Columbia River Redband Trout (*Oncorhynchus mykiss gairdneri*) Conservation Status Rank Summary

February 27, 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	2024-02-14	Y: 5807.5 km²	3.140	MTNHP Range Maps	None
Area of Occupancy	2024-02-23	352 | 1km² cells	2.750	FWP Fish Distributio n Layer	Length of streams with pure populations
Number of Occurrences			-		Factor not used in ranking.
Population Size			-		Factor not used in ranking.
# of Occurrences in Good Condition	2024-02-23	3	1.100	MTFWP	Three populations with genetically pure stock remain
% 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: **((3.14 × 1) + (2.75 × 2) + (1.10 × 2)) / 5 = 2.17**					
Trends					
Short-term Trend	2024-02-14		0.000	MTFWP unpublishe d	MFWP (unpublished) - 2 monitoring sections on known-genetically unaltered streams (Callahan and Bear Creeks, J. Dunnigan pers. comm.) Data on these two creeks shows a slight, increasing trend. DAB: Although isolated populations may be secure ongoing hybridization of other populations may be decreasing pure trout
Long-term Trend	2024-02-14	[-65.0, -47.0%]	[-0.220, -0.140]	Muhlfeld et al. (2015)	Muhlfeld et al. (2015) Trend Low is the known genetically unaltered river miles and trend high is all river miles with 10% hybridization. Data for MT basins provided by S. Albeke (UWyo)
Trends score is calculated by summing weighted short and long-term trend scores: **((0.00 × 2) + ([-0.22, -0.14] × 1)) = [-0.22, -0.14]**					

Threats

Rank Factor	Date Assessed	Value	Score	Data Source	Comments
Threats					
Overall Threat Impact		Very high	0.000		None
Intrinsic Vulnerability			-		Factor not used in ranking.
Threat score is calculated from Overall Threat Impact when available or Intrinsic Vulnerability if not: **(0.00) = 0.00**					

Individual Threats Data

Threat Category	Date Assessed	Impact Score	Scope	Severity	Immediacy	Comments
Natural System Modifications	None	Low	Small	Serious	High	Multiple Level 2 threats - see Additional Threat Details table.
Invasive & Other Problematic Species, Genes & Diseases	2024-02-14	High	Pervasive	Serious	High	Hybridization with nonnative subspecies continues to be an ongoing and pervasive threat to persistence and is likely to increase with warming streams
Climate Change & Severe Weather	2024-02-14	High	Pervasive	Serious	High	Clancy et al. in review and Clancy unpublished data. There are unknowns regarding the upper thermal tolerance of CRRB...hence the wide estimates for proportional loss.
Threat Tally: 0 - Very High, 2 - High, 0 - Medium, 1 - Low Overall Threat Impact* = Very high						

*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: (2.17 × 70%) + Threats: (0.00 × 30%) + Trends: ([-0.22, -0.14]) = [1.30, 1.38]

Calculated Rank: S1

Accepted Rank	S1
Date Approved	2024-09-30
Approval Authority	Montana Species of Concern Committee
Rank Justification	Species historically occurred across a moderately sized portion of northwestern Montana, but is hybridizing with nonnative trout across almost all of its range. Few populations of pure stock exists, but those that do appear to be stable. Species is threatened by ongoing loss of genetics and habitat loss due to warming water temperatures.

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=AFCHA02092

Predicted Suitable Habitat Model:
https://mtnhp.mt.gov/resources/models/?elcode=AFCHA02092

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

No additional information are needed to assess species trend at this time.

Summary of Information Needs

Ongoing monitoring of extant populations should continue to maintain current trend information.

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
Natural System Modifications - 7.1 - Fire & Fire Suppression	2024-02-14	N Clancy	Nelson McLellan (2023)	Small	Serious	High	From 2000-2018, approximately 10% of the Kootenai basin burned (visual estimate from GeoMac by USGS), assuming the same approximate amount of fire-~5% of the basin will burn in the next decade. Nelson & McLellan (2023) saw Redband Trout recruitment declines of ~60% in Idaho streams subject to wildfire
Natural System Modifications - 7.2 - Dams & Water Management/Use	2024-02-14	N Clancy	Muhlfield et al. 2015	Small	Serious	High	From Muhlfeld et al. (2015) approx. 152/1739 (~9%) km of conservation populations are isolated. I arbitrarily estimate a 50% loss of these isolated populations due to stochastic factors and inbreeding leading to permanent losses but conservation actions leading to reconnection for others...though this process will likely take place over more than 10 years in many systems.
Invasive & Other Problematic Species, Genes & Diseases - 8	2024-02-14	N Clancy	None	Pervasive	Serious	High	Hybridization with nonnative subspecies continues to be an ongoing and pervasive threat to persistence and is likely to increase with warming streams
Climate Change & Severe Weather - 11.1 - Habitat Shifting & Alteration	2024-02-14	N Clancy	N. Clancy et al. In review	Pervasive	Serious	High	Clancy et al. in review and Clancy unpublished data. There are unknowns regarding the upper thermal tolerance of CRRB...hence the wide estimates for proportional loss.