov/pine/>

(Pinelands Commission, NPS, others;  
*Positive national model*)

**Wisconsin Arboretum**

<http://uwarboretum.org/>

(Aldo Leopold; Univ. of Wisconsin;  
*Positive national historical model*)

**Genius Reserve, FL**

<http://www.rollins.edu/olin/archives/Genius/>

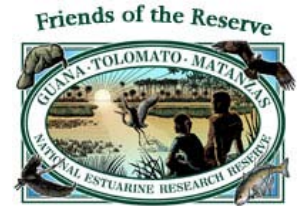
<http://www.1000friendsofflorida.org/Awards/08genius.asp>

(Genius Foundation /Rollins College;  
*1000 Friends Award, 2008*)



# The Guana Reserve experience...

The Guana Tolomato Matanzas National Estuarine Research Reserve encompasses approximately **55,000 acres** of salt marsh and mangrove tidal wetlands, oyster bars, estuarine lagoons, upland habitat and offshore seas in Northeast Florida. It contains the northern most extent of mangrove habitat on the east coast of the United States.



*Guana Restoration Reserve images (from other sources)*

**“Guana Restoration Reserve”** (55,000 acres near St. Augustine, Florida)

## National reserve example:

**The Pinelands National Reserve, 1.1 million acres** including portions of seven counties and all or parts of 56 municipalities. This internationally important ecological region occupies 22% of New Jersey's land area. It is the largest body of open space on the Mid-Atlantic seaboard between Richmond and Boston and is underlain by aquifers containing 17 trillion gallons of some of the purest water in the land. **The Reserve includes extensive ecotourism with agriculture.**

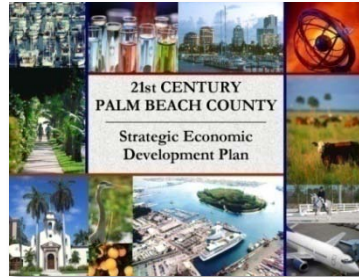


*Pineland National Reserve images (from other sources)*

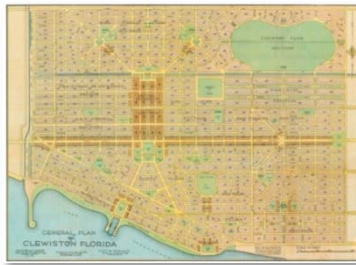
**Pinelands National Reserve (1.1 million acres, New Jersey)**

# River of Grass Restoration Reserve

Consistent with local governmental plans and economic development statements:



**Palm Beach County: 2007, Commission accepted Strategic Economic Development Plan** (Grand Canal System, greenways, blueways, trails, streetscapes for the development of the Glades Lake O. communities, within comprehensive planning process requirements; **also including land requests from the cities to the State**)



**City of Clewiston Town Plan, 1925:** (Waterfront development and town perimeter areas growth plan; partially constructed per plan prior to hurricanes; new development areas correspond generally with the historic plan)



**Glades County: 2008, local goal to rehydrate historic Lake Hicpochee for economic purposes** (Currently in the Northern Everglades Caloosahatchee River Watershed Protection Plan to the Florida Legislature; originally forwarded by Mr. Alvin Ward of Glades County; any new land usage is proposed to compensate the local public revenues)



## Supportive Plans

Water Resources Development Act (WRDA)  
Comprehensive Everglades Restoration Plan (CERP)  
Florida Save Our Rivers  
Florida Preservation 2000 and Florida Forever  
Florida Comprehensive Growth Management  
Florida Greenways and Trails  
Florida Energy Commission  
Rivers Coalition  
Seminole Tribal Writings on the environment  
Everglades Coalition's and Audubon's writings as of 2009  
USACE, NPS and State of Florida environmental plans

## and Technology

### **Pre-1990 Florida Reservoirs**

(1929 Lake Talquin State Park; Lake Manatee, etc.; with native vegetated edges)  
(Post-1990s FL reservoirs are concrete levee-based, with structural failures)

### **EcoReservoir Program** © 2007, Developed by Forest Michael, LA0000751

(Using USACE, NPS, FDEP, SFWMD, DOD, BLM best practices and other private innovations; use prohibited without consent; Restoration Reserve uses this ecoreservoir technology)



# Current restoration practice in the Everglades



The River of Grass Restoration Reserve does not propose this type of construction

**Restoration**



# **The River of Grass Restoration Reserve**

An ecological approach with lakes and community benefits  
proposed for the Florida's US Sugar land purchase



# River of Grass Restoration Reserve

Reserve components using the Ecoreservoir Program

## 1) Chain of storage lakes-ecoreservoirs

Cost savings; a multiuse chain of lakes within low natural landforms (Similar to a low Okeechobee Ridge), littoral zones of cypress, pond apple and sawgrass; gravity flow; navigable; no levees;



## 2) Rivers, creeks and sloughs

Natural Florida blueways reflecting nature, replacing canals; cypress, pond apple and sawgrass; gravity flow; navigable;



## 3) River of Grass for water quality

A 100 mile ecological Big Sawgrass flowway on the outside of the upper lakes; and the lower lakes reflecting the former sawgrass; paddlecraft;



## 4) Agricultural lands

Limited agriculture where appropriate and consistent with the overall goals.



*River of Grass Restoration Reserve approach images (from other sources)*



# River of Grass Restoration Reserve *Page 2, continued*

Reserve components using the Ecoreservoir Program

## 5) Wildlife and habitat

Cost savings; less maintenance; new habitat for Threatened and Endangered species; expanded populations, birding; increased support businesses;

## 6) Community waterfront places

Revenue and jobs from new development; some used for the upgrade of existing areas; more support businesses and a higher Quality of Life; Educational center interpreting the Reserve;

## 7) Nature-based commerce

Revenue and jobs from water and wildlife oriented development, more events and lodging, restaurant visits; increased support business.



*River of Grass Restoration Reserve approach images (from other sources)*

# US Sugar Corporation Lands (USSC)

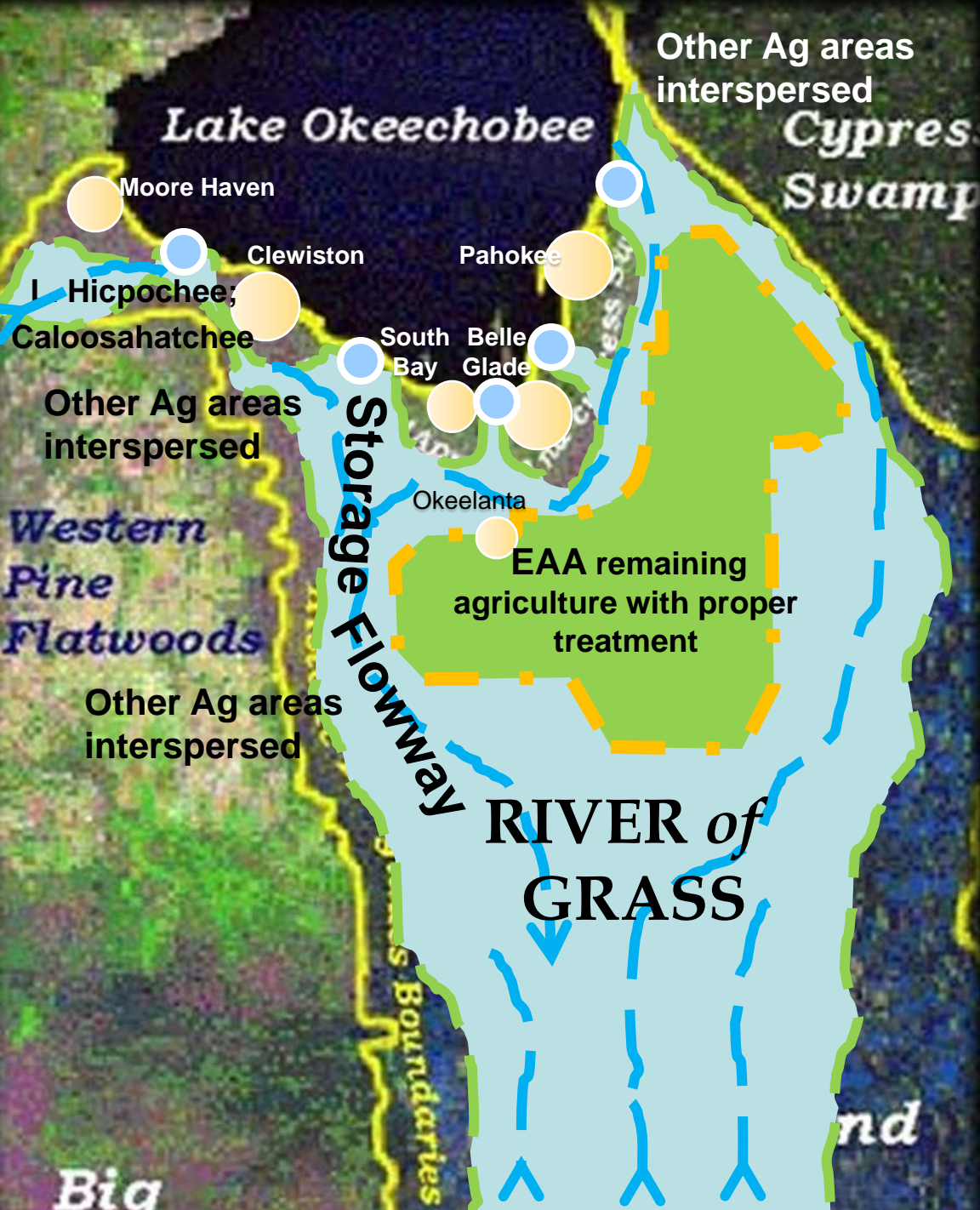
(Planned State of Florida purchase)



-  USSC land
-  City areas

US Sugar Corporation Land





General Diagram  
**River of Grass  
 Restoration Reserve**  
*- Continuous Flow -*

Lake Okeechobee and  
 communities

Custard apple, cypress and  
 lakes

Everglades Agricultural  
 Area Remaining

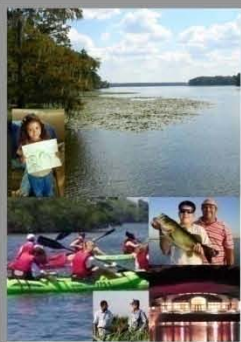
Sawgrass plain  
 remnant flowway

River of Grass Restoration  
 Reserve extends south

# Everglades Blueway and Ecoreservoir River of Grass Restoration Reserve

World-class blueway with filtering ecoreservoir lakes, commerce, agriculture, recreation, education wildlife and restoration; community development revenue and jobs using US Sugar lands and others

**Concept for discussion**



**LEGEND**

- Public natural lands
- US Sugar land - Basis for River of Grass Reserve
- US Sugar land kept in agricultural production
- Concept Everglades flow way to Florida Bay
- Chain of Lakes as Ecoreservoirs

**Caloosahatchee Riverway Lakes**

Ortona

**Upper Lakes Restored**

Labelle

**Lake LaBelle Lower Cost Concept for the C-43 Reservoir**

**ECONOMIC CONCEPT:**  
Co-use Everglades Restoration funds to invest in the region's communities with new commerce and jobs, lakefront development areas to include privately financed marinas, houses, recreation, lodging, conferencing, farms, parks and neighborhoods. Affordable phases result in quicker jobs for locals and lower construction and O&M costs for the Restoration. Provide greener inland logistics integrated with the cities for commuting and enhancements. Use some US Sugar land to trade with agreeable landowners to establish a more efficient River of Grass Reserve flowway and boating channel.

**EDUCATION AND RECREATION:**  
A 100-mile Chain of Lakes/Ecoreservoirs for fishing, hiking, bicycling, paddling, hunting, pleasure craft, education, waterfront parks and birding; an 80 mile boat channel; a restoration education and interpretation center to highlight the connection of Lake Okeechobee and the River of Grass.

**ECOLOGY AND SUSTAINABILITY:**  
A 100-mile Flowway/Chain of Lakes/Ecoreservoirs stores and filters water with lower energy consumption; plus 180,000 acres of new wildlife habitat; not all lakes will be hydrated year round similar to others in Florida, although lakes at each community will be hydrated year round for economic benefits.

**Lakes/Ecoreservoirs, 100-Mile Channel and Stormwater Flowway, Blueway and Greenway**

**RESERVE and BLUEWAY**

**BAA Everglades Agricultural Area**

**RIVER of GRASS**

**COMMUNITIES:**

<b>O&amp;M Savings:</b>	Land revenues + fuel savings = billions saved
<b>Affordable Phases:</b>	Lakes allow smaller phases for quicker jobs
<b>Lakefronts:</b>	New development revenues "cityside" of lakes
<b>New Waterway:</b>	100 miles (St. Lucie - Caloosahatchee - all cities)
<b>Agriculture:</b>	Lease maximum land back to agriculture
<b>Inland Logistics:</b>	Communities benefit from multiple siltes
<b>Ecotourism:</b>	180,000 acres amplifying current businesses

**HYDROLOGY:**

<b>Chain of Lakes:</b>	100 Mile Flowway (Water storage and quality)
<b>Water Storage:</b>	1,800,000 acre-feet (Per DOI Vision 2008)
<b>Average Lakes:</b>	(99,000 ac @ 7' = 693,000 acre-feet storage)
<b>Deeper Lakes:</b>	(11,000 ac @ 9' = 99,000 acre-feet storage)
<b>Water Quality:</b>	(70,000 ac @ 4' = 245,000 acre-feet)
<b>Caloosahatchee:</b>	(Protection Plan = 400,000 acre-feet storage +)
<b>St. Lucie:</b>	(Protection Plan = 200,000 acre-feet storage +)
<b>Misc. Dynamic:</b>	(Distributed = 128,000 acre-feet storage)

**Concept sketch for discussion:** includes city land asks to the State; it represents some areas where equitable trades with current landowners other than US Sugar may be negotiated, if these landowners are willing; it does not represent any "takings" and is a very early sketch that may be modified.



**River of Grass Restoration Reserve:**

“comprehensive” following the historic *“Big Sawgrass”* flowway;

... from Dupuis (East) to Lake Hicpochee (West), south to Everglades National Park;

... integrating with other parks and the Lake Okeechobee Greenway/ National Scenic Trail, while improving the Lake and Ag based communities;

... and often corresponding with the published economic plans and writings of Hendry, Glades, Palm Beach and Martin counties.

**Concept sketch for discussion:** includes city land asks to the State; it represents some areas where equitable trades with current landowners other than US Sugar may be negotiated, if these landowners are willing; it does not represent any “takings” and is a very early sketch that may be modified.

**Area sketch**



# Everglades Agricultural Area and the River of Grass Restoration Reserve:

- 1) Assures cohesive Ag operations and farmland.
- 2) Provides approx. 10-20% of USSC land to the Communities based on size.

a) Communities provided some lands for agricultural leases and lakefront developments (TBD).

b) Communities assure stormwater quality /TMDL per US EPA /FDEP



(Dark gray areas are possible traded USSC land for agriculture)

**Concept sketch for discussion:** includes city land asks to the State; it represents some areas where equitable trades with current landowners other than US Sugar may be negotiated, if these landowners are willing; it does not represent any “takings” and is a very early sketch that may be modified.

## Area Agriculture Concept



**St. Lucie** (No historic flow from Okeechobee except in extreme conditions)

**Caloosahatchee**  
(Historic @ ~15 to 20)  
**Lake Hicpochee**  
(Historic connection)

## “FLOW” - River of Grass Restoration Reserve:

A potential 100 mile “flowway” using USSC purchase.

Some trading is needed for gaps, or, if not possible then use existing canals (As creeks) to maintain “flow.”

Emulates historical “flow” and water quality and storage.

Route often doubles as commercial and recreational watercraft access for recreation and business.



**Concept sketch for discussion:** includes city land asks to the State; it represents some areas where equitable trades with current landowners other than US Sugar may be negotiated, if these landowners are willing; it does not represent any “takings” and is a very early sketch that may be modified.

**Potential flow using USSC land (Safely avoiding all communities)**

## Multiuse Benefits:

Restore River of Grass –

Historic Flowway –

Storage and Quality –

E. and W. Estuaries –

Water Supply –

Replenish Groundwater –

Flood Control Safety –

Gravity Flow –

Energy Savings –

## Ecology and Water Management

**~165,000 acres** min. historic ecology plus the USDOJ envisioned decompartmentalization areas extending south; ecotourism;  
**~100 miles** for water quality, flood protection and recreation;  
**~1,000,000 (plus) acre-feet in the Reserve system;**  
Substantial relief for the Caloosahatchee and St. Lucie;  
Supply for the cities, agriculture, Florida Bay (analysis required);  
More than half of Glades water has been lost;  
Wider flowways relieve Lake Okeechobee and potential Dike breaches;  
Restore ROG Flow; manage fewer structures and pumps;  
Substantially less energy use from pumping; low carbon;

## Multiuse Benefits:

New Jobs –

New Support Jobs –

Community-Ag Jobs –

Development Revenue –

Lower Costs /Savings –

Waterfront Development –

Inland Port(s) –

Ecotourism –

Lakes Waterway (Grand Canal)

River of Grass Reserve –

Educational Center –

## Economic and community

**New construction jobs** from more affordable phases;  
**New development jobs** from Everglades-based development;  
**~15,000 acres to the cities** for economic purposes;  
**New revenue to cities** from lakefront developments;  
**Lower costs** due to less infrastructure and O&M;  
**~ 30-miles of land for development**, marinas and parks;  
Accommodation of concept for local jobs and prosperity;  
Lodging, conferencing, fishing, birding, trails, paddling;  
**~100-mile channel connecting cities** for commercial and residents;  
Regional-scaled park for residents, businesses, visitors;  
Interpretive Educational Center for the Upper Everglades;

( ~ means approximate; all calculations are approximate in this sketch phase)

## Multiuse Benefits of the Restoration Reserve





# The River of Grass Restoration Reserve

Provides the maximum flood protection for lake residents, landowners and agriculture at the lowest cost:

- Multiple Lake O. outfalls;
- Maximum flowways south;
- E&W Estuary protection;
- Maximum storage capacity to pre-stage storm events;
- Little or no breaching potential compared with levees;
- Replenish critical groundwater

## New Orleans Hurricane Katrina damage



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### “Eye on Okeechobee: Protecting Residents From a Breach in an Aging Dike ...

By Scott Travis, South Florida Sun-Sentinel Oct. 7, 2008

PORT MAYACA -- A plan to restore an aging dike could protect thousands of residents near Lake Okeechobee from a Hurricane Katrina-like flood, .....

**Safety – lakes compared with current levee system**



# Kissimmee River Restoration

- “re-establish historic hydrologic conditions
- recreate the historical river/floodplain connectivity
- recreate the historic mosaic of wetland plant communities
- restore the historic biological diversity and functionality”

Restored flow in  
original riverway

Canal-38 re-filled

“...to restore over 40 square miles of river and floodplain ecosystem including 43 miles of meandering river channel and 27,000 acres of wetlands.”

**The River of Grass**  
is similar to the very popular Kissimmee River Restoration

# Ecoreservoir / Lakes Restoration Model: Florida State Parks



FDEP Images

A scenic view of a park, likely the Emerald Necklace in Boston. The foreground shows a paved path and a wooden bench where a person is sitting, reading. The middle ground features a large pond with many ducks and a stone bridge in the background. The background is filled with dense green trees.

**“Greatest good for the greatest number,”**

Fredrick Law Olmsted and Charles Eliot, 1890s

Dr. Bruce Stephenson and  
Professor David Schuyler

**Boston’s Historic Emerald Necklace**  
(Urban and regional stormwater system example)

Comments

# **River of Grass Restoration Reserve**

Karl Wickstrom and Forest Michael, 2009

Please send written comments to:

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