Oak Lake Wetland Restoration: Difference in Hydrology between Newly Restored and Reference Wetlands

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Oak Lake Wetland Restoration: Difference in Hydrology between Newly Restored and Reference Wetlands

Jennifer A. Dailey & Nels H. Troelstrup, Jr., Ph.D.
Wetland Restoration

• Wetlands have been decreasing since the 1780s
  – Upwards of 87% lost; rate of loss has slowed, but not stopped
• Restoration programs started in the 1900s
• State and federal agencies as well as non-profits work on wetland restoration projects
  – USFWS, USDA, Ducks Unlimited
• The goal is to return the wetland functions and services to levels consistent to a reference wetland in the region
Location

- Red circle = Restored Wetland
- Green circle = Reference Wetland
Locations of the Wetlands

• Reference Wetland

<table>
<thead>
<tr>
<th></th>
<th>Reference</th>
<th>Restored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin Length</td>
<td>92 M</td>
<td>133 M</td>
</tr>
<tr>
<td>Basin Width</td>
<td>73 M</td>
<td>54 M</td>
</tr>
<tr>
<td>Average Depth</td>
<td>37 cm</td>
<td>32 cm</td>
</tr>
</tbody>
</table>

• 1.74 kilometers apart
• Very similar area and depth

• Restored Wetland
Objectives

• Look at three main attributes for both reference and restored wetlands
  – Wetland Hydrology
    • Hydroperiod, dynamic responses (dry/wet periods)
  – Water Chemistry
    • Similar fluctuations & ranges
  – Invertebrate Assemblage Structure
    • Total abundance, composition, & number of species
Wetland Hydrology

• Hydroperiod – Intermittent
  – Most important factor when considering stability of a wetland
  – Period of time that the basin holds water

• Dynamics
  – Dry or wet periods of a wetland
  – Storm Response
Methods

- Measuring Hydroperiod and Dynamics
  - Hobo Data Loggers
    - Set a recording start date
    - Deploy in wetland
    - Retrieve & Replace
    - Download Data & Analyze it
  - Weekly Depth Measurements
    - 3 marked locations
Reference Wetland Dry/Wet Period

<table>
<thead>
<tr>
<th>Time</th>
<th>Temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/24/18 0:00</td>
<td></td>
</tr>
<tr>
<td>7/9/18 0:00</td>
<td></td>
</tr>
<tr>
<td>7/24/18 0:00</td>
<td></td>
</tr>
<tr>
<td>8/8/18 0:00</td>
<td></td>
</tr>
<tr>
<td>8/23/18 0:00</td>
<td></td>
</tr>
</tbody>
</table>

The graph shows the temperature changes over time, with a vertical line indicating the period when the wetland began drying and the dry period.
Conclusion

• Hydroperiod
  – Wet longer than 2017, but still doesn’t hold water as long as reference
• Dynamic responses (dry/wet periods)
  – Similar in both wetlands; depth increase after rainfall events
• Restored basin has wetland hydrology
  – Hydrology is there; looks more like reference every year
Acknowledgements

• Oak Lake Field Station
  – Charles & Marcia McMullen
• Department of Natural Resource Management
• South Dakota Agriculture Experiment Station
• Dr. Troelstrup
• Kate Wollman and Ashlee Nilson