

Abundance of Peregrine Falcons in Grand Canyon National Park Has Implications for Regionwide Recovery

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Recent studies to determine the status and abundance of nesting peregrine falcons (*Falco peregrinus anatum*) in Grand Canyon NP have documented the largest population of this species on a single land-management unit in the lower 48 states. At least 58 adult pairs of peregrines were discovered in a survey of approximately 25 percent of the park in the 1989 nesting season alone. Throughout the 1988-89 study period, 71 breeding areas have been identified.

The overwhelming extent of large cliff habitat present within Grand Canyon suggests that the park is ideal nesting habitat for peregrine falcons. In addition, the proximity of the Colorado River with its abundance of resident and migrant birdlife provides a large prey base for potential use by peregrines. Preliminary surveys of the park in the early 1980s revealed a half-dozen pairs of peregrines, but a more thorough survey was desirable.

In 1987, the NPS at Grand Canyon contracted with SWCA Environmental Consultants, Inc., of Flagstaff, Ariz., to conduct a 3-year survey of peregrine population status in the park. Resource managers John Ray and Peter Rowlands of Grand Canyon NP were to administer the study. Close cooperation was maintained with the non-game branch of the Arizona Game and Fish Department which was conducting a statewide survey of nesting peregrine falcons, and with the U.S. Fish and Wildlife Service.

The survey's primary purpose was to determine the number of nesting pairs present. Additional objectives were to examine nesting success, compile observations on the impacts of human disturbance on nesting pairs, and to develop a long-term monitoring program for use by NPS personnel.

The immense size, limited access, and remoteness of the Grand Canyon presented logistical obstacles which had to be overcome before any survey work could be accomplished. Areas of the Park that could be reached easily by road, trail, or river were surveyed first to maximize cost-effectiveness. The use of helicopters was almost completely eliminated in order to minimize disturbance and noise impacts to park visitors and wildlife.

Instead, observers reached their study sites on foot, by road, or by boat. Study sites were located from one to three miles apart along the continuous lines of cliffs, which occur in three general tiers, or steps, from the bottom to the top of the Canyon. Up to 10 adjacent study sites a day could be surveyed in this way by using motorized rafts to place observers along the Colorado River.

Once at their study sites, observers would camp there overnight. Survey results from evening and morning observation periods indicated whether or not peregrines were active at the site. By surveying up to 10 contiguous study sites per day, an entire line of cliffs could quickly be "cleared" (no peregrines present), or the activity range of a pair or individual could be defined by simultaneous, overlapping observations. A key assumption of the field technique was that peregrines were absent from the site if no activity was observed during the evening and morning observation periods totalling 10 hours.

1988 and 1989 Results

Twenty-eight pairs of nesting peregrine falcons were identified during the 1988 field season, in an area com-



Hundreds of miles of high-quality peregrine falcon nesting habitat exist along the Colorado River in Grand Canyon NP. Photo by Bryan Brown.

prising approximately 10 percent of the park. Most of those pairs were located along the Colorado River, with some pairs on the north and south rims. Few pairs were located in the inner canyon between the rims and river. Seven successful eyries fledged an average minimum of 1.83 juveniles each.

Extrapolation of the 1988 survey results suggested that 69 pairs of peregrines could potentially occur in those areas of the park exhibiting high-quality nesting habitat: the north rim, south rim, and river corridor. The scope of the 1989 survey work was modified to test the accuracy of this extrapolation by shifting the emphasis of the survey to those three areas.

Field work in 1989 more than doubled the area of the park that was surveyed, so that the entire river corridor and most of the north and south rims were included. The increase in area surveyed in 1989 was cause for the greater number of pairs found. The 58 pairs identified in the 1989 survey included 15 of the pairs previously identified in 1988; 13 pairs located in 1988, however, were not detected during the 1989 survey. A 21-day river survey confirmed that the core of the peregrine population at Grand Canyon occurs along the river, where at least 37 pairs were located.

The more extensive field surveys of 1989 made it possible to better determine average spacing between adult pairs of peregrines. Average distances between pairs on the south rim, north rim, and Colorado River were 3.7 miles, 5.0 miles, and 4.2 miles, respectively. Minimum distances between eyrie cliffs of adjacent pairs were 1.8 and 2.0 miles on the river and the south rim, respectively.

Difficulties with weather and timing on a portion of the Colorado River survey ruled out a direct comparison of 1989 results with the 1988 population estimate of 69 pairs on the rims and river. Nevertheless, the more accurate estimates of spacing between pairs

obtained in 1989 made possible a refined estimate of the actual peregrine population on the rims and river. Extrapolation from the 1989 survey data indicates that approximately 100 pairs of peregrines could occur in those areas of the park.

Preliminary information on the food habits of nesting peregrines along the river, based on observations of prey captures during May, suggested that large numbers of bats and white-throated swifts were being taken as prey. Bats and swifts apparently have increased greatly in numbers along the river since 1963 due to habitat changes (increased riparian habitat and insect populations) brought about by the operation of Glen Canyon Dam, located just 15 miles upstream of the park. The use of these two species as important prey items illustrates a possible relationship between the operation of the dam and the abundance of peregrines along the river – a hypothesis that would require thorough testing to confirm.

Relation to Colorado Plateau Population

The extraordinary number of peregrine falcons in Grand Canyon represents the dense core of a large population of peregrines occurring on the Colorado Plateau of Arizona, Colorado, New Mexico, and Utah. Falcon surveys of Canyonlands NP, Capitol Reef NP, Glen Canyon NRA, and Zion NP (*Park Science* 9(2):3-4) by The Peregrine Fund, Inc., and NPS have demonstrated the large size of the Colorado Plateau population and its contribution to regionwide recovery efforts. Since the majority of this population is on NPS land, management conflicts resulting from peregrine conservation efforts will be minimal.

The presence of a large, possibly interdependent, population of peregrine falcons on NPS lands on the Colorado Plateau suggests a need for greater cooperative efforts between the parks, as well as between NPS Regions. All parks involved in peregrine population monitoring have in common a desire to maintain the long-term health and natural well-being of the population. Ongoing research and monitoring efforts in a number of NPS areas on the Colorado Plateau could be coordinated to provide more useful information than the results from any one park could provide alone. A uniform monitoring protocol, for example, if adopted by several parks, would do much to establish regionwide population trends.

Implications for Recovery

These findings have substantial implications for the recovery of this endangered species in Arizona and the Southwest. Surveys by the Arizona Game and Fish Department in 1989 located over 70 pairs of peregrine falcons across Arizona in areas outside of Grand Canyon NP. The 58 pairs located within the park in 1989, when combined with Arizona Game and Fish Department total, raise the state total to almost 130 pairs. The boundaries and goals of recovery areas for peregrines in the Southwest are still in the process of being established, but the population size in Arizona appears to be near full or partial recovery. A possible result of these findings, made possible in part by the discovery of a large peregrine population in Grand Canyon, would be downlisting of peregrines in the Southwest from endangered to threatened status in the near future.

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