Floodplain Restoration Using a RiverVision Approach in Meacham Creek, Oregon USA.

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Mission Statement

To protect, restore, and enhance the First Foods for the perpetual cultural, economic, and sovereign benefit of the Umatilla Tribes.

This is accomplished utilizing traditional ecological and cultural knowledge and science to inform:
1) population and habitat management goals and actions; and
2) natural resource policies and regulatory mechanisms.
“Extending the Table”
Using the First Foods to Guide DNR
“Extending the Table”

Using the First Foods to Direct Natural Resource Restoration

1. **Water**
   - Men’s Foods
     - Salmon
     - Chinook
     - Coho
     - Sockeye
     - Steelhead
     - Lamprey
     - Mussels
     - Trout
     - Whitefish
     - Suckers

2. **Salmon**
   - Deer
     - Mule Deer
     - RM Elk
     - WTD
     - Bighorn
     - Mtn Goat
     - Moose

3. **Deer**
   - Cous
     - Celery
     - Camas
     - Bitterroot

4. **Cous**
   - Huckleberry
   - Chokecherry

5. **Huckleberry**

Featured Management | Research/Development | Future Investigations
“Extending the Table”
Using the First Foods to Organize DNR

Organizational Units

- Cultural Resources Protection Program
- Fish Habitat
  - Instream + riparian + floodplain + hyporheic
- Range & Forest Ecology

- Water
- Salmon
- Deer
- Cous
- Huckleberry
- Water Res
- Fisheries
- Wildlife
The Need for a Vision

Sound river management and restoration include the need to develop a systemic and holistic vision of a functional river.

The vision provides:

1) a framework for planning management or restoration efforts;

2) a benchmark for assessing management progress and outcomes; and

3) context necessary for understanding the role of any specific management decision or action in the context of other decisions or actions.
The River Vision provides a holistic view of a functional river with connectivity in space (longitudinal, lateral, vertical) and time.
Volume and timing of water
Volume and timing of water
Volume and timing of water

![Graph showing volume and timing of water flows over months.](image)
Connectivity

Longitudinal, Lateral, and Vertical
Floodplain/channel water exchange
Geomorphology

Topographically Diverse, Accessible by River
Channel Geometry

L  meander wavelength
M_L  meander arc length
W  average width at bankfull discharge
M_A  meander amplitude
r_c  radius of curvature
θ  arc angle
Riparian Vegetation

Native Vegetation – Large Wood Inputs, Other
Aquatic Biota

Healthy Native Species
“The Umatilla basin includes a healthy river capable of providing First Foods that sustain the continuity of the Tribe’s culture. This vision requires a river that is dynamic, and shaped not only by physical and biological processes, but the interactions and interconnections between those processes.”
Vision Application: Fisheries Habitat

**Primary Touchstone**
- Hydrology
- Geomorphology
- Connectivity
- Riparian Vegetation
- Aquatic Biota

**Secondary Touchstone**
- Aquatic Biota
- Connectivity
- Riparian Veg
- Geomorphology
- Aquatic Biota
- Geomorphology
- Hydrology
- Geomorphology

**Restoration Actions**
- Flow Acquisition
- Flow Enhancement
- LWD Additions
- Natural Channel Design
- Channel Meander Const.
- Vertical Bed Stabilization
- In-stream Structure
- Levee Modification
- Levee Removal
- Floodplain Construction
- Passage Barrier Removal
- Conservation Easement
- Riparian Pasture
- Riparian Planting
- Noxious Weed Removal
- Wetland Enhancement
- Habitat Complexity

**Action Groups**
- Flow Restoration
- Active Channel Construction
- Active Floodplain Construction
- Migration Pathways
- Floodplain Vegetation Management
- Active Channel Construction
Critical data needs - Meacham Creek specific

- **Hydrology**
  - Historical variability of low and high flows
  - Location and extent of subsurface flows

- **Geomorphology**
  - Controls limiting the availability of spawning gravels
  - Expected LWD supplies

- **Connectivity**
  - Historical diversity of habitats and floodplain channel feature patterns
  - Location and timing of migration barriers (physical and habitat based)

- **Aquatic biota and communities**
  - Habitat utilization by First Foods fishes
  - Density and distribution of beaver and dams on the floodplain

- **Riparian vegetation**
  - Assess natural potential and range distributions of species
  - Quantify recruitment and retention rates for large wood
Touchstone Correlation Examples

Restoration actions are intended to directly address touchstones.

- **Hydrology** - Increased quantity and quality through floodplain storage
- **Geomorphology** - Channel meander development, LWD additions
- **Connectivity** - Levee removal and floodplain activation
- **Riparian vegetation** - Land acquisition and use changes, vegetation management
- **Aquatic Biota** - Remove physical migration barriers, increase habitat complexity
Hyporheic Investigation (Connectivity)

- Quantify water residence time pre- and post restoration (hyporheic exchange).
- Establish monitoring network of thermographs to measure changes in surface/groundwater temperatures.
- Pilot a new method of stream restoration monitoring.
Hyporheic Investigation (Connectivity)

- Shallow piezometers
- Fluorescent dye and salt tracer
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