

Alaska Department of Fish and Game  
Division of Wildlife Conservation  
Nongame Wildlife Program Report

DISTRIBUTION, ABUNDANCE,  
AND PRODUCTIVITY OF  
OSPREYS IN INTERIOR ALASKA



by  
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## SUMMARY

The Tetlin Indian Reservation, Tetlin National Wildlife Refuge, and Susitna River valley were surveyed for ospreys (Pandion haliaetus) nests during May and July 1989. Thirty-seven nests were located; 27 were occupied by breeding adults. Sixteen nests contained a total of 29 young ospreys. Three new nests were located this year; the 6 previously identified osprey nests that had not been relocated were presumed destroyed by inclement weather. Productivity was calculated to be 1.1. Twenty-one young birds were banded with red-colored leg bands as well as standard USFWS lock-on bands. Four addled eggs were collected from nests to determine shell thickness and levels of pesticide contamination.

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## BACKGROUND

Most osprey (Pandion haliaetus) populations throughout North America, excluding Alaska, have been studied (Henny 1977). The only published results for Alaska include a 50-year nesting survey in Southeast that identified osprey nest locations, recorded breeding and fledging success, and banded nestlings (Hughes 1982). Interestingly, ospreys received little attention in North America until 1964, when a population crash of a colony along the Connecticut River was documented and pesticides were implicated as the primary cause of its decline.

Because of their specific habitat requirements, ospreys are sensitive indicators of human-caused environmental degradation and natural changes in habitats; i.e., nest sites adjacent to water and fish prey. Therefore, many previous studies in other states have identified bird concentrations or nest sites that might be in jeopardy from human disturbance, pesticide contamination, logging, or other land management practices. Information has also been collected for evaluating future changes in distribution and abundance, as opposed to only resolving management problems.

A major management objective of ADF&G's Nongame Wildlife Program is to maintain healthy populations of all naturally occurring nongame birds and mammals in Alaska. Information regarding the location and size of a particular population is a precursor to this objective. Other population parameters needed to manage a species include natality, mortality, age composition, and dispersal (including emigration and immigration) as well as information regarding the location and condition of seasonal ranges or habitats of migrational species. Unfortunately, we are lacking these basic population data for ospreys.

Information regarding the distribution and abundance of nesting ospreys in Alaska is sparse. There are few early records of osprey sightings in the state; this raptor is usually designated

as "rare" or "uncommon," and there is no attempt at enumeration. After reviewing the early records of ospreys in Alaska, Gabrielson and Lincoln (1959:277) noted the following:

The osprey is widely distributed in Alaska and has a tendency to be localized as a breeding bird. As with other hawks, actual breeding records are few.

Armstrong (1980:92) listed the osprey as a rare breeder or probable breeder in all regions of the state, except north of the Brooks Range.

Ospreys appear to have a problematic future in Alaska because of our growing human population in both urban and rural areas. Changing land uses associated with this growth threaten vast acreages of pristine wildlife habitat. Agriculture projects, mining interests, power developments, public land disposal programs, and increasing numbers of recreationists are only a few of the problems biologists must minimize or mitigate so that healthy wildlife populations can be maintained.

#### OBJECTIVES

To locate osprey nests in Interior Alaska and determine if they are occupied by breeding pairs.

To monitor the productivity of ospreys, band nestlings, and collect addled eggs.

#### STUDY AREA AND METHODS

Field work in 1989 was conducted in the Susitna Valley and near Tok on the Tetlin Indian Reservation and adjacent National Wildlife Refuge. The river, lake, and marsh habitats in those areas support an abundance of prey, including whitefish (Coregonus spp.), Arctic grayling (Thymallus arcticus), and northern pike (Esox lucius), that make these areas particularly attractive to nesting ospreys.

During the summer of 1989, 2 aerial surveys were completed as well as a visit on foot to nests that contained young. The initial survey was conducted on 31 May 1989, to determine the location and number of nesting pairs on the Tetlin Reservation and Tetlin National Wildlife Refuge. A Piper Super Cub (PA-18) flown at reduced speeds and at altitudes varying between 200 and 500 feet was used. There was 1 observer and a pilot. In late July 1989 a Cessna (C-185) flown at reduced speeds and similar altitudes was used during a resurvey of the same area. There were usually 2 observers and a pilot during the second survey. When a nest had been located, we visited the site to count and band nestlings. Young were banded with U.S. Fish & Wildlife Service (USFWS) lock-on aluminum leg bands and an additional color band (i.e., rivet-on, red anodized aluminum leg band with

two alphabetical characters). Any unhatched eggs remaining in the nests were collected.

Observations were recorded on 1:63, 360-scale U. S. Geological Survey maps. Bird banding records were reported to the Bird Banding Laboratory at Patuxent Wildlife Research Center in Laurel, Maryland.

The following terms were used to describe osprey productivity: (1) occupied nest equals any nest in which young were raised, eggs were laid, adults were seen in an incubating position, or 2 adults were observed on or near it; (2) inactive nest equals any nest unattended by an adult osprey during the breeding season and one that was usually in a state of disrepair; (3) supernumerary nest site equals an alternate nest built, maintained, and frequented in proximity to the primary nest; and (4) productivity equals the number of young per occupied nest at the time of banding.

#### RESULTS AND DISCUSSION

Thirty-seven osprey nests were located and checked for nesting activity in approximately 15 hours of aerial surveying during 1989. Three nests were observed for the first time during these surveys, while 6 previously identified osprey nests were not relocated and presumed destroyed by inclement weather. Thirty-six nests were located in the tops of live spruce (*Picea* spp.) trees, and 1 nest was located at the top of a microwave tower. Thirty-one nests were located on the Tetlin Reservation, 2 nests on the Tetlin National Wildlife Refuge, and 4 nests in the Susitna River valley where there was limited aerial reconnaissance. Maps providing location of nests are on file in ADF&G regional office in Anchorage.

Nest status and fledging success for 1989 are summarized in Table 1. Twenty-seven (73%) of the nests observed were occupied; 16 (59%) of the occupied nests contained a total of 29 nestlings. Three (19%) nests contained 3 young, 7 (44%) nests had 2 nestlings, while 6 (37%) nests held a single young osprey. The annual productivity for 1989 was 1.1; in osprey nests that contained live nestlings, there were 1.8 birds per nest. Twenty-one young ospreys in 12 nests were banded. Ten (27%) of the nests observed were inactive during the breeding season, and three (8%) were classified as supernumerary nest sites. Four addled osprey eggs were collected from 4 different nests.

Fourteen bald eagle nests were observed during the aerial surveys. The 9 nests that were occupied produced at least 7 young. Two young eagles in separate nests were banded.

This was the 7th year of an ongoing survey and inventory project to determine the distribution, abundance, and productivity of ospreys nesting in Interior Alaska. Department staff banded 115

Table 1. Summary of osprey nest surveys in Interior Alaska, 1989.

Area	Located nests	Inactive nests	Occupied nests	Nest with young	Number fledglings (Banded)
Tetlin Reservation	31	9	22	12	22 (19)
Tetlin National Wildlife Refuge	2	0	2	2	3 (1)
Susitna Valley	4	1	3	2	2 (1)
Total	37	10	27	16	29 (21)

young ospreys, recovered 3 bands, collected 10 infertile eggs for pesticide analysis, and located over 70 osprey nests (i.e., mapped and monitored them for breeding activity in Interior Alaska; Appendix I). Although the progress of this project has been encouraging, the results should be interpreted with caution.

In the past, we have observed significant differences in the number of young ospreys produced each year. While the numbers of occupied nests containing young each year have been similar among years, there were significant differences in brood sizes from 1984 to 1987 (Hughes 1987). Brood size is related to clutch size, particularly in the absence of significant numbers of addled eggs or evidence of egg predation.

Several investigators (Ogden 1977, Judge 1983, Poole 1985) have shown that clutch size can vary with laying dates; i.e., significantly smaller clutches are produced by ospreys that lay later. Weather phenomena have been identified as a possible cause for delays in egg laying. In northeastern Canada, Wetmore and Gillespie (1976) found that poor breeding success by ospreys was accentuated during late springs. They reported a significant negative correlation between young per occupied nest and date for "water clear of ice."

In Interior Alaska, freeze-up date, snow cover, winter temperatures, thawing date, and spring warming were analyzed in an attempt to explain fluctuations in osprey brood size (Hughes 1987). Weather conditions for the area were extrapolated from weather data recorded in the nearby community of Northway. There was little variation in winter conditions (i.e., freeze-up date, snow cover, and winter temperatures); however, the varied thawing conditions (i.e., particularly spring temperatures) allowed for the development of indices describing spring break-up. Correlation coefficients calculated by comparing the separate weather indices with the number of young, mean brood size, and productivity were inconclusive. Succinctly, the unparalleled best year of breeding success in 1986 and the poorest year for osprey nesting in 1985 had very similar winter and spring weather. It appears that inclement weather does not provide a plausible explanation for annual fluctuations in the mean brood size of ospreys in Interior Alaska.

Age and experience of adults are factors that can affect clutch size in ospreys. In coastal Massachusetts, Poole (1985) found the age of a pair and the length of time the pair had been together influenced courtship periods and laying dates. Older (and presumably more experienced) osprey pairs arrived first and laid eggs sooner than younger pairs. The ages and experience levels of breeding pairs in the survey area are difficult to evaluate, because we have been unable to distinguish individual birds.

In 1988 we began to mark fledglings so that we could recognize individual birds. In addition to a standard USFWS band, young



ospreys were marked on the right leg with a red, anodized aluminum band engraved with two silver-colored alphabetical characters. These highly visible leg bands will enable us to determine the ages of individual breeding pairs, the number of young that return to their natal area as adults to breed, and the dispersal of fledglings into other areas. Hopefully, we will be able to evaluate age and experience of adults and determine their effect on osprey clutch size.

Four unhatched eggs were recovered from nests. These eggs were forwarded to USFWS facilities for pesticide analysis and determination of shell thickness. We are slowly accumulating information on pesticide contamination of osprey eggs, and we will continue to collect unhatched eggs during our surveys.

Since 1983 there have been 3 bands recovered from ospreys during this project. A nestling banded on the Tetlin Reservation in August of 1983 was found dead near Roseville, California during November of the same year. The second returned band was from Guadalajara, where a nestling banded near Tok in late July 1986 was recovered less than 2 months later on the southwestern coast of Mexico. The latest returned band was from a fledgling banded in 1985 in the Susitna River Valley. The bird was found dead (i.e., entangled in fishing gear) on the southwestern coast of Mexico during early February 1988. Although ospreys banded in western North America have been recovered throughout Central America and as far south as Ecuador, this late-winter recovery probably represents the wintering area for this particular osprey. Band recoveries from the neotropics support observations that most ospreys reach winter quarters by late November and are then quite sedentary until their return migration begins in late February or early March (Poole and Agler 1987).

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#### LITERATURE CITED

- Armstrong, R. H. 1980. A guide to the birds of Alaska. Alaska Northwest Publishing Company, Anchorage, AK. 309pp.
- Gabrielson, I. N., and F. C. Lincoln. 1959. The birds of Alaska. The Stackpole Co. and Wildl. Manage. Inst. 922pp.

- Henny, C. J. 1977. Research, management, and status of the osprey in North America, pp. 199-222. I.C.B.P., World Birds of Prey Conf. (Vienna). 442pp.
- Hughes, J. H. 1982. The Osprey in southeast Alaska. Pp. 197-204 In Proceedings of the symposium and workshop raptor management and biology in Alaska and western Canada. USDI, USFWS, Anchorage, Ak. 355pp.
- \_\_\_\_\_. 1987. Distribution, Abundance and Productivity of Ospreys in Interior Alaska. AK Dept. Fish and Game, Anchorage. Unpublished Report. 9pp.
- Judge, D. 1983. Productivity of Ospreys in the Gulf of California. Wilson Bull. 95:243-255.
- Ogden, J. 1977. Report on Florida Bay Ospreys. Pp. 133-151 in Trans. North American Osprey Res. Conf. (J. Ogden, Ed.) U. S. Natl. Park Serv.
- Poole, A. 1985. Courtship feeding and Osprey reproduction. Auk 102:479-492.
- \_\_\_\_\_. and B. Agler. 1987. Recoveries of Ospreys banded in the United States, 1914-1984. J. Wildl. Manage. 51:148-155.
- Wetmore, S., and D. Gillespie. 1976. Osprey and Bald Eagle populations in Labrador and northeastern Quebec, 1969-1973. Can. Field-Nat. 90:330-337.

Appendix A. Nest status, and young produced by ospreys on Tetlin Reservation (TR) Tetlin National Wildlife Refuge (NWR), Susitna Valley (PR), and Shaw Creek (SC) during 1983-89; Oc = Occupied I = Inactive, (number) = young produced, (s) = supernumerary nests, x = nest destroyed, \* = new or rebuilt nest, b.e. = bald eagle nest.

Location/Number	1983	1984	1985	1986	1987	1988	1989
TF/01-83	Oc (3)	Oc (2)	Oc	Oc X	Oc (1)*	Oc (2)	I
TR/02-83	Oc (1)	Oc (2)	Oc X	Oc (2)	Oc	Oc (3)	I (s)
TR/03-83	Oc (2)	Oc (3)	Oc (2)	Oc (2)	I	I	I
TR/04-83	Oc (3)	Oc (3)	I	Oc (2)	Oc	Oc	Oc
TR/05-83	Oc	I	Oc	Oc	Oc (1)	Oc (2)	I
NWR/06-83	Oc	Oc	I	Oc (3)	Oc (1)	Oc	Oc (2)
TR/07-83	Oc	Oc	Oc	I (s)	I (s)	Oc	X
TR/08-83	I (s)	I (s)	I (s)	Oc	Oc	I (s)	Oc
TR/09-83	I	X		Oc *	I	X	-
TR/10-83	I	I	I	Oc	Oc	Oc	Oc (1)
TR/11-83	I	Oc	Oc	I	I	Oc	Oc
NWR/12-83	I	I	X	-	-	-	-
NWR/13-83	I	I	I	I	Oc (1)	Oc (2)	Oc (1)
NWR/14-83	I	Oc (2)	Oc	b.e.	b.e.	b.e.	b.e.
NWR/15-83	I (s)	I (s)	I (s)	Oc	X	-	-
PR/16-83	Oc	Oc, X	Oc	I	I	I (s)	I (s)
TR/17-84		I	X	-	-	-	-
TR/18-84		Oc	Oc	I	X	-	-
TR/19-84		I	X	-	-	-	-
TR/20-84		I	I	I	I	X	-
TR/21-84		I	X	-	-	-	-
TR/22-84		I	Oc (1)	Oc (2)	Oc (3)	I	Oc
TR/23-84		Oc *	X	-	-	-	-
TR/24-84		I	X	-	-	-	-
TR/25-84		Oc *	Oc	I	Oc	I	I
TR/26-84		I	Oc (1)	Oc	X	-	-
TR/27-84		I	I	I	Oc	I	I
TR/28-84		I	X	-	-	-	-
TR/29-84		I	Oc	Oc	I (s)	I	X
TR/30-84		I (s)	I (s)	I (s)	Oc	I	Oc
TR/31-84		Oc *	Oc (2)	Oc (3)	Oc (3)	I	Oc (3)
TR/32-84		I	I	I	Oc	I	I
TR/33-84		Oc	Oc (1)	Oc (3)	Oc (2)	Oc (1)	Oc (1)
TR/35-84		Oc (1)	Oc	Oc X	-	-	Oc *
TR/34-84		I	I	Oc	X	-	-
TR/36-84		I	I	I	Oc	I	I
TR/37-84		I	I	X	-	-	-
TR/38-84		Oc	I	X	Oc (1)*	Oc	Oc (2)
TR/39-84		I	I	X	-	-	-
SC/40-84		Oc (3)	X	-	-	-	-
NWR/41-84		Oc *	I	I	I	I	X
TR/42-85			I	X	-	-	-

Appendix A. Continued.

Location/Number	1983	1984	1985	1986	1987	1988	1989
TR/43-85			Oc (2)	Oc (3)	Oc	Oc (3)	X
TR/44-85			Oc (s)	I (s)	I (s)	I (s)	Oc
TR/45-85			I (s)	I (s)	Oc (3)	Oc	I (s)
TR/46-85			I	b.e.	b.e.	b.e.	b.e.
TR/47-85			I (s)	X	-	-	-
TR/48-85			I	I	I	X	-
TR/49-85			I	X	-	-	-
TR/50-85			I	X	-	-	-
TR/51-85			Oc (1)*	Oc (2)	Oc (2)	Oc (2)	Oc (2)
TR/52-85			I (s)	Oc (2)	Oc (1)	Oc (2)	Oc (2)
TR/53-85			Oc *	Oc (2)	Oc	I	Oc (1)
TR/54-85			I	I	I	I	-
TR/55-85			I	X	-	-	-
PR/56-85			Oc (1)	Oc (2)	Oc (3)	Oc (3)	Oc (2)
NWR/57-87					Oc *	X	-
PR/58-87					I	Oc (2)	Oc (2)
TR/59-86				Oc (3)	X	Oc (2)	Oc (1)
TR/60-86				Oc	Oc	Oc (1)	Oc
TR/61-86				I	X	-	-
TR/62-86				I	X	-	-
TR/63-86				I	X	-	-
TR/64-86				Oc (1)	Oc	Oc (3)	Oc (1)
TR/65-86				Oc (2)	X	-	-
TR/66-87					Oc	Oc (3)	Oc (2)
TR/67-88						Oc (2)	Oc (3)
TR/68-88						Oc	X
TR/69-88						I (s)	Oc
TR/70-88						Oc (1)	Oc (3)
NWR/71-88						Oc (2)	X
TR/72-89							Oc *
PR/73-89							Oc *

STUDY TITLE: Distribution, Abundance, and Productivity of Ospreys in Interior Alaska

Estimated Expenditures

Operating (excluding P/S)	\$2.4
Salaries	
PFT WB III (PCN 2168, 1 month)	4.5
PTF WB II (PCN 2178, 1 month)	5.0
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TOTAL COST	\$11.9

Donated

Fixed-wing aircraft, 3 hours (Tetlin Refuge)	\$0.5
3 person-days (Refuge Staff)	3.0
1 person-day (volunteer)	1.0
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TOTAL DONATED	\$4.5



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