Topic 14:
Trees and Wood in Restoration Design
Physical Functions

- Channel structure
  - Bank erosion
  - Lateral migration
  - Vertical control
- Temperature
  - Microclimate
  - Shading
- Increased hyporheic flow
- Hydraulic roughness
- Hydrograph regulation

Figure 4-5. (A) Historic Changes to the Upper Willamette Transforming the Natural Anabranching Morphology into a Single-Thread Channel; (B) Lower Taku River, a Wood-Rich Anabranching River in Southeast Alaska.

1854  1910  1946  1967
Ecological Functions

- Carbon source: species, stand density, and size affect dynamics
- Temperature
- Habitat provision
  - Temperature refugia
  - Flow refugia
  - Velocity diversity
- Nutrient dynamics
# Engineered Wood Structures

<table>
<thead>
<tr>
<th>Configuration</th>
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<tbody>
<tr>
<td>ELJs or flow deflection jams</td>
<td><img src="image" alt="ELJs or flow deflection jams" /></td>
<td>Rootwads or meander jams</td>
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<td>Log vanes/step jams</td>
<td><img src="image" alt="Log vanes/step jams" /></td>
<td>Tree revetments or roughness logs or bench jams</td>
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<td>Log weirs/valley jams</td>
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<td>Bar apex jam</td>
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</tbody>
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Social Considerations

- Recreational hazard
- Altered flood stage
- Channel dynamics may not be locally favorable
- Infrastructure protection

![Image: Natural Wood Accumulation in Idaho](source: American Whitewater Association (2012))
Structure v. Process

- Construction v. recruitment
- Aging of wood structures
Further Reading

• Bandrowski and Conyngham (Eds.). 2015. Guidelines for planning, design, placement, and maintenance of large wood in fluvial ecosystems. Bureau of Reclamation.
  – All material shown today is from here.

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