

# Preliminary Analysis of fish-habitat relationships using preliminary 2011 CHaMP data

Presentation to Expert Panel, 13 February 2012



Presenter: Seth White

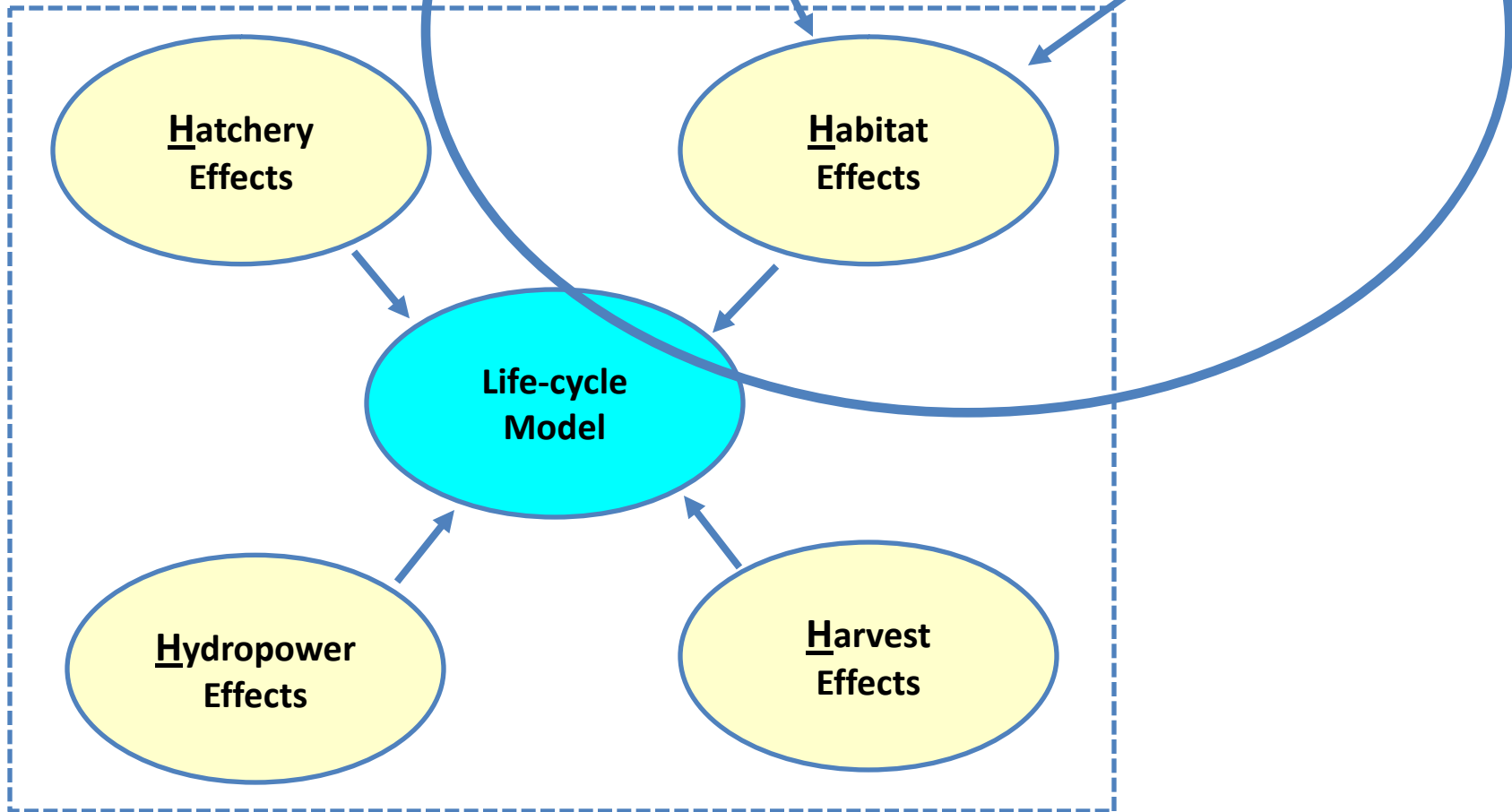
Coauthors: Casey Justice and Dale McCullough

Columbia River Inter-Tribal Fish Commission

BPA Project # 2009-004-00



# Conceptual Modeling Framework

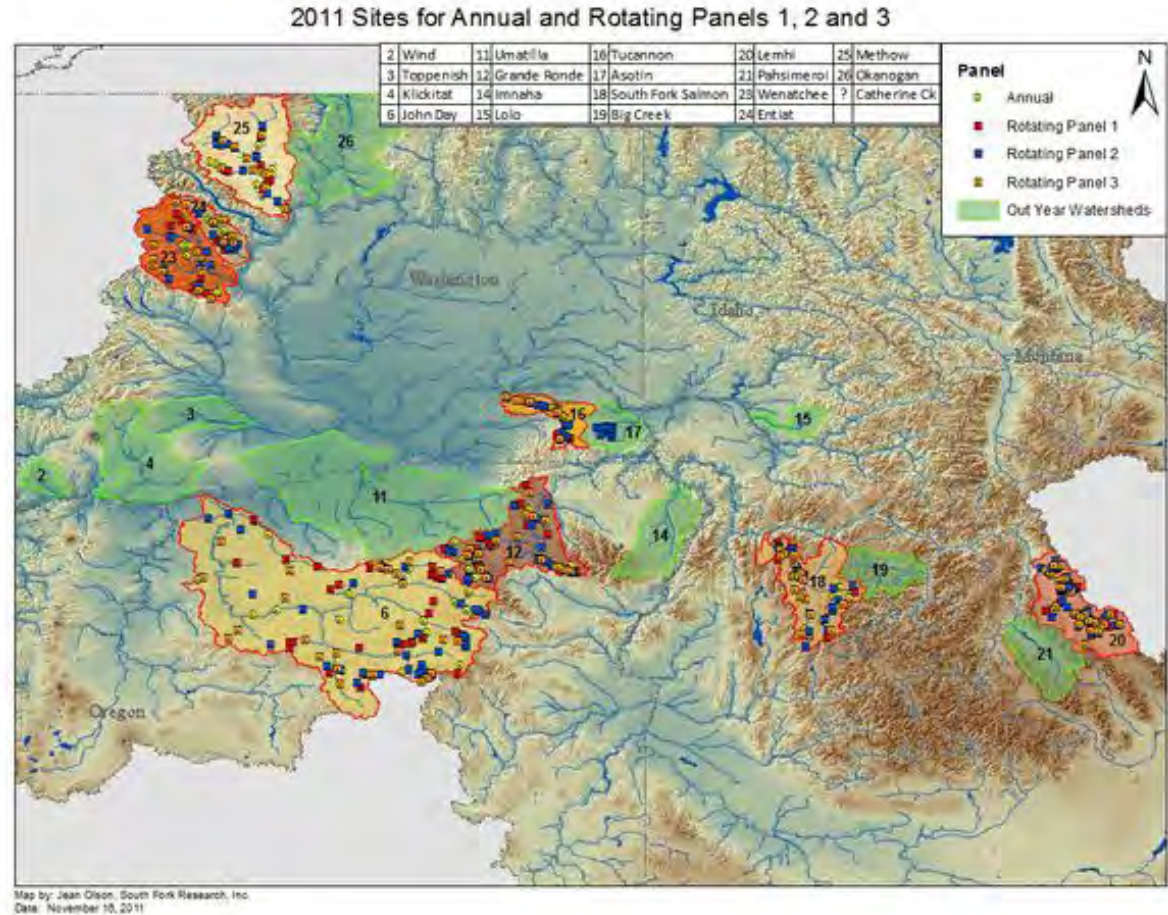


# Objectives

- 1) Determine influence of landscape-scale features on site-level fish habitat metrics
- 2) Demonstrate a statistical tool for linking habitat to juvenile Chinook salmon distribution

# CHaMP Study Design

- 9 watersheds in Columbia River basin
- Spatially balanced (GRTS)
- 3-year rotating panel (annual & repeat sites)
- Pre-stratification: Source, Transport, Response (most watersheds)

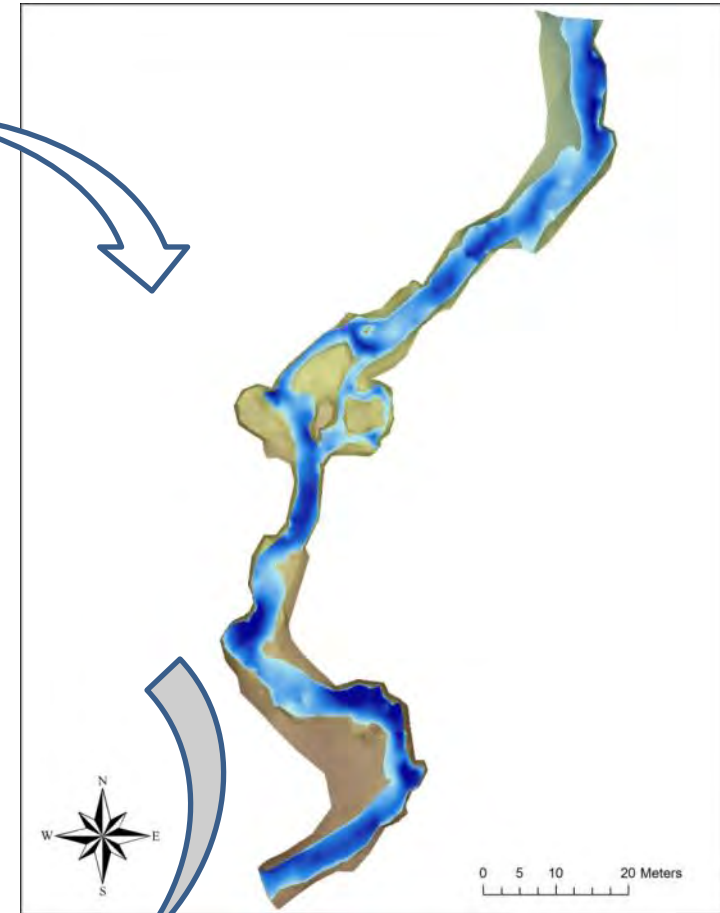




# CHaMP Methods

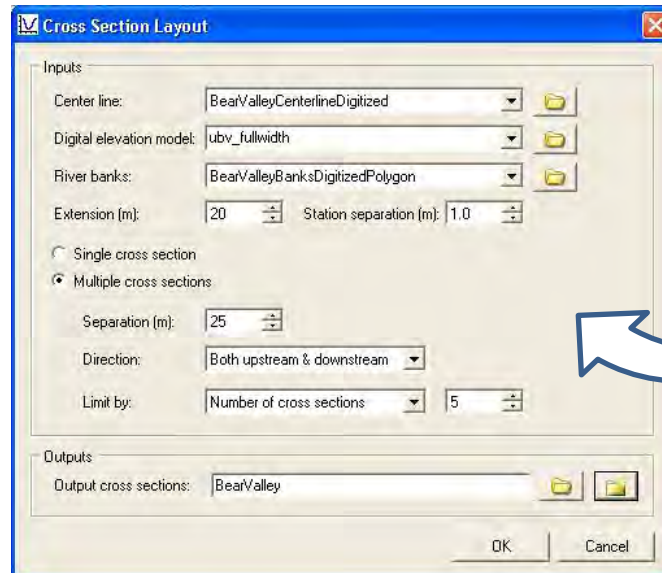


**Field Survey**

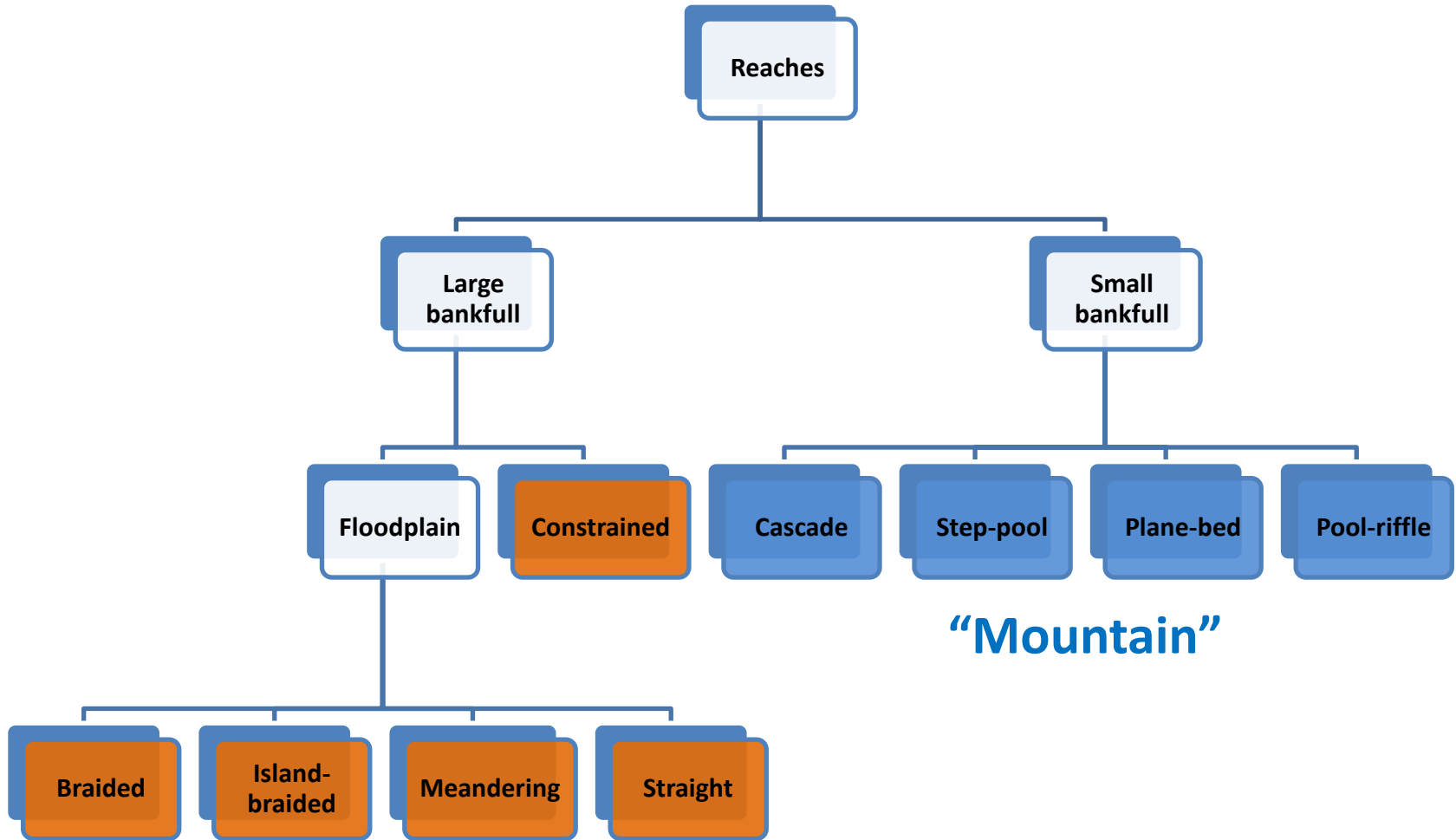


**GIS post-processing**

**River  
Bathymetry  
Toolkit (RBT)**



# Simplified Beechie Channel Classification



**“Floodplain & Constrained”**

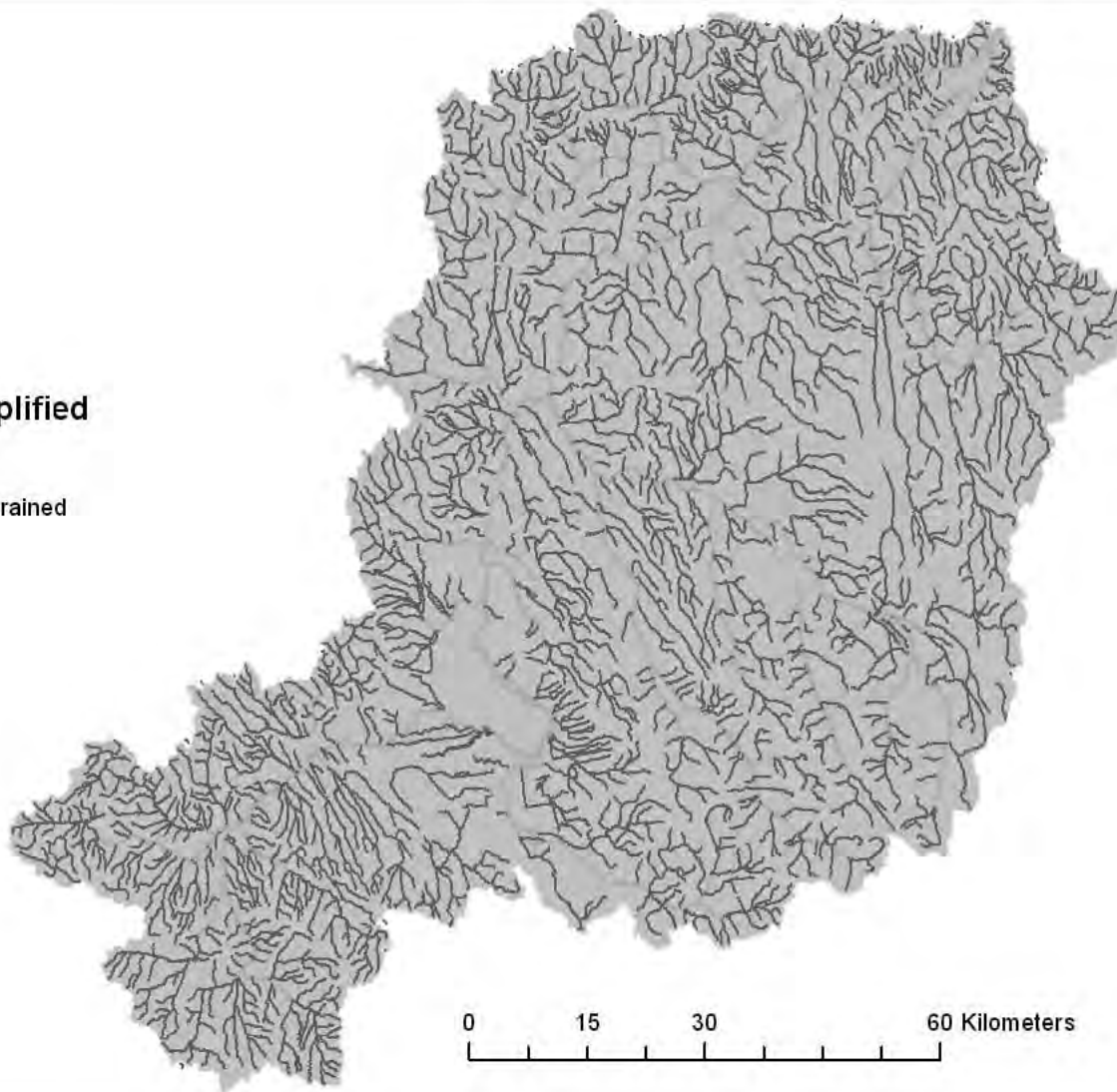
**“Mountain”**

### Channel type - Simplified

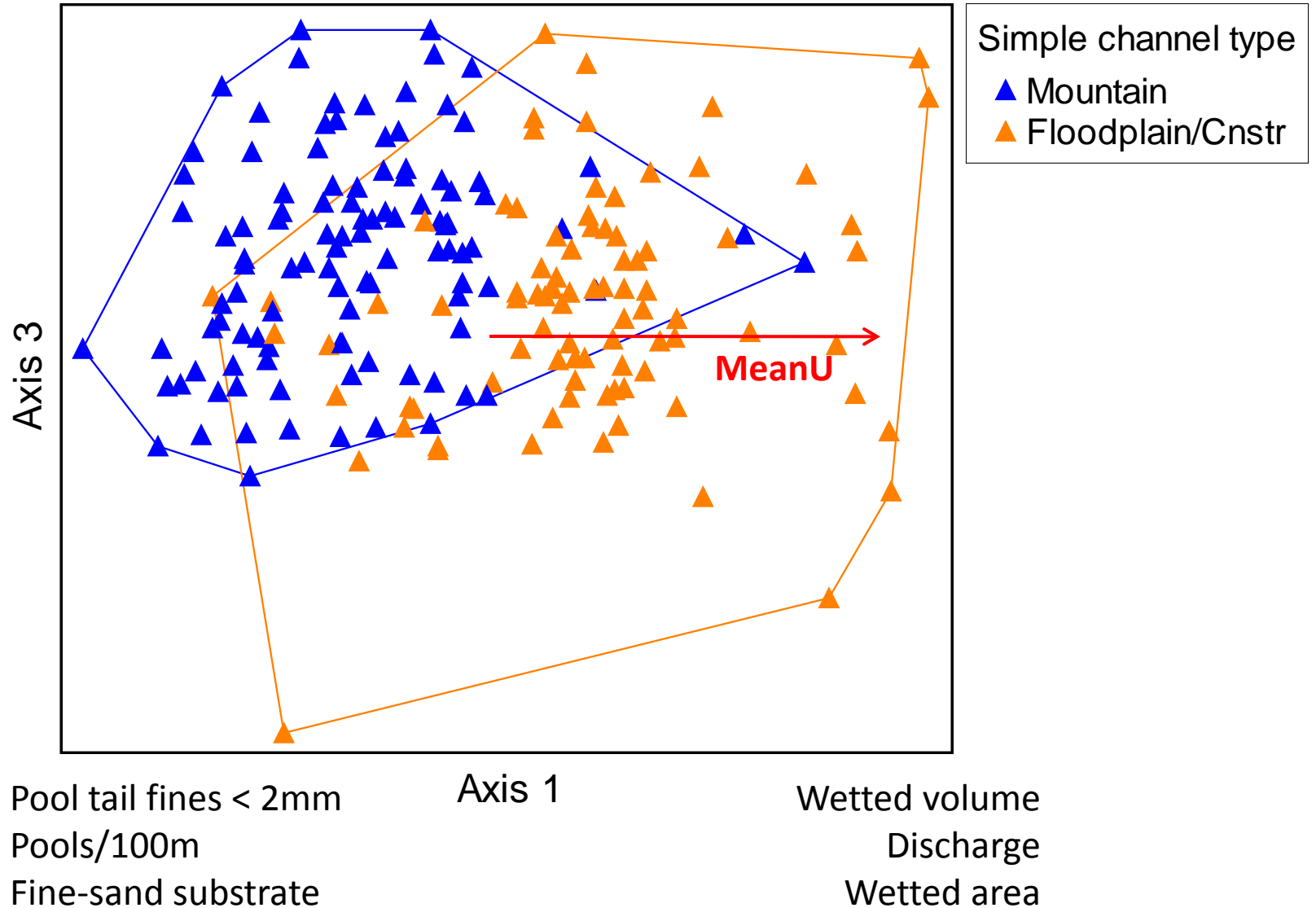
- Mountain
- Floodplain + Constrained



0 15 30 60 Kilometers

A horizontal scale bar with vertical tick marks. The numbers 0, 15, 30, and 60 are placed above the bar, with 'Kilometers' at the far right end.

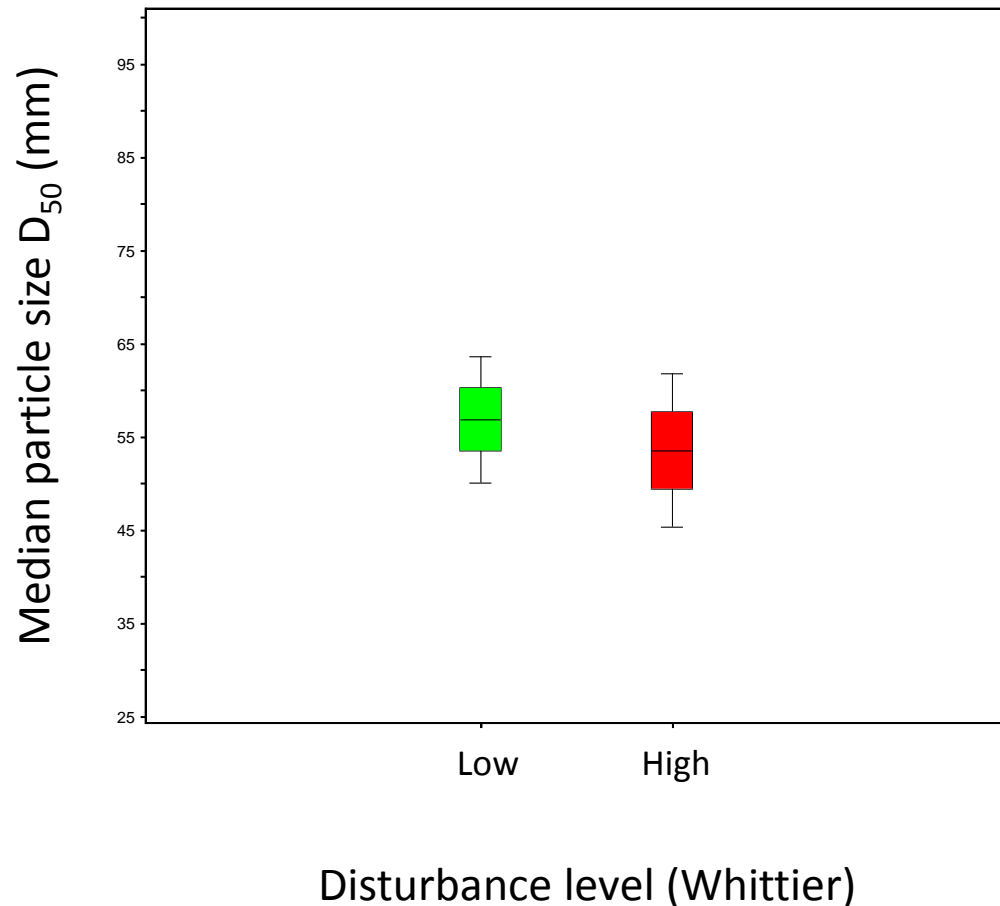
## NMS on relativized data - CHaMP pilot data 2011



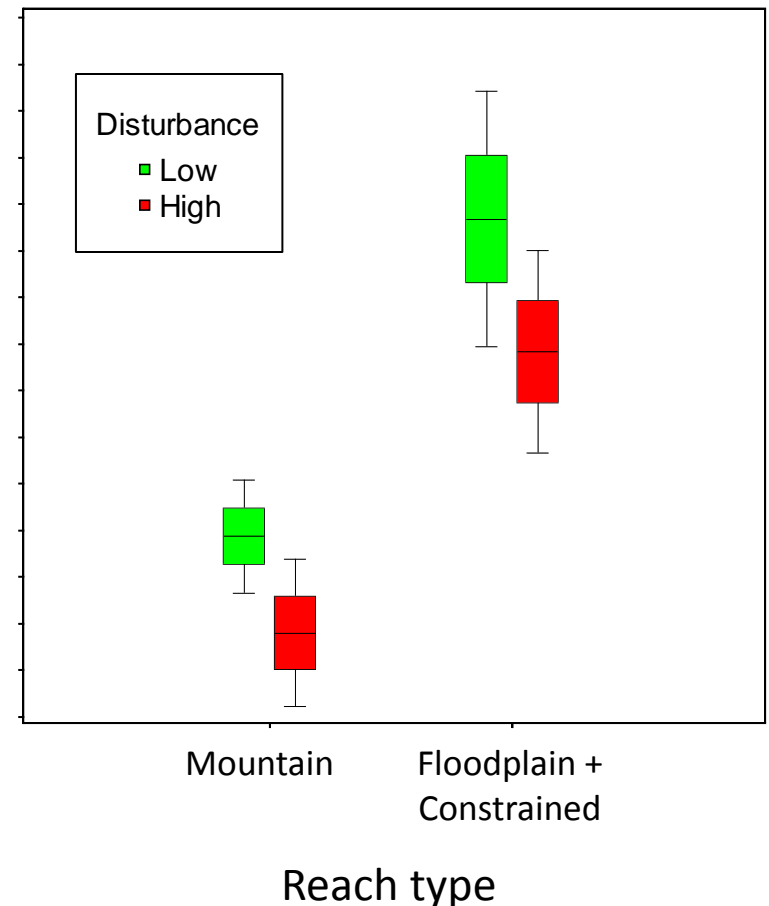


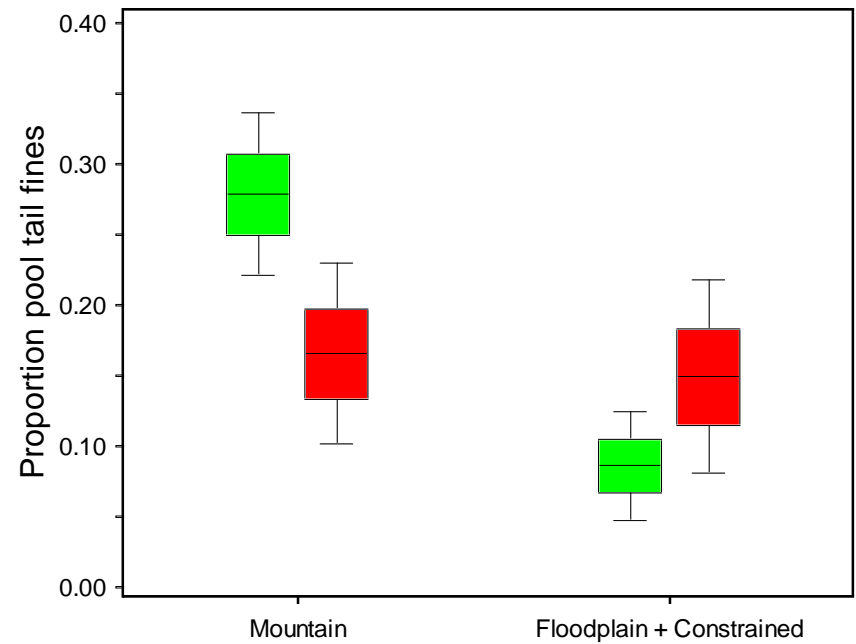
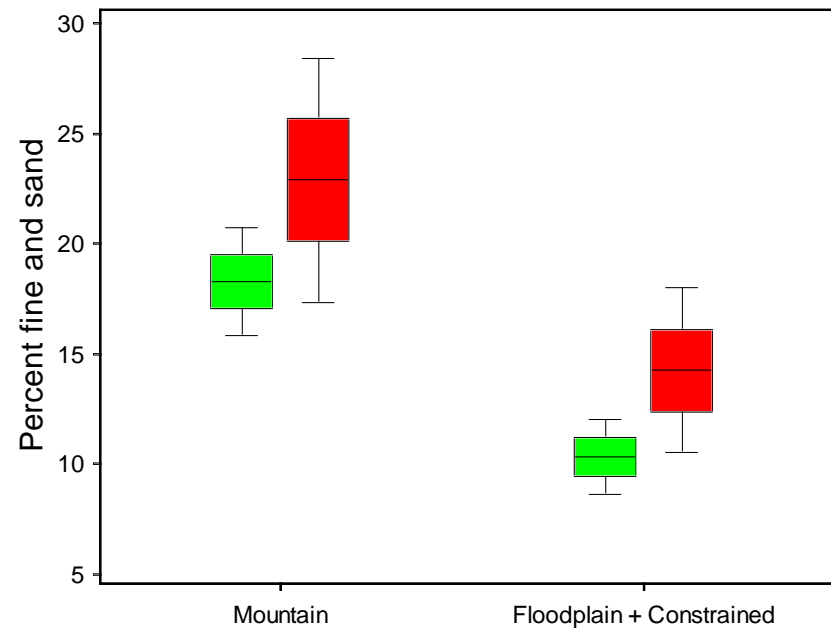
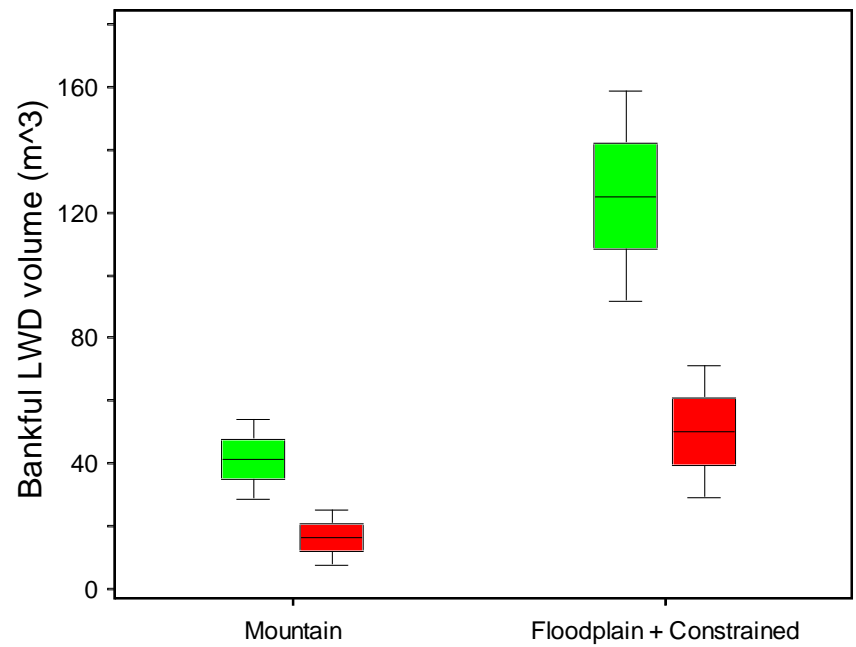
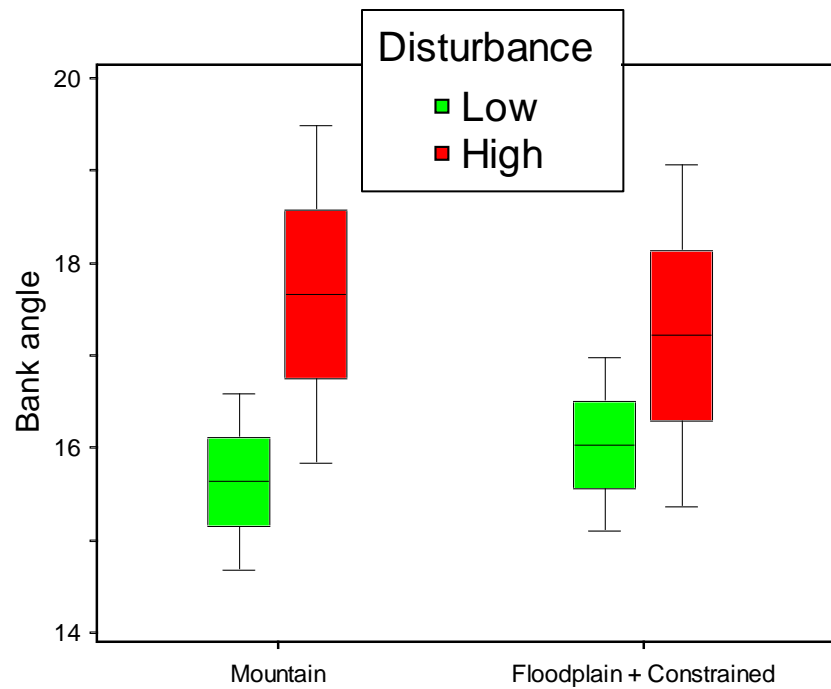
# Difference between naïve vs. informed analyses

Naïve



Informed by classification

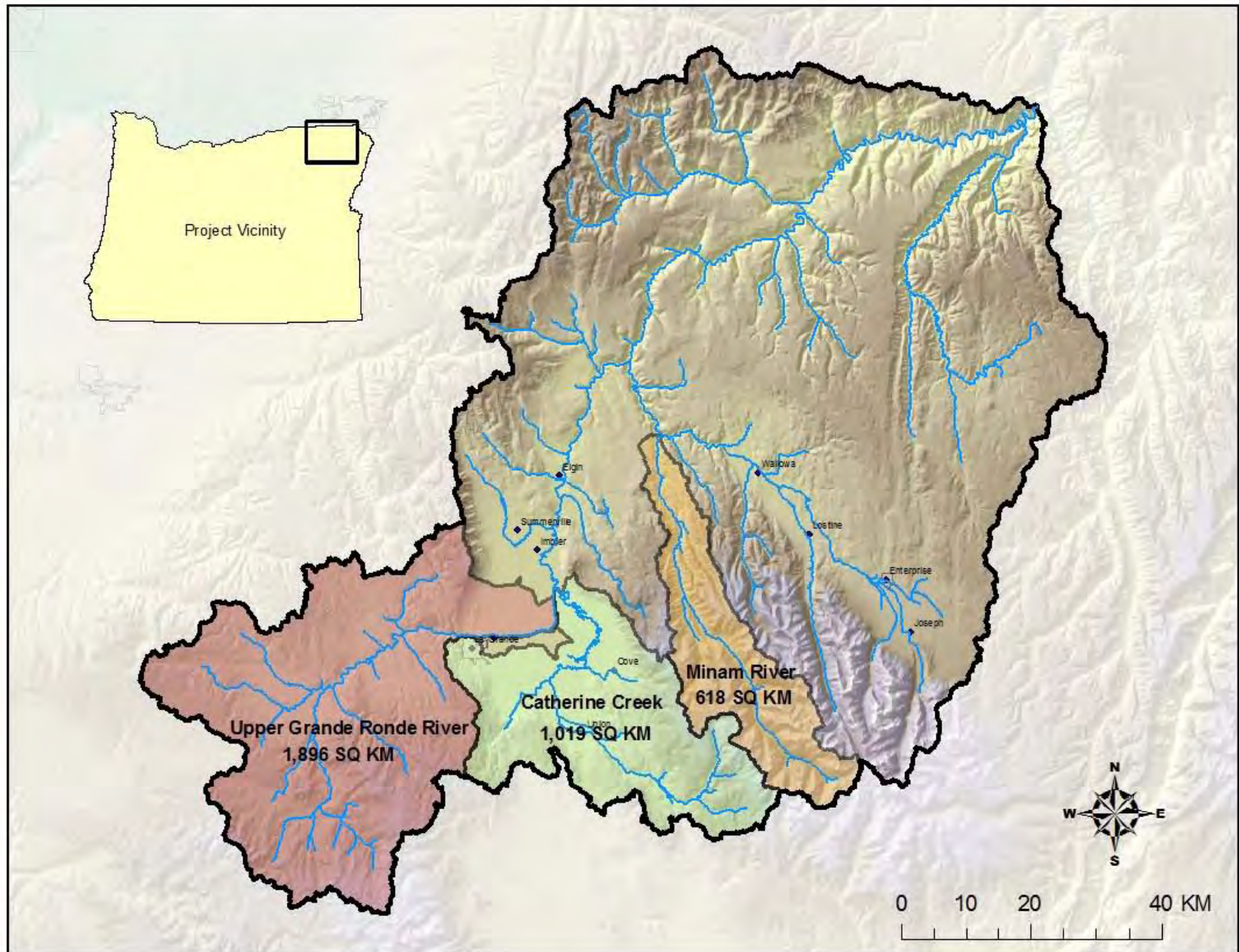




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# The Grande Ronde River Basin



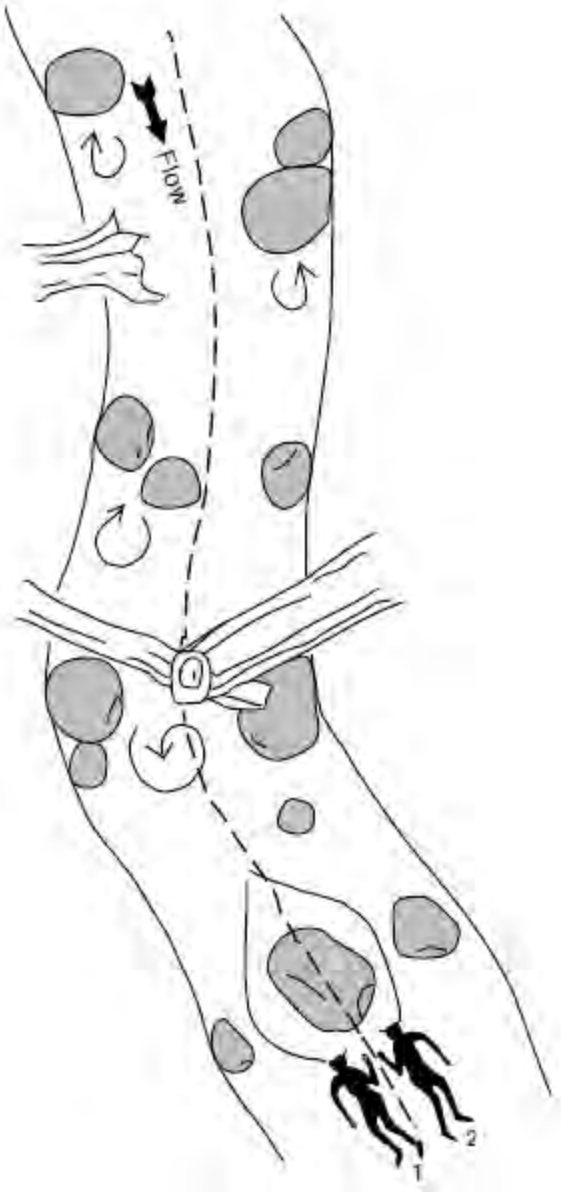
# Current Habitat Condition

- ❖ Spring Chinook salmon and steelhead listed as “Threatened” under ESA
- ❖ Upper Grande Ronde and Catherine Creek listed as “Critical Habitat”
- ❖ Heavily degraded habitat from timber harvest, agriculture and irrigation, and cattle grazing



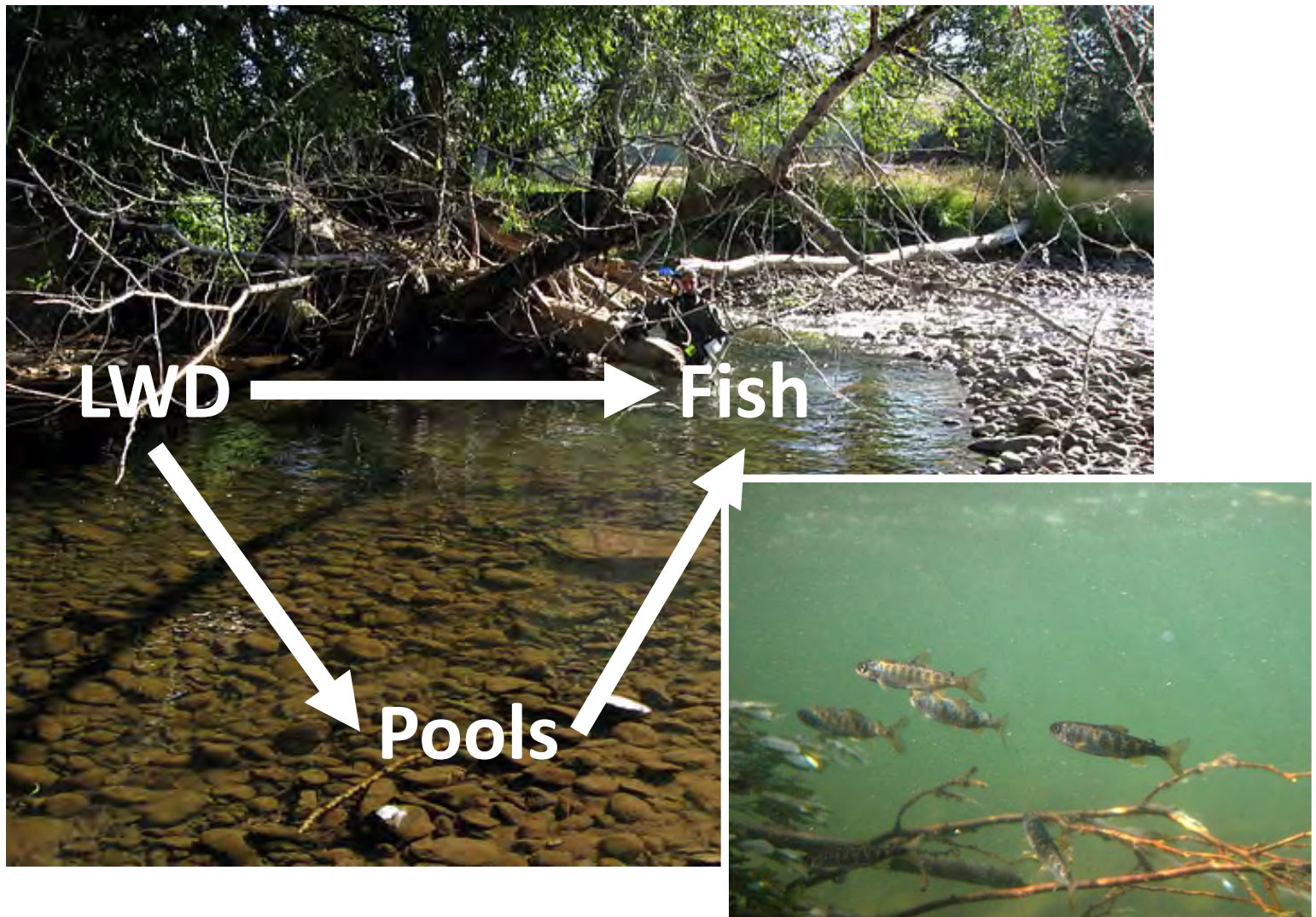


# Snorkel Surveys

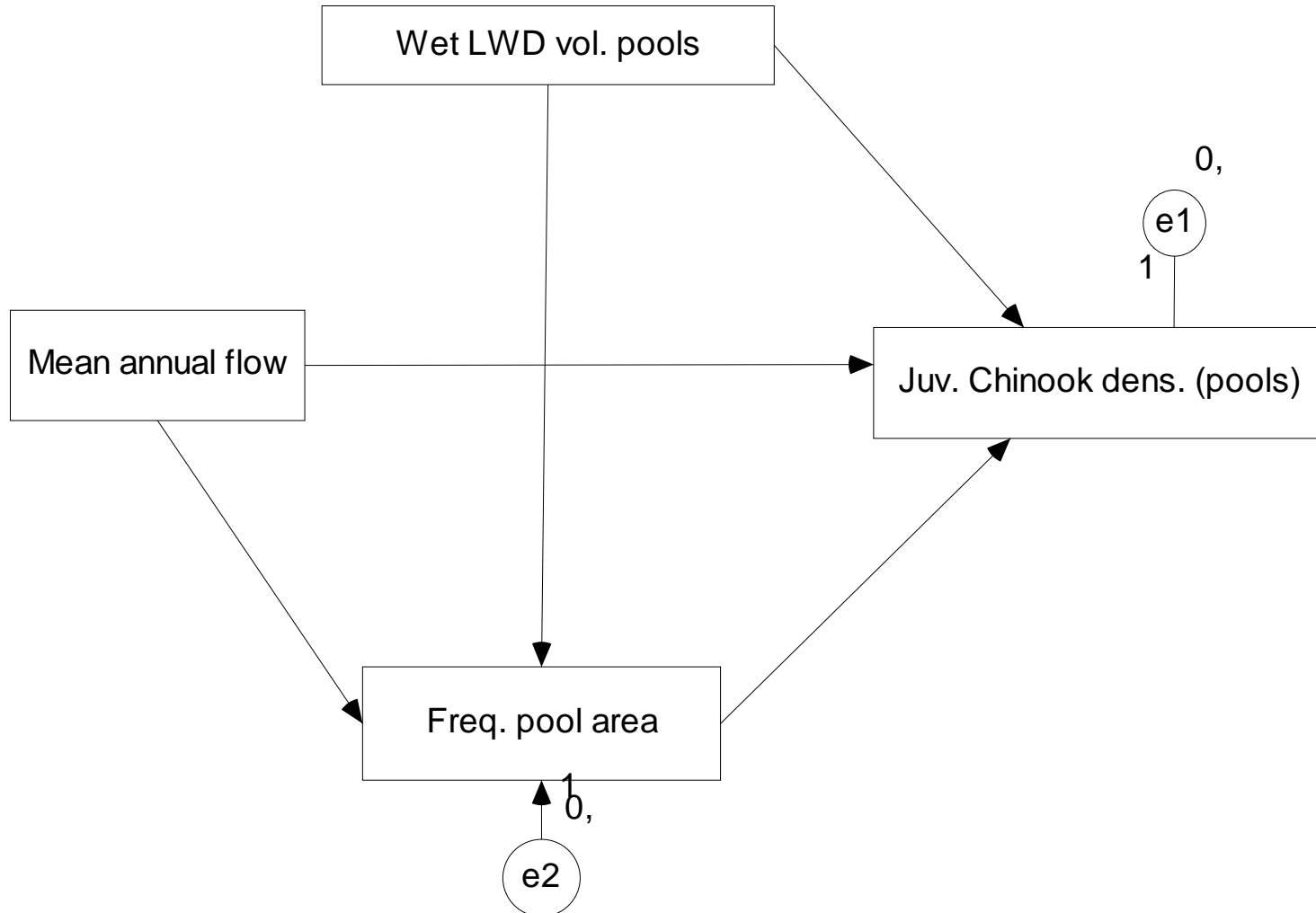


- ❖ Estimates of relative abundance & density of salmonids by species & size class (Thurrow 1994, O'Neal 2007) at channel unit scale
- ❖ In collaboration with ODFW La Grande
- ❖ Data aggregated to reach scale (50 reaches for analysis)

# Interaction among LWD, pools, and juvenile Chinook



# SEM – Graphical Hypotheses

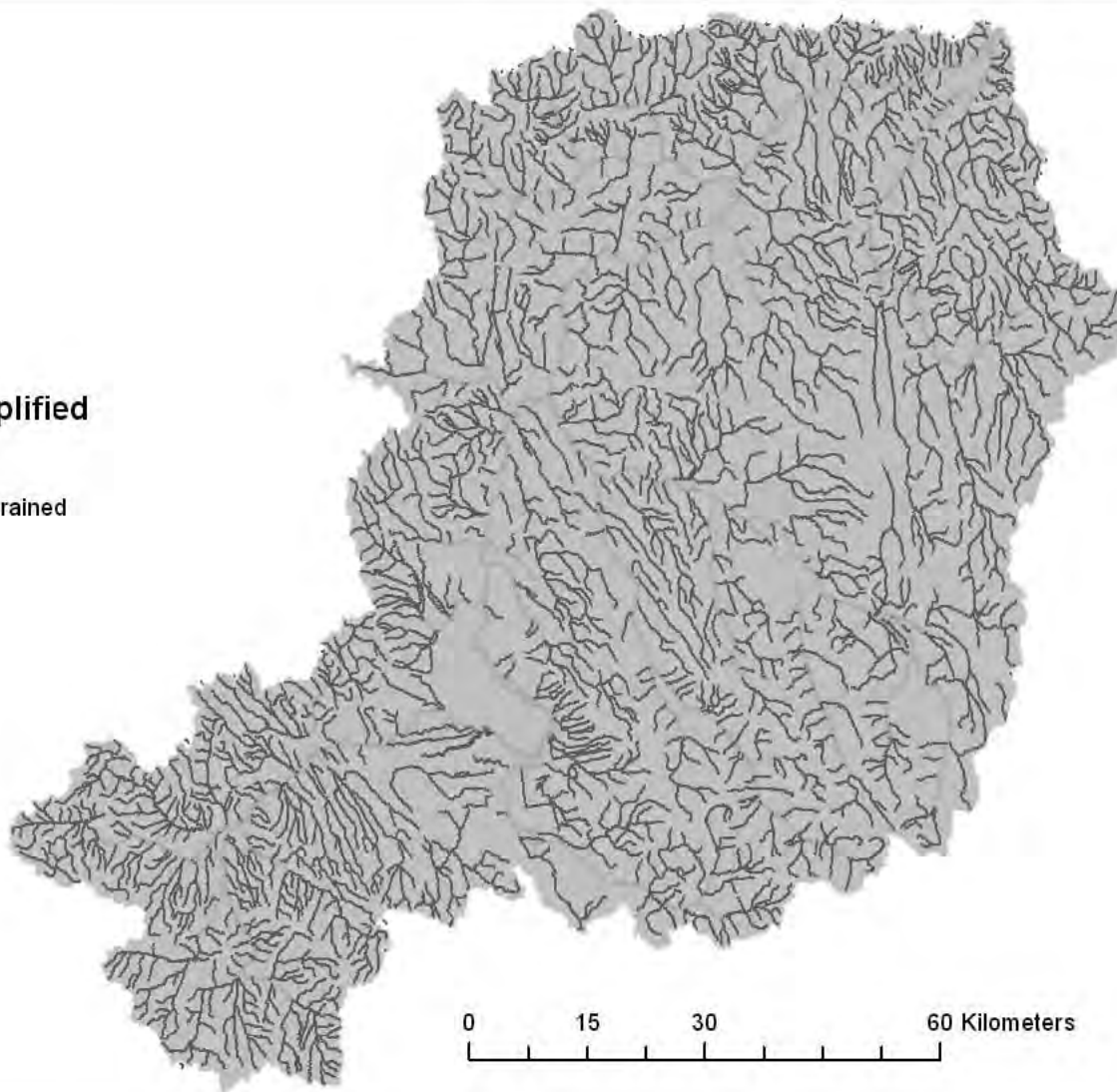


### Channel type - Simplified

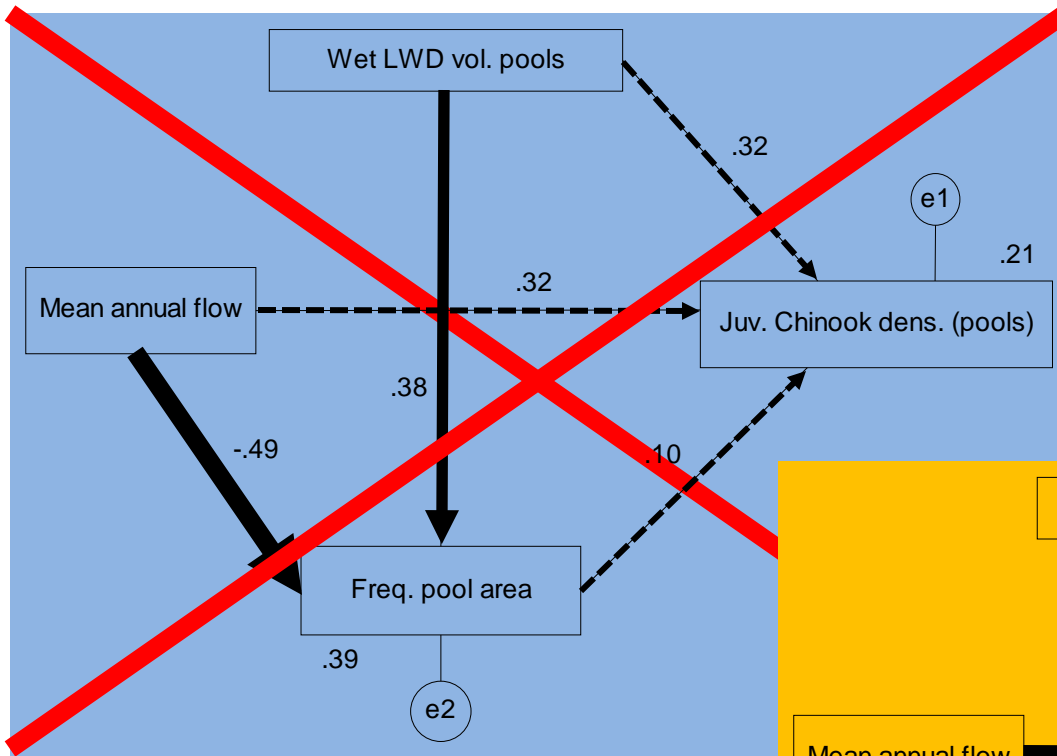
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0 15 30 60 Kilometers

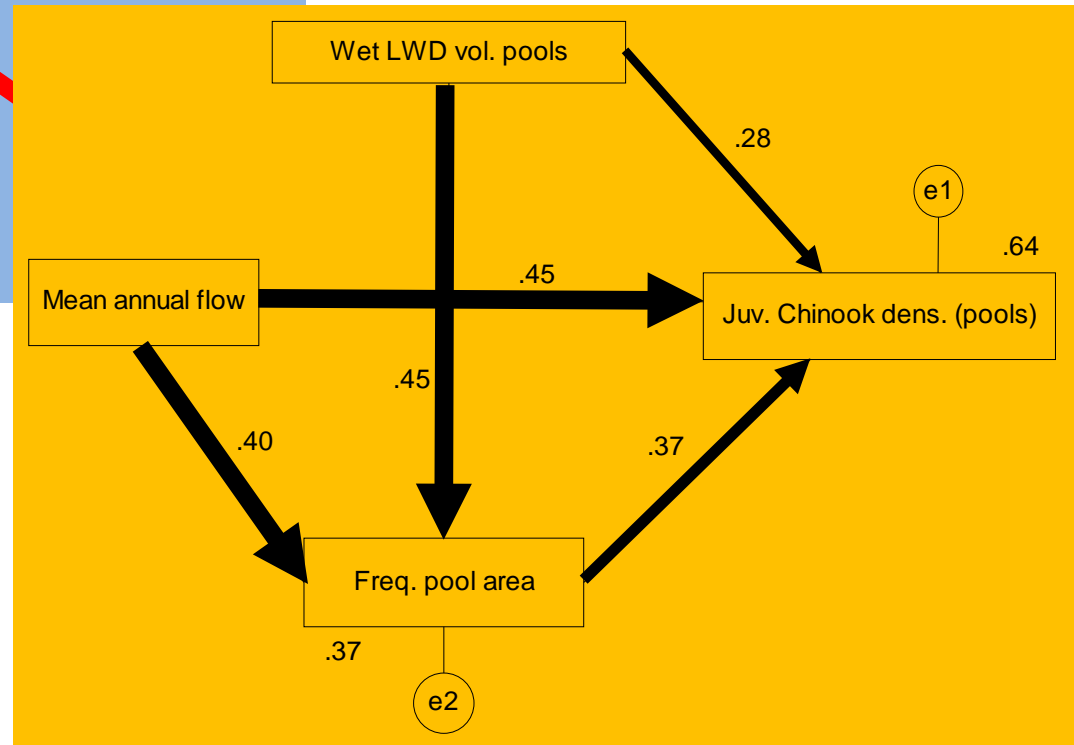
A horizontal scale bar with vertical tick marks. The labels '0', '15', '30', and '60 Kilometers' are placed above the bar at regular intervals.

# Do Ecological Systems Behave Differently by Channel Type?



“Mountain”

“Floodplain & Constrained”

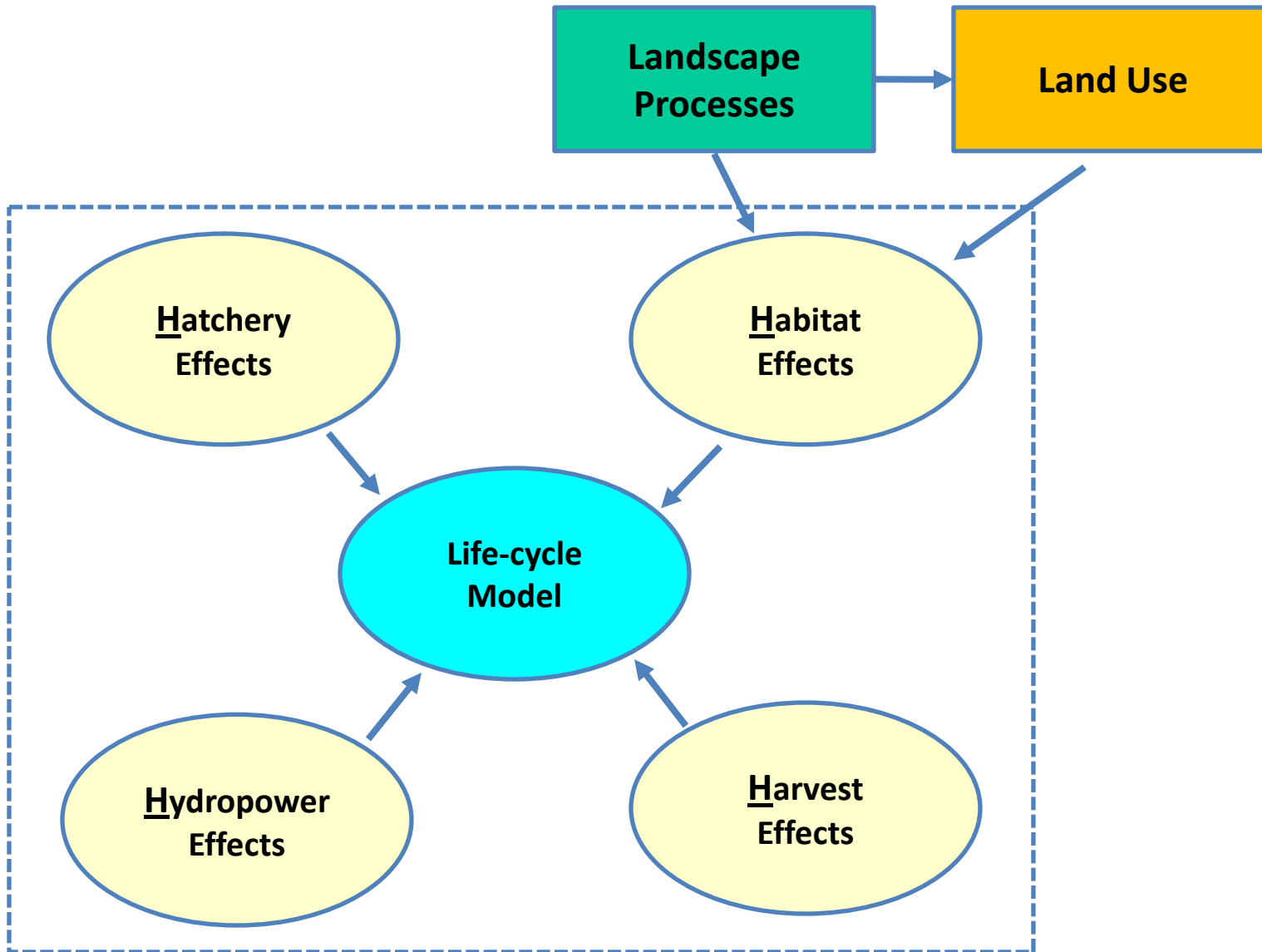




# Conclusions

- A simple stream classification explained differences in landscape-habitat dynamics
- Mean annual streamflow was a controlling variable for fish-habitat relationships
- LWD had direct & indirect effects on juvenile Chinook
  - More wood → more fish
  - More wood → more pools → more fish
- SEM is a valuable tool for describing landscape-fish habitat processes

# Conceptual Modeling Framework





# **Acknowledgements**

**Field Crew – Laurinda Hill, Paul Pradeau, Tarin Lewis,  
Chris Vondrasek**

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Jirka Musil**

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