PEREGRINE FALCON REINTRODUCTION EFFORTS IN THE EASTERN SIERRA NEVADA

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Abstract: Recovery direction for the American peregrine falcon (Falco peregrinus anatum) in the Mono Basin and Owens Valley was guided through a local interagency recovery plan. This plan was based on the Pacific Coast American Peregrine Falcon Recovery Plan (USFWS 1982). After evaluating recovery criteria, various reintroduction methods were considered. Reintroduction efforts were initiated in 1983, using hacking as the preferred method. Nine peregrine falcons were released in 1983 and 1984. Eight of these reached independence. A third hacking in 1985 failed. Numerous local sightings of peregrine falcons have been documented following hacking efforts. Recommendations for continued reintroduction efforts and monitoring habitats for nesting activity are discussed.

In 1982, the Pacific Coast Recovery Plan (USFWS 1982) for the American peregrine falcon (Falco peregrinus anatum) was developed by the Pacific Coast American Peregrine Falcon Recovery Team. This plan provides standards and guidelines for the recovery, management and protection of the peregrine falcon in Washington, Oregon, Nevada and California.

Although this plan includes considerable information on the status, life history and recovery objectives for the peregrine falcon in the Pacific Coast region, local recovery plans are needed to provide specific implementation direction at the field level.

In 1983 the Inyo National Forest, Bishop Resource Area of the Bureau of Land management and Region 5 of the California Department of Fish and Game completed a recovery plan for the Mono Basin and adjacent areas (McCarthy et al. 1983). The purpose of this recovery plan is to provide specific direction for peregrine falcon recovery at the local level. Plan objectives are based on those stated in the Pacific Coast Recovery Plan.

In this paper, we report on the development of the recovery plan including criteria for selecting potential reintroduction sites. We also report on the methods and successes of the initial reintroduction efforts.

METHODS

The Mono Basin surrounds Mono Lake and lies between Yosemite National Park and the California-Nevada border (Fig. 1). This area lies on the western edge of the Great Basin and is comprised of mainly of Great Basin sagebrush (Artemisia tridentata) plant communities which gradate into singeleaf pinyon (Pinus monophylla), juniper (Juniperus osteosperma and J. occidentalis) and Jeffrey pine (P. jeffrey) plant communities at higher elevations. Several creeks on the east slope of the Sierra Nevada feed into Mono Lake. Vegetation communities associated with these riparian areas include lodgepole pine (P. contorta), aspen (Populus tremuloides), willows (Salix spp.) and wet meadows.

The areas in and adjacent to the Mono Basin were given highest priority for reintroduction purposes based on the following criteria: (1) objectives stated in the Pacific Coast Recovery Plan, (2) documented historical nesting activity, (3) proximity to active peregrine falcon nest territories and (4) suitability of habitats for nesting and foraging.

Pacific Coast Recovery Plan Objectives

A goal of the Pacific Coast Recovery Plan (USFWS 1982) is to remove the peregrine falcon from listing status. Objectives required to consider delisting are: (1) the establishment of 185 active pairs in California, Nevada, Oregon and Washington, and (2) a minimum productivity average of 1.5 fledglings per active pair over a five year period.

Objectives required to consider reclassification of the species from endangered to threatened are: (1) the establishment of 122 active pairs in the Pacific Coast region, and (2) a minimum productivity average of 1.5 fledglings per active pair.

To meet the objective of reclassifying the species from endangered to threatened, the four states were divided into peregrine falcon management units, with a prescribed number of pairs for each unit (Fig. 2). A

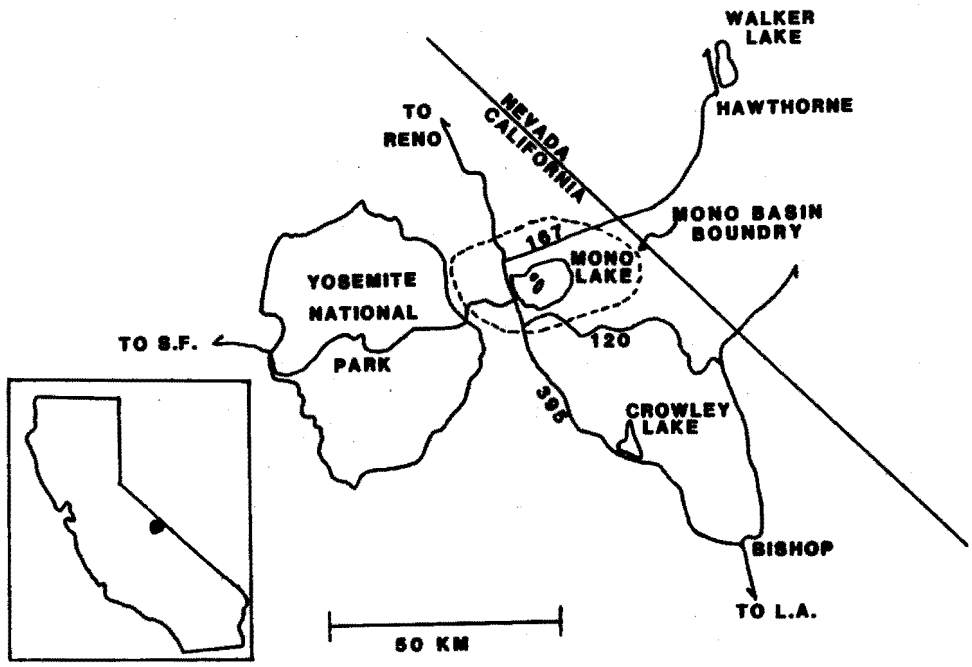

Fig. 1. Yosemite National Park, Mono Basin, and adjacent areas.

goal of 10 pairs was recommended for the Sierra Nevada Management Unit. Potential exists for a minimum of two of these pairs on the east side of the Sierra Nevada in or adjacent to the Mono Basin.

Historical Nesting Activity

Peregrine falcon nesting activity was documented in and adjacent to the Mono Basin (Fig. 3). Grinnell and Storer (1924:294-295) cite Dixon (1916) who found a nesting pair of peregrine falcons at Negit Island, Mono Lake. Thelander (pers. comm. to Hubbell) cited Bond's unpublished notes of 1948 which identified a peregrine falcon eyrie near Grant Lake, approximately 10 km southwest of Mono Lake. Walton (pers. comm.) stated that an active peregrine falcon eyrie existed in the upper Owens River drainage until the early 1960s.

Three nest sites in Yosemite National Park were active in the 1920s and 1930s (Davis and Asay 1982). A historical nest site was also documented at Walker lake, Nevada (Herron, pers. comm.). Although there is no evidence that these nest sites were active simultaneously, peregrine falcons clearly were historical residents of the Mono Basin and adjacent areas.

Existing Nesting Activity

One consideration for establishing reintroduction sites is the proximity of the proposed site to active territories. Introduced falcons would augment production of progeny from wild nests and increase genetic diversity in the existing population.

Two active territories occur in Yosemite National Park (Fig. 3) within 50 km of the Mono Basin (Davis and Asay 1982). The best known site is on El Capitan. This nest site was discovered in 1978 and has fledged young in all but two years since then. The second nest site was discovered in 1981. This nest has successfully fledged young every year since 1982.

Suitability of East-Side Habitats for Nesting and Foraging

Three surveys have been conducted in the Mono Basin to evaluate the adequacy of nesting habitat. Garrett (1978) conducted a cliff nesting raptor survey on the Mono Lake Ranger District, Inyo National Forest. Kirven (1980) conducted a state wide habitat evaluation on and adjacent to Bureau of Land Management administered lands. As part of this study, Kirven assessed Negit Island, Lundy Canyon, Saddlebag Lake, Lee Vining Canyon and June Lake Loop, all in the Mono Basin. McCarthy (unpublished data) rated potential nesting

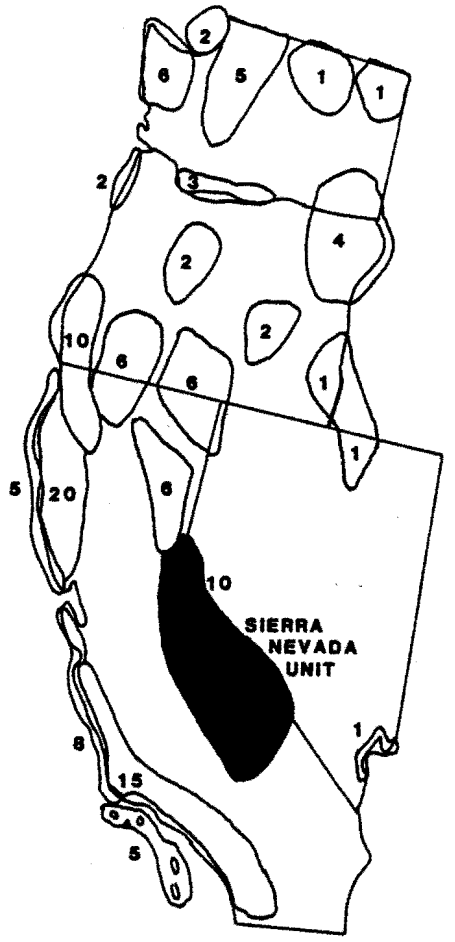

Fig. 2. Pacific coast peregrine falcon management units. Numbers represent the minimum number of pairs required in each unit before reclassification to threatened (USFWS 1982).

habitat in three drainages feeding into Mono Lake: Rush Creek (June Lake Loop), Lee Vining Creek and Mill Creek (Lundy Canyon). Survey methods for this study were adapted from Boyce (1979).

All three surveys identified suitable nesting habitat in June Lake Loop, Lee Vining Canyon and Lundy Canyon. These sites contain large cliffs which would function for nest sites and extensive riparian habitats for foraging.

These drainages are also near Mono Lake, which has high potential for peregrine falcon foraging habitat. At least 98 species of shorebirds and waterfowl occupy Mono lake at various times of the year (Gaines, pers. comm.). These can number over a million individuals in the summer and fall. Many of these species are considered suitable prey for peregrine falcons.

Reintroduction Methods

We considered three methods for re-establishing peregrine falcons in the Mono Basin. One of these is the natural dispersal of wild birds into the Mono Basin. The other two methods involve reintroducing captive raised birds into the area by cross-fostering or hacking.

Natural dispersal would rely on progeny from wild nests immigrating into the Mono Basin. Success of this method is speculative as it could take many years before such dispersal would result in breeding peregrine falcons in east-side habitats, if they were to do so at all.

Cross-fostering involves the placement of captive raised peregrine falcons into prairie falcon nests and relies on the adult prairie falcons to act as surrogate parents. Concerns associated with cross-fostering include: (1) peregrine falcon chicks may not be available when prairie falcon eyries are active, (2) prairie falcon diets in many areas consist mainly of mammals, whereas peregrine diets consist almost entirely of birds, (3) prairie falcons in some areas contain parasites which could be detrimental to peregrines, (4) prairie falcon eyeries have to be in habitats suitable for peregrine falcon nesting and foraging. Prairie falcon nest sites in the Mono Basin were not considered suitable for cross-fostering purposes.

Hacking also utilizes young captive raised peregrine falcons that are subsequently fledged at a re-introduction location (Sherrod et al. 1981). When the birds are 35 days old, they are placed in an artificial nest or hack box located in or near suitable nesting and foraging habitat. The barred front of the box allows the birds to become familiar with the environment while preventing access to predators. The birds are fed twice each day for one week. At approximately 42 days of age, the hack box is opened and the young falcons are allowed to fledge. Food is provided to the fledglings until they reach independence, which may take up to nine weeks.

Hacking was considered the best method available for re-introduction of peregrine falcons to east-side Sierra Nevada habitats. Problems such as susceptibility of the fledglings to predators in the absence of adult birds do exist with hacking. Since juvenile mortality is high, hacking efforts are usually continued for three years, with a minimum of three birds

per year.

RESULTS

In 1983, a hack site was established in Lee Vining Canyon (Fig. 3). The site was selected on the basis of poximity to active and historical nest sites, suitability of the adjacent area for nesting and foraging and access for hack site attendants.

In 1983, three birds (two males and one female) were hacked. All three reached independence. Independence indicates that the birds were successfully hunting on their own when the attendants left the hack site. In 1984, six birds were hacked (four females and two males). Five of the six birds reached independence. One male broke his wing attempting a landing and was returned to SCPBRG. In 1985, three birds were hacked (two females and one male). This hacking effort failed, resulting in one mortality and the two remaining birds being returned to SCPBRG. This failure was the result of bobcat depredation on the food source for the fledglings following their release from the hack box.

During the 1983 hacking, one of the males and the female formed a sibling bond and were seen together on numerous occasions during the hacking period. On 17 October 1983 a juvenile pair of peregrines, probably the same pair, were observed hunting at Crowley Lake, approximately 50 km south of the hack site (Tilleman, pers. comm.). On 11 May 1984, prior to the 1984 hacking effort, a pair of peregrine falcons, possibly birds released in 1983, were observed at the hack site (Burger, pers. comm.). They were not observed after this date.

During the 1984 hacking, an adult male appeared at the hack site and was seen daily throughout the remainder of the hacking period. This bird had a blue band on its right leg and undoubtedly was one of the birds hacked in 1983. An adult peregrine with a blue color band was observed 21 December 1984 on the north shore of Mono Lake (DeSante, pers. comm.). This was probably the same bird observed at the hack site during the 1984 hacking. One female which reached independence in the 1984 hacking was shot in southern Oregon during the fall of 1984. Although there were several other sightings of peregrines in the Mono Basin during 1984, we could not be certain about the origin of these birds.

DISCUSSION

Between 1983 and 1985, 23 peregrine falcons were fledged successfully by wild nesting pairs in Yosemite national Park and from the hack site in Lee Vining Canyon (Table 1). The Lee Vining hack site accounted for eight (35%) of these.

Although no east-side Sierra Nevada nest sites have been located, the scenario is encouraging. In west coast releases, there are few instances where introduced birds have been documented in the wild. A banded adult male nesting at Diablo Canyon was from a cross-fostering in Santa Barbara County. Banded birds have also been seen at other nest sites and may be from cross-fostering or hacking attempts. Banded sub-adults were observed during 1986 hackings at Crater Lake, Oregon, and the Channel Islands, California, that were probably hacked birds from the previous year. The infrequency of documenting cross-fostered or hacked birds in the wild does not indicate that reintroductions are unsuccessful. It is extremely difficult to document an introduced bird in the wild unless bands or some other identifying characteristic can be observed. In most of the west coast releases, peregrine falcon sightings have increased in areas where reintroduction efforts have occurred. The numerous peregrine observations and identification of hacked birds in the wild following our releases suggest that at least some of the hacked birds have survived and use the Mono Basin as a portion of their home range.

Peregrine falcons may initiate pair bonding and eyrie selection their first or second years, however successful nesting attempts usually begin the third year. Falcons released in 1983 will be three years old in 1986. If successful nesting attempts result from hacking efforts, these should be apparent in 1986 or 1987.

Due to the quantity of potential peregrine falcon nesting habitat in the Mono Basin, the difficulty of access and the rugged nature of the terrain, locating an eyrie is a difficult task. A major objective following the hacking efforts is to survey the drainages in the Mono Basin for nesting peregrine falcons. Sites identified as suitable in Lee Vining Canyon, Lundy Canyon and June Lake Loop will be inventoried for nesting activity using methods developed by Boyce (1979) and Davis and Asay (1982).

A second objective is to establish second hack site in the vicinity of Crowley Lake (Fig. 3). This would be a tower hack site (Sherrod et al. 1981) constructed in one of the extensive marsh areas around the lake. It's purpose would be to expand territories of peregrine falcons to the south and east of existing territories. Crowley Lake contains habitats which are used by many species of waterfowl and

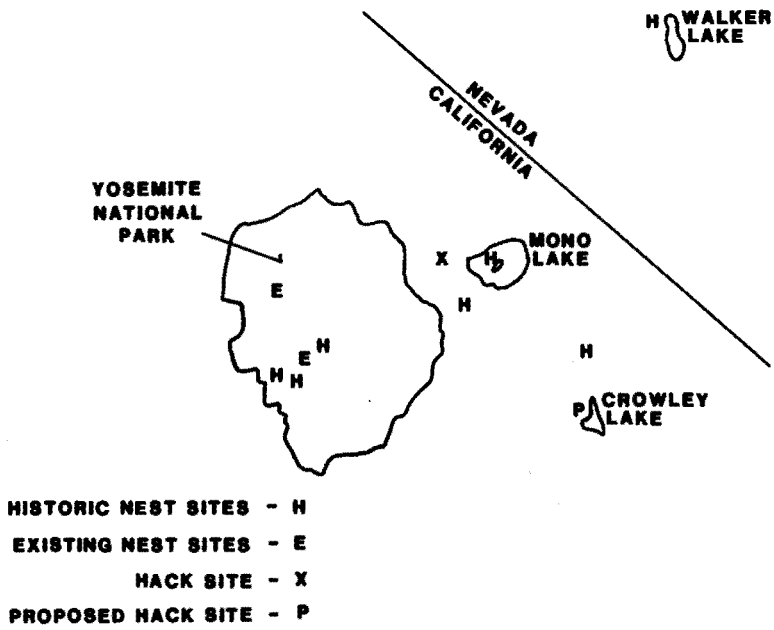

Fig. 3. Location of historic nest sites, existing nest sites, existing hack site, and proposed hack site.

shorebirds for nesting and during the migrations. Crowley Lake also lies approximately 15 km south of a historic peregrine falcon nest site.

In addition to the Lee Vining site, two other hack sites have been established in the Sierra Nevada: one at Lake Tahoe, and the other at Kings Canyon. These two sites have collectively fledged nine birds in 1984 and 1985. The potential for interaction between hacked birds and wild birds is excellent on both sides of the Sierra Nevada and should result in the establishment of new territories.

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Table 1. Fledgling success of two Yosemite nest sites and the Lee Vining hack site.

Site	1978	1979	1980	1981	1982	1983	1984	1985
El Capitan	1	0	2	2	2	0	2	2
Yosemite No. 2	--	--	--	0	2	3	4	4
Lee Vining	--	--	--	--	--	3	5	0
Total	1	0	0	2	4	6	11	6

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