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
1970s

- 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

- 1978 - Ridge 1 Study
1980s

- **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

- **1989** - Declared ETB and HR WUCAs
1990s

- **1990/1991** – ETB, NTB, and HR WUCA Rules
- **1992** – Declared SWUCA
- **1994** – SWUCA 1 Rules and NWSI
- **1996/1997** – MFLs Legislation
  - Set MFLs in NTB
  - Annual priority list and schedule
  - Structural alterations
  - Recovery strategy
- **1997** – SWUCA 1 order received and appealed
2000s

- **2000** – District prevails on SWUCA 1 appeal – more appeals
- **2002** – “Kick-Off” Board meetings for SWUCA 2 – primarily to address MFL legislation
- **2003** – Implement SWUCA 1 rules
  - 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?
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

Conceptual Map Showing Areas of Resource Concern

Saltwater Intrusion

NTB

SWUCA

Pinellas

Hillsborough

Polk

Manatee

Hardee

DeSoto

Sarasota

Charlotte

Highlands
Southwest Florida Water Management District

with West-Central Florida Ground-Water Basins
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
- Agricultural
- Industrial/Commercial
- Mining/Dewatering
- Public Supply
- Recreational

Dot Size Indicates Pumping Rate
- 0.5 MGD
- 1 MGD
- 5 MGD
Losing Stream
Generalized Potentiometric Surface of the Upper Floridan Aquifer along the Peace River

Water Level (ft above NGVD)

Approximate Distance (miles)

Lake Hancock

Charlotte Harbor

Polk Co.
Hardee Co.
DeSoto Co.
Charlotte Co.

Bartow
Fort Meade
Arcadia

Predevelopment

Land surface (Peace River)
Generalized Potentiometric Surface of the Upper Floridan Aquifer along the Peace River

- Polk Co.
- Hardee Co.
- DeSoto Co.
- Charlotte Co.

- Bartow
- Fort Meade
- Arcadia

Water Level (ft above NGVD)

Approximate Distance (miles)

Lake Hancock Charlotte Harbor

Average (1988-1992)

Land surface (Peace River)
Kissengen Spring ceased flow
Kissengen Spring Ceases Continuous Flow

SWUCA Groundwater Withdrawals = 320 mgd

SWUCA: Estimated Ground-Water Use

Based on ground-water levels and excluding Charlotte County

SWFWMD Begins Issuing WUPs

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
5. Develop projects to reestablish MFLs
6. 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
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
SWUCA Chronology

- **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
SWUCA Chronology

• 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
SWUCA Chronology

- **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
SWUCA Chronology

- **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
SWUCA Chronology

• 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)

70% of days

Year

Days
Upper Peace River Watershed

Lake Hancock

2002 Landsat

2004 DOQs
Upper Peace River Watershed

- Lake Hancock
- Peace Creek
- Karst Features
- "Reconnect" Lands
- Reservoir

2004 DOQs

2002 Landsat
Upper Peace River Recovery Projects

• Lake Hancock lake level modification
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• Reservoir
Lake Hancock Lake Level Modification Project

Outfall Treatment
Structure P-11
Days Fort Meade Flows Met MFL (27 cfs)

- Days Below MFL
- Days MFL Met Naturally

70% of days
Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (25 cfs Sink Losses)

87% of days
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

<table>
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<tr>
<th>Description</th>
<th>Cost (M)</th>
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<tr>
<td>Land Acquisition to date</td>
<td>$120 M</td>
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<td>Land Acquisition remaining</td>
<td>$30 M</td>
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<td>Structure (Des/Construction)</td>
<td>$6 M</td>
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<td>Mitigation (Des/Construction)</td>
<td>$14 M</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$170 M</strong></td>
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Note: Potential surplus of lands could offset some costs
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
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

Introduction
In October 2001, the U.S. Geological Survey (USGS) in cooperation with the Southwest Florida Water Management District (SWFWMD) began a study to evaluate the distribution, timing, and volume of surface-water to ground-water exchange in the Upper Peace River Hydrologic Area in Polk County, Florida. This area was above surface-water levels (standing streams, small and second-order recharge streams) and contained karst features, which are typically drained by interconnected high permeability (fractures) (Stewart 1996). Stratigraphy of the Peace River (fig. 1) altered the landscape. (2) altered the natural surface-water drainage patterns, and (3) changed the ground-water flow patterns by routing the upper 30 feet of sediment and lowering the potential for surface flow. Today, this area of the Peace River appears to be a flowing stream. Groundwater issues are generally small, but through karst features found in the low-order channels and the floodplains.

Karst Features
Locations, surface orientations, and dimensions of prominent karst features were measured in mid-May 2002 when waters of the river were dry. Examples of features are shown in the photographs. Mammal features (fig. 2) are a wadi or vughs, a group of vertical pipes; bobkrafts (fig. 3) is a vadose zone, a sub-aquifer with small fractures near the base; Dover sink (fig. 4) at the base of the cliff is located in the end of a 200-foot deep, discontinuous in the floodplain; and the caverns (fig. 5) includes multiple...
Cypress Root

Extent of flow on May 20, 2002

Extent of flow on June 25, 2002

Extent of upstream flow from June 19-24, 2002

Peace River near Bartow (7)

Midway (8)

Elephant Graveyard (9)

Cypress Root

Catacombs

Paternoster Complex

Dover Sink (10)
Extent of flow on May 20, 2002

Extent of flow on June 25, 2002

Extent of upstream flow from June 19-24, 2002

Peace River at Bartow (1)
Wabash (2)
Cypress Root
Corbett (3)
Cooke’s Ripple (4)
Ledges (6)
Harley
Jackson
Fricano (5)
Catacombs
Peace River near Bartow (7)
Midway (8)
Elephant Graveyard (9)
Paternoster Complex
Crevasses
Dover Sink (10)
Gator Log
The Ledges
Crevasses
Dover Sink
South
Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (25 cfs Sink Losses)

- Days Below MFL
- Days Met With Lake Hancock (25 cfs Sink Losses)
- Days MFL Met Naturally

87% of days
Days Fort Meade Flows Met MFL (27 cfs) with Lake Hancock (17 cfs Sink Losses)

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

89% of days
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

- Lake Hancock lake level modification
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Peace Creek
Peace Creek Canal
Peace Creek Canal
Peace Creek Canal
2002 Landsat

Peace Creek

2004 DOQs
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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”

94% of days
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
CS-11 Conceptual Cost Estimates

<table>
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<tr>
<th>Description</th>
<th>Cost</th>
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<tr>
<td>Land Acquisition</td>
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<tr>
<td>Design/Construction</td>
<td>$152.8 M</td>
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<td>Total</td>
<td>$163 M</td>
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Upper Peace River Recovery Projects

Questions?