

Human impacts on golden eagles in northeastern Arizona

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In this paper I present information on general eagle biology, eagle populations in North America and the western USA, and specific information on eagles in and near Wupatki National Monument relative to the issue of Hopi collecting of eaglets for religious ceremonial use. I do not discuss ethnohistorical information or legal issues.

The golden eagle (*Aquila chrysaetos*) is very important in Hopi culture and religion. The Hopi have been collecting and utilizing eagles for hundreds of years at least.

Wupatki, located in northeastern Arizona about 40 mi north of Flagstaff, was set aside in 1924 to “preserve and protect prehistoric ruins built by the ancestors of the Hopi tribe....” It covers 145 sq km and is bordered to the north, west, and southeast by private and state land, to the south by the Coconino National Forest, and to the east by the Navajo Reservation.

Wupatki and the surrounding area is an important eagle-gathering area to the Hopi. The issue of collecting within Wupatki emerged on 27 May 1999 when a group of Hopi presented a valid U.S. Fish and Wildlife Service (USFWS) permit to harvest golden eagles and asked permission to collect in Wupatki. The district ranger temporarily denied the request. On 11 June the superintendent denied the request in a letter citing 36 Code of Federal Regulations sections 2.1 and 2.2, which prohibit taking wildlife in national park areas unless mandated by federal law and when consistent with sound resource management practices. In letters dated 17 June and 26 July, respectively, the National Park Service (NPS) intermountain regional director and acting director supported the superintendent’s decision. On 12 September, the assistant secretary of the interior withdrew the NPS letters to reconsider the matter, and on 22 January 2001, the Department of Interior published a proposed rule for “Collection of Golden Eaglets by the Hopi Tribe in Wupatki NM for Religious Ceremonial Use.” Also in January 2001, the Hopi Cultural Preservation Office suggested NPS consider eaglet collection in its general management planning for Navajo National Monument.

The proposed rule states: “Upon terms and conditions sufficient to prevent impairment to park resources, and upon a showing that the Tribe has a valid permit to collect golden eaglets under the Bald and Golden Eagle Protection Act, the Superintendent of Wupatki NM shall grant a permit to collect golden eaglets from Wupatki NM for religious ceremonial purposes.” Before collecting may occur, a National Environmental Policy Act analysis must be done. If it determined that a harvest would have no significant impact, the Superintendent would be required to issue an NPS permit to collect an eaglet in Wupatki.

The Hopi reservation is in northeastern Arizona, but they once lived and traveled over a much greater area. According to the Hopi Tribal Council, the Hopi are traditionally associated with some 40 NPS areas, ranging from Arches National Park (northeastern Utah) to the north, Pecos National Historical Park (central New Mexico) to the east, Organ Pipe Cactus National Monument (Arizona–Sonora border) to the south, and Lake Mead National Recreation Area (Arizona–Nevada border) to the west (Table 14.1).

Year	Activity
1999	Citadel Sink — fresh nesting material and “whitewash” but no successful nesting
2000	Citadel Sink — no successful nesting activity
2000	Doney Mountain — no successful nesting activity
2000	Citadel Wash — successful nesting (1 eaglet fledged)
2001	Citadel Sink — adult pair mating and nest-building, apparently not nesting
2001	Citadel Wash — adult pair courting and nest-building, apparently not nesting
2001	Doney Mountain — Citadel Wash pair using area

Table 14.1. Golden eagle survey summary for Wupatki National Monument and nearby areas (year 2000 records from Drost 2001).

The USFWS permit authority is the Bald and Golden Eagle Protection Act. Permit number PRT 707073 has been issued since 1985 or 1986. The 1999 permit limited the take to 40 eaglets and an unlimited number of red-tailed hawks to be taken with land manager permission in Apache, Coconino, and Navajo counties in northeastern Arizona. This is the only federal permit issued to the Hopi for the harvest of eagles. There is an Arizona permit limiting harvest to 10 eaglets and 10 red-tailed hawks.

Golden eagles are large, long-lived raptors with low reproductive potential. Their productivity is linked with breeding-season weather and abundance of small-to-medium-sized mammal prey. In the Wupatki area, breeding spans January through August or later. Females usually lay two eggs (Kochert et al. in review) and fledge one eaglet per territorial pair (Thompson et al. 1982). Golden eagles build stick nests on cliffs, rock outcrops, and large trees. They have anywhere from 1 to 14 alternate nests (Kochert et al. in review) separated by 1,000-5,000 m or more in their territory. Pairs defend their territories from other golden eagles. There is a “floating” population of non-breeding adult and subadult eaglets “waiting” for a breeding territory vacancy.

To support one breeding pair in of golden eagles in western North America, 46-251 sq km are needed (studies summarized in Watson 1997) coinciding with nearest-neighbor distances of 3.1-13.2 km. If eagle habitat in Wupatki is similar to other study areas in the West, it could support three pairs of eagles (maximum) with about 9 km between territories.

I surveyed Wupatki in 1999 and again in 2001 and Drost (2001) surveyed the area in 2000. There was evidence that eagles had visited Citadel Sink nests in 1999, but they did not raise large young and they likely did not lay eggs. In 2000, Drost found no nesting activity in Wupatki, though he did locate eagles nesting just north of the park on private land. In 2001, I observed an adult pair mating and visiting one of Citadel Sink nests and a different pair mating and flying between Doney Mountain and Drost’s 2000 nest. Neither pair laid eggs in 2001. Drost (personal communication) and I believe there is little chance we missed potential breeding sites in or near Wupatki.

Drost (2001) reviewed Wupatki natural resource files and found reference to two golden eagle nest sites in the park. The Black Falls Trading Post record is vague and may represent a site on the Navajo Reservation, leaving Citadel Sink as the only known nest site in Wupatki. He summarized eagle observations in park files (Table 14.2). There are four records of eagles laying eggs from 1936-2001. An eagle was shot at Citadel Sink in 1943, and the park road was relocated to within approximately 354 m of the nest cliff at Citadel Sink in 1954. A parking lot and interpretive trail

were built within 200 m of the cliff, probably after the road was relocated. The district ranger who served during the period 1990-1998 does not believe golden eagles successfully nested at Citadel Sink during his tenure, though he noted a broken eagle egg in the nest in 1995.

Year	Activity
1936	Doney Mountain — two eggs in nest
1939	Documented successful nesting
1940-43	Multiple records of eagles (including eagles visiting nests)
1943	Eagle shot at Citadel Sink
1944-51	No golden eagle record at Citadel Sink
1954	Park road built within 250 m of Citadel Sink
1992	Doney Mountain — “active” (Arizona Game and Fish records)
1995	One egg noted in nest by district ranger, eventually broken, unsuccessful attempt
1990-98	Occasional golden eagle activity noted by district ranger, no successful nesting

Table 14.2. Golden eagle records from Wupatki National Monument natural resource files (from Drost 2001).

Mark Fuller, Mike Kochert, and Loren Ayres of the U.S. Geological Survey Biological Resource Division (USGS-BRD) Snake River Field Station have written a proposal to USFWS to determine golden eagle population size and trend and productivity trend for the western USA from the western Great Plains to the crest of the Cascade and Sierra Mountains over a 10-year period. They will use August and September aerial surveys (and possibly Breeding Bird Survey data) to count and age individuals, and distance sampling to estimate density. They propose intensive radio telemetry work to determine detectability and hope to be able to age birds to estimate productivity.

USGS-BRD and USFWS dropped a radio telemetry study to determine age-specific mortality and model harvest impacts from an earlier version of the proposal. It would have helped quantify causes of mortality in northeast Arizona. Kochert et al. (in review) estimate that about three-quarters of golden eagle deaths are human-caused: 27% are due to collisions with structures or vehicles, 25% to electrocution, 15% to shooting, and 6% to poisoning. They cite anecdotal reports of noteworthy eagle mortality, including 5,000 shot in West Texas from 1941-1947, 1,000 killed by vehicles in southwestern Wyoming in the winter of 1984-1985, and 28-43 killed annually by wind turbines in California. According to USFWS, Hopi harvest reported under PRT 707073 totals 208 through 2000. There may be unreported harvest of eagles by the Hopi or others in northeastern Arizona.

Most raptor biologists consider golden eagles relatively sensitive to human disturbance, although the evidence is mostly anecdotal or correlative. Steidl et al. (1993) found adults spent less time at the nest and fed young less frequently when campers were 400 m compared with 800 m from the nest. Harmata (2001) showed adult golden eagles whose young are banded are more likely to move to an alternate nest or not breed the following year. There are no data on the effect of harvest on territory reoccupancy in subsequent years.

At Wupatki, the location of the park road, along with the presence of visitors in the parking lot and interpretive trail at Citadel Ruin, may be the reasons why there are

few recent records of eagles nesting at Citadel Sink. To encourage nesting, the superintendent closed the parking lot and interpretive trail from February through late March 2001. The birds did mate at Citadel Sink and visit the nests, but did not lay eggs. The superintendent is committed to a similar closures next year to minimize potential disturbance. Wupatki staff adopted monitoring protocols to minimize disturbance risk, specifying that unlimited observations may be made from a distance, while closer observations from within a vehicle on the park road are limited to a maximum of 15 minutes.

Before NPS can make scientifically based management decisions for eagles in Wupatki and the region, important information needs must be met. USGS-BRD and NPS have gathered available information on past nesting in and near Wupatki, and NPS is committed to monitoring territory occupancy, breeding status, and breeding outcome in the future. The effects of visitors are being considered in Wupatki management. NPS must also address the effect of potential harvest on future territory occupancy: Will such harvest cause adults eagles to move outside Wupatki or not breed in subsequent years? NPS must also consider the regional population: What is the size and trend of the population that would be affected by Hopi harvest, and what are the causes of mortality that can be mitigated?

USFWS has inadequate information as a basis for PRT 707073. The agency does not know the size, trend, productivity, or geographic extent of the regional golden eagle population. It does not know the effect of harvest on breeding in subsequent years, nor the causes and importance of human-induced mortality in the region nor have they done cumulative impacts analysis.

Even though this is a contentious issue, good things are happening. NPS is more aware of eagles in Wupatki and the southwestern USA and is addressing human disturbance and monitoring the birds. USFWS is sponsoring a western-USA population monitoring study. This work and increased understanding of the magnitude of human-caused mortality may result in actions to reduce it. Everyone involved with the issue of harvest in northeastern Arizona wants to see a healthy eagle population, and there are opportunities to work together towards that goal.

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