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Appendix C1

Restore Peregrine Falcons to the Channel Islands

C1.1 GOALS AND NEXUS TO INJURY

The goal of this 5-year action is to facilitate recovery of peregrine falcons to the Channel Islands. Data collected in 1992 in the Southern California Bight demonstrated severe (>15 percent) eggshell thinning in peregrine falcons (Kiff 1994). Peregrine falcons were extirpated from the Channel Islands by the mid 1950s, largely due to DDT contamination, which led to eggshell thinning and reproductive failure (Kiff 2000).

C1.2 BACKGROUND

Peregrine falcons once numbered in the hundreds in Southern California (Walton 1997). Between 20 and 30 pairs are estimated to have nested on the Channel Islands prior to 1945 (Kiff 1980, Hunt 1994). However, the historical record of peregrine falcons on the Channel Islands is largely deficient, and the overall carrying capacity of the territories is unknown (Kiff 2000, Walton 1999). Peregrine falcons disappeared from the Channel Islands by 1955, and only two pairs were located in California in 1970 (Kiff 1980, Herman et al. 1970). In 1973, this species was listed as endangered under the Endangered Species Act. Contamination by organochlorines, in particular the pesticide DDT, was a major cause of the decline of the peregrine falcon on both the Channel Islands and the mainland (Risebrough and Peakall 1988). DDT is a mixture of several chemicals that are further metabolized in the environment; DDE is a component of DDT contamination in the environment that has specifically been implicated in reproductive failures of many species of birds. A mean DDE level of 15–20 parts per million (ppm) wet weight in peregrine eggs is a critical level associated with approximately 17 percent eggshell thinning and population declines (Peakall et al. 1975, Peakall and Kiff 1988).

C1.2.1 Recovery on the Channel Islands

The peregrine falcon has made a dramatic recovery since 1975, in large part due the restrictions placed on DDTs in 1972 and an active release program that was initiated soon afterward. Incubation of thin-shelled eggs removed from wild nests and a captive breeding program provided source birds for the release program. Between 1978 and 1993, the Santa Cruz Predatory Bird Research Group released over 719 peregrine falcons in California (Hunt 1994). On the Channel Islands, 34 birds were hacked or fostered between 1983 and 1998, including 6 birds on San Miguel Island and 17 birds on Santa Catalina Island (Linthicum, pers. comm., 2004). In 1987, the first reestablished pair was documented on San Miguel Island (Hunt 1994). In 1989, active nests were recorded on Anacapa and Santa Cruz Islands (Hunt 1994). Between 1992 and 1994, 8 to 10 pairs were noted on the Northern Channel Islands (Hunt 1994). Since 1995, an additional 165 birds have also been released on the proximate mainland to the Channel Islands at the Vandenberg Air Force Base and the Santa Ynez area (Linthicum, pers. comm., 2004).

The release program accelerated the recovery of the peregrine falcons in California and the rest of the United States. The peregrine falcon was delisted from the List of Threatened and Endangered Species on August 25, 1999 (USFWS 1999). The U.S. Fish and Wildlife Service (USFWS) recovery goal of five pairs for the Channel Islands was exceeded at the time of delisting (USFWS 1982). In this ruling, the USFWS acknowledges that there were areas where

impacts from DDT were still occurring, but those impacts had been reduced to local mortality of eggs and local territory failures (USFWS 1999).

Eggshells collected in 1992–1993 averaged 19 percent thinner than pre-1947 museum specimens, and had elevated concentrations of DDE (Hunt 1994, Kiff 1994). Productivity rates are substantially lower when eggshells range between 17 and 20 percent thinner than normal (Peakall and Kiff 1988). It has been estimated that 1 ppm of DDE in the diet of peregrine falcons is sufficient to cause the eggshells to be 16 percent thinner, and 3 ppm DDE results in eggshells being 10 to 28 percent thinner (Enderson et al. 1982, Deweese et al. 1986, Hunt 1994). Peregrine falcons prey almost exclusively on other birds. Data collected in 1992 indicated that contamination in the food web was still at sufficient levels to result in substantial eggshell thinning on the Channel Islands.

In 1998, eggs from eight peregrine falcon territories on the Channel Islands were sampled to determine eggshell thinning (Walton 1999). Results indicated average eggshell thinning continued to exceed 17 percent for coastal Channel Islands territories, while most inland Channel Island territories demonstrated slightly reduced levels of thinning. These differences are likely a reflection of the higher levels of DDE in marine-oriented prey (i.e., seabirds) than terrestrial prey (i.e., land birds) (Walton 1999).

C1.2.2 Current Status on the Channel Islands

No data are available on peregrine falcon eggshell thinning on the Channel Islands since 1998. The Natural Resource Trustees for the Montrose case (Trustees) funded a study in 2004 to determine the occupancy and reproductive success of peregrine falcons on Santa Catalina Island, including current levels of eggshell thinning. Although occupancy was determined for two resident pairs, evidence of egg laying, incubation, and chick rearing was not observed (PBRG 2004). It is possible that any early nests failed due to eggshell thinning; however, this was not determined.

Despite the ongoing presence of DDTs in the marine environment surrounding the Channel Islands and the potential for eggshell thinning, it is clear that the number of peregrine falcon pairs is steadily increasing on the islands. In 2004, approximately 21 peregrine falcon pairs were occupying breeding territories on six of the eight Channel Islands (PBRG 2004). The majority of the pairs (18 of 21) occur on the Northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa), while 3 pairs occur on the Southern Channel Islands (2 pairs were recently confirmed on Santa Catalina Island and 1 on Santa Barbara Island). Recolonization to the Southern Channel Islands has been slower than to the Northern Channel Islands. Peregrine falcons have also been recently observed on San Clemente and San Nicolas Islands; however, breeding has not been confirmed to date (Walton, pers. comm., 2003, Smith, pers. comm., 2004).

C1.3 PROJECT DESCRIPTION AND METHODS

The overall goal of this action is to speed the recovery of peregrine falcons to the Channel Islands. Since the majority of the known occupied territories in 2004 occurred on the Northern Channel Islands (18 of 21), this 5-year action would involve active restoration of peregrine falcons to the Southern Channel Islands through hacking techniques. Hacking is a process that involves releasing fledgling peregrine falcons from a hack box and supplementing food for the

birds until they develop adequate hunting skills. Because of the presence of federally endangered and threatened bird species on both San Clemente and San Nicolas Islands (that may be preyed upon by the falcons), this project would involve releasing birds only on Santa Catalina Island. Two hack towers would be used for the release of 10 birds per year, for a total of 50 birds over a 5-year period. Peregrine falcons of west coast origin that are either bred in captivity or removed from urban structures would be released. All released peregrine falcons would be banded with both USFWS bands and alphanumeric bands that can be read at a distance. A monitoring component of the project would also be developed, and additional documentation pursuant to National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA) would be completed as needed.

C1.4 ENVIRONMENTAL BENEFITS AND IMPACTS

C1.4.1 Biological

Benefits

The active restoration of peregrine falcons would speed the recovery of this species into historically occupied habitat both on the Channel Islands and mainland. Based on the results of earlier release programs, this effort would likely result in the establishment of additional peregrine falcon territories on the Channel Islands (Walton 1997). This program would result in an influx of birds around the Southern Channel Islands, thus encouraging recolonization on these islands. Although peregrine falcons are recolonizing the Southern Channel Islands, as demonstrated by the recent breeding on Santa Barbara and Santa Catalina Islands, recolonization has not yet occurred on San Clemente and San Nicolas Islands. This program would encourage the recolonization of peregrine falcons into historically occupied habitat on the Channel Islands. In addition, peregrine falcons that fledge from the Channel Islands frequently disperse to the mainland (Walton 1999). Therefore, unoccupied territories on the mainland are also likely to benefit from the release program.

Raptors, such as the peregrine falcon, are an essential part of healthy, functioning ecosystems. The peregrine falcon is an apex predator that fills a particular ecological niche in the Channel Islands ecosystem. Significant efforts are underway to restore the ecosystems of the Channel Islands, such as the removal of nonnative species, habitat restoration, and reintroduction of top predators (e.g., bald eagle). Although peregrine falcons are once again a top predator on the majority of the Channel Islands, complete recovery has not yet been achieved. Additional active restoration would further encourage recovery on the Channel Islands in an effort to restore a missing component of the island ecosystem.

Impacts

The peregrine falcon is a highly specialized feeder, concentrating almost entirely on birds. Kiff (1980) reported that peregrine falcons prey on at least 22 species of birds on the Channel Islands and the Coronado Islands. On the Channel Islands, dietary studies of peregrine falcons in 1992 and 1993 showed that gulls, alcids, and land birds comprised between 73 and 82 percent of their diet depending on season (Hunt 1994). Grebes, shorebirds, and phalaropes constituted a smaller,

but substantial part of their diet. Within these groups of birds, the species that accounted for 5 or more percent of the prey biomass included the California gull, western gull, Cassin's auklet, Xantus's murrelet, unidentified grebes, red phalarope, rock dove, mourning dove, and European starling.

The recovery of the peregrine falcon on the Channel Islands may have a negative impact on bird populations, particularly for those species that are in decline or have limited populations. Predators, such as the peregrine falcon, limit population growth by reducing nest productivity and increasing adult and juvenile mortality. The Channel Islands are critical breeding areas for seabirds and support important colonies of special-status or declining species, such as the state-threatened Xantus's murrelet, rare ashy storm-petrel, and federally threatened western snowy plover. Peregrine falcons are known predators of the Xantus's murrelet and western snowy plover (Hunt 1994, USFWS 2001). Peregrine falcons have also been documented preying on petrels (Walton 1997, White et al. 2002); therefore, ashy storm-petrels could be impacted as well. Because many seabirds are under constant threat (e.g., from oil spills, human disturbance, El Niño events), they may not be able to withstand peregrine falcon predation (Paine et al. 1990). In particular, depressed populations of seabirds may not be able to effectively absorb the additional predation pressure from increased peregrine falcons on these islands.

Recolonization of peregrine falcons to the Southern Channel Islands may also impact the federally endangered San Clemente loggerhead shrike *(Lanius ludovicianus mearnsi).* This bird subspecies is endemic to the U.S. Navy–owned San Clemente Island and was listed by the USFWS as endangered in 1977 due to its localized range, critically low population numbers, consistently low productivity, and intense predation pressure. Significant effort has been made to decrease the threat of extinction of the wild population. Although this population has been recently increasing, the subspecies remains highly endangered and vulnerable to predation pressure.

Peregrine falcons do not prey upon California brown pelicans (Walton 1997); therefore, release of additional birds is not expected to adversely impact this species.

C1.4.2 Physical

Benefits

This action has no known benefits to the physical environment.

Impacts

This action has no known impacts to the physical environment.

C1.4.3 Human Use

Benefits

The recovery of the peregrine falcon to the Channel Islands provides both aesthetic and recreational benefits to visitors of the islands. Peregrine falcons are known for their spectacular

flights with an average speed of 40–55 kilometers (km)/hour (25–34 miles/hour) with speeds reaching 112 km/hour (70 miles/hour) (Cade 1982).

Impacts

This action has no known impacts to human uses.

C1.5 LIKELIHOOD OF SUCCESS/FEASIBILITY

The methodology proposed for hacking peregrine falcons on Santa Catalina Island is one that has been successfully employed worldwide to reestablish peregrine falcons and other species. Hacking of peregrine falcons in California has been successful and has contributed to the ongoing recovery of this species on the mainland and in the Northern Channel Islands. Once birds are released from the hack towers, operational work beyond monitoring is minimal. The proposed methodology is technically sound and feasible and the likelihood of increasing the number of occupied peregrine falcon territories on the Channel Islands is high. While hacking is a feasible method for increasing the number of peregrine falcons on the Channel Islands, ongoing contamination of the food web of the Southern California Bight may impair the ability of peregrine falcons to successfully reproduce in certain territories.

C1.6 PERFORMANCE CRITERIA AND MONITORING

Specific performance criteria would be developed as part of the monitoring plan for this action. The plan would outline established methods for monitoring the distribution, number of pairs, reproductive success (i.e., productivity), recruitment, foraging behavior, and dispersal of released peregrine falcons on the Channel Islands.

C1.7 EVALUATION

The Trustees have evaluated this action against all screening and evaluation criteria developed to select restoration actions and concluded that this action is consistent with these selection factors. Recovery of this species on the Channel Islands is under way, as documented by the current presence of approximately 21 pairs on six of the eight Channel Islands. Both the ongoing release program on the mainland and natural recruitment are responsible for the recolonization of these islands. Although the historical record is incomplete for the Channel Islands, between 20 and 30 pairs were estimated prior to 1945 (Kiff 1980, Hunt 1994). In 2004, the current number of pairs occupying the Channel Islands is within this estimated range and continues to increase.

The number of pairs on the Channel Islands has been steadily increasing. In the last 10 years, the number of pairs has doubled from 8 to 10 pairs in 1994 to 21 pairs in 2004. This increase can be attributed to both successful production on the islands and hacking efforts on the mainland. As peregrine falcon numbers continue to increase on the mainland, natural recruitment to the Channel Islands from the mainland is likely to increase as well.

Current levels of DDE-associated eggshell thinning are unknown for the breeding pairs on the Channel Islands. However, because some pairs are successfully reproducing, contaminant levels are not high enough to result in widespread failure on the Northern Channel Islands. This may not be the case with the Southern Channel Islands. The slower rate of colonization and lack of

known successful breeding attempts on the Southern Channel Islands may indicate that contamination continues to negatively impact certain pairs. However, for the Channel Islands as a whole, ongoing impacts due to DDT contamination are being buffered by the natural recruitment of birds from other areas (Walton 1999).

Peregrine falcons are experiencing an overall expansion on the Channel Islands despite any ongoing effects from DDE in their diet. The number of breeding pairs on both the Northern and Southern Channel Islands is within the estimated range prior to their disappearance from the islands. Productivity on the islands, recruitment from the mainland, and ongoing hacking efforts on the mainland continue to result in the occupation of additional territories on the Channel Islands. Although additional active restoration may further speed recovery, the Trustees have determined that additional hacking efforts are not necessary at this time. However, as part of the Preferred Alternative, the Trustees will fund several peregrine falcon surveys over the next 5 years that will provide updated information on the status and distribution of these birds on the Channel Islands (see Appendix C2). Based on the results of these surveys, the Trustees may proceed with active restoration activities on the Channel Islands in Phase 2 of the restoration program. A subsequent NEPA/CEQA document would be released to the public to address future restoration projects in Phase 2.

C1.8 BUDGET

The estimated cost of a 5-year active restoration program on Santa Catalina Island is shown below. This budget does not include all the associated monitoring and contaminant analysis costs.

- Labor.....$374,000
- Supplies.....$99,000
- Equipment.....$7,000
- Transportation.....$13,000
- Overhead.....$110,000
- **Total Cost Years 1–5.....$603,000**