

THREAT LEVEL

WESTERN RIDGED MUSSEL IDAHO FISH & GAME

Apparently Secure (S3):

Moderate risk of extinction, restricted range, few populations



WESTERN PEARLSHELL MUSSEL IDAHO FISH & GAME

Imperiled (S2):

Species is rare or declining



WDFW PRIORITY HABITAT AND SPECIES PROGRAM

Species of Greatest
Conservation Need



CALL TO ACTION

- ▶ Support research to better understand how mussels will adapt to climate change
- ▶ Protect key mussel habitat
- ▶ Conduct research on how climate change will impact the species



Western Pearlshell & Western Ridged Mussel

Margaritifera falcata & Gonidea angulata

Photo Credit: wdfw.wa.gov

OVERVIEW

Water ecosystems are at great risk due to drought and increasing water temperatures, which threaten the fish populations that play a critical role in mussels' life cycles. Water pollution from human development along waterways also degrades mussel health and shortens their life span. Mussels require specific water flow rates for breathing and reproduction, and water pollution and dam management are degrading habitat. Considering their long life span, more research is needed to understand how these species will adapt to climate change.

CONSERVATION CONSIDERATIONS

VULNERABILITY RANKING

CLIMATE

MODERATE-HIGH

NON-CLIMATE

MODERATE-HIGH

CONFIDENCE

LOW

Physiological, phenological, or ecological factors to consider when planning conservation projects:

- ▶ Long life spans may limit the ability of these mussels to adapt quickly to environmental changes
- ▶ Small, isolated populations face limited recruitment and reduced genetic diversity

Vulnerability Rankings Methodology

These priority species have been assessed for climate and non-climate vulnerability using a process adapted from the Washington Department of Fish & Wildlife's Methodology for ranking the Climate Change Vulnerability of Species. WDFW's approach includes rating each species' climate sensitivity and exposure. These two rankings are then averaged for a climate vulnerability ranking. The Tribe developed a non-climate vulnerability ranking to capture species' relative risk and adaptability to factors such as human-caused development, predator/prey relationships, or low population numbers. Confidence rankings were assessed based on the availability of scientific research.

KEY THREATS

Habitat Modification

One of the main stressors for both species is habitat loss and degradation caused by dams and other water diversions. Water pollution from runoff from nearby human development and agriculture is another significant threat.

Climate Change

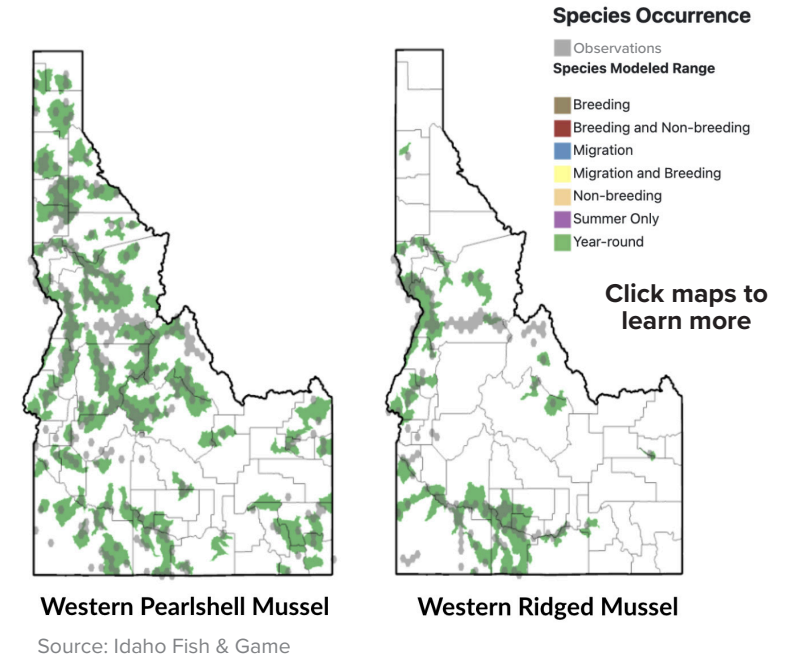
- ▶ Warmer water temperatures can lead to fewer mussels reaching adulthood and higher rates of mortality at the larval stage. In their larval stage, mussels depend on host fish for nutrients and to travel upstream. Rising water temperatures are expected to reduce the availability of host fish, further threatening larval survival.
- ▶ Mussel larvae rely on streamflow to travel downstream in search of host fish, and reduced flows may limit their ability to do so successfully.



Photo Credit: Roger Tabor

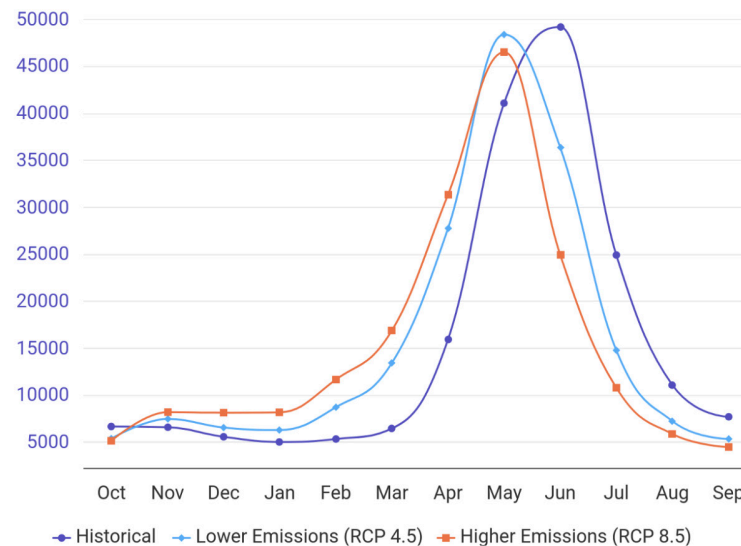
PROJECTED AVG AUGUST STREAM TEMPERATURE (°C)

Stream location	Historical	Mid century (2040)	Late century (2080)
Boundary Creek, at Saddle creek	10.58	12.32	13.24
"Lower" Smith Creek	14.13	15.51	16.52
"Upper" Smith Creek	10.98	12.24	13.15
Kootenai River, Copeland Rd. crossing	16.20	17.67	18.74
Kootenai River, Nimz ranch	15.97	17.43	18.48
"Upper" Myrtle creek	10.25	11.48	12.37
"Lower" Myrtle creek	13.45	14.81	15.74
Deep Creek, where Pine Island Rd ends	15.22	16.65	17.69
Kootenai River, Leonia	17.03	18.53	19.62
Deep Creek, at Ruby creek	14.46	15.86	16.87



Source: Idaho Fish & Game

PROJECTED NON-REGULATED STREAMFLOW (2070-2099) KOOTENAY RIVER AT BONNERS FERRY, ID



REFERENCES

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Stream Temperatures chart: <https://www.fs.usda.gov/rm/boise/AWAE/projects/NorWeST.html>.

Streamflow chart: Hegewisch, K.C., Abatzoglou, J.T., ' Future Streamflows' web tool. Climate Toolbox (<https://climatology.org/>) accessed Apr. 30 2025.

Roger Tabor. National Parks Service, <https://www.nps.gov/articles/000/western-pearlshell.htm>.

PRIORITY AT-RISK SPECIES

KOOTENAI TRIBE OF IDAHO