

# Stillwater Floodplain Restoration



## Wild Fish Conservancy

N O R T H W E S T

S C I E N C E      E D U C A T I O N      A D V O C A C Y

# Stillwater Floodplain Restoration

- ▶ Salmonid life histories
- ▶ Floodplain processes
- ▶ Stillwater project
- ▶ Stream power modeling

# Salmon Life Histories

## ▶ Chinook

- Extremely diverse
  - Fry migrant
  - Stream type

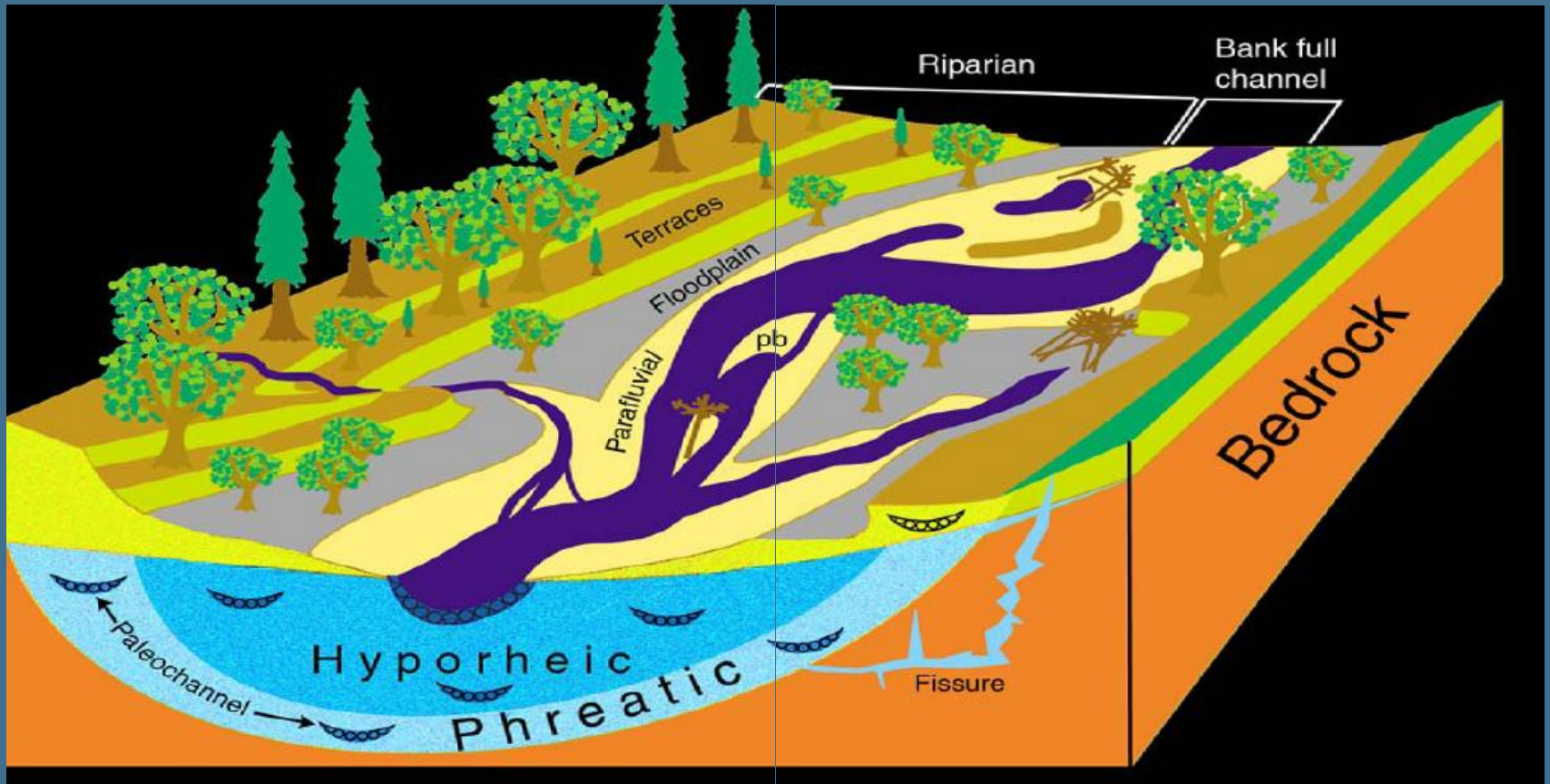


## ▶ Coho

- Rear in freshwater for up to 3 years
- Utilize off channel habitat



# Shifting Habitat Mosaic



From Stanford 1998

1994

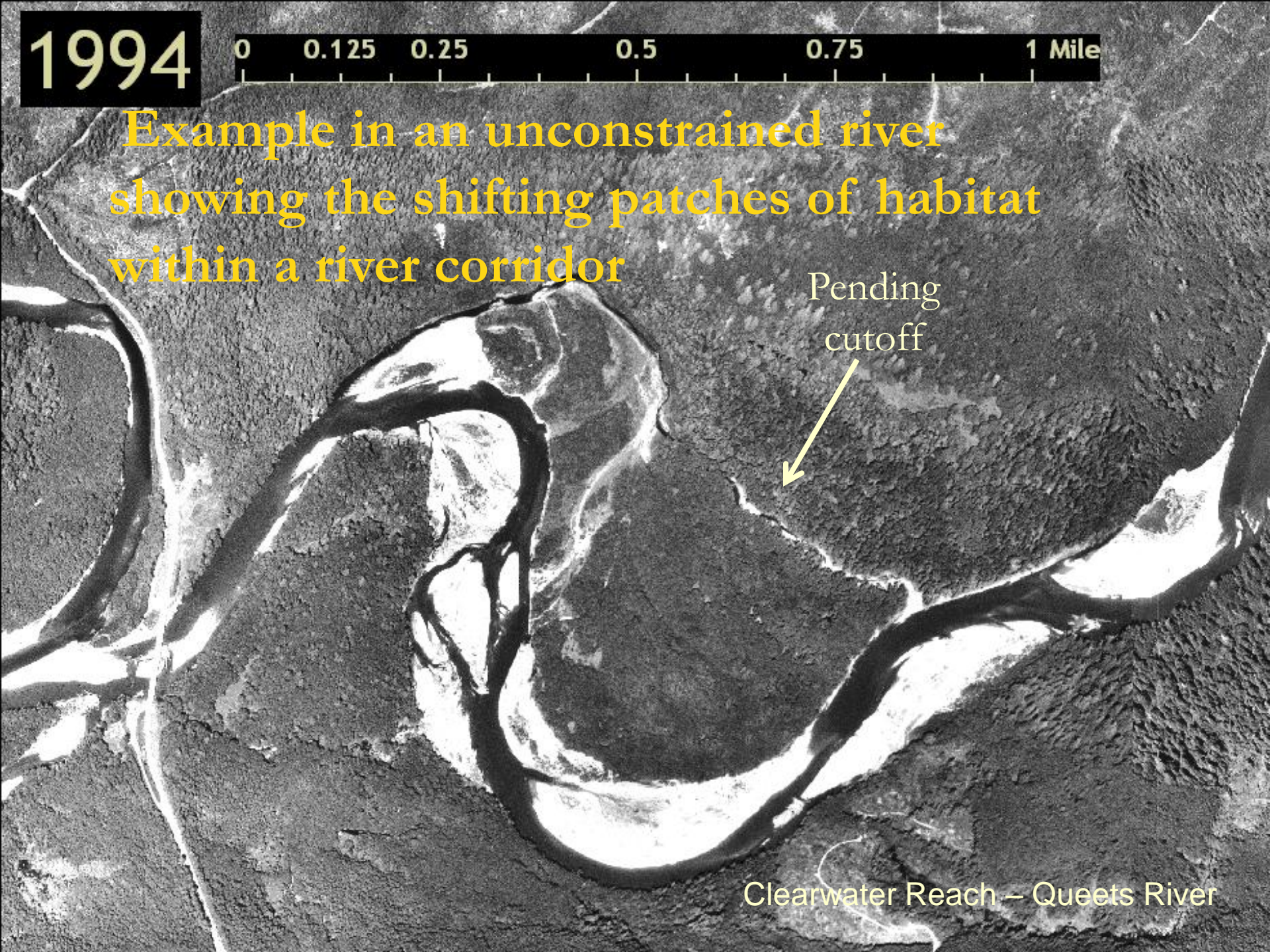
0 0.125 0.25 0.5 0.75 1 Mile

Example in an unconstrained river showing the shifting patches of habitat within a river corridor

Pending cutoff



Clearwater Reach – Queets River



1996

0 0.125 0.25 0.5 0.75 1 Mile

Mainstem

Side channel w/  
groundwater  
flow under low  
flow conditions

Clearwater Reach – Queets River



2002

0 0.125 0.25 0.5 0.75 1 Mile

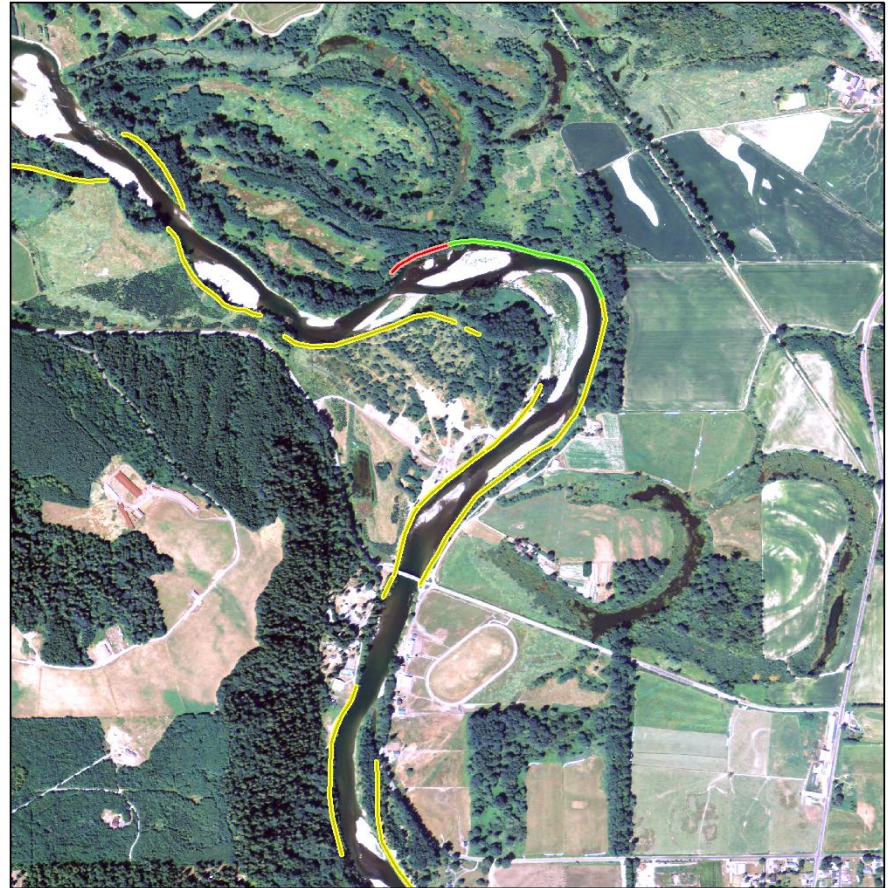
Side-channel/backwater

Mainstem

Clearwater Reach – Queets River



# Stillwater Restoration Project



Snoqualmie River Revetment Removal  
and Habitat Enhancement Project

Stillwater Wildlife Area



1,000 500 0 1,000 Feet

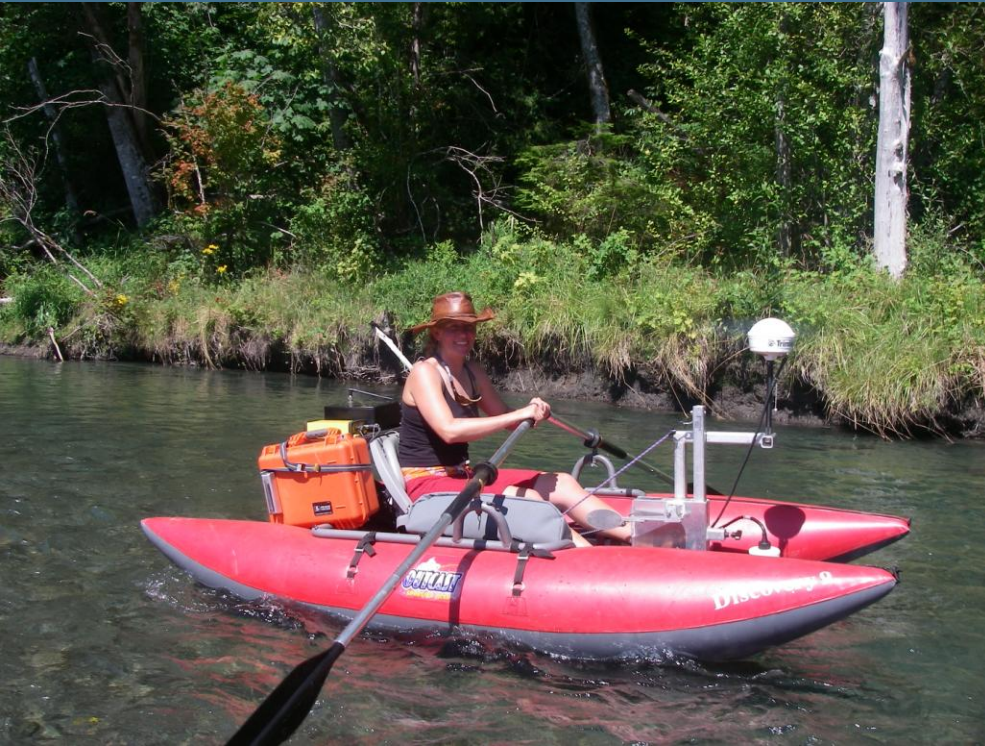


## Legend

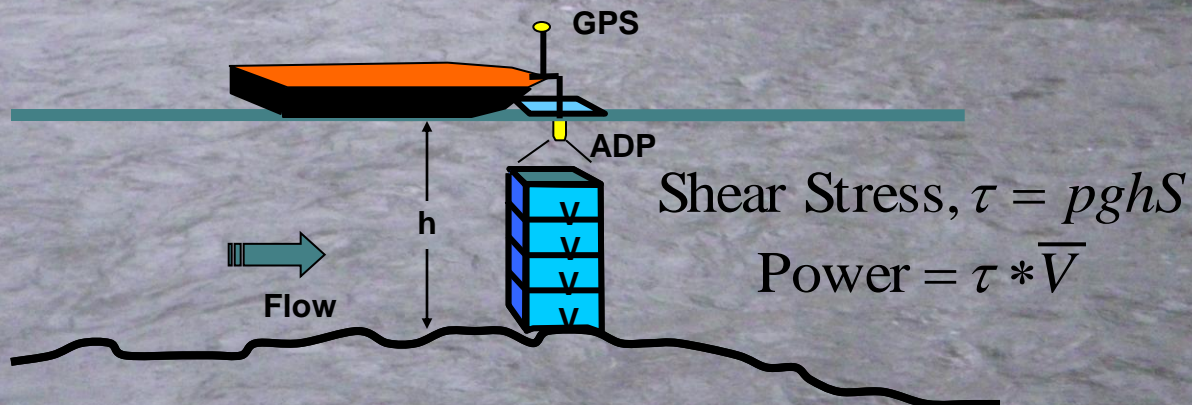
- WDFW
- Gaisford
- Other

WDFW and Gaisford revetments are targeted for removal in this project.

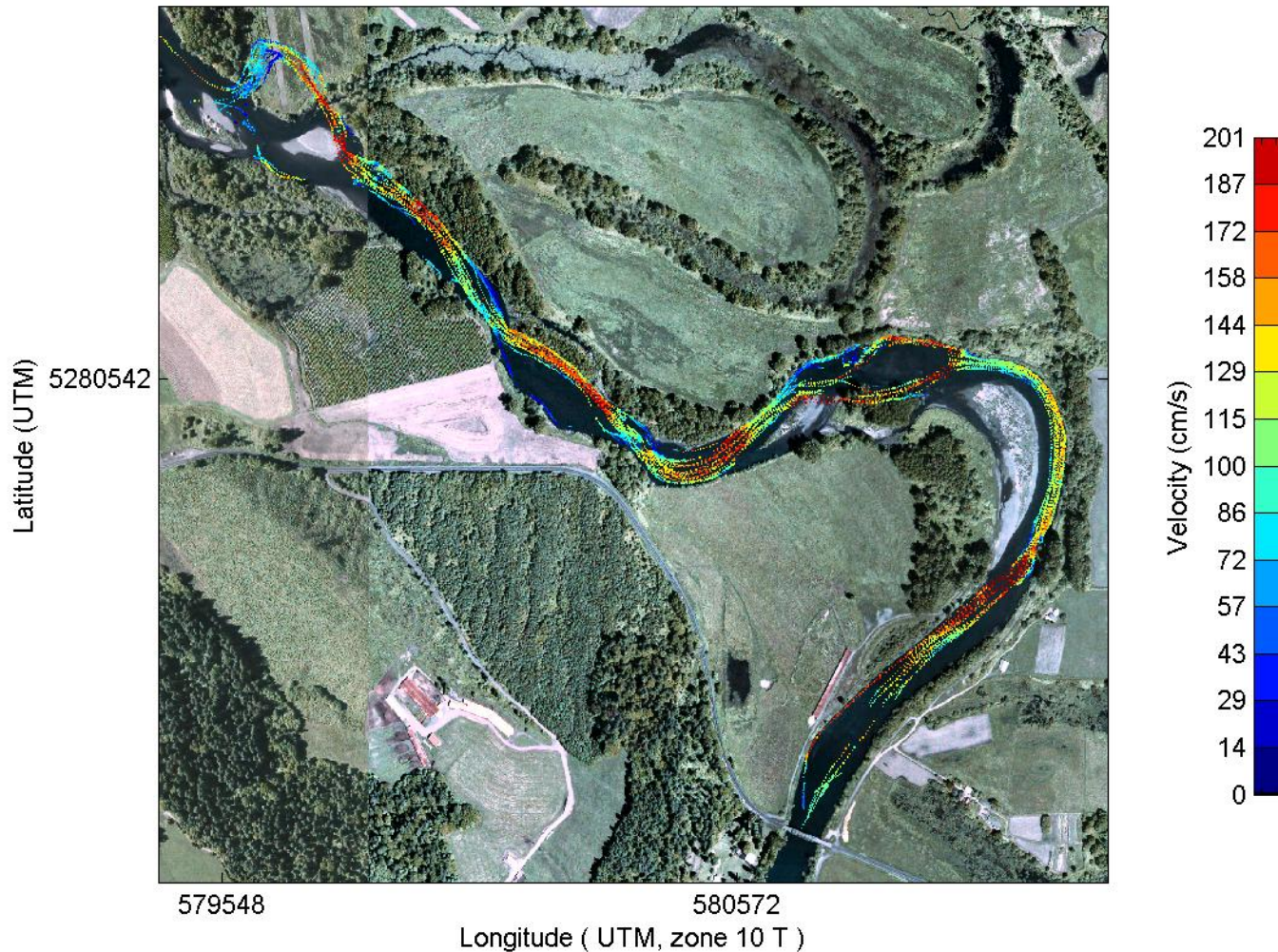
# Acoustic Doppler Data



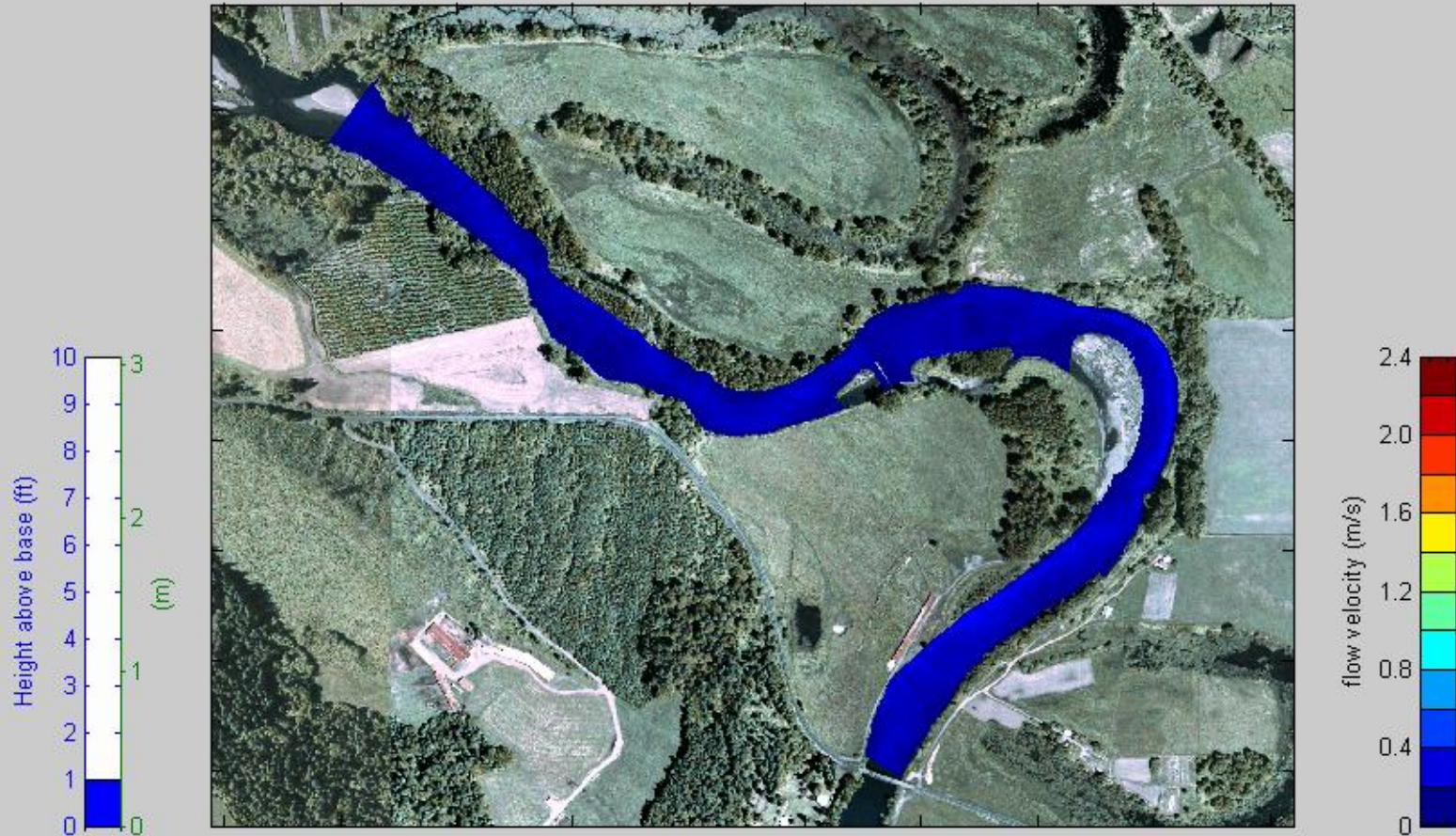
Wendy Marsh from WFC collecting ADP data during flood conditions. GPS locations along with velocity profiles and depth data are collected every 5 s and stored on a laptop computer. Velocity is collected in 15 cm bins and depth along 3 beams including average depth (h). Water surface slope (S) was collected with a survey grade GPS mounted on the raft during low flow conditions. Water surface slope for higher discharges was then modeled (see slide 27 for explanation)



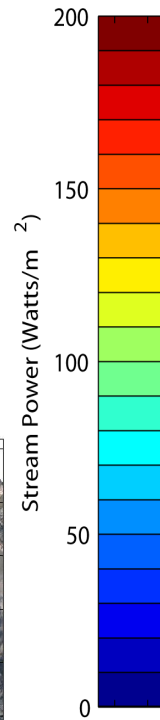
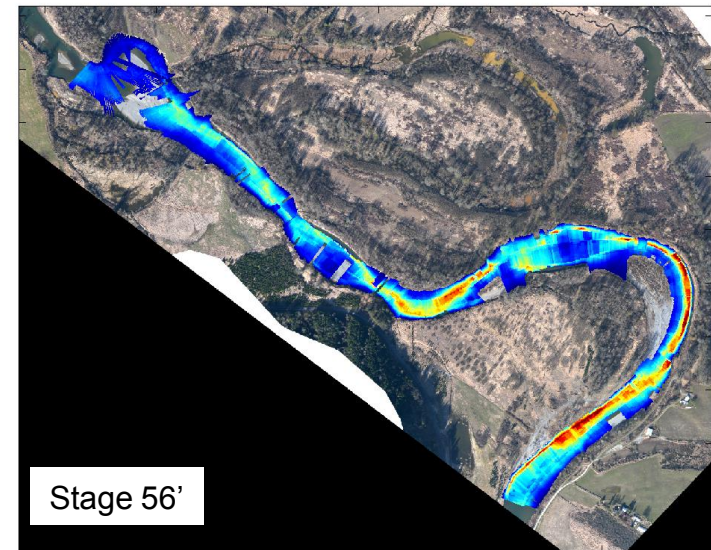
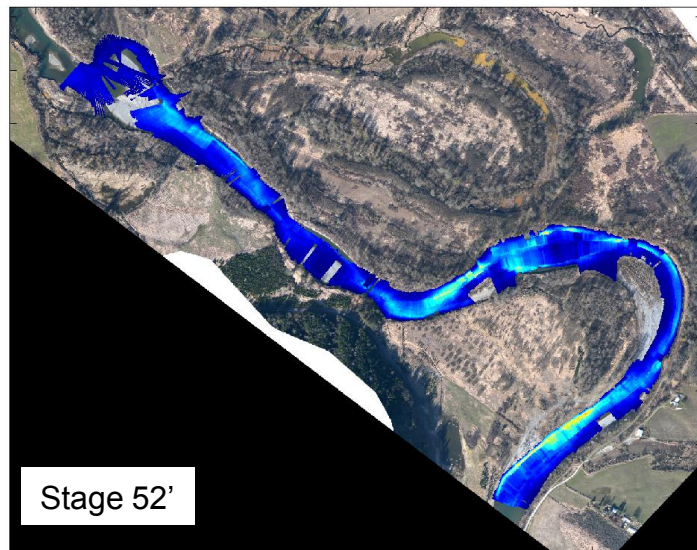
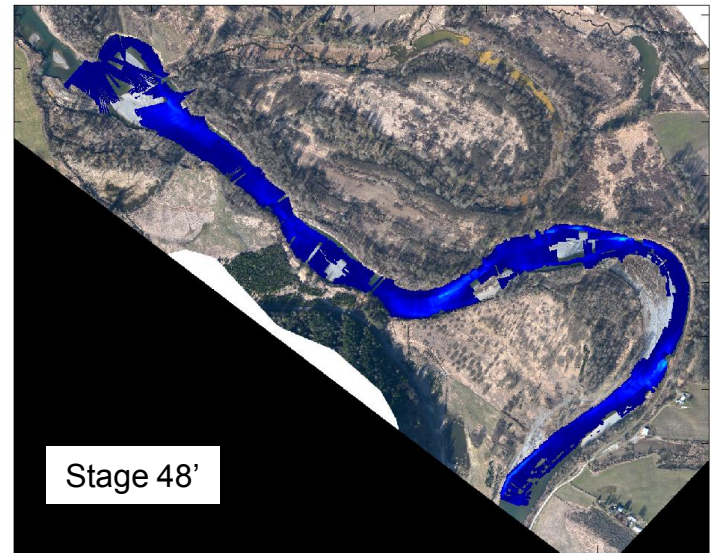
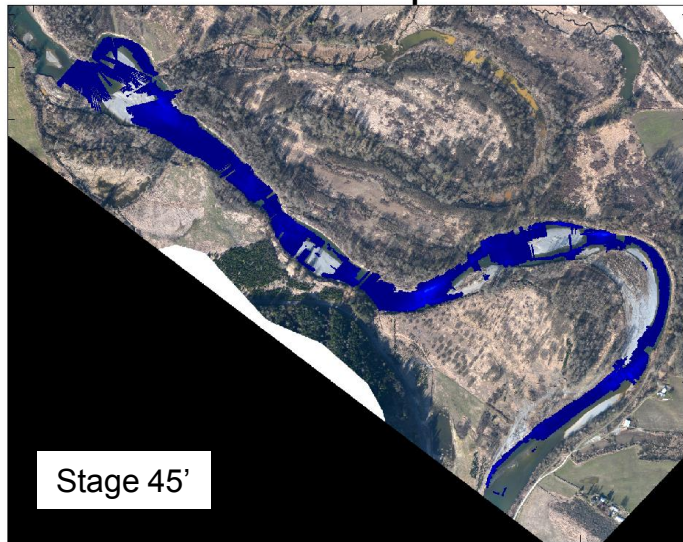
Multiple ADP runs were collected for 6 different river stage levels.  
Plot shows ADP tracks and mean water column velocity (V) for each profile collected.



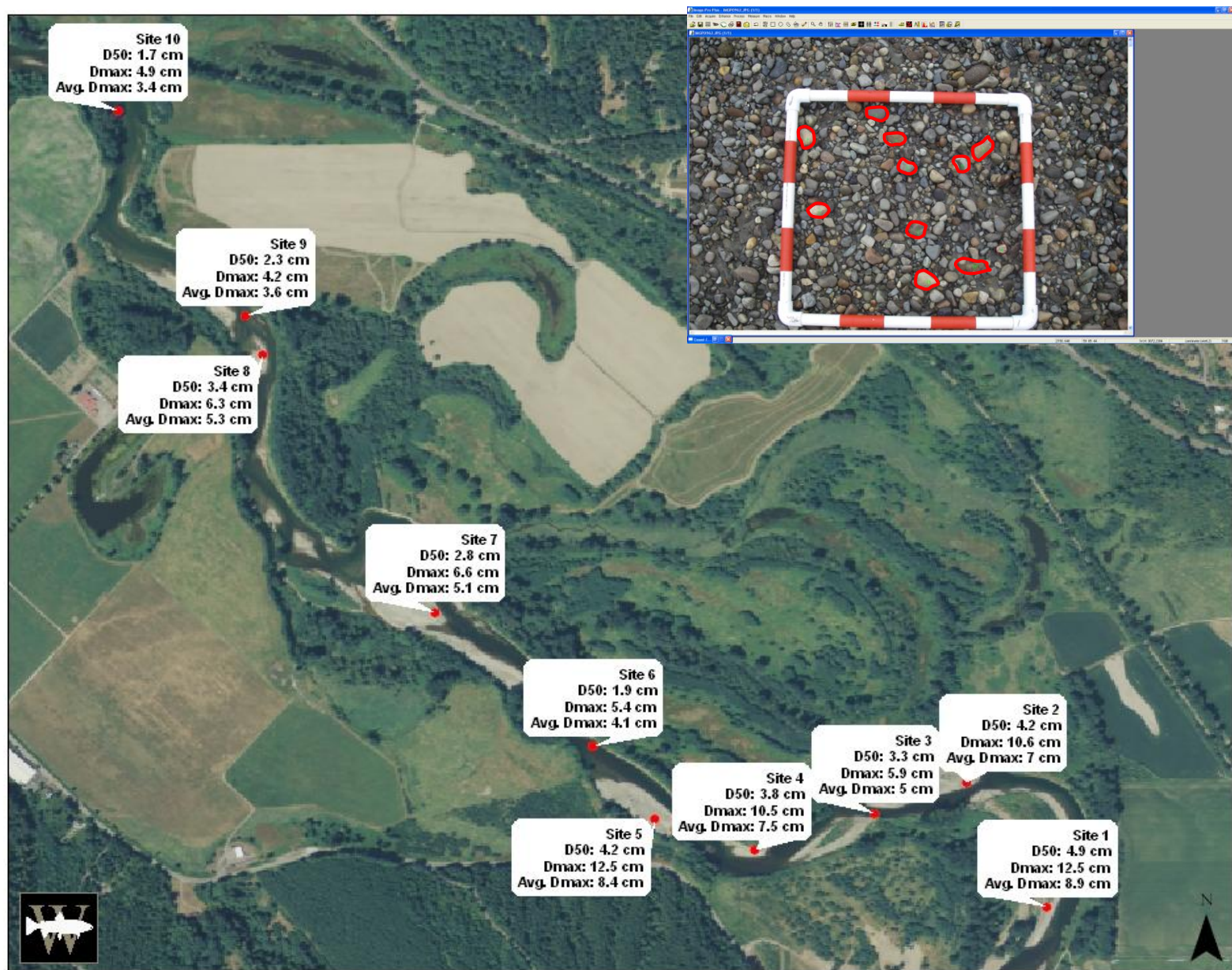
# River Analyzer OUTPUT Example: Flow Pattern Modeling



# Maps of modeled Stream Power patterns

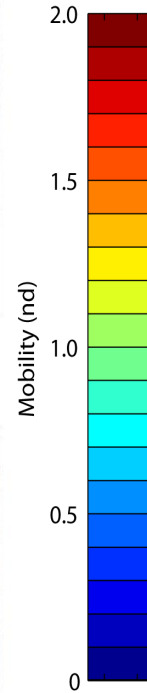
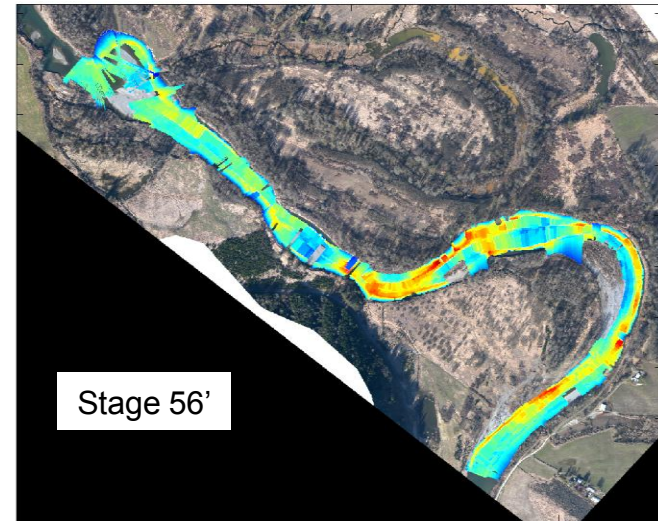
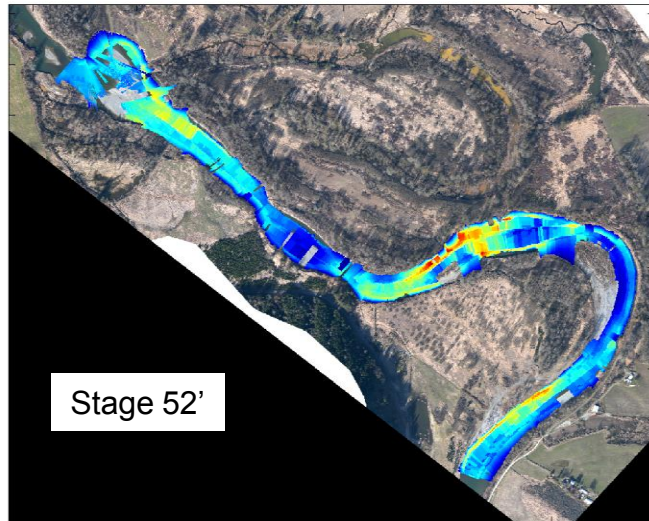
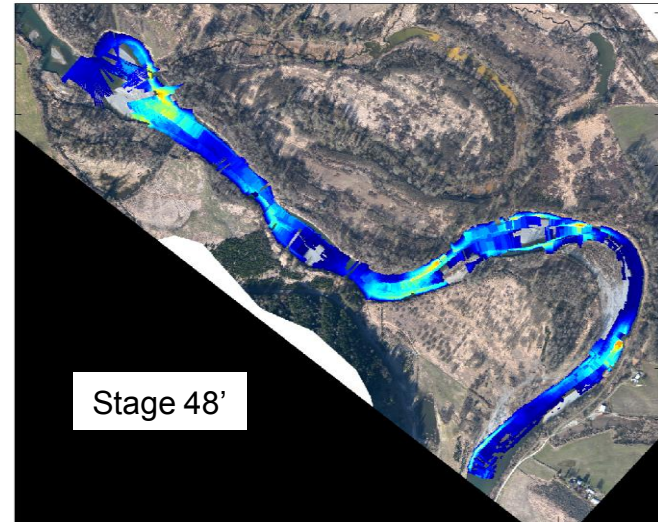
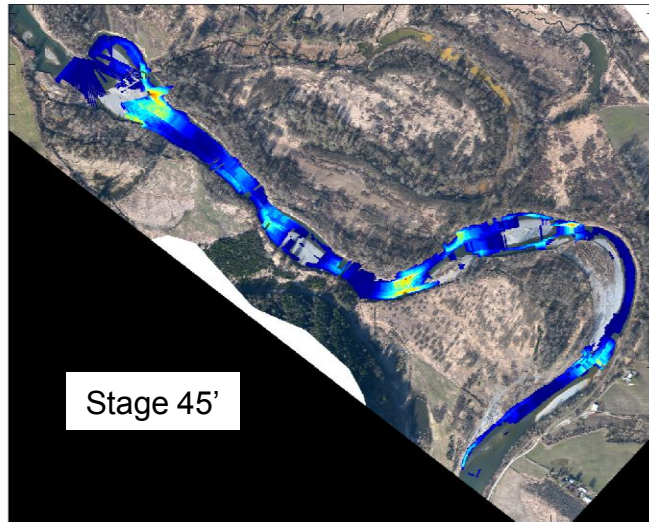


# Photosieve Locations and example of analysis

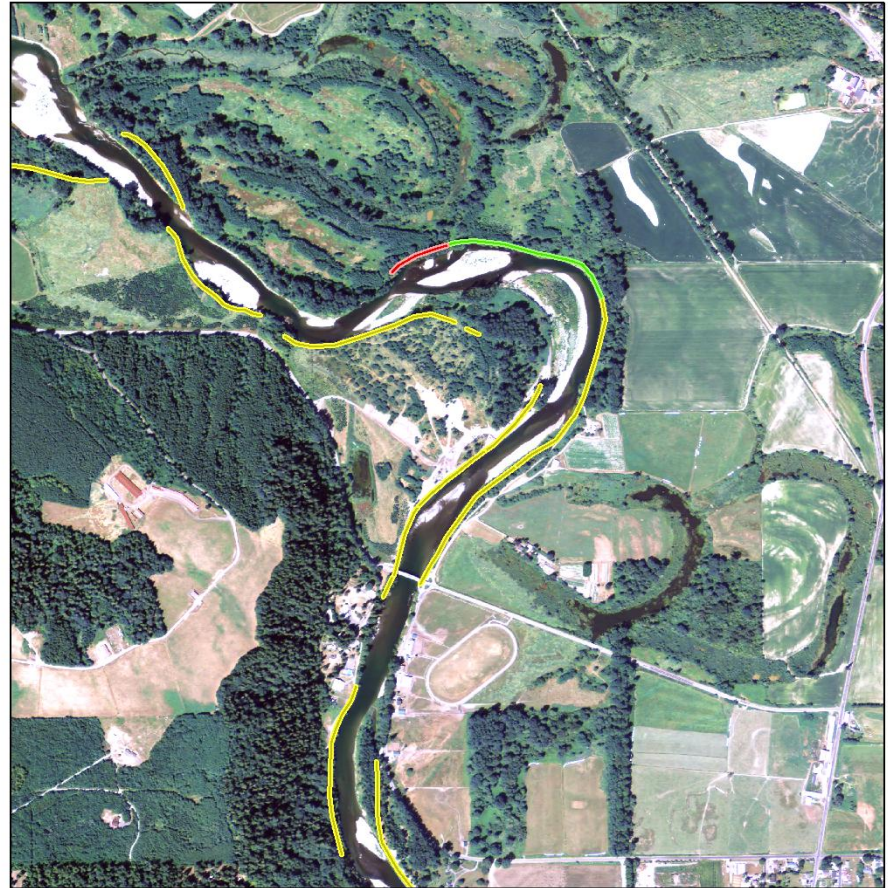


$$\xi = \frac{pghS}{0.045(p_s - \rho)gD_{50}^{0.6}D_{\max}^{0.4}}$$

Mobility Patterns > 1 (green to red) means threshold entrainment conditions met



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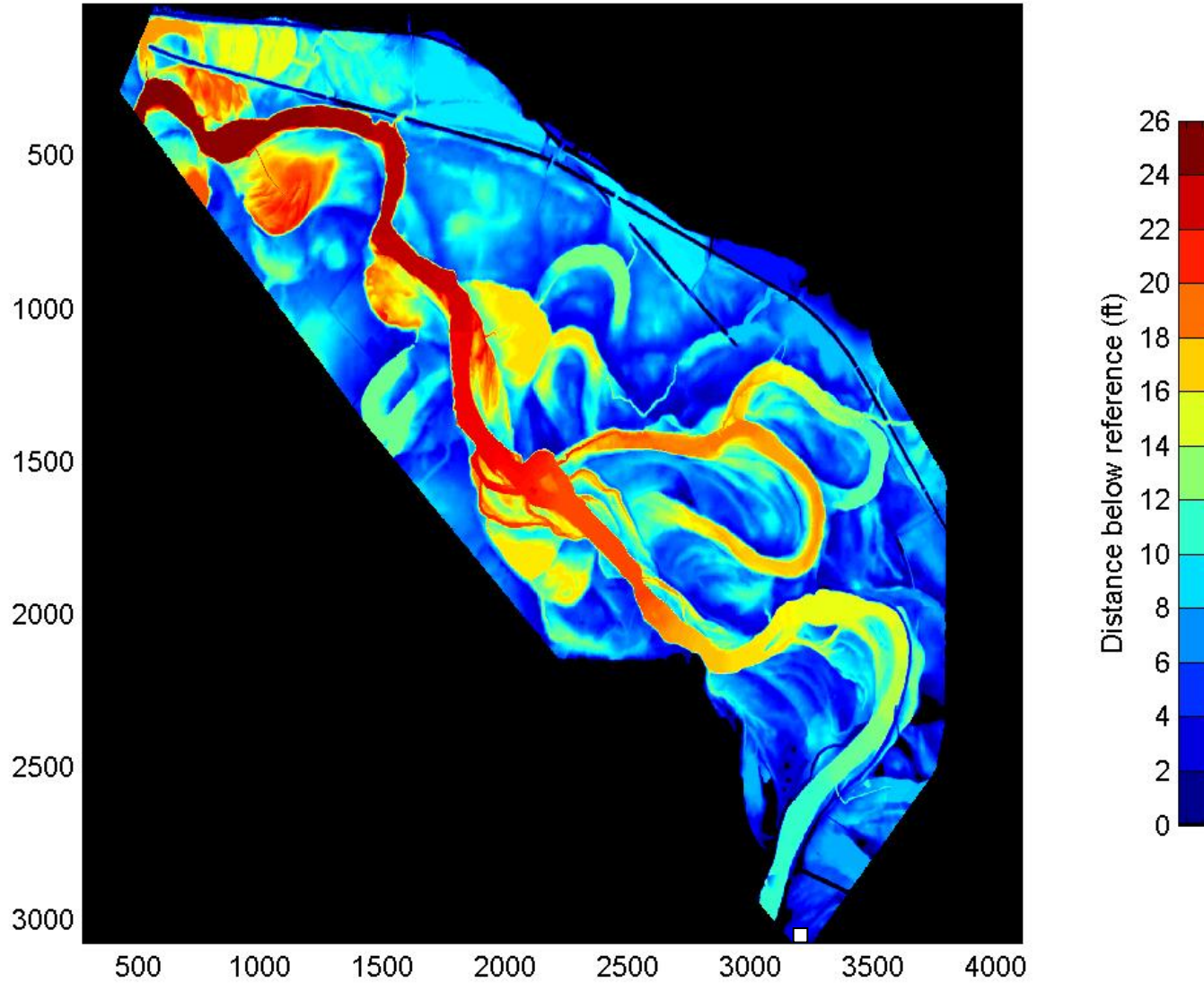


## Legend

- WDFW
- Gaisford
- Other

WDFW and Gaisford revetments are targeted for removal in this project.

Elevation difference plot relative to area in white box on x-axis, showing elevations below that reference point.



# Collaboration and Partnerships

- ▶ King County
  - Meander migration modeling
  - Landowner outreach
  - Data sharing
- ▶ WDFW
  - Stakeholder outreach
  - Collaborative restoration
- ▶ University of Montana
  - Mark Lorang – modeling