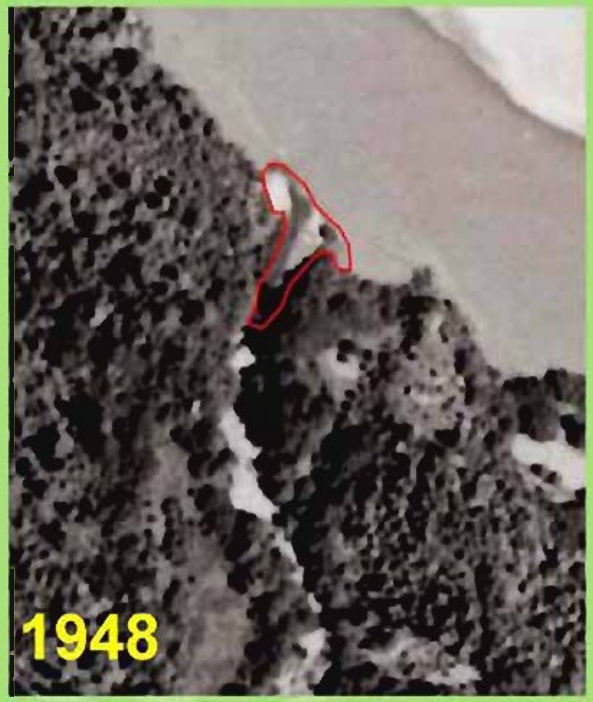
Implementation of Large Wood Projects to Affect Hydrogeomorphic Conditions that Benefit Salmonids and Aquatic Ecosystems: Examples from Northern California

Rocco Fiori – Fiori GeoSciences
Sarah Beesley – Yurok Tribal Fisheries Program, Lower Klamath Division
Aaron Marton – Yurok Tribal Fisheries Program, Trinity River Division
David "DJ" Bandrowski – Trinity River Restoration Program
Joel Benegar – US Army Corps Of Engineers
Thomas Dunklin – Thomas B. Dunklin Productions

Background – Habitat Response to Wood Depletion

Major Cause of Aquatic Ecosystem Dysfunction



Conversion of Valuable Low Gradient Habitats to Gravel Wastelands & Bowling Alleys

Standard Approach to Address the Loss of Instream Wood: Northern California

Typical Instream Structures – Small Streams

Standard Approach to Address the Loss of Instream Wood: Northern California

Low Flow

High Flow

Typical Instream Structures – Large Streams

Bio-Geomorphic Based Approach

Constructed Wood Jams

Key Principles

- Mimic Architecture, Location & Spacing of Natural Wood Jams Using Reference Conditions as a Guide

Canoe Creek – Humboldt Redwoods State Parks

Key Principles

- Establish Key Jams First

- Whole Tree Materials Preferred
- Limit or Avoid the Use of Quarry Rock
- Periodically Add Mobile Wood Until Natural Sources are Self Maintaining

Wood Sources – Slash Pile Salvage

Wood Sources – Road Decommissioning

Wood Sources – Whole Tree Logging

Wood Transportation

Wood Transportation

Off Road Construction – McGarvey Creek

Water Quality Management – Small Streams

Water Quality Management – Large Streams & Rivers

Setting Posts and Piles

Setting Posts and Piles

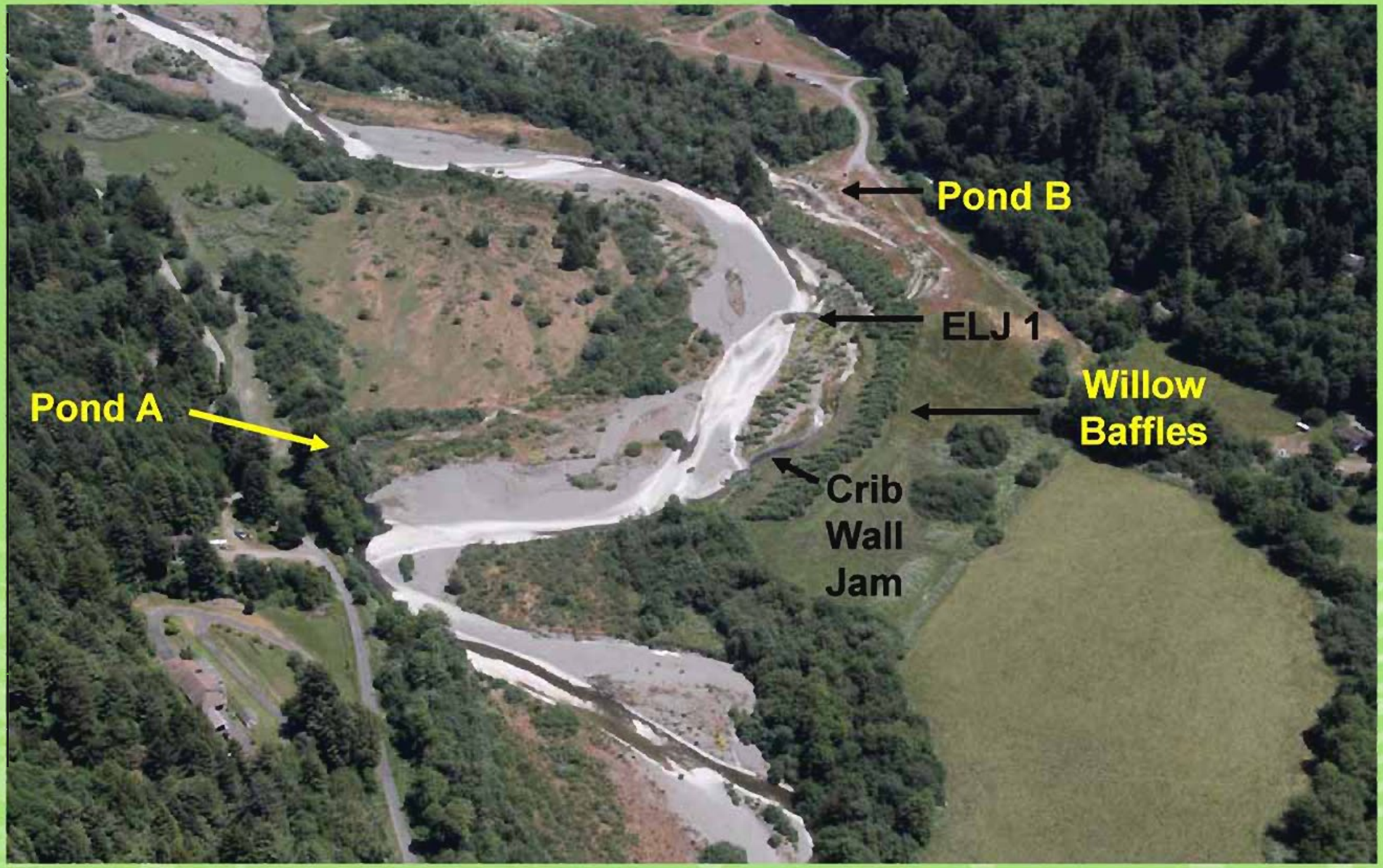
Engineered Log Jams – Terwer Creek

ELJ 1 - Post-Construction
Flow

2 Years Post-Construction

Terwer Creek
First Winter Post-Project

Integrated Use of ELJs & BioEngineering
Terwer Creek, Lower Klamath River



McGarvey Creek Site #25

During Construction

First Winter Post-Project

McGarvey Creek Site #15

Pre-Project - Top Post-Project - Bottom

McGarvey Creek – Alcove 1

Facilitating & Maintaining Floodplain Connectivity

Helicopter Assisted Wood Loading – Tectah Creek

Tectah Creek

Site #20 - During Project

Post-LWD Placement

Following High Flows

Tectah Creek

Site #18 Pre-Project

Post-LWD Placement

Following High Flows

EF Mill Creek

Mobile Wood Loading

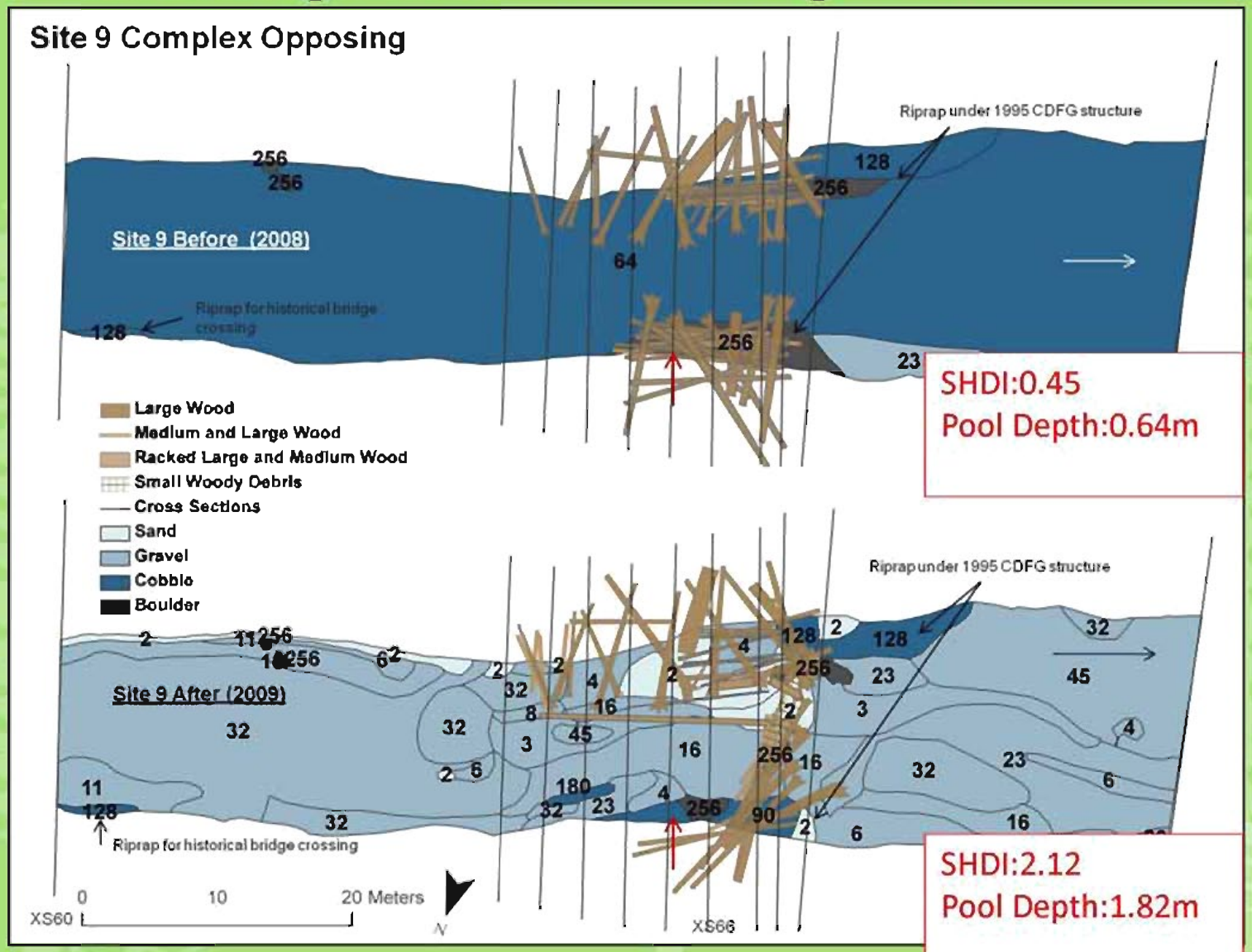
Site #9 - East Fork Mill Creek - High Flow / Low Flow Comparison

Summer low flow (after construction) - August 1, 2008

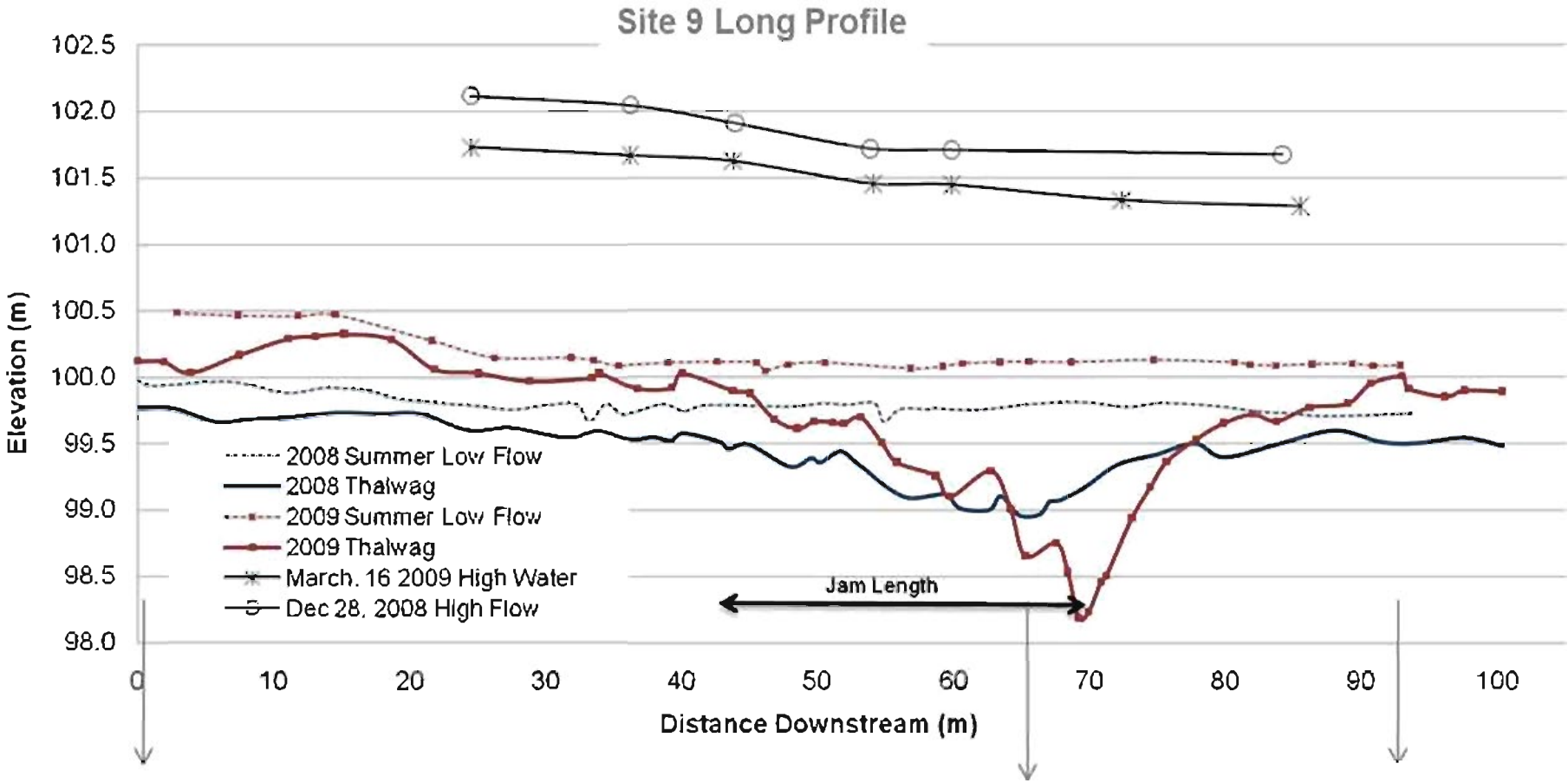
Flood Flow - March 16, 2009

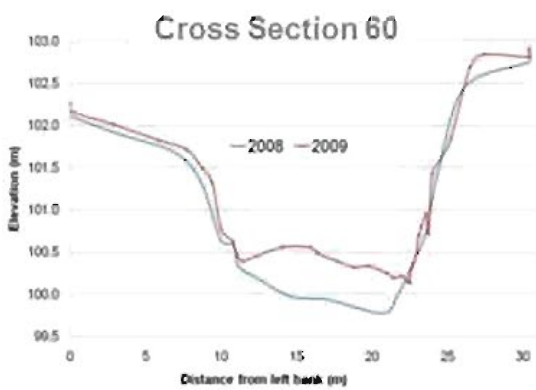
East Fork Mill Creek – Site #9 Opposing Jam

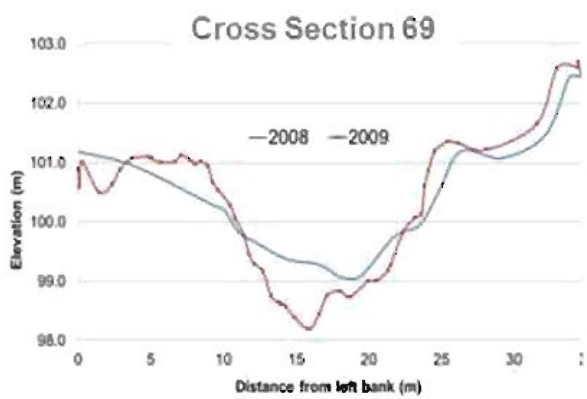
Habitat Changes Related to Large Wood Loading

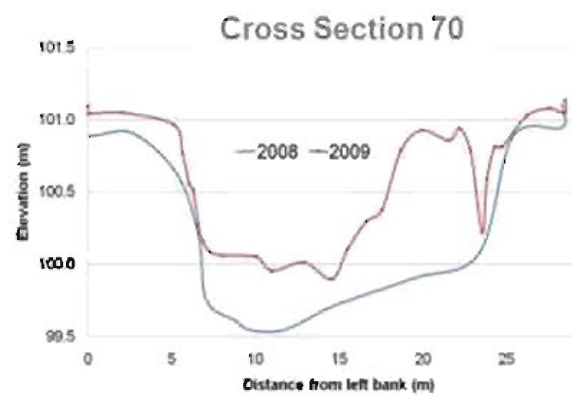


East Fork Mill Creek – Site #9 Opposing Jam

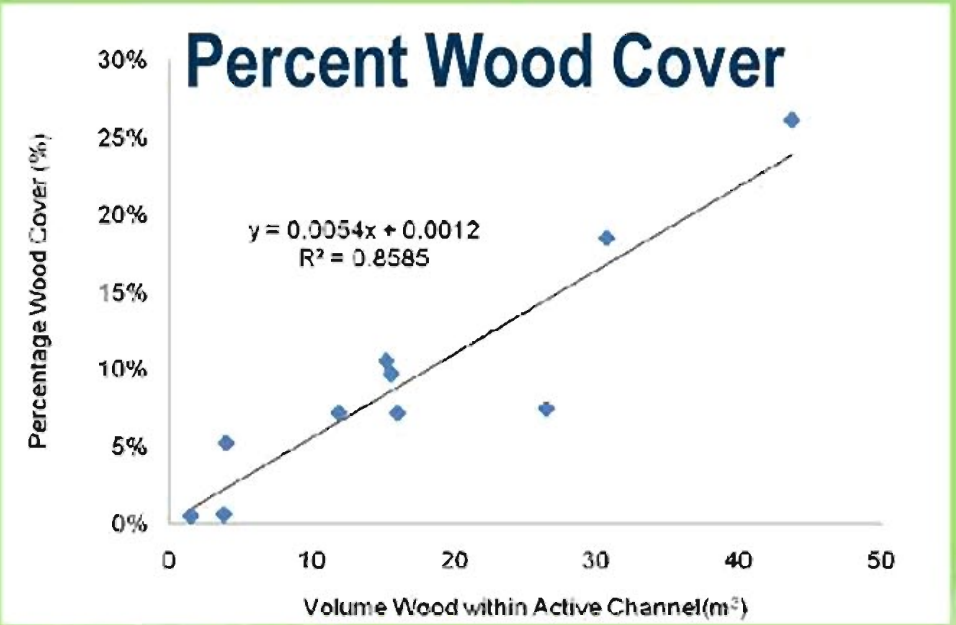


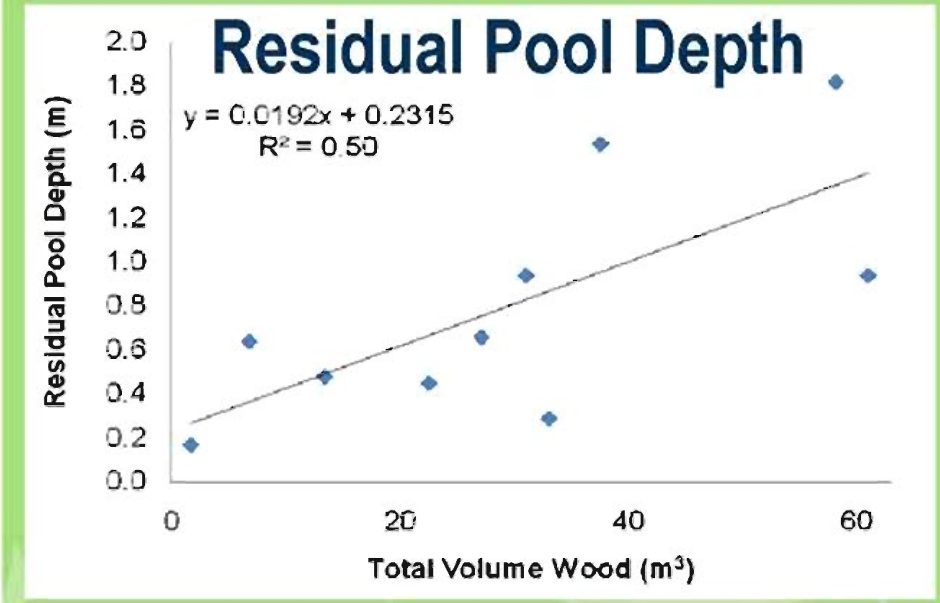


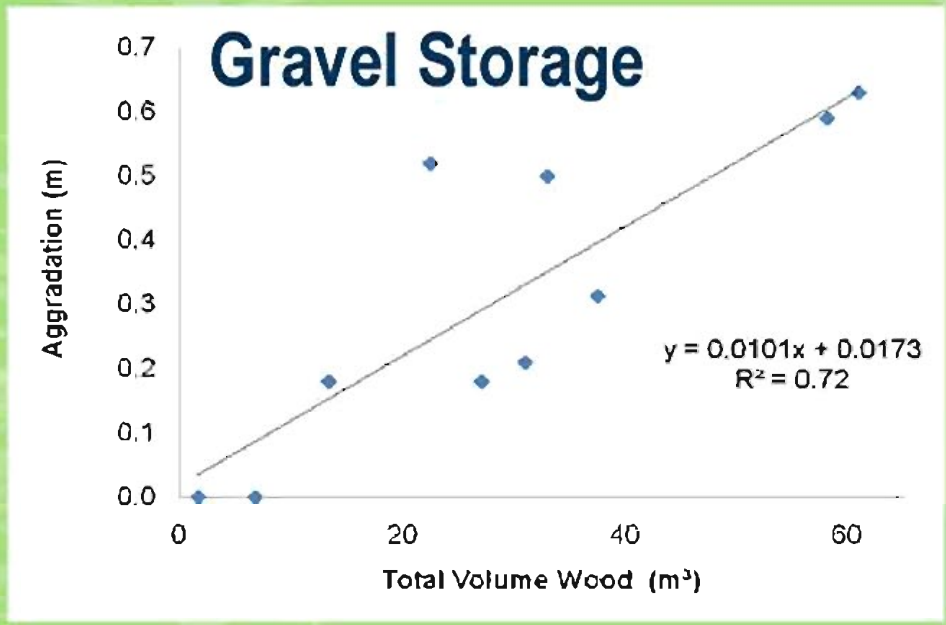


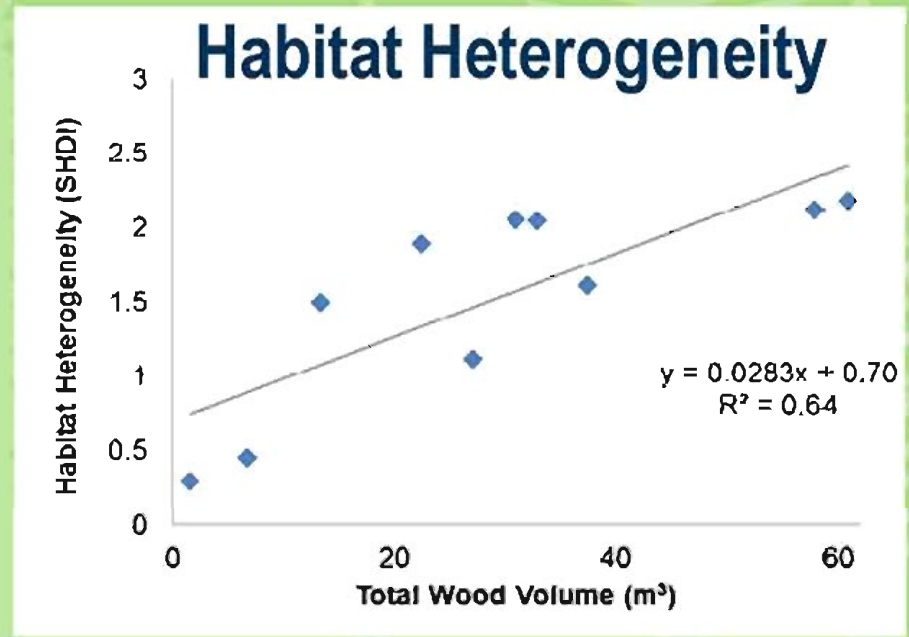


Habitat Changes Related to Large Wood Loading

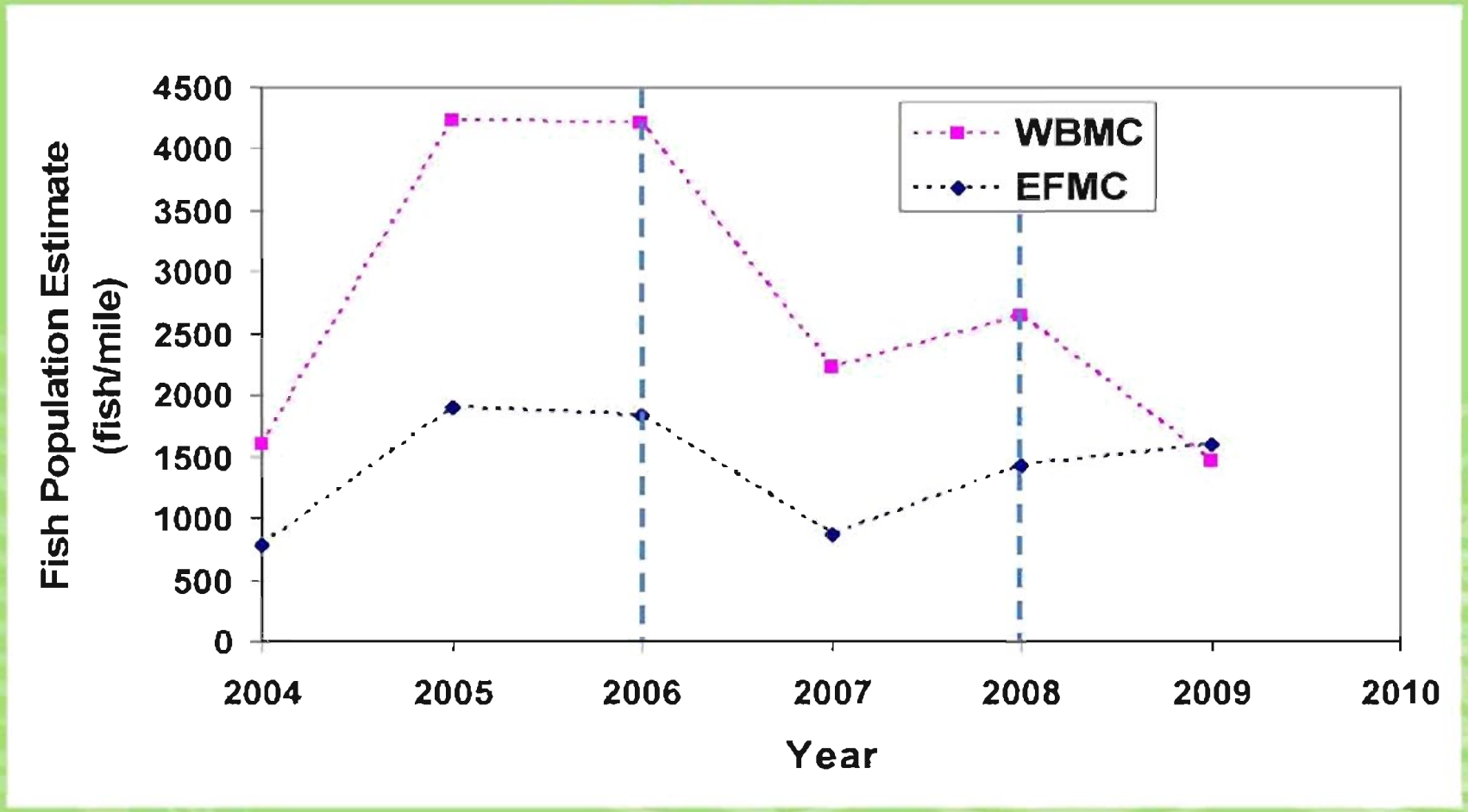








Juvenile Coho Salmon Summer Population Estimates Mill Creek Watershed, Smith River California



Adapted from McCloud and Howard 2010

Thank You