Large River Aquatic Community and Food Web Changes: How Can We Manage Introduced Species?

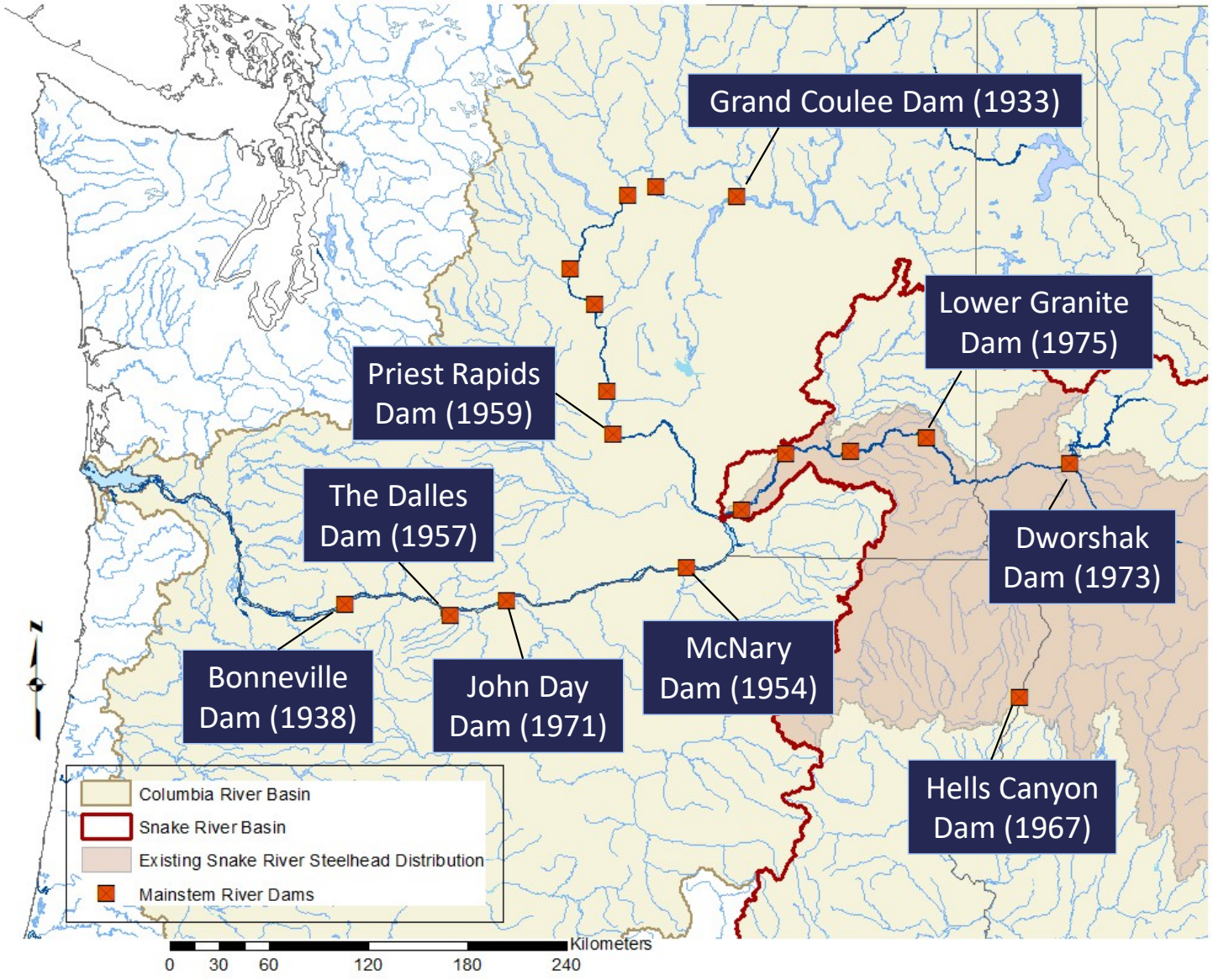
Marika Dobos

Idaho Department of Fish and Game

John Erhardt

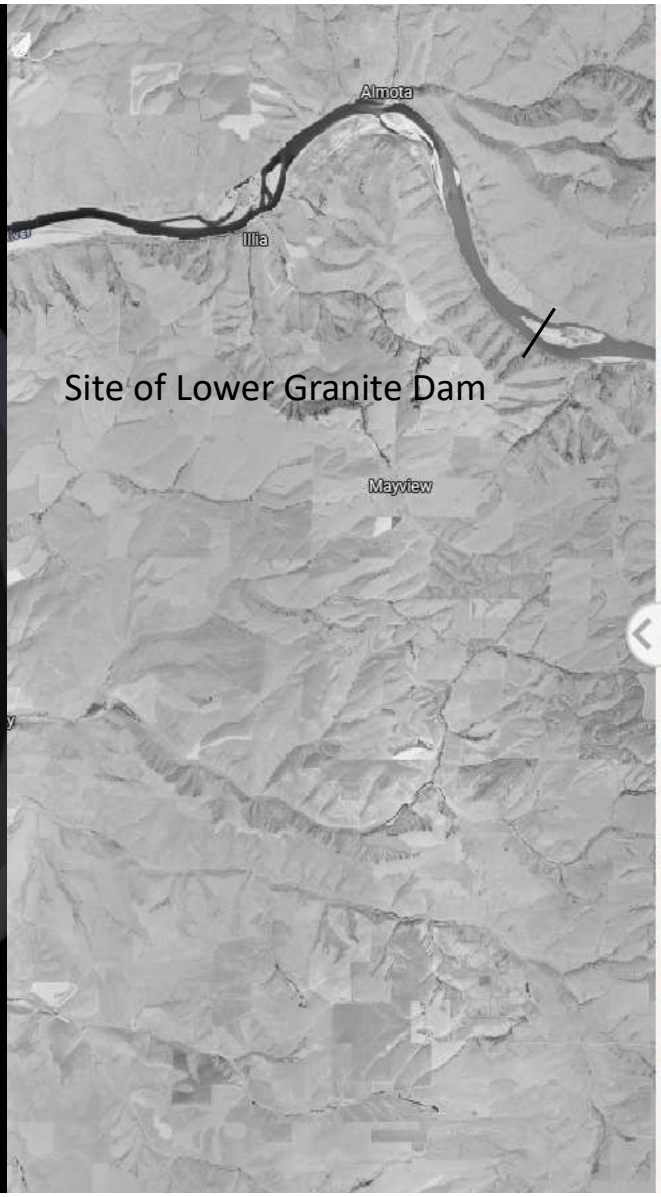
U.S. Fish and Wildlife Services

Columbia and Snake Rivers



Shifts from Rivers to Reservoirs

- Slower flow velocities
- Manipulated flow patterns
- Thermal stratification
- Chemical Stratification
- Accumulation of sediment and nutrients
- Change in aquatic community



History of Introduced Species

American Shad

- Documented in the Columbia River in 1876
- Moved into the Snake River after the Dalles Dam was completed

Smallmouth Bass

- Introduced in the Willamette River in early 1920s by ODFW
- Introduced in the Snake River in 1942 by IDFG

Walleye

- Introduced in late 1940s
- Documented in the Snake River in 1996

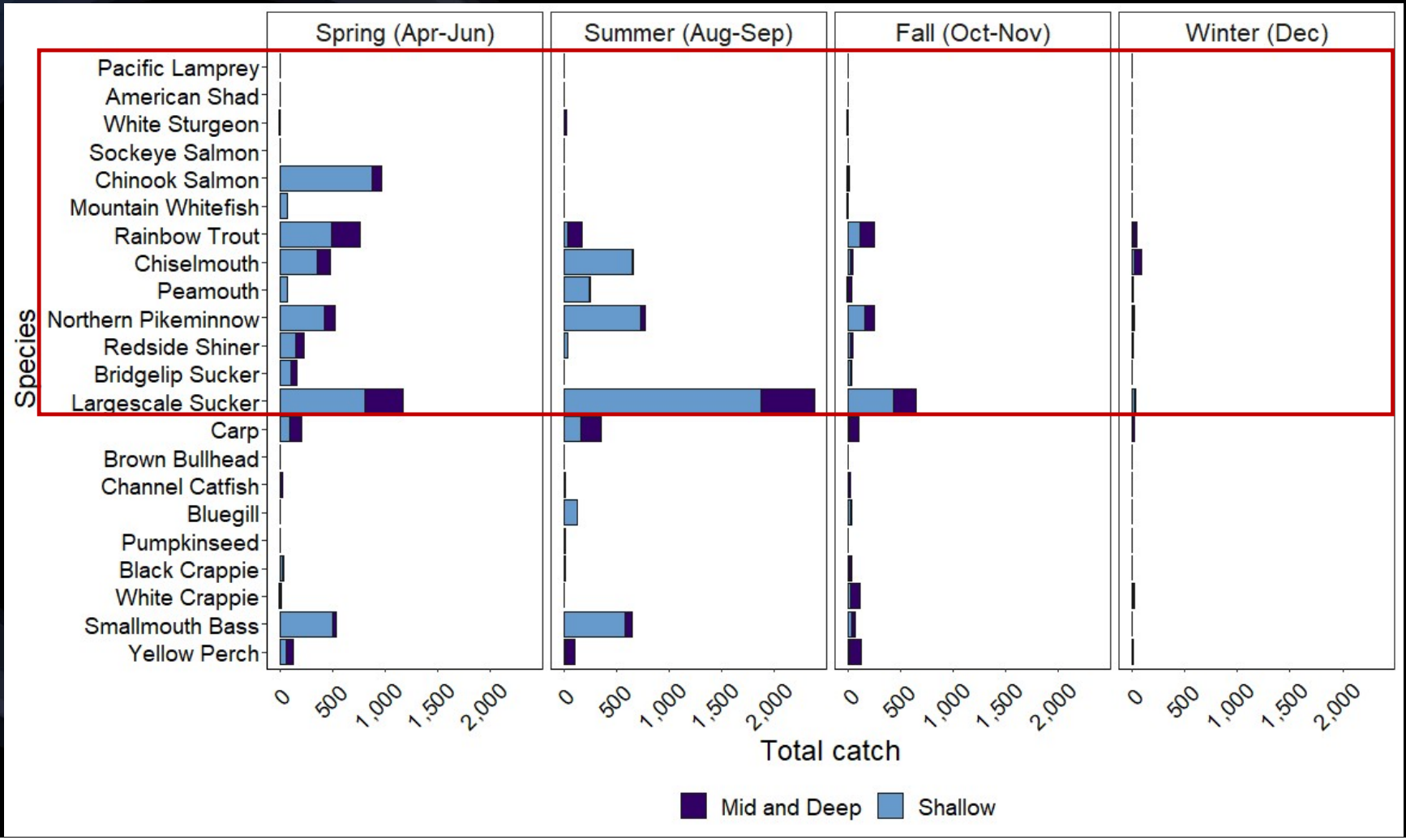
Opossum Shrimp

- Documented in the early Columbia River in the 1980s
- Documented in the Snake River in the early 1990s

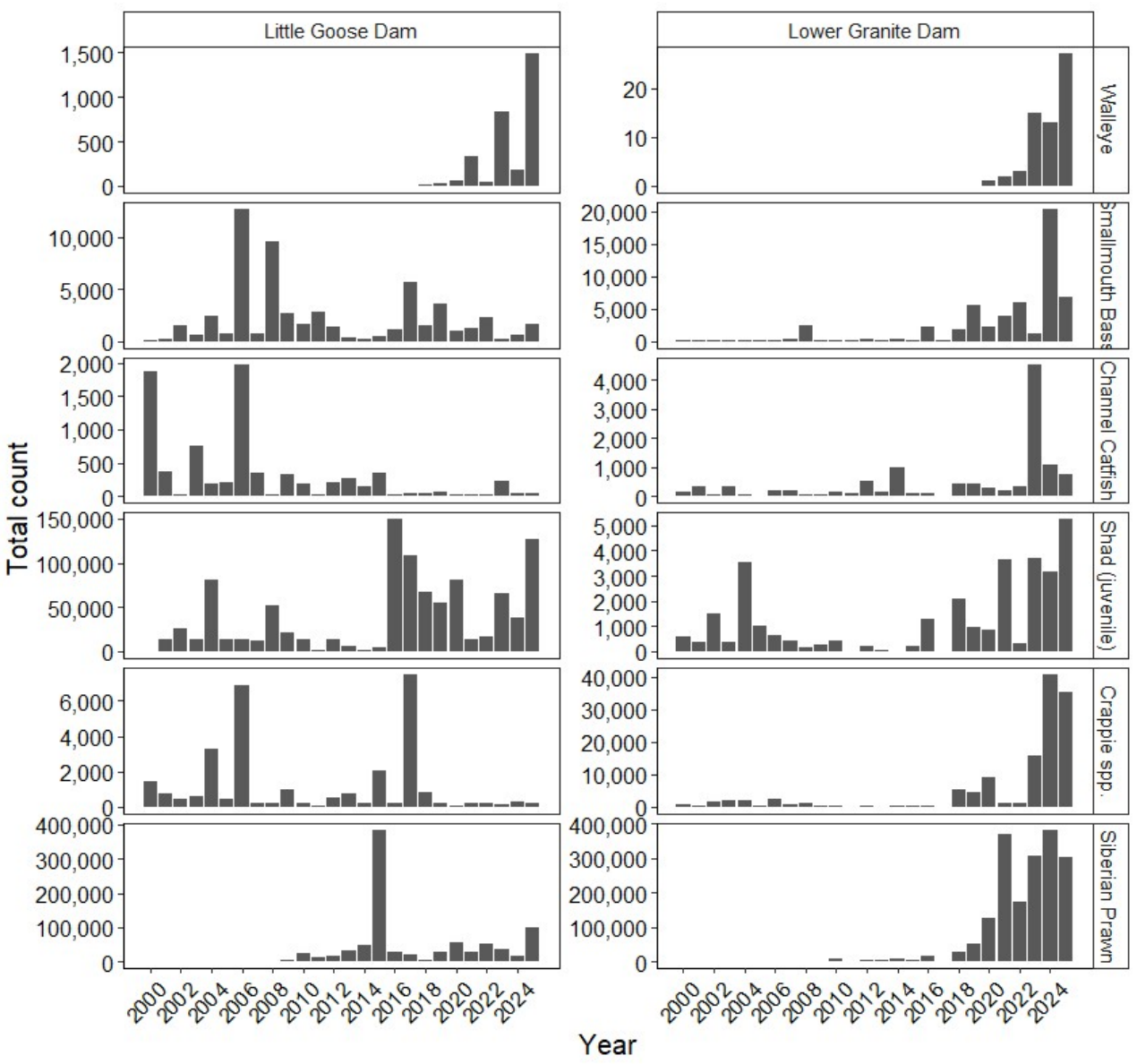
Siberian Prawns

- Documented in the Columbia River in 1995
- Documented in the Snake River in 1998

Lower Granite Reservoir 1987 Surveys



Incidental Catch of Introduced Species



USGS Nonnative Research 2010-2015

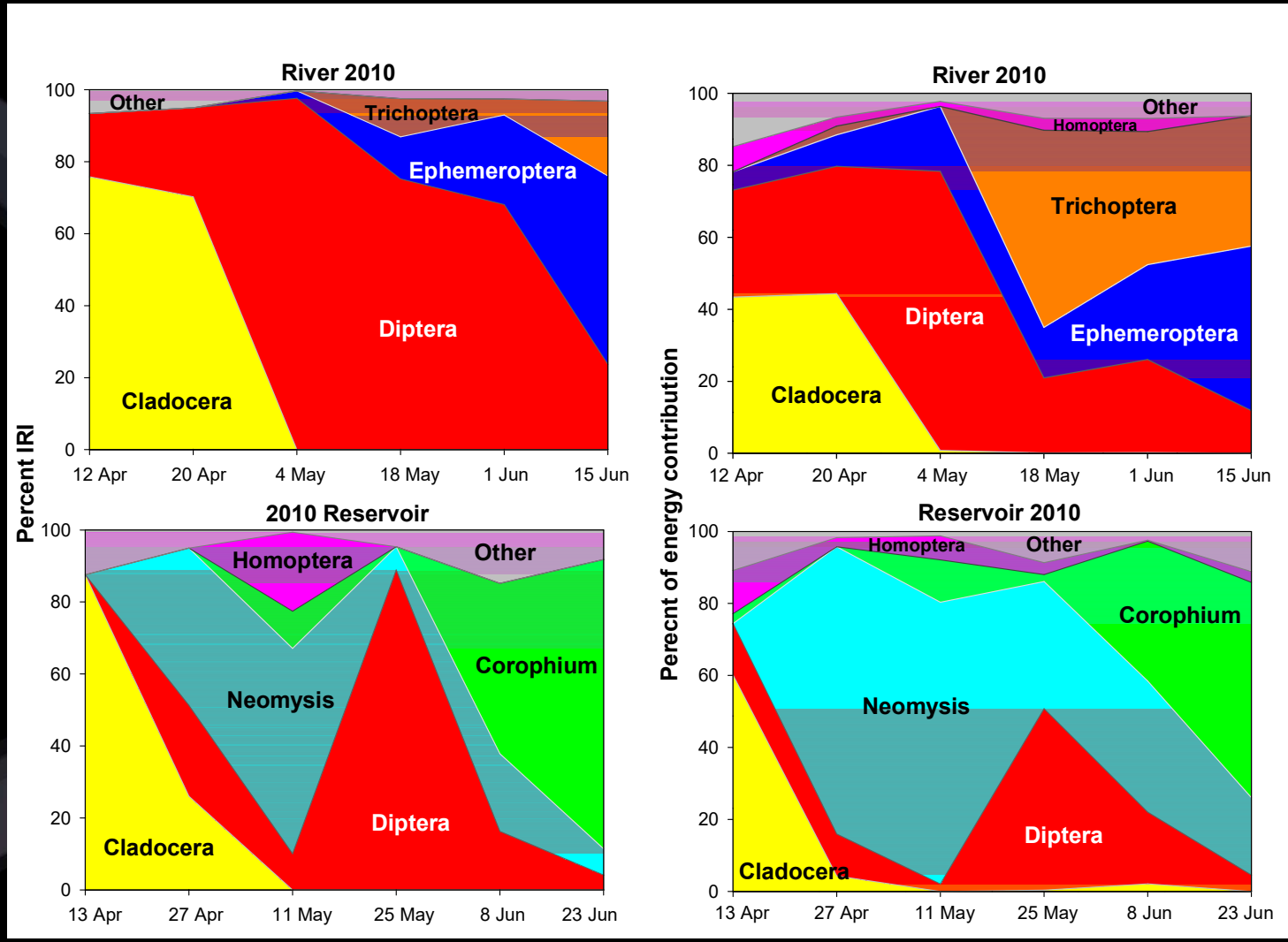
- Food web not what it was 20 years prior:

- *Neomysis mercedis*
- Siberian prawns
- *Corophium* spp.
- Polychaete
- *Corbicula* spp.
- Sand rollers
- Banded killifish

Subyearling Chinook Salmon diet

- Subyearling growth lower in Reservoir

Mayfly nymph	3,665 J/G
Adult Caddis Fly	5,495 J/G
Corophium	2,675 J/G
Neomysis	3,825 J/G

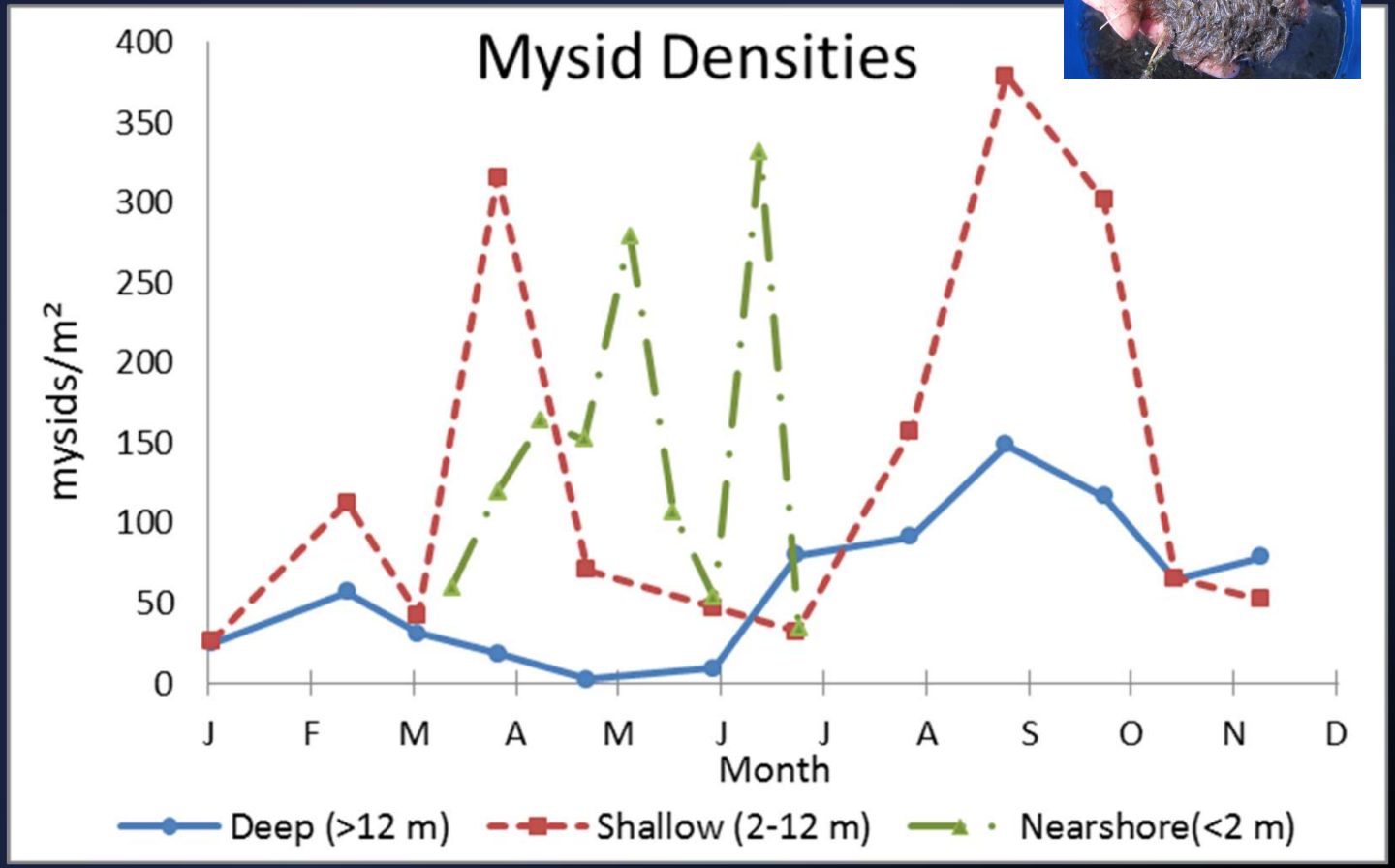


Neomysis mercedis

Composes >90% of invertebrate biomass in shoreline rearing areas

Prey for many fish: Salmonids, sunfishes, crappie, killifish, perch, sculpin, sand rollers, bass, catfish…

Main diet of Siberian prawns



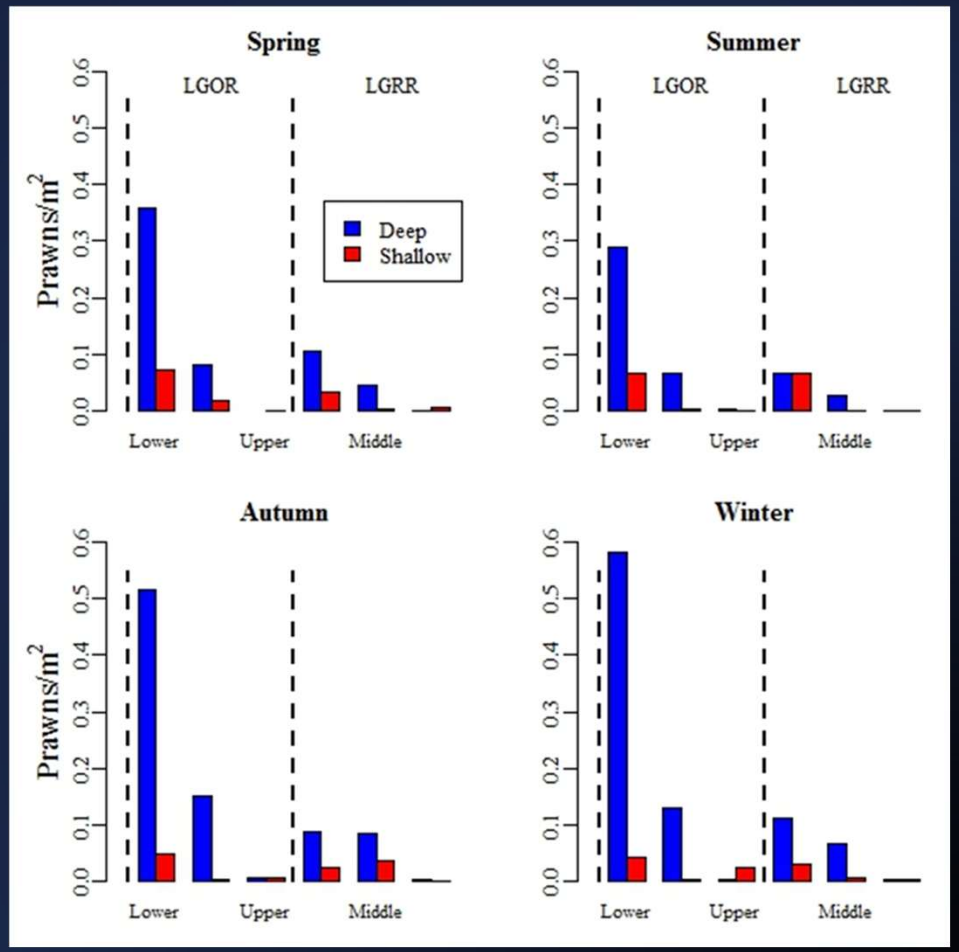
Siberian Prawns

Prawns were more abundant in Little Goose that Lower Granite

More abundant in deep (>12 m) than in shallow (<12 m) habitats

More abundant in lower reservoir reaches

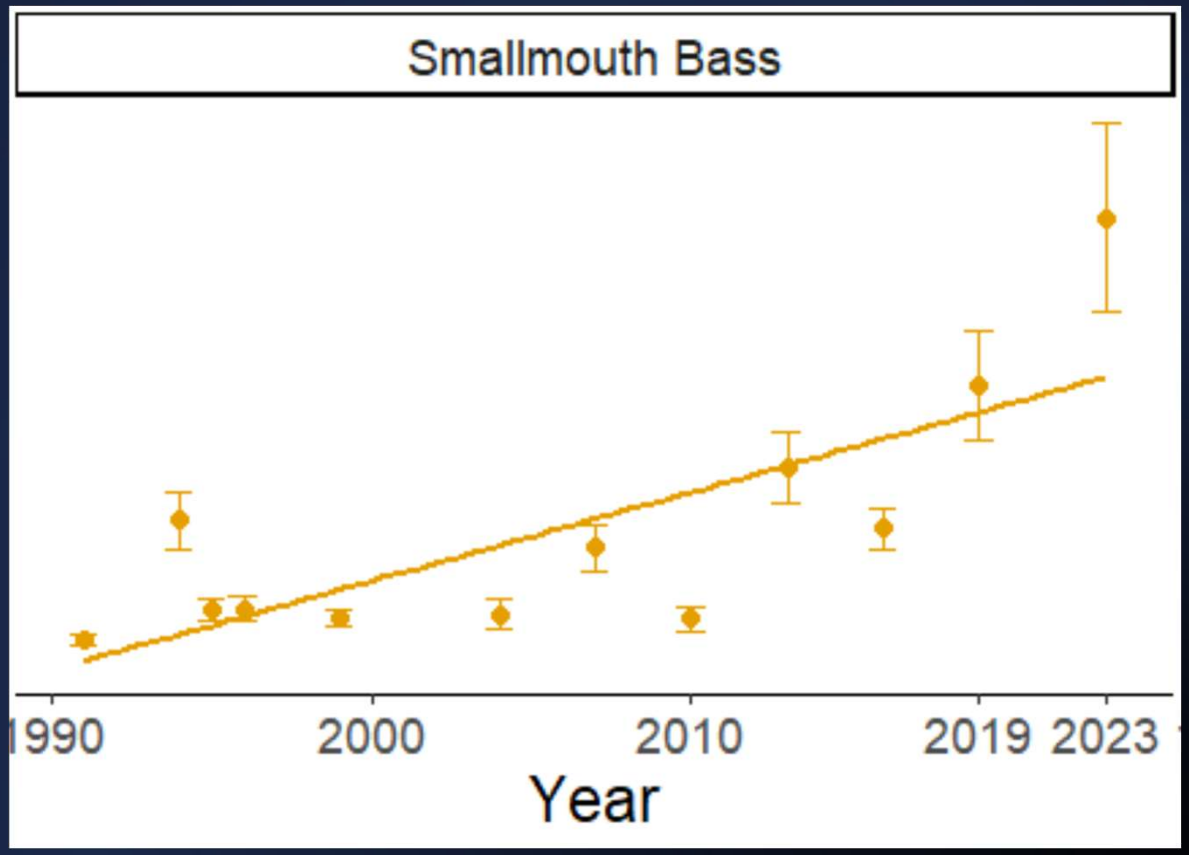
More abundant in autumn and winter



Smallmouth Bass

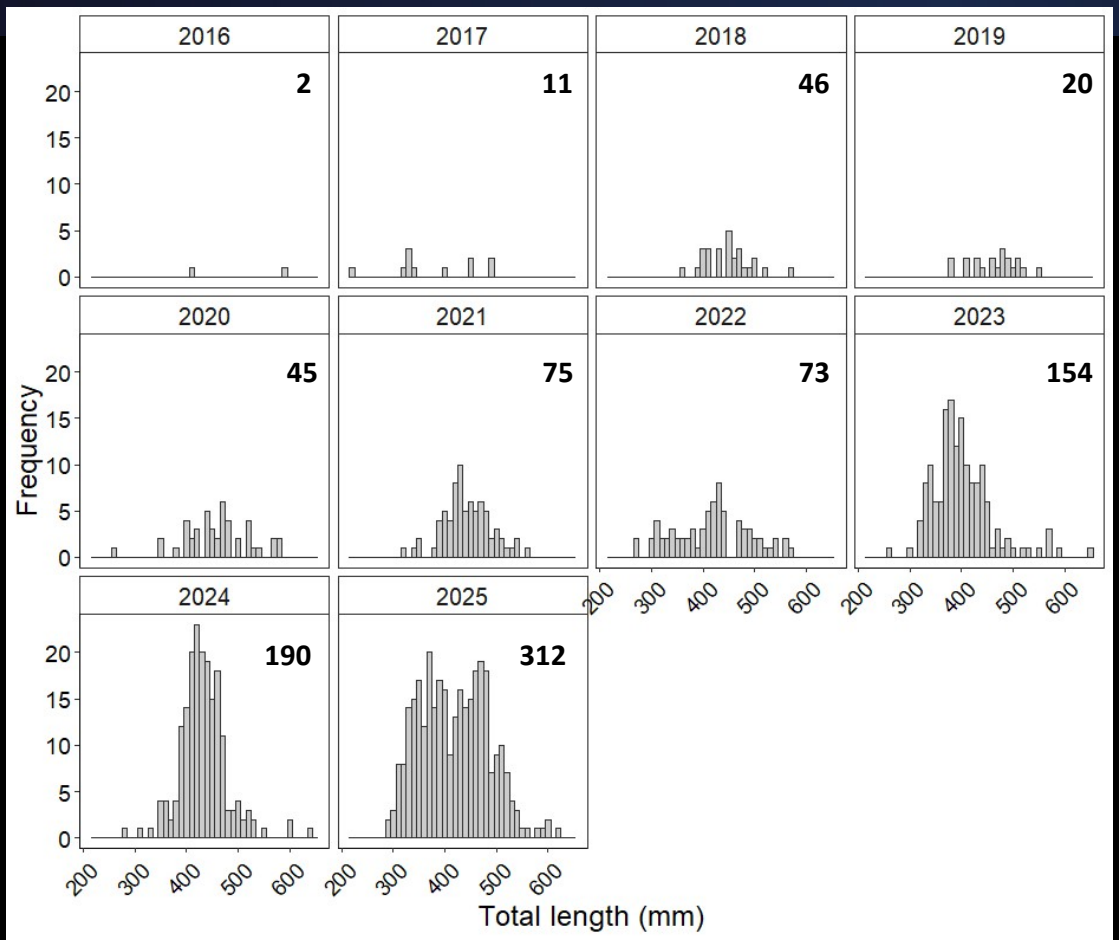
Diet shifts from native prey in rivers to nonnative prey in reservoirs

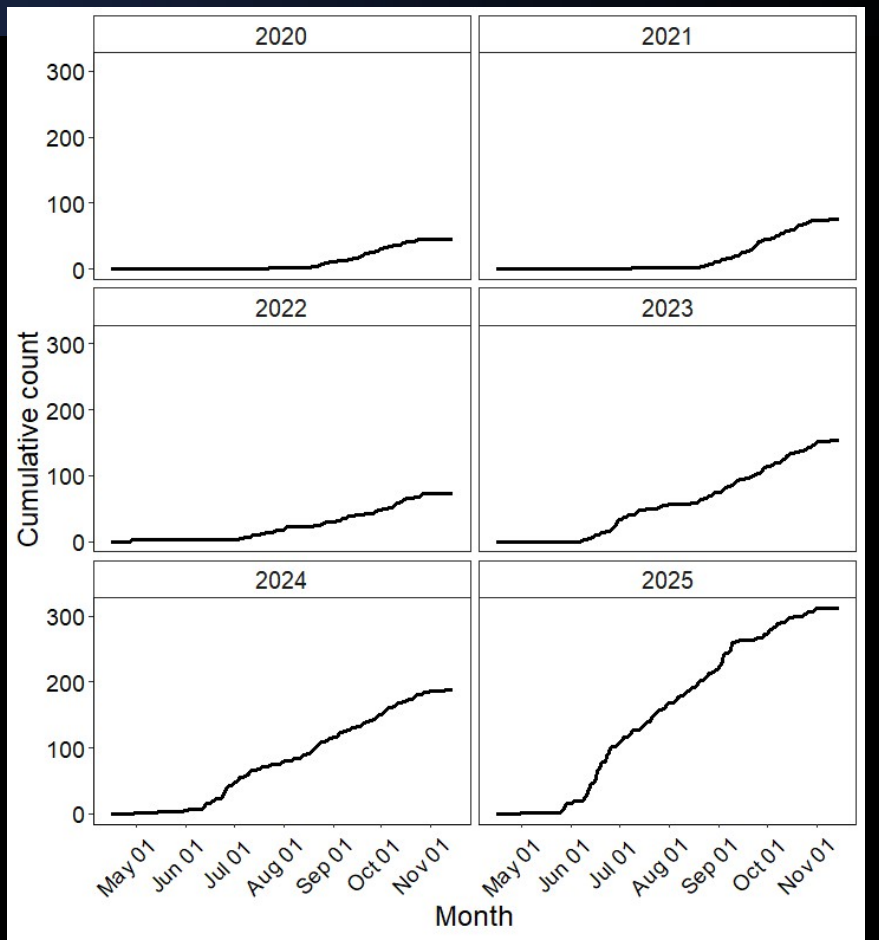
Winther et al. (2025): Increasing trends in Lower Granite Reservoir



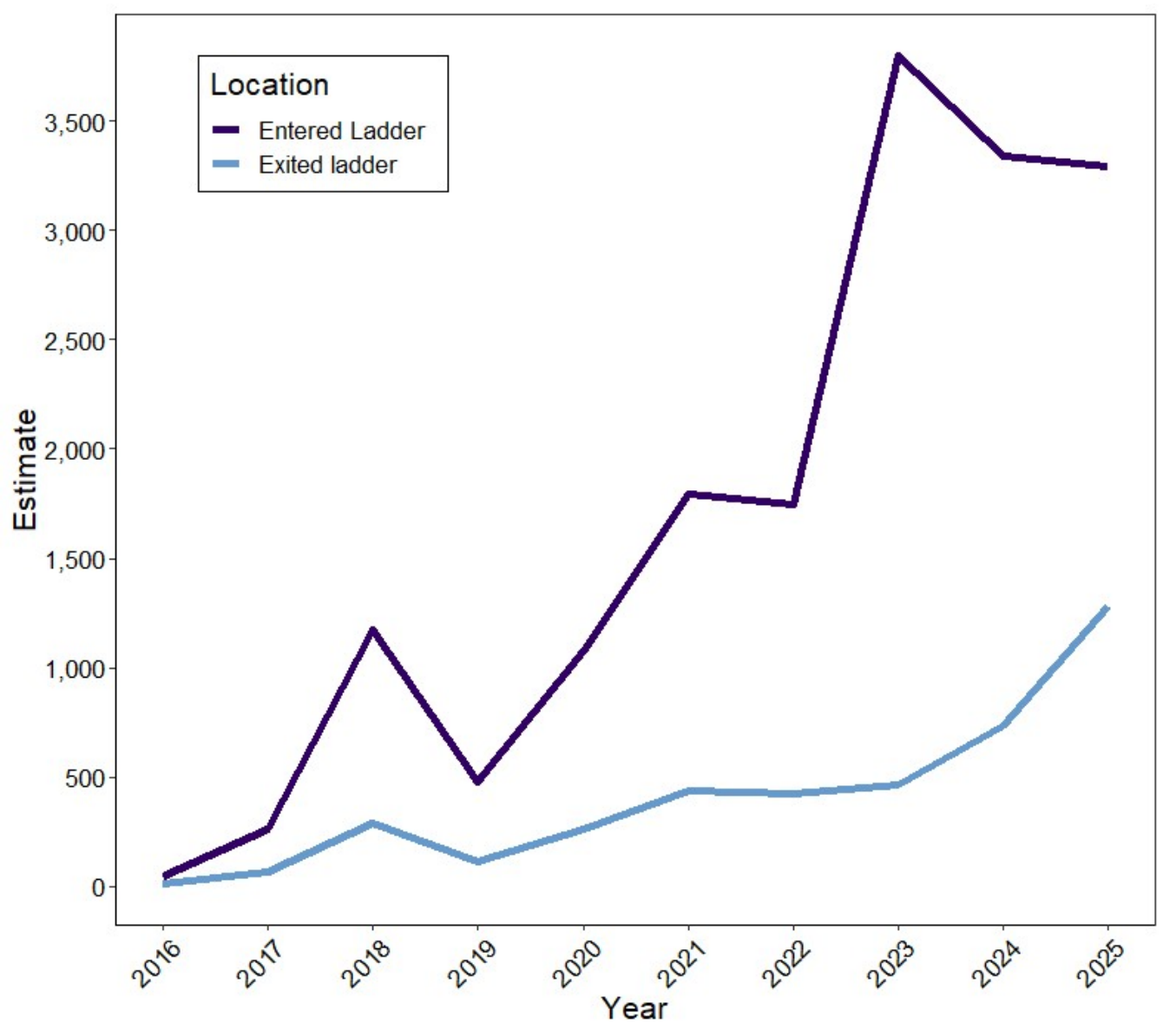
Walleye at Lower Granite Dam

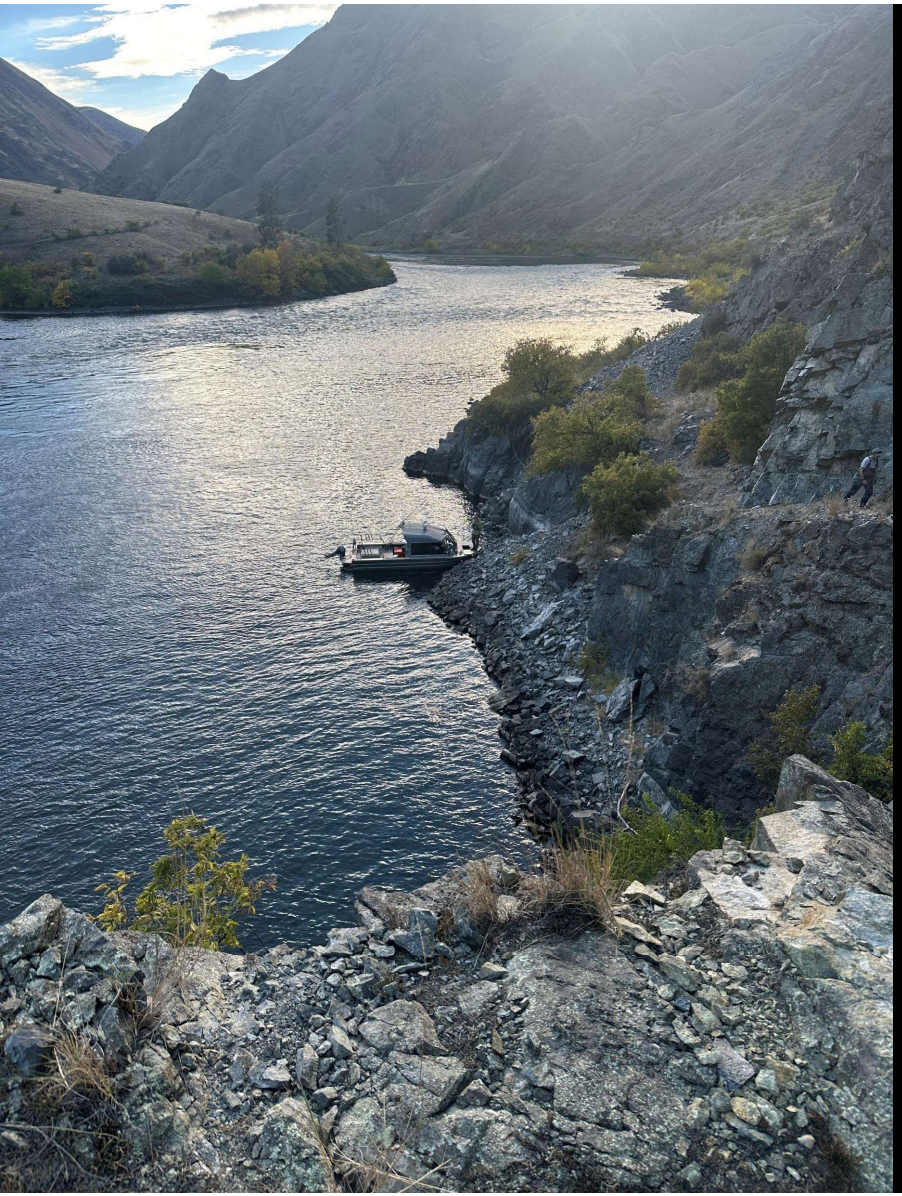
Size and Timing of Walleye





Estimated Walleye





What are we up against?

- Large river environments have changed
- Introduced species are thriving and changing food web dynamics
- Science-based knowledge is limited in the Snake and Columbia rivers
- Introduced piscivorous fishes are difficult to manage

Snake River Basin Walleye Work Group

- Bonneville Power Administration
- Confederated Tribes of the Umatilla Indian Reservation
- Idaho Department of Fish and Game
- Nez Perce Tribe
- Oregon Department of Fish and Wildlife
- US Geological Survey
- Washington Department of Fish and Wildlife
- NOAA – Northwest Fisheries Science Center

Implement research and management actions with a goal to reduce, minimize, and prevent piscine predation-related mortality from introduced non-native fishes on anadromous species within the Columbia River basin.

Acknowledgements

- Ken Tiffan's Lab
- Lower Granite Team
- Predator Management Team
- Work Group Members
- NW Power Council