Western Silvery Minnow (*Hybognathus argyritis*)
Conservation Status Rank Summary

March 7, 2024

For details on assessment and ranking methodology, see: *Conservation Status Assessment Definitions, Process, Rank Factors, and Calculation of State Ranks for Montana Species*

Rarity and Trends

Rank Factor	Date Assessed	Value	Score	Data Source	Comments
Rarity					
Range Extent	2024-02-20	Y: 191324.6 km²	3.930	MTNHP Range Maps	None
Area of Occupancy			-		Factor not used in ranking.
Number of Occurrences			-		Factor not used in ranking.
Population Size			-		Factor not used in ranking.
# of Occurrences in Good Condition			-		Factor not used in ranking.
% of Area Occupied in Good Condition			-		Factor not used in ranking.
Environmental Specificity			-		Factor not used in ranking.
Rarity is calculated by averaging weighted factor scores: **((3.93 × 1)) / 1 = 3.93**					
Trends					
Short-term Trend	2024-02-20	[-49.0, -20.0%]	[-0.140, -0.070]	BLM and FWP monitoring Data; Reinhold et al. 2017; Patton et al. 1998	Trend assessment may not accurately reflect status on largere rivers in core habitat. Adjusting to more moderate lower CI to relfect SOC committee discussion. MCFO BLM surveys show a drastic decline in this species since 2011, however majority of these surveys are on smaller streams than preferable to WSMN. The increased presence of WSMN in 2011 and 2012 could have been due to a high-water year and the species has been migrating out as water levels lower. (MCFO BLM prairie stream surveys from 2011 to 2023) FishMT Survey and Inventory Data accessed 2/1/24 - data on Yellowstone River – last record of WS MN was from 2012, declining in Powder River. Reinhold et al. 2017 sampling on Yellowstone River, WS MN most abundant species sampled in their study (used many different sampling gear types, study did not specify what gear WS MN were caught on). Most sampling in FishMT data

					is either seine or electro which might not be efficient in sampling WSMN, this could be the reason for the appearance of a decline in the species. Some sampling efforts in SD and NE did not find any WSMN where there was historic presence. WY study shows WSMN to be decreasing (Patton et al. 1998) KS lists this species as threatened.
Long-term Trend			-		**Factor not used in ranking.**
Trends score is calculated by summing weighted short and long-term trend scores: **(([-0.14, -0.07] × 2)) = [-0.28, -0.14]**					

Threats

Rank Factor	Date Assessed	Value	Score	Data Source	Comments
Threats					
Overall Threat Impact		Medium	3.670		None
Intrinsic Vulnerability			-		Factor not used in ranking.
Threat score is calculated from Overall Threat Impact when available or Intrinsic Vulnerability if not: **(3.67) = 3.67**					

Individual Threats Data

Threat Category	Date Assessed	Impact Score	Scope	Severity	Immediacy	Comments
Natural System Modifications	2024-02-20	Low	Restricted	Slight	High	Reservoirs and diversion dams reduce sediment loads, may be cause of extirpation from Big Horn (Fishes of WY) and declines elsewhere (Patton et al. 1998, Dodds et al. 2004)
Invasive & Other Problematic Species, Genes & Diseases	2024-02-20	Low	Pervasive	Slight	High	Common Carp may impact feeding and spawning as they uproot vegetation (Carp in North America) Predation by Northern pike, walleye (FWP field guide) possibly smallmouth bass. As proper hydrologic processes are lost due to stream channel modifications (impact listed above) predation impacts will increase as well – less habitat types for species to hide from predators.
Pollution	2024-02-20	Low	Small	Slight	High	Poorly managed livestock grazing – reduces riparian vegetation which reduces food source, thermal refuge, filtration of overland flow, increased sedimentation, excess nutrients, etc. Streams flowing through oil and gas fields periodically have high conductivity levels to a lethal point (all personal observations)
Climate Change & Severe Weather	2024-02-20	Low	Pervasive	Slight	High	Prefer larger tributaries, requires deeper water and flow for eggs, drought years could make it difficult for finding spawning areas (Dodds et al. 2004)
Threat Tally: 0 - Very High, 0 - High, 0 - Medium, 4 - Low Overall Threat Impact* = Medium						

*See Conservation Status Assessment Definitions, Process, Rank Factors, and Calculation of State Ranks for Montana Species for calculation of Overall Threat Impact based on the number and impact of individual threats.

Conservation Status Rank Calculation

Raw score

Rarity: (3.93 × 70%) + Threats: (3.67 × 30%) + Trends: ([-0.28, -0.14]) = [3.57, 3.71]

Calculated Rank: S4

Accepted Rank	S4
Date Approved	2024-09-30
Approval Authority	Montana Species of Concern Committee
Rank Justification	Species is widespread but appears to be declining and facing numerous low level threats

Supplementary Information

Montana Natural Heritage Program. 2021. Conservation Status Assessment Definitions, Process, Rank Factors, and Calculation of State Ranks for Montana Species. 18 p.
https://mtnhp.mt.gov/docs/Montana_State_Rank_Criteria_20211201.pdf

Montana Field Guide Species Account:
https://fieldguide.mt.gov/speciesDetail.aspx?elcode=AFCJB16010

Predicted Suitable Habitat Model:
https://mtnhp.mt.gov/resources/models/?elcode=AFCJB16010

Information Needs

Information needs are assessed by considering the availability of factors used to assess species status as well as the quality of these assessments. Current information availability and quality to inform Conservation Status Rank for this species are highlighted.

Rank Factor	Assessment Category	Value	Criteria
General Status	Status Quality	Adequate	Calculated rank has low uncertainty and is represented by a single rank (e.g. S3); accepted rank may be adjusted to a range rank (e.g. S2S3)
		Poor	Rank assessed as SU or calculated rank has notable uncertainty and corresponds to a range rank with 2 or more values (e.g. S2?, S1S3, or S4S5)
Rarity	Range Quality	Adequate	Range polygon adequately represents area of probable occupancy and does not include substantial unoccupied areas; range may be adequately defined and still include areas of unsuitable habitat (e.g. mountain ranges for plains species)
		Marginal	Range polygon defined, but may include or exclude notable areas where the species may or may not occur on the landscape
		Poor	Range polygon not defined
	Habitat Quality	Adequate	Species-habitat relationship is well-defined (e.g. relevant literature or robust habitat model available)
		Marginal	Understanding of species-habitat relationship is adequate among some but not all habitats (e.g. literature covers similar habitats outside of Montana or habitat model performance is only somewhat adequate)
		Poor	Species-habitat relationship is not well understood
Threats	Threat Quality	Adequate	Threat Impact is a single value (including "Unthreatened")
		Marginal	Threat Impact assessed at more than one value (e.g. "High - Medium")
		Poor	Threat Impact is Unknown but Intrinsic Vulnerability is assessed
		Unknown	Threat Impact is Unknown and Intrinsic Vulnerability is not assessed
Trends	Recency	Current	Short-term Trend assessment date less than 10 years old
		Out of Date but Adequate	Short-term Trend assessment date is more than 10 years old or Unknown, but species is Unthreatened
		Out of Date	Short-term Trend assessment date more than 10 years old
		Not Available	Short-term Trend data are not available
	Trend Quality	Sufficient	Short-term Trend assessed at a single value or multiple values with a minimum trend greater than -10% (stable or increasing)
		Unknown but Sufficient	Short-term Trend is Unknown, but species is Unthreatened
		Poor	Short-term Trend is less than -10% (in decline) with two or more values selected
		Unknown	Short-term Trend is Unknown

Summary of Information Availability

Data are available, but short term trend is uncertain.

Summary of Information Needs

Further research on larger rivers is necessary to account for trend in core populations.

Additional Threat Details

The table below contains the complete threats assessment for this species. While the Conservation Status Rank Calculation is based on cumulative, broadly categorized (Level 1) threats data, threats are assessed and tracked for more specifically categorized (Level 2) threats when available.

Threat Category	Date Assessed	Assessed By	Data Source	Scope	Severity	Imme-diacy	Comments
Biological Resource Use - 5.4 - Fishing & Harvesting Aquatic Resources	2024-02-20	Christina Stewart	Expert opinion	Restricted	Negligible	High	Used as bait fish
Natural System Modifications - 7	2024-02-20	Christina Stewart	Patton et al. 1998, Dodds et al. 2004	Restricted	Slight	High	Reservoirs and diversion dams reduce sediment loads, may be cause of extirpation from Big Horn (Fishes of WY) and declines elsewhere (Patton et al. 1998, Dodds et al. 2004)
Invasive & Other Problematic Species, Genes & Diseases - 8.1 - Invasive Non-Native/Alien Species/Diseases	2024-02-20	Christina Stewart	Expert Opinion	Pervasive	Slight	High	Common Carp may impact feeding and spawning as they uproot vegetation (Carp in North America) Predation by Northern pike, walleye (FWP field guide) possibly smallmouth bass. As proper hydrologic processes are lost due to stream channel modifications (impact listed above) predation impacts will increase as well – less habitat types for species to hide from predators.
Pollution - 9.3 - Agricultural & Forestry Effluents	2024-02-20	Christina Stewart	Expert Opinion	Small	Slight	High	Poorly managed livestock grazing – reduces riparian vegetation which reduces food source, thermal refuge, filtration of overland flow, increased sedimentation, excess nutrients, etc. Streams flowing through oil and gas fields periodically have high conductivity levels to a lethal point (all personal observations)
Climate Change & Severe Weather - 11.1 - Habitat Shifting & Alteration	2024-02-20	Christina Stewart	Dodds et al. 2004	Pervasive	Slight	High	Prefer larger tributaries, requires deeper water and flow for eggs, drought years could make it difficult for finding spawning areas (Dodds et al. 2004)