



Peregrine Falcons

OVERVIEW

The extensive global breeding distribution of the peregrine falcon is rivaled among bird species only by that of the osprey and raven (McEneaney et al. 1998). Its name is derived from the Latin *peregrinus*, meaning pilgrim or wanderer; some peregrine falcons complete among the longest seasonal migration routes of any North American bird. The American peregrine falcon (*Falco peregrinus anatum*) has the broadest distribution of the three peregrine subspecies in North America. Although widely distributed, the American peregrine nests in low densities and its estimated historical

population in the United States is about 4,000 breeding pairs (White et al. 2002). It is one of four falcon species found in Greater Yellowstone, the others being the prairie falcon (*Falco mexicanus*), the American kestrel (*Falco sparverius*) and the merlin (*Falco columbarius*).

Physical Characteristics

The falcon genus, *Falco*, is derived from “*falx*,” the Latin word for sickle, in reference to the sickle-shaped silhouette of the falcon’s sharply pointed wings in flight. Also distinctive is the falcon’s notched beak that is used to kill prey by severing the spinal column at the neck. The female adult peregrine falcon weighs about 24 ounces, stands about 20 inches tall, and has a wingspan of up to 46 inches; the males are significantly smaller. Peregrine falcons are similar in size and appearance to the more common prairie falcon, which has paler brown plumage, a narrower facial mustache, and dark wing pits (Montana Peregrine Institute).

Ecology

Nest sites. The female peregrine selects the nest site, often on a cliff with an overhang adjacent to a broad valleys, lake, stream or other terrain that enables a commanding view of the surrounding terrain and offers the most protection. The same peregrine eyrie may be used repeatedly over many years by the same or a different breeding pair. Established pairs may alternate between different nest sites within their breeding territory over successive years (White et al. 2002). Nest-site selection may have evolved as a response to human rather than non-human predation (Ratcliffe 1993). They sometimes use nests that have been abandoned by ravens or golden eagles.

In Greater Yellowstone peregrine falcons typically nest on the upper third of a large cliff face that is at least 150 feet in height and near a watercourse (Montana Peregrine Institute). An eyrie found at an elevation of 10,220 feet on

Colter Peak in Yellowstone National Park is the highest known eyrie in North America at that latitude (McEneaney et al. 1998). Territory size varies depending upon prey abundance and nest site availability, but generally pairs will not tolerate another peregrine nest within a few miles. They may pursue and challenge ravens, prairie falcons and other peregrines in territorial disputes. The first line of defense is usually soaring flights and vocalizations; the frequency of physical attacks may be greatest in areas where competition for resources is most severe ((Ratcliffe 1993). Prairie falcons are more likely than peregrine falcons to use a nest site that is further from water, but they have been known to nest within one-third of a mile of peregrine falcon nest (Montana Peregrine Institute).

Peregrine falcons have adapted to the loss of historical habitat to some extent by nesting on the ledges of tall buildings or bridges. Of the 3,005 nesting pairs in the United States recorded in 2003, 92% were nesting on natural substrates in all regions except the Midwestern/Northeastern region, where only 32% nested on natural substrates (USFWS 2006).

Reproduction. Peregrine falcons may start breeding in their second year, but males typically begin one year later. Annual breeding can continue throughout their life, although productivity declines as they get older. Although peregrines have been observed to form monogamous pair bonds that persist through many breeding seasons, the extent to which this behavior is typical is not known (Ratcliffe 1993).

Breeding behavior involves aerial displays and courtship feeding prior to copulation at the nest site, which is usually a shallow depression in the gravel on a narrow ledge. About two weeks after breeding behavior begins, the female typically lays three or four eggs (Ratcliffe 1993). In Yellowstone National Park, the eggs are usually laid between late April and mid-May (McEneaney 1988). In Montana, peregrines have produced an average of two eggs per active nest since 1994 (Montana Peregrine Institute). Factors affecting annual productivity include egg and chick mortality from cold, wet, and late spring weather and prey availability (Ratcliffe 1993).

Both parents care for their young, though females are present on the eggs for most of the incubation period, which may last from 28 to 37 days. Chicks typically fledge in August, five to six weeks after hatching, and the fledglings usually remain dependent upon their parents for an additional 6 to 15 weeks (White et al. 2002).

Human activities and noises may alter courtship behavior and be a factor when peregrines fail to establish nests. Eggs sometimes roll out of their shallow nests if



the incubating parent is suddenly disturbed. The impact of rock climbers can be particularly severe in remote areas where peregrines are not habituated to human presence and the climbers' route follows cracks and ledges that may support the little vegetation found on cliffs and are used by peregrines for foraging, roosting, and nest sites (Richardson and Miller 1997, Ratcliffe 1980).

Food. Peregrine falcons prey mostly on small and medium-sized birds, but they can kill game species such as pheasants, ducks, grouse, and Hungarian partridge (Montana Peregrine Institute). They occasionally consume insects but rarely take small mammals or fish or scavenge carrion. At level flight, these birds typically travel 40 to 55 miles per hour, but during a hunting dive, their terminal velocity can be in excess of 200 miles per hour, making them the fastest creature on land, sea or air (USFWS 2006). They can catch and kill small birds in mid-air; larger birds they strike with their talons and retrieve after the prey falls to the ground.

Migration. In North America, the migratory range of the peregrine falcon extends from Greenland into South America, their breeding range from northern Alaska to northern Mexico. Migrating peregrines may be seen throughout North America in spring and fall. The northernmost nesting populations generally migrate south in the winter to tropical environments, while those that nest in warmer climates migrate shorter distances or not at all. The primary winter range of peregrine falcons that nest in Greater Yellowstone is believed to be in Mexico and northern Central America. Peregrines that were banded in the Greater Yellowstone have returned from the Mexican states of Sinaloa and Jalisco, areas that attract high concentrations of migratory shorebirds, waterfowl and passerines, providing a steady prey source for peregrines. Migrating peregrine falcons arrive in Greater Yellowstone from late March to early April, and usually depart in October or November (McEneaney et al., 1998).

Mortality. Healthy peregrines in the wild usually live for an average of 13 years, but have been known to live for up to 20 years in extreme cases. Peregrines have few predators, the most significant of which may be the great horned owl (*Bubo virginianus*), which can take young or adult falcons from a roost ledge during the night (Ratcliffe 1993). Golden eagles are known to prey upon peregrine falcons and their eggs. Most human-caused mortality is a result of environmental contamination or habitat destruction. West Nile Virus and other avian diseases may ultimately pose the greatest threat to the peregrine falcon (Montana Peregrine Institute).

History

Historically, the peregrine falcon was a common bird all over the world. Peregrines have been used to

hunt or pursue game (falconry) for thousands of years, beginning with nomad tribes in central Asia, and spreading through Europe and America. The presence of peregrines in Yellowstone was documented as early as 1914, but early park records provide only intermittent reports on nest locations and little on which to assess population abundance.

The effect of pesticides. The decline in peregrine and other raptor populations in the United States that began after World War II was eventually attributed to the widespread use of dichloro-diphenyl-trichloroethene (DDT) and other organochlorine pesticides. DDT was sprayed in and around Yellowstone in the 1950s to combat spruce budworm infestations (McEneaney et al., 1998). Raptors become contaminated by consuming birds that have stored the chemicals in their fatty tissues. Heavily contaminated female birds may fail to produce eggs, lay thin-shelled eggs that break before hatching, or pass on organochlorines to the egg, causing the embryo to die. The peregrine falcon was considered extirpated in Greater Yellowstone by the 1960s, and in 1970 it was listed as endangered throughout the United States under the Endangered Species Conservation Act of 1969.

Population recovery. Restrictions were placed on organochlorine pesticides in Canada and the United States starting in the early 1970s, and pesticide-caused reproductive failure was believed to be rare if not absent in northern populations by the late 1980s, though organochlorine levels in the environment remained high in some areas (Peakall 1990). Use of these pesticides is still permitted in Mexico and some Central and South American countries where they may affect migratory birds. Although pesticide restrictions are considered the primary factor in reversing the peregrine falcon population decline, the widespread release of captive-bred falcons helped the species regain much of its former distribution in North America (White et al. 2002).

Surveys done in the late 1970s found no occupied peregrine nest sites in Idaho, Montana, or Wyoming. Reintroduction efforts in these states began when the Peregrine Fund released 11 juveniles at three sites in the Jackson Hole area in 1980, and 4 juveniles in the Centennial Valley of Montana in 1981. The following year, the state of Idaho released 8 juveniles at two sites on the western edge of Greater Yellowstone. In 1983, the Wyoming Game and Fish Department in collaboration with the Peregrine Fund and federal agencies, released 4 juveniles in Yellowstone National Park. The following year, two breeding pairs with leg bands (indicating they had been captive bred) were observed in Greater Yellowstone: one pair on a cliff in Centennial Valley and one that produced three young in a historically occupied nesting site in the Grand Canyon of the Yellowstone River. In 1985, the leg bands of a pair recorded in the Grand



Canyon indicated that the male had been released on Targhee National Forest in Idaho and the female in Jackson Hole (McEneaney et al., 1998).

In Grand Teton National Park, 52 peregrines had been released by 1986; in Yellowstone, 36 by 1988; and in Bighorn Canyon National Recreation Area, 28 by 1994. The goal set by a Greater Yellowstone working group of having 30 nesting peregrine pairs in the tri-state area was met in 1989. A subsequent goal of 30 nesting pairs in Wyoming was achieved in 1994. Reintroduction efforts outside of the parks continued in Idaho until 1994, in Wyoming until 1995, and in Montana until 1997. As a result of significant population gains throughout its historical range, the U.S. Fish and Wildlife Service removed the American peregrine falcon from the endangered species list in 1999.

Current Status and Management

The peregrine falcon is considered fully recovered in Greater Yellowstone. Annual surveys of peregrine nesting sites in the park has been and will continue to be dependent on the availability of park staff, state wildlife personnel, or volunteers to do the time-consuming work. Collecting data on site occupancy and production requires at least three visits per site, and often requires monitoring a site all day. The first visit occurs during late courtship to check for site occupancy. If a previously used nest site does not appear to be occupied, some effort should be expended to locate an alternate site within the territory. A second visit checks again for occupancy and attempts to confirm the specific eyrie location, if any; and a third visit (or more) to occupied territories is made when any hatchlings produced would be at least four weeks old but not yet fledged. Data is collected on the number of hatchlings, subadult, and adult peregrines, behavioral or physical evidence of breeding activity, and photographs are used to document eyrie locations. Data summaries are sent to the U.S. Fish and Wildlife Service Regional Coordinator for Peregrine Monitoring. Helicopter surveys supplemented by ground

surveys in suitable but unoccupied habitat are helpful in the effort to locate other territories, but are rarely feasible because of the expense and time required.

In Bighorn Canyon. The 70 miles of steep canyon walls along the reservoir appear to provide suitable peregrine nesting areas and abundant rock doves and other prey. Five eyries have been identified since 1994, one of them near the Devils Canyon overlook. The three sites that were active in 2007 produced a total of eight fledglings. With assistance from the Peregrine Fund, the Rocky Mountains Cooperative Ecosystem Studies Unit at the University of Montana, Missoula, plans are underway to survey Bighorn Canyon and its tributaries for falcon eyries in 2008 and 2009. The surveys will be conducted primarily by boat in June and July, when young are fledging and the birds are generally easiest to detect.

In Grand Teton. Annual surveys have been conducted since 1990 to document the distribution and productivity of nesting peregrines within the park. Although there appear to be numerous canyons in the park with suitable cliffs, no more than three eyries are known to have been active each year during this period. Nesting territories have been located in Garnet Canyon, Webb Canyon and by Glade Creek. All three territories were occupied from 2005–2007; three peregrines fledged in 2005, none in 2006, and one in 2007. Peregrines have been reported in Death and Cascade Canyons but no eyries have been found there. The relatively low productivity rate and small number of peregrine territories in the park may be a result of its short breeding season, harsh spring weather, or other unknown factors.

In Yellowstone. One of the highest concentrations of nesting peregrine falcons in the northern Rockies can be found in Yellowstone. The number of nesting pairs has increased steadily since the birds were reintroduced in the park starting in 1983, reaching a post-recovery record of 32 nesting pairs in 2007 that produced 47 fledglings, the largest number of nesting pairs ever recorded in Yellowstone.



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