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MIDWEST PEREGRINE FALCON RESTORATION, 1990 REPORT

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INTRODUCTION

The ninth year of restoration of Peregrine Falcons (*Falco peregrinus*) in the Upper Midwest was completed in 1990 with the release by hacking of 78 young falcons. An additional 10 were released northeast of Thunder Bay, Ontario. Pairs or single falcons were on territories at about 28 places by the end of the season. Fifteen pairs of wild falcons laid eggs and at least 32 young fledged successfully.

Since 1982, 453 falcons produced in captivity have been released in the Midwest; for Minnesota, the total is 183 and no additional releases are planned. An additional 68 or more young falcons have been fledged by peregrines now breeding on their own in the wild. Although Minnesota releases have been concluded, releases will continue in other Midwest states for several more years to reach the regional goal of 40 territorial pairs.

1990 POPULATION STATUS

SUCCESSFUL BREEDING PAIRS

1. Multifoods Tower, Minneapolis, Minnesota. MF 1 (Muffin) and Will were both present on February 17, apparently having spent the winter in the area. This was MF 1's fourth nesting season, Will's second. They had four eggs by April 8, hatched all four by May 13. The young, two males and two females, were moved to the roof on June 5. All fledged the third week of June. An adult male was in the nest box on December 5 and two adults were present on December 7. MF 1 was photographed in mid-November and a falcon was seen there regularly into January on the roof of the Moos Tower on the University of Minnesota Minneapolis campus, two miles from the Multifoods Tower.

Three Red-tailed Hawks which entered downtown Minneapolis on different days in the summer were attacked by the resident peregrines. One, a pale adult female, was killed and another was severely injured by strikes to the back of the head. A third red-tail was knocked to the ground, but recovered enough to evade capture and fly weakly away.

One of the 1990 MFT female young, 72V, was photographed eating a pigeon at North Star Concrete, Apple Valley, Dakota Co., on September 27. A peregrine (same bird?) was back in October for at least one visit.

2. North Central Life Tower, St. Paul, Minnesota. Meg, the female who nested here in 1988 and 1989, apparently spent the winter here. She was seen repeatedly in February. On March 4, an adult male with a black band on its left leg and silver on right was in the box. He was seen again on March 10 and 12. On April 9, when there were three eggs in the box, there was much aggression all day, with two falcons repeatedly locking feet and falling to lower roofs and once almost to the ground. After one such encounter, a falcon lay on the roof over Town Square for about a minute before recovering and flying away. The fights were observed by Scott Lazaretti, David Skoog, and others from their office on the 24th floor of the Meritor Tower. At the time we thought it was

redirected aggression between the male and female because of disturbance by window washers, but it now seems more likely that the fight was between two males. The black-banded male present earlier was replaced sometime between March 12 and June 23 when a new adult male, Beaner (816-21848, anodized gold, right leg), released in 1986 in Minneapolis, was in possession of the territory and was captured on the Meritor Tower roof. It seems likely that this new male is the bird that was at Hastings in 1988 and for a few days in 1989, at NSP Bayport in early 1989, and at NCL in summer of 1989 following the death of the original 1989 male, Radar, in a plane collision on July 7. Supporting evidence comes from spring arrival dates for this bird at Hastings, carefully checked daily by Joanne Dempsey, April 21, 1988 and April 16, 1989. If he arrived in St. Paul in 1990 on April 9 when the fight was seen, he could not have fathered the 1990 NCL young. Perhaps the 1990 Montgomery Ward male, Maverick, (see below) was the black banded male who was displaced from the NCL nest by Beaner, who had priority at the site. The severity of the territorial fight can be explained because both males had reason to feel that they "owned" the territory, Beaner because he held it for several months in 1989 before leaving for the winter, the black-banded male because he held it early in 1990 and fertilized the clutch of eggs. Beaner, the victor in the dispute, is four years old, the black-banded male at most three. If the black-banded male was Maverick (who is two years old), he then nested only three miles to the west on the Montgomery Ward tower. Blood

samples from the NCL and Ward young should prove whether Maverick sired both broods. One inconsistency is that the late 1989 NCL male was reported by Tordoff to have a silver, not gold, band on its right leg, but this may have been an error. When Beaner was trapped in 1990, the gold anodizing on his band was too faded to be reliably seen under field conditions.

Since there were three eggs on April 9, the fourth was probably laid April 10 or 11; three hatched by May 14. The young, two females and one male, were moved to the roof on May 30, where they fledged around June 21. Both female young got severe *Trichomonas* infections ("frounce"), which is common in pigeons, were picked up weakened on the street in early July, and died at The Raptor Center. The young male seemed unaffected and was seen at the nest box on July 30.

Two adult peregrines were still at the NCL tower in early December. On November 23, Chase, 06T, from Rochester was picked up on the ground with a broken wing one block west of the NCL tower, presumably injured by the resident falcon(s). For details, see account 23 below.

3. Control Data Corporation Headquarters, Bloomington, Hennepin County, Minnesota. The 1989 peregrines, female 08V and male 04T, returned on March 10, 1990. They ignored the box installed in 1988, so we gave them a gravel tray on a favorite ledge on April 6. Three eggs were laid by April 20, one hatched by May 17 (the others had dead embryos). We added two young from Bob Anderson and moved the brood, all females, to the nest box on June 8. All fledged around June 27. One young flew into the glass-walled building and was killed on June 30. Another, 74V, killed a pigeon and was captured for positive identification and released by Ken Wagner in Andover, MN, 30 miles north of Bloomington, on September 1. A nest box has been placed at a new location on the roof of the north wing of the building to eliminate the problem of confusing reflections from the glass walls which apparently deterred the falcons from using the old box in 1990.

4. NSP King Power Plant, Bayport, Minnesota. An adult male arrived at the nest box on the smokestack on March 12. He was joined by an immature female on March 20; they turned out to be half-siblings, 31V, Mae, female produced by MF1 and Will in Minneapolis in 1989 and 13T, male, produced by MF1 and Alfie in Minneapolis in 1988. By April 23 they had three eggs; none had hatched by May 30, when the female was seen on a TV monitor to eat one egg. Two male young from Bob Anderson placed in the box were adopted immediately. They fledged around June 28. The female, 31V, seemed casual about incubation, spending long periods away from the nest and standing over the eggs instead of incubating them during the period when they should have been hatching, behavior probably reflecting her immaturity. One adult was seen at the nest box on September 29. A peregrine thought to be a male was seen by Paul Simonet near the NSP plant on January 8, 1991.

5. Montgomery Ward, St. Paul, Ramsey County, Minnesota. This new pair was reported by Tom Shearen, who works in the building, on May 3. The male is 05T, Maverick, released at Rochester, Minnesota, in 1988; the female is 11V, Comet, released at Virginia, Minnesota, in 1988. They laid three eggs on tar roofing material on the upper ledge of the 250 foot tower which we transferred to a gravel tray. One hatched June 9 after at least 36 days of incubation. This male chick and one additional male from Bob Anderson were put in the tray in front of a new nest box on the east side of the tower. Both fledged around July 20; one fell down a large nearby smokestack but was rescued and released unharmed, the other was killed in a collision with the MW building on August 14 or 15. For possible earlier history of Maverick, see pair 2, NCL, St. Paul, above.

6. Palisade Head, Lake County, Minnesota North Shore. Two adult peregrines were seen by a rock climber on a new nest ledge north of the parking lot on May 1, when the nest contained two eggs. On May 6, Tordoff read the bands on both adults; they are Larry and Fridge, both nesting here in 1988 and 1989. The clutch of four eggs hatched in early June and the four young, three females and one male, fledged around July 12. Late in the nestling period, the adults brought at least 14 gulls, apparently all Ring-billed Gulls, to the brood and remains of other peregrine-killed gulls were found by residents living just north of Palisade Head. It will be interesting to see if there is any effect of eating gulls on egg-shell thickness in future years. Gulls are known to store high levels of pesticide residues in their fat. This pair of falcons seemed to use gulls for food for only a few weeks during the last half of the nesting period when four young needed feeding. There was no evidence of gull use by these individuals in 1988 or 1989, with broods of two and one. Perhaps brief episodic consumption of gulls will be less harmful to the adults and young than would be more consistent use.

Three young were seen at the nest cliff on August 5 by Dudley Edmondson.

7. Mt. Leveaux/Mt. Oberg/Homer Lake, Cook County, Minnesota. For three years, we have been outwitted by a pair of adult peregrines in this area. In 1988 there was no evidence of nesting; in 1989, at least one young was fledged from an unlocated nest; this year, a pair was reported on Mt. Oberg by Jim Carlson on May 20 but could not be found there in later searches. On August 12, Dan Taylor saw three juvenile peregrines and one adult, probably male, on Homer Lake, off the Caribou Trail, about 19 miles north of Mt. Oberg. It is only a guess that just one pair is involved in these events; none of the birds has been identified.

On September 2, Dudley Edmondson saw an adult peregrine drive a Broad-winged Hawk into the woods at Mt. Leveaux.

8. Environmental Learning Center, Finland, Lake County, Minnesota. Although a pair was present here in 1989, the adults that nested here in 1990 were apparently two new birds (1989 male reported to have red band on one leg, dark band on other; 1990 male had green band on left leg, right leg bare, indicating release at Mt. Leveaux in 1985 or 1986; 1989 female a one-year-old; 1990 female apparently is 20P, Blueberry, released at Virginia, Minnesota in 1987. 20P is a peregrinus X pealei female from Jack Oar; she might have shown enough immature plumage in 1989 to have been taken for a one-year-old). The pair arrived on April 14 and moved into a nest box placed on a cliff at Wolf Lake in 1987. Four eggs were being incubated by April 26 and hatched in late May. On June 15, part of the rotted bottom of the box and three of the four young fell to the rocks below when the young were being banded. Two of the chicks, one male and one female, were killed; the other two, also one male and one female, were unharmed and went on to fledge without further incident.

9. First Wisconsin Center, Milwaukee, Wisconsin. McArthur, 03Y, and Sibella, 20V, apparently spent the winter here. This was McArthur's third nesting season, the second with Sibella. They produced four eggs by April 6, all hatched, and four young (three females, one male) fledged in late June.

10. Cline Avenue at Lake Michigan, East Chicago, Indiana. The same pair of peregrines that nested here in 1989 remained through the winter and nested again in 1990. The first attempt, in an expansion joint under the highway, was washed out in heavy rains on May 9-10. They renested in the same cave-like opening under the highway overpass that they used in 1989 and fledged two young males from three eggs in early August. One young, 32X, was killed by a car on the bridge the day after fledging. Both adults were captured for blood sampling

on July 17: the male is Floyd, 34Y, released in Milwaukee in 1987; the female is Phoenix, 08P, released in Fort Sheridan, Illinois, also in 1987. Their ID numbers are consistent with the partial numbers read in 1989.

There is also the possibility of another Indiana pair about nine miles from the Cline Avenue pair. An observer reported seeing a pair and young during the summer. An Indiana DNR person sent to the site reported suitable habitat and saw an adult peregrine in the vicinity. No further details are available.

11. Commodore Perry Motor Inn, Toledo, Ohio. At this site two young were fledged in 1988, none in 1989, and one in 1990. A second young died in the nest in 1990. The 1990 pair included the same female as in 1988 and 1989, released in St. Catherine, Ontario, in 1987, and an unidentified male.

12. Winnipeg, Manitoba. The same adults as in 1989 (Maud, 27P, and a male released in Winnipeg in 1985) nested again and produced two young from four eggs. One of Maud's 1989 young, a male, was present in 1990 on the University of Manitoba campus (see pair 22 below). According to Robert Nero, a male released at the University of Manitoba campus in 1989 helped a female raise two foster chicks at Edmonton, Alberta, in 1990.

On December 17, Nero reported identifying a new adult female (52V), released in Cedar Rapids, Iowa, in 1989, in the downtown Winnipeg territory, setting the stage for a territorial conflict next spring if the old pair returns to find an interloper. The new bird, present since early fall, was seen as late as December 20.

UNSUCCESSFUL BREEDING PAIRS

13. Northern Building (recently renamed 125 S. Wacker Bldg.), Chicago, Illinois. For the third year, a pair nested at this site. The female is Harriet, who nested here in 1988 and 1989; the male is unidentified. The pair produced four eggs, the first on March 19. Three young hatched, but the chicks disappeared around May 4 at eight days of age, cause unknown. The adults did not re-nest.

14. Trap Hills, Bergland, Ontonagon County, Michigan. A pair of adults, at least one with a black band indicating Midwest release, nested on the cliff where a pair was present in 1989 and where releases were made in 1988 and 1989. Their behavior indicated that young were hatched, but the nesting failed, perhaps because of predation on the young.

15. Porcupine Mountains, about 5 miles west of Silver City, Ontonagon County, Michigan. A pair of adults, at least one with a black band, nested on a cliff. Adults were seen bringing food to the nest ledge, but the young disappeared, perhaps casualties of a severe storm in early July.

NONBREEDING TERRITORIAL PAIRS

16. Detroit, Michigan. The male, Solo (20Y), was mated in 1988 to Bogey and in 1989 to a female, 3B1, released in Montreal in 1984; the two 1989 nesting attempts failed. On March 22, 1990, a new female, unbanded and adult-plumaged, appeared and 3B1 disappeared from Solo's territory. The new female remained at least until May 30. Copulation was seen several times in early April and potential nest sites were visited, but no nesting was attempted. The female's behavior toward Solo appeared fairly aggressive. An unidentified female peregrine was seen with Solo on July 20, but he seemed to be unpaired for the rest of the summer.

17. Little Trout Bay, off Cloud Bay, between Thunder Bay and U.S. border, Ontario. Gordon Cameron, Ontario MNR, reported a pair, adult male and immature female, seen in mid June on a remote lakeside cliff. No further details available.

18. Duluth, Minnesota. A pair of peregrines defended the Richard Bong Bridge between Duluth and Superior, Wisconsin, in late May, harassing a highway crew most of one day. Dave Evans visited the site later and could find no certain evidence of nesting but thinks the pair may have had a nest that was abandoned as a result of the day-long invasion of their territory by the highway crew. Later in the summer and early fall, a female peregrine with a black band was present around grain elevators farther north in Duluth harbor.

19. Pictured Rocks National Lakeshore, Alger County, Michigan. An unidentified pair was present early in the season but did not nest. Releases planned for this location were moved to Isle Royale.

20. Hyde Park, south Chicago, Illinois. A pair of peregrines was present much of the summer but did not nest. One member of the pair is unbanded, the other has at least one band, aluminum on the left leg. A nest box may be installed for use in 1991.

21. Chicago, Illinois. Since at least February, 1988, a rehabilitated male, Pacer, released in Chicago in 1986, was paired with a female, Zoar, P32, released in Milwaukee in 1987. Their territory, occupied year around, centers on the Fisher Building, near Irving Park and Lakeshore Drive, where two nest boxes are available. Zoar was killed in a collision with a building on February 18, 1990. Pacer remained at the site until early June, when a new pair appeared: the new male is Pegasus, 14Y, released in 1987 at Fort Sheridan; the female is a one-year-old, ?42?, probably Silverstreak, 42V, from Illinois Beach State Park, 1989. The new pair remained all summer, copulating and using the nest box, but did not nest. Pacer's fate is unknown.

22. Winnipeg, Manitoba. A one-year-old male produced by Maud and her mate in downtown Winnipeg in 1989 spent much of the summer and fall, 1990, on the University of Manitoba campus. He was joined in mid-September by a female, 67P, released in 1989 in Omaha, Nebraska.

SINGLE TERRITORIAL BIRDS

23. Mayo Clinic, Rochester, Minnesota. An adult male, Chase, 06T, released at the Mayo Clinic in 1988, was present the entire season. A female arrived on April 24, provoking much calling and food transfers, but she must have had another destination in mind because she did not stay. Chase did not attract a permanent mate.

At 4 a.m. on November 23, Chase was picked up from the ground at Mickey's Diner, one block west of the North Central Life tower in St. Paul with a fractured left carpometacarpus inflicted by a blow from above. The most plausible explanation is that he was exploring greener pastures, having gone unmated in Rochester, and entered the territory of the St. Paul pair, both still in residence. Presumably one of them dealt him a blow to the wing. Examination of his left wing also disclosed an old fully healed fracture of the left radius, an injury which would have kept him flightless for at least a month. How did he get food through this period? Chase has recovered flying ability at The Raptor Center; after conditioning he will be returned to the Mayo Clinic for release in February, ready for a much needed improvement in his luck.

24. Madison, Wisconsin. On May 20, as the first 1990 batch of hacked peregrines was released from Van Hise Hall, University of Wisconsin, an adult female peregrine (whether banded is uncertain) arrived on the scene. She hassled the young birds but never actually struck them. She became less aggressive as later groups of young were released. By late June, she had been replaced by a banded adult male (band not read) who remained through the rest of the season.

25. Fargo, North Dakota. Wick Corwin reported two peregrines at the First Interstate Bank building on May 15. The female was an unbanded adult who left the area several days later. The male was one year old, banded with a black band on right leg, silver on left, suggesting that he was produced by a pair nesting in the wild. He was somewhat oiled on the underparts and the black band was not readable at a distance. Prey remains on the roof of the building indicate that one or both birds had been present for some weeks. The male remained on the territory for the rest of the season. A tray of gravel was placed on the east side of the building.

26. Hill Annex Mine State Park, Calumet, Itasca County, Minnesota. Used as a hack site in 1989. An adult male falcon was intermittently present here in 1989. In 1990, three peregrines were seen at one time here in spring. On several other occasions, single birds were seen but no close watch was kept and the status of falcons here remains uncertain.

27. Omaha, Nebraska. A one-year-old male peregrine appeared in mid-May and remained for the rest of the season. Four young peregrines were released here in midsummer, without serious interference from the older male.

28. Cedar Rapids Iowa. A one-year-old male with a black band on the left leg and silver on right appeared at the hack site on June 21, apparently attracted by the seven young falcons in the box. He stayed through the summer, chasing the young aggressively at first but without harming them. Later in the summer his aggression waned and he began courting the young birds.

NATURAL BREEDING

Summing up the natural breeding in 1990, 15 pairs nested, 12 (80%) of which were successful. Thirty-two young were fledged (counting five young added to three nests in the Twin Cities), 2.7 young fledged per successful pair, 2.1 per nesting pair.

Of the 15 nesting pairs, eight were on buildings, five on cliffs, one on a smokestack, and one under a highway overpass. Seven of the eight building pairs succeeded, as did three of the five cliff pairs, the smokestack pair, and the highway pair. Of the 32 young fledged in the wild, all except the three young at Homer Lake were banded.

PEREGRINE RELEASES IN 1990

Minnesota. Five young from Bob Anderson were added to wild broods: two at Control Data, one at Montgomery Ward, and two at the NSP plant in Bayport. All fledged successfully, but one was later lost at Control Data and one at Montgomery Ward, both in building collisions. Young added to wild broods are counted in our totals as "wild-produced" rather than hacked to emphasize their rearing by wild falcons rather than their captive origin.

Wisconsin, Madison. Nineteen falcons were released in batches of seven, six, and six. All fledged successfully, although one, 68T, was later killed when hit by a vehicle near Madison and another, 70V, was found dead at Winthrop Harbor, Illinois, on August 31. A female, 94P, released at Madison in July 1989 was trapped and released by Ken Holkestad at Moose Mountain, north of Duluth, Minnesota, on September 30, 1990.

Michigan, Isle Royale National Park. Eighteen falcons were released and 16 reached independence successfully. At Blake Point, six were hacked. At Feldtmann Ridge, two batches of six were released; one youngster died shortly after release from unknown cause and another was killed after fledging by an avian predator, perhaps a goshawk.

Ohio. Columbus. Eight falcons were released and four reached independence. One was lost in a building collision, two starved through failure to get back to the hack box, and one died of disease.

Ohio. Cincinnati. Six falcons were released with five successfully reaching independence. One bird failed to develop properly and is in captivity, perhaps to be released in 1991.

Illinois. Glen Ellyn. Ten falcons were released at the College of DuPage in groups of six and four. All fledged successfully, but by the end of the season four were lost, one to a predator, one to disease, and two to unknown causes. One other falcon suffered a broken wing and is undergoing rehabilitation.

Iowa. Cedar Rapids. Thirteen falcons were released from the Telecom*USA building, in groups of seven, three, and three. A one-year-old male with a black band on the left leg, silver on right, arrived with the first group, harassed the youngsters as they learned to fly, but did no damage. Two of the young were killed in building collisions, eleven reached independence.

Nebraska. Omaha. Four peregrines were hacked from the Mutual of Omaha building; all dispersed normally. An adult male peregrine arrived at the hack

site when the young had been flying for about 12 days and remained for the rest of the season. He was not aggressive to the young falcons.

From mid-July to late summer, a peregrine was present in Lincoln. It was reported to have a "brass" band; its origin is not known.

Ontario. Thunder Bay. The Ontario Ministry of Natural Resources (Thunder Bay District), Canadian Wildlife Service, and the Thunder Bay Field Naturalists, led by Harold Kish, cooperated in a release of 10 peregrines on a cliff in Sleeping Giant Provincial Park, Sibley Peninsula, about 30 km east of Thunder Bay. All fledged successfully, for an excellent two year total of 26 falcons released in the Thunder Bay district without any known losses.

To sum up production for 1990 in the Midwest, 32 young were fledged by wild pairs and 88 young (including the 10 at Thunder Bay, Ontario, part of the Midwestern population although not released under our auspices) were released from captive pairs, for a total of 120. Of these, 101, 84%, lived to independence (74 hacked, 84%; 27 wild, 84%). Causes of deaths before independence were: collision with buildings (5), killed by predator (2), disease (4), collision with vehicle (2), starvation because of failure to return to hack box (2), developmental problem (1), unknown (3).

EGG-SHELL THINNING

Four intact unhatched eggs were recovered in 1990, two from the NSP pair in Bayport, MN, one from the Montgomery Ward pair in St. Paul, and one from the East Chicago, Indiana, pair. These eggs, compared with the mean for eggs from the pre-1947 eastern U.S. peregrine population (Ratcliffe Index, 1.99), show no significant shell thinning (R. I.: NSP, 1.99, 2.08; MW, 2.01; E. Chicago, 3.0 - too high, perhaps not fully blown or dried). (The Ratcliffe Index combines empty eggshell weight, length, and breadth to give a standardized index of shell thickness.)

GENETIC ANALYSIS

We have begun a genetic analysis of the new midwestern population of peregrines, in order to measure inbreeding, outbreeding, genetic variation, changes in occupancy of territories, dispersal of adults and young, success of the different genetic stocks introduced, and long-term development of genetic structure in the new population. Sharon Moen has raised the research funds and is doing the genetic work for the next two years as a PhD project. In 1990, she compiled pedigrees from data supplied by the falcon breeders and visited Los Alamos National Laboratory to learn DNA fingerprinting techniques from Jon Longmire. She has extracted and purified DNA from over 150 peregrine blood samples and "fingerprinted" 40 peregrines.

We collected blood samples in 1990 from 82 newly released peregrines, from 25 wild young, and from eight wild adults. In addition, blood is being collected by the various breeders from the captive founders of the new population.

PLANS FOR 1991 AND BEYOND

In 1988, we suggested a new goal for the Midwestern restoration effort of 40 territorial pairs of peregrines for the nine state area (Minnesota, Wisconsin, Michigan, Nebraska, Iowa, Illinois, Indiana, Ohio, and Missouri) and western Ontario. Twenty-two pairs were on territories in 1990. Judging by experience with the restored eastern peregrine population and our five year

history of nesting birds in the Midwest, the population can be expected to double every two to three years in its early growth stage and then quickly level off. In 1989 we predicted 20 to 22 pairs in 1990; the actual count is 22. For the years ahead, we repeat our prediction made in 1989, namely, 26 to 30 pairs in 1991, 32 to 36 in 1992, with the goal of 40 pairs reached in 1993 or 1994, given releases at the 1989 level through 1991. Individual states each have their own goals, however, which will likely result in a tapering off of releases in the 1990s, rather than an abrupt termination.

The general objective of the restoration effort is to establish a self-sustaining population of Peregrine Falcons, large enough to reduce or eliminate the possibility of extinction through random events and sufficiently diverse genetically to provide adequate variation for natural selection. The size of a founder population is irrelevant to its survival if recruitment is not adequate. Large populations will disappear without recruitment; small populations will grow with adequate reproduction. No one can be sure at what level the new Midwest population will stabilize, but this level will be reached without human help once the general objective is met. The only biological benefit of releasing more falcons than the minimum needed to establish a safe, self-sustaining population is to reach the present carrying capacity of the region more quickly and to distribute the birds across the region in a satisfactory manner, although the final details of distribution will be determined by the falcons themselves.

ACKNOWLEDGEMENTS

The Midwest Peregrine Project is a cooperative effort involving many people and organizations. The University of Minnesota provides the overall coordination and administration of the project through Dr. Pat Redig of the Raptor Center and Dr. Bud Tordoff of the Bell Museum. The Minnesota Chapter of The Nature Conservancy provides administrative support services and is involved in critical peregrine habitat preservation. Other financial and logistical support for the Minnesota part of the effort is provided by Minnesota DNR Nongame Wildlife Program, Minnesota DNR Parks and Recreation, Endangered Species Office and Minnesota Cooperative Fish and Wildlife Research Unit of the U. S. Fish and Wildlife Service, U.S Forest Service, Minnesota Falconers Association, Iron Range Resources and Rehabilitation Board, Wolf Ridge Environmental Learning Center, Mayo Clinic, Northwest Airlines, and BCED Minnesota in Minneapolis and St. Paul. Each cooperating state and agency has, in addition, its own list of cooperators, for which see the individual hack site reports. Falcons are obtained from private falconer/breeders, listed in the appendix, throughout North America. Falcons were supplied through us to the Wisconsin, Michigan, Illinois, Ohio, Iowa, and Nebraska releases on a contract basis. The day to day devoted care that makes hacking falcons successful was provided by the hack site attendants listed in the appendix.

APPENDIX

BREEDERS SUPPLYING PEREGRINES FOR 1990 RELEASES

Robert Anderson, Hugo, Minnesota
Les Boyd, Pullman, Washington
James Doyle, Arlington, Texas
Don Hunter and Victor Hardaswick, Centerville, South Dakota
Jack Oar and Bruce Haak, Eagle, Idaho

Lynn Oliphant and Paddy Thompson, Saskatoon, Saskatchewan
The Peregrine Fund, Boise, Idaho
Ralph Rogers, Winnifred, Montana
Steve Sherrod, Bartlesville, Oklahoma

1990 CONTRIBUTORS TO PEREGRINE RESTORATION IN MINNESOTA

Individuals

Linda Falch
Norman L. Ford
Louis F. Hill
Louis W. Hill, Jr.
Marion J. Mengel
Elaine Mellott
Tom and Toni Shearen
Harrison B. Tordoff
Robert J. Wilkie

Organizations

BCED Minnesota
Big Game Club Special Projects Foundation
Control Data Corporation
Friends of the Minnesota River Valley
Mayo Clinic
Minnesota DNR Nongame Wildlife
Minnesota Falconers Association
Northwest Airlines
University of Minnesota Graduate School Faculty Grant-in-Aid
U. S. Fish and Wildlife Service

1990 HACK SITE ATTENDANTS

Michigan

Isle Royale National Park, Blake Point: James Berkelman, James Garland.
IRNP, Feldtmann Ridge: Marcus Koenen, Mary Maule.

Wisconsin

Madison, Van Hise Hall, Univ. Wisc.:
Milwaukee, First Wisconsin Center: Greg Septon and Annie Wendt.

Illinois

Glen Ellyn, College of DuPage: Mary Ann Schmidt, Dan Bartley, Sally Baumgardner, David Bernier, Gwyn Boughner, Eileen Bunker, Donna Burdick, Steven Brockway, Vicki Byre, Hal Cohen, Phillip Collura, Elna Davis, Tom Doan, Didge Donovan, Don and Donna Eisenmenger, Sandy Fejt, Antonella Gianni, Mary Hennen, Linda Hill, Russ and Sandy Kamine, Jim Kaney, Kathy Lucas, Leila Parts, Bobbi Perkins, Sue Schultz, Herb Schulz, Janice Siska, Christine Stenson, Tim Stephenson, Jan Underwood.

Iowa

Cedar Rapids, Telecom*USA Building: Kristin VanRees, Wendy Van DeWalle.

Ohio

Columbus, Rhodes State Office Tower: Jeanette Bettinger, Pamela Claar, Martha Konidaris.

Cincinnati, Commerce Center: Margaret Kelly, Stephanie Dubs, William Brunner, Jenny Herbst.

Nebraska

Omaha, Mutual of Omaha Bldg.: Lauren Gilson, Jason McMeen.

Table 6. PEREGRINE POPULATION GROWTH IN THE MIDWEST

Year	Total rel.	Terr. pairs	Nest. pairs	Succ. pairs	Young fldgd	Yg/n. pair	Yg/s. pair
1986	102	4	1	0	0	0	0
1987	170	6	3	1	1	.33	1.0
1988	254	13	8	6	12	1.5	2.0
1989	370	16	12	9	22	1.8	2.4
1990	453	22	15	12	32	2.1	2.7

Note: Starting in 1989, "young fledged" includes all young surviving to first flight from the nest.