# Burbot (*Lota lota*)
# Conservation Status Rank Summary

April 22, 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** | 2024-04-22 | Y: 94209.8 km² | 3.930 | MTNHP Range Maps | None |
| **Area of Occupancy** | 2010-04-08 | | 3.440 | MTNHP Species Rank Data Table, Methodology: NS (2003) \| Original Score: F | 605 square kilometers based on Heritage Range Maps and occupancy of 1% of landscape by streams and occupancy of 80% of stream reaches and/or tributaries. |
| **Number of Occurrences** | 2024-04-22 | | 4.130 | MTNHP | Over 100 occurrences in MTNHP database |
| Population Size | | | - | | Factor not used in ranking. |
| **# of Occurrences in Good Condition** | 2024-04-22 | | 3.300 | Expert Opinion | Most populations of the species occur in altered systems or in proximity to agriculture. Generally they are in good condition, but some may be degraded due to these factors |
| % 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) + (3.44 × 2) + (4.13 × 1) + (3.30 × 2) ) / 6 = 3.59** | | | | | |
| **Trends** | | | | | |
| **Short-term Trend** | 2024-04-22 | [-80.0, 120.0%] | [-0.310, 0.070] | | None |
| **Long-term Trend** | 2010-04-08 | | 0.140 | MTNHP Species Rank Data Table | Long term trend has been for an increase in numbers of fish and area of occupancy as a result of dams that have created cold water habitats that were not present prior to European arrival. These changes to habitat have likely resulted in an increase of g \| Methodology: NS (2003) \| Original Score: F |

Trends score is calculated by summing weighted short and long-term trend scores:
**( ([-0.31, 0.07] × 2) + (0.14 × 1) ) = [-0.48, 0.28]**

## Threats

| Rank Factor | Date Assessed | Value | Score | Data Source | Comments |
|---|---|---|---|---|---|
| **Threats** | | | | | |
| **Overall Threat Impact** | | Low/No Threats | 5.500 | | Climate change, drought, agricultural dewatering, and high winter flows below Libby dam on the Kootenai River all represent threats to the species in Montana. |
| Intrinsic Vulnerability | | | - | | Factor not used in ranking. |
| Threat score is calculated from Overall Threat Impact when available or Intrinsic Vulnerability if not: **( 5.50 ) = 5.50** | | | | | |

**Individual Threats Data**

| Threat Category | Date Assessed | Impact Score | Scope | Severity | Immediacy | Comments |
|---|---|---|---|---|---|---|
| No individual threats data used in ranking this species | | | | | | |

## Conservation Status Rank Calculation

**Raw score**

Rarity: (3.59 × 70%) + Threats: (5.50 × 30%) + Trends: ([-0.48, 0.28]) = [3.68, 4.44]

Calculated Rank: S4

| | |
|---|---|
| **Accepted Rank** | S4 |
| **Date Approved** | 2025-02-03 |
| **Approval Authority** | Montana Natural Heritage Program Staff |
| **Rank Justification** | Species is generally stable with declines and increases within some populations. Threats from alteration of the hydrology of occupied systems and entrapment within canals and ditches used for agriculture are the primary threats, but these appear to be low and unlikely to drive significant changes in these populations. |

## 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=AFCMA01010

Predicted Suitable Habitat Model:
https://mtnhp.mt.gov/resources/models/?elcode=AFCMA01010

# 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

None

Summary of Information Needs

None

## 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 |
|---|---|---|---|---|---|---|---|
| **Agriculture & Aquaculture - 2.3 - Livestock Farming & Ranching** | 2024-04-22 | Chris Clancy | Expert Opinion Chris Clancy | Restricted | Unknown | High | Entrapment in Diversion Ditches |
| **Natural System Modifications - 7.2 - Dams & Water Management/Use** | 2024-04-22 | Chris Clancy | Expert Opinion Chris Clancy | Restricted | Unknown | High | Altered hydrology of dammed systems. Dams impede migration but Burbot also adapt to reservoirs. More research needed |
| No threats data available for this species | | | | | | | |