St. Lucie River Watershed Protection Plan

Jodie Hutchins, P.E., Lead Engineer
South Florida Water Management District
August 28, 2020

St. Lucie Estuary in Martin County
Menti.com Instructions

➢ Step 1: Open a new internet browser on your computer or smart phone (such as Internet Explorer, Safari, Google, or Edge). To view all public input leave the Zoom meeting window open. We will be coming back to the Zoom Meeting for Q&A.

➢ Step 2: Type the web address, Menti.com and hit enter.

➢ Step 3: Enter the Menti Code in the box on your screen and click “Submit”

Today’s Code:

15 02 15 8
Objectives

➢ Engage stakeholders and the public in a collaborative approach to meet Northern Everglades & Estuaries Protection Program (NEEPP) goals

➢ Identify projects, activities, and programs that can be implemented for additional water quality improvements, with an emphasis on meeting reduction goals

➢ Review St. Lucie River Watershed (SLRW) characteristics, recent data, and projects and programs

➢ Prioritize areas for South Florida Water Management District (SFWMD) focused assessments to identify sources and integrated solutions

sfwmd.gov/wpps
Workshop Schedule

➢ June 26 - Kickoff and Overview
➢ July 21 – Lake Okeechobee Watershed
➢ August 28 - St. Lucie River Watershed
➢ September 2 – Caloosahatchee River Watershed

sfwmd.gov/wpps
NEEPP: Coordinating Agency Roles

Northern Everglades and Estuaries Protection Program (F.S. 373.4595)

- Lake Okeechobee (LO) Watershed Protection Program
  - LO Internal Phosphorus Management Program (SFWMD)
  - Watershed Protection Plans (WPPs) (SFWMD)
  - Research & Monitoring Program (Primarily SFWMD)

- Caloosahatchee River Estuary and St. Lucie River Watershed Protection Programs
  - Agricultural BMPs (FDACS) (FDEP)
  - Basin Management Action Plans (BMAPs) (FDEP)
  - Exotic Species Control Program (Coordinating Agencies)
    - Water storage projects
    - Water treatment projects
    - Wetland restoration
    - Hydrologic restoration
    - Cost Share Programs
    - Chapter 40E-61, FAC

Watershed Construction Projects & Programs (SFWMD)
NEEPP: Coordinating Agency Roles

➢ Watershed Protection Plans (WPPs) Inform FDEP in BMAP Progress Reports & 5-Year Updates
➢ Research and Water Quality Monitoring Program
  ▪ Comprehensive monitoring network
    ● Flow, water quality, precipitation, biology, etc.
    ● Major structures, upstream, and estuarine
    ● Research and modeling of a wide-range of ecosystem processes
➢ Watershed Construction Projects & Programs
  ▪ Programs
  ▪ Regional projects
  ▪ New Projects
  ▪ Project costs
  ▪ Estimated and measured project performance
➢ When combined with information from other agencies, WPPs help further understanding of the ecosystem, identify problems/deficiencies, and lead future restoration activities.

sfwmd.gov
Workshop Approach for Identifying Solutions

1. Summarize Water Quality Data
2. Prioritize areas of focus
3. Account for existing projects and programs
4. Define the gaps & remaining “problems”
5. Identify potential solutions via projects and programs
6. Feedback to Coordinating Agencies
7. Facilitate discussions to propose solutions to problems
Considerations

Parameters

➢ **Nutrient Load**: The cumulative weight of a constituent transported (usually by stormwater) passed the point of measurement. Commonly expressed in pounds (lbs) or metric tons (t).

➢ **UAL**: Unit Area Load is the nutrient load per acre of area.

➢ **Discharge Volume** (acre-feet): Amount of water required to cover 1 acre of land to a depth of 1 foot.

➢ **Runoff** (inches): The depth to which the drainage area would be covered.

➢ **FWMC**: Flow Weighted Mean Concentration: Represents the average concentration of a constituent that passes through a structure relative to the total flow volume passing through.

Other

➢ **Project Site Selection**

➢ **Proximity to Receiving Body**

➢ **Planned Projects**

➢ **Quick fix vs. Long-term**
Land Uses (2014-2016)
St. Lucie Estuary TMDL:

- **Total Phosphorus (TP):** 0.081 mg/L
- **Total Nitrogen (TN):** 0.720 mg/L

**HR1**
- TP Average = 0.189 mg/L
- TN Average = 0.890 mg/L

**SE03**
- TP Average = 0.157 mg/L
- TN Average = 0.850 mg/L

**SE08B**
- TP Average = 1.080 mg/L
- TN Average = 1.080 mg/L

Source: 2021 South Florida Environmental Report - DRAFT
St. Lucie River Watershed Monitoring Data WY2016 – WY2020

5-Year Average Flow

- St. Lucie Basins: 45%
- Lake O: 32%
- Tidal Basins: 23%
- C-44 Basin: 10%
- C-23 Basin: 11%
- C-24 Basin: 13%
- Ten Mile Creek Basin: 11%

5-Year Average TP Load

- St. Lucie Basins: 64%
- Lake O: 26%
- Tidal Basins: 10%
- C-44 Basin: 15%
- C-23 Basin: 16%
- C-24 Basin: 18%
- Ten Mile Creek Basin: 15%

5-Year Average TN Load

- St. Lucie Basins: 45%
- Lake O: 34%
- Tidal Basins: 17%
- C-44 Basin: 10%
- C-23 Basin: 12%
- C-24 Basin: 14%
- Ten Mile Creek Basin: 9%
Accounting for Lake Okeechobee’s Contribution

- Northern Everglades watersheds are all connected by Lake Okeechobee
- Each watershed has individual restoration goals and BMAPs
- St. Lucie River and Estuary BMAP assigns allocations and accounts for projects within the SLRW.
- Lake contributions accounted for in:
  - WPPs through regional projects and programs
  - BMAPs through Targets Restoration Area (TRA) Process
### SLRW 5-year Average for WY2016-WY2020

<table>
<thead>
<tr>
<th>Basin</th>
<th>TP UAL (lb/ac)</th>
<th>TP Load (t)</th>
<th>TP FWMC (mg/L)</th>
<th>Runoff (Inches)</th>
<th>Area (ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten Mile Creek</td>
<td>2.35</td>
<td>43.0</td>
<td>0.292</td>
<td>34.14</td>
<td>40,327</td>
</tr>
<tr>
<td>C-24</td>
<td>1.38</td>
<td>52.3</td>
<td>0.321</td>
<td>18.20</td>
<td>83,373</td>
</tr>
<tr>
<td>C-23</td>
<td>0.94</td>
<td>47.1</td>
<td>0.338</td>
<td>11.70</td>
<td>110,872</td>
</tr>
<tr>
<td>C-44</td>
<td>0.72</td>
<td>43.6</td>
<td>0.348</td>
<td>9.03</td>
<td>132,705</td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>0.40</td>
<td>30.7</td>
<td>0.117</td>
<td>15.82</td>
<td>170,509</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basin</th>
<th>TN UAL (lb/ac)</th>
<th>TN Load (t)</th>
<th>TN FWMC (mg/L)</th>
<th>Runoff (Inches)</th>
<th>Area (ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten Mile Creek</td>
<td>8.28</td>
<td>151.5</td>
<td>1.06</td>
<td>34.14</td>
<td>40,327</td>
</tr>
<tr>
<td>C-24</td>
<td>6.39</td>
<td>241.8</td>
<td>1.53</td>
<td>18.20</td>
<td>83,373</td>
</tr>
<tr>
<td>C-23</td>
<td>4.14</td>
<td>208.1</td>
<td>1.5</td>
<td>11.70</td>
<td>110,872</td>
</tr>
<tr>
<td>Tidal Basin</td>
<td>3.72</td>
<td>287.5</td>
<td>1.11</td>
<td>15.82</td>
<td>170,509</td>
</tr>
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<td>C-44</td>
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<td>162.6</td>
<td>1.35</td>
<td>9.03</td>
<td>132,705</td>
</tr>
</tbody>
</table>

Source: 2021 South Florida Environmental Report - DRAFT
Upstream Monitoring Data
Upstream Monitoring Data (C-23, C-24, C-44 Basins)

Five Year Average TN Concentration
- <720 µg/L
- 721-1100 µg/L
- 1101-1600 µg/L
- >1600 µg/L
- No WY2016-2020 Data

Five Year Average TP Concentration
- <81 µg/L
- 82-180 µg/L
- 181-300 µg/L
- >300 µg/L
- No WY2016-2020 Data

Source: 2021 South Florida Environmental Report - DRAFT
Upstream Monitoring Data (Tidal Basins)

Five Year Average TN Concentration
- <720 µg/L
- 721-1100 µg/L
- 1101-1600 µg/L
- >1600 µg/L
- No WY2016-2020 Data

Five Year Average TP Concentration
- <81 µg/L
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- >300 µg/L
- No WY2016-2020 Data

Source: 2021 South Florida Environmental Report - DRAFT
Estimated Progress toward Achieving TMDL Based on Projects

Cumulative TP Reduction (t)
- 185 t by 2020
- 86 t by 2023
- 15-Year Milestone

Cumulative TN Reduction (t)
- 568 t by 2020
- 386 t by 2023
- 15-Year Milestone

Source – 2020 St. Lucie River and Estuary BMAP
BMAP reductions estimated with modeled concentrations.
BMAP modeled concentrations represent the average modeled outputs from 2007 – 2016.
Measured data using the most recent 5-year period 2016 - 2020.

<table>
<thead>
<tr>
<th>Basin</th>
<th>TP Modeled Concentration (mg/L)</th>
<th>Required Reduction to meet TMDL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-23</td>
<td>0.352</td>
<td>77</td>
</tr>
<tr>
<td>C-24</td>
<td>0.279</td>
<td>71</td>
</tr>
<tr>
<td>C-44</td>
<td>0.111</td>
<td>27</td>
</tr>
<tr>
<td>Ten Mile Creek</td>
<td>0.201</td>
<td>60</td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>0.175</td>
<td>51</td>
</tr>
<tr>
<td><strong>TP Measured Concentration (mg/L)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-23</td>
<td>0.338</td>
<td></td>
</tr>
<tr>
<td>C-24</td>
<td>0.321</td>
<td></td>
</tr>
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<tr>
<th>Basin</th>
<th>TN Modeled Concentration (mg/L)</th>
<th>Required Reduction to meet TMDL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-23</td>
<td>1.74</td>
<td>59</td>
</tr>
<tr>
<td>C-24</td>
<td>1.71</td>
<td>58</td>
</tr>
<tr>
<td>C-44</td>
<td>0.92</td>
<td>22</td>
</tr>
<tr>
<td>Ten Mile Creek</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>0.906</td>
<td>20</td>
</tr>
<tr>
<td><strong>TN Measured Concentration (mg/L)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-23</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>C-24</td>
<td>1.53</td>
<td></td>
</tr>
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<td>1.35</td>
<td></td>
</tr>
<tr>
<td>Ten Mile Creek</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>1.11</td>
<td></td>
</tr>
</tbody>
</table>

a. Source – 2020 St. Lucie River and Estuary BMAP
b. Represents the average concentrations for the Tidal Basins reported in the BMAP.
c. Source- 2021 South Florida Environmental Report – DRAFT
d. Represents the average concentrations for 29 upstream monitoring sites.
### Reduction Goals & Expected Reductions from Projects

<table>
<thead>
<tr>
<th>Basin</th>
<th>TP (t/yr)</th>
<th>TN (t/yr)</th>
<th>Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLRW Total</td>
<td>185</td>
<td>568</td>
<td></td>
</tr>
<tr>
<td>C-23</td>
<td>59</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>58</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>C-24</td>
<td>40</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Ten Mile Creek</td>
<td>14</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>C-44</td>
<td>14</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basin</th>
<th>TP (t/yr)</th>
<th>TN (t/yr)</th>
<th>Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLRW Total</td>
<td>90</td>
<td>334</td>
<td>33%</td>
</tr>
<tr>
<td>C-23</td>
<td>29</td>
<td>113</td>
<td>15%</td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>5</td>
<td>19</td>
<td>86%</td>
</tr>
<tr>
<td>C-24</td>
<td>17</td>
<td>71</td>
<td>57%</td>
</tr>
<tr>
<td>Ten Mile Creek</td>
<td>4</td>
<td>19</td>
<td>58%</td>
</tr>
<tr>
<td>C-44</td>
<td>35</td>
<td>112</td>
<td>-167%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basin</th>
<th>TP (t/yr)</th>
<th>TN (t/yr)</th>
<th>Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLRW Total</td>
<td>34</td>
<td>82</td>
<td>27%</td>
</tr>
<tr>
<td>C-23</td>
<td>21</td>
<td>16</td>
<td>23%</td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>8</td>
<td>55</td>
<td>64%</td>
</tr>
<tr>
<td>C-24</td>
<td>-</td>
<td>-</td>
<td>53%</td>
</tr>
<tr>
<td>Ten Mile Creek</td>
<td>-</td>
<td>-</td>
<td>41%</td>
</tr>
<tr>
<td>C-44</td>
<td>-11</td>
<td>-11</td>
<td>-93%</td>
</tr>
</tbody>
</table>

**Reductions from projects are estimates**
## Watershed Storage Goals & Progress

### Protection Plan Storage Goal

| SLRW | 200,000 AF |

<table>
<thead>
<tr>
<th>Expected Storage</th>
<th>Storage (AF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin</td>
<td></td>
</tr>
<tr>
<td>C-44</td>
<td>128,005</td>
</tr>
<tr>
<td>C-23</td>
<td>96,651</td>
</tr>
<tr>
<td>C-24</td>
<td>57,408</td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>7,500</td>
</tr>
<tr>
<td>Ten Mile Creek</td>
<td>2,104</td>
</tr>
<tr>
<td>Total</td>
<td>291,668</td>
</tr>
</tbody>
</table>

*Expected Storage from projects are estimates*
## Putting It All Together

<table>
<thead>
<tr>
<th>Basin</th>
<th>Measured Data Results</th>
<th>Reduction Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TP UAL (lbs/ac)</td>
<td>TN UAL (lbs/ac)</td>
</tr>
<tr>
<td>Ten Mile Creek</td>
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<td>C-23</td>
<td>0.94</td>
<td>4.14</td>
</tr>
<tr>
<td>C-44</td>
<td>0.72</td>
<td>2.70</td>
</tr>
<tr>
<td>Tidal Basins</td>
<td>0.40</td>
<td>3.72</td>
</tr>
</tbody>
</table>
The St. Lucie Basins are the greatest contributor of the basins’ total flow, TP load and TN load to the St. Lucie Estuary when reviewing measured data.

Lake Okeechobee is also a significant contributor. Accounted for in WPPs through regional projects and programs, and in the BMAPs Targeted Restoration Area process.

Of the St. Lucie Basins, the C-24 and TMC have the highest UAL and runoff.

The C-24, TMC, and Tidal Basins have the greatest deficit in required reductions based on the BMAP reduction goals and SFWMD and BMAP project estimates.

Upstream monitoring concentrations are the lowest in the C-44 and Tidal Basins.

C-24 and TMC basins selected by the SFWMD team of experts as priorities for conducting detailed assessments; however, not locked into any area to focus on.
Next Steps

➢ Gather detailed information on focus areas
➢ Perform detailed assessments to identify all potential contributing sources and potentially responsible entities (e.g. local ordinances to control urban runoff, stricter ERPs, more NOIs, septic tank hook ups, etc.)
➢ Assess SFWMD existing project/program performance and cost effectiveness
➢ Identify problems and potential solutions
➢ Adjust and change course as necessary based on findings/feedback
➢ Future workshops to discuss findings and recommendations
➢ Comment by September 15
Watershed Protection Planning Website

The 2016 Northern Everglades and Estuaries Protection Program (NEEPP; Section 373.4565, F.S.) describes the legislative intent to protect and restore surface water resources and achieve and maintain compliance with water quality standards in the Northern Everglades through a phased, comprehensive and innovative protection program that includes long-term solutions based upon the state’s total maximum daily loads (TMDLs) established in accordance with Section 403.067, F.S. The Northern Everglades watersheds include Lake Okeechobee watershed and the Caloosahatchee and St. Lucie River watersheds and estuaries (see map).

NEEPP requires watershed protection programs to improve the quality, quantity, timing and distribution of water in the Northern Everglades ecosystem. The programs are watershed specific and comprised of research and monitoring, development and implementation of best management practices, refinement of existing regulations, and structural and nonstructural projects, including public works. The programs are driven by FDEP’s Basin Management Action Plans (BMAPs) and supported, in part, by the Watershed Protection Plans (WPPs) developed by the District and integrated with FDEP and FDACS programs to control nutrient sources at the local, subregional, and regional levels.

GEOGRAPHIC AREA

Northern Everglades map:
Map of current Northern Everglades and Estuaries Protection Program boundaries
Have a question?

➢ Please use the Q & A feature using zoom to type in your question so that we respond.
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Today’s Code: 15 02 15 8
Public Comment

Want to comment?

➢ Each speaker will have 3 minutes complete their comment

➢ Please remember to first state your name and who you are representing for the record.

➢ Zoom audio/microphone
  ▪ If you’re participating via zoom – use the Raise Hand feature

➢ Phone
  ▪ If you’re participating via you phone –
  ▪ *9 Raises Hand
  ▪ *6 Mutes/Unmutes your phone