Upper McKenzie River Large Wood Restoration Project

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Presentation Objectives

- Reach is intensively monitored – focus on the following:
  - Large wood monitoring
  - Channel response
  - Snorkel surveys

Why Large Wood Restoration?

- Bull trout spawning and early rearing habitat.
- 1964 Flood mobilized and transported large wood out of the reach .
- Large wood was removed from the reach by the Forest Service during the 1960' s thru the early 1980's.
- Identified as a restoration need in the Upper McKenzie Watershed Analysis (1995)

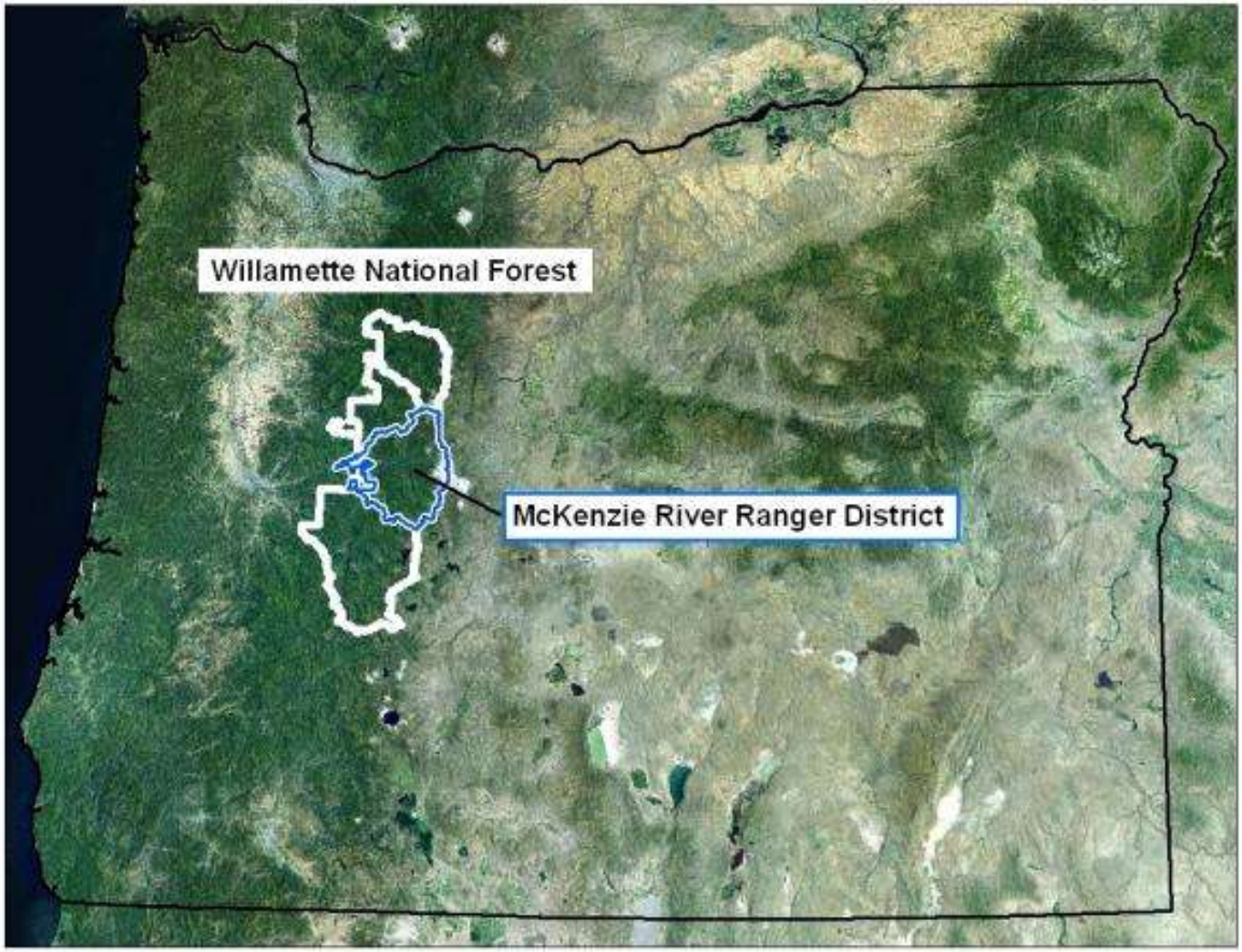
Project Considerations

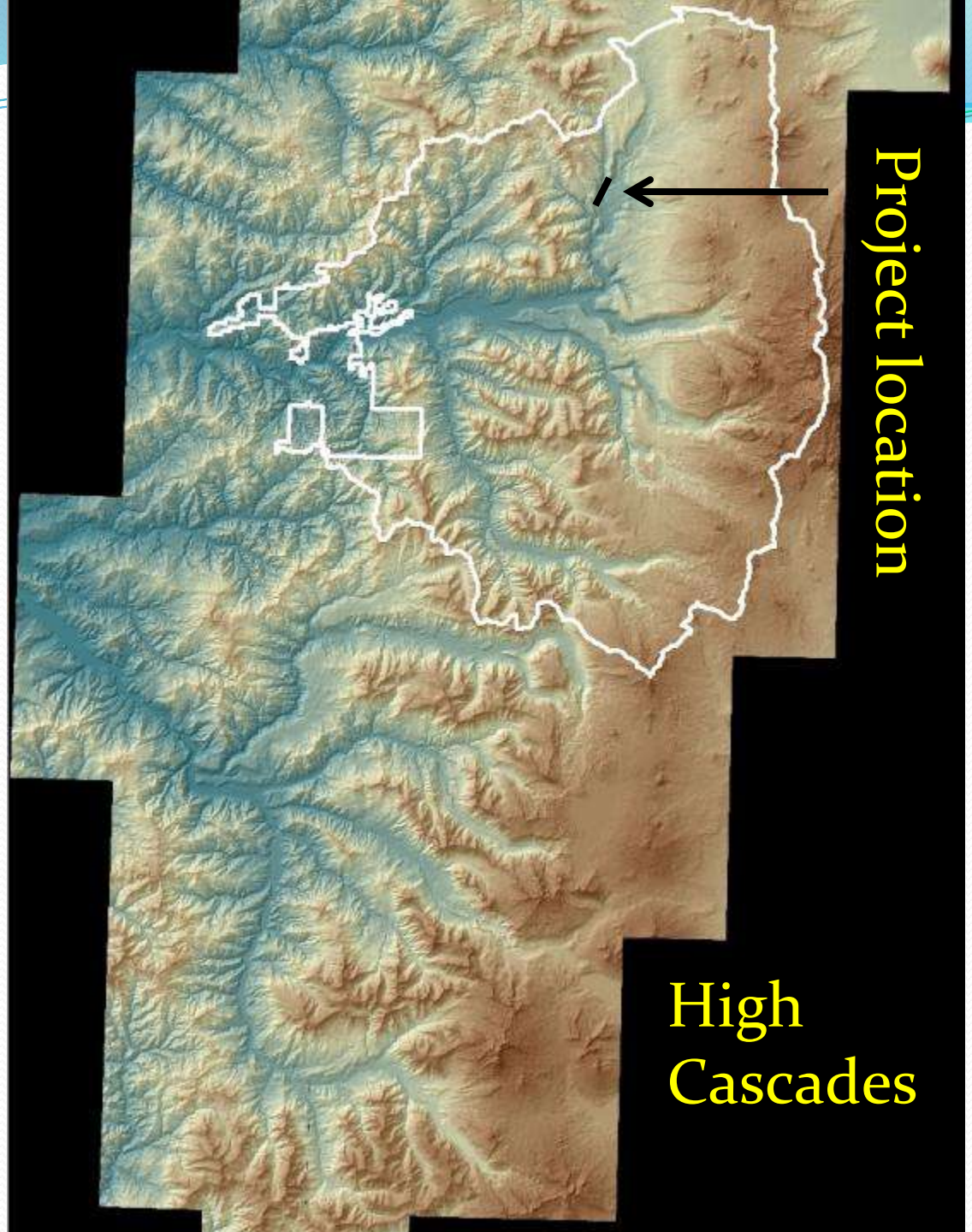
- Federal Wild and Scenic River and State Scenic Waterway
- McKenzie River National Scenic Trail
- Proximity of Eugene Water & Electric Board hydroelectric developments
- Bull trout spawning and early rearing habitat

Project Goals

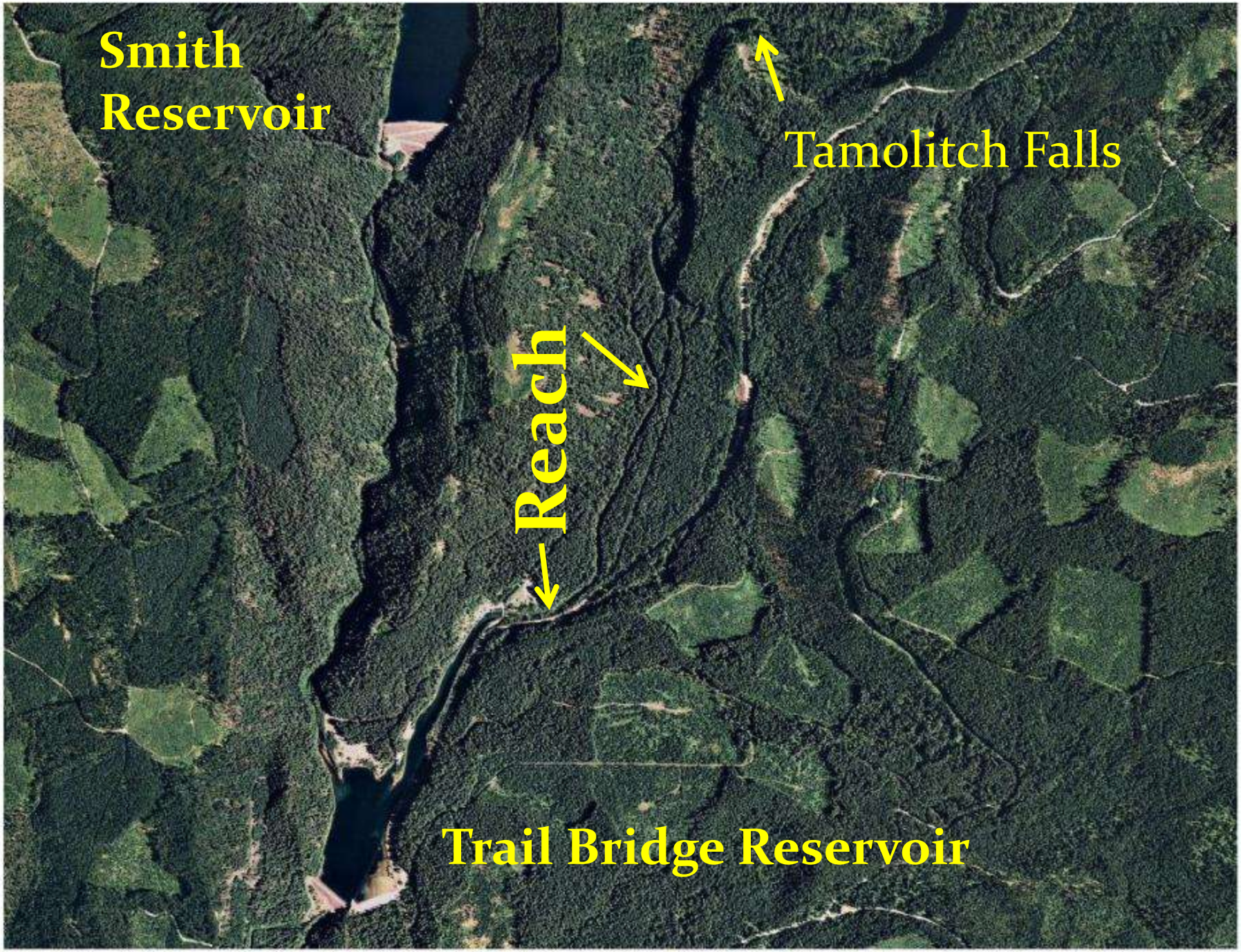
- Restore large wood that is “natural” in appearance.
- Design the project so that wood is stable without artificial anchoring (i.e. cables).
- Provide a physical feature to trap spawning gravels, add gravel if necessary.
- Increase rearing habitat for juvenile bull trout.

Project Location




Project location
High
Cascades

Tamolitch Falls


Smith
Reservoir
Tamolitch Falls
Reach
Trail Bridge Reservoir

Project Implementation 2005

- Phase I = Wood round up and staging
- Phase II = Whole tree tipping
- Phase III = Helicopter placement

BLUE RIDGE
Timber Cutting, Inc.
Coos Bay, OR
USDOT 710317
80,000

FOR FIRE ONLY

2007 Blow Down Event

Monitoring Questions

- Is wood stable?
- Did any channel changes occur?
- Did wood capture spawning gravels?
- Did wood increase fish use of mid-channel areas in the river?

Hypothesized Outcomes

- Given High Cascade hydrogeology and presence of rootwads on key pieces, wood will be stable without cable anchors.
- No significant channel changes expected.
- Given High Cascades hydrogeology little gravel accumulation expected.
- Increase in wood frequency should provide more mid-channel rearing of bull trout.

Monitoring – Large Wood

- Two round aluminum tags on each piece of wood.
- Measure all wood greater than 25 feet each year.
- Low Elevation Aerial Photography (LEAP) to monitor changes through time.

Low Elevation Aerial Photography
Post-Project Habitat Mapping Fall 2007

BEFORE

Habitat Unit 9D

AFTER

Wood Measurements

- Length
- Maximum and minimum diameter
- Presence or absence of root wad
- Relationship to other pieces
- Channel orientation

Wood Location

- Four zone system developed by Dr. Robert Beschta (Oregon State University)

Wood Location 4-Zone System

- Zone 1 = portion of wood that is underwater at time of survey
- Zone 2 = portion of wood that would be inundated during bankfull events
- Zone 3 = portion of wood that is above wetted channel during bankfull events
- Zone 4 = portion of wood that is either within the floodplain or on the hillslope

Channel Cross Sections

- Twenty-two monumented channel cross sections above and below tipped trees.

Wolman Pebble Counts

- Conducted at each cross section
- Above and below each tipped tree

Snorkel Surveys

- Nocturnal surveys due to bull trout behavior
- Three divers in the channel: right, left, and mid-channel
- Document location, species, and size of fish

Wood Survey Results

2004 Pre-project	2005 Post-project	2006 with natural retention	2007 with blow down wood
163	246	251	341

- In 2005 83 pieces of wood were introduced into the study reach
  - 23 tipped trees
  - 56 via helicopter
  - 4 from upstream sources
- In 2006 90 new pieces from blow down event introduced into the study reach
- As of 2007 inventory no pieces have been mobilized out of the reach

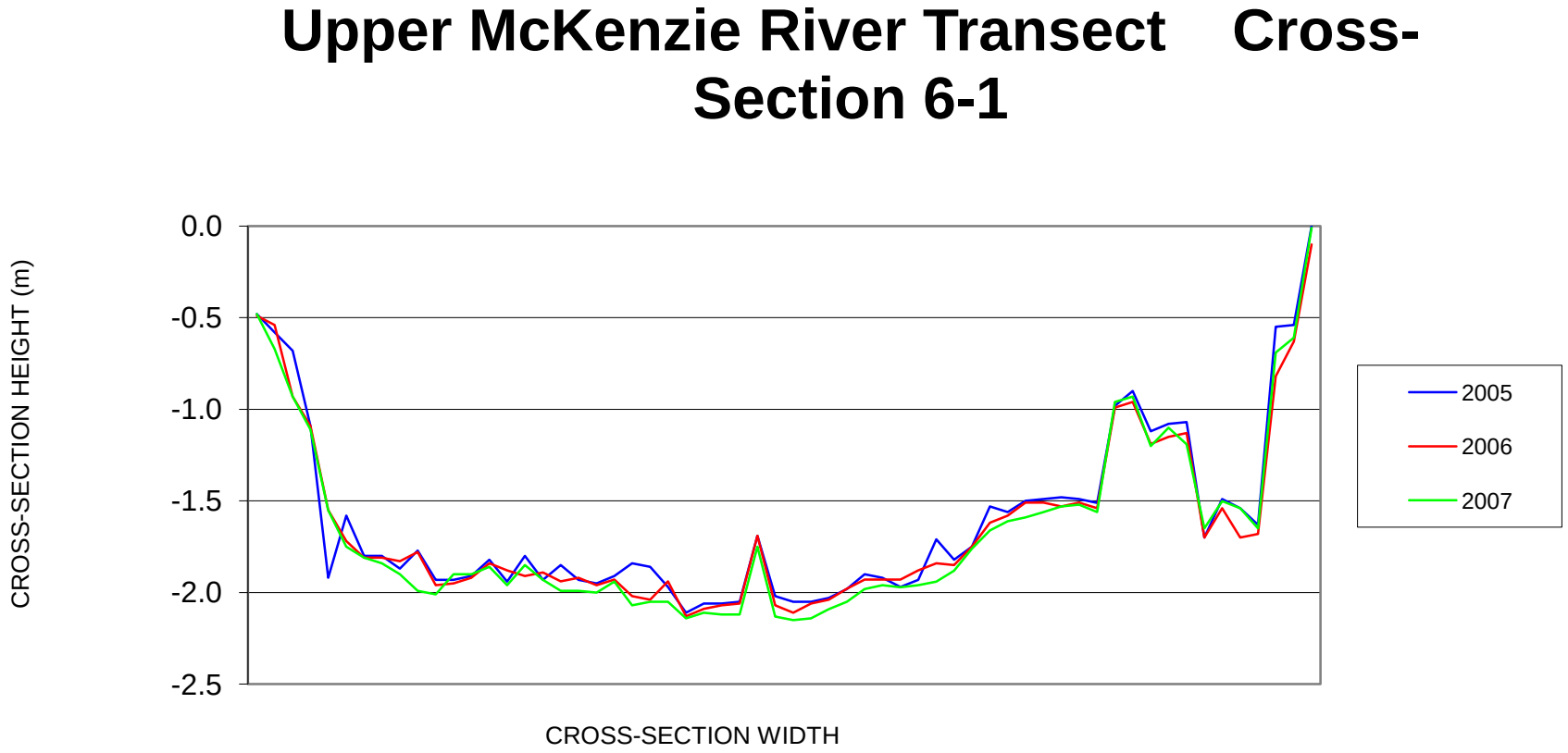
Wood Survey Results – Cont.

- Of the 341 total pieces of wood:
  - 129 occur on the left side of the river
  - 107 occur on the right side of the river
  - 58 are distributed in the center of the channel
- In addition, 47 pieces are considered to be full channel spanners.

Wood Survey Results – Cont.

- Zone I = contained 1,645 sq ft
- Zone II = contained 3,156 sq ft
- Zone III = contained 4,784 sq ft
- Zone IV = contained 4,159 sq ft

Channel Cross Section Results



Wolman Pebble Count Results

- Results show that minimal bed aggradation or degradation has taken place since large wood introductions in 2005

Snorkel Survey Results

- Six species of fish with bull trout being the most numerous
- All species continue to prefer river margin locations

Fish Locations 2006

Fish Species	River Right	Center	River Left
Brook Trout	7	3	5
Bull Trout	148	71	108
Cutthroat Trout	68	32	37
Rainbow Trout	23	12	24
Sculpin	8	6	4
Trout Fry	14	3	24
Total	268	127	202

Project Costs

- Project Implementation costs = $62,650
- Project monitoring costs = $61,005 to date

Project Partners

- Willamette National Forest
- McKenzie Watershed Council (Oregon Watershed Enhancement Board grantee)
- Eugene Water & Electric Board
- Stillwater Sciences – EWEB contractor
- Oregon State University (Dr. Stan Gregory and Randy Wildman)