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Golden Eagles (*Aquila chrysaetos*) in the United States of America: Threats and the Federal Response to Potential Impacts from Renewable-Energy Development

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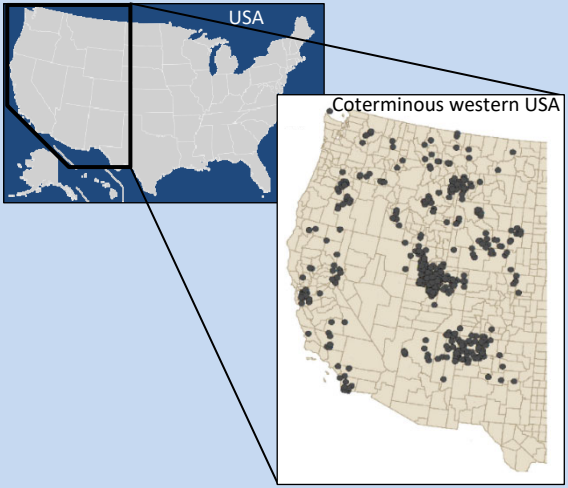
Photo from Vic Schendel, USFWS Mountain Prairie Region, Flickr

Estimated population size of Golden Eagles in the coterminous western United States as of 2022: 13,800 individuals



Protected in the U.S. by State and Federal law

Not considered Threatened or Endangered

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Millsap et al., 2022, Age-specific survival rates, causes of death, and allowable take of Golden Eagles in the western United States, Ecological Applications, v. 32, e2544.

Anthropogenic mortality to Golden Eagles in the coterminous western United States is responsible for 74 percent of all mortalities after the first year

Top 4 threats

Shooting

~670 / year

Photo from Robert Murphy, Eagle Environmental

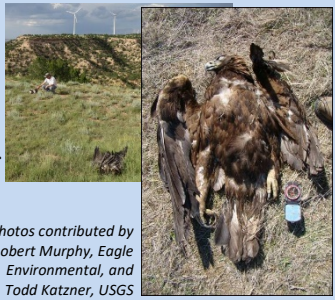
Electrocution

~506 / year

Photo from Tom Koerner, USFWS Mountain Prairie Region, Flickr

Collisions

~611 / year



Photos contributed by Robert Murphy, Eagle Environmental, and Todd Katzner, USGS

Poisoning

~427 / year

Photo from Robert Murphy, Eagle Environmental

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Two federal laws protect Golden Eagles

- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA)

Migratory Bird Treaty Act (MBTA)

- Prohibits the “take” or possession of protected species without a permit issued by the U.S. Fish and Wildlife Service
- “Take”: It is illegal to pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to do any of the above activities.
- It is also illegal to possess, sell, purchase, barter, import, export, or transport any migratory bird, part, nest or egg without a permit
- Criminal penalties for violations

Bald and Golden Eagle Protection Act

- "Take" or possessing an eagle, without a permit issued by the U.S. Fish and Wildlife Service, is a violation
- "Take" of eagles is defined as: "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" individual eagles, their parts, nests, or eggs
- Establishes a "Preservation Standard"— a management objective to keep breeding populations at stable or increasing levels
  - Take limit for Golden Eagles currently is 0, so any take authorized by permit must be offset by compensatory mitigation
- Criminal penalties for violations

Compensatory Mitigation for Take

Definition: pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" individual eagles, their parts, nests, or eggs

The U.S. Fish and Wildlife Service approach is risk-averse.

- Take must be below the estimated, sustainable limit
- Additional take must be mitigated
- A Golden Eagle taken under a permit must be offset at a 1:1.2 offset ratio

  That is, the loss of 1 eagle must be offset by saving 1.2 eagles from mortality or adding 1.2 eagles to the population

"Take" — Why zero and why a 1:1.2 ratio?

Estimated take allowed by permits, based on the population model of Millsap et al., 2022:	1,441 individuals per year
Estimated current level of take ("take" that is mostly illegal):	2,500 individuals
Estimated exceeded level of take ("take" that is mostly illegal):	-1,059 individuals

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Millsap et al., 2022, Age-specific survival rates, causes of death, and allowable take of Golden Eagles in the western United States, Ecological Applications, v. 32, e2544.

Federal Guidance for Wind-Energy Developers

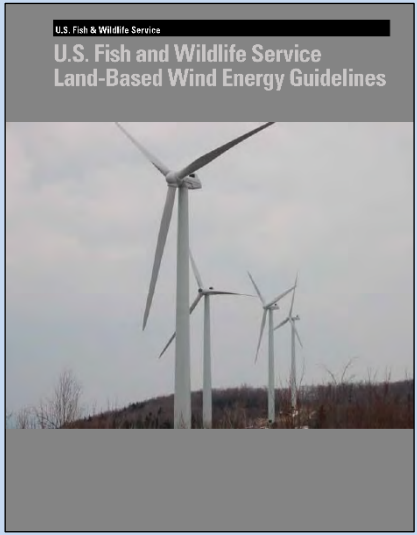
- U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines
- Eagle Conservation Plan

Note that both documents can only seek voluntary compliance by wind-energy developers

Federal Guidance

U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines

- Broad overview of wildlife considerations for siting and operating wind facilities
- Assess potential adverse effects to species and habitats in a tiered approach
- Tiers quantify possible risk in increasing detail. Tiers 1-3 (pre-construction) work to identify, avoid, and minimize risks. Tiers 4 and 5 (post-construction) assess success.
    - Tier 1 — Landscape Scale
    - Tier 2 — Project Scale
    - Tier 3 — Field studies
    - Tier 4 — Post-construction studies
    - Tier 5 — Research



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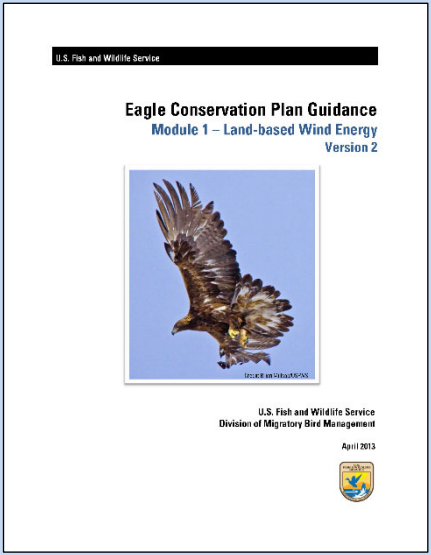
Federal Guidance
Eagle Conservation Plan

- Supplement to Land-Based Wind Energy Guidelines
- Provides measures for siting, construction, and operation of wind facilities that are consistent with regulatory requirements
- Helps avoid and minimize unintentional take
- Identifies biological data needed to support permit applications for take



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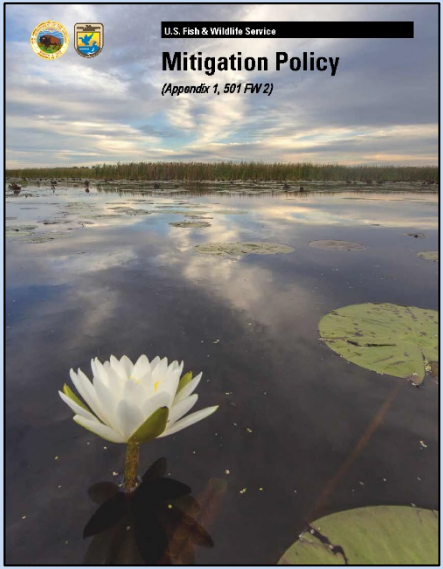
Federal Guidance
U.S. Fish and Wildlife Mitigation Policy

- Avoid impact altogether
- Minimize impact
- Mitigate for impact



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Federal Policy

U.S. Fish and Wildlife Mitigation Policy

Avoid

Process

- Wind developer calculates take by using prediction model of New et al., 2015
- Prediction defines level of risk (Category 1 to 3)
- USFWS suggests avoiding Category 1 sites

Another avoidance option: Reduce number of turbines

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New, L., Bjerre, E., Millsap, B., Otto, M.C., and Runge, M.C., 2015, A collision risk model to predict avian fatalities at wind facilities—An example using Golden Eagles, *Aquila chrysaetos*: PLoS One, v. 10, no. 7, p. e0130978. [Also available at https://doi.org/10.1371/journal.pone.0130978.]

Federal Policy
U.S. Fish and Wildlife Mitigation Policy
Minimize

Minimization Options

- Remove carrion, perches, and attractions for eagle prey
- Install flight diverters
- Inhibit nest-building
- Curtail (temporarily turn off) high-risk turbines
- Use turbine setbacks or avoid high-risk areas
- Employ systems that detect and emit acoustic signals intended to alter flight path

Allison, T.D., Cochrane, J.F., Lonsdorf, E., and Sanders-Reed, C., 2017, A review of options for mitigating take of Golden Eagles at wind energy facilities: The Journal of Raptor Research, v. 51, no. 3, p. 319–333. [Also available at https://doi.org/10.3356/JRR-16-76.1.]

Federal Policy

U.S. Fish and Wildlife Mitigation Policy

Mitigate

Currently, the U.S. Fish and Wildlife Service has authorized only the retrofitting of power poles as an approved compensatory mitigation option

Bald Eagle and Golden Eagle Electrocution Prevention In-Lieu Fee Program

- Sells advance credits to users authorized by the USFWS
- Offsets take by retrofitting high-risk power poles in the same eagle management unit as the permitted take
- High-risk poles based on electrocution risk models

https://www.eaglemitigation.com/mitigation-basics

Federal Policy
U.S. Fish and Wildlife Mitigation Policy
Mitigate

Other potential mitigation options:

•Remove animal carcasses to reduce vehicle collisions

•Reduce lead toxicosis by using non-toxic substitutes (such as copper bullets) and by disposal of gut piles of big game killed by lead ammunition

•Support rehabilitation of injured eagles

•Boost populations of eagle prey

Allison, T.D., Cochrane, J.F., Lonsdorf, E., and Sanders-Reed, C., 2017, A review of options for mitigating take of Golden Eagles at wind energy facilities: The Journal of Raptor Research, v. 51, no. 3, p. 319–333. [Also available at https://doi.org/10.3356/JRR-16-76.1.]

Other Viable Options (but not yet Federal policy)

Mitigate

Remove animal carcasses to reduce vehicle collisions

- Carcass relocation is a viable mitigation strategy
- Can save up to 7 eagles each year (depending on location)
- Carcass relocation refers to moving a carcass ≥ 12 meters away from a roadside

Photo from Tom Koerner, USFWS Mountain Prairie Region, Flickr

Lonsdorf, E.V, Gerber, J.S., Ray, D., Slater, S.J., and Allison, T.D., 2023, Assessing carcass relocation for offsetting Golden Eagle mortality at wind energy facilities: The Journal of Wildlife Management, 322478. [Also available at https://doi.org/10.1002/jwmg.22478.]

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For a list of sources cited in slides and other relevant resources, contact:

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