Water Resource Management
Lee County & South Florida

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Director, Natural Resources Division

Lee County Board of County Commissioners
March 15, 2016
Presentation Overview

- Lee County Water Quality/Storage Initiatives
- Regional Initiatives
- Current Conditions
- Moving Forward
Lee County Initiatives

Proactive Role in addressing the quality, quantity, timing and distribution of surface waters in Lee County

• Capital Improvements
• TMDLs projects/programs
• Conservation Land
Caloosahatchee Watershed

- Caloosahatchee River – 70 miles, Moore Haven to Shell Point
- 1,400 square mile watershed
  - Shrinks during droughts
  - Expands with wet conditions
- Estuary of National and State Significance
Where the nutrients come from (based on 2011-15 Nitrogen data)

- TIDAL BASIN (ESTIMATED) 20%
- C-43 AND S-4 BASINS TO ESTUARY 48%
- LAKE OKEECHOBEE 32%
# BoCC Commitment to Water Quality/ Storage Improvements

<table>
<thead>
<tr>
<th>Local Water Quality/ Storage Projects Completed in the Last Five Years</th>
<th>Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Briarcliff / Fiddlesticks Water Quality Improvements</td>
<td>$2,125,588</td>
</tr>
<tr>
<td>Lakes Park Water Quality Project Filter Marsh</td>
<td>$3,073,620</td>
</tr>
<tr>
<td>Lakes Park Water Quality Project Structure Mod</td>
<td>$613,821</td>
</tr>
<tr>
<td>North Fort Myers Surface Water Improvements (various small projects)</td>
<td>$32,761</td>
</tr>
<tr>
<td>Palmona Park Water Quality Improvements</td>
<td>$554,535</td>
</tr>
<tr>
<td>Popash Creek Preserve</td>
<td>$1,554,319</td>
</tr>
<tr>
<td>Powell Creek Hydrological Restoration</td>
<td>$2,773,402</td>
</tr>
<tr>
<td>Powell Creek Weir / Valencia</td>
<td>$50,000</td>
</tr>
<tr>
<td>Spanish Creek Restoration (re-hydration and pond phase1)</td>
<td>$613,672</td>
</tr>
<tr>
<td>Ten Mile Canal Filter Marsh - Phase II</td>
<td>$2,128,886</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$13,520,604</strong></td>
</tr>
</tbody>
</table>
## BoCC Commitment to Water Quality/ Storage Improvements

<table>
<thead>
<tr>
<th>Local Water Projects Currently Underway</th>
<th>Total Spent to Date</th>
<th>Est Balance To Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fichter’s Creek Restoration</td>
<td>$ 403,722</td>
<td>$ 1,400,000</td>
</tr>
<tr>
<td>FPL Powerline Easement Project (Study Only)</td>
<td>-</td>
<td>$ 300,000</td>
</tr>
<tr>
<td>Halfway Creek Filter Marsh (Three Oaks)</td>
<td>$ 417,102</td>
<td>$ 60,000</td>
</tr>
<tr>
<td>Hendry Creek West Branch Water Quality Improvements</td>
<td>-</td>
<td>$ 2,500,000</td>
</tr>
<tr>
<td>Nalle Grade Storm Water Park</td>
<td>$ 245,933</td>
<td>$ 2,750,000</td>
</tr>
<tr>
<td>Prairie Pines Restoration</td>
<td>$ 207,835</td>
<td>$ 400,000</td>
</tr>
<tr>
<td>Spanish Creek Restoration Project (pond phase 2)</td>
<td>-</td>
<td>$ 300,000</td>
</tr>
<tr>
<td>Yellow Fever Creek / Gator Slough Improvements</td>
<td>$ 208,614</td>
<td>$ 500,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 1,483,206</strong></td>
<td><strong>$ 8,210,000</strong></td>
</tr>
</tbody>
</table>
## BoCC Commitment to Water Quality/ Storage Improvements

### Future Local Water Improvement Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Lagoon Preserve</td>
<td>$ 3,000,000</td>
</tr>
<tr>
<td>Lakes Park Littoral Zones</td>
<td>$ 400,000</td>
</tr>
<tr>
<td>Sunniland / Nine Mile Run</td>
<td>$ 600,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 4,000,000</strong></td>
</tr>
</tbody>
</table>

### Future Regional Water Improvement Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Spent to date</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caloosahatchee Crosslinks/GS-10 Project (w/ LAMSID)</td>
<td>$40,000</td>
<td>$ TBD</td>
</tr>
<tr>
<td>Boma ( Caloosahatchee C-43 Water Quality Facility) (w/ SFWMD) (1700 acre land purchase in 2007)</td>
<td>$10,000,000</td>
<td>$ TBD</td>
</tr>
</tbody>
</table>
## Lee County prior projects (> 5 yrs)

<table>
<thead>
<tr>
<th>Prior Water Project</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten Mile Canal Filter Marsh Phase 1</td>
<td>$2,020,000</td>
</tr>
<tr>
<td>Ten Mile Canal Hanson Improvements</td>
<td>$313,988</td>
</tr>
<tr>
<td>Island Park Filter Marsh</td>
<td>$1,600,000</td>
</tr>
<tr>
<td>East Mulloch Drainage District – floating vegetation islands</td>
<td>$55,050</td>
</tr>
<tr>
<td>East Mulloch Drainage District – weir replacement and littoral planting</td>
<td>$595,820</td>
</tr>
<tr>
<td>Gator Slough Flow-way (Phase I&amp;II Improvements)</td>
<td>$1,672,136</td>
</tr>
<tr>
<td>Gator Slough Channel Improvements</td>
<td>$3,250,916</td>
</tr>
<tr>
<td>Powell Creek Algal Turf Scrubber pilot</td>
<td>$427,000</td>
</tr>
<tr>
<td>Halfway Creek Filter Marsh (FPL site)</td>
<td>$211,512</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$10,146,422</strong></td>
</tr>
</tbody>
</table>
LEE COUNTY WATER QUALITY PROJECTS
Represents $31.8M Commitment

Projects
- Complete
- In Progress
- Planning

3/10/2016

Map source: © OpenStreetMap contributors and the ODbL User Community
Ten Mile Canal Filter Marsh
Gator Slough
Lakes Park Flow-way
Water Quality Source Control
Lee County Fertilizer Ordinance
C2020 $316m, 25,000 acres

State/Federal and other conservation lands /preserves: 69,536 acres

Private: 3605 acres
20/20 Lands

- County staff investigated opportunities to store water
- Most parcels were wet due to local rainfall
- Additional storage would entail extensive physical alterations with associated costs and permitting of infrastructure
  - Additional 1 foot of storage on all 20/20 lands within Caloosahatchee watershed would add 14,000 acre-feet of water – or 22 hours of Lake Okeechobee releases
- Threat to existing ecosystems and adjacent property owners
C2020 Storage - February 12, 2016

Popash Creek Preserve

Daniels Preserve
Regional Issues

Pre-Development

Post-Development
Central & South Florida (C&SF) Project

- Designed for multiple purposes
  - Flood Control
  - Water Supply
  - Navigation
  - Prevention of Saltwater Intrusion
  - Protection of Fish & Wildlife
- Constructed by the U.S. Army Corps of Engineers between 1949 and 1970
Water Management System

- 2,100 miles of canals
- 2,000 miles of levees
- 1,225 water control structures/culverts
- 71 stormwater pumping stations
- Regional telemetry system
- 57,000 acres of regional wetland Stormwater Treatment Areas
- Lake Okeechobee
  - 450,000 acre water storage
- Water Conservation Areas
  - 959,000 acre water storage
Challenges to Moving Water South

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Constraint</th>
</tr>
</thead>
<tbody>
<tr>
<td>☁️</td>
<td>Weather Patterns</td>
</tr>
<tr>
<td>⛧</td>
<td>Herbert Hoover Dike</td>
</tr>
<tr>
<td>💧</td>
<td>2008 LORS</td>
</tr>
<tr>
<td>🔧</td>
<td>Structure Capacity</td>
</tr>
<tr>
<td>🛤️</td>
<td>Canal Conveyance</td>
</tr>
<tr>
<td>🐘</td>
<td>Species protection</td>
</tr>
<tr>
<td>🔝</td>
<td>STA Treatment Capability</td>
</tr>
<tr>
<td>💲</td>
<td>Pump Capacity</td>
</tr>
<tr>
<td>🛤️</td>
<td>STA 5 / 6 Connectivity</td>
</tr>
<tr>
<td>🦃</td>
<td>Wildlife Management Area</td>
</tr>
<tr>
<td>🌊</td>
<td>Water Level Limitation</td>
</tr>
<tr>
<td>🌊</td>
<td>(Tree Islands &amp; Wildlife)</td>
</tr>
<tr>
<td>🛤️</td>
<td>LEC Canal Conveyance</td>
</tr>
<tr>
<td>🔥</td>
<td>Levee Safety</td>
</tr>
<tr>
<td>🔥</td>
<td>Flow Limitation</td>
</tr>
<tr>
<td>🔥</td>
<td>Flood Risk (G3273, SDCS)</td>
</tr>
</tbody>
</table>
Comprehensive Everglades Restoration Plan

- 50/50 state-federal partnership
- Restore and improve quality, quantity, timing and flow of water
- Provide sustainable water supply to meet environmental, agricultural and urban needs
Maximizing Storage: Utilizing Public and Private Lands
Moving Forward: Build Project & Provide Benefits

- Complete ongoing projects and start seeing benefits
- Send more clean water south
- Look for additional storage opportunities
Current Conditions

C&SF System Status Update

Average Daily Conditions as of: 15 March 2016, 0000 hrs

Lake Okeechobee Stage
15.41 ft

Previous Day: 15.44 ft
One Week Ago: 15.65 ft
7-Day Trend: Falling

Structure Flows
Total Inflow: 1,430 cfs
Total Outflow: 7,190 cfs

Estimated Net Gains (+)/Losses (-)
Direct Rain/ET/Others: -.740 cfs

Current Average Target Outflows
S-77: 4,000 cfs
S-80: 1,800 cfs

Area | Stage | Departure from Reg. | 7-Day Trend
--- | --- | --- | ---
WCA-1 | WCA1S ft | WCA1D | WCA1T
WCA-2A | WCA2S ft | WCA2D | WCA2T
WCA-3A | WCA3S ft | WCA3D | WCA3T

For more detailed information please see our other reports:
http://s3.amazonaws.com/myh2oreports.png

Elevations are in feet, NOVO29. Flows are in average daily CFS. All data is provisional and subject to revision.
January Rainfall

DISTRICT-WIDE: 9.18”
476% of Avg. or +7.25”

- Wettest January since record keeping began in 1932
- Nearly all basins received more than 300 percent of average
- SW Coast received 11.54”
- Lee County – 11.2” average
January 26-29, 2016 Rainfall

Most of the recent event was concentrated on the 3 calendar days Jan-26 to Jan-29 with a total of ~ 3.9” in 3 days

- Lake Okeechobee vicinity received 3-6”
Caloosahatchee Estuary

Data are provisional and subject to change

Weekly Average Inflow

Inflow from Lake: 1483 cfs
C-43 Basin Inflow: 8911 cfs
Tidal Basin Inflow: 2436 cfs
Total: 12830 cfs

Weekly Average Inflow

- Inflow from Lake*: 4158 cfs
- C-43 Basin Inflow: 1412 cfs
- Tidal Basin Inflow: 251 cfs
- Total: 5821 cfs

Data are provisional and subject to change

Flow (cfs)

1/1/16  1/10/16  1/19/16  1/28/16  2/6/16  2/15/16  2/24/16  3/4/16  3/13/16

Tidal Basin Inflow (downstream of S-79)  C-43 Basin Inflow
Inflow from Lake* (using downstream gauge)

Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.
Current Conditions
Lee County - Water Action Plan

Operations / Lake Okeechobee Management
• Pursue Lake O Regulation Schedule modifications post Dam Risk Assessment Study
• Advocate shared adversity

State Funding / Cost Share
• Continue support Legacy Florida for Everglades funding
• Continue support for C-43 Reservoir
• Continue support for Boma Water Quality Project
• Continue pursuit of local water quality project funding

Federal
• Advocate completion of Herbert Hoover Dike Repairs
• Support authorization of Central Everglades Planning Project (CEPP) – WRDA 2016
• Support completion of Comprehensive Everglades Restoration Plan (CERP)

Local
• Utilize water storage capabilities of C2020 and other public lands where practicable
• Continue water quality projects and programs in fulfillment of TMDL obligations
Lee County Investments in Water Quality/ Storage

How long?
Since the late 80’s Lee County has taken pro-active measures to address impairments to our waterways and preserve our natural systems.

How much?
• 25,000 acres purchased ($316m) from C2020 land acquisition program
• $25m spent on projects in last 5-10 years
• $12.2m planned future projects
• $60m estimated project expenditures over next 15 years for balance of TMDL compliance
• $96m spent over the last 5 years in capital and operations towards stormwater management activities (per NPDES reporting data)

Milestones:
• Six Mile Cypress Slough Land Purchases (1980)
• CREW Land Purchases (1989)
• Weir structures added to Six Mile Cypress, Kehl Canal, Whiskey Creek to retain water (late 80’s , early 90’s)
• C2020 (1996)
• NPDES MS4 permit holder (1997)
• Ten Mile Canal –first filter marsh (2005)
• Northern Everglades Estuary Protection Act (NEEPA)- Boma purchase (2007)
• TMDL/ BMAP stakeholder (2008-9/2012)
Questions?