Golden Eagle (*Aquila chrysaetos*)

**Species Status Statement.**

**Distribution**

Golden eagle lives throughout the northern hemisphere across Europe, northern Africa, central Asia, and North America (Kochert et al. 2002). In North America, this species is more common in the western portion, breeding as far north as Alaska, and residing year-round from southwestern Canada to central Mexico (Kochert et al. 2002). Utah hosts wintering golden eagles, as well as resident breeding populations statewide.

Table 1. Utah counties currently occupied by this species.

| Golden eagle | ALL |

**Abundance and Trends**

U.S. Fish & Wildlife Service (2016a, 2016b) estimated the total population size for golden eagle in the contiguous United States and Alaska was 39,000 in 2009 and 41,500 in 2014. However, recent research indicates that the population in the western United States might be declining toward a lower equilibrium size of about 26,000.

WEST, Inc. conducted aerial surveys across 4 Bird Conservation Regions (BCR) in the western U.S. and produced an estimated high abundance of approx. 27,000 in 2003 and low estimate of approx. 19,500 in 2008, using the same methodology for surveys in 2003 and 2006-2012 (Good et al. 2007, Nielson et al. 2012). Though populations in each BCR appear stable, there may not be enough years of data to detect substantial changes in abundance (Nielson et al. 2012). Millsap et al. (2013) used the WEST, Inc. data and BBS survey data from 1968-2010 to estimate trends for all of the western BCRs combined, and found stable populations both for the period of 1968 to 2010 (0.4% [-0.3, 1.0] per year) and for 1990-2010 (0.5% [-0.3, 1.3] per year).

- Partners in Flight (2019) has given this species a High Regional Concern Score of 16 (high), but does not give it a special conservation status. Neither does Rosenberg et al. (2016).
- Kochert and Steenhof (2002) found that nesting territory occupancy and productivity were stable or declining in four regions of the western U.S., including north-central Utah, as part of a review of the species’ status and trends.
- Early analyses of long-term migration-station counts across the western United States indicate that abundance has declined during fall migration (Hoffman and Smith 2003, Smith et al. 2008).
Breeding Bird Survey (BBS) results for the Western BBS Region show a non-significant decline of -0.2% (-1.3, 0.5) per year from 1966 to 2015 and a non-significant increase of 0.5% (-0.9, 2.4) per year from 2005 to 2015, though these estimates should be taken with caution due to low abundance (<1.0 birds/route; Sauer et al. 2017).

BBS results for Utah only show greater, but still non-significant declines of -1.2% (-2.6, 0.2) per year from 1966 to 2015 and of -1.5% (-4.9, 1.5) per year from 2005 to 2015, though these results also have issues related to low abundance (Sauer et al. 2017).

Statement of Habitat Needs and Threats to the Species.

Habitat Needs

Golden eagles are habitat generalists that primarily use open to semi-open landscapes such as tundra, shrublands, grasslands, woodland-brushlands, and coniferous forests from sea level to 12,000 ft. in elevation (Kochert et al. 2002). In Utah, they breed mainly in desert lowland, grassland, shrubland, pinyon-juniper, and aspen-conifer vegetation types (Kochert et al. 2002, Keller 2018). Golden eagles prefer to forage in open areas such as desert lowland and grasslands (Kochert et al. 2002). Nests are usually placed on cliffs, but trees, the ground, and human-made structures (e.g. nesting platforms and electrical transmission towers) also have been used (citations within Kochert et al. 2002).

Rabbits and squirrels are the main food source for golden eagles (Kochert et al. 2002, Bedrosian et al. 2017). In the central Great Basin of Utah, black-tailed jackrabbit (Lepus californicus; 61.5%), cottontail (Sylvilagus spp.; 8.3%), and rock squirrel (Otospermophilus variegatus; 6.1%) comprised the greatest proportion of food items found in nests from 1970 to 2018 (Keller 2018). Other mammals, birds, reptiles, fish, and carrion are consumed in lesser proportions (Kochert et al. 2002, Bedrosian et al. 2017, Keller 2018).

Threats to the Species

Recent analyses indicate that since this species was added to the Bald and Golden Eagle Protection Act (BGEPA) in 1962, unpermitted human-caused mortality is the leading cause of death of golden eagles in the United States, and may lead to population declines for this species (U.S. Fish & Wildlife Service 2016a,b). Anthropogenic factors were responsible for about 56% of satellite-tagged eagle mortalities (U.S. Fish & Wildlife Service 2016a, 2016b). Citations within Kochert and Steenhof (2002) and articles from a special issue of the Journal of Raptor Research in 2017 demonstrate that accidental trauma (e.g. collisions with vehicles, fences, wires, and wind turbines), electrocutions, shooting, and poisoning from lead and anticoagulant rodenticide were the leading causes of death for this species.

Loss of breeding adults to anthropogenic factors is major threat to populations. Breeding adult survival has the greatest relative effect on population growth rate. Even minor reductions in breeding adult survival (<-4.5%) cannot be made up with increases in productivity, and therefore cause otherwise stable populations to decline (Tack et al. 2017). Furthermore, Wiens et al.
(2017) produced a population simulation model that reinforced the analyses presented by the U.S. Fish and Wildlife Service (2016b) that any increases in mortality to current populations will worsen the potential for future declines, or steepen the rate of current declines.

Beyond direct mortality, human disturbance from recreational use (OHV and pedestrians) reduced territory occupancy and the probability of egg laying, and decreased nest survival for golden eagles (Steenhof et al. 2014, Spaul and Heath 2016). Religious harvest by indigenous North Americans also has the potential to negatively affect local populations (Kochert et al. 2002, Stahlecker et al. 2017).

Urban, agricultural, and energy development, accelerated fire regimes due to invasive grasses in shrublands and woodlands, and drought are drivers of habitat loss and degradation, another set of threats to golden eagles (Kochert et al. 2002). This species depends on rabbits and squirrels as its main food source, and these prey species are not as abundant in areas degraded by cheatgrass, fire, or prolonged drought (Steenhof et al 1997, Kochert et al. 1999, Kochert et al. 2002). While adults can forage widely for prey, their ability to provide for dependent nestlings is reduced when prey are limited.

Table 2 summarizes the results of a statewide-scale threat assessment and prioritization completed in 2013 (Utah WAP 2015; Salafsky et al. 2008). Note that these threat rankings do not apply at the scale of local populations; a threat ranked medium at the overall, statewide level may be the most important threat to a local population. The threat assessment provides more information not presented here, including lower ranked threats, crucial data gaps, and definitions for all the threats and data gaps.

<table>
<thead>
<tr>
<th>Golden Eagle</th>
<th>Medium</th>
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<tbody>
<tr>
<td>Excessive Harvest – Unregulated / Illegal</td>
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<tr>
<td>Inappropriate Fire Frequency and Intensity</td>
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<tr>
<td>Incidental Poisoning</td>
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<td>Invasive Plant Species – Non-native</td>
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<td>OHV Motorized Recreation</td>
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<td>Roads – Energy Development</td>
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<td>Utility and Service Lines</td>
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Rationale for Designation.

Golden eagle population trends apparently have been relatively stable, but recent research indicates a probable decline in the immediate future, mostly due to anthropogenic causes. One of these threats is the increased development of renewable energy sources that produce incidental “take”. The Western Golden Eagle Team (WGET) was established in 2013 by 4 western U.S. Fish and Wildlife Service Regions to “proactively address energy-related threats to Golden Eagle populations in the western U.S. by developing conservation strategies at
appropriate scales." WGET is in the final stages of making its products (e.g. models of breeding and wintering habitat and movement, threat assessments) and decision tools available to partners such as other State and Federal eagle teams and agencies, land management agencies, and research institutions. Some of this related work has already been published in various peer-reviewed journals, including in a special issue of the *Journal of Raptor Research* dedicated to Golden Eagle conservation. The WGET products should be very useful in directing proactive steps to help keep this species from declining to the point of federal intervention. Inclusion of Golden Eagles on the Utah Sensitive Species list will allow the State to provide comments and recommendations during the planning stage of renewable and other energy development, which will be imperative in preventing the decline of this species.

**Economic Impacts of Sensitive Species Designation.**

Table 3. Brief description of the threat as it presents to all wildlife and habitats statewide. Includes some discussion of sources, potential ways to engage those sources to manage the threat, and some risks and opportunities of engagement.

<table>
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<tr>
<th>Threat (all taxa)</th>
<th>Economic &amp; Social Assessment</th>
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<tr>
<td>Excessive Harvest – Unregulated / Illegal</td>
<td>This refers strictly to illicit harvest, or &quot;poaching,&quot; the implication being current law is poorly communicated, disregarded, and/or insufficiently enforced. Reasons cited include intentional killing as &quot;varmints,&quot; intentional killing as a result of misidentification, intentional live collection as personal pets, and intentional live or dead harvest for commerce. Existing licensing, permitting, and enforcement processes exist to manage this threat. Social and economic impacts of management are not expected to change. Economic impacts to manage this threat are minor, while social impacts are localized and sometimes keenly felt (especially by the perpetrators). Actions taken to mitigate this threat have moderate potential to prevent or reverse Endangered Species Act listings.</td>
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<tr>
<td>Inappropriate Fire Frequency and Intensity</td>
<td>This is a complicated problem with significant technical, social, fiscal, and legal components. Concerns range from &quot;lack of fire&quot; at one extreme, to &quot;too much fire&quot; at the other. Planning, best management practices, and significant regulations already exist to manage this threat. Consultation is available to help avoid, minimize, or mitigate further impacts. Incentives and partnerships exist to help landowners manage watersheds to improve the frequency and intensity of fire and fire surrogates. Economic impacts to manage this threat range from moderate to immense. Economic impacts of failure to manage this threat are worse. Positive social effects would likely be dispersed and substantial, while negative ones would likely be localized and intense. Actions taken to mitigate this threat have high potential to prevent or reverse Endangered Species Act listings.</td>
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<tr>
<td>Threat Type</td>
<td>Description</td>
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<td>Incidental Poisoning</td>
<td>This threat to wildlife comes from spent lead ammunition, and from the use of pest control chemicals. Incentives and education can facilitate vendors' and manufacturers' modification of products and packaging to reduce unintended harmful consequences. Incentives and education can enhance end users' acceptance and adoption of these changes. Economic impacts would likely be modest. Positive and negative social effects would likely be dispersed and also modest. Actions taken to mitigate this threat have moderate potential to prevent or reverse Endangered Species Act listings.</td>
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<tr>
<td>Invasive Plant Species – Non-native</td>
<td>This threat to wildlife includes both upland, wetland/riparian, and aquatic plant species. Main effects include alteration of stream channel morphology, alteration of fire cycles, elimination of open water habitat, and excessive consumption of water. Preventing new arrivals, and the spread of existing populations, is essential. Confining or reducing existing populations is often difficult. Non-native invasive plant species also crowd out desirable native vegetation by competing for space, nutrients, sunlight, or soil moisture. Prevention is the best and cheapest strategy, treatment is expensive and difficult. Economic impacts of invasive wildlife species can be enormous, and can completely alter the ecological succession of a given vegetation association. Social effects can also be very large, as invasive species are to a significant extent a social problem. Education can help change people's behavior; regulation has a role but alone it is insufficient. Incentives and partnerships are available to help landowners manage invasive plants. Actions taken to prevent, reverse, or mitigate this threat have very high potential to prevent or reverse Endangered Species Act listings.</td>
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<td>OHV Motorized Recreation</td>
<td>This threat to wildlife refers to cumulative impacts of recreational activities which can contribute to habitat degradation (erosion, water quality, etc) and facilitate other threats (spread of invasives, disease/pathogens, etc). Planning, best management practices, and some regulations already exist to manage this threat. Economic impacts to manage this threat range from minimal to moderate. Positive social effects would likely be dispersed, while negative ones would likely be localized and potentially keenly felt. Actions taken to mitigate this threat have moderate potential to prevent or reverse Endangered Species Act listings.</td>
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<td>Roads – Energy Development</td>
<td>This threat refers only to those roads built and used to access and extract traditional or renewable energy sources. Impacts include both the permanent loss and fragmentation of terrestrial and aquatic habitats that occurs when a new road is sited, as well as ongoing direct mortality to wildlife as long as the road exists and wildlife persist near it. Roads often facilitate several other threats - fires, contamination, recreation, etc. Planning, best management practices, and some regulations already exist to manage this threat. Consultation is available to help avoid, minimize, or mitigate impacts. Economic impacts to manage this threat range from minor to moderate. Social effects are mostly minor. Actions taken to mitigate this threat have moderate potential to prevent or reverse Endangered Species Act listings.</td>
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<tr>
<td>Utility and Service Lines</td>
<td>This threat refers only to linear infrastructure built and used to accommodate diverse energy, commerce, and transit interests. Impacts include both the temporary disturbance and any permanent loss and fragmentation of habitat that occurs when a line is sited, as well as direct mortality during construction, maintenance, and ongoing operations. Planning, best management practices, and some regulations exist to manage this threat. Consultation is available to help avoid, minimize, or mitigate further impacts. Economic impacts to manage this threat range from minimal to significant. Positive social effects would likely be dispersed, while negative ones would likely be localized but modest. Actions taken to mitigate this threat have low potential to prevent or reverse Endangered Species Act listings.</td>
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**Literature Cited.**


Utah Division of Wildlife Resources. 2019. Utah Natural Heritage Program: biotics database and files. Salt Lake City, Utah, USA.