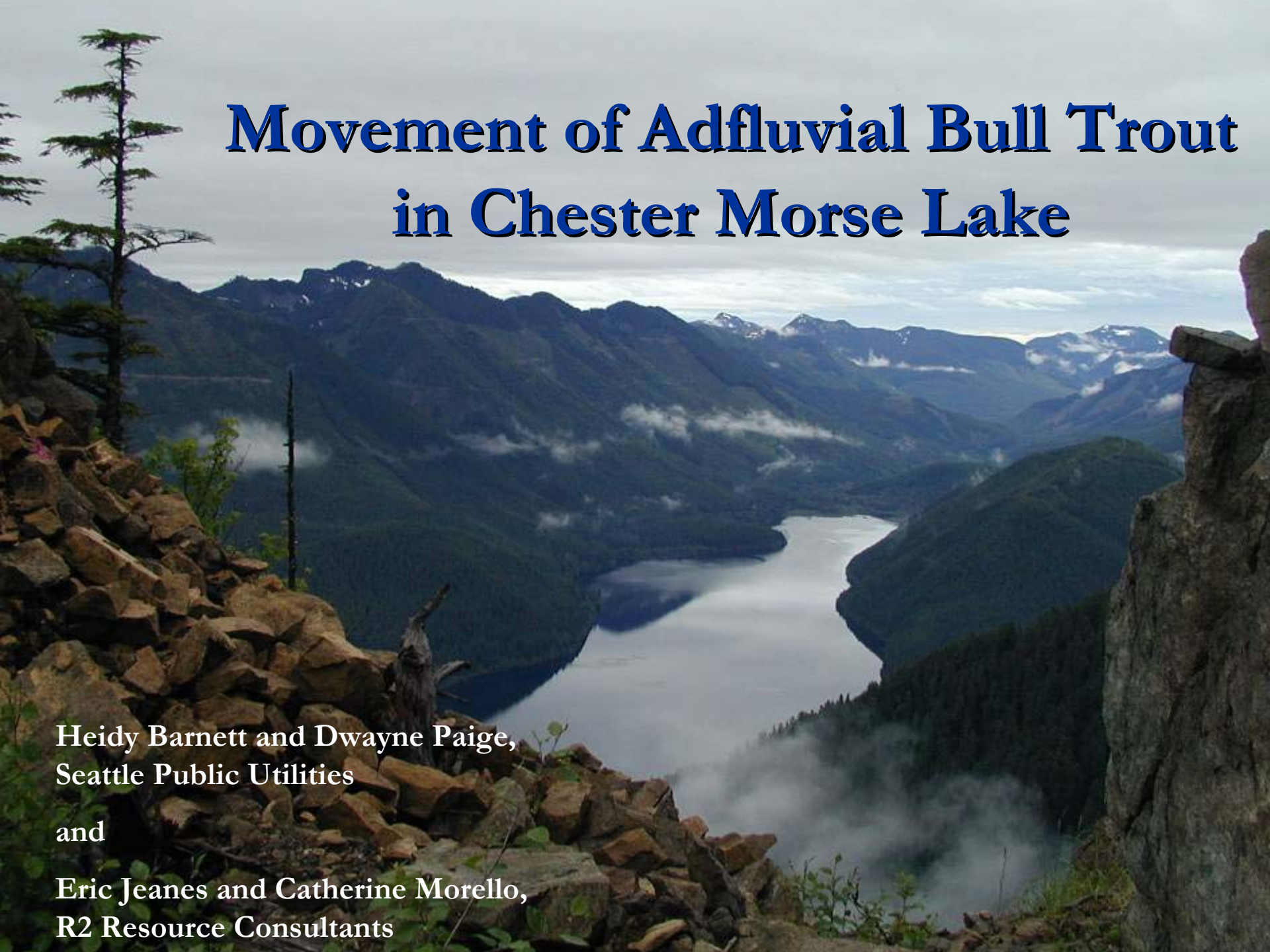
# Movement of Adfluvial Bull Trout in Chester Morse Lake



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**Seattle Public Utilities**

**and**

**Eric Jeanes and Catherine Morello,**
**R2 Resource Consultants**




- Natural falls barrier downstream Chester Morse Lake blocks anadromous/migratory species
- CRMW managed under 50-year HCP (signed 2000)
  - •No commercial harvest, active restoration (forest, aquatic, road decommissioning)

# Chester Morse Lake Fish Community

- Bull Trout – located in deep parts of lake but also along shoreline

- Rainbow Trout – primarily located in littoral zone of lake and deltas

- Pygmy Whitefish – food source for adfluvial bull trout, reside in deepest part of lake (bottom 2.5 meters)

- Shorthead Sculpin – food source for bull trout, distributed around shoreline

# Project Objectives

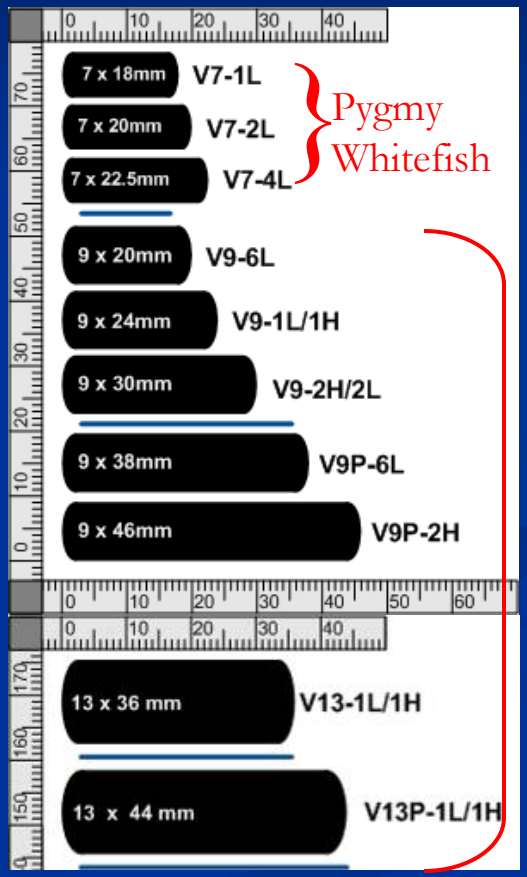
- Determine year round horizontal and vertical distribution of adfluvial bull trout
- Determine timing and other characteristics of individual
  - Age of fish
  - Timing of spawning – difference between males/females
  - Growth
- Investigate differences between horizontal and vertical distribution of adfluvial bull trout and rainbow trout

# Chester Morse Lake - Reservoir Operational Effects

- Water levels vary 14-20 feet annually
  - Temperature profile changes
  - Fish species behavior and ecology
  - Forage types – productivity and availability of food resources

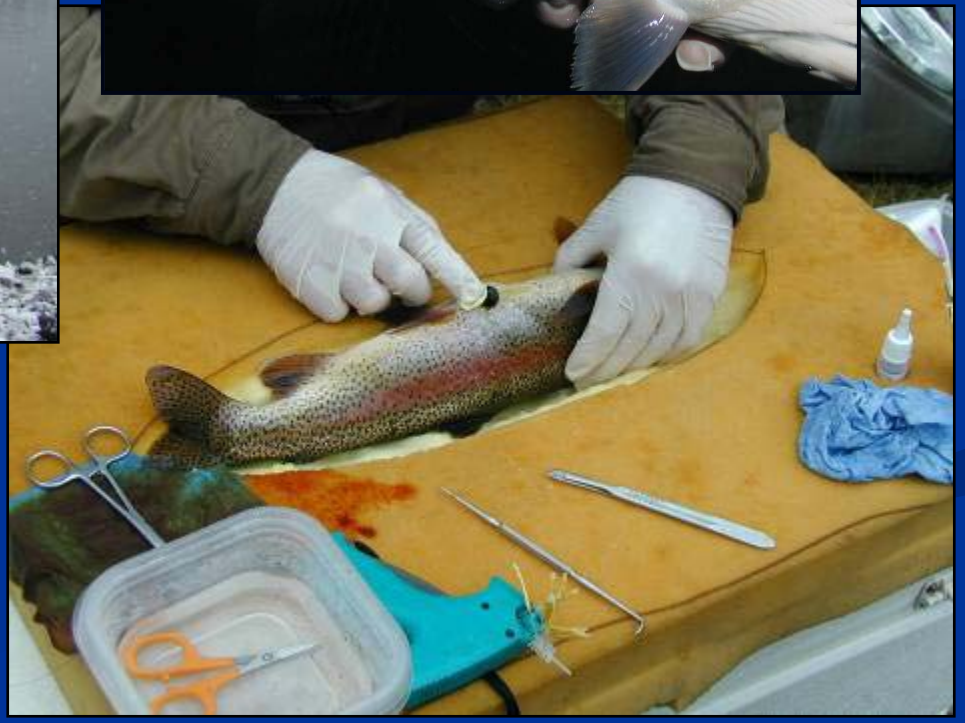
# Acoustic Telemetry

VR2 Hydrophone – collects data in internal memory, runs constantly, low maintenance




Range of tags used in study

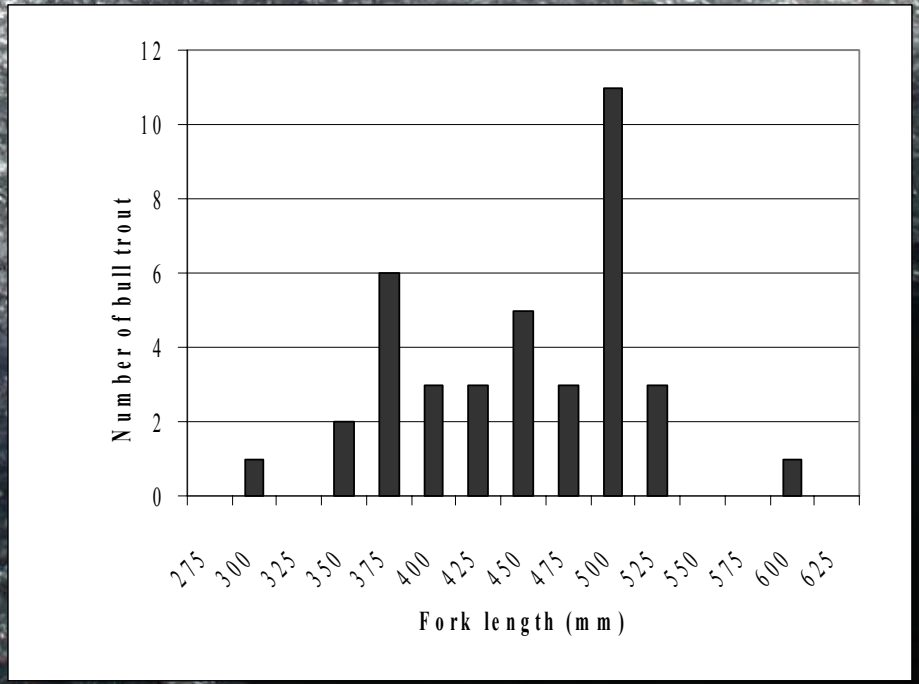
# Fish Capture and Tagging



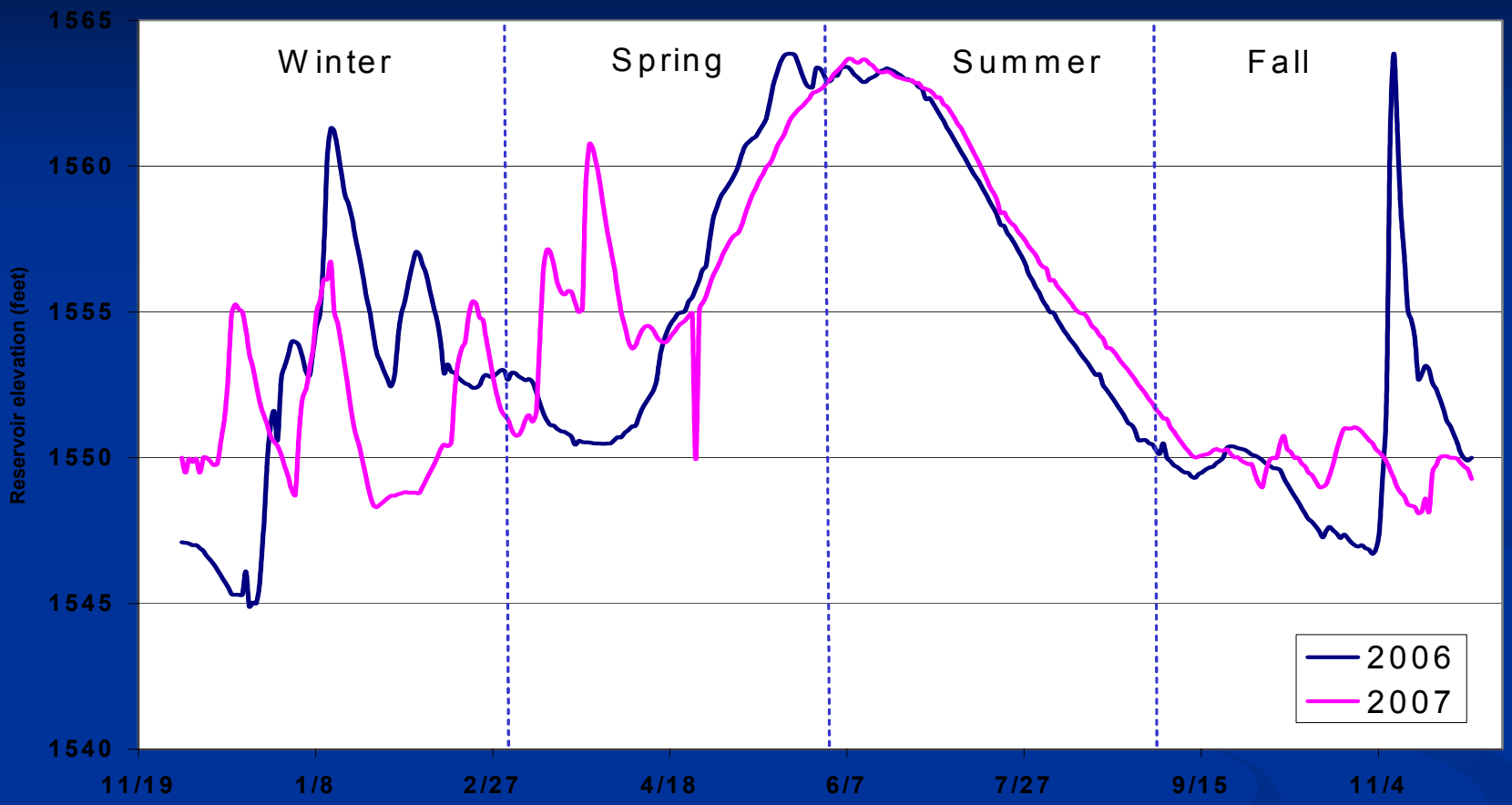
Floy Tag

Scale samples taken to age fish

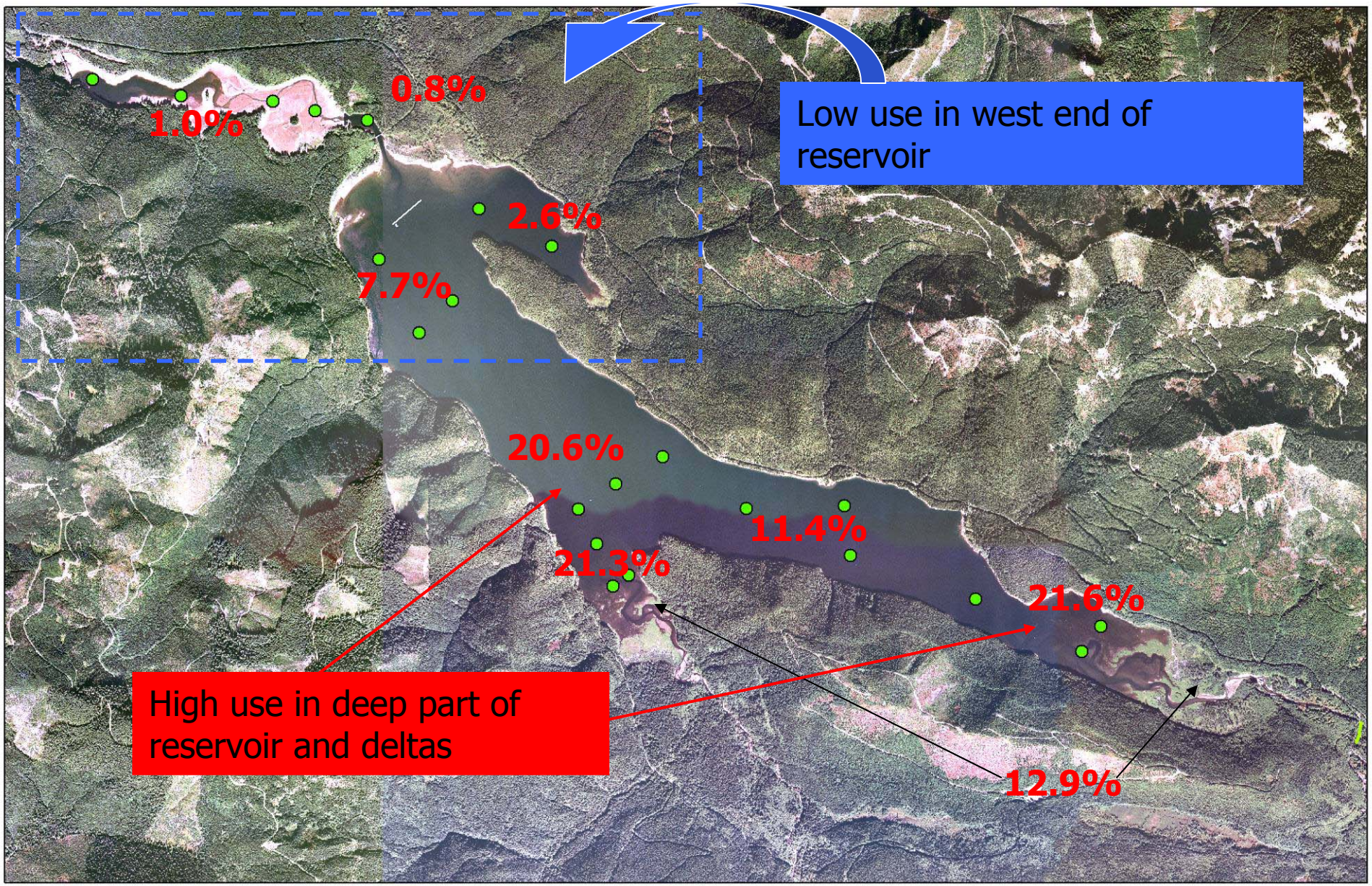
**<u>133</u> individual fish with acoustic tags!!**
**38 BLT (17 depth, 6 temp), 61 RBT, 34 PWF**



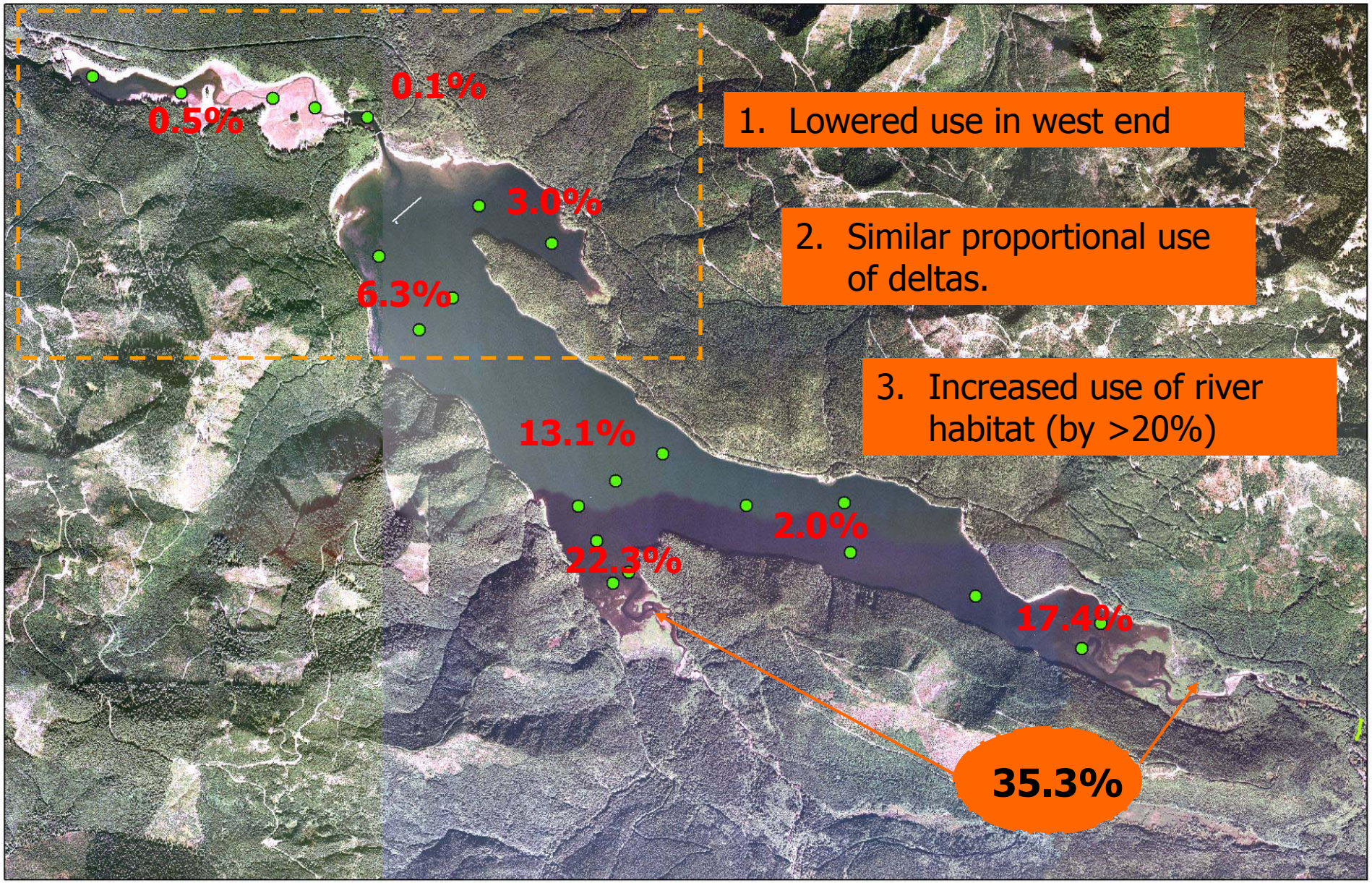
# Chester Morse Lake - Water Elevation



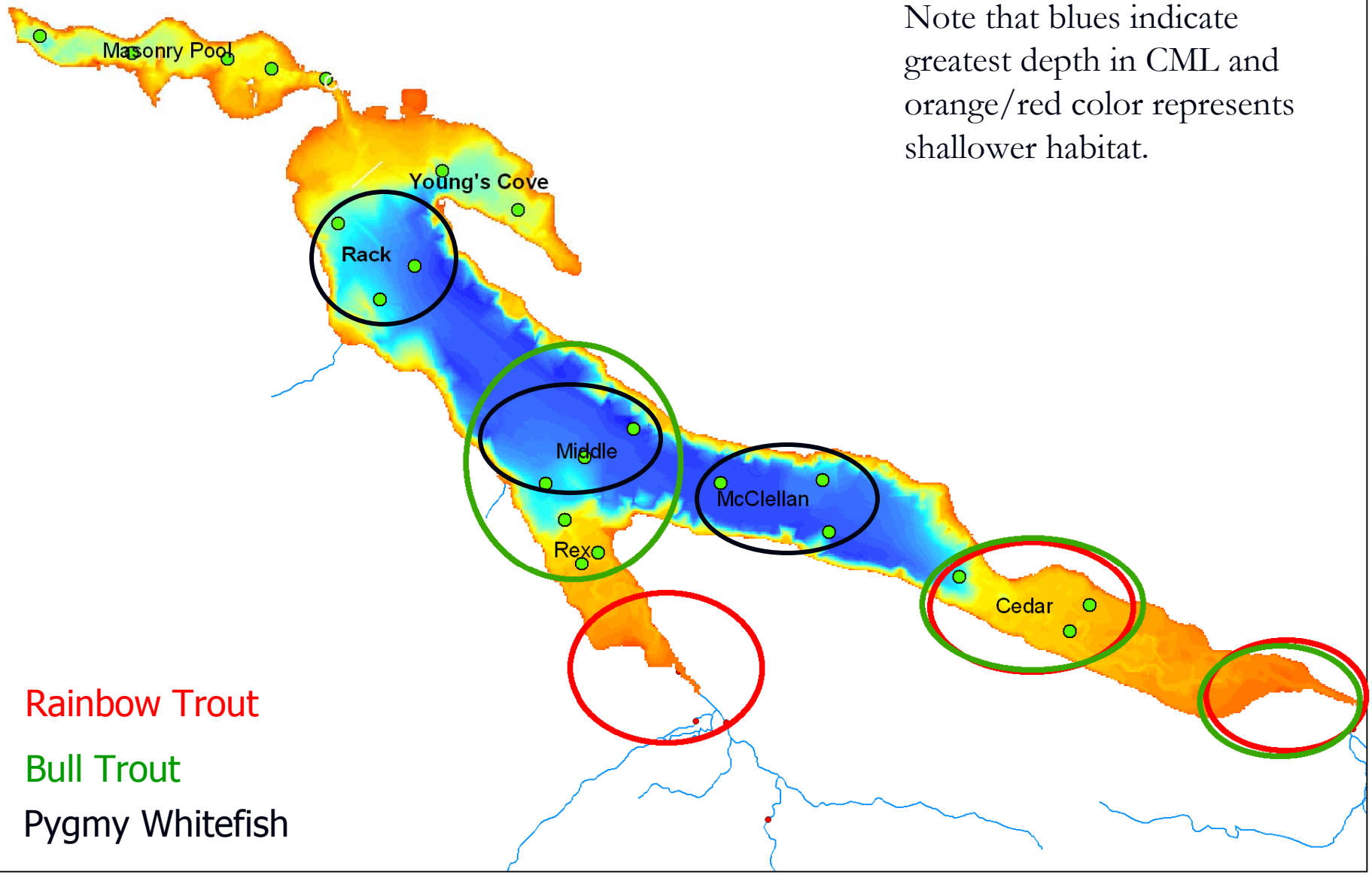

# Horizontal Distribution of Bull Trout in 2007



# Summer Horizontal Distribution of Bull Trout



# High Use Areas



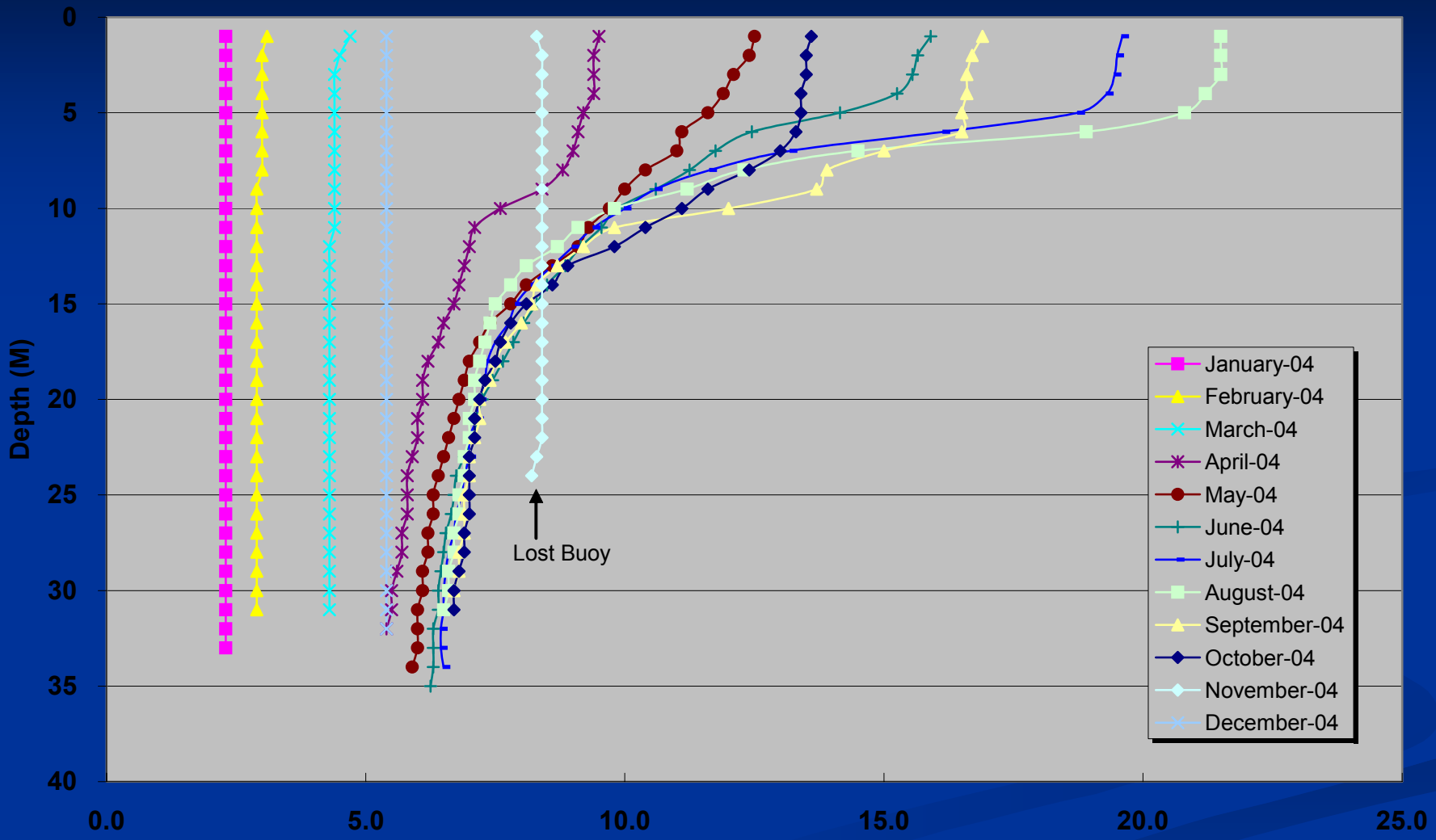

Note that blues indicate greatest depth in CML and orange/red color represents shallower habitat.

Rainbow Trout

Bull Trout

Pygmy Whitefish

# Chester Morse Lake Temperature Profile




Graph from Moya Joubert, SPU

# Vertical Distribution of Bull Trout in Main Lake Basin

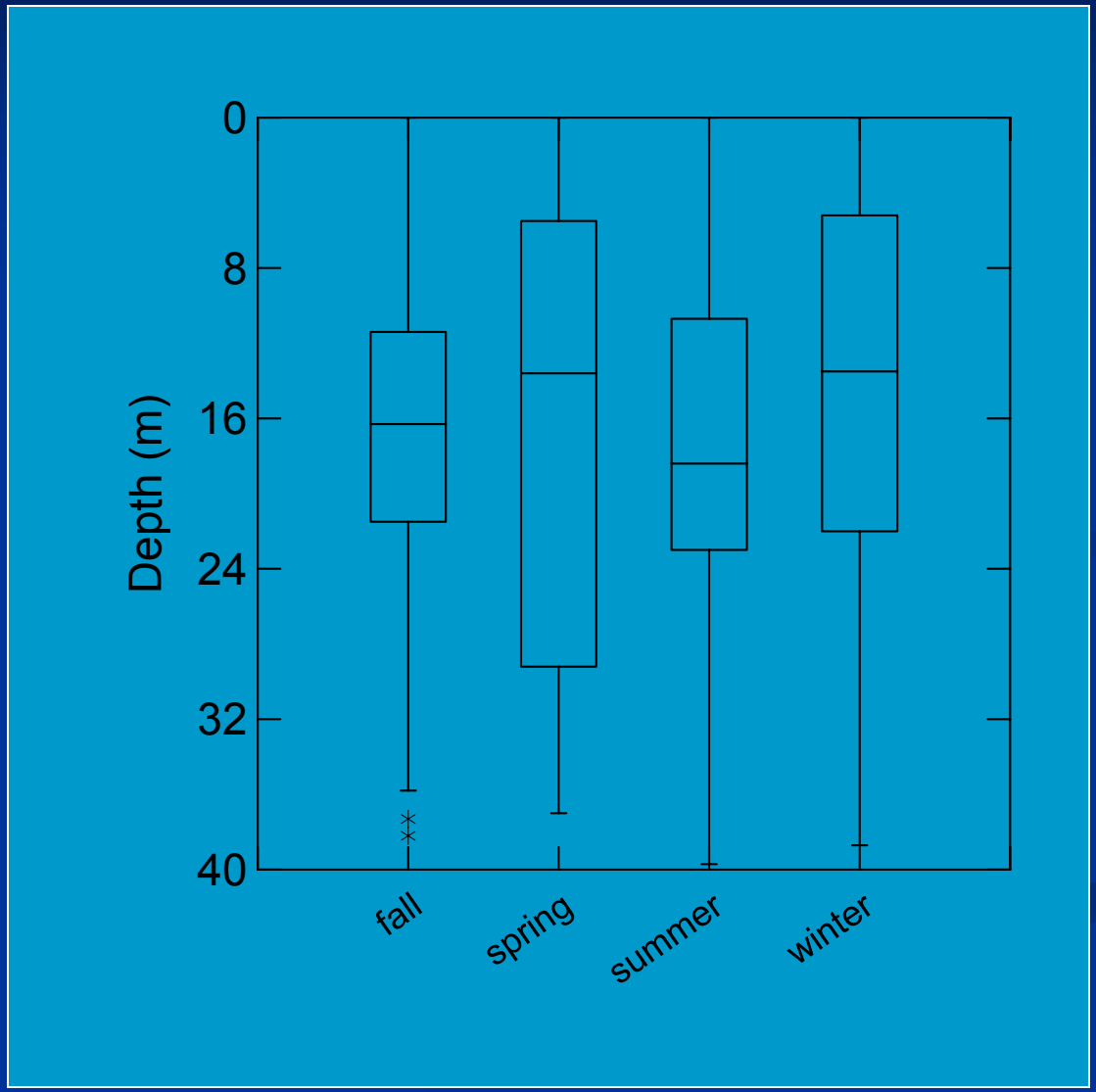
**Mean Depth**

Fall = 16.3 m

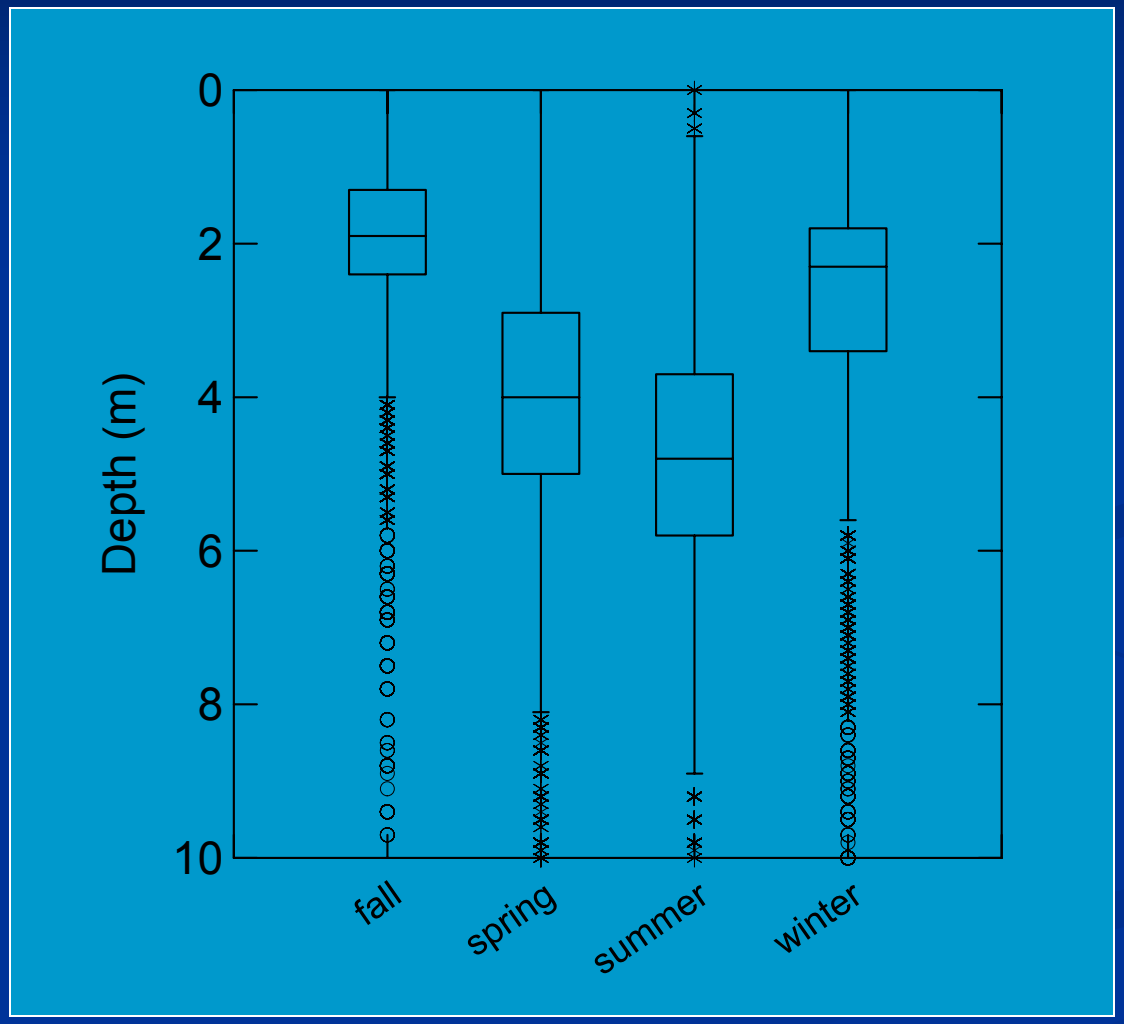
Spring = 16.7 m

Summer = 18.5 m

Winter = 15.1 m



# Vertical Distribution of Bull Trout in River Deltas




**Mean Depth**

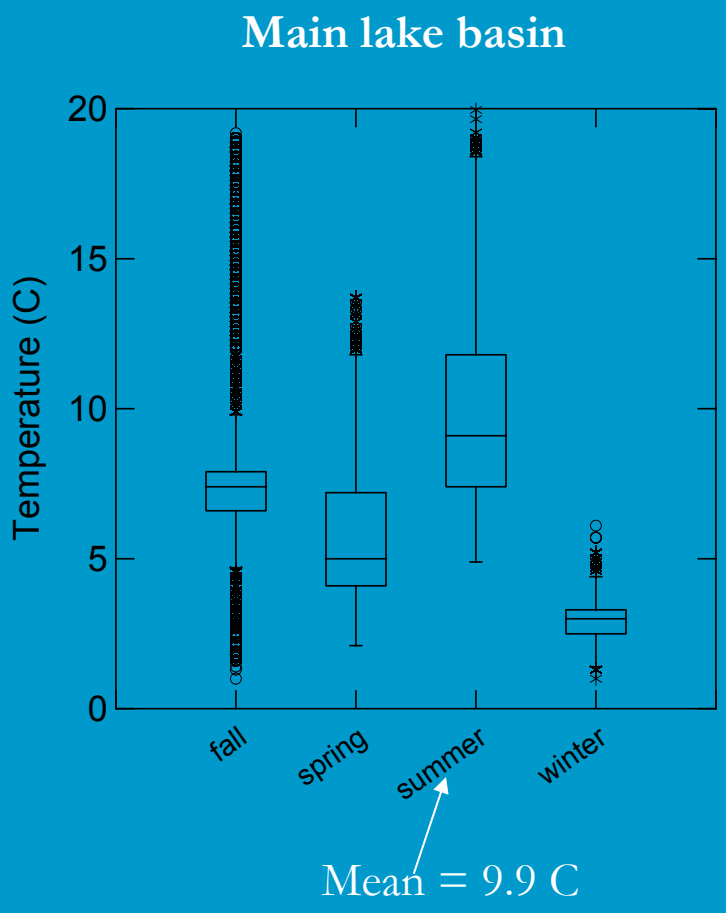
Fall = 2.0m

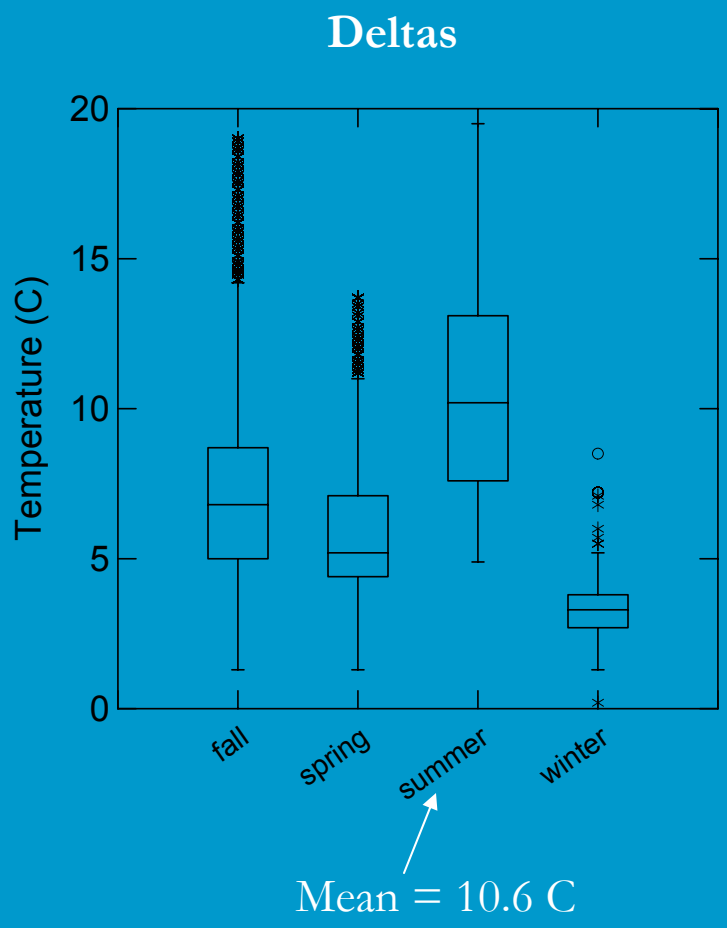
Spring = 4.3m

Summer = 4.7m

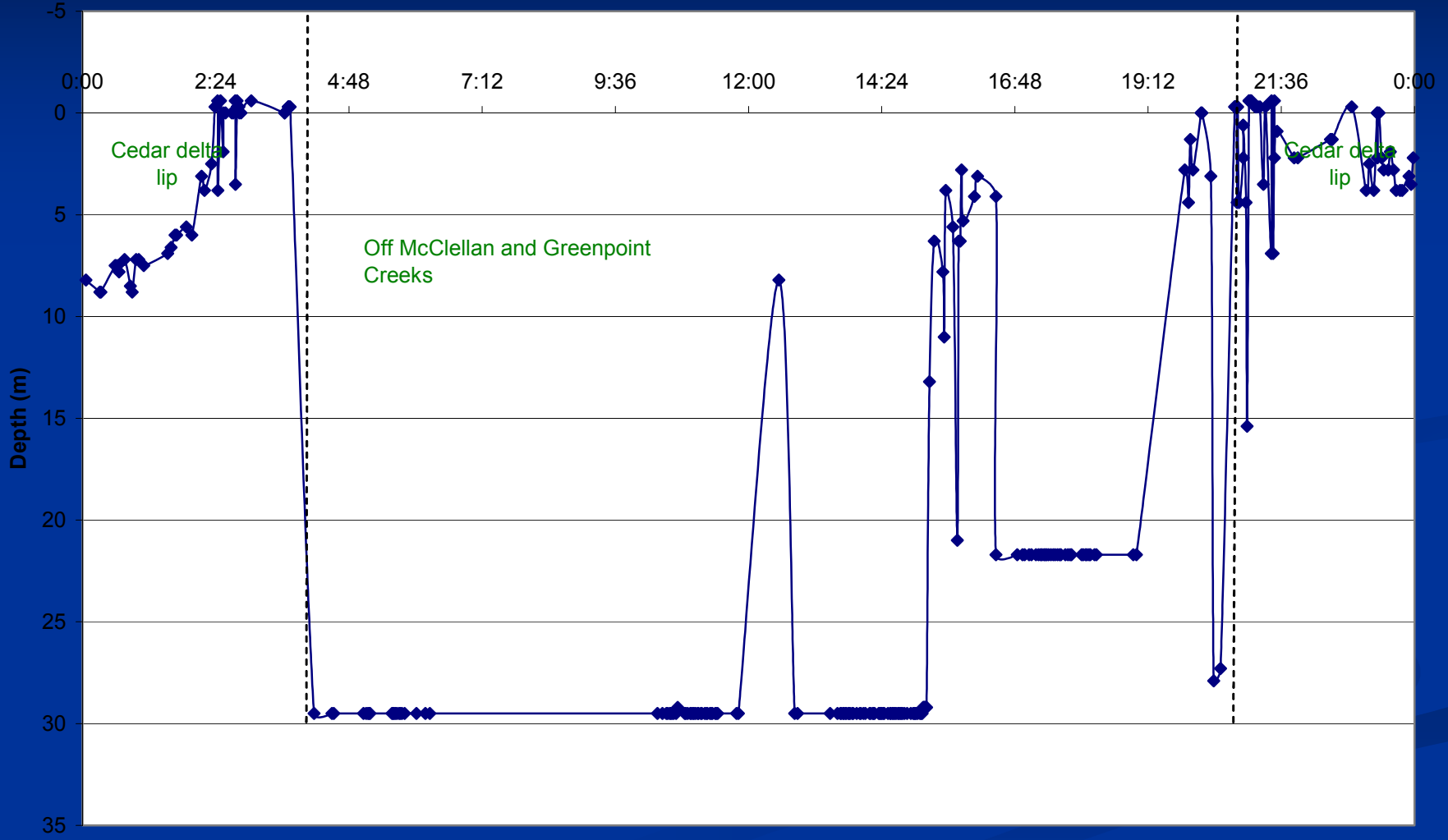
Winter = 3.0m

# Temperature at Bull Trout Locations



**Fish #6 Movement of November 20, 2006**
**Male Bull trout**



- Lake level held “higher”- typically winter and spring (very little thermal stratification)
  - Fish have more room to spread out, use shoreline habitat and river deltas

- Lake level held “lower”- typically summer and fall (thermal stratification)
  - Fish are more concentrated, limited access to shoreline habitat and river deltas, and are observed moving into river habitat for temperature refuge

Acknowledgements
- Ed Connor, Seattle City Light
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