

Harlequin Duck (*Histrionicus histrionicus*)

Conservation Status Rank Summary

October 21, 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	2024-10-21	S: 150524.9 km ²	3.930	MTNHP Range Maps	None
Area of Occupancy	2024-10-21	1844 4km ² cells	4.130	MTNHP Modeling	None
Number of Occurrences	2024-10-21	42	2.750	MTNHP Databases	None
Population Size			-		Factor not used in ranking.
# of Occurrences in Good Condition	2024-10-21		0.000	Expert Opinion	Threats to population are widespread and although most occurrences are on federally managed lands, all face threats and have likely experienced some degradation.
% of Area Occupied in Good Condition			-		Factor not used in ranking.
Environmental Specificity	2008-09-15	Narrow	-	MTNHP Species Rank Data Table	Factor not used in ranking. Mountain streams. Methodology: NS (2003) Original Score: B
Rarity is calculated by averaging weighted factor scores: $((3.93 \times 1) + (4.13 \times 2) + (2.75 \times 1) + (0.00 \times 2)) / 6 = 2.49$					
Trends					
Short-term Trend	2024-10-21		-	Expert Opinion	Factor not used in ranking. No trend data are available for the species in Montana. Ongoing monitoring is needed to compare current population numbers to previously established baselines
Long-term Trend	2008-09-15		-0.140	MTNHP Species Rank Data Table	A number of streams surveyed relatively recently (1980s and 1990s) no longer have breeding pairs or the number of breeding pairs are reduced. Methodology: NS (2003) Original Score: D
Trends score is calculated by summing weighted short and long-term trend scores: $((-0.14 \times 1)) = -0.14$					

Threats

Rank Factor	Date Assessed	Value	Score	Data Source	Comments
Threats					
Overall Threat Impact		Very high	0.000		None
Intrinsic Vulnerability	2008-09-15	Moderately vulnerable	-	MTNHP Species Rank Data Table	Factor not used in ranking. Methodology: NS (2003) Original Score: B
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
Biological Resource Use	2026-03-10	Low	Small	Slight	High	<p>Aquatic and riparian habitat degradation from logging. Sedimentation from logging or from logging roads can lower prey base (macroinvertebrate) density and species composition and increase turbidity which can result in lower foraging efficiency or displacement. Logging in riparian zones can cause habitat degradation and disturbance to nesting sites or habitat complexity.</p> <p>The majority of breeding streams are located on federal land with 300 ft riparian SMZs. State and private lands have only 50 ft SMZs.</p> <p>While not likely to be a significant threat under current regulations, for a species that is declining where monitored, that does not easily reoccupy areas where breeding populations have been lost, and that is faced by a "death from 1,000 cuts" array of issues this is one threat we can easily manage.</p>
Human Intrusions & Disturbance	2024-10-21	Very high	Pervasive	Extreme	High	Disturbance by boaters on rivers and streams. The ultimate scope and severity of this threat is unstudied and based on anecdotal observations of ducks avoiding boaters during the breeding period.
Natural System Modifications	2026-03-10	Low	Pervasive	Slight	High	Catastrophic and high severity wildfire. High severity fire may cause high sedimentation in streams lowering prey base (lower aquatic

						productivity) and higher turbidity making foraging more difficult. If riparian vegetation is burned over it can result in loss of nesting cover till regrowth starts. Higher severity fires take longer to regrow than lower severity fires.
Climate Change & Severe Weather	2024-10-21	High	Pervasive	Serious	High	<p>increase in the magnitude of flood events. These appear to have significant impacts on nest success during the breeding season. Harlequin ducks typically arrive at breeding streams before peak runoff when turbidity is low and foraging optimal, begin incubation at or near peak runoff when water levels are at their highest, and locate nests very close to stream edge.</p> <p>Unusual or extreme peaks in runoff or timing of runoff are negatively correlated with harlequin duck reproductive success. Late or secondary peaks in runoff can flood nests and re nesting rarely occurs because males migrate back to the coast soon after incubation begins. Early peak runoff can result in low foraging efficiency for females during energetically costly egg laying period, resulting in decreased reproductive success. Climate change is predicted to increase the number of hydrologic peaks, induce earlier peak runoff, and cause increasingly erratic flow due to extreme precipitation events.</p> <p>Low streamflow in summer during the brood rearing season is expected to lower brood rearing success although this has not been formally studied. Low water limits refuge from predators, decreases available foraging habitat, food resources, and can be exacerbated by high levels of recreation.</p>
<p>Threat Tally: 1 - Very High, 1 - High, 0 - Medium, 2 - Low Overall Threat Impact* = Very high</p>						

*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: $(2.49 \times 70\%)$ + Threats: $(0.00 \times 30\%)$ + Trends: (-0.14) = 1.60

Calculated Rank: S2

Accepted Rank	S2B
Date Approved	2024-10-21
Approval Authority	Montana Species of Concern Committee
Rank Justification	Species is a summer breeding resident of swift-flowing streams and rivers across montane regions of western Montana. It has undergone declines over the past decades and the current trend of the population is unknown. It faces threats from increased flooding events during the nesting season and disturbance from recreational boating.

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=ABNJB15010>

Predicted Suitable Habitat Model:

<https://mtnhp.mt.gov/resources/models/?elcode=ABNJB15010>

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

Species range and the historic occupancy of many breeding streams is well recorded. Recent trend in occupancy or abundance across the species range are not well studied. Threats are known but their scope and magnitude are uncertain.

Summary of Information Needs

A range-wide assessment of site occupancy and repeated surveys of select breeding streams is needed to determine short-term trend. Study of boating impacts and better quantification of impacts of flood events and the magnitude of risk this presents will better inform assessment of threats.

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	Immediacy	Comments
Energy Production & Mining - 3.2 - Mining & Quarrying	2026-03-10	Dan Bachen	SWAP Assessment	Small	Slight	Unknown	Mining can threaten harlequin ducks via chemical contaminants or sedimentation causing poor water quality resulting in lower prey density, human disturbance, or loss of nesting habitat.
Transportation & Service Corridors - 4.1 - Roads & Railroads	2026-03-10	Dan Bachen	SWAP Assessment	Large	Unknown	High	Roads adjacent to breeding waters. Sedimentation from roads can lower macroinvertebrate prey base density and species composition. Sedimentation increases turbidity which can result in lower foraging efficiency or displacement.
Biological Resource Use - 5.1 - Hunting & Collecting Terrestrial Animals	2026-03-10	Dan Bachen	SWAP Assessment	Pervasive	Unknown	High	<p>Legal hunting in winter range. Harlequin ducks are legally hunted in every state and province of the pacific winter range, and Montana birds are found to winter in all these states and provinces. Colorful males are considered trophies and are harvested at a higher rate than females; of the 250 banded individuals reported as harvested from 1979-2019, 89.1% were male and 10.4% were female.</p> <p>Banff National Park banded 164 male harlequin ducks over 15 years (1995-2017), 5.5% were reported as harvested. This is likely an underestimate of harvest mortality as reporting is not 100% and could be closer to 7.2-9.7% of male mortality. Simulations of hunting mortality found >3-5% annual harvest of a population to be unsustainable.</p> <p>For a species that is declining where monitored in the intermountain west, that does not easily reoccupy areas where breeding populations have been lost, and that is faced by a "death from 1,000 cuts" array of issues, taking a closer look at the population level effect of legal hunting is warranted.</p> <p>2024-2025 harvest regulations are as follows: Alaska has a personal bag limit of 12 per person, British Columbia has a personal possession limit of 6 per person, Washington has a permitted take of 38 per year, and Oregon has a daily bag limit of one and possession limit of 3. Oregon and Washington both recently reduced harvest.</p>

<p>Biological Resource Use - 5.3 - Logging & Wood Harvesting</p>	<p>2026-03-10</p>	<p>Dan Bachen</p>	<p>SWAP Assessment</p>	<p>Small</p>	<p>Slight</p>	<p>High</p>	<p>Aquatic and riparian habitat degradation from logging. Sedimentation from logging or from logging roads can lower prey base (macroinvertebrate) density and species composition and increase turbidity which can result in lower foraging efficiency or displacement. Logging in riparian zones can cause habitat degradation and disturbance to nesting sites or habitat complexity.</p> <p>The majority of breeding streams are located on federal land with 300 ft riparian SMZs. State and private lands have only 50 ft SMZs.</p> <p>While not likely to be a significant threat under current regulations, for a species that is declining where monitored, that does not easily reoccupy areas where breeding populations have been lost, and that is faced by a "death from 1,000 cuts" array of issues this is one threat we can easily manage.</p>
<p>Human Intrusions & Disturbance - 6.1 - Recreational Activities</p>	<p>2024-10-21</p>	<p>Dan Bachen</p>	<p>Expert Opinion</p>	<p>Pervasive</p>	<p>Extreme</p>	<p>High</p>	<p>Disturbance by boaters on rivers and streams. The ultimate scope and severity of this threat is unstudied and based on anecdotal observations of ducks avoiding boaters during the breeding period.</p>
<p>Natural System Modifications - 7.1 - Fire & Fire Suppression</p>	<p>2026-03-10</p>	<p>Dan Bachen</p>	<p>SWAP Assessment</p>	<p>Pervasive</p>	<p>Slight</p>	<p>High</p>	<p>Catastrophic and high severity wildfire. High severity fire may cause high sedimentation in streams lowering prey base (lower aquatic productivity) and higher turbidity making foraging more difficult. If riparian vegetation is burned over it can result in loss of nesting cover till regrowth starts. Higher severity fires take longer to regrow than lower severity fires.</p>
<p>Invasive & Other Problematic Species, Genes & Diseases - 8.2 - Problematic Native Species/Diseases</p>	<p>2026-03-10</p>	<p>Dan Bachen</p>	<p>SWAP Assessment</p>	<p>Small</p>	<p>Negligible</p>	<p>High</p>	<p>Sport fish stocking. Harlequin density is negatively correlated to fish density. It is believed that high fish densities do not lower abundance of aquatic insects via direct competition, but rather cause ant-predator behavior in insect prey base that make them less available to harlequins. Widespread fish stocking into historically fishless waters may have decreased habitat quality, lower levels of stocking in present day could have some impact on harlequins.</p>
<p>Invasive & Other Problematic Species, Genes & Diseases - 8.4 - Problematic Species/Diseases of Unknown Origin</p>	<p>2026-03-10</p>	<p>Dan Bachen</p>	<p>SWAP Assessment</p>	<p>Large</p>	<p>Unknown</p>	<p>High</p>	<p>Highly pathogenic avian influenza . Harlequins are particularly susceptible to spreading disease while in winter flocks when populations across the whole breeding range mix. There have been no known deaths due to HPAI, with new variants emerging there are a lot of unknowns but is expected to get worse. A study in 2008 found 42% of harlequins sampled in Prince Williams Sound to have avian influenza plasma antibodies.</p>

<p>Climate Change & Severe Weather - 11.4 - Storms & Flooding</p>	<p>2024-10-21</p>	<p>Dan Bachen</p>	<p>Glacier National Park monitoring data</p>	<p>Pervasive</p>	<p>Serious</p>	<p>High</p>	<p>increase in the magnitude of flood events. These appear to have significant impacts on nest success during the breeding season. Harlequin ducks typically arrive at breeding streams before peak runoff when turbidity is low and foraging optimal, begin incubation at or near peak runoff when water levels are at their highest, and locate nests very close to stream edge.</p> <p>Unusual or extreme peaks in runoff or timing of runoff are negatively correlated with harlequin duck reproductive success. Late or secondary peaks in runoff can flood nests and re nesting rarely occurs because males migrate back to the coast soon after incubation begins. Early peak runoff can result in low foraging efficiency for females during energetically costly egg laying period, resulting in decreased reproductive success. Climate change is predicted to increase the number of hydrologic peaks, induce earlier peak runoff, and cause increasingly erratic flow due to extreme precipitation events.</p> <p>Low streamflow in summer during the brood rearing season is expected to lower brood rearing success although this has not been formally studied. Low water limits refuge from predators, decreases available foraging habitat, food resources, and can be exacerbated by high levels of recreation.</p>
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