Golden Eagle (*Aquila chrysaetos*)
Conservation Status Rank Summary

October 4, 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	2024-10-04	Y: 380530.8 km²	4.710	MTNHP Range Maps	None
Area of Occupancy			-		Factor not used in ranking.
Number of Occurrences	2024-10-04	1700	5.500	MTNHP Databases	None
Population Size			-		Factor not used in ranking.
# of Occurrences in Good Condition	2024-10-04		2.200		None
% 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: **((4.71 × 1) + (5.50 × 1) + (2.20 × 2)) / 4 = 3.65**					
Trends					
Short-term Trend	2023-12-20	[-35.1, 29.6%]	[-0.140, 0.140]	IMBCR	IMBCR trend in population estimates for Montana. "- 95% CI"
Long-term Trend	2011-12-22		-0.140	MTNHP Species Rank Data Table	Long-term declines since European arrival due are likely due to persecution of predators and small mammal prey. | Methodology: NS (2003) | Original Score: D
Trends score is calculated by summing weighted short and long-term trend scores: **(([-0.14, 0.14] × 2) + (-0.14 × 1)) = [-0.42, 0.14]**					

Threats

Rank Factor	Date Assessed	Value	Score	Data Source	Comments
Threats					
Overall Threat Impact		High	1.830		Collisions, human persecution, and nest site disturbance all represent threats to the species.
Intrinsic Vulnerability			-		**Factor not used in ranking.**
Threat score is calculated from Overall Threat Impact when available or Intrinsic Vulnerability if not: **(1.83) = 1.83**					

Individual Threats Data

Threat Category	Date Assessed	Impact Score	Scope	Severity	Immediacy	Comments
Agriculture & Aquaculture	None	Medium	Pervasive	Moderate	High	Multiple Level 2 threats - see Additional Threat Details below.
Energy Production & Mining	None	Low	Restricted	Moderate	High	Multiple Level 2 threats - see Additional Threat Details below.
Transportation & Service Corridors	None	Low	Pervasive	Slight	High	Multiple Level 2 threats - see Additional Threat Details below.
Biological Resource Use	2026-03-11	High	Pervasive	Serious	High	Consumption of lead bullet fragments from harvested ungulates. Leathal and sublethal effects have high potential to drive populations declines and interact with other threats. Ultimate impacts are poorly characterised at the local scale, but there is evidence of widespread exposure and prediciton of impacts on demographics from direct mortality and well as sublethal effets that may reduce survival. Additionally, Illegal killing and trafficking eagle parts is not uncommon. While the magnitude of illegal activities is difficult to track, a single sting operation in 2018 uncovered parts from 143 individual eagles and two people were arrested in 2024 for poaching and selling parts from hundreds of eagles in Montana. A recent synthesis of data from western states that investigated tagged eagle deaths found shooting to be the leading anthropogenic cause of golden eagle deaths at 20%. Lead toxicosis is a serious threat to golden eagle across North America and in Montana. Nearly all eagles captured in Montana in recent years

						have detectable levels of lead in their bloodstream. Harmata and Restani (2013) found that 97% of eagles captured in Central Montana had lead in their bloodstream, although 65% of those were considered to be background levels. Similarly Domenech et al. (2021) found that 94.6% of golden eagles captured in western MT to have lead in their bloodstream. Crandall et al. (2019) found lead to be the leading cause of death in south central Montana, although sample size was small. High levels of lead can kill eagles, sublethal levels can still impair eagles and lead to higher risk of mortality. From 2012-2023 only 2 golden eagles were reported caught in traps in Montana. While not a significant documented cause of death in Montana, recent synthesis of tagged eagles across western states found 3.2% of mortalities were from eagles being caught in traps. Montana regulations help prevent capture by prohibiting traps be set within 30 ft of exposed bait, and wolf traps have 10 lb pan tension. We suspect trap mortalities and injuries are underreported, researchers have seen a fair proportion of eagles with injuries likely acquired from foot hold traps.
Human Intrusions & Disturbance	2026-03-11	Low	Small	Slight	High	Golden eagles are sensitive to disturbance from human presence and activity while nesting.
Pollution	2024-10-04	Low	Restricted	Moderate	High	Consumption of poisioned rodents (rodenticide)
Threat Tally: 0 - Very High, 1 - High, 1 - Medium, 4 - Low Overall Threat Impact* = 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: (3.65 × 70%) + Threats: (1.83 × 30%) + Trends: ([-0.42, 0.14]) = [2.69, 3.25]

Calculated Rank: S3

Accepted Rank	S3
Date Approved	2009-05-01
Approval Authority	Montana Species of Concern Committee
Rank Justification	Species is uncommon across much of Montana. Population estimates are not of good quality and the species may be declining. It faces significant threats to persistence form lead poisoning through consumption of bullet fragments in gut piles and wind energy development.

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=ABNKC22010

Predicted Suitable Habitat Model:
https://mtnhp.mt.gov/resources/models/?elcode=ABNKC22010

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 is well studied but short-term trend data have some degree of uncertainty.

Summary of Information Needs

Continued monitoring of short -term trend. If trend continues to decline, more specific monitoring methods may be necessary to produce better estimates

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 - 2.1 - Annual & Perennial Non-Timber Crops	2026-03-11	Dan Bachen	SWAP Assessment	Restricted	Moderate	High	Conversion of native habitat to agriculture decreases abundance of prey and is avoided as breeding and non-breeding habitat. Only 26% of suitable habitat in Montana is publicly owned (state or federal), thus the majority of habitat occurs on private land and is vulnerable to conversion to agriculture. Approximately 17% of Montana is already converted to agriculture (crops or hay) and is projected to increase. This threat occurs in breeding and migratory range outside the state
Agriculture & Aquaculture - 2.3 - Livestock Farming & Ranching	2026-03-11	Dan Bachen	SWAP Assessment	Pervasive	Slight	High	mproper grazing can decrease prey populations and limit regeneration of cottonwoods used for nesting. Persecution (intentional poisoning or shooting) by ranchers due to real or perceived threats of golden eagle predation on livestock. Poison targeted to kill terrestrial livestock predators or pests can result in mortalities if eagles eat poisoned bait or rodents that have ingested poisoned bait. It is hard to gauge the severity of illegal activities.
Energy Production & Mining - 3.1 - Oil & Gas Drilling	2026-03-11	Dan Bachen	SWAP Assessment	Small	Slight	High	Oil and gas drilling is not a significant threat to golden eagles in Montana at the current level of occurrence in the state, however it will become more significant of a threat if extraction expand. Where this threat occurs on a larger scale it is a significant threat. Low levels of oil and gas development can have local level issues. Oil and gas development threatens golden eagles indirectly by increasing development and infrastructure such as increased human presence (general disturbance), traffic (vehicle mortality), infrastructure (habitat fragmentation), and distribution lines (electrocution). Open oil pits pose a drowning hazard to eagles.
Energy Production & Mining - 3.3 - Renewable Energy	2024-10-04	Dan Bachen	Katzner et al. 2017	Restricted	Moderate	High	Mortality at wind energy facilities in Montana is poorly characterized. Mitigation effort through preconstruction scoping seek to reduce mortality, but studies in other areas sugest that mortality is addative and wind energy facilities can create population sinks.

Transportation & Service Corridors - 4.1 - Roads & Railroads	2026-03-11	Dan Bachen	SWAP Assessment	Large	Slight	High	Golden eagles often feed on roadkill carrion, especially in the fall and winter. Scavenging on roadkill can lead to vehicle strikes as eagles take off and land while feeding.
Transportation & Service Corridors - 4.2 - Utility & Service Lines	2026-03-11	Dan Bachen	SWAP Assessment	Pervasive	Slight	High	Electrocution is a leading cause of golden eagle mortalities in Montana and a significant cause of mortality across North America. A recent synthesis of studies in western states found that electrocution caused 14% of tagged adult golden eagle mortalities.
Biological Resource Use - 5.1 - Hunting & Collecting Terrestrial Animals	2026-03-11	Dan Bachen	Kelley et al. 2011; Ecke et al. 2017; Slabe et al. 2024; Garth and Eagles-Smith 2024	Pervasive	Serious	High	Consumption of lead bullet fragments from harvested ungulates. Leathal and sublethal effects have high potential to drive populations declines and interact with other threats. Ultimate impacts are poorly characterised at the local scale, but there is evidence of widespread exposure and prediciton of impacts on demographics from direct mortality and well as sublethal effets that may reduce survival. Additionally, Illegal killing and trafficking eagle parts is not uncommon. While the magnitude of illegal activities is difficult to track, a single sting operation in 2018 uncovered parts from 143 individual eagles and two people were arrested in 2024 for poaching and selling parts from hundreds of eagles in Montana. A recent synthesis of data from western states that investigated tagged eagle deaths found shooting to be the leading anthropogenic cause of golden eagle deaths at 20%. Lead toxicosis is a serious threat to golden eagle across North America and in Montana. Nearly all eagles captured in Montana in recent years have detectable levels of lead in their bloodstream. Harmata and Restani (2013) found that 97% of eagles captured in Central Montana had lead in their bloodstream, although 65% of those were considered to be background levels. Similarly Domenech et al. (2021) found that 94.6% of golden eagles captured in western MT to have lead in their bloodstream. Crandall et al. (2019) found lead to be the leading cause of death in south central Montana, although sample size was small. High levels of lead can kill eagles, sublethal levels can still impair eagles and lead to higher risk of mortality. From 2012-2023 only 2 golden eagles were reported caught in traps in Montana. While not a significant documented cause of death in Montana, recent synthesis of tagged eagles across western states found 3.2% of mortalities were from eagles being caught in traps. Montana regulations help prevent capture by prohibiting traps be set within 30 ft

							of exposed bait, and wolf traps have 10 lb pan tension. We suspect trap mortalities and injuries are underreported, researchers have seen a fair proportion of eagles with injuries likely acquired from foot hold traps.
Human Intrusions & Disturbance - 6.3 - Work & Other Activities	2026-03-11	Dan Bachen	SWAP Assessment	Small	Slight	High	Golden eagles are sensitive to disturbance from human presence and activity while nesting.
Invasive & Other Problematic Species, Genes & Diseases - 8.4 - Problematic Species/Diseases of Unknown Origin	2026-03-11	Dan Bachen	SWAP Assessment	Unknown	Unknown	High	While there are records of golden eagle mortalities in Montana due to highly pathogenic avian influenza (HPAI), there is still much to be learned about recent strains and their impact on golden eagle individuals and populations. Mortalities and nest failures have been attributed to HPAI outside of Montana. West Nile is transmitted via mosquito bites or by feeding on infected carcasses. It has only been detected in young of year golden eagles in the Northwest Plains. Mosquito abundance peaks around fledge time, due to lower mobility fledglings are likely more susceptible to mosquito bites than adults. Outbreaks are influenced by amount of mosquito larva habitat, especially near nesting areas. Larval habitat may fluctuate yearly based on precipitation, temperature, flooding, and is predicted to grow with climate change. It is worst in high precipitation years
Pollution - 9.7 - Pesticide/Herbicide/Insecticide Application	2024-10-04	Dan Bachen	Expert opinion	Restricted	Moderate	High	Consumption of poisioned rodents (rodenticide)