**Petition to the U.S. Fish & Wildlife Service to List the Eastern Golden Eagle as a Threatened or Endangered Distinct Population Segment Under the Endangered Species Act**

November 15, 2023

## Contents

## I. Notice of Petition

American Bird Conservancy ("ABC") hereby petitions the Secretary of the Interior, through the U.S. Fish and Wildlife Service ("FWS"), to list the Eastern Golden Eagle (*Aquila chrysaetos*) as a U.S. Distinct Population Segment ("DPS") that is endangered or threatened under the Endangered Species Act. Alternatively, ABC asks that FWS list the species as a whole as endangered or threatened under the Act. ABC also asks FWS to designate critical habitat.

This Petition is submitted under Section 4(b) of the ESA, 16 U.S.C. § 1533(b), Section 553(3) of the Administrative Procedure Act, 5 U.S.C. § 533(e), and 50 C.F.R. § 424.14(a). In accord with § 424.14(a)(9), we attach hereto copies of the notification letters or electronic communications we have provided to the State agency or agencies responsible for the management and conservation of the Eastern Golden Eagles in each State where Eastern Golden Eagles currently occur (Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, Wisconsin).

Under 16 U.S.C. § 1533(b)(3)(A), to "the maximum extent practicable, within 90 days after receiving" this Petition, the FWS must make an initial finding as to whether it "presents substantial scientific … information indicating that the petitioned action may be warranted." ABC believes that the best available science demonstrates that listing the eastern U.S. DPS of the Golden Eagle as endangered or threatened *is* warranted; however, the initial statutory test is whether a listing *may* be warranted. Accordingly, we respectfully request that FWS make a prompt positive initial finding and commence a further review of the Petition as required by 16 U.S.C. § 1533(b)(3)(B).

ABC is a national nonprofit conservation organization with more than 25,000 members dedicated to the protection of America's birds and the habitats upon which they depend. *See* http://www.abcbirds.org. ABC seeks to further the ESA's purpose by preserving our national biodiversity. ABC's members have a direct interest in ensuring the survival and recovery of the eastern population of Golden Eagles in the United States and in conserving the unique Appalachian ridgeline communities upon which nearly the entire population relies and which it benefits.

## II. Executive Summary

The Golden Eagle (*Aquila chrysaetos*) is a large diurnal raptor in the *Accipitridae* family of hook-billed birds of prey. It breeds across the northern hemisphere, with breeding ranges stretching across Canada and the western United States. The species once bred in the eastern United States as well, but was extirpated in the 1990s.

A population segment of a wildlife species qualifies as a DPS under the ESA if it is both "discrete" and "significant" (61 Fed. Reg. at 4725). The eastern population of the Golden Eagle in North America meets both criteria. The population is discrete because it is physically separated from other Golden Eagle populations, generally does not overlap or mix with those populations, and exhibits differences in genetics and habitat use from other populations. The population is significant because it persists in a unique ecological setting: contiguous eastern forests. In addition, loss of this population would result in a major gap in the species' range.

According to the best available scientific evidence, the current breeding population of this eastern subspecies is roughly 5,000 individuals. Many of these birds breed in Quebec, Canada. Given the lack of mixing with western birds, a decline to this small population could quickly spiral into its complete extirpation. The population faces numerous threats, including collisions, electrocutions, toxins, shooting, and habitat loss including from energy development.

In light of its very low population level and slow reproductive biology, we believe that FWS should designate the eastern population of the Golden Eagle as endangered or threatened under the ESA. Alternatively, FWS should designate the entire Golden Eagle population as endangered or threatened because it faces the same threats as those identified above, meaning that it is in danger of extinction or is likely to become in danger of extinction within the foreseeable future.

## III. Natural History

*Figure 1. An adult Golden Eagle, showing the dark-plumaged body and distinctive golden nape.*

### a. Description and taxonomy

The Golden Eagle is a large, dark-plumaged, diurnal bird of prey. Young birds are mostly dark brown, with white at the base of the primaries and tail. Adults are generally brown all over. Both age groups share a golden nape extending down to their shoulders, though the visibility varies with feather wear and the viewing angle. They are one of the largest raptors in North America, with wingspans between 6 and 7.5 feet. Golden Eagles have a powerful appearance in flight, with long, broad wings often held in a slight dihedral. Female birds tend to be heavier than males. Young Bald Eagles without their distinctive white heads and tails are most readily confused for Golden Eagles, though Bald Eagles have noticeably larger bills and head projection in flight and a different underwing pattern and flight profile.

*Figure 2. Young Golden Eagles have variable amounts of white feathering at the base of the primaries and the tail.*

There are six recognized subspecies of the Golden Eagle: *canadensis, chrysaetos, daphanea, homeyeri, japonica,* and *kamtschatica* (Katzner et al. 2020). Populations in North America are of the *Aquila chrysaetos canadensis* subspecies.

| | |
|---|---|
| Kingdom | Animalia |
| Phylum | Chordata |
| Class | Aves |
| Order | Accipitriformes |
| Family | Accipitridae |
| Genus | Aquila |
| Species | Aquila chrysaetos |

*Table 1.* Taxonomy of the Golden Eagle.

### b. Geographic range

Eastern Golden Eagles within the U.S. migrate and winter within the Atlantic and Mississippi flyways and are found in all eastern states (Miller et al. 2017). The core of their range is in the

Appalachian Mountains, spanning from Georgia, Tennessee, and North Carolina, through the mid-Atlantic region, including West Virginia, Virginia, Maryland, and Pennsylvania, and extending northward into parts of New York, Vermont, and New Hampshire (Katzner et al. 2012b; Miller et al. 2017).

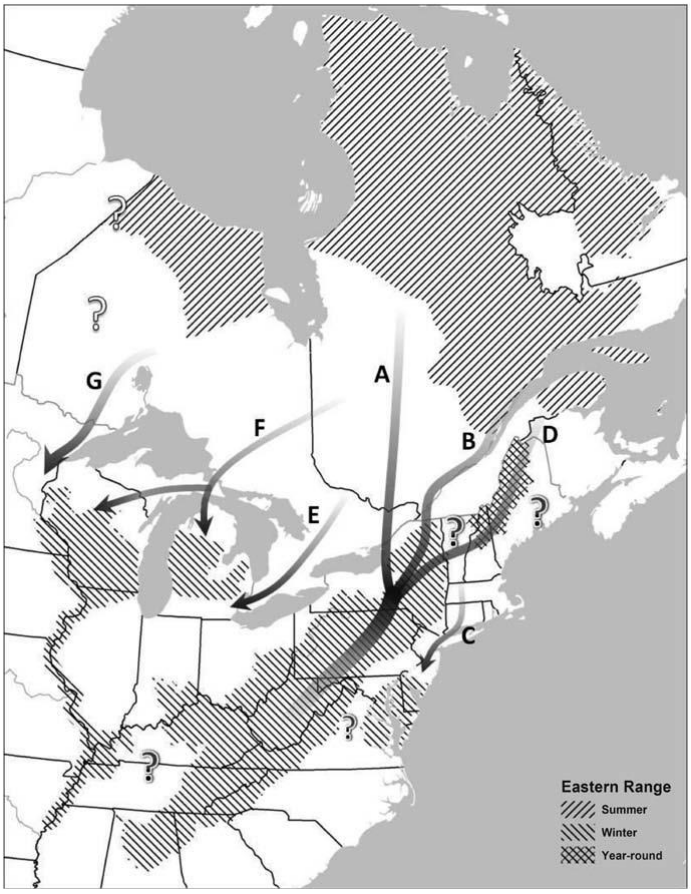


*Figure 3. Distribution of Eastern Golden Eagles, showing known summer and wintering grounds as well as known and suspected southbound migration corridors. Areas where distribution is unclear are indicated with a question mark (open on breeding grounds, filled on wintering grounds). Letters correspond to different suspected southbound migration routes. (From Katzner et al. 2012).*

They winter in lower numbers in coastal marshes of the mid-Atlantic region as well. In the Midwest, the Driftless Region of western Wisconsin is notable for concentrations of Golden Eagles.

During migration, Eastern Golden Eagles primarily follow major ridges of the Appalachian Mountains, with many birds funneling through Pennsylvania (Katzner et al. 2012b). Data from hawkwatches and eBird indicate that birds occur in greater numbers in the northern parts of this range. Other major flight paths follow shorelines in the Great Lakes (Kerlinger 1989). Spring migration generally occurs from February through June, with older birds moving earlier in the season (Miller et al. 2016; 2017). Fall migration generally occurs from October through December.

There are no currently known nesting Eastern Golden Eagles in the U.S. Historical sites in the eastern U.S. were concentrated in New England and northern New York, but the last known occupied sites in Maine were abandoned in the 1990s (Todd 2000).

### c. Life history, longevity, and growth

Eastern Golden Eagle nests are generally made of sticks and vegetation and can be quite large (Katzner et al. 2012b). Nests average 5-6 feet wide and 2 feet deep (Kochert et al. 2002). While western birds nest on cliffs, trees, the ground, or even in anthropogenic structures, eastern birds are generally found nesting on cliffs or occasionally in trees in Quebec (Katzner et al. 2020). Spring migration of Eastern Golden Eagles is among the earliest of any eastern bird species, with

individuals already moving north in February. Breeding in the north begins as early as April, with younger, non-breeding birds arriving in the north in May and June (Miller et al. 2017).

Golden Eagles generally lay 1-3 eggs in a single brood. The incubation period is 41-45 days and nestlings remain in the nest for an additional 45-81 days. Eggs are cream or pale pink with small brown spots. Nestlings start at roughly 3 oz and are covered in grey down (Kochert et al. 2002). Golden Eagles generally do not reach sexual maturity for four years. Combined with their small brood size, the long maturation period means that Golden Eagle populations can be slow to recover from declines.

### d. Habitat

In the winter, Eastern Golden Eagles are most abundant in large tracts of contiguous forests with topographic variability (McCabe et al. 2021). Eastern Golden Eagles are known to follow off-road trails and utility right-of-ways within contiguous forests. They also utilize marshes and other water bodies where waterfowl concentrate. Birds on the east coast can be found in marshes or pine stands; in the Midwest, wintering birds are regularly found around wildlife refuges or other water bodies where waterfowl congregate.

During migration, Eastern Golden Eagles generally favor topography like ridges which provide favorable updrafts. The Appalachian Ridge and Valley regions provide particularly favorable migration routes along largely forested ridges broken only by occasional water gaps. Breeding Eastern Golden Eagles utilize a variety of northern habitats, including tundra, shrublands, and forests (Katzner et al. 2020).

### e. Diet

In general, Golden Eagles hunt on the wing or from perches, and can take prey as large as small deer (Katzner et al. 2020). Eastern birds have been documented to prey upon ungulates, groundhogs, hares, foxes, and other small mammals; avian prey species have included herons, geese and turkeys (Todd 1989; Miller et al. 2017). Eastern birds are also well-known to scavenge, particularly in winter upon white-tailed deer carcasses (where they are vulnerable to lead ingestion and poisoning).

### f. Population Status

Accurate population estimates and trends for the Eastern Golden Eagle have been difficult to estimate due to limited historical data (Katzner et al. 2012). Telemetry studies in recent years have demonstrated that this population ranges broadly throughout eastern North America, but

significant gaps in our knowledge remain. (Katzner et al. 2012). Two recent studies estimated the total population to be just 5,000 or so individuals (Dennhardt et al. 2015; Morneau et al. 2015).

Migration counts likely represent the most robust estimate of population size and trends for Eastern Golden Eagles; given variability of conditions, however, these counts should be used with caution (Bednarz et al. 1990; Dunn et al. 2008). Major flight paths through Pennsylvania in particular are thought to be used by a majority of the eastern population (Brandes and Ombalski 2004; Miller et al. 2014; Dennhardt et al. 2015). Most eastern hawkwatches with 10+ years of count data on Golden Eagles indicate a stable trend, although the species is known to have become extirpated as a breeding species from the U.S. in recent decades suggesting that a longer-term decline may be involved.

## IV. The Eastern U.S. Population of the Golden Eagle Qualifies as a DPS Entitled to ESA Protection

The ESA defines a "species" as including "any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." 16 U.S.C. § 1532(16). The Service has adopted a policy to evaluate whether a Distinct Population Segment ("DPS") qualifies for protection under the ESA. Policy Regarding the Recognition of Distinct Vertebrate Population Segments under the Endangered Species Act, 61 Fed. Reg. 4722 (Feb. 7, 1996) ("DPS Policy"). Under the DPS Policy, we are aware that the Service weighs three factors in determining whether to list a DPS:

A. Discreteness of the population segment in relation to the remainder of the species to which it belongs;
B. The significance of the population segment to the species to which it belongs; and,
C. The population segment's conservation status in relation to the Act's standards for listing (*i.e.,* whether the population segment, when treated as if it were a species, is endangered or threatened).

*Id*. at 4725.

A species (or DPS) is "endangered" under the ESA if it is "in danger of extinction throughout all or a significant portion of its range." *See* 16 U.S.C. § 1532(6); 50 C.F.R. § 424.02(e). A species (or DPS) is "threatened" if it is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." *See* 16 U.S.C. § 1532(20); 50 C.F.R. § 424.02(m).

As we now show, the Eastern Golden Eagle population, separated from the western population by the Great Plains, satisfies the discreteness and significance criteria, and its population status warrants ESA protection.

a. **Discreteness**

To begin with, the Service does not "require absolute reproductive isolation as a prerequisite to recognizing" a DPS, and "does not require absolute separation of a DPS from other members of its species, because this can rarely be demonstrated in nature for any population of organisms." 61 Fed. Reg. 4724.

Within that framework, a population segment of a wildlife species may be considered discrete if it is "markedly separated from other populations of the same taxon as a consequence of physical, physiological, behavioral, or ecological factors" (61 Fed. Reg. at 4725). "Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation." (*Id*). The Eastern Golden Eagle population satisfies this test on physical and ecological factors, and discreteness is quantified by genetic factors.

*Physical Factors*

Eastern Golden Eagles have a distinct breeding, migratory, and wintering range in comparison to western birds. A 2017 study compiling satellite telemetry tracking data for 571 Golden Eagles found little overlap between western and eastern populations, separated roughly by the Great Plains (Brown et al. 2017), and by Hudson Bay to the north. A compilation of satellite telemetry tracking data for 100 eastern Golden Eagles by Conservation Science Global shows a similar tendency for eastern birds to generally remain east of the Great Plains (Miller 2019). Breeding populations in eastern Canada are not well-inventoried and mapped, but the satellite telemetry tracking data do show a substantive separation in range between eastern and western birds. Published range maps, in both print and online guides, also show a separation between breeding western and Eastern Golden Eagles, (e.g., Cornell Laboratory of Ornithology 2023).

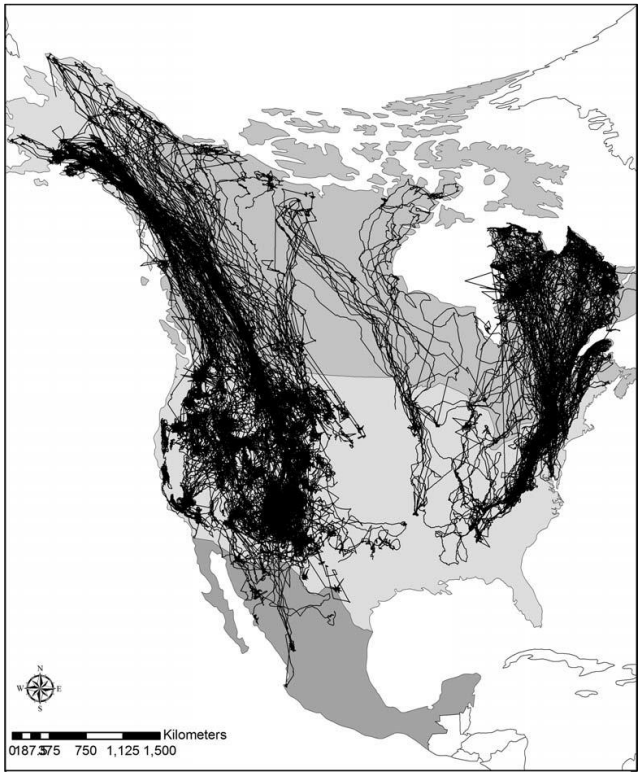


*Figure 4. Telemetry fixes of 571 Golden Eagles tracked in North American between 1992 and 2016. Lines indicate unobserved straight-line paths between consecutive telemetry fixes. (from Brown et al. 2017).*

*Ecological factors*

Eastern Golden Eagles differ ecologically from western birds in that they are associated with forested areas during winter (Miller et al. 2017, McCabe et al. 2021), and to a lesser degree

during spring and fall migration (McCabe et al. 2021). Western birds are more associated with open habitats. For example, a study including 52 GPS-tagged eastern Golden Eagles found that they had fairly similar cover type compositions among home ranges. Forest composed an average of 79% ± 14% of home ranges (range: 6-97%; Miller et al. (2017)).

*Genetic evidence*

Genetic analyses of North American Golden Eagle populations indicate there are four presumptive populations: Alaska, California, western states, and eastern states. Pairwise single nucleotide polymorphism (SNP) comparisons between these four subpopulations in North America found that eastern birds were a genetically distinct population from western birds; Doyle et al 2016 noted that "[s]ignificant population differentiation was evident in … eastern versus western pairwise comparisons".

Late in the 20th century, birds from the western population were introduced to the east as part of an unsuccessful attempt to establish a new breeding population, which could have diluted the eastern population's gene pool. However, a subsequent genetic analysis concluded that translocations have not significantly affected Golden Eagle genetic population structure (Wheeler 2014).

### b. **Significance**

"If a population segment is considered discrete under one or more of the above conditions, its biological and ecological significance will then be considered" using "available scientific evidence of the discrete population segment's importance to the taxon to which it belongs" (61 Fed. Reg. at 4725). This consideration may include the following three factors (*id.*):

*Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon*

The Eastern Golden Eagle population is unique in that it is associated with contiguous eastern deciduous forests during winter, migration, and breeding seasons. Birds in the western population are primarily associated with open areas.

*Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon*

The eastern population occupies a relatively large proportion of the Golden Eagle's U.S. range and is the only population found in more than 30 states and readily appreciable by hundreds of millions of Americans. The eastern population is geographically separate from the western one, with little evidence of mixing between populations. If this population were to be extirpated, it would not be likely to be recolonized by western birds.

*Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.*

As discussed above, pairwise comparisons of SNPs indicate that the eastern population is genetically distinct from other populations of Golden Eagles in the U.S. (Doyle et al., 2014).

## V. Conservation Status Warranting ESA Protection

To qualify for listing as a "threatened" or "endangered" species under the ESA, a species or DPS must satisfy at least one of five listing criteria (16 U.S.C. § 1533(a)(1)):

- The present or threatened destruction, modification, or curtailment of its habitat or range;
- Overutilization for commercial, recreational, scientific, or educational purposes;
- Disease or predation;
- The inadequacy of existing regulatory mechanisms; or
- Other natural or manmade factors affecting its continued existence.

We address each of the criteria here.

### a. The present or threatened destruction, modification, or curtailment of its habitat or range

The Eastern Golden Eagle is faced with a multitude of threats, some of which entail destruction and/or modification of its habitat.

Ridgetops are an important component of habitat for Eastern Golden Eagles throughout the year, and in winter, hillsides and cliffs are important as well (Miller et al. 2017). As discussed above, these birds are found in greatest numbers in forested areas of the Appalachian Mountains during winter and migration. This collectively means that any activity that removes forest or underlying material from Appalachian ridgelines is likely to be detrimental to Eastern Golden Eagles.

*Mountaintop mining*

Mountaintop mining occurs in the Eastern Golden Eagle's range in states including West Virginia, Kentucky, Virginia, and Tennessee and may detrimentally affect the species. Becker et al. (2015) found that forest interior birds showed the greatest negative impacts of mountaintop mining among avian species in the central Appalachians, which is relevant to Eastern Golden Eagles given their association with large areas of forest at certain times of year. Wickham et al. (2013) indicated that mountaintop mining "disproportionately affects wildlife species that depend on forested ridgetops." Negative impacts upon soils and underlying biodiversity as a result of these activities can trickle-up to impact predatory species like Eastern Golden Eagles.

*Wind energy development*

Appalachian ridgelines, cliffs and steep slopes that Eastern Golden Eagles use are often attractive to wind energy projects. This was confirmed by a Pennsylvania study which found that Eastern Golden Eagles used locations near industrial-quality winds more frequently than more distant locations (Miller et al. 2014). The vast majority of birds flew through "extreme" risk areas at least once during the study.

Wind energy development is a growing threat Eastern Golden Eagles because many existing facilities in this region are placed on ridgetops that are used by eagles, with many more being planned (e.g., Anthracite Ridge Wind, Rocky Forge Wind). All such facilities require clearing of any ridgetop forest for installation

Wind facilities also have adverse implications for Eastern Golden Eagles due to collision risk (see below).

*Other industrial activities*

Other large-scale industrial activity in the Eastern Golden Eagle's range further threaten these birds and their habitat, including hydraulic fracturing ("fracking") and potentially, commercial timber harvest. Fracking causes forest loss, fragmentation, disturbance, and changes in water quality (Brittingham et al. 2014), all of which can affect species with small population sizes and of high sensitivity (*id.*). Impacts from changes in forest cover, including growth, harvest, and fragmentation are not well-studied but have been suggested as factors in the current absence of breeding populations in the northeastern United States (Morneau et al. 2012).

### b. Overutilization for commercial, recreational, scientific, or educational purposes

Recreational shooting of Eastern Golden Eagles represents a significant threat. A 2014 study of 1,427 carcasses determined that 24% of birds submitted from the eastern flyway were killed by shooting (Russell and Franson 2014). This mirrors the western population, where shooting is the leading anthropogenic source of mortality (Millsap et al. 2022). Shooting deaths are also presumed to be under-counted (Katzner et al. 2012). More recently, two-thirds of recovered raptor carcasses of numerous species from across the continent near powerlines were found to have been killed by shooting; this is generally a higher proportion than previously assumed (Thomason et al. 2023). These data concerned more species across a broader geographic range than Eastern Golden Eagles but still help to provide greater insight into causes of deaths for carcasses found near powerlines. Shooting a Golden Eagle is illegal under multiple federal statutes, but enforcement has proven difficult, and shooting has become one of the more intractable dangers to eagle populations more broadly.

### c. **Disease or predation**

The recent, rapid spread of H5N1 avian flu among wild bird populations has increasingly alarmed biologists. H5N1 flu has been detected in more than 7,000 wild birds in the United States as of September 2023 (USDA 2023). There are not yet data from Eastern Golden Eagles on the impact of this pathogen, although evidence from Scotland from the summer of 2023 indicates that avian influenza outbreaks are primarily responsible for a decline in Golden Eagle breeding success from 55% to 16% (Wilson et al. 2023). Even less-severe rates of impact from avian influenza could push Eastern Golden Eagles into significant decline.

### d. **The inadequacy of current regulatory mechanisms**

The regulatory mechanisms currently in place have proven inadequate to deter continued high levels of incidental take of Golden Eagles by electrocution and from collisions at wind energy facilities. Electrocutions are a major source of mortality (see below), and industry adoption of best practices remains uneven.

We applaud FWS for the recently proposed incidental take permitting system for wind energy facilities, promulgated under the Bald and Golden Eagle Protection Act (87 FR 59598). But we remain concerned that key sources of Golden Eagle mortality and habitat destruction will not be adequately addressed by the final rule, particularly for Eastern Golden Eagles.

Our biggest concerns involve the proposed permit map (Figure 4). First, we are alarmed that there are not exclusionary areas carved out to deter wind energy development along particularly important Eastern Golden Eagle migratory routes. A majority of this population passes through a narrow geographic area; given the species' unique susceptibility to collisions with wind turbines (see below), wind development in these areas has the potential to serve as a population sink. Deterring wind energy development in these areas would provide a powerful incentive for developers to avoid these particularly harmful sites.

Second, and relatedly, much of the Eastern Golden Eagle migratory route would be covered only under a general permit. While eBird data serves as a wonderful resource for many ornithological queries, it is ill-suited to demarcate legal regimes for difficult-to-find species across large areas with relatively low survey effort. In particular, data from transmitter studies would help to further refine this map.

A final, general concern is the lack of guardrails and transparency for the proposed general permit structure. We remain concerned at the minimal level of third-party or agency oversight of these self-certified permits. More-frequent agency review of the sites and permits would provide greater confidence in the permit structure more generally.

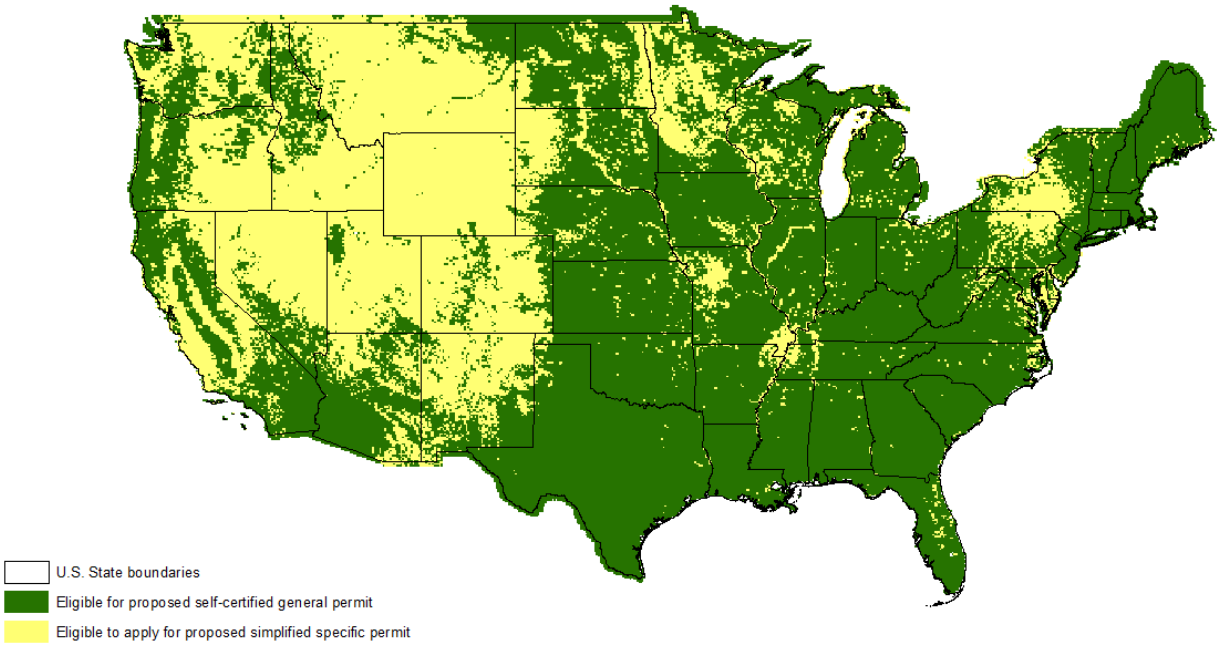


*Figure 5. Proposed map of general and specific permit areas under the Bald and Golden Eagle Protection Act (87 FR 59598) that does not include significant parts of the Eastern Golden Eagle range*

### e. Other natural or man-made factors affecting its continued existence

Many anthropogenic sources of mortality for Eastern Golden Eagles are not addressed above: collisions with wind turbines, energy infrastructure, and vehicles; electrocutions; incidental trap mortality; lead poisoning; rodenticide poisoning; and climate change.

Taken together, collisions accounted for mortality in 23% of the Eastern Golden Eagle carcasses studied from 1975 to 2013 and represent a significant threat to this population (Russell and Franson 2014).

*Collisions with wind turbines and energy infrastructure*

Wind turbines are a growing threat to Golden Eagles because they are frequently installed in locations important to these birds. A review of relevant science indicated that, "with increasing numbers of industrial-scale wind energy facilities at high elevations in breeding, migratory, and wintering ranges, Golden Eagles in eastern North America will likely face similar threats" facing western Golden Eagles (Katzner et al. 2012).

The threat that wind turbines pose to Golden Eagles is well documented. At one wind energy facility in California, Golden Eagle populations were only maintained by "continental scale migration" (Katzner et al. 2017); i.e., high mortality caused by collisions with wind turbines was only offset by attracting additional birds at a massive scale, creating a drain on populations elsewhere. A more recent study found that Golden Eagles are at risk of population-level declines

specifically as a result of wind energy development, in part due to their relatively slow reproductive rates (Diffendorfer et al. 2021).

A study of eight eastern Golden Eagles fitted with global positioning system tags found that migrating birds flew at higher elevations than birds engaged in "local" movements (Katzner et al. 2012b). This study also found that birds flying over areas of high topographic relief (e.g., ridgetops and steep slopes) flew at lower altitudes (about 65m above the ground) than elsewhere. Local movements occurred an average of 109m above the ground. Both elevations are well within the average rotor-swept zone of terrestrial turbines (American Wind Wildlife Institute, 2014). Migratory flights averaged 284m above the ground, and about 135m over ridgetops and summits – also within turbine blade range. The study concluded that "turbine development on ridgetops and near steep slopes over which eagles fly at lower altitudes should therefore proceed with extreme caution and careful attention to possible mitigation measures" (Katzner et al. 2012b).

That caution is important because, as mentioned earlier, a Pennsylvania study found that Golden Eagles used Appalachian ridgelines, cliffs and steep slopes near industrial-quality winds more frequently than more distant locations (Miller et al. 2014). The vast majority of birds flew through "extreme" risk areas at least once during the study. Use of extreme- and high-risk areas was most prevalent in the Ridge and Valley Ecoregion, the southern extent of which lies in western Virginia.

Decades of mortality data from the Altamont Pass Wind Resource Area (APWRA) demonstrate the risk that turbines can pose to populations of Golden Eagles on a continental scale. High rates of localized mortality from poorly sited wind projects in areas heavily used by Golden Eagles can affect populations across a vast geographic area (Katzner et al. 2016). For Eastern Golden Eagles, with a much smaller and more localized migratory population, poorly sited wind development could have catastrophic effects.

Collisions with power lines represent a major threat to populations as well, though carcasses found near lines are often the result of shooting or electrocution as well. Eastern birds are thought to avoid power lines perhaps more effectively than western birds, by adjusting their flight altitude (Luzenski et al. 2016). However, increased presence of transmission infrastructure within utilized habitat still represents an increased collision risk.

*Collisions with vehicles*

Golden Eagles regularly scavenge on road kill, particularly in the winter months, and are regularly killed by collisions with vehicles (Bedrosian et al. 2017). This mortality source appears to be increasing in recent decades (Russell and Franson 2014). Recognizing this threat, some state and provincial agencies have begun removing ungulate carcasses along roads in areas with high rates of vehicle collisions.

*Electrocution*

Electrocutions of Golden Eagles are common in western populations where energy infrastructure is more commonly used as perches (Millsap et al. 2022). Among 417 electrocution-caused raptor deaths between 2000 and 2015 studied by the USFWS's National Forensics Laboratory, Bald and Golden Eagles were the most common species (Kagan 2016). There are fewer documented electrocutions in the eastern population (Russell and Franson 2014). Expansion of energy infrastructure is expected as rural energy development continues rapidly, and this infrastructure can be expected to pose an increasing risk to Eastern Golden Eagles.

*Incidental trap mortality*

By-catch of Golden Eagles by trappers represents a significant source of mortality for Golden Eagles (Millsap et al. 2022). This source of mortality is likely underreported but has been documented for the eastern population throughout its range (Katzner et al. 2012; Fitzgerald et al. 2014).

*Lead poisoning*

Lead poisoning represents a significant cause of both lethal and sublethal effects in Golden Eagles (Millsap et al. 2022). This generally occurs after birds have been scavenging on carcasses or gut piles of animals taken by lead shot, and is more common during the winter when birds scavenge more often (Slabe et al. 2020). Golden Eagles in the eastern flyway have higher rates of poisoning than western birds (Russell and Franson 2014; Slabe 2019). In the east, 30% of eagles captured in the winter showed sublethal levels of lead poisoning (Slabe et al. 2020). Forty-seven percent of eastern birds showed chronic levels of lead poisoning, with varying degrees of physiological effects (Slabe et al. 2022). Effects of lead poisoning may be acute or chronic, leading to a wide range of effects including direct mortality (Haig et al. 2014). Sublethal effects may include impaired organ function, lower body weight, impaired motor control, and impaired sensory function (Pattee et al. 1981), which has been theorized to contribute to eagle collisions with anthropogenic objects (Helander et al. 2009). Taken together, lead poisoning is estimated to account for a persistent 0.8% reduction in population growth of Eastern Golden Eagles (Slabe et al. 2022).

In short, the Eastern Golden Eagle population faces many threats to its continued existence, including collisions with vehicles and wind turbines, electrocution from energy infrastructure, incidental trap mortality, illegal recreational shooting, and poisoning from lead and other toxins. It has suffered retraction of its historical range, and the foreseeable growth of energy infrastructure along the migratory path used by nearly the entire population threatens the continued existence of the population segment.

## VI. Conclusion

We have shown above that the Eastern Golden Eagle satisfies the relevant criteria of discreteness and significance, and so qualifies as a DPS under the ESA. Additionally, we have shown that the Eastern Golden Eagle faces such significant threats that it is in danger of endangerment or extinction within the foreseeable future and thus warrants ESA protection. Accordingly, the Service should grant this Petition, list the Eastern Golden Eagle as a DPS that is "threatened" or "endangered" under the ESA, and designate critical habitat.

November 15, 2023

Respectfully submitted,

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