# **Workshop**

# Southern Water Use Caution Area Recovery Strategy and Upper Peace River Projects

### Governing Board and Peace River, Alafia River and Manasota Basin Boards

September 29, 2009



# **Overview of Workshop – Expectations**

### **Bruce C. Wirth, P.E., Deputy Executive Director**

# **SWUCA Chronology of Key Activities**

# SWFWMD Boundaries 1974 & Present



### • 1972 - Florida Water Resources Act

- Peace River Water Use Caution Area

### • 1975 - Water Use Permitting

 1977 - Manatee, Sarasota and portions of Highlands and Polk Counties added

o 1978 - Ridge 1 Study

 1987/1988 - Designated ETB, HR, and NTB Areas of Special Concern
 Initiated the Ridge 2 Study
 Initiated Water Resource Assessment Projects for ETB and NTB

### o 1989 - Declared ETB and HR WUCAs

- 1990/1991 ETB, NTB, and HR WUCA Rules
- 1992 Declared SWUCA
- o 1994 SWUCA 1 Rules and NWSI
- 1996/1997 MFLs Legislation
  - $\circ$  Set MFLs in NTB
  - $_{\rm O}$  Annual priority list and schedule
  - **o Structural alterations**
  - $\circ$  Recovery strategy
- 1997 SWUCA 1 order received and appealed

- 2000 District prevails on SWUCA 1 appeal more appeals
- 2002 "Kick-Off" Board meetings for SWUCA
  2 primarily to address MFL legislation
- o 2003 Implement SWUCA 1 rules
  - **o** Increased conservation and reporting requirements
  - Reduction in permitted irrigation quantities
- 2006 Governing Board adopts SWUCA 2 Recovery Strategy
- 2007 SWUCA 2 Recovery Strategy became effective

# Minimum Flows and Levels Statutory Requirements

# **MFL Statutory Requirements**

- Establish Minimum Flows or Levels for regionally significant water resources – using science.
- Considerations in establishment: Changes and structural alterations to watersheds.
- Exclusions: Water bodies that no longer serve historical hydrologic functions. Recovery may not be economically or technically feasible.
- Expeditiously implement recovery strategy
  - Achieve recovery as soon as practicable
  - Recovery strategy shall include phasing
- MFLs: Reevaluated periodically and revised as needed

# Review of Goals, Guiding Principles and Major Elements of the 2006 SWUCA Recovery Strategy

# Goals

- Restore minimum levels to priority lakes in the Ridge Area by 2025
- Restore minimum flows to the upper Peace River by 2025
- Reduce the rate of saltwater intrusion by achieving the minimum aquifer level for saltwater Intrusion by 2025; once achieved, seek further reductions and ultimate stabilization
- Ensure sufficient water supplies for all existing and projected reasonable beneficial uses

# **Guiding Principles**

- Contribute to management & resource recovery
- Protect investments of existing WUP holders
- Allow for economic expansion
- Based on best available peer reviewed science
- Minimize the need for rule revisions
- Financial and regulatory incentives
- Implemented in a practical timeframe
- Consistent with other statewide strategies
- Strategy is designed to meet these principles

\*Periodic review and update of plan. Every 5 years.

# **Six Major Elements**

- 1. Regional water supply planning
- 2. Use of existing rules
- 3. Enhancements to existing rules
- 4. Financial incentives to develop AWS
- 5. Develop projects to reestablish MFLs
- 6. Resource monitoring

# **Questions?**

# **SWFWMD** Governing Board Workshop

# SWUCA and Upper Peace River Water Resource Issues

## By Ron Basso, P.G.

September 29, 2009

# Water Resource Issues in the Southern Water Use Caution Area

- Resource concerns
- Background
- Groundwater impacts
- Upper Peace River
  - Groundwater cutbacks to achieve MFLs

## **Resource Concerns**



### Southwest Florida Water Management District

with West-Central Florida Ground-Water Basins



### General Hydrogeologic Cross Section of the Region



SOUTH

### Comparison Of Effect Of Pumping 30 MGD



(Adapted from P.D. Ryder, 1985: USGS Professional Paper 1403-F)

### Long Term Changes in the Potentiometric Surface of the Upper Floridan Aquifer



Predevelopment to 1975

Predevelopment to 2006

### 2006 Estimated Groundwater Withdrawals

#### Water Use Type



#### Dot Size Indicates Pumping Rate









### Generalized Potentiometric Surface of the Upper Floridan Aquifer along the Peace River



### Generalized Potentiometric Surface of the Upper Floridan Aquifer along the Peace River





**Kissengen Spring ceased flow** 



#### SWUCA: Estimated Ground-Water Use

Kissengen Spring Ceases Continuous Flow SWUCA Groundwater Withdrawals = 320 mgd

# **Questions?**

# **SWFWMD** Governing Board Workshop

# SWUCA Recovery Strategy and the Upper Peace River Recovery Projects

# By Mark A. Hammond, P.E., Director

September 29, 2009

# **SWUCA Recovery Strategy**

- Governing Board approved in 2006
  - Effective January 2007
- Achieve MFLs by 2025
- Adaptive management approach
  - Continue to monitor
  - Annual report to Governing Board
  - Reevaluate every five years
  - Adjust as needed

# Six Major Elements of SWUCA Recovery Strategy

- **1. Regional water supply planning**
- 2. Use of existing rules
- 3. Enhancements to existing rules
- **4. Financial incentives to develop AWS**
- Develop projects to reestablish MFLs
  Resource monitoring

# **Upper Peace River Recovery Projects**

- Lake Hancock lake level modification
- Lake Hancock outfall treatment
- Stream flow losses in karst features
- Peace Creek watershed
- "Reconnect" lands
- Reservoir

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- January 2002
  - Governing Board workshop
  - Reservoir feasibility study
- March 2002
  - Financial engine
- December 2002
  - Upper Peace River MFL peer review
  - Funding for USGS karst features study

- January 2003
  - Federal funding assistance packet
- February 2003
  - Lake Hancock Lake Level Modification Project
- April 2003
  - Design of reservoir on mine lands
  - Initiate land and easement acquisition
  - Survey old phosphate lands for potential reservoir
- June 2003
  - Lake Hancock outfall treatment project

- May, June & July 2004
  - Lake Hancock Lake Level Modification Project
    - Benefits and impacts
    - Sink losses
    - Floodplain
    - Land acquisition
    - Mitigation & permitting
- October 2004
  - Preliminary design at 100.0 feet
  - Prepare conceptual ERP application
- December 2004
  - Interim USGS report on karst features

- March 2005
  - Projects to restore MFLs for upper Peace River
- June, August & November, 2005
  - Lake Hancock Outfall Treatment Project
    - Preliminary cost estimates
    - Evaluation and ranking of various treatment technologies
- February 2006
  - Lake Hancock Outfall Treatment Project
    - Adopted 27% N load reduction
    - Approved wetland treatment as primary option

- March 2006
  - MFLs and SWUCA Recovery Strategy
- September 2007
  - Lake Hancock Lake Level Modification Project
    - Authorized project
    - Resolution authorizing eminent domain
    - Amended Florida Forever work plan (\$41 million)
    - Designated \$79 million in general fund
    - Construction budget consistent with financial engine
- October 2008
  - First annual update



### Days Fort Meade Flows Met MFL (27 cfs)



2002 Landsat

# Upper Peace River Watershed

2004 DOQs

2002 Landsat



2004 DOQs

-



Lake Hancock

Upper Peace River Watershed Peace Creek

Karst Features

"Reconnect" Lands

Reservoir

2004 DOQs

2002 Landsat

## **Upper Peace River Recovery Projects**

- Lake Hancock lake level modification
- Lake Hancock outfall treatment
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# Lake Hancock Lake Level Modification Project

Outfall Treatment





### Days Fort Meade Flows Met MFL (27 cfs)



### Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (25 cfs Sink Losses)



# **Secondary Benefits**

- Complete Lake Hancock section of the Upper Peace River to Tenoroc (Green Swamp) greenway corridor
  - with acquisition of approximately 7,000 to 8,400 acres around Lake Hancock
- Opportunities for partnerships with Polk County and City of Bartow for recreation
- Preserve approximately 4,800 acres of floodplain
- Restore historic levels for a 4,500-acre lake
- Improve approximately 1,000 acres of wetlands around lake
- Provide land for a 1,000-acre treatment wetland to reduce nitrogen loading by 27%
- Provides restoration and/or mitigation opportunities

## Lake Hancock Lake Level Modification

Land Acquisition to date	\$	120 N
Land Acquisition remaining	\$	30 N
Structure (Des/Construction)	\$	6 N
Mitigation (Des/Construction)	<u>\$</u>	14 N
Total	\$	170 N

Note: Potential surplus of lands could offset some costs

## **Upper Peace River Recovery Projects**

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   Lake Hancock outfall treatment
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  - **Peace Creek watershed**
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### USGS-SWFWMD Cooperative Funding Study



Streamflow Losses through Karst Features in the Upper Peace River Hydrologic Area, Polk County, Florida, May 2002 to May 2003

Figure 2. Fricano fracture.

Figure 3. Midway sink

Figure 4. Devensink

#### Introduction

In October 2001, the U.S. Geological Survey (USGS) in cooperation with the Southnest Florida Walter Management District (SWPMWD) began a study to evaluate the distribution, immig, and volume of surface-waiter to ground-walter exchange in the Upper Posce River Hydrologic Ames in Polk County, Florida (fig. ). Historically, geomed-wate levels in



U.S. Department of the Interior U.S. Geologie al Sarvey this new were showe surface-water levels (gaining stream), wells and second-order magnitude syntags flowed, and thouates unitated the survanility highlands (tosury) (Steward, 1940). Stity-stituting of phosphane or (1) altered the inducator, (2) changed the matrix autrace-water dratage patterns, and (3) changed the ground-water flow paiture by removing the syntext interpret software of the synthes. Though this same of the beace River appears to be a losing stam. Stream too biases are befored analy through laxit features found in the now-water schame in and the flood piloh.

#### Karst Features

Locations, surface orientiations, and dimensions of prominent hurst features were measured in mid-May 2002 when reaches of the river were day. Examples of features measures the pholographs. Priorico fracture (Bg. 2) is a contexting group of wereasi piper, bidway sint (Bg. 3) is a collapping simbole with small fractures pear the base; Dower that (Hg. 4) at the base of the outcrop is located at the end of a 200-blog distributary in the flood plain, and the errors coll, (Hg. 4) at the



# SQS Fact Sheet 102-49 Jan + 2001

### Effect of Karst Development On Peace River Flow





## **Cypress Root**





## Fricano





## **The Ledges**





### Crevasses





### **Dover Sink**







### Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (25 cfs Sink Losses)



### Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (17 cfs Sink Losses)



### Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (17 cfs Sink Losses) and Dover "Low-Flow Device"

### Days Below MFL

Days Met By Diverting Low Flows From Dover

- Days Met With Lake Hancock (17 cfs Sink Losses)
- Days MFL Met Naturally

### 94% of days



## **Upper Peace River Recovery Projects**

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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT







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## "Reconnect" Lands



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### Reservoir

### Survey of old mine lands

- 99 parcels evaluated
  - 400 acres or greater
  - Within one mile of the Peace River/tributary
- 10 sites ranked
  - CS-11 top ranked
    - Largest site
    - Dams still intact





## **CS-11 Site Studies**

- Topographic Survey to determine storage volume
- Geotechnical investigations to verify integrity of berms
- Comparison of retrofitting CS-11 with construction of a reservoir on a "green field" site

### Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (17 cfs Sink Losses) and Dover "Low-Flow Device"

#### Days Below MFL

Days Met By Diverting Low Flows From Dover

- Days Met With Lake Hancock (17 cfs Sink Losses)
- Days MFL Met Naturally

### 94% of days



Year

### Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (17 cfs Sink Losses), Dover "Low-Flow Device" and Reservoir (17,500 ac-ft)

Days Below MFL

Days Met With Reservoir (17,500 ac-ft)

Days Met By Diverting Low Flows From Dover

Days Met With Lake Hancock (17 cfs Sink Losses)

Days MFL Met Naturally

### 99.7% of days



Year

# **CS-11 Conceptual Cost Estimates**

Land Acquisition	\$ 10.2 M
<b>Design/Construction</b>	<u>\$152.8 M</u>
Total	\$163 M

# Upper Peace River Recovery Projects

## **Questions?**

