Landscape Patterns and Processes of the McCormack-Williamson Tract

A framework for restoring at a landscape scale
Background

• **Delta Historical Ecology Investigation** (Whipple et al. 2012)

• **Delta Landscapes Project**
  • *Management Tools for Landscape-Scale Restoration of Ecological Functions*
  • Full Delta
  • 2012-2015

• **Application of HE to MWT**
  • Beagle et al. 2012
  • *Landscape Patterns and Processes of the MWT: A framework for restoring at the landscape scale*
Key questions

1. How to use historical ecology to enhance landscape scale restoration?

2. How to apply these principles to the McCormack-Williamson Tract
Role of historical ecology

- Historical ecology is one way to get to that landscape-scale vision
- Using the past to understand the present landscape and assess its future potential
- Not recreating the past
- Looks for patterns, connectivity, gradients, transitions
Historical Habitats c. 1850
“The lake was situated far out in an impenetrable tule swamp of immense extent... it was a sort of "sanctuary" to which birds came...”

“nothing but tule, without a tree under which the navigator may find shade”

“In a grass-covered area between the forest and swamp”

“lagoons... whose waters flowed back swiftly into the Sacramento with the ebbing tides”

“the river was filled with drift wood, forming a raft”
<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Size/ Shape</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>“Definite”</td>
<td>+/- 10%</td>
</tr>
<tr>
<td>Medium</td>
<td>“Probable”</td>
<td>+/- 50%</td>
</tr>
<tr>
<td>Low</td>
<td>“Possible”</td>
<td>+/- 25%</td>
</tr>
</tbody>
</table>
Delta Historical Ecology

Key findings:

- The Delta had many deltas
- Multiple landscapes
- Range of habitat types
Conceptual models of historical landscapes

Central Delta: where tides dominate
North Delta: where flood basins flank rivers
South Delta: where floodplains meet tides

Different characteristics

- Habitat types (proportion, size, position)
- Connectivity
- Complexity
- Temporal variability
Delta Historical Ecology

Key Findings

- Made up of many gradients
- Connectivity along gradients
- Temporal variability
How do we create ecologically functional, resilient landscapes?
Case study: McCormack-Williamson Tract

• **Opportunities**

  • Large restoration opportunity

• **Variable topography**

• **Connection to uplands and tides**

• **Remnant historical features**
Case study: McCormack-Williamson Tract

- **Constraints**
  - Short term constraints
    - *Flooding bottleneck*
  - Long term constraints
    - *Radio tower, access*
    - *Land ownership*
Short term opportunities

Long term opportunities

Site scale restoration

Landscape scale restoration

TIME

SIZE

MWT

?
1) It is important to know how we got here:

• How the formation of the tract underlies “constraints”

• What are the physical drivers of this landscape?

2) How do these drivers influence restoration potential?
(Holmes et al. 1913).
Topographic Variability
Channels and Tides
Tidal influence and indicators

Reece 1864
1930s elevation data from Boyd 1930.
Vegetation patterns
Vegetation patterns

Debris Commission 1914
Vegetation patterns
What can historical ecology tell us about a vision for landscape scale restoration?

It is important to know how we got here.

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Historical area (km²)</th>
<th>Current area (km²)</th>
<th>% of historical</th>
<th>% of current MWT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riparian Forest/ Natural Levee</td>
<td>0.96</td>
<td>0.68</td>
<td>13.83</td>
<td>9.91 (distributed around edge)</td>
</tr>
<tr>
<td>Marsh plain</td>
<td>5.98</td>
<td>0.12</td>
<td>86.17</td>
<td>1.72</td>
</tr>
</tbody>
</table>
Site scale restoration

Landscape scale restoration

Long term opportunities

Short term opportunities

TIME

SIZE

?
But what if?

2012

Radio tower

Delta Meadows

Hwy 5

MWT

Dead Horse Island
This is not what the landscape looked like in 1850.
## Habitat and Connectivity for Native Species

<table>
<thead>
<tr>
<th></th>
<th>MWT proposed</th>
<th>MWT as part of OLU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal Marsh Area</td>
<td>~500 acres</td>
<td>~1000 acres</td>
</tr>
<tr>
<td>Riparian Width</td>
<td>&lt;10m</td>
<td>100-150m</td>
</tr>
</tbody>
</table>

*note: sample #s*

![Diagram showing habitat and connectivity changes]
## Connectivity for Fragmented Populations

<table>
<thead>
<tr>
<th></th>
<th>MWT proposed</th>
<th>MWT as part of OLU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riparian Forest Connectivity</td>
<td>none</td>
<td>&gt;10,000m (+4000m to Cosumnes Reserve)</td>
</tr>
<tr>
<td>Tidal Marsh Patch Size</td>
<td>500 acres</td>
<td>1000 acres</td>
</tr>
<tr>
<td>NND (to marsh for fish)</td>
<td>4000m</td>
<td>200m</td>
</tr>
</tbody>
</table>

![Diagram showing connectivity](image)

*note: sample #s*
Long term opportunities

- Acquire land between MWT and Cosumnes Preserve
- Enhance lateral and longitudinal connectivity
- Acquire Dead Horse Island
- 35 year lease on radio tower
- Degrade levees, tidal channels
- Lake reconnection

Short term opportunities

- MWT
Thank you. Questions?

julieb@sfei.org
robin@sfei.org

Thanks to:
TNC
Leo Winternitz

CDFW
Daniel Burmester
Carl Wilcox
Dave Zezulak