

# Native Freshwater Fishes Research in the Chehalis River

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Washington Department of  
*FISH AND WILDLIFE*

# Research needs

- Early on established need to increase understanding of native freshwater fishes in Chehalis River Basin
- Limited information available

- Investigate
  - Species distribution
  - Habitat preferences
  - Movement patterns
  - Occupancy/density

Increase our understanding  
of native freshwater fish in  
Chehalis River

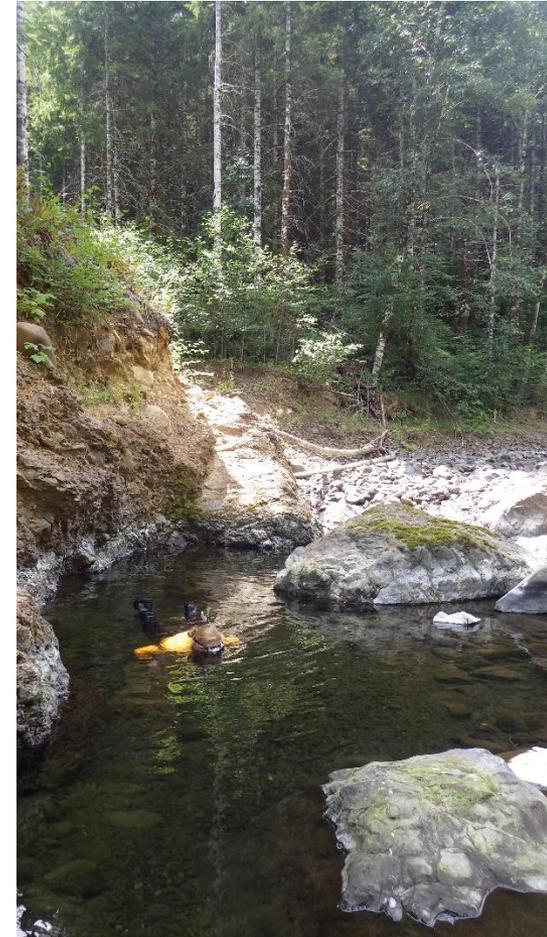
- Determine survey methods, establish baseline (occupancy or density) for monitoring efforts
- How will restoration targeting salmon and steelhead influence other native fish species in the Chehalis River?

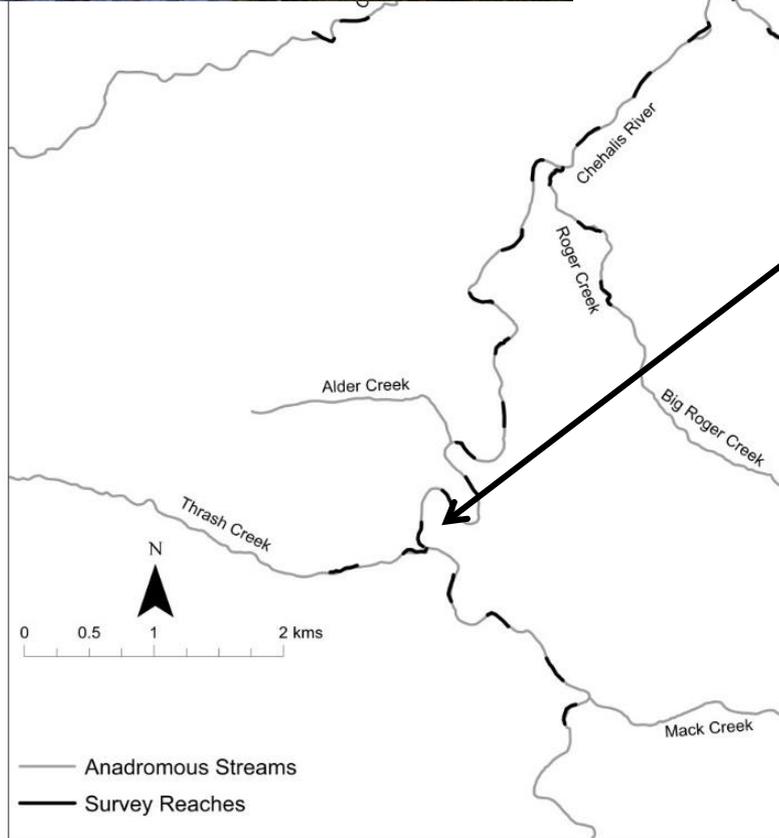
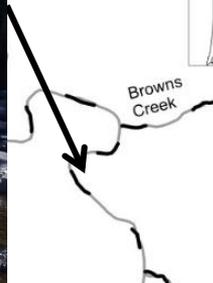
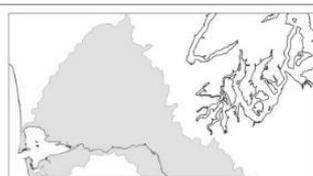


## Study 1. Upper Chehalis Instream Fish

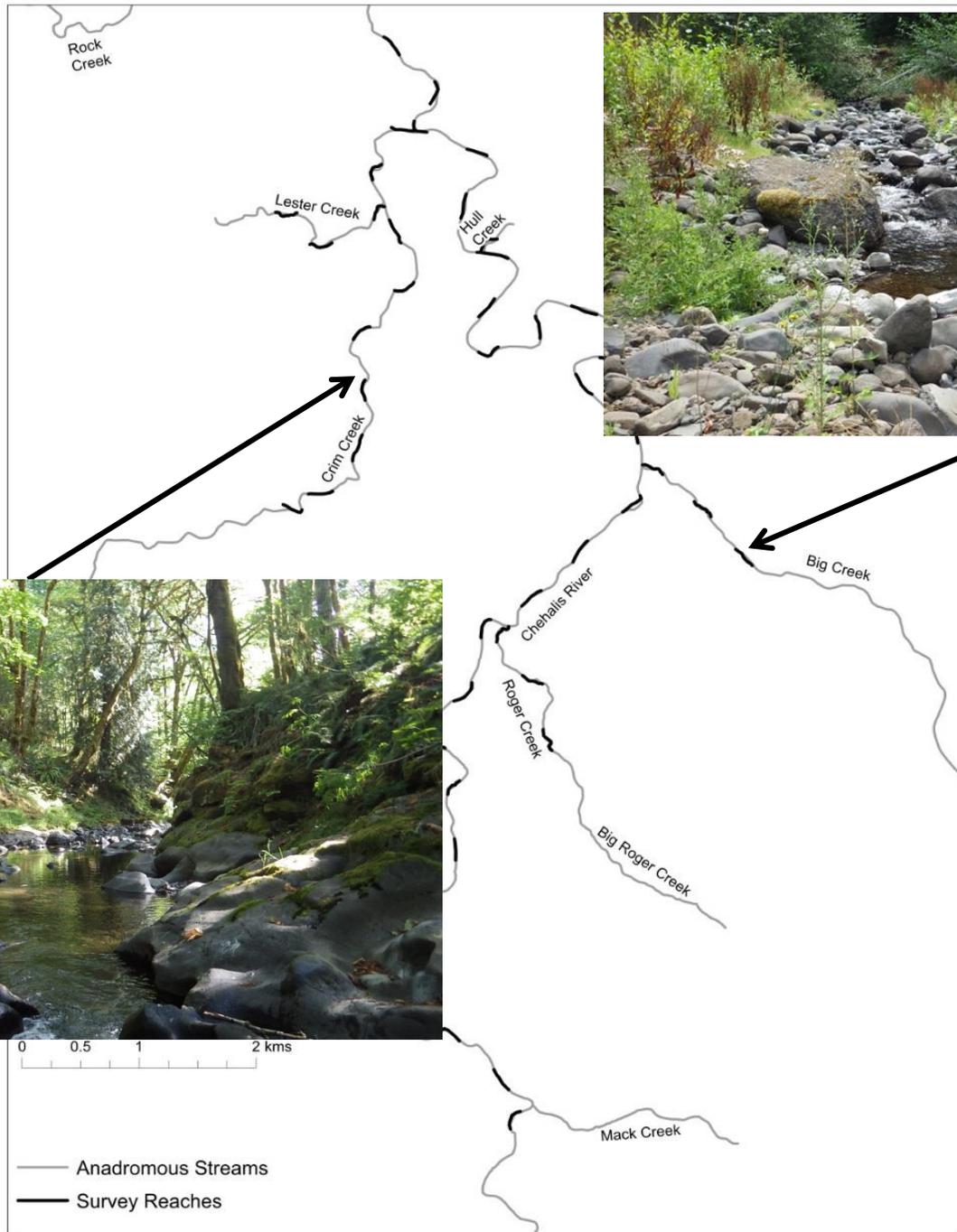
# 1. Upper Chehalis Instream Fish Study

- Describe **distribution** of fish present within Upper Chehalis mainstem and select tributaries
- Surveyed 30 river Km
- Fieldwork completed in summer 2015
- Report available: Winkowski, M., Kendall, N., Zimmerman, M. (2016) *Upper Chehalis Instream Fish Study 2015*. Washington Dept. Fish and Wildlife, Olympia, WA. FPT 16-11

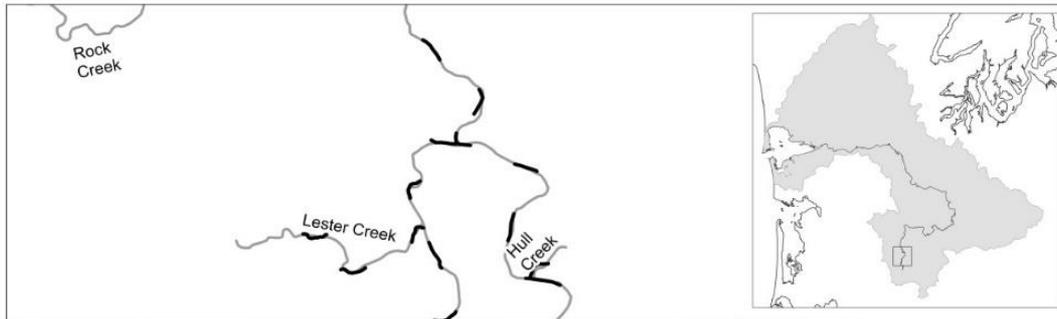




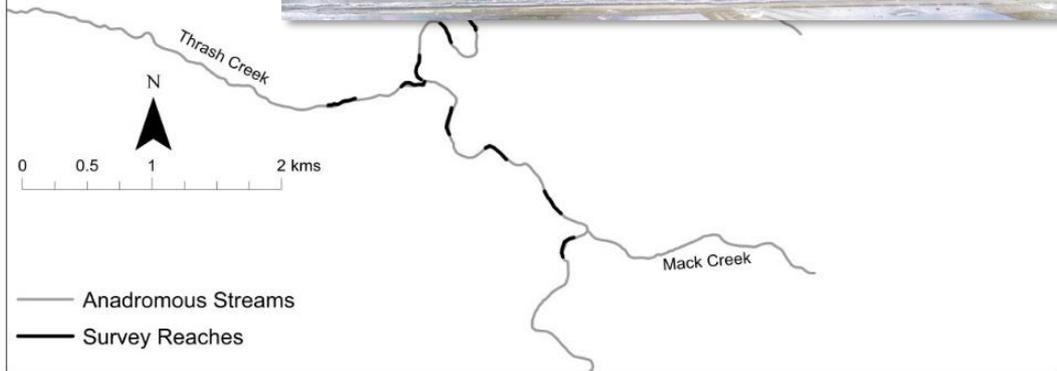
— Anadromous Streams  
— Survey Reaches



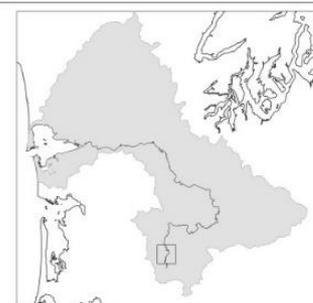
Longnose dace



Speckled dace

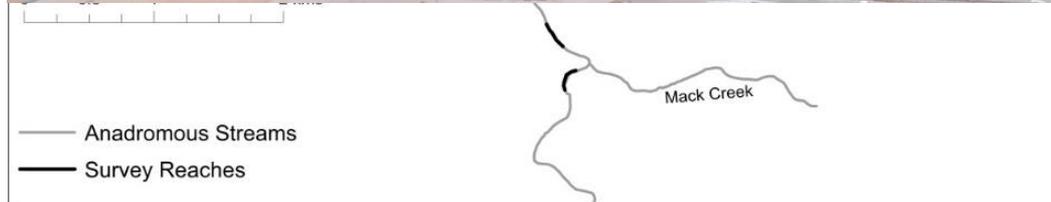
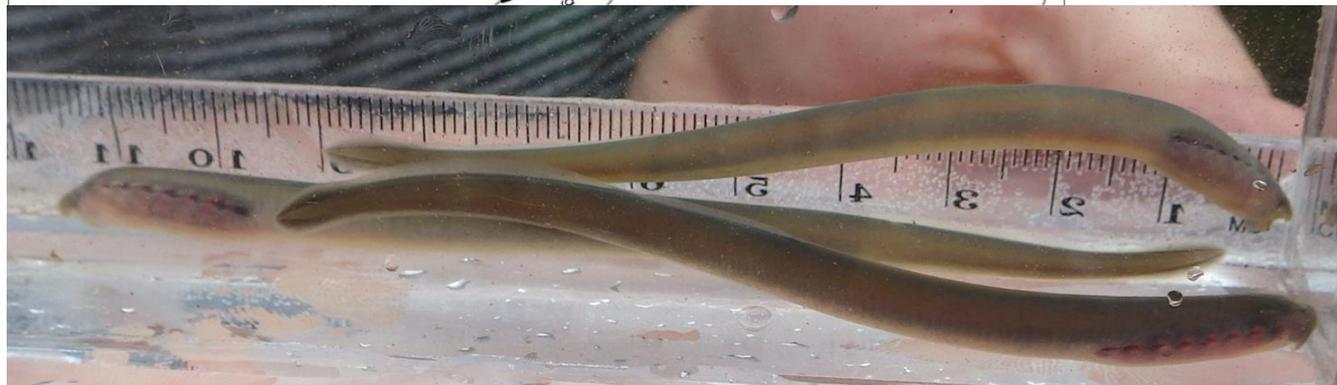


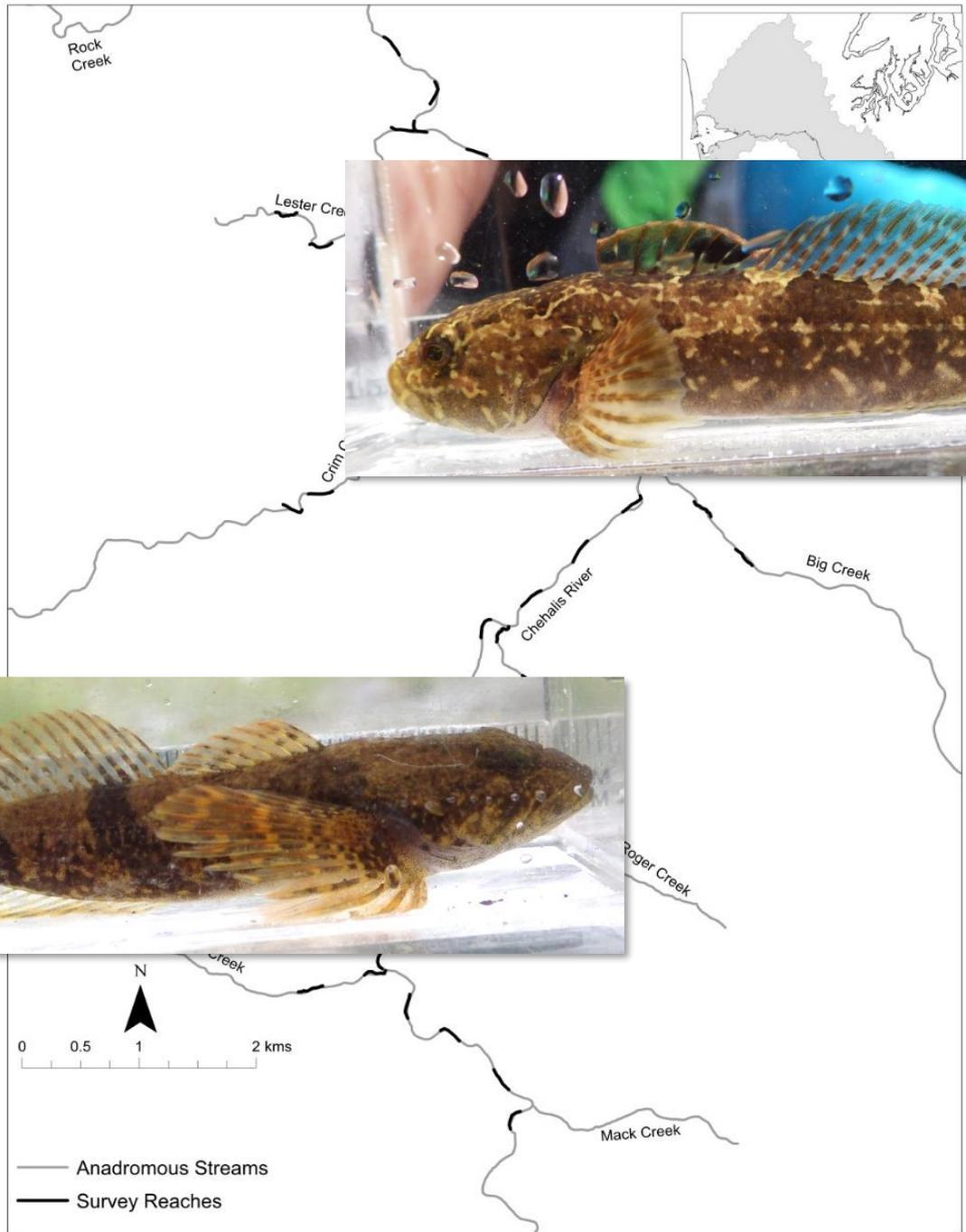
Redside shiner



Largescale sucker

Pacific lamprey





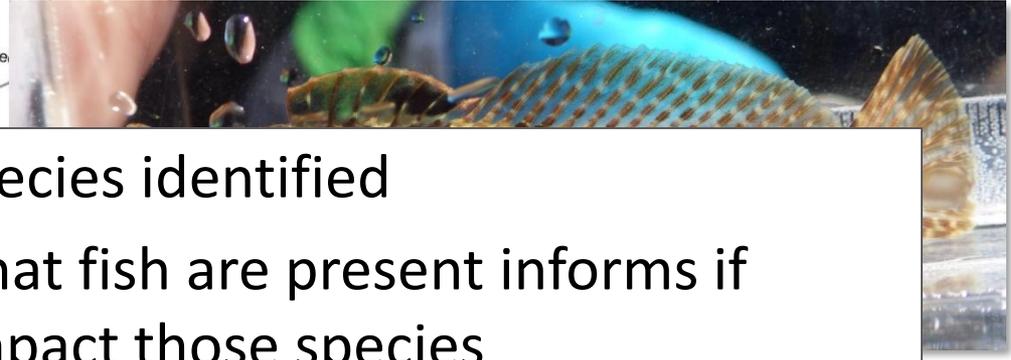
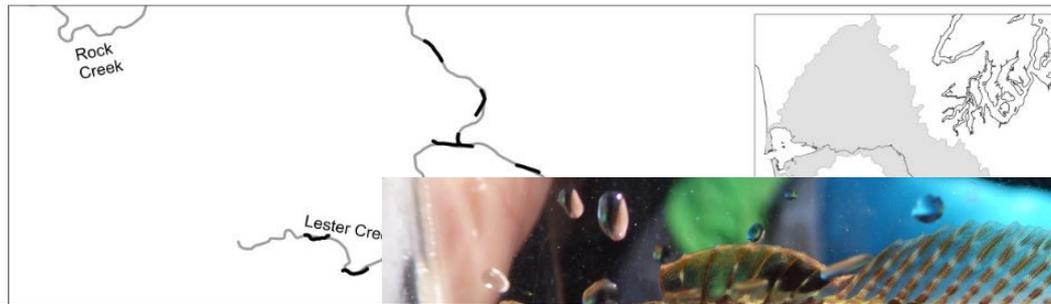
Reticulate sculpin



Torrent sculpin

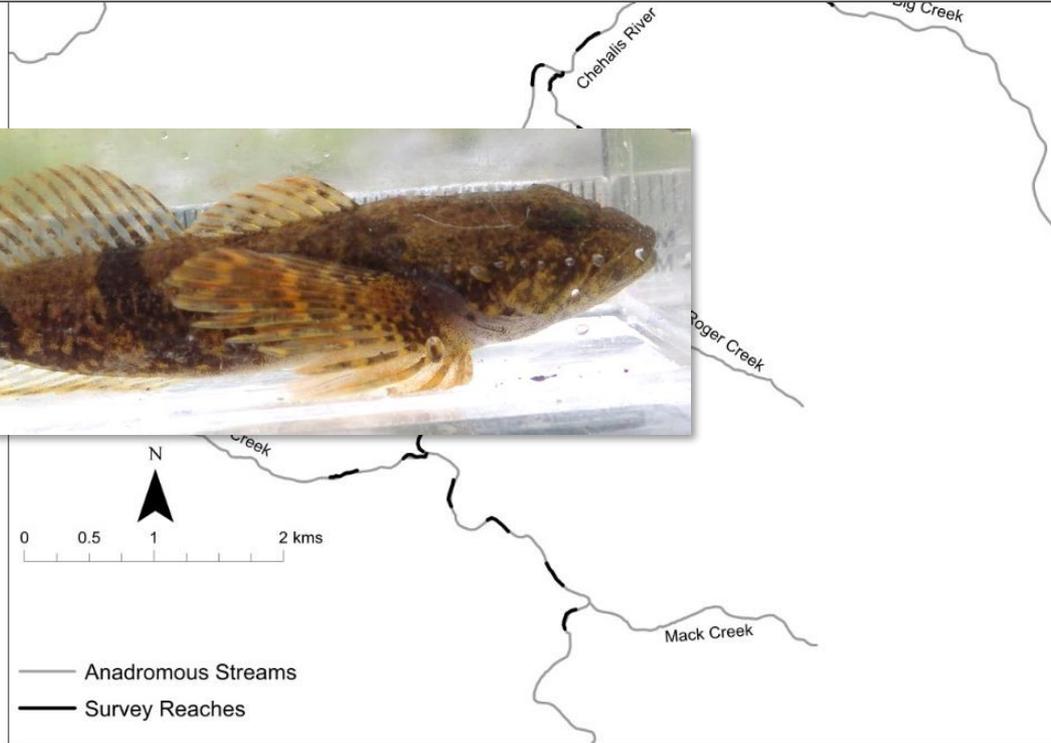


— Anadromous Streams  
 — Survey Reaches



sculpin

- Overall, 14 fish species identified
- Understanding what fish are present informs if restoration will impact those species



Torrent sculpin



## Study 2. Validation of Habitat Preferences

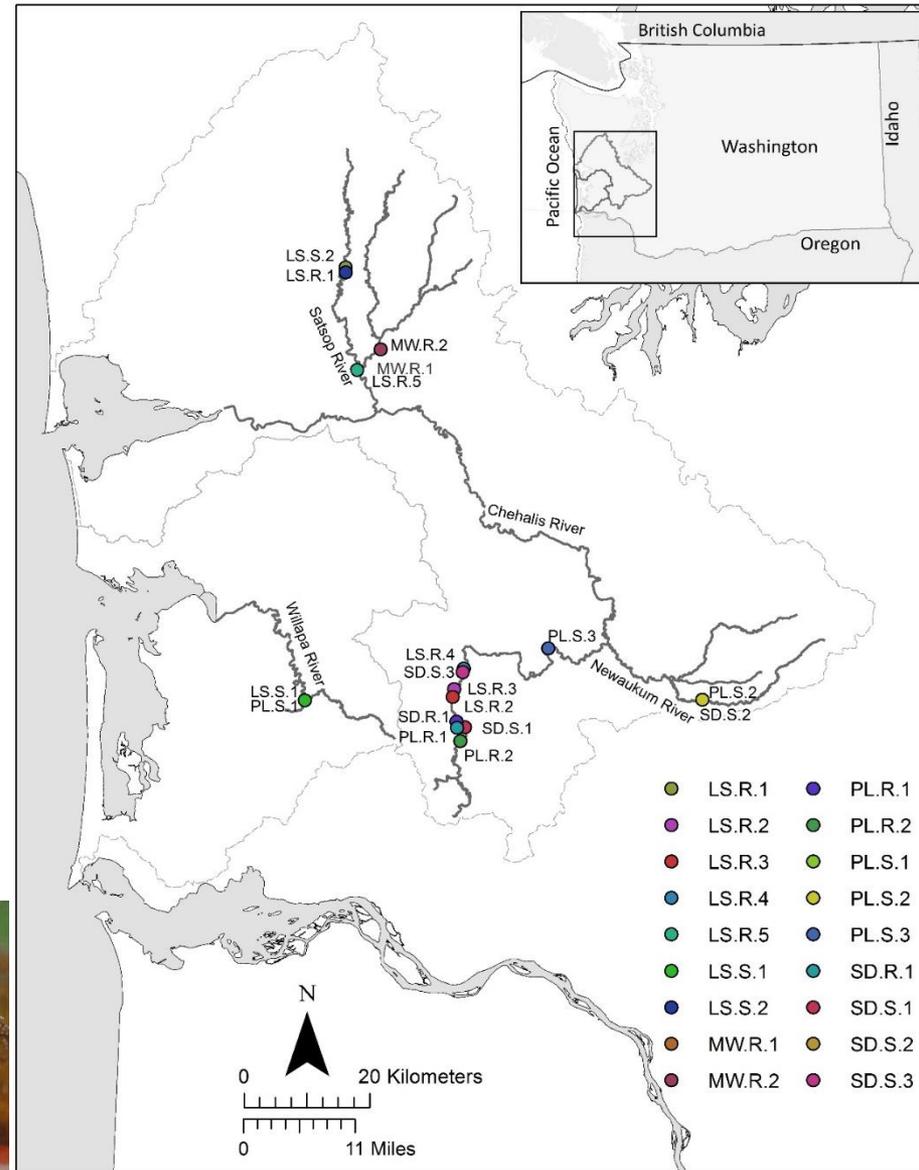
## 2. Validation of Habitat Preferences

- Initially, we utilized habitat preference information not specific to the Chehalis
- Identified need to validate and inform additional habitat preferences
- Report available: Winkowski, M., and N. Kendall (2018) *Validation of Habitat Preferences for Select Native Freshwater Fishes in the Chehalis River, Washington State*. Washington Dept. Fish and Wildlife, Olympia, WA. FPT 18-02.



## 2. Validation of Habitat Preferences

- Considered select key species
  - Largescale sucker
  - Speckled dace
  - Pacific lamprey
  - Mountain whitefish
- Surveyed spring and summer 2016



## 2. Validation of Habitat Preferences

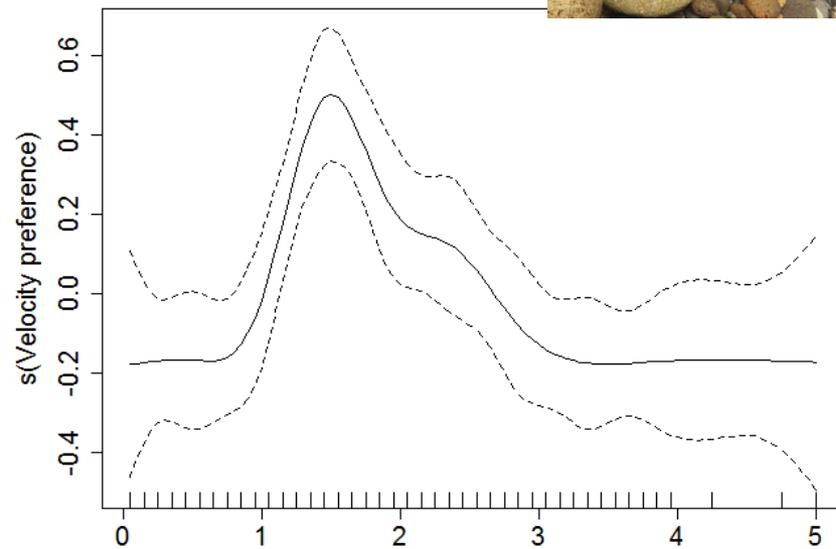
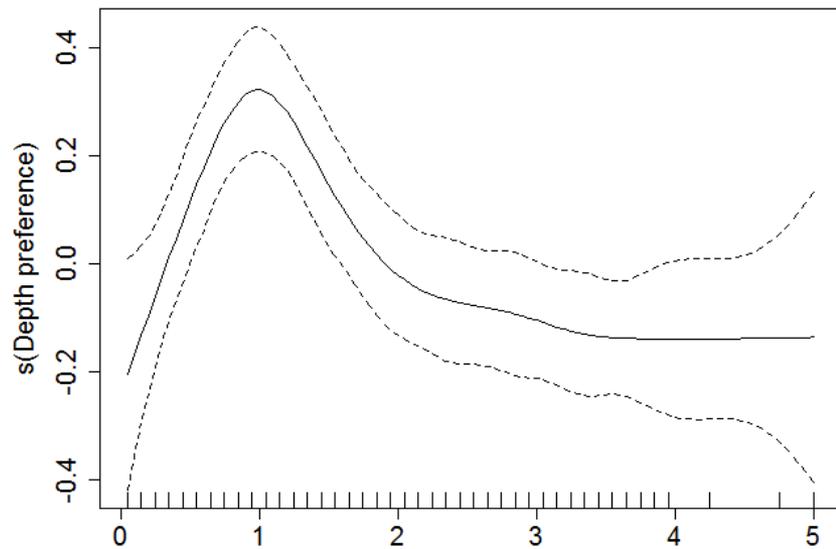
- Construct life-stage specific habitat suitability criteria
- Describe depth, velocity, substrate preferences
- Fitted data with generalized additive model (GAM)



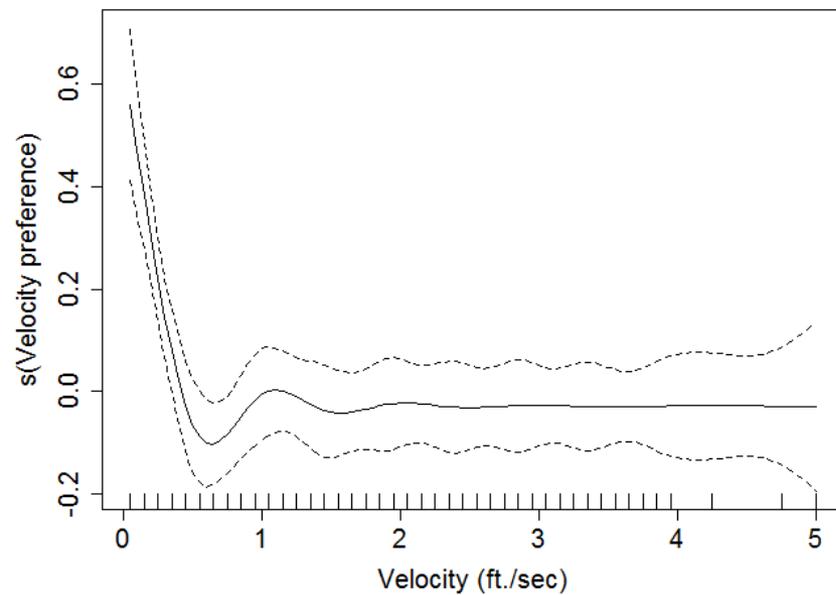
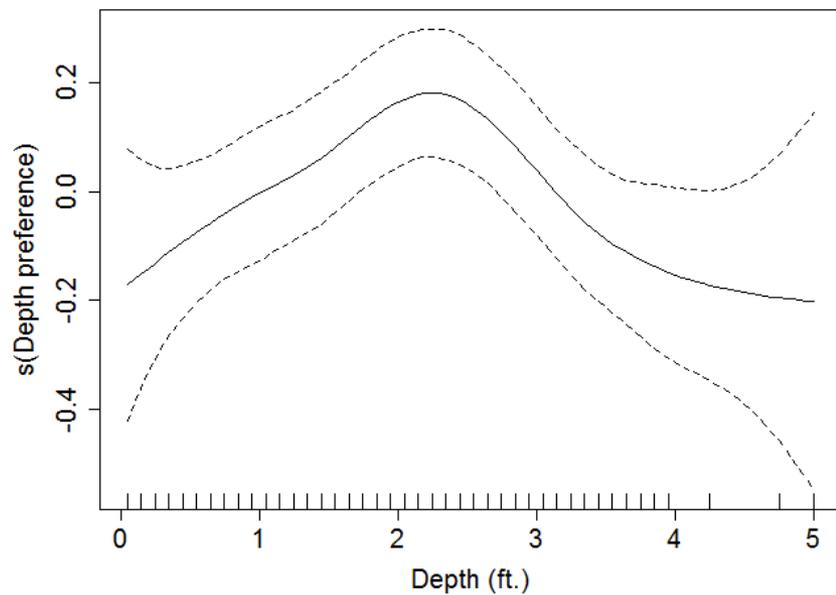
# Pacific lamprey



Spawning



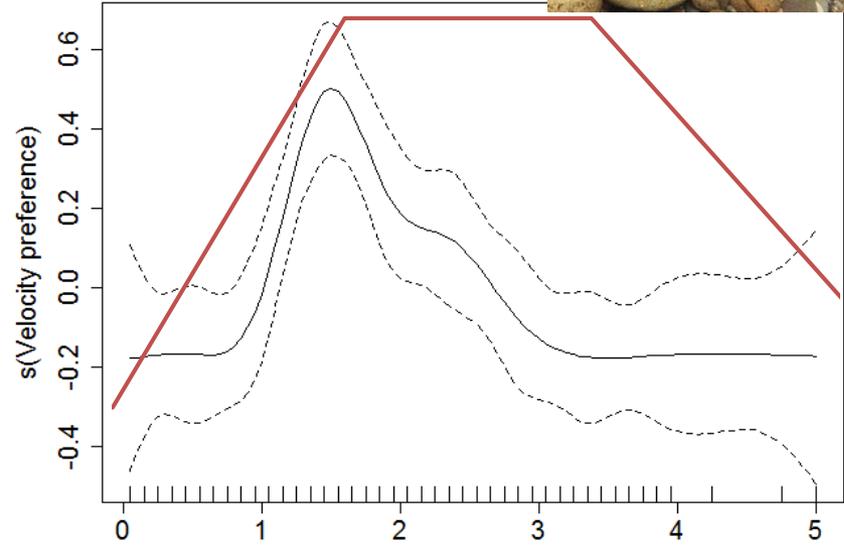
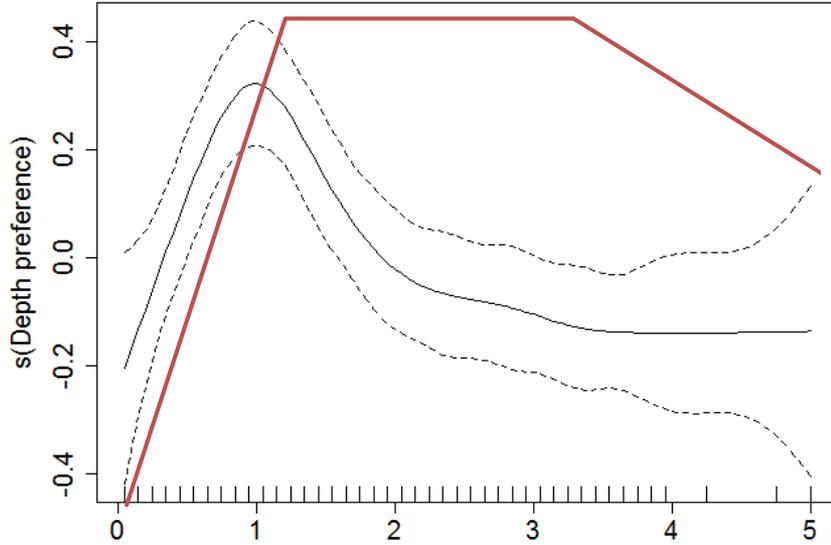
Rearing



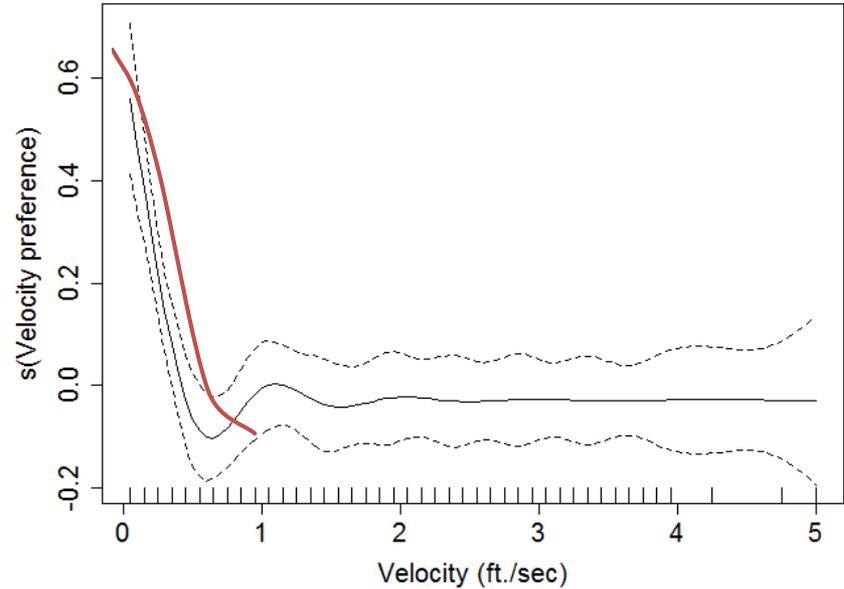
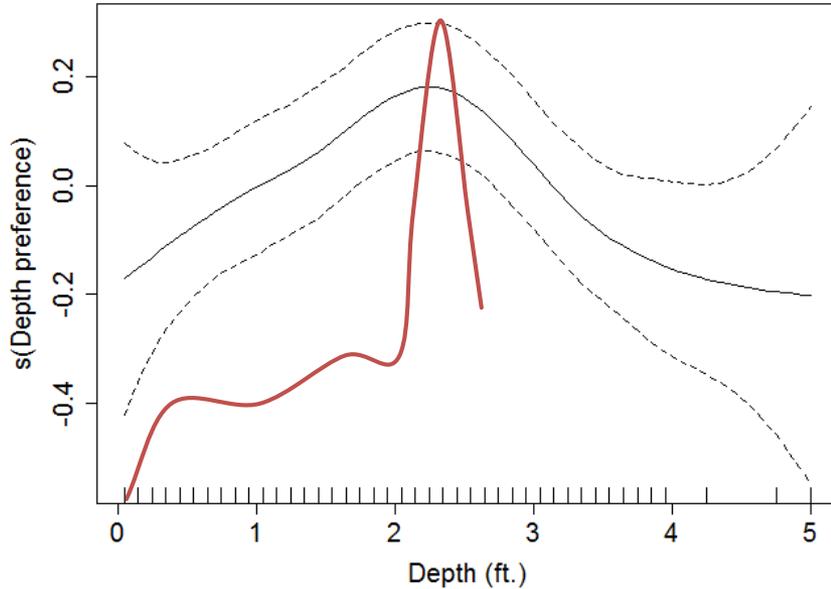
# Pacific lamprey



Spawning



Rearing



## 2. Validation of Habitat Preferences

- Used with Physical Habitat Simulation (PHABSIM)
  - Method to compare index of habitat quality and quantity based on flow for species that we know relatively little about
  - Weighted usable area (WUA) comparisons
- Evaluate impacts associated with flow changes from restoration scenarios, climate change
  - E.g., LWD additions to increase habitat complexity could benefit spawning and rearing lamprey





## Study 3. Movement and Home Range

# 3. Movement and Home Range

- Objectives:
  - Describe movements and home ranges of mountain whitefish
  - Describe pre-spawning movements of Pacific lamprey
  - Identify and describe relationship between fish movements to flow and temperature
- Interim report available:
  - Winkowski, M., Kendall, N., and E. Cropper (2018) Movement and Home Range Study of Select Native Fishes in the Chehalis River, Washington State. Interim Report. Washington Dept. Fish and Wildlife.

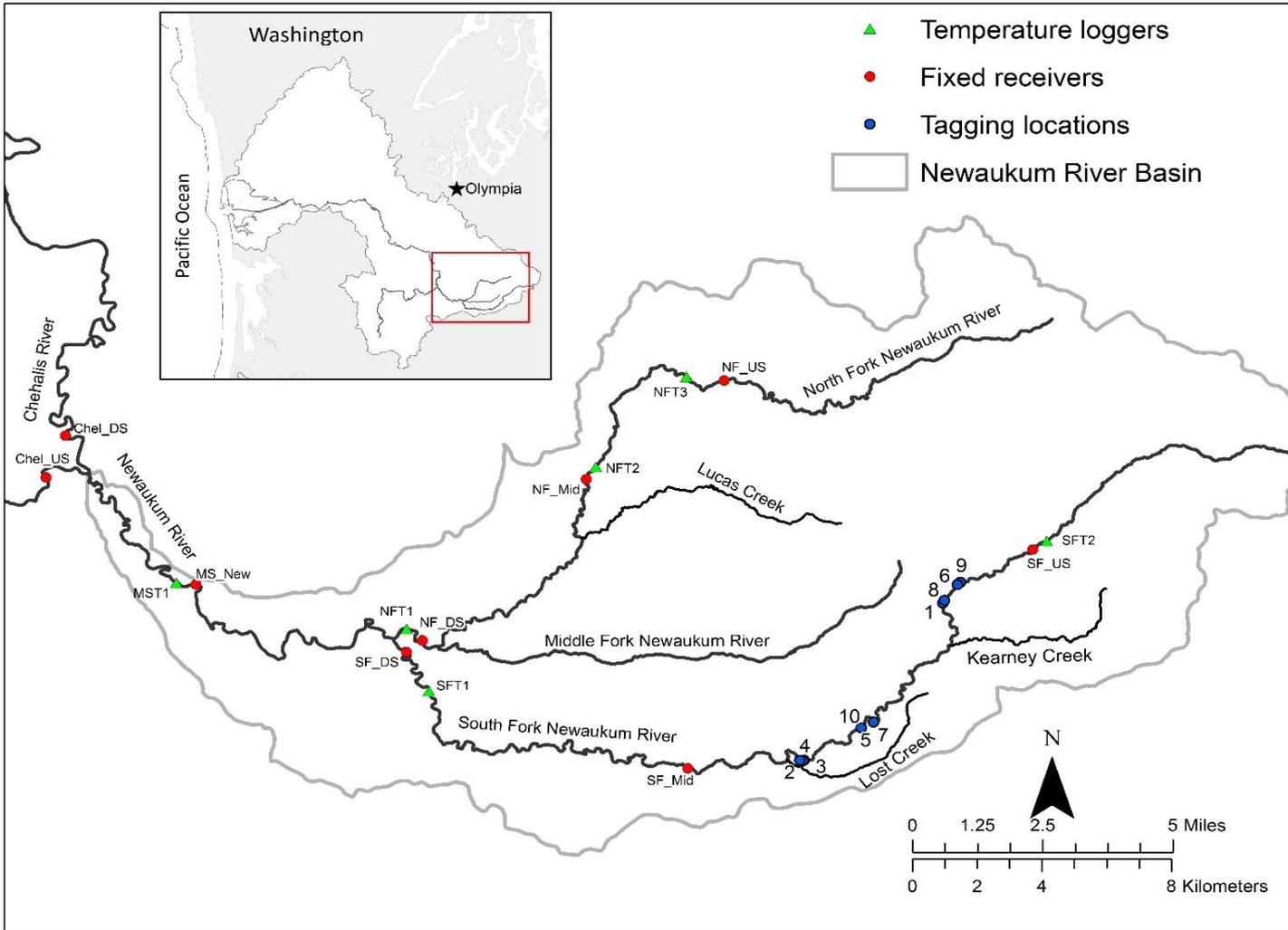


# 3. Movement and Home Range

- Radio telemetry
- Track movements – fixed telemetry receivers and mobile tracking
- Compare movements to flow and temperature data



# 3. Movement and Home Range



### 3. Movement and Home Range



# 3. Movement and Home Range

- Preliminary findings for mountain whitefish
  - Remained within study area
    - Scale of restoration
  - Range of migrations varied
    - Smaller range (< 10 Rkm) vs larger range (up to 27 Rkm)
    - Whitefish can move into areas targeted for restoration
  - Winter movements to tributaries
    - Complex movements
    - Connectivity - whitefish can benefit from barrier removals

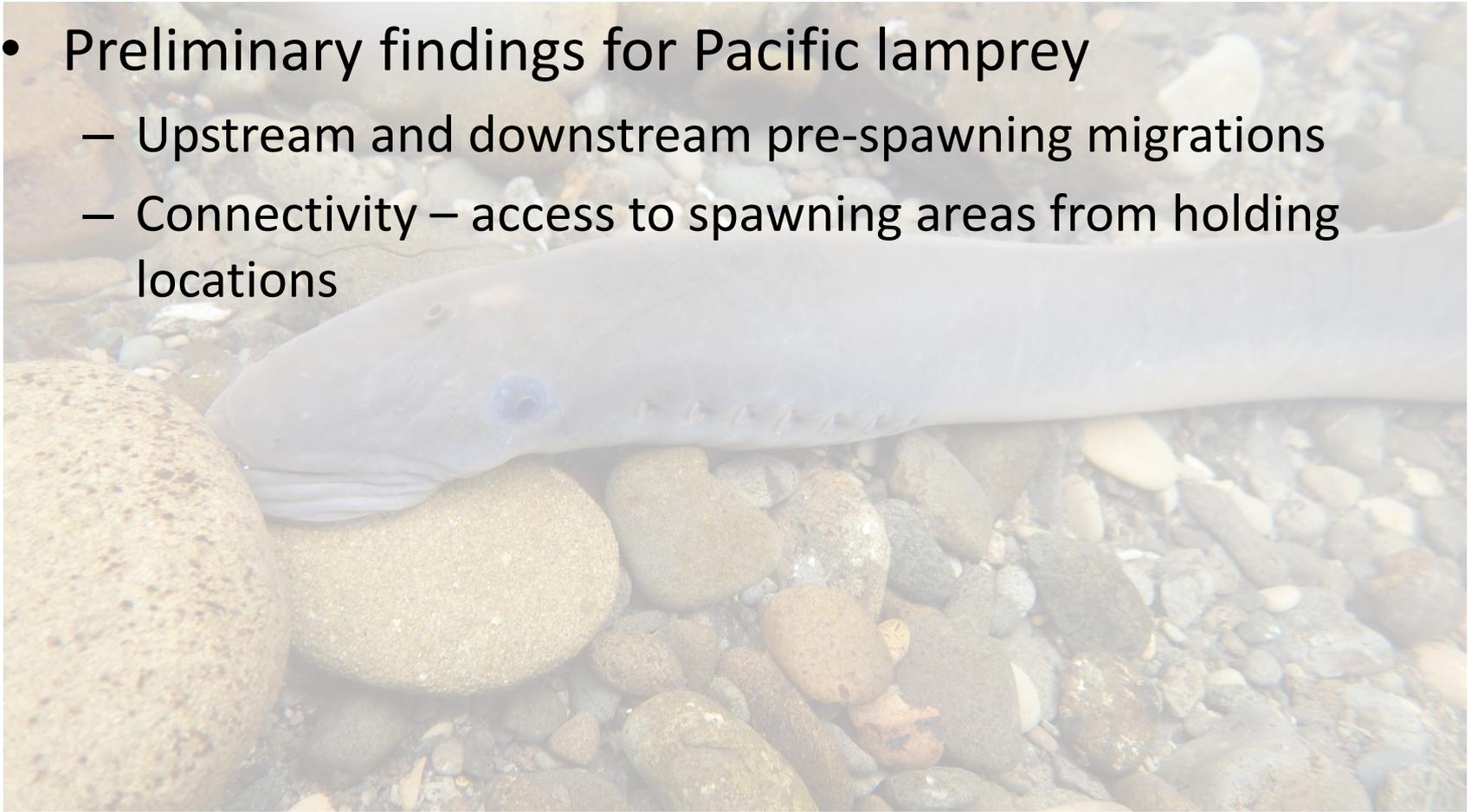


### 3. Movement and Home Range



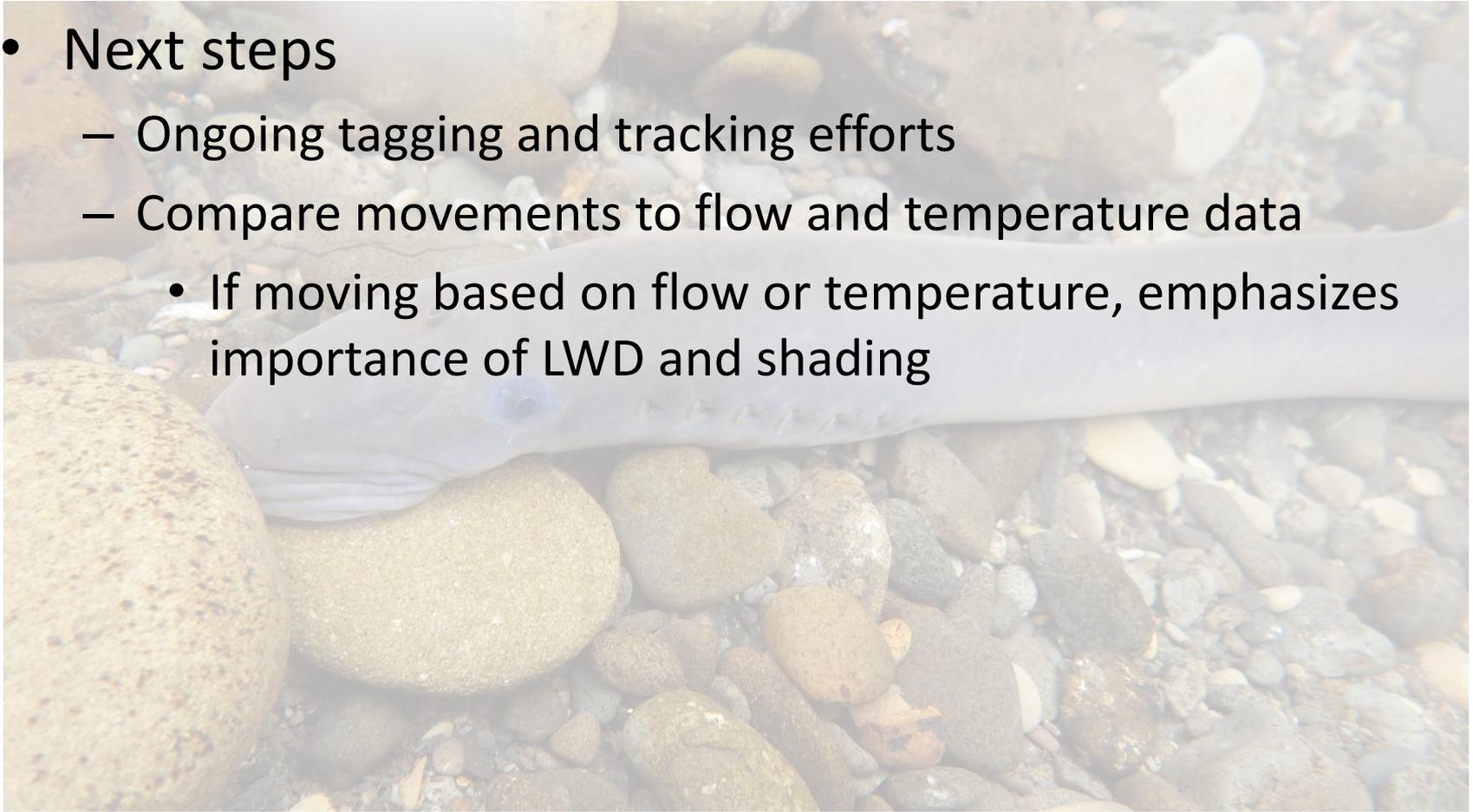
### 3. Movement and Home Range

- Preliminary findings for Pacific lamprey
  - Upstream and downstream pre-spawning migrations
  - Connectivity – access to spawning areas from holding locations



### 3. Movement and Home Range

- Next steps
  - Ongoing tagging and tracking efforts
  - Compare movements to flow and temperature data
    - If moving based on flow or temperature, emphasizes importance of LWD and shading





## Study 4. Pilot Native Fish Density Study

# 4. Pilot Native Fish Density Study

- Feasibility of density study on juvenile Pacific lamprey
- Fieldwork summer and fall 2018 (ongoing)
- Objectives:
  - Estimate density to help with future monitoring efforts (development of baseline)
    - Estimate density per meter or habitat area
  - Predictive model of juvenile Pacific lamprey density based on habitat and landscape attributes
  - Are juvenile Pacific lamprey occupying a restored area?
    - Predicted density within restored area

# Summary

- Increase our understanding of native freshwater fish in Chehalis River
  - Species present
  - Distribution
  - Habitat preferences
  - Movements
  - Occupancy and density
- How will restoration targeting salmon and steelhead influence other native fish species in the Chehalis River?
  - Removing barriers could benefit mountain whitefish
  - Area targeted for restoration, would we expect lamprey to use it for overwintering?

# Acknowledgements

- Field staff and crew members
- WDFW Water Science Team, Ecology Water Resources Program
- Spawning survey crews
- Weyerhaeuser, Panesko Tree Farm
- Funding: Washington State legislature

