

Peregrine Falcon Research in the Yukon-Charley Rivers National Preserve, Alaska

By Skip Ambrose and Steve Ulvi

The decline of the peregrine falcon came to symbolize the devastating effects of some man-made chemicals on the environment. Likewise, peregrines have become a showcase of man's ability to protect and recover endangered species. While not all species will be so responsive to human management efforts, the recovery of the peregrine falcon is a genuine success story. Recent issues of **Park Science** included several articles on surveys and hacking efforts in parks in the lower 48 states. In Alaska, where peregrines declined to approximately 30 percent of their historical (pre-DDT) levels, there has never been any nest manipulations or hacking. Consequently, peregrine populations in Alaska offer a unique opportunity to study the natural recovery of an endangered species without human intervention. The Yukon-Charley Rivers National Preserve (YUCH) in particular is invaluable for such study because of the historical information available and many years of intensive survey and banding studies.

Three subspecies of peregrine falcons occur in

Alaska: the Arctic Peregrine Falcon (*Falco peregrinus tundrius*) inhabits the northern tundra region of the state, the American Peregrine Falcon (*F. p. anatum*) occurs in the forested interior, and the Peale's Peregrine Falcon (*F. p. pealei*) occurs in the coastal regions of the Aleutian Islands, Gulf of Alaska and southeast Alaska. Both the Arctic and American subspecies are highly migratory, wintering as far south as Brazil and Argentina. The Peale's Peregrine Falcon is for the most part a year-round resident within its range, but some movement along the west coast of Canada and the United States occurs. The Arctic subspecies is currently listed as "threatened" and the American subspecies is listed as "endangered." The Peale's subspecies is not considered threatened or endangered.

The decline of peregrine falcons in Alaska may have begun as early as the 1950s following initial use of DDT. Surveys of the past three years recorded numbers over twice those observed in the early surveys, and investigators now believe the very early surveys either missed birds, due to timing of the surveys, or the population was already declining and researchers had no

way of knowing this.

Research on peregrines in Alaska has focused on the listed Arctic and American subspecies, and the YUCH has been a principal study area in interior Alaska. As early as 1898, biological surveys in this area documented peregrines nesting on the cliffs that occur along the Yukon River, and in the 1950s, Dr. Tom Cade (1960) surveyed sections of the river. Because of the historical information available, this section of the Yukon River was selected by the Alaska Peregrine Falcon Team as an index population area for monitoring and measuring recovery. Since 1979, intensive surveys, banding and other research have been ongoing in the Preserve. With information dating back to the late 1800s, and continuous intensive research beginning in the late 1970s, few areas offer such an opportunity for research and monitoring.

Surveys in Alaska

Peregrine falcons arrive in interior Alaska about mid-April. Males and females apparently migrate separately but arrive at the nest site within days of each



Adult female feeds her young. Notice the FWS band and black aluminum band with alpha-numeric code.

other. Breeding activity is initiated immediately, and the first eggs are laid by early May. Our first surveys, to determine nest territory occupancy and the number of pairs attempting to breed, begin about two weeks after the river ice breaks up – usually between May 5 and May 15. Large ice floes, trees and debris congest the river and make travel dangerous for about two weeks after breakup, so surveys generally start about May 25. Eggs hatch between early and mid-June, and we plan our second survey to correspond with the optimum banding age, about three weeks. Our second surveys generally occur during the first two weeks of July.

A 20-foot river boat with a 90 horsepower outboard is used to survey the 165 mile stretch of the Yukon River between the Alaska-Yukon Territory border and Circle, Alaska. Inflatable rafts, flown to the headwaters in helicopters or small fixed-wing aircraft, are used to survey the tributary rivers. Ground surveys, as opposed to aircraft surveys, are essential for accurate results.

Other research projects concerning peregrine falcons or their prey also have been conducted during the past 10 years. Trapping adult falcons to determine dispersal, movement and mortality was initiated in 1981. Beginning in 1986, all young and adults trapped were banded with alpha-numeric coded color leg bands in addition to the standard USFWS leg band. Using high-powered spotting scopes, we are able to identify individual falcons in subsequent years without the need to trap and handle the birds. Pesticide studies on peregrine eggs were conducted in 1984 and again in 1989. Prey remains are collected from occupied eyries every year for identification, and in 1985 and 1986 a study on

prey selection was conducted. A limited home range study using radio-telemetry was undertaken in 1986.

The wide variety of survey techniques employed in the past, and the resulting difficulty in analyzing survey data, led the USFWS and others to develop standardized techniques for surveys and data collection in Alaska. These require at least two trips through study areas, one during incubation and another when the young are three to four weeks old. At least four hours of observation at any known or suspected nest site is necessary before a determination of the status of that site can be made. Finally, all survey data are recorded on a Raptor Observation Record Card developed by the USFWS for raptor surveys. A computerized database was developed in conjunction with the card facilities data entry and analysis. This card and database was further refined in cooperation with NPS scientists in other regions and is now used in several other states.

Results of Falcon Research in the Preserve

The earliest surveys along the Yukon River in the Preserve area documented 15 to 16 pairs per year (Bishop 1900, Cade 1960). In 1966, 15 pairs and 27 young were observed (Cade et al. 1968). The lowest recorded level was in 1973 when Ritchie (1976) observed 11 pairs, 1 single adult and 16 young. The population remained near this level until 1978 when the first increases were detected. That year, 16 pairs, 3 single adults and 28 young were seen. The population has continued to increase through 1989 when 33 pairs, 2 single adults and 54 young were seen (Ambrose et al. 1988). Surveys along the major tributaries such as the Charley, Kandik, Nation and Tatonduk rivers docu-

mented similar increases. In recent years, it has not been unusual to find 50 or more occupied sites and 80 to 100 young. A crude estimate of the total population in the preserve is 60 to 70 pairs, and possibly more in the highest years.

Cade (1960) estimated the interior Alaska peregrine population at 250 pairs. Recent surveys throughout the interior suggest that pre-DDT population number may have been higher than Cade's figure. The increases of the peregrine population during the past 10 years have been truly remarkable.

With a sizeable and healthy population, we were able to undertake research projects that were fundamental to understanding the biology of peregrine falcons. Some of these projects were not

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feasible, biologically or politically, in any other area of the United States. Over 1500 nestlings have been banded in interior Alaska since 1979, many of these in the Yukon-Charley Rivers National Preserve. Close to 100 recoveries outside Alaska have revealed major migration routes, staging areas and wintering areas. Given the changing nature of habitats all over the world and the continued use of harmful pollutants in many areas, this information is critical to management of the species.

In addition to recoveries outside Alaska, nearly 200 recoveries in the state have resulted from our adult trapping effort. This trapping has allowed us to determine dispersal patterns from natal areas, age of first breeding, turnover of adults at nest sites, movement of breeding adults between nest territories, and adult mortality. Age of first breeding appears to be related to density of the population and available nest sites; females tend to disperse farther than males (mean of 75 miles for female versus 43 miles for males) (Ambrose and Riddle 1988). More importantly, with this understanding of age of first breeding (in both a depressed and recovered population), breeding success of different aged birds, and normal dispersal distances, we can lend insight into recovery potential and timing in other areas.

Future Management Considerations

The peregrine population in the Preserve appears to be nearing full recovery. Peregrines in Alaska will likely be considered for delisting in the next few years. Continuing pesticide use and habitat changes along migra-

tion routes and in wintering areas, and their unknown cumulative effects, make future monitoring critical. Expansion of research and inventory and monitoring efforts on this unique population will provide the opportunity to assess and monitor several aspects of the biodiversity of these river ecosystems. Such research should allow us to measure to some degree the effects of pollutants and habitat alteration outside the United States. The peregrine is an effective ecological generalist and as such is an excellent indicator species, reflecting subtle changes in the environment.

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ROMO Raptor Survey

All Park areas in the Rocky Mountain Region known to have peregrine falcons are in the midst of raptor surveys. One goal is to survey all of the suitable habitat for peregrine falcons by fall, 1991. NPS is co-operating with USFWS in a peregrine prey contamination study designed to follow-up a similar study completed 10 years earlier. The results should give insight into the peregrines' recent population increase and may provide clues as to why certain segments of the population continue to experience poor reproductive success. The NPS has co-operated with USFWS in a color-banding protocol for the western U.S., consistent with the protocol for Alaska, Canada, and Greenland. The bands, easy to read from a distance, will provide more information with less handling of the birds.

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