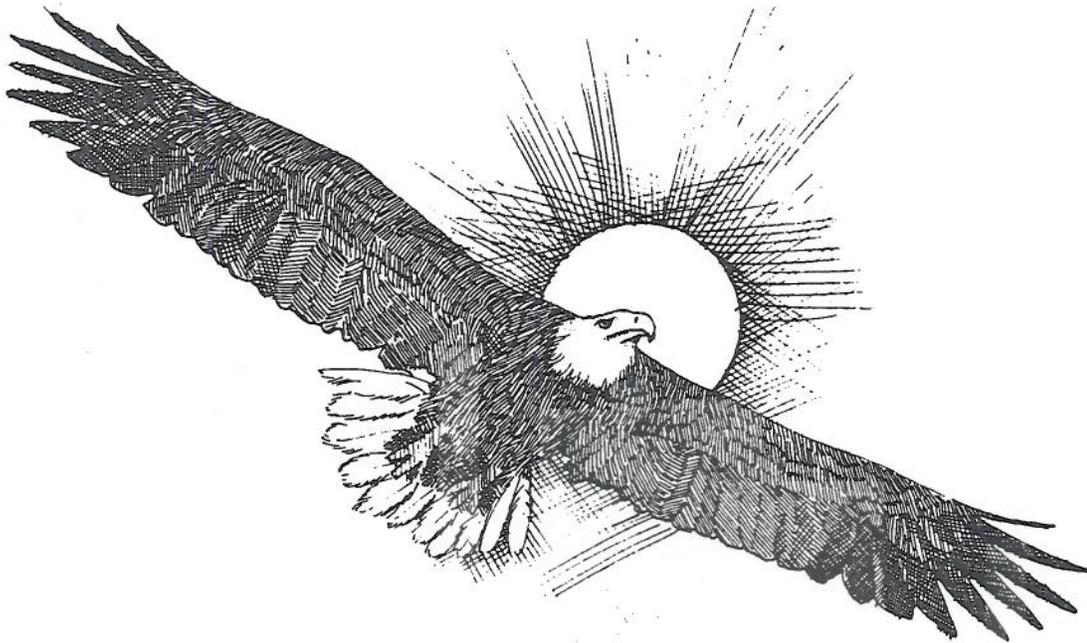


Studies of Bald Eagles, Ospreys, and Other Raptors 1986

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BALD EAGLE BANDING AND RELATED RESEARCH IN MICHIGAN, 1986

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While the reproductive success of Bald Eagle populations has been monitored in several parts of their breeding range for various lengths of time (in Michigan for 26 years), reliable information on survival rates is mostly lacking and the currently available band recovery data are still insufficient for calculations of life equations (Grier 1980). Such information is crucial to an understanding of eagle population dynamics and its application to management; this especially so, because populations of long-lived, slowly reproducing birds are more sensitive to changes in survival rates than to changes in reproductive rates (Young 1968, Grier 1980). The objectives of this continuing research are:

- (1) Through the banding of nestlings establish an adequately large population of banded Bald Eagles to produce in the long term the needed data base for (a) calculation of realistic estimates of age-specific survival rates for life equations, and (b) studies to determine patterns of dispersal and migratory movements and to identify wintering localities of adult and immature Bald Eagles.
- (2) In conjunction with the banding work gather information on various other aspects of Bald Eagle ecology, including food habits, nest site and habitat selection, behavior, responses to human activity and land use, and the influence of environmental pollutants on eagle reproduction and survival.
- (3) Assist the Michigan Department of Natural Resources with the monitoring of the state's nesting eagles and their reproductive success, compile the annual survey summary, and to provide consultation on Bald Eagle biology and management as needed.

This is a progress report of field research accomplished during the 1986 breeding season.

METHODS AND STUDY AREA

Close liaison was maintained during the breeding season with DNR biologists involved in the two aerial surveys. Preliminary information from these surveys was used to identify nests containing bandable young. A number of breeding areas (territories) and nests had to be rechecked from the

air; this was done to determine occupancy by eagles of several breeding areas for which the available information was inconclusive, or to explore the best ground access routes to new nests which had not been reached on the ground previously. Most nests containing young were then climbed when the eaglets were between 5 and 8 weeks old and the young birds banded, either with Size 9 rivet-type bands as issued by the U.S. Fish and Wildlife Service Bird Banding Laboratory, or with Size 9 lock-on bands reworked and converted to smaller rivet-type bands, intermediate between Sizes 8 and 9; the latter type was used on individuals with slender tarsi, believed to be males. The tree-climbing was done by John B. (Jack) Holt, Jr., Joseph M. Papp, and James Crowley. Instances in which the number of young found by the banding team differed from the aerial survey findings were reported to the appropriate DNR biologists. Such discrepancies resulted from occasionally inaccurate aerial counts of very small eaglets, as well as due to subsequent mortality.

Information and materials obtained during visits to nest sites include:

- (a) Presence of adults and their behavior was noted.
- (b) Whenever and wherever conditions permitted, the adults were checked for presence of bands.
- (c) Prey remains found in or below nests were either identified in the field and recorded, or collected for later identification.
- (d) Nestlings were checked for general condition and, whenever possible, examined for ectoparasites.
- (e) When conditions permitted, the foot pad and length of the eighth primary (counted toward the distal end of the manus) were measured to determine to what extent the sex and age criteria developed by Bortolotti (1984) in Saskatchewan also apply to Bald Eagles in our area.
- (f) Nests and nestlings were examined for presence of, or entanglement with fish line, hooks, etc.; whenever found such items were removed.
- (g) For nests visited for the first time the nest site and breeding habitat characteristics were described and patterns of human land use in the surrounding area noted. Such descriptions typically included: tree species and condition, height of nest above ground, trunk diameter at breast height (DBH), brief description of topography, forest cover, distance to nearest water; openings, roads, dwellings, etc.
- (h) Suitable specimens (addled eggs, eggshells, dead eagles, molted feathers) were looked for for studies of toxic-pollutant contamination and its effects. Molted feathers from adult eagles and feathers from dead young

were stored in plastic zip-lock bags and labeled with date and location. Addled or abandoned eggs were measured, wrapped in aluminum foil, stored in a cool place and finally frozen.

The study area includes the entire state of Michigan, however as most Bald Eagle nests occur in the northern two-thirds of the state (DNR Regions I and II), most of my field work was concentrated there.

RESULTS AND DISCUSSION

The 1986 Population and Recent Trends. The aerial surveys undertaken by DNR biologists, my own observations and those of the banding teams, and reports from other natural resource agencies together located 122 breeding areas (territories) occupied by Bald Eagle pairs in 1986. Pairs were seen at three additional breeding sites, but no occupied nests were found there. No eagle activity was noted this year at seven sites which were occupied in 1985, and at eight sites only single adults were observed (Table 1, Fig. 1). Some of these sites may have been occupied by pairs — most likely non-breeders — of which only one member was seen during the all-too-brief over-flight, some may involve pairs which have moved to new nests which remain yet to be discovered, while others were almost undoubtedly attended by only single individuals which had lost their mates.

In the western Upper Peninsula there were 63 pairs (not counting one on Isle Royale) against 65 in 1985, plus five sites with apparently only single adults, suggesting a slight decline since last year. However in a portion of this area the first aerial survey (to determine site occupancy and incubation) was not undertaken until late April, 3 weeks past the optimum time for this purpose (see Fraser et al. 1983, 1984; Postupalsky 1974, 1981). Thus some nonbreeding or early-failing pairs were probably missed, and this year's lower count may be just an artifact of poor survey timing. However it is nevertheless evident that the eagle population in the inland section of the western Upper Peninsula has been at best stagnant in recent years. Most new pairs that have established new breeding territories (or re-occupied long-abandoned historic ones) during the last several years have done so along the eastern and northern margin of the area (eastern Iron, Dickinson, Menominee, Marquette, Houghton counties). One new pair was discovered this year in Menominee County, at a site where no nest existed 2-3 years ago.

Table 1. BALD EAGLE REPRODUCTIVE SUCCESS - MICHIGAN, 1986

	Upper Peninsula	Lower Peninsula	Michigan totals	
Occupied breeding sites (pairs)	84 (+1)	38 (+2)	122 (+3)	<u>a/</u>
Pairs apparently breeding	75	38	113	
Pairs, breeding uncertain	2	0	2	<u>b/</u>
Pairs apparently not breeding	7	0	7	<u>c/</u>
Breeding sites with one adult	6	3	9	<u>d/</u>
Occupied breeding sites with known outcome	84	37	121	<u>e/</u>
Productive nests	44 (52%)	24 (65%)	68 (56%)	
Nests with 1 young	24 (55%)	11 (46%)	35 (51%)	
Nests with 2 young	19 (43%)	11 (46%)	30 (44%)	
Nests with 3 young	1 (2%)	2 (8%)	3 (4%)	
Total number of young	65 (+13 died)	39 (+3 died)	104 (+16 died)	<u>f/</u>
Young/productive nest	1.48	1.63	1.53	
Young/occupied breeding site (with known outcome)	0.77	1.05	0.86	

a/ Two adults were observed at three additional breeding sites, but no occupied nests were found (Mc 07, Al 03, Mn 04).

b/ Mq 01, Bg 02.

c/ Go 12, Go 26, Ir 06, Ir 13, Lu 08, Mc 03, Cp 23.

d/ Go 02, Go 06, Bg 10, Ir 03, Di 01, Cp 22, My 01, My 04, Ro 01.

e/ Outcome unknown for Sg 01.

f/ Known nestling mortality occurring after the late May survey flights:

Go 16: 2 young between 5/24 and 6/25;

Go 20: 1 young between 6/4 and 6/23;

Go 23: 1 of 2 young between 5/30 and 6/9;

On 07: 1 young between 6/4 and 6/23;

On 18: 2 young between 6/4 and 6/27;

Ho 07: 1 young between 5/24 and 6/29;

Ir 01: 2 young between 5/24 and 6/20;

Ir 07: 1 young between 5/24 and 6/20;

Mq 18: 2 young between 5/29 and 6/18;

Ap 02: 2 young between 6/2 and 6/15;

Ap 06: 1 young between 6/2 and 6/15.

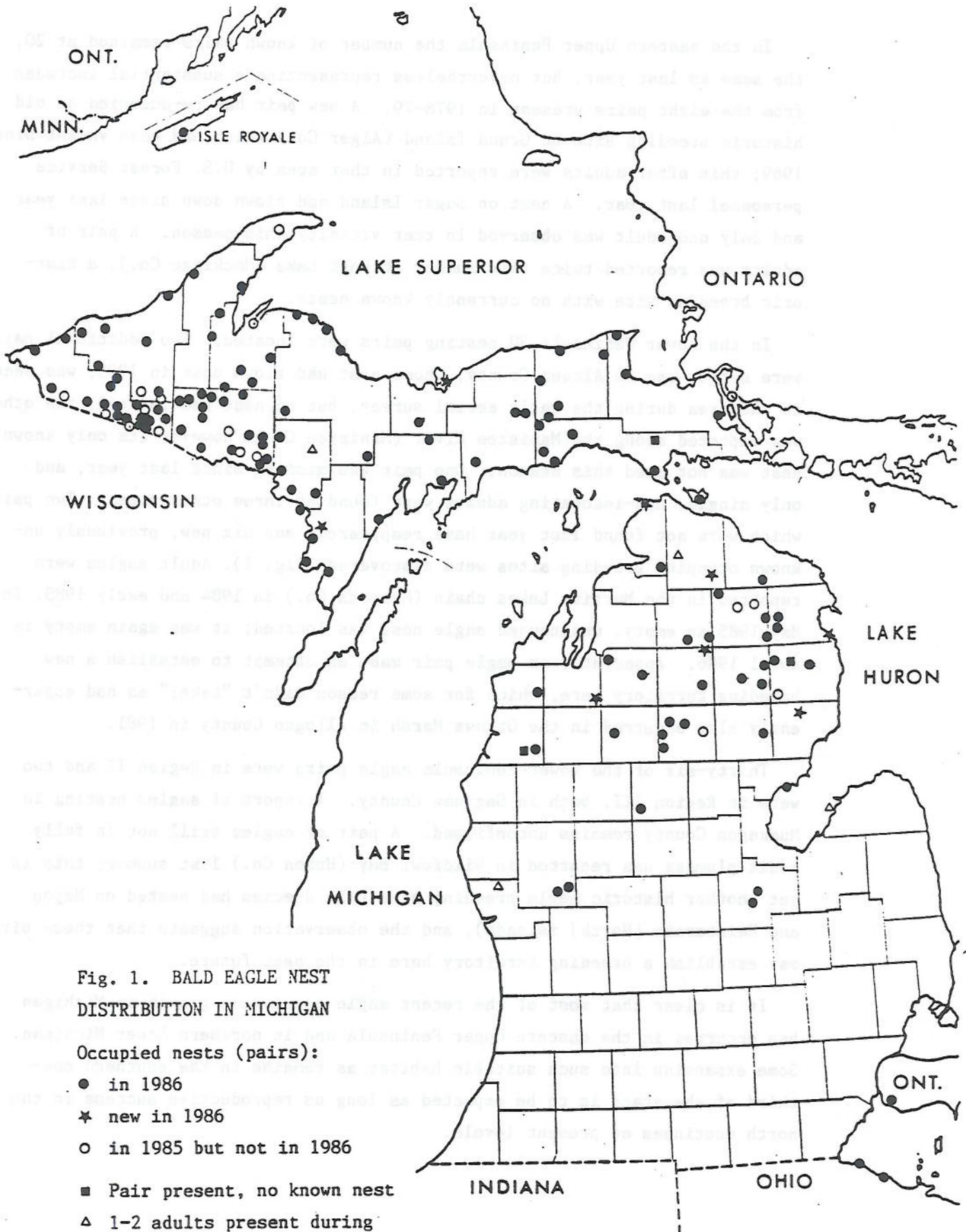


Fig. 1. BALD EAGLE NEST DISTRIBUTION IN MICHIGAN

Occupied nests (pairs):

- in 1986
- ★ new in 1986
- in 1985 but not in 1986
- Pair present, no known nest
- △ 1-2 adults present during breeding season

In the eastern Upper Peninsula the number of known pairs remained at 20, the same as last year, but nevertheless representing a substantial increase from the eight pairs present in 1978-79. A new pair has re-occupied an old historic breeding site on Grand Island (Alger Co.) which had been vacant since 1969; this after adults were reported in that area by U.S. Forest Service personnel last year. A nest on Sugar Island had blown down since last year and only one adult was observed in that vicinity this season. A pair of adults was reported twice this summer at East Lake (Mackinac Co.), a historic breeding site with no currently known nests.

In the Lower Peninsula 38 nesting pairs were located. Two additional pairs were noted: one in Alcona County, whose nest had blown down in 1985, was seen in the area during the early aerial survey, but no nest was located; the other was reported along the Manistee River (Manistee Co.), however its only known nest was not used this season. One pair was missing since last year, and only single, non-incubating adults were found at three other sites. Two pairs which were not found last year have reappeared, and six new, previously unknown occupied breeding sites were discovered (Fig. 1). Adult eagles were reported in the Martiny Lakes chain (Mecosta Co.) in 1984 and early 1985. In May 1985 an empty, unattended eagle nest was located; it was again empty in April 1986. Apparently an eagle pair made an attempt to establish a new breeding territory here, which for some reason didn't "take," as had apparently also occurred in the Ottawa Marsh in Allegan County in 1981.

Thirty-six of the Lower Peninsula eagle pairs were in Region II and two were in Region III, both in Saginaw County. A report of eagles nesting in Muskegon County remains unconfirmed. A pair of eagles still not in fully adult plumage was reported in Wildfowl Bay (Huron Co.) last summer; this is yet another historic eagle breeding area (the species had nested on Mejou and Heisterman [North] islands), and the observation suggests that these birds may establish a breeding territory here in the near future.

It is clear that most of the recent eagle population growth in Michigan has occurred in the eastern Upper Peninsula and in northern Lower Michigan. Some expansion into such suitable habitat as remains in the southern one-third of the state is to be expected as long as reproductive success in the north continues at present levels.

Reproductive Success. The outcome of nesting was determined for 121 occupied nests, of which 68 (56%) were productive and a total of 104 young were raised to an advanced stage of development (Table 1). Nestlings which are known to have died prior to fledging are not included. Productivity of the 1986 population was 0.86 young/occupied nest (i.e., territorial pairs, including nonbreeders), or somewhat below the mean for the past 10 years (0.95; N=963), but still exceeds the estimated minimum level (0.7) required for population maintenance (Sprunt et al. 1973).

The below-average productivity this year was in part due to higher than usual nestling mortality. At least 13 eaglets died or disappeared from nine nests in the western Upper Peninsula and at least three eaglets were dead or missing from two Lower Michigan nests. These losses were discovered between June 9 and 29. They were not part of brood reduction which often occurs in raptors under less than optimal food supply, but in all but one case involved entire broods. None were attributable to destruction of nests by high winds. The nestlings either disappeared without a trace, or little more than a "grease spot" and a scattering of feathers, still partly in their sheaths, were found in the nest or on the ground below. Most of these eaglets died about the second week of June, coincident with a period of low night temperatures (30°F), when they were about 5 weeks old, at a stage not yet adequately feathered but already too large to be effectively brooded by the adult. Larger young apparently were unaffected. In late May we banded 17 of the largest eaglets in 10 nests in the western Upper Peninsula. All but one of these nests were rechecked from the air on June 27 and 29, and all 16 eaglets were found alive and apparently well; these young were well over 6 weeks old during the cold spell.

In the Lower Peninsula three eaglets were lost in two nests at Fletcher Pond between June 2 and 15, but closer to the latter date, judging from the condition of the remains found. Heavy rain occurred in the area on June 10-12, with a severe thunderstorm on the latter date. (One brood each of Red-tailed and Red-shouldered Hawks were also lost in this area during the same period.)

The number of Bald Eagles nesting near the Michigan shores of the Great Lakes continues growing; it has increased from a low of six pairs in 1975 to 18 pairs last year and 23 pairs in 1986 (Table 2). Nests situated within 2 miles of the Great Lakes or their connecting channels are considered

Table 2. NUMBERS AND REPRODUCTIVE SUCCESS IN BALD EAGLES NESTING NEAR THE GREAT LAKES COMPARED TO THOSE IN INLAND SITUATIONS, 1982-86

	1982	1983	1984	1985	1986	1982-86
<u>Inland</u>						
Occupied nests (pairs)	88	98	96	104	99(98) ^a	485(484) ^a
Productive nests (%)	53(60%)	57(58%)	58(60%)	69(66%)	59(60%)	296(61%)
Total no. of young	81	91	93	107	91	463
Young/prod. nest	1.53	1.60	1.60	1.55	1.54	1.56
Young/occupied nest	0.92	0.93	0.97	1.03	0.93	0.96
<u>Great Lakes</u>						
Occupied nests (pairs)	9	12	13	18(17) ^a	23	75(74) ^a
Productive nests (%)	5(56%)	7(58%)	6(46%)	6(35%)	9(39%)	33(45%)
Total no. of young	7	10	10	10	13	50
Young/prod. nest	1.4	1.4	1.7	1.7	1.4	1.52
Young/occupied nest	0.77	0.83	0.77	0.59	0.57	0.68
<u>Lake Superior</u>						
Occupied nests (pairs)	7	8	8	12(11) ^a	14	49(48) ^a
Total no. of young	6	7	9	6	9	37
Young/occupied nest	0.86	0.88	1.13	0.55	0.64	0.77
<u>Lake Michigan</u>						
Occupied nests (pairs)	2	3	3	3	5	16
Total no. of young	1	1	0	2	2	6
Young/occupied nest	0.50	0.33	0	0.67	0.40	0.38
<u>Lake Huron</u>						
Occupied nests (pairs)	0	1	2	3	4	10
Total no. of young	0	2	1	2	2	7
Young/occupied nest	0	2.00	0.50	0.67	0.50	0.70

a/ Occupied nests with known outcome.

in this group. While productivity in the Great Lakes nests still lags behind that observed in inland nests, it is near the estimated break-even point of 0.7 young/occupied nest (Sprunt et al. 1973). The lower productivity is at least in part due to the fact that a high proportion of these breeding sites are occupied by new pairs, apparently made up of young, inexperienced individuals undertaking their first nesting attempts. This is suggested by the reduced productivity recorded in the Great Lakes nests in 1985-86 (as compared to that in 1982-84) while the population increased from 13 to 23 pairs (Table 2).

Banding. In 1986 we visited 73 occupied nest sites and 61 nests were climbed. Young eagles were banded in 54 nests. Seven nests turned out to be unproductive. In all we banded 85 eaglets between 4½ and 9 weeks of age. This constitutes 82% of the known statewide production of 104 eaglets. Fourteen productive nests containing 19 eaglets were not climbed for the following reasons: nest tree dead and unsafe for climbing (3 nests), young already too large (3 nests), nest found too late in the season (1 nest), location too remote (6 nests), and landowner refused permission (1 nest). Twelve nest sites were visited on the ground, but the nests were not climbed when it was determined that they were either unproductive, or the eaglets were too large and might have attempted premature flight.

To date Jack Holt and I have banded 1379 Bald Eagle nestlings in the Great Lakes region, including 1248 in Michigan, and have received about 145 band recovery reports from 23 states and two Canadian provinces. For distribution of recoveries of Michigan-banded eagles through 1985 see Fig. 1 in last year's report (Postupalsky 1986).

Other Research into Bald Eagle Ecology.

Whenever conditions permit, adults at nest sites are checked for bands as they circle just over the treetops. This has been possible at only a small number of nests because adults are often not present, or they are too far away or too high, or the forest canopy allows only brief glimpses of the circling birds. Consequently only a limited number of adult eagles could be checked for presence of bands and even then the determination was not always conclusive. Breeding sites at which the banding status of one or both adults was determined during the past three seasons are listed in Table 3. In all 19 banded adult eagles (9 females, 8 males, 2 undetermined) and 4 probably banded individuals (1 female, 3 males) were observed. No bands were noted

Table 3. BREEDING ADULT BALD EAGLES CHECKED FOR BANDS IN 1984-86

<u>Breeding site</u>	<u>Sex</u>	<u>Band and position</u>	<u>Dates</u>
Go 02 Sucker Lake	F:	no bands	6/23/84
Go 03 Cisco Lake	F:	no bands	5/24/86
	M:	probably band on right leg	5/24/86
Go 05 Thousand Is. L.	F:	no bands	6/28/85, 5/24/86
	M:	no bands	5/24/86
Go 09 McDonald Lake	F:	band on right leg, probably also on left	6/28/84
	M:	has band (leg uncertain)	6/28/84
Go 14 Crooked/Banks L.	M:	probably band on right leg	6/29/86
Go 22 Pomeroy Lake	F:	no bands noted	5/25/86
	M:	no bands noted	5/25/86
Ho 03 Prickett Dam	F:	band on right leg	6/25/84
Ho 07 Silver Creek	F:	band on right leg	6/29/84
Ir 15 Mud L./Paint R.	F:	no bands	6/26/84
Mm 04 Shakey River	F:	no bands	5/27/84
	M:	no bands noted	5/27/84
Mm 05 Grand Rap. Dam	F:	band on right leg	5/26/86
	M:	band on right leg	5/26/86
Mq 15 Saux Head Lake	?:	band on right leg	6/30/84
Mq 18 Boney Falls Dam	F:	band on right leg	5/29/84
	M:	band on right leg	5/29/84
Ag 07 Forest Lake Bas.	M:	band on right leg	6/25/86
Sc 01 Seney B-1 Pool	F?:	no bands	7/03/86
Sc 04 Seney C-2 Pool		one adult reported banded	1985
PI 02 Sportsmen's Dam	F:	band on right leg	6/13/86
	M:	band on right leg	6/13/86
My 02 Turtle Lake	F:	band on right leg	6/02/84, 4/28/86
	M:	band on right leg	4/28/86
Ot 02 Caulkins Creek	M:	band on right leg	6/10/84
Bz 06 Grass L. Fldg.	F:	probably band on right leg	6/20/84
	M:	probably band on right leg	6/20/84
Io 05 Canoe Rac. Mon.	F:	band on right leg	6/14/86
Og 02 Stylus Lake	F:	band on right leg	6/12/85, 6/01/86
	M:	band on right leg	6/01/86

on 10 individuals. The majority of banded adults noted to date were at recently established new or re-occupied old breeding sites, which suggests that a high proportion of young adults which are entering into the breeding population are banded. This comes as no surprise, considering that 80-90% of the annual eaglet production in Michigan and Wisconsin have been banded for the past 15 years or so. The probability is high that banded adults are younger individuals, while the unbanded ones are older adults. Due to the biases inherent in these observations no estimate of the proportion of banded adults in the total nesting population can be made at this time.

Prey remains were identified and/or collected in or below 43 occupied eagle nests; none were found at 13 other nests checked. Much of this material along with that collected in past seasons is yet to be identified, quantified, and analyzed.

Twenty-six eaglets in 16 broods were checked for blowfly (Protocalliphora) larvae. These maggots or their sign (dirty exudate) were noted in the ear openings of five eaglets in four different broods. As these larvae typically drop out and puppate before eaglets reach 6-7 weeks of age, i.e., prior to our banding visits, we find them or evidence of their recent presence only in the younger nestlings we handle. Therefore we now check only the younger ones for these "ear maggots". Bortolotti (1985) reports that in Saskatchewan all Bald Eagle nestlings examined were parasitized one or more times during the early part of the nestling period. In some raptor species in our area, such as the Red-shouldered Hawk, the infestation rate of nestlings is nearly 100% (Postupalsky, unpubl. notes).

Information on nest site and habitat characteristics was obtained for 22 nest sites not ground-checked or climbed previously. Such information typically includes species of nest tree, height of nest above ground (18 nests in 1986), diameter at breast height (DBH) of nest tree (22 nest trees), dominant forest cover, type of and distance to nearest water, and type of and distance to nearest site of human activity, and is on file for most nests that were visited during banding operations since 1978.

During the banding work we collected two clutches of two eggs each. One set was found in an abandoned nest near the Menominee River (Menominee Co.), and the other, consisting of addled eggs, was still being incubated in mid-June near the Lake Huron shore (Alpena Co.). No dead eaglets were salvaged,

due to advanced decomposition of the remains found. We collected feathers from dead nestlings from four nests and large molted-out feathers (primary or secondary remiges, rectrices, or large coverts) from resident adults at 24 different breeding territories and turned them over to Dr. Elwin D. Evans of the Surface Water Quality Division, Michigan DNR, to be analyzed for mercury and other heavy-metal residues.

RECOMMENDATIONS

Since 1980 Michigan's Bald Eagle population has increased by more than 40% with the fastest growth occurring in the eastern Upper and the northern Lower Peninsula. These recent population changes are cause for guarded optimism concerning the Bald Eagle's recovery in the state, however they should not be an excuse for complacency. By virtue of its trophic position as a terminal link of a long, mainly aquatic food chain, this species is sensitive to toxic pollutants and other environmental perturbations. For this reason the monitoring of the nesting population and its reproductive success should continue.

Increased efforts are called for to achieve a more complete census of occupied nests (territorial pairs) and more accurate assessment of breeding activity and success — essentially the minimum required population data recommended by Brown (1974):

- (1) the total number of (resident, territorial) pairs in the study area;
- (2) the total number of pairs that actually bred (i.e., laid eggs);
- (3) the total number of young produced.

While in the Michigan eagle surveys assessment of Item (3) has been quite accurate in most years, that of (1) and (2) has not been satisfactory for all parts of the state. Each year the status of several breeding sites remains undetermined, some nonbreeding and/or early-failing pairs are missed in the nesting inventories, and the observational data are inadequate to determine whether or not certain pairs bred. These circumstances tend to bias the results by underestimating population size and overestimating productivity. Also, eagles which move to new nests may not be found again for 2-3 years, causing gaps in the record. These shortcomings can be held to a minimum by strict adherence to recommended survey techniques (Brown 1974; Postupalsky 1974, 1981; Fraser et al. 1983, 1984). Proper timing of nest checks is crucial. The first spring survey must be undertaken during early incubation (and not about hatching time or even later). Checks during

early incubation yield the most accurate results (Fraser et al. 1983, 1984) and allow time for a systematic repeated checking of "problem" sites (i.e., those with missing pairs, single adults, apparent nonbreeding, inconclusive observations) during the balance of the early part of the breeding season. The point is that a single spring survey is insufficient to locate all territorial pairs and to identify those which bred and those that did not. Such data are essential for studies of environmental factors which influence breeding activity and success at each successive stage of the breeding cycle. Moreover, accurate site occupancy and breeding activity data will facilitate a quantitative evaluation of quality of eagle breeding territories in terms of food supply and nest tree availability correlated with site occupancy and reproductive success.

A systematic survey effort needs to be undertaken in Region III, where this has been left largely to the discretion of field personnel. There are two pairs in the Shiawassee area of Saginaw County and unconfirmed reports of eagles nesting in northern Muskegon County. Potential breeding habitat, including historic breeding sites, exists at several places along Saginaw Bay (Fish Point, Tuscola Co.; Wildfowl Bay, Huron Co.), the St. Clair Flats (St. Clair Co.), Point Mouillee and the Erie Marshes (Monroe Co.), the Ottawa Marsh (Allegan Co.), and possibly elsewhere. Known, reported or suspected breeding sites and all known nest structures must be checked during late March or early April for presence of adults, and any occupied nests found are to be rechecked in late May or early June for reproduction. Potential breeding sites, including nest platforms placed in 1982 and 1983 by the Michigan United Conservation Clubs, should be checked at least every other spring.

More attention also needs to be paid to the other side of the population equation -- mortality. All records of eagle mortality and of birds found sick or injured within the state should be compiled at a central location. Such data would serve as basis for studies to evaluate the relative importance of different mortality causes and to identify such hazards to eagle survival that exist in the man-dominated landscape.

As survival rates exert as great, or greater influence on Bald Eagle population dynamics as do reproductive rates (Grier 1980), research efforts aimed at estimating survival rates, including the banding of nestlings and adults, should be continued and expanded -- a recommendation also made by the Northern States Bald Eagle Recovery Plan (U. S. Fish and Wildlife Ser-

vice 1982). While cost-efficient methods of trapping adequate numbers of adult eagles on the breeding range for banding and marking have yet to be developed, the necessary techniques for the banding of a high proportion (80-90%) of the annual eaglet production have been worked out and can be routinely accomplished as long as personnel experienced in tree-climbing and the handling of large raptors and up to date information on nest location and success is available. The banding of nestlings should continue at least until cost-effective techniques for banding and marking enough adults have been developed. In the meantime, ways need to be found to increase the yield of information from banded adults currently in the breeding population. A research proposal towards this goal shall be submitted next year.

ACKNOWLEDGMENTS

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STUDIES OF OSPREYS, BALD EAGLES, AND OTHER RAPTORS - 1986

This summary of field research activities during the 1986 breeding season is for the information of funding groups, supporters, and cooperators, to keep them up to date on some aspects of ongoing work with Ospreys, Bald Eagles, and other raptors in Michigan and certain adjacent areas in the Great Lakes region. Delayed decisions concerning grants by the administrators of the Michigan Non-game Wildlife Fund affected timely planning for the season's work, lining up assistants, and scouting for nests in early spring. Nonetheless I was able to spend a total of 102 days in the field in Michigan between April 15 and August 2. My assistants between them spent 88 man/days in Michigan in addition to limited field work in south-central Wisconsin and northern Ohio. In addition to the Bald Eagle and Osprey nesting studies we also checked over 150 natural breeding sites of other raptors and close to 100 nest boxes for kestrels and owls and then followed over 160 occupied nests to determine reproductive success, record data on nesting habitat and prey used, and to band the young.

Bad weather affected 1986 nest success in several species. In the northern Lower Peninsula a rainy period in late May was followed by abandonment of several Osprey clutches on Fletcher Pond, the rainstorms on June 10-12 were followed by losses of broods in Bald Eagles, Red-shouldered and Red-tailed hawks, and heavy rains about July 4-5 were followed by nestling mortality in Sharp-shinned Hawks, American Kestrels, and possibly also Ospreys. In the Upper Peninsula a June cold spell with freezing night temperatures was associated with the loss of several eagle broods.

OSPREY

Long-term studies into population dynamics and other aspects of Osprey ecology based on banding of nestlings and adults and observations of individually marked birds again received my special attention. This study is centered on Fletcher Pond (Alpena and Montmorency Co.) and the numerous wildlife floodings in Roscommon County, where most nests are accessible for research.

The largest Osprey colony in the state is located on Fletcher Pond, a water storage reservoir maintained by Alpena Power Company. Nesting platforms, built and maintained there since 1967 by Conservation for Survival, made possible an increase from a low of 11 pairs in 1966, to 20-21 pairs in 1979-85, and 23 pairs in 1986. Of these 23 pairs, 20 laid a total of 57 eggs; at least 36 (63%) eggs hatched, and 28 young survived to fledging age and were banded. While this is below the record production of 37 young in 1985, the productivity of 1.22 young/pair is well above the minimum required replacement level of 0.8 young/pair.

The 8 nestlings which did not survive include one found with a broken wing during the banding work in July. I removed it from the nest, which also contained a healthy, normal sibling, and turned it over to DNR biologist Tom Carlson. A local vet set the wing and the young Osprey was taken to the veterinary clinic at Michigan State University and later to the Kellogg Bird Sanctuary. There the bird somehow broke its other wing and eventually died. Evidently it had suffered from a developmental anomaly which leaves bones weak and brittle.

Three cases of adult mortality of Fletcher Pond Ospreys came to my attention in 1986. The first was a 3-year-old male (#608-55379) found dead in the water near the west shore of the Pond on May 25; this bird was not known to be a local breeder.

The second case was an adult found disabled near the Thunder Bay River west of Hillman on July 23. It turned out to be the breeding male (#608-26596) from a nest in the northwest part of the Pond. It was treated by a local vet and sent to the veterinary clinic at Michigan State University. This bird had a shot injury in its carpal joint. As the prognosis for rehabilitation and release was poor, for such injuries usually result in a stiffening of the joint and loss of flying ability, the bird was shipped to the Kellogg Bird Sanctuary where it later died. I was very concerned about the fate of its three young. Previous observations suggest that the female may not be able to raise more than one young alone, as the male normally supplies nearly all the food during the incubation and nestling stages. Normally the female does not relinquish her brooding and guarding duties to resume hunting until the young are close to fledging. Several checks of the nest site in late July revealed that the young were doing fine, with the female absent (apparently fishing) on half of these checks. As these young were just over 6 weeks old when the male was disabled, it was close to the time when the female would have normally started hunting. Young Ospreys fledge when 7-8 weeks old. All three young were reported on or near the nest in early September.

I did not learn about the third case until fall, when I received a band recovery report for #608-46584. This referred to a female which nested on a platform in the northeast arm of the Pond. She was identified at her nest on April 27 while incubating and was still doing so on May 14. On June 2 I found her clutch of 3 sun-bleached, abandoned eggs; two adults were nearby and remained in the vicinity through the summer. The band report clarified the cause of this nest failure - the female was found dead, floating in the water nearby on May 18. Evidently the male soon found a new mate, however the new female would not incubate her predecessor's eggs, which by this time were undoubtedly dead.

In the Houghton Lake area of Roscommon County 19 pairs were located in 1986 - an increase of 3 pairs over 1985 - distributed over 12 different floodings. Five pairs (one more than in 1985) nested on the Dead Stream Flooding above Reedsburg Dam, 4 pairs on Backus Creek Flooding, and one pair on each of the ten other floodings. At least 18 pairs produced eggs, a total of at least 54. Of these at least 36 (67%) hatched and 28 young survived to fledging age. I banded 24. One of these disappeared before reaching fledging age. Three young were in a nest on top of a dead pine snag, unsafe for climbing, and two others flew from their platform nest before I could reach them; this particular flooding was drawn down and the mucky bottom was impassable earlier in the season. With 19 pairs the Houghton Lake area now rivals Fletcher Pond as an important Osprey breeding area in Lower Michigan.

The Tomahawk Creek Flooding in Presque Isle County supported two pairs in 1986. Each incubated a clutch of 3 eggs, all of which hatched, and 5 young survived to fledging age. One pair nested on the Mud Lake Flooding (Lake Dubonnet) in Grand Traverse County and produced 3 young. All 8 young were banded.

In Mecosta County only 3 pairs were located by the DNR's aerial surveys. Since 1985 two pairs have either disappeared or moved to unknown locations. The new pair in the Martiny Lakes chain produced young (2) for the first time.

In May 1986 Ospreys built a nest on top of an 85-ft. light pole at a softball field in Benzonia, Benzie County. The county had the power to the floodlights on this pole disconnected and the lights on the other poles redirected so that night games could continue. The Ospreys went about their business undisturbed. On July 7 the nest contained one recently hatched chick (4-5 weeks later than most other young in the northern Lower Peninsula). We banded it on July 31. Cheryl Connell reported both adults and fledgling still in the area on September 25.

Altogether I banded 78 Ospreys in 1986 - 75 nestlings and 3 adults. Besides the 61 nestlings already mentioned for the Lower Peninsula, this also includes 10 young in 4 nests on range-light towers near Neebish Island in Chippewa County and across the channel on the Ontario side (2 young in one nest), two young on two floodings in Dickinson County, and two young in a nest just across the line in Wisconsin. Since 1963 I have banded 1004 Ospreys - 919 nestlings and 85 adults - 964 in Michigan, the rest in Wisconsin and Ontario. In 1986 I also trapped 13 adults (9 females, 4 males). Three were unbanded birds, presumably raised outside my study area, six had been banded as nestlings, and four were individually marked birds caught to replace lost or faded color bands.

Nestlings are banded with a single color band on the left leg to identify hatching year (lavender in 1986) and the numbered Fish & Wildlife Service band on the right leg. Adults receive in addition to the FWS band a unique combination of 2 or 3 color bands for individual identification. Color banding of nestlings serves to reveal at what age individual Ospreys start breeding. To date I have trapped 74 different breeding Ospreys which had been first banded as nestlings. This also reveals how far from their birthplace Ospreys disperse prior to nesting.

Over 60 adult Ospreys are now individually marked. This enables me to follow breeding behavior and success, as well as survival of individual birds from one year to the next. Two Ospreys banded as nestlings were 16 years 11 months and 17 years 2 months old when last seen. One female banded as a breeding adult (therefore at least 3 years old) in 1971 was still present at the same nest in 1986; she was then at least 18 years old and mated to her fifth male! Another female, banded as a breeding adult in 1972, was last seen in 1985, when at least 16 years old; she did not return in 1986.

Besides my own retraps, I have also received 47 recovery reports of banded Ospreys. Apart for a number found within or just south of the species' Michigan breeding range, these came from Ontario (2), from 9 states to the south and southwest of Michigan (12), Mexico (1), Dominican Republic (1), the Bahamas (1), Panama (3), Colombia (4), Venezuela (2), Ecuador (2), Peru (2), Brazil (1), Bolivia (1), and Argentina (1). The distribution pattern shows a wintering range of Michigan Ospreys centered on northwestern South America.

The aerial surveys by the DNR and my more detailed observations in my principal study area together located 158 breeding sites occupied by Osprey pairs. The outcome of nesting was determined for all 158 nests, of which 102 (65%) were productive and a total of 200 young were raised to fledging or near-fledging age. The statewide productivity was 1.27 young/occupied nest - the second highest on record (1.56 in 1985) since these surveys were started in 1965 and well above the minimum level needed to maintain an Osprey population. During the past decade Michigan's Osprey population has increased by 98%, at a mean annual growth rate of 7.3%.

BALD EAGLE

The aerial surveys undertaken by the DNR supplemented by my own observations and those of our banding teams located 122 breeding areas occupied by eagle pairs. Pairs were also noted at three additional sites, but no occupied nests were found there. Single, apparently unmated adults were seen at nine sites. Thus at least 125 potential nesting pairs were present in Michigan during the 1986 breeding season. The outcome of nesting was determined for 121 occupied nests, of which 68 (56%) were productive and a total of 104 young were raised to an advanced stage of development. The 1986 productivity of 0.86 young/occupied nest is somewhat below the mean value for the past 10 years (0.95), but

is still in excess of the estimated minimum level (0.7) required for population maintenance.

Eight pairs which have established new breeding territories (or re-occupied long-abandoned historic ones) were recorded in 1986. Nevertheless the number of resident pairs located (125) was just below the 1985 total (126), because several other pairs were not found. Some nonbreeding or early-failing pairs were likely overlooked, particularly in areas where the first survey flight was undertaken too late, others were probably missed where little effort was made to locate pairs which may have moved to new, yet unknown nests. Most of the recent eagle population growth in Michigan has occurred in the eastern Upper Peninsula and in the northern Lower Peninsula. Of the eight new pairs located in 1986 one is in the western, one in the eastern Upper Peninsula and six are in Lower Michigan.

The number of Bald Eagles nesting near the Michigan shores of the Great Lakes continues growing; it has increased from a low of 6 pairs in 1975 to 13 pairs in 1984, 18 pairs in 1985, and 23 pairs in 1986 (14 pairs near Lake Superior, 5 near Lake Michigan, 4 near Lake Huron). While productivity in the Great Lakes nests still lags behind that observed in inland nests, it is near the estimated break-even level of 0.7 young/occupied nest. The lower productivity is at least in part due to the fact that a high proportion of these breeding sites are occupied by new pairs, apparently consisting of young, inexperienced individuals undertaking their first nesting attempts.

The below-average 1986 statewide productivity was in part due to higher nestling mortality. At least 13 eaglets died or disappeared from 9 nests in the western Upper Peninsula. These losses were not part of brood reduction, which often occurs in raptors under less-than-optimal food availability, but in all but one case involved entire broods. None were attributable to nest destruction by high winds. Most of these eaglets died about the second week of June, coinciding with a period of low night temperatures, when they were about 5 weeks old, i.e., at a stage not yet well feathered, but already too large to be effectively brooded by the adult. Broods of larger, older young apparently were not affected. In the northern Lower Peninsula two broods containing at least 3 eaglets were lost at Fletcher Pond, coinciding in time with heavy rains and severe thunderstorms which occurred in the area on June 10-12.

In 1986 we visited 73 occupied nest sites, 61 nests were climbed, and eaglets were banded in 54 nests. Seven nests turned out to be unproductive. In all we banded 85 eaglets, or 82% of the known statewide production of 104. Fourteen productive nests containing 19 young were not climbed for one or more of the following reasons: nest tree dead and unsafe for climbing, young already too large, nest found too late in the season, location too remote, or landowner refused permission. Twelve nest sites were visited on the ground, but were not climbed when it was determined that they were either unproductive, or the eaglets were too large and might attempt premature flight. To date Jack Holt and I have banded 1379 Bald Eagle nestlings in the Great Lakes region, including 1248 in Michigan, and have received close to 150 band recovery reports from 23 states and two Canadian provinces.

OTHER RAPTORS

Turkey Vulture. The hollow pine stub in western Alpena Co. was used again; a brooding adult was present on 6/13 and one fully feathered young was confirmed on 8/1. Lewis Scheller found another nest in a large tree cavity near Alpena; two well feathered young were present on 8/4.

Northern Harrier. L. Scheller found three nests in Alpena Co. I banded two young each in two nests and the 4 young at the third site were already flying on 7/8.

Sharp-shinned Hawk. Scheller found 3 nests near Alpena. I banded 5 young in one and 3 young in another. The third nest contained only two recently dead downies and some fresh prey on 7/8 - a few days after a period of rainstorms.

Cooper's Hawk. Two nests occupied in 1985 were again used: one in Ontonagon Co. produced 4 young and one in Ogemaw Co. had 4 young; one of the latter was a runt which probably did not survive. Scheller found a new nest with 3 young near the 1985 site in Alpena Co. Don Stroup found a nest in Manistee Co. which produced 3 young. Unfortunately this mature maple-beech-hemlock forest on rolling terrain near Lake Michigan is being destroyed to make room for a condominium-golf course complex. Red-shouldered Hawks and N. Goshawks have also nested in these woods. All viable Cooper's Hawk young (13) were banded.

Northern Goshawk. In the Upper Peninsula eight previously occupied breeding areas were checked and breeding goshawks were found in two (25%) of them. Two previously unknown breeding sites were reported. These 4 occupied nests were in Mackinac, Schoolcraft, Delta, and Dickinson counties. Three contained two young each and one produced 3 young.

In Lower Michigan I checked 12 old breeding sites. Goshawk pairs were present at 6 (50%), however one pair apparently was not breeding. Two previously unknown breeding sites were reported. Of these 8 occupied sites 2 were in Manistee Co. and one each in Emmet, Cheboygan, Alpena, Presque Isle, Oscoda, and Roscommon Co. Six pairs nested successfully and produced 10 young. Altogether I banded 18 young goshawks in 1986. Bert Ebbers reported two additional nests: one in Presque Isle Co. with 3 young, and one in Cheboygan Co. with an unknown number of young already fledged. The goshawk population appears to be rebounding with increased breeding activity since the low of a few years ago.

Red-shouldered Hawk. In northern Lower Michigan collaborators and I located 26 occupied nests: in Alpena (9), Manistee (7), Emmet (4), Cheboygan (3), Newaygo (2), and Otsego (1) counties. At least 15 other old breeding sites were checked, but no nesting hawks were found. Three pairs repaired their nests, but apparently did not breed. Fourteen pairs were successful and raised a total of 30 young. Young had been present in two additional nests, but perished before reaching fledging age. The productivity of 1.15 young/occupied nest is well below estimated population-replacement level.

In the Upper Peninsula I located 2 occupied nests - the regularly used site in Iron Co. and a new one in Menominee Co. The former produced 2 young, the latter had 2 small downies on 5/26, however only one remained on 6/26. Although about 5 weeks old, this bird was unable to fledge due to severe damage to, and loss of, flight feathers caused by heavy blowfly (Protocalliphora) larva infestation of feather follicles; it was placed with a local rehabilitator. I also observed a displaying pair in northeastern Delta Co., but found no nest there. I banded a total of 33 redshoulder nestlings; one later disappeared.

Broad-winged Hawk. This common hawk rarely reuses old nests and breeds later than its two congeners; new nests are obscured by foliage by the time incubation begins. Therefore most nests are found by chance. Scheller found 2 nests near Alpena; one failed, the other produced 2 young. In the Upper Peninsula I learned of 3 occupied nests: one in Houghton Co. failed and the remains of an adult were found near the base of the nest tree. Mike Peczynski came across a nest with 2 young in Chippewa Co. and USFS personnel located a nest in Mackinac Co. with one fledgling nearby. I banded all 5 young.

Red-tailed Hawk. For several reasons, mostly logistic, I've decided not to continue monitoring Red-tailed Hawks nests along the freeways in southeastern Michigan. Data collected during 1966-85 are being tabulated and analyzed.

In the northern Lower Peninsula I learned of 11 occupied nests. Three breeding sites used in 1985 were not occupied in 1986. Distribution of occupied nests

was as follows: Manistee (4), Newaygo (2), Montmorency (2), Lake (1), Mason (1), and Alcona (1) counties. Seven nests were productive with a total of 10 young. At the eighth nest the 4-week old young was dead on the ground following the June 10-12 rainstorms. In the Upper Peninsula I examined 4 occupied nests - 3 in Alger and one in Marquette Co. Three were productive with one large young in each. Overall productivity was 0.87 young/occupied nest.

American Kestrel. For 1986 I had 53 nest boxes available, mainly in the Alpena-Hillman, Iron Mountain-Crystal Falls, and Sault Ste. Marie areas. Mike Peczynski had 12 boxes and also found 3 Wood Duck boxes used by kestrels - all in Chippewa Co. The Munising Ranger District, USFS, had 8 kestrel boxes in Alger Co. Thus, not counting the duck boxes, 73 boxes were monitored for kestrel use. Of these, 46 (63%) were used by kestrels. If the 3 duck boxes are included, kestrels bred (laid eggs) in 49 boxes. Distribution by counties of these kestrel nests was: Alpena (8), Montmorency (8), Oscoda (1), Presque Isle (1), Emmet (1), Chippewa (14), Mackinac (1), Schoolcraft (1), Alger (3), Dickinson (7), and Iron (4). Altogether 37 (76%) nests were productive and 128 young were raised and banded. The 1986 productivity was 2.61 young/breeding pair, against 1985's excellent 3.45 young/breeding pair. While clutch size and hatching rate were similar to those recorded in 1985, mean brood size (3.46 young/productive nest), as well as productivity were about 1 young lower than in 1985. This was due to higher nestling mortality, including the total loss of 4 broods. Evidently kestrels had difficulty providing enough food for their broods in 1986.

Great Horned Owl. As usual, several hawk nests were used by Great Horned Owls. In the northern Lower Peninsula we found 4 pairs using old Red-shouldered Hawk nests and one in a Red-tailed Hawk nest. All 5 pairs bred successfully and together raised 8 young. Two were located in Alpena, and one each in Manistee, Crawford, and Montmorency counties. Two pairs were located in UP's Chippewa Co. - one using an old hawk nest, the other nested ontop of a "witches' broom." One young fledged at each site.

Barred Owl. Nine nests of these owls were located in 1986. Four pairs were using nest boxes placed by Scheller in Alpena Co. and 5 were nesting in natural tree cavities: 2 in Alpena, and one each in Alger, Schoolcraft, and Menominee counties. Eight nests were productive and all 15 young produced were banded. Barred Owls were also noted near two nest sites used in 1985, however no current nest sites were found. No Barred Owls were found using open nests in 1986.

SOUTH-CENTRAL WISCONSIN

Red-tailed Hawk. We located 20 occupied red-tail nests in the Madison area (16 in Dane, 3 in Columbia, and one in Waukesha Co.). Nineteen pairs bred and 17 (85%) were productive with a total of 27 young, or 1.35 young/occupied nest. Joe Papp banded 26 young red-tails.

Great Horned Owl. Joe and I located 6 occupied nests of these owls (4 in Dane and 2 in Columbia Co.). All were productive. We banded 5 young in 3 nests, the other 3 were discovered after young (at least one per nest) had fledged.

BALD EAGLES NEAR LAKE ERIE

Eleven occupied breeding sites were known near Lake Erie in 1986. On the Ontario side there were 5 occupied nests, of which 4 produced 5 eaglets; 3 of the latter were banded by OMNR personnel. On the Ohio side there were again 6 pairs, 4 of which raised 6 native young plus one captive-hatched eaglet fostered out by the Ohio DNR. Jack Holt banded all 7 eaglets.

ST. JOSEPH ISLAND, ALGOMA DISTRICT, ONTARIO

I located 2 occupied Osprey nests at the south and southwest side of this island. Both were productive with 2 and 1 young. The Bald Eagle nest was again unoccupied. The eaglet we had banded there in 1981 was identified at eagle feeding stations in Maine during four different winters!

1986 BANDING TOTALS

In all, we banded 78 Ospreys, 92 Bald Eagles (including Jack Holt's efforts in Ohio and Lower Michigan), 283 hawks and owls of 10 species, as well as 291 non-raptors, primarily Double-crested Cormorants. Subpermittee Joe Papp did the banding in south-central Wisconsin. Subpermittee Mike Peczynski banded 215 birds, mainly kestrels (included in above raptor total), Tree Swallows, and Eastern Bluebirds in his nest boxes in Chippewa County.

ACKNOWLEDGMENTS

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Plans for the coming season. For 1987 the Michigan Nongame Wildlife Fund is providing grants covering only about 60% of funds needed to carry on this research which is essential for sound management and conservation of our raptors. Increased funding from private sources will therefore be needed, if substantial cutbacks are to be avoided. This applies especially to field work on hawks and owls which currently receives no DNR funds, even though there is concern that several species may be sensitive to forest fragmentation and removal of mature stands. Two organizations are accepting contributions for raptor research:

U.S., Inc.
316½ E. Mitchell St., Suite 4
Petoskey, MI 49770

Thunder Bay Audubon Society
Ester Cole, Treasurer
2462 S. Second
Alpena, MI 49707

Please report currently occupied raptor nests promptly to allow me to include them in this year's studies.

March 27, 1987

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