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Cultivation of the Backwater: Weirs as a Window into Historical Ecology and Ecosystem Engineering in the Lower Columbia

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Cultivating the Backwater: Weirs as a Window into the Historical Ecology and Ecosystem Engineering in the Lower Columbia
Michelle N. North & Virginia L. Butler (Portland State University)

Background Context

- Recent research highlights ways Indigenous people have employed systems of ecosystem engineering, social practice, and cultivation.
- Intentional modifications to the landscape have a cascading effect on the ecosystem creating an interconnected anthropogenic environment that supports cultivation.
- The term “aquaculture” can be applied to human engineering in aquatic systems.
- Most scholarship on aquaculture in the Pacific Northwest has focused on coastal and stream settings.
- Productive backwater wetlands such as on the Lower Columbia have received minimal attention.
- Ethnographic and ethnohistoric information on backwater use is limited.
- However, archaeological records from the Portland Basin show the importance of plants and animals that thrive in such wetlands.
- Wapato, small mammals (beaver, muskrat), and fishes such as sucker (Catostomidae) and minnow (Cyprinidae).
- According to foraging models, suckers and minnows are low ranked.
- Would cultivation and mass harvesting alter procurement costs, effectively raising their rank?
- What practices/technology were used in the harvest and cultivation of backwater species to enhance the productivity of this archaeologically prominent fishery?

Research Goals

- Explore the role of weirs as more than technology-components in larger interconnected systems of aquaculture and ecosystem engineering.
- Resolve conflicting information from archaeology and ethnohistory about backwater resource use.
- Elucidate the role of the rich backwater environment of the Lower Columbia in Indigenous subsistence and cultivation.

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Fish Family</th>
<th>Site Abundance (N Sites where family most abundant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4 mm (1/4&quot; mesh)</td>
<td>Salmoid</td>
<td>2</td>
</tr>
<tr>
<td>8 assemblages</td>
<td>Minnow-Sucker</td>
<td>2</td>
</tr>
<tr>
<td>3.2 mm (1/8&quot; mesh)</td>
<td>Salmoid</td>
<td>1</td>
</tr>
<tr>
<td>5 assemblages</td>
<td>Minnow-Sucker</td>
<td>3</td>
</tr>
<tr>
<td>2 mm (~1/16&quot; mesh)</td>
<td>Salmoid</td>
<td>1</td>
</tr>
<tr>
<td>3 assemblages</td>
<td>Minnow-Sucker</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Eulachon</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: if exclude stickleback (1 mm mesh), minnow-sucker dominate four assemblages.

Acknowledgements

Dennis Torresdal, Kenneth Ames, Jim O'Connor, Nancy Nelson, Pat Reed

Vancouver Lake Weir

- Wood stake weir recorded in early 1980s, containing 158 stakes, and 120 stake holes (Wessen 1983).
- Made of split western red cedar.
- Located in southeast corner of lake.
- C-14 Dates= 310 +/-60. adjusted to Approx. 200 B.P. based on wood growth rate (contact era).
- Given location, backwater fish likely target.

Virginia Lake Weir?

- Reported by local resident Dennis Torresdal in early 2010s.
- Located in seasonally dry backwater lake on Sauvie Island likely seasonally flooded prior to levee construction.
- Nearby ethnographic village and multiple archaeological sites (villages, activity areas).
- Currently unrecorded.
- 18 visible wooden stakes in 2 horizontal alignments.

Proposed Project

- Record the feature, and any landscape modifications.
- Subsurface testing.
- Collect samples for C14 dating.
- Evaluate whether wood shaped with metal tools.
- Study lake history (legacy lake cores, historic photos/maps).
- Reconstruct how “weir” would have functioned.
- Synthesize faunal data from surrounding sites to identify the prevalence and role of backwater species.
- Compare feature to Vancouver Lake weir.
- Review the literature on landscape modification and Indigenous cultivation and place the site within the broader context of anthropogenic landscape modification.

Theoretical Frameworks:

- Historical Ecology
- Niche Construction Theory