Management Measures for Sustaining Vegetation Health and Performance in Emergent Cells

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Maximize P Uptake

Maintain Sustainable Uptake Processes and Mechanisms
In emergent cells P uptake is provided primarily by dense cattail stands.
In emergent cells P sequestration occurs primarily by microbial processes within the dead and decomposing litter layer. Healthy cattail stands provide constant production of the leaf litter that sustains these P uptake processes and leads to the eventual burial of the sequestered P.
Water Depths in

STA 3/4 - Cell 1A – Target Depth = 1.25 ft

One day during POR with depth < 0.5 ft

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<thead>
<tr>
<th>Year</th>
<th>3 - 3.5 ft</th>
<th>3.5 - 4 ft</th>
<th>&gt; 4 ft</th>
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<tr>
<td>2005-06</td>
<td>40</td>
<td>30</td>
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<td>2006-07</td>
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<td>2009-10</td>
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Frequent deep water (> 3 ft) events such as these impact the health of cattail stands and lead to declining densities of live plants.
Typical Cattail Densities in STAs – 12-15 ramets / m² (Toth and Galloway 2009), and are similar to impacted areas of WCA 2A (Miao and Sklar 1998, Weisner and Miao 2004)

STA-3/4 Cell 1A (n=20) – densities 50-75% lower than healthy stands

- Adult
- Juvenile
Declining densities of live cattail culms will eventually eliminate the litter-related P uptake pathway and thereby impact performance.
Depth induced degradation can be prevented by providing favorable conditions for new growth
Revitalization of Cattail Stands in Cell 1A of STA 3/4

Dry season (March-May) Drawdown of Water Levels
- Establishment of new seedlings and clonal expansion

Managed Stage and Discharge Recovery Period (June)
- Slow increase of water levels will maximize survivorship and recruitment of new growth and
  - Reestablish microbial uptake pathways

Online in July
Extensive Scientific Literature on the Need for Drawdowns to Maintain Health of Wetland Plant Communities


Hydraulic short circuits preclude the sheet flow across the cell that is necessary to maximize P uptake
A bioengineering approach for reducing or possibly eliminating the impacts of these short circuits is to use bales of cattail to block and redistribute flow. Capitalize on the conditions provided by the dry season drawdown of Cell 1A of STA 3/4 to mow, harvest and bale 5-10 acres of cattail in the northeast end of the cell.
Use these bales to obstruct flow in nearby short circuit channels. If conditions permit, also pilot and evaluate cattail baling in cells in STA 1E and/or 1W.
Adaptive Management and Operation Strategies

Revitalization – proactive measures to maintain health and performance of treatment system

Bioengineering – innovative use of vegetation to address compromised performance

Functional Redundancy – promote additional P removal pathways

Compartmentalization – use of emergent vegetation to foster resilience and functional redundancy in SAV cells