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Raptor Management at Lake Sonoma, California

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INTRODUCTION: Warm Springs Dam and Lake Sonoma, located 11.5 miles northwest of Healdsburg, Sonoma County, California, was proposed in 1958 and authorized by Congress in the Flood Control Act of 1962 for flood control, water supply, and recreation. Construction on the dam at the confluence of Warm Springs Creek and Dry Creek by the U.S. Army Corps of Engineers (USACE) began in 1978.

In 1976 the U.S. Fish & Wildlife Service (USFWS) proposed the designation of critical habitat for the endangered American Peregrine Falcon (*Falco peregrinus anatum*), including portions of Dry Creek (referred to as the Dry Creek Critical Habitat Zone), which partially overlapped project lands designated primarily for wildlife management. The critical habitat designation was finalized by the USFWS in 1977.

Reoccupation of a nesting site by Peregrine Falcons on Mt. Alice, located in the Pritchett Peaks overlooking the northern arm of the lake, was confirmed by Dr. Monte Kirven (then with the U.S. Bureau of Land Management in Ukiah, California, now with the Biology Department at Santa Rosa Junior College) in the spring of 1979. The nest site is located 3.1 miles north of Warm Springs Dam on a sheer, south-facing rock cliff 330 feet high.

After consulting with the USFWS, in accordance with the Endangered Species Act (ESA) of 1973, the USACE established a Peregrine Falcon monitoring program in 1979, which continued through 1989.

With the removal of the Peregrine Falcon from the USFWS's List of Threatened and Endangered Species of Plants and Wildlife in August 1999, and protection under the ESA, active and passive raptor management at Lake Sonoma has shifted to the population

of nesting Ospreys (*Pandion haliaetus*), and more recently to a newly discovered pair of nesting Bald Eagles (*Haliaeetus leucocephalus*).

Herein, we describe the diurnal and nocturnal raptors (eagles, vultures, kites, hawks, falcons, and owls) of Lake Sonoma, and the USACE's past, present and future management activities for birds of prey, including special status species.

RAPTORS: To date, a total of 131 species of birds have been identified at Lake Sonoma, which includes 17,000 acres of public land supporting oak woodlands, mixed evergreen forests, chaparral, grasslands, and riparian woodlands (USACE 2002). Commonly observed (in all seasons) birds of prey in the park include the American Kestrel (*Falco sparverius*), Red-tailed Hawk (*Buteo jamaicensis*), Red-shouldered Hawk (*Buteo lineatus*), White-tailed Kite (*Elanus leucurus*), Turkey Vulture (*Cathartes aura*), Barn Owl (*Tyto alba*), and Great Horned Owl (*Bubo virginianus*).

Golden Eagles (*Aquila chrysaetos*) are commonly seen in spring and summer, whereas Cooper's Hawks (*Accipiter cooperii*), Sharp-shinned Hawks (*Accipiter striatus*), and Northern Harriers (*Circus cyaneus*) are common in winter (USACE 2002).

Rarely or uncommonly observed species include the Prairie Falcon (*Falco mexicanus*) and Merlin (*Falco columbarius*) in winter, Swainson's Hawks (*Buteo swainsoni*) in the spring, and Northern Pygmy-Owls (*Glaucidium gnoma*) and Western Screech-Owls (*Otus kennicottii*) in winter (USACE 2002).



Peregrine Falcon ©Wade Eakle 1981



Peregrine Falcons ©Craig Himmelwright/SCPBRG

PEREGRINE FALCON: With the designation of the Dry Creek Critical Habitat Zone in 1977 by the USFWS, and reoccupation of Mt. Alice by nesting Peregrine Falcons in

1979, a cooperative effort to maintain the nesting falcons was initiated between the Santa Cruz Predatory Bird Research Group (SCPBRG), USACE, and the USFWS in 1979.

Since biologists had noted low annual productivity for the Mt. Alice peregrines, an analysis of eggshell fragments was conducted. The eggshells were found to be thinner than historic thickness levels for peregrines in California, but not to the degree normally associated with reproductive failure (SCPBRG 1980).

Biologists also thought the small size of the nesting ledge may have contributed to the low productivity of the Mt. Alice pair, so the historic nesting ledge and a ledge used for roosting were excavated and enlarged to make them more usable for peregrine activity (SCPBRG 1980).

From 1979-81, the peregrines fledged 1-3 young per year at Mt. Alice. Because of the excessively thin eggshells collected from the peregrines in 1981, the USACE and USFWS began an augmentation program in 1982. After egg laying was confirmed, eggs were removed from the nest for artificial incubation at the SCPBRG facility at UC Santa Cruz. The eggs were replaced with dummy eggs, which the adult falcons continued to incubate, and later with captive hatched peregrine nestlings raised at the SCPBRG facility (SCPBRG 1986).

From 1982-88, 1-2 captive raised peregrines were fostered into the Mt. Alice nesting site each year, with one or both young successfully fledging in 6 of the 7 years. A total of 12 young were fostered, of which 10 successfully fledged (SCPBRG 1988).

In 1989, the USFWS altered their policy of Peregrine Falcon nest site manipulation in California. Because of the greater number of nests and higher fledging rates in northern California, manipulation and recovery efforts were focused in southern California. No nest augmentation was conducted at Mt. Alice in 1989 and the peregrines were allowed to hatch their own eggs, later fledging two young (SCPBRG 1989).

In addition to the augmentation program conducted from 1982-88 by the SCPBRG, the USACE in cooperation with the USFWS established a nest site-monitoring program in 1979. The purpose of the program was to protect the falcons from harassment and to collect life history data needed to better understand the habitat requirements of the nesting falcons at Mt. Alice. One or more monitors conducted daily observations on falcon breeding activities, foraging behavior, prey deliveries, and territorial interactions. The USACE and USFWS provided equipment and transportation for the nest watchers (Weinstein 1979, 1982; Vouchilas 1983).

From 1990-97, the peregrines at Mt. Alice are known to have fledged two young each year in 1991, 1994, and 1996. No productivity data were collected for the site from 1998 to 2004 (SCPBRG unpub. data).

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The USFWS recently published their monitoring plan for the American Peregrine Falcon (USFWS 2003), which describes all facets of the Federal monitoring program, including monitoring for contaminants. The next USFWS monitoring year will occur in 2006 (every 3 years). In the meantime, the USFWS encourages state agencies and others to collect data from falcon territories on occupancy, nest success, and productivity as described in the plan, and to participate in the contaminants monitoring efforts as well (USFWS 2003).

Comprehensive reviews of Peregrine Falcon ecology, life history and habitat requirements can be found in Mitchell et al. (2000a) and White et al. (2002).



Bald Eagles at Lake Sonoma ©Joe Lishka 2003 Adult Bald Eagle ©Wade Eakle 1982

BALD EAGLE: Bald Eagles have been observed year-round at Lake Sonoma. In March 2001 an active nest and breeding pair was discovered, and USACE park rangers began informal monitoring. Each subsequent year, a breeding pair has returned to the nesting area, laying and hatching two eggs each season. In 2001 and 2002 at least one of the young eagles successfully fledged, and was observed later in the summer. In 2003 and 2004 two eaglets fledged each year and were later observed flying together.

Bald Eagles mate for life and may reuse the same nest for many years. The mild marine-influenced climate at Lake Sonoma allows the birds to winter at the lake, and breeding activity has been observed as early as December.

Bald Eagles eat fish, small mammals, injured waterfowl, and carrion. They also pirate fish from Ospreys (Buehler 2000). The eagle nest is in a large Douglas Fir snag, with a commanding view of the lake near optimal Osprey foraging habitat. The eagles benefit as well from the lake's healthy fish population.

In July 1995, the USFWS reclassified the Bald Eagle from Endangered to Threatened in the lower 48 States. In July 1999, the USFWS proposed to remove the Bald Eagle from their List of Endangered and Threatened Wildlife, and protection under the ESA. A final

rule de-listing the Bald Eagle has not yet been published, but draft “National Management Guidelines for Bald Eagles” were released in June 2004 (USFWS 2004).

Comprehensive reviews of Bald Eagle ecology, life history and habitat requirements can be found in Buehler (2000), Fischer (2000) and Guilfoyle et al. (2000).



Osprey in flight ©Wade Eakle 2004



Osprey nest ©Wade Eakle 2004

OSPREY: Several (possibly >10) breeding Osprey pairs are also found at Lake Sonoma. The nests are generally located in the shallow reaches of the lake. Unlike most raptors, Ospreys do not defend a territory outside of the immediate nest site itself (Poole et al. 2002). In some areas, several nests are within 100 yards of each other. Ospreys are frequently seen capturing fish from the shallow waters near nest sites, as well as from the surface of deeper waters elsewhere on the lake.

When Warm Springs Dam and Lake Sonoma were planned, the decision was made to leave most of the Douglas Firs standing in the upstream areas. As the reservoir filled, the submerged fir trees created fish habitat. Currently, Threadfin Shad act as the primary forage species for Largemouth and Smallmouth Bass, Rainbow Trout, Black Crappie, Redear Sunfish, and Catfish (USACE 2004). A very healthy population of these larger fish species supports the breeding Ospreys, which feed almost exclusively on fish (Poole et al. 2002).

The standing dead fir trees near the shoreline, surrounded by water, provide nest sites with protection from predators. Nests are built in the larger trees and are reused in subsequent years by Osprey breeding pairs, which are generally monogamous and long-lived, with a possible life span >20 years (Poole et al. 2002). Ospreys are seen throughout the year at Lake Sonoma. The resident birds are non-migratory and begin breeding behavior between December and March.

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Ospreys are not federally listed under the ESA, but are listed as a Species of Concern by the California Department of Fish and Game.

Comprehensive reviews of Osprey ecology, life history and habitat requirements can be found in Mitchell and Wolters (2000), Mitchell et al. (2000b), Poole et al. (2002) and Henny et al. (2003).

MANAGEMENT: Population monitoring is critical for all aspects of conservation, including assessment of population status, identification of causal factors in population change, setting population targets, and evaluating success of conservation action (Rich et al. 2004). The monitoring protocol for Peregrine Falcons described in USFWS (2003) should be implemented at Mt. Alice in 2005, and all-subsequent years until 2015, to satisfy the de-listing monitoring requirements of the ESA. General information on observing peregrines can be found at http://www2.ucsc.edu/scpbrg/peregrine_survey.htm including an explanation of behaviors at <http://www2.ucsc.edu/scpbrg/protocol.htm>. The Mt. Alice nesting site should be monitored for occupancy, nest success, and productivity, with data provided annually to the California State Coordinator (Janet Linthicum, SCPBRG).

Mitchell et al. (2000a) also provides management recommendations for Peregrine Falcons at USACE projects, including restricting activity within 1-mile of active nest sites from 15 April through 31 August (nesting season).

Since the Bald Eagle is still listed as a Threatened species in the lower 48 states and protected under the provisions of the ESA, the USACE is obligated to ensure that any activity it funds, carries out, or otherwise authorizes does not jeopardize the continued existence of the eagle or adversely modify its critical habitat. The USACE has played a significant role in recovery efforts of the Bald Eagle across the nation, with the nesting pair at Lake Sonoma one of many examples of USACE projects providing nesting, foraging, and wintering habitat for our national symbol (Fischer 2000).

The Bald Eagle is also considered a stewardship species for the Pacific avifaunal biome because it is characteristic of the Pacific climatic-biogeographic region. For stewardship species, the goal is to highlight the need to care for habitats, which will benefit a broad suite of additional species, many of them other than birds (Rich et al. 2004).

The informal Bald Eagle monitoring began by park rangers in 2001 should be standardized following accepted raptor survey methods and protocols, and expanded to include Ospreys at Lake Sonoma (Kochert 1986; Fuller and Mosher 1987; and Bibby et al. 2000).

Beginning in 2005, a minimum of four visits should be made to the Bald Eagle breeding territory per season, with the first visit in January or February to determine occupancy

and incubation, if possible. The incubation period for eagles is generally 35-days, so the second visit should occur 1-month (March) after incubation behavior has been observed to verify the breeding territory is still active (a nest in which eggs have been laid). Since Bald Eagle nestlings in California leave the nest on average at 12-weeks, the third and fourth visits to the nest site should occur six (April or May) and 12-weeks (June or July), respectively, after hatching has been confirmed. These latter visits should allow park rangers to determine if the nest was successful (at least one young fledged) or failed (the eggs failed to hatch or the young died), and the productivity [expressed as the number of large (or fledged) young per occupied nest with known outcome].

Once the Bald Eagle is de-listed, and no longer afforded the protections of the ESA, a population-monitoring program will be developed by the USFWS similar to the monitoring program for the American Peregrine Falcon (USFWS 2003). Given the high number of Bald Eagles that nest and winter at USACE projects, the agency will be a key cooperater in this effort. Additionally, the draft management guidelines released by the USFWS (2004) will be finalized and should be implemented at Lake Sonoma and other USACE projects to ensure the agency (or individuals) does not violate the Bald Eagle Protection Act of 1940, as amended, and the Migratory Bird Treaty Act of 1918, as amended in 1972 to cover Bald Eagles and other raptors.

In addition, a boat survey of the entire Lake Sonoma shoreline should be completed in early 2005 to locate and map all Osprey nests. At least two checks of each occupied nest should be made per breeding season. The first check, made during early incubation (March), is needed to count the population of territorial pairs, and the second, taken just prior to the time young are due to fledge at 52-days (May), is needed to count the number of young raised. Both are required for calculation of reproductive success of the Osprey population.

Also, Guilfoyle et al. (2000), Mitchell and Wolters (2000), Guilfoyle and Wolters (2000), and Mitchell et al. (2000b) provide management recommendations for Bald Eagles, Ospreys, Red-shouldered Hawks, and riparian raptors at USACE projects, respectively, that should be implemented at Lake Sonoma.

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Adult Bald Eagles and two nestlings at Lake Sonoma ©Joe Lishka 2003

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