Tidal Tributary Restoration by Modification of Salinity Control Structures in Tampa Bay, Florida

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GPI
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Channel A & G Pilot Monitoring Project
Freshwater Inflow

Structure A-1
Rocky Creek enters Channel A

Structure G-1
Sweetwater Creek enters Channel G
Gates

Channel A gate

Channel G gate
Pilot Project Monitoring

• Collect baseline data and monitor changes post-modification.

• Data included:
  – Benthic invertebrates
  – Surface water quality
  – Groundwater quality
  – Vegetation changes
  – Fish assemblages
  – Bathymetry, sediment chemistry, microalgae (not in presentation)
Results

Photo credit: Nanette O’Hara
The project restored .70 miles/3,685 feet of tidal tributary
Benthic Invertebrates

Percentage Marine and Estuarine Fauna

- Channel A
- Channel G
- Rocky Creek

<table>
<thead>
<tr>
<th>Year</th>
<th>Channel A</th>
<th>Channel G</th>
<th>Rocky Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>60</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>2012</td>
<td>47</td>
<td>49</td>
<td>6</td>
</tr>
<tr>
<td>2014</td>
<td>82</td>
<td>60</td>
<td>14</td>
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</tbody>
</table>
Surface Water Quality
## Land-based sampling

<table>
<thead>
<tr>
<th>Channel</th>
<th>Site</th>
<th>Water Depth (m)</th>
<th>Baseline Avg</th>
<th>Post-Modification Avg</th>
<th>Baseline Max</th>
<th>Post-Mod Max</th>
<th>St. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G - above</td>
<td>2</td>
<td>0.61</td>
<td>0.18</td>
<td>0.14</td>
<td>0.22</td>
<td>0.21</td>
<td>0.05</td>
</tr>
<tr>
<td>G - above</td>
<td>3</td>
<td>0.61</td>
<td>0.32</td>
<td>0.3</td>
<td>0.43</td>
<td>0.59</td>
<td>0.16</td>
</tr>
<tr>
<td>G - below</td>
<td>5</td>
<td>0.61</td>
<td>2.09</td>
<td>4.37</td>
<td>5.08</td>
<td>10.41</td>
<td>3.07</td>
</tr>
<tr>
<td>A - above</td>
<td>9</td>
<td>0.61</td>
<td>0.46</td>
<td>5.04</td>
<td>0.68</td>
<td>15.01</td>
<td>6.84</td>
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<tr>
<td>A - above</td>
<td>10</td>
<td>0.48</td>
<td>0.33</td>
<td>3.42</td>
<td>0.49</td>
<td>15.34</td>
<td>5.9</td>
</tr>
<tr>
<td>A - above</td>
<td>11</td>
<td>0.61</td>
<td>0.26</td>
<td>1.17</td>
<td>0.36</td>
<td>8.07</td>
<td>2.79</td>
</tr>
<tr>
<td>A - below</td>
<td>8</td>
<td>0.61</td>
<td>18.86</td>
<td>13.12</td>
<td>21.23</td>
<td>20.79</td>
<td>2.82</td>
</tr>
</tbody>
</table>
Sonde sampling
Other surface water sampling

- Citizen WQ Sampling
- Hillsborough EPC sampling data
- Surface WQ Results:
  - Salinity highly variable in system, esp above structures
  - DO levels improved in some sampling, fluctuate in others
  - Water levels affected
  - System becoming more tidal
Groundwater
# Groundwater

<table>
<thead>
<tr>
<th>Salinity (ppt)</th>
<th>Ch A Baseline</th>
<th>Ch A Post</th>
<th>Ch G Baseline</th>
<th>Ch G Post</th>
<th>Sheldon Base</th>
<th>Sheldon Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>average</td>
<td>0.74</td>
<td>0.72</td>
<td>3.43</td>
<td>3.52</td>
<td>0.6</td>
<td>0.61</td>
</tr>
<tr>
<td>median</td>
<td>0.74</td>
<td>0.72</td>
<td>3.43</td>
<td>3.52</td>
<td>0.6</td>
<td>0.62</td>
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<tr>
<td>maximum</td>
<td>0.75</td>
<td>0.81</td>
<td>3.46</td>
<td>3.95</td>
<td>0.6</td>
<td>0.63</td>
</tr>
<tr>
<td>minimum</td>
<td>0.74</td>
<td>0.71</td>
<td>3.38</td>
<td>3.37</td>
<td>0.59</td>
<td>0.58</td>
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<tr>
<td>standard dev</td>
<td>0.02</td>
<td>0.06</td>
<td>0.06</td>
<td>0.50</td>
<td>0.02</td>
<td>0.20</td>
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Vegetation Survey
Fish Sampling

Photo credit: Nanette O’Hara
Juvenile Snook
Fish salinity tolerance

Salinity Tolerance Index

- Channel A Below
- Channel G Above
- Channel G Below

August 2011
February 2015
June 2015
Summary
Thanks

• Co-authors:
  – Ed Sherwood- TBEP
  – Nancy Norton- SWFWMD
  – Lizanne Garcia- SWFWMD
Current sampling questions?