ALASKA DEPARTMENT OF FISH AND GAME

JUNEAU, ALASKA

STATE OF ALASKA

Steve Cowper, Governor

DEPARTMENT OF FISH AND GAME

Don Collinsworth, Commissioner

DIVISION OF GAME

W. Lewis Pamplin, Jr., Director

DISTRIBUTION, ABUNDANCE, AND PRODUCTIVITY OF OSPREYS IN INTERIOR ALASKA

By

Jeffrey Hughes

NONGAME WILDLIFE PROGRAM REPORT

1987

This is a progress report on a raptor survey and banding project designed to determine the distribution, abundance, and productivity of nesting ospreys (*Pandion haliaetus*) in interior Alaska. The objectives of this report are to provide wildlife managers with information gathered during 1987, and summarize the results of the past 5 years (Appendix A). Information regarding the distribution and abundance of nesting ospreys in Alaska is sparse. An historical review of the problem, general strategy, and objectives for this project are contained in a problem analysis[1] and will not be reiterated in this paper.

The project was initiated by Nongame Wildlife Program biologists, who have received field assistance from other ADF&G biologists and volunteers. This ongoing survey involves locating osprey nests and banding nestlings in those nests that contain young. The information generated as a result of this project will facilitate management of this raptor.

Areas Surveyed and Methods

Field work in 1987 (as in previous years), was conducted in the Susitna Valley and near Tok on the Tetlin Indian Reservation and adjacent Tetlin National Wildlife Refuge. The river, lake, and marsh habitats in these areas support a variety of osprey prey, including whitefish (*Coregonus* spp.), Arctic grayling (*Thymallus arcticus*), and northern pike (*Esox lucius*) which make these areas particularly attractive to nesting ospreys. Areas surveyed previously (1986), but not included this spring, included segments of the Tanana River between Fairbanks and Tok.

This summer, 2 aerial surveys were completed, followed by a visit on foot to nests that contained young. The initial survey was flown on 28 May, to determine the location and number of nesting pairs on the Tetlin Reservation, and Tetlin National Wildlife Refuge. This survey was completed in a Piper Super Cub (PA-18) aircraft, flown at reduced speeds, and altitudes varying between 200-500 feet. There was 1 observer in addition to the pilot. In late July, a Cessna (C-185) aircraft, flown at reduced speeds and similar altitudes was used for a resurvey of the same area. There were usually 2 observers in addition to the pilot during the second survey. At this time, nests containing young birds were approached closely from the ground to evaluate the possibility of climbing into the nest and banding immature ospreys. The Petersville Road nest (16-83) was approached closely from the ground during June, and checked for breeding activity.

---

1 Survey and Inventory Project: To Determine the Distribution, Abundance and Productivity of Nesting Ospreys. On file with ADF&G Nongame Wildlife Program, Anchorage Regional Office.

Results

Forty-one osprey nests were located and checked for nesting activity in approximately 12 hours of aerial surveying during 1987. At least 3 nests were observed for the first time during this year's surveys. Seven previously identified osprey nests were not relocated and presumed destroyed by inclement weather. Forty nests were located in the tops of live spruce (*Picea* sp.) trees, and 1 nest was atop a microwave tower. Thirty-four nests were located on the Tetlin Reservation, 4 nests were found on the Tetlin National Wildlife Refuge, and 3 nests were located in the Susitna Valley where there was limited aerial reconnaissance (maps on file in ADF&G Anchorage regional office).

Nest status[2] and fledging success for 1987 are summarized in Table 1. Twenty-seven of the nests observed (66%) were occupied, and of these occupied nests, 14 nests (52%) contained 28 nestlings. Five nests (36%) contained 3 young, 4 nests (29%) had 2 nestlings, while 5 nests (36%) held a single young osprey. The annual productivity[3] for 1987 was 0.96. In osprey nests that contained live nestlings, there were 2.00 birds per nest. Two nests each contained 1 dead young at the time of the survey in early August. Twenty-one young ospreys in 11 nests were banded.

Table 1. Summary of osprey nest surveys in interior Alaska, 1987.

Area	Nests Located	Occupied Nests	Nests With Young	Number of Fledglings (Banded)
Tetlin Reservation	34	24	11*	19(17)
Tetlin National Wildlife Refuge	4	2	2	4(1)
Susitna Valley	3	1	1	3(3)
TOTAL	41	27	14	26(21)

* Includes 2 nests, where young perished prior to banding.

---

[2] An occupied nest is any nest in which one of the following occurred: young were raised, eggs were laid, an adult was seen in an incubating position, or 2 adults were observed on or near the nest.

[3] Productivity is the number of young per occupied nest at the time of banding.

Fourteen of the nests observed (34%) were inactive. Inactive nests were unattended by an adult osprey during the season and were in a state of disrepair. Three of the inactive nests were classified as supernumerary nest sites (Supernumerary nests are nests maintained by an active nesting pair in addition to and usually in proximity to the nest with eggs or young.)

Eleven bald eagle nests were observed during the aerial surveys. Five nests were occupied, and we observed and banded a total of 6 young eagles in 4 nests.

Discussion

This was the fifth year of an ongoing project to determine the distribution, abundance, and productivity of ospreys nesting in interior Alaska. Our efforts to date include 72 young ospreys banded, 2 bands recovered, 5 infertile eggs collected for pesticide analysis, and over 70 osprey nests located, mapped, and monitored for breeding activity in interior Alaska. Although the progress of this project is encouraging, the results should be interpreted with caution.

Osprey abundance is indirectly measured by tallying the number of occupied nests located each year. Abundance in the Interior is difficult to assess. The enormous size of the area, limited resources for the project, and varying survey conditions are a few of the inherent nest census problems. A subjective, relative estimate of osprey abundance in interior Alaska, based upon observations by biologists working throughout the area, is that over the past 5 years, osprey numbers are stable or slightly increasing. Although the number of occupied nests located has increased during the past 5 years, a comparison of totals among years is inappropriate since our survey efforts vary markedly.

A meaningful comparison of osprey productivity among years requires standardization of the survey areas and methods. The area examined during the initial survey in 1983 was limited in scope and conducted with minimal aerial reconnaissance. While surveys in subsequent years have included adequate aerial coverage, additional areas often have been included in the surveys. Therefore, only data collected from a core area and surveyed each breeding season during the past 4 years, is included in the analysis of productivity. The core area is depicted in Figure 1.

Osprey productivity in the core area ranged between 0.55 and 1.24 for the past 4 years (Table 2), and interestingly, there were significant differences among years in the number of young produced each year ($X^2 = 8.27$, $P < 0.05$). What is the proximate mechanism(s) and ultimate cause(s) for this observed variability?

Table 2. Summary of osprey breeding, interior Alaska, 1984-87.

	Occupied nests	Nests w/young(%)	Number young	Brood size	Productivity
1984	18	6(33)	13	2.2	0.72
1985	20	8(40)	11	1.4*	0.55
1986	21	11(52)	26	2.4*	1.24
1987	23	11(48)	21	2.0	0.91
Mean	20.5	9.0	17.8**		

*ANOVA ($P<0.05$)
**Chi square ($P<0.05$)

Annual productivity is affected by the number of breeding adults (occupied nests), breeding success (nests with young), and the number of young per successful nest (brood size). The number of nests occupied each year (X = 20.5, range 18 to 23) was quite similar among years ($X^2 = 1.32$, $P > 0.05$). Also, the number of nests containing young each year (X = 9.0, range 6 to 11) was quite constant among years ($X^2 = 2.00$, $P > 0.05$), and the proportion of occupied nests that contained young each year were quite similar among years ($X^2 = 0.67$, $P > 0.05$) ranging between 33 to 52%. However, there were differences in brood sizes in the core area among the past 4 years ($F = 4.62$, $P < 0.05$). Mean brood size ranged from 1.4 to 2.4 during 1984-87 (Table 3). The average brood size for 1985 was 1.4 (range 1 to 2) and there were no broods of 3 young. The mean brood size for 1986 was 2.4 (range 2 to 3), and there were no broods containing only 1 young. The difference in brood sizes between 1985 and 1986 was significant ($q = 4.08$, $P = 0.05$). Brood size should be related to clutch size, particularly in the absence of addled eggs or evidence of egg predation.

Table 3. Osprey brood sizes, interior Alaska, 1984-1987.

Brood Size	1984	1985	1986	1987
Mean	2.2	1.4	2.4	2.0
Range	1-3	1-2	2-3	1-3
Standard Deviation	0.75	0.52	0.50	0.94

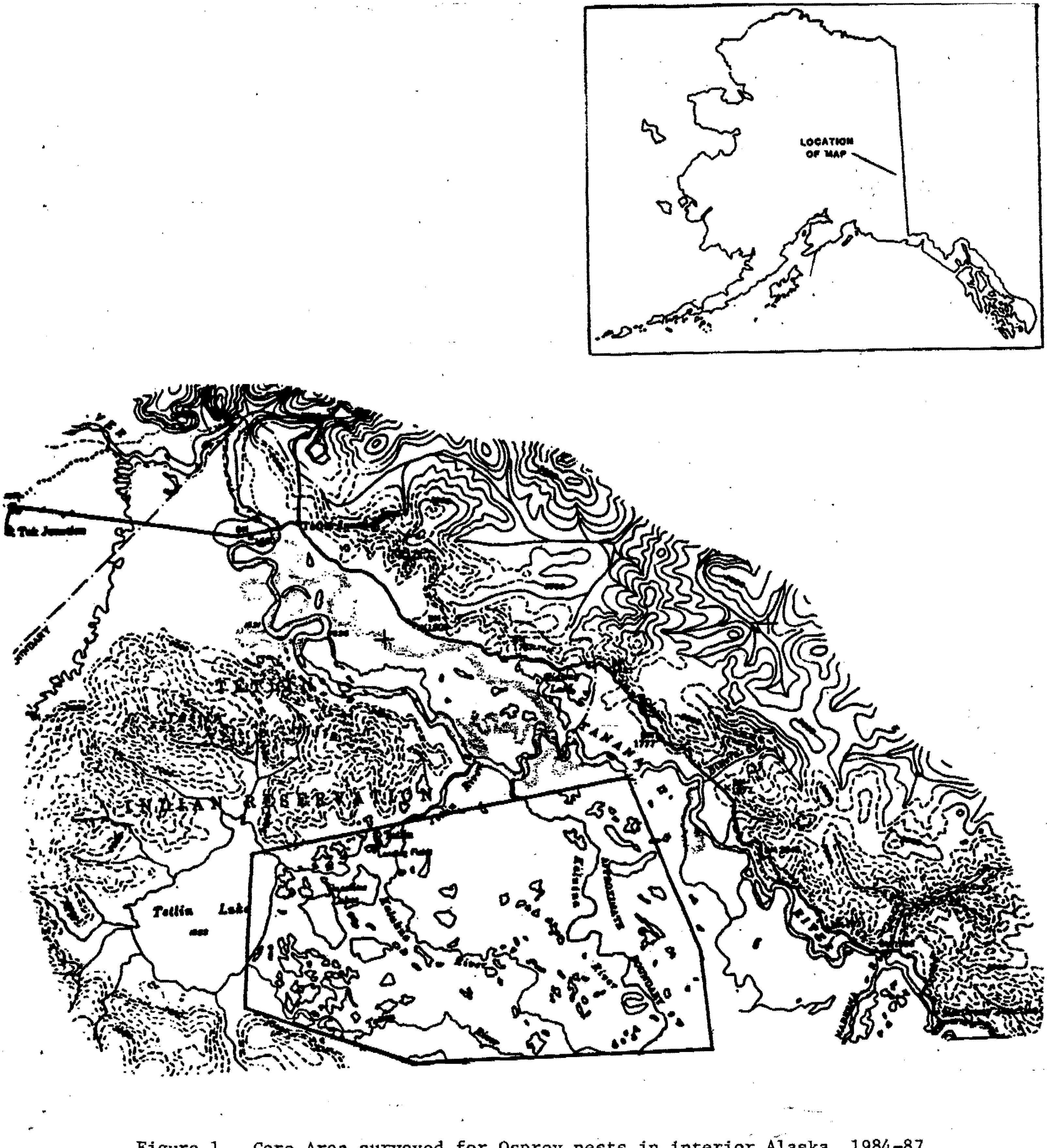

Figure 1. Core Area surveyed for Osprey nests in interior Alaska, 1984-87.

Several investigators (Ogden 1977, Judge 1893, and Poole 1985) have shown that clutch size can vary with laying dates: 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. Weather conditions for the core area were extrapolated from weather data recorded in the nearby community of Northway. There was little variation in winter conditions, (freeze-up date, snow cover, and winter temperatures) from 1983 through 1987, however, thawing conditions, particularly spring temperatures, varied considerably and allowed the development of indices describing spring breakup in the core area. Correlation coefficients were calculated by comparing the separate weather indices with the number of young, mean brood size, and productivity. The sample correlation coefficients ranged from 0.46 to -0.53 and were not significant at the 0.05 level. 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 very 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 core area are difficult to evaluate since we were unable to distinguish individual birds.

The number of productive nests and the number of occupied nests were quite similar among years (Table 2). In addition, there was little variation in the number of new nests or inactive nests that were subsequently reoccupied (Table 4).

Table 4. Summary of osprey nest status, 1984-87.

	1984	1985	1986	1987
Occupied nest lost	0	2	2	4
Occupied nest rebuilt	-	1	1	1
Productive nest to inactive nest	0	1	0	1
Inactive nest to occupied nest	2	4	4	5
New nests	4	2	1	2

One of the more noticeable delays involved with laying a clutch of eggs, and apparently independent of experience, is nest construction or repair. During 1984-87, new and rebuilt nest (including productive nests) in the core area were likely to contain 0 or 1 young, while nests substantially intact at the beginning of the breeding season, which were classified as productive or occupied the previous year, produced 2 or 3 young ($X^2 = 12.86$, $P < 0.01$). Recall however, there were insignificant differences among years in the number of new nests constructed or number of occupied nests lost or rebuilt (Table 4).

In summary, it appears a group of productive nests in the core area account for the majority of osprey young produced. In a poor year, these nests produce 1 or 2 young, while in a good year they produce 2 or 3 young. New nests, rebuilt nests, and reoccupied nests usually contain 0 or 1 young except during a poor year when they contain fewer young per nest. At this time, it is difficult to identify any significant factors to account for the observed variability in osprey brood size in interior Alaska. Undoubtedly, small sample sizes make it difficult to detect the factor(s) affecting brood size. Inclement weather and experience do not appear to be plausible explanations at this time.

Since 1983, there have been 2 bands recovered from ospreys banded during this project. A nestling banded on the Tetlin Reservation (nest 03-83) in August of 1983, was found dead near Roseville, California during November of the same year. The second band return was from Guadalajara, where a nestling banded near Tok (nest 33-84) in 1986, was recovered less than 2 months later on the southwestern coast of Mexico.

Acknowledgment - I wish to acknowledge and extend credit to Lynn Fisher, USFWS, Bener Jones, BLM, John Wright, and Nick Steen for field assistance; Dave Kelleyhouse and Dan Grangaard for information and help with organizing the survey.

Literature Cited

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. 143-151 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.

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), and Susitna Valley (PR), and Shaw Creek (SC) during 1983-87; Occupied = Oc, Inactive = I, (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
TR/01-83	Oc (3)	Oc (2)	Oc	Oc X	Oc (1) *
TR/02-83	Oc (1)	Oc (2)	Oc X	Oc (2)	Oc
TR/03-83	Oc (2)	Oc (3)	Oc (2)	Oc (2)	I
TR/04-83	Oc (3)	Oc (3)	I	Oc (2)	Oc
TR/05-83	Oc	I	Oc (1)	Oc	Oc
NWR/06-83	Oc	Oc	I	Oc (3)	Oc (3)
TR/07-83	Oc	Oc	Oc	I (s)	I (s)
TR/08-83	I (s)	I (s)	I (s)	Oc	Oc
TR/09-83	I	X		Oc *	I
TR/10-83	I	I	I	Oc	Oc
TR/11/83	I	Oc	Oc	I	I
NWR/12-83	I	I	X		
NWR/13-83	I	I	I	I	Oc (1)
NWR/14-83	I	Oc (2)	Oc	b.e.	b.e.
NWR/15-83	I (s)	I (s)	I (s)	Oc	X
PR/16-83	Oc	Oc, X	Oc	I	I
TR/17-84		I	X		
TR/18-84		Oc	Oc	I	X
TR/19-84		I	X		
TR/20-84		I	I	I	I
TR/21-84		I	X		
TR/22-84		I	Oc (1)	Oc (2)	Oc (3)
TR/23-84		Oc *	X		
TR/24-84		I	X		
TR/25-84		Oc *	Oc	I	Oc
TR/26-84		I	Oc (1)	Oc	X
TR/27-84		I	I	I	Oc
TR/28-84		I	X		
TR/29-84		I	Oc	Oc	I (s)
TR/30-84		I (s)	I (s)	I (s)	Oc
TR/31-84		Oc *	Oc (2)	Oc (3)	Oc (3)
TR/32-84		I	I	I	Oc
TR/33-84		Oc	Oc (1)	Oc (3)	Oc (2)
TR/34-84		I	I	Oc	X
TR/35-84		Oc (1)	Oc	Oc X	
TR/36-84		I	I	I	Oc
TR/37-84		I	I	X	
TR/38-84		Oc	I	X	Oc (1) *

Appendix A. (cont'd)

Location/Number	1983	1984	1985	1986	1987
TR/39-84		I	I	X	
SC/40-84		Oc (3)	X		
NWR/41-84		Oc *	I	I	I
TR/42-85			I	X	
TR/43-85			Oc (2)	Oc (3)	Oc
TR/44-85			Oc (s)	I (s)	I (s)
TR/45-85			I (s)	I (s)	Oc (3)
TR/46-85			I	b.e.	b.e.
TR/47-85			I (s)	X	
TR/48-85			I	I	I
TR/49-85			I	X	
TR/50-85			I	X	
TR/51-85			Oc (1) *	Oc (2)	Oc (2)
TR/52-85			I (s)	Oc (2)	Oc (1)
TR/53-85			Oc *	Oc (2)	Oc
TR/54-85			I	I	I
TR/55-85			I	X	
PR/56-85			Oc (1)	Oc (2)	Oc (3)
NWR/57-87					Oc *
PR/58-87					I
TR/59-86				Oc (3)	X
TR/60-86				Oc	Oc
TR/61-86				I	I
TR/62-86				I	I
TR/63-86				I	X
Tr/64-86				Oc (1)	Oc
TR/65-86				Oc (2)	X

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-6077, (TDD) 907-465-3646, or (FAX) 907-465-6078.