ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
Bill Sheffield, Governor

DEPARTMENT OF FISH AND GAME
Don W. Collinsworth, Commissioner

DIVISION OF GAME
W. Lewis Pamplin, Jr., Director
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ANNUAL REPORT OF

SURVEY-INVENTORY ACTIVITIES

PART V. WATERFOWL

By

Bruce H. Campbell

Volume XIV
Federal Aid in Wildlife Restoration
Project W-22-2, Job 11.0

(Printed February 1984)

full

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CONTENTS

1982-1983 ALASKA WATERFOWL REGULATIONS SUMMARY - SEASONS AND LIMITS

AREA	NORTHERN	GULF COAST	SOUTHEAST	KODIAK & ALEUTIANS
State Game Management Units	11-13 & 17-26	5-7, 9, 14-16 & Unimak Island	1-4	8 & 10 (except Unimak Island)
Open Seasons	Sept. 1-Dec. 16	Sept. 1-Dec. 16	Sept. 1-Dec. 16	Oct. 8-Jan. 22
	LIMIT BAG POSS.	LIMIT BAG POSS.	LIMIT BAG POSS.	LIMIT BAG POSS.
Ducks	10 30	8 24	7 21	7 21
Sea Ducks[a] & Mergansers	15 30	15 30	15 30	15 30
Geese[b]	6 12	6 12[e, f]	6 12c	6 12[d]
Emperor Geese	6 12	6 12	6 12	6 12
Brant	4 8	4 8	4 8	4 8
Snipe	8 16	8 16	8 16	8 16
Crane	2 4	2 4	2 4	2 4

a Sea Ducks: Eiders, Scoters, Old Squaw, Harlequin.
b No more than 4 daily, 8 in possession may be Canada and/or white-fronted geese.
c Provided that Unit 1C is closed to the taking of snow geese.
d The taking of Canada geese in the Aleutian Islands, except on Unimak, is illegal. (To protect the Aleutian Canada goose).
e Except in Unit 9E where no more than 1 daily and 2 in possesion may be Canada and/or white-fronted geese.
f Except in Units 1-9 and 14-16, where no more than 1 daily and 2 in possession may be white-fronted geese.

(a) WEAPONS: Waterfowl may be taken with a shotgun (not larger than 10 gauge) or bow and arrow, but not rifle or pistol.

(b) PLUGS: Shotguns must be plugged to a 3-shell capacity or less for waterfowl hunting.

(c) CONVEYANCES: Hunting is not permitted from an aircraft, motor driven vehicle, air boat, jet boat, or propellor driven boat, which the motor of such has not been completely shut off and its progress therefrom has ceased.

(d) POSSESSION: No state tagging requirements, see Federal Regulations.

(e) TRANSPORTATION: Waterfowl may be plucked in the field but one fully feathered wing or the head must remain attached while being transported.

(f) SHOOTING HOURS: One half hour before sunrise to sunset.

(g) STAMPS: No person 16 or more years of age may take waterfowl unless he carries a current validated Federal migratory bird hunting stamp (Duck Stamp) on his person.

SUMMARY OF FEDERAL REGULATIONS

In addition to State Regulations, these Federal rules apply to the taking, possession, transportation and storage of migratory game birds:

Restrictions. No person shall take migratory game birds:
- -from a sink box (a low floating device, having a depression affording the hunter a means of concealment beneath the surface of the water).
- -By the use or aid of live decoys.
- -Using records or tapes of migratory bird calls, or sounds, or electrically amplified imitations of bird calls.
- -By the aid of baiting (placing feed such as corn, wheat, salt or other feed to constitute a lure or enticement). Hunters should be aware that a baited area is considered to be baited for 10 days after the removal of bait, and it is not necessary for the hunter to know an area is baited to be in violation.

Field Possession Limit. No person shall possess more than one daily bag limit while in the field, or while returning from the field to one's car, hunt camp, etc.

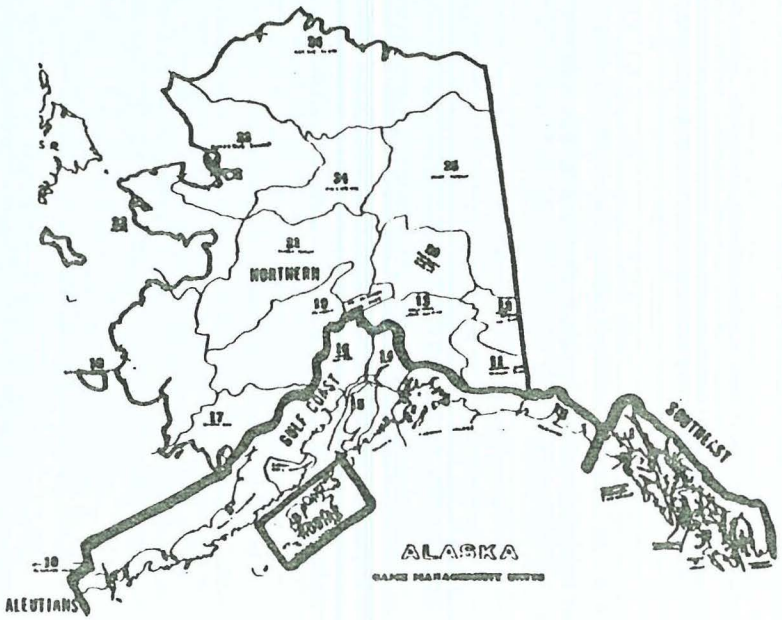
Possession of Live Birds. Crippled birds must be immediately killed.

Transportation. No person shall import during any one week beginning on Sunday more than (1) 25 doves and 10 pigeons from any foreign country and (2) 10 ducks and 5 geese from any foreign country except Canada and Mexico may not exceed Canadian or Mexican export limits and these vary from province to province and from state to state. In addition, one fully feathered wing must remain attached to all migratory game birds being transported or shipped between a port of entry and one's home or to a migratory bird preservation facility. No person may import migratory birds belonging to another person.

Possession. Federal Regulations require migratory birds to be tagged before being left at any place other than the hunter's residence or placed in the custody of another person for any purpose. Tags must state the number and kind of birds, dated killed and address and signature of hunter.

Shipment. No person shall ship migratory game birds unless the package is marked on the outside with: (1) the name and address of the person sending the birds, (2) the name and address of the person to whom the birds are being sent, and (3) the number birds, by species, contained in the package.

CAUTION: More restrictive regulations may apply to National Wildlife Refuges open to hunting. For additional information on Federal regulations, contact Special Agent-in-Charge, U. S. Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, AK 99503. Telephone (907) 276-3800.



WATERFOWL HARVEST AND HUNTER ACTIVITY

Introduction

For the past 6 years, ADF&G has used the U.S. Fish and Wildlife Service (FWS) mail questionnaire and parts collection survey to estimate waterfowl harvest and hunter activity. These surveys were used in lieu of a State waterfowl hunter survey for reasons described by Timm (1978). Due to anomalies in the FWS surveys, and a need for harvest estimates for specific areas within Alaska which the FWS surveys do not provide, a State survey was reinstituted in 1983. ADF&G feels that this survey, used in conjunction with the FWS survey, provides the most accurate estimate of hunter activity and harvest in Alaska.

Survey Procedures

A computerized list of all residents legally licensed to hunt in 1982 was used as a sampling base. Seven thousand six hundred and thirty-nine individuals (9.6% sample) were randomly selected by computer and mailed a survey form (Fig. 1). Each form was self-contained inside a snap-open envelope, and a postage-paid return address was printed on the form's reverse side.

To standardize results, survey data were categorized according to the codes used in the FWS parts collection survey (Table 1).

Data were coded to either specific locations within 11 harvest areas (Fig. 2) or, if birds were not taken at the specific locations listed in Table 1, then the general harvest area code was assigned. For example, a duck shot in the Kasilof Flats would be coded 1103. Timm (1978) provided a more detailed description of the coding system. Reporting bias was corrected during data analysis as described by Timm (1977).

Results

Number of Hunters:

Because of the number of people in Alaska hunting without duck stamps and the incidence of hunting outside legal season limits, the assessment of waterfowl hunter activity and waterfowl harvest is complicated (Timm 1972). While 8 and 42 people reported hunting waterfowl without purchasing a duck stamp or hunting in the spring, respectively, these data were not included in the analyses. Data on number of hunters, harvest, etc., in this report are based solely on duck stamp sales and therefore should be considered the fall sport hunting harvest only.

A total of 3,892 people returned the questionnaire for a response rate of 50.9%. Of the 1,138 individuals indicating that they had purchased a duck stamp, 716 reported hunting 1 or more days

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

WATERFOWL HUNTER SURVEY
1982 - 1983

DEAR HUNTER:

Your cooperation is needed to better manage Alaska's waterfowl. By accurately answering the questions below concerning your hunting activities in 1982, you can help insure continued liberal bag limits and good hunting for the future. If you can't remember exact numbers, give your best estimate. Complete the form printed below and drop this card in the mail. No stamp is necessary. Thank you for your cooperation.

1.

PART I (ALL HUNTERS COMPLETE)

2. DID YOU BUY A DUCK STAMP IN 1982? _____ YES ☐ NO ☐

3. DID YOU HUNT FOR WATERFOWL DURING THE 1982-83 SEASON? YES ☐ NO ☐

PART II (COMPLETE ONLY IF YOU BOUGHT A STAMP OR HUNTED)

4. HOW MANY DAYS DID YOU HUNT WATERFOWL? ☐

AT WHAT PLACE DID YOU HUNT FOR MOST OF YOUR DUCKS?

5. _____

(E.G. PILOT POINT, MINTO FLATS, PYBUS BAY, ETC.)

AT WHAT PLACE DID YOU HUNT FOR MOST OF YOUR GEESE?

6. _____

COMMENTS _____

PART II (CONT.) HOW MANY OF THE FOLLOWING BIRDS DID YOU SHOOT AND RETRIEVE?

DUCKS	☐ 7.
SEA DUCKS AND MERGANSER	☐ 8.
CANADA GEESE	☐ 9.
SNOW GEESE	☐ 10.
WHITE-FRONTED (SPECKS) GEESE	☐ 11.
BRANT	☐ 12.
EMPEROR GEESE	☐ 13.
UNKNOWN KIND OF GEESE	☐ 14.
CRANE	☐ 15.
SNIPE	☐ 16.
* HOW MANY DUCKS DID YOU SHOOT IN APRIL, MAY AND JUNE?	☐ 17.
* HOW MANY GEESE DID YOU SHOOT IN APRIL, MAY AND JUNE?	☐ 18.

* YOU WILL NOT BE PROSECUTED FOR ANSWERING

Fig. 1. Alaska State Waterfowl Hunter Survey form, 1982-83.

Table 1. Summary of FWS codes used to assign harvest locations in Alaska.

Old code	New code	ADF&G region (R) and place names	Original FWS "county" name	Harvest zone
0001	0000	Unknown	Unknown	Unknown
0011	0101	North Slope (R)	Arctic Slope	NW
0031	0301	Seward Peninsula (R)	Seward Peninsula	"
0051	0502	Yukon Valley (R)	Upper Yukon-Kuskokwim	Central
0051	0512	Yukon Flats	"	"
0071	0702	Central (R)	Fairbanks-Minto	"
0071	0712	Minto Flats	"	"
0071	0722	Eielson AFB	"	"
0071	0732	Salchaket Slough	"	"
0071	0742	Healy Lake	"	"
0071	0752	Delta Area	"	"
0071	0762	Tok-Northway	"	"
0091	0901	Yukon Delta (R)	Yukon-Kuskokwim Delta	NW
0111	1103	Cook Inlet (R)	Anchorage-Kenai	SE
0111	1113	Susitna Flats	"	"
0111	1123	Palmer Hay Flats	"	"
0111	1133	Goose Bay	"	"
0111	1143	Potter Marsh	"	"
0111	1153	Chickaloon Flats	"	"
0111	1163	Portage	"	"
0111	1173	Trading Bay	"	"
0111	1183	Redoubt Bay	"	"
0111	1193	Kachemak Bay	"	"
0131	1303	Gulf Coast (R)	Cordova-Copper River	"
0131	1313	Copper River Delta	"	"
0131	1323	Yakutat Area	"	"
0131	1333	Prince William Sound	"	"
0151	1503	Southeast Coast (R)	Juneau-Sitka	"
0151	1513	Chilkat River	"	"
0151	1523	Blind Slough	"	"
0151	1533	Rocky Pass	"	"
0151	1543	Duncan Canal	"	"
0151	1553	St. James Bay	"	"
0151	1563	Mendenhall Wetlands	"	"
0151	1573	Farragut Bay	"	"
0151	1583	Stikine River Delta	"	"
0171	1704	Kodiak (R)	Kodiak Island	SW
0171	1714	Kalsin Bay	"	"
0191	1904	AK Peninsula (R)	Cold Bay-AK Peninsula	"
0191	1914	Cold Bay	"	"
0191	1924	Pilot Point	"	"
0191	1934	Port Moller	"	"
0191	1944	Port Heiden	"	"
0211	2104	Aleutian Chain (R)	Aleutians-Pribilofs	"

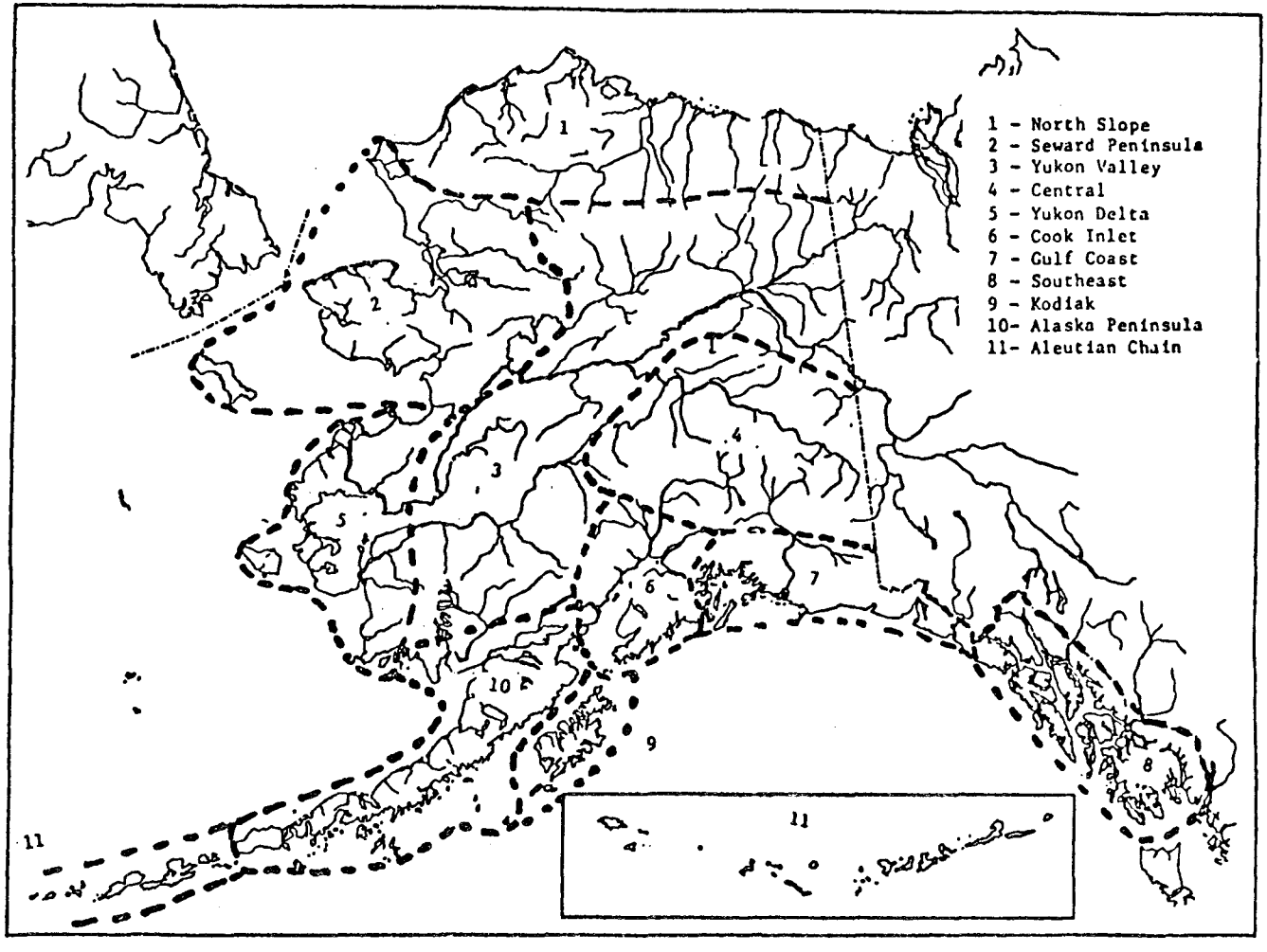


Fig. 2. Harvest areas used in data analyses.

(63% active hunters). Due to a sampling error resulting from an incomplete listing of resident hunters, only 0.06% of the Statewide sample was from Southeast Alaska. To compensate for the absence of questionnaire-derived harvest data, the ratio of duck stamp sales in Southeast to harvest for the most recent State waterfowl harvest survey (1976) and stamp sales in Southeast in 1982 was used to estimate hunting activity and harvest statistics for that region. This comparison is likely valid as stamp sales were not significantly different between 1976-1982 ($\underline{x}^2 = 0.80$, $\underline{P} > 0.05$).

Using the total duck stamp sales in Alaska of 17,600 reported by Carney et al. (1983), a calculated 11,070 people hunted waterfowl during the 1982-83 season (Table 2).

Hunting Activity:

Hunters reported hunting an average of 5.5 days during the 1982-83 season. This projects to a total of 61,425 waterfowl hunter-days (Table 2). The distribution of hunter-days and resulting harvest are summarized by region in Table 3 and by specific hunting area in Table 4. Table 5 compares trends in waterfowl sport hunting statistics for the past 5 years (1978-82).

Duck Harvest:

Magnitude of Harvest. A calculated average of 10.1 ducks/active hunter was taken in 1982 as compared to 7.2 in 1981 and a 5-year average of 8.5 (Table 5). Calculated average daily hunting success was 1.8 ducks in 1982 as compared to 1.1 in 1981.

The projected Statewide duck harvest was 112,010 (Table 2), 43.2% greater than 1981 and 7.0% greater than the 5-year average (Table 5). Game ducks composed 93.7% (104,980) and other ducks 5.8% (7,030) of the total bag as calculated from the State survey.

Species Composition of Harvest. Based on the FWS parts collection survey, which is believed to provide the best estimate available for species composition projections, 85.4% of the duck harvest was dabbling ducks, while 11% was diving ducks and 3.6% sea ducks and mergansers (Table 6). This compares to 87.7% dabblers, 9.9% divers, and 2.3% sea ducks and mergansers in 1981. Similar to 1981, the mallard was the most important game duck in 1982, composing 36.1% of the harvest. Barrow's goldeneye was the most common diver in the 1982 bag, as compared to the lesser scaup in 1981.

Location of Harvest. Results of the State waterfowl hunter survey indicate that over 50% of the duck sport harvest occurred in Cook Inlet, with Southeast Alaska and the Central harvest area contributing an additional 30% (Table 7).

Table 2. Summary of Alaska waterfowl hunter mail questionnaire survey, 1982-83.

No. licensed hunters: Residents 79,000

No. license buyers sampled: 7,639 (10%)

No. and proportion of respondents from survey[a]: 3,892 (50.9%)

No. returns usable for waterfowl calculations: 716

Projected number of fall sport hunters:

Duck stamps sold in Alaska[b]: 17,600 (17,050 potential hunters)

No. active hunters: 11,070 (63%)

Calculated Statewide fall sport harvests[c]:

Ducks: Game: 104,980; other species: 7,030; total 112,010

Geese: Canada: 7,640; emperor: 1,770; brant: 1,770; white-fronted: 1,090; snow: 665; unknown species: 190; total: 13,125

Cranes: 1,746

Snipe: 4,833

Hunter-days: 61,425

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[a] Estimated rate of deliverable questionnaires only--excludes change of address, insufficient address, deceased hunter, etc.

[b] Carney et al. 1983.

[c] Including an estimate for Southeast Alaska.

Table 3. Calculated duck, crane, and snipe fall sport harvests and sport hunter activity by harvest area, 1982-83.

Harvest area	Hunter-days		Game duck		Nongame duck		Crane		Snipe	
	No.	% of total	No.	% of total	No.	% of total	No.	% of total	No.	% of total
North Slope	--	--	--	--	--	--	--	--	--	--
Seward Pen.	553	0.9	840	0.8	246	3.5	164	9.4	--	--
Yukon valley	921	1.5	2,729	2.6	49	0.7	23	1.3	--	--
Central	10,504	17.1	18,057	17.2	330	4.7	540	30.9	60	1.2
Yukon Delta	2,641	4.3	2,939	2.8	1,195	17.0	433	24.8	--	--
Cook Inlet	29,853	48.6	56,899	54.2	2,369	33.7	550	31.5	3,383	70.0
Gulf Coast	3,133	5.1	3,779	3.6	408	5.8	12	0.7	159	3.3
Southeast	9,889	16.1	15,642	14.9	1,090	15.5	--	--	957	19.8
Kodiak	2,150	3.5	2,415	2.3	1,244	17.7	--	--	145	3.0
Alaska Pen.	1,167	1.9	1,365	1.3	--	--	23	1.3	130	2.7
Aleutian Chain	553	0.9	210	0.2	105	1.5	--	--	--	--
Statewide	61,364	99.9	104,875	99.9	7,036	100.1	1,745	99.9	4,834	100.0

Table 4. Locations of most sport hunting activity and greatest waterfowl sport harvest, 1982-83.

Estimated duck harvest and hunter-days					Estimated goose harvest		
	Ducks		Hunter-days				
Location	No.	% of State total	No.	% of State total	Location	No. geese	% of State total
Susitna Flats	16,710	14.9	6,325	10.3	Cold Bay	1,490	11.4
Minto Flats	10,265	9.2	3,625	5.9	Susitna Flats	1,170	8.9
Palmer Hay Flats	9,940	8.9	5,650	9.2	Minto Flats	685	5.2
Trading Bay	5,570	5.0	1,475	2.4	Delta Area	615	4.7
Redoubt Bay	3,605	3.2	1,350	2.2	Chickaloon Flats	405	3.1
Portage Flats	3,385	3.0	1,965	3.2	Prince William Sound	335	2.6
Prince William Sound	3,385	3.0	1,475	2.4	Copper R. Delta	235	1.8
Copper River Delta	2,730	2.4	2,765	4.5	Palmer Hay Flats	140	1.1
Kachemak Bay	2,730	2.4	980	1.6	Pilot Point	125	1.0
Potter Marsh	2,400	2.1	2,150	3.5	Kachemak Bay	110	0.8
Kalsin Bay	2,075	1.9	800	1.3	Portage	95	0.7
Goose Bay	1,855	1.7	1,170	1.9	Cinder River	85	0.6
Chickaloon Flats	1,640	1.5	675	1.1	Potter Marsh	70	0.5
Healy Lake	1,310	1.2	615	1.0	Trading Bay	55	0.4
Cold Bay	1,200	1.1	800	1.3	Redoubt Bay	30	0.2
Eielson AFB	875	0.8	1,045	1.7	Goose Bay	15	0.1
Tok-Northway	875	0.8	245	0.4	Healy Lake	15	0.1
Delta area	765	0.7	1,410	2.3	Salchaket Slough	15	0.1
Salchaket Slough	545	0.5	555	0.9	Eielson AFB	15	0.1
Pilot Point	330	0.3	185	0.3	Yukon Flats	15	0.1
Yakutat area	220	0.2	--[a]	--[a]			
Yukon Flats	110	0.1	60	0.1			
Subtotals	72,520	64.9	35,320	57.5		5,720	43.5
Statewide totals	112,010	100.0	61,425	100.0		13,125	100.0

[a] None reported.

Table 5. Statewide waterfowl fall sport hunting trends for the past 5 years, 1978-1982.

Category	Hunting season					
	1978[a]	1979[a]	1980[a]	1981[a]	1982[b]	10 yr avg.
Duck stamp sales	19,468	18,946	17,260	15,885	17,600	17,518
% active hunters	73.2	70.3	73.3	70.1	63.0	70.0
No. active hunters	13,811	13,065	12,425	10,862	11,070	12,247
No. days/adult hunter	6.4	6.8	6.3	4.3	5.5	5.7
Total hunter-days[c]	88,680	96,824	85,294	71,538	61,425	72,169
No. ducks/hunter	8.9	8.7	7.7	7.2	10.1	8.5
Total duck harvest	122,431	114,634	96,117	78,209	112,010	104,680
No. geese/hunter	1.0	1.2	1.0	0.9	1.2	1.1
Total geese harvest	13,932	15,116	13,030	10,203	13,125	13,081
Total crane harvest	312	675	1,049	1,049	1,746	966

[a] Based on FWS mail questionnaires and parts collection surveys.
[b] Based on Alaska waterfowl hunter mail questionnaire survey.
[c] Included estimated juvenile hunter-days (hunters under 16 years of age).

Table 6. Species composition of the duck harvest, 1982-83 waterfowl season.[a]

Species	% total harvest by area											% total Statewide[c]
	North Slope[b]	Seward Pen.[b]	Yukon valley	Central	Y-K Delta	Cook Inlet	Gulf Coast	South-east	Kodiak[b]	Alaska Pen.	Aleutian Chain[b]	
Mallard			--	30.2	100.0	37.8	--	41.4		17.5		36.1
G-W teal			--	10.1	--	13.5	--	28.0		26.3		16.1
Am. wigeon			--	18.4	--	13.3	--	10.8		12.3		13.3
Pintail			--	13.4	--	16.0	--	12.5		14.0		14.8
Shoveler			--	8.4	--	3.7	--	3.0		1.8		4.1
Gadwall			--	--	--	--	--	--		17.5		0.8
B-W teal			--	1.7	--	--	--	--		--		0.2
Total dabblers			0	82.2	100.0	84.3	0	95.7		89.4		85.4
Lesser scaup			--	9.5	--	1.1	--	--		--		2.0
Common goldeneye			--	--	--	2.1	--	0.4		3.5		1.5
Greater scaup			--	--	--	0.4	--	--		--		0.2
Barrow's goldeneye			--	--	--	4.9	100.0	0.9		--		3.9
Bufflehead			--	5.6	--	2.9	--	1.3		1.8		2.9
Redhead			--	0.6	--	0.1	--	--		--		0.2
Canvasback			--	0.6	--	--	--	--		--		0.1
Ringneck			--	0.6	--	0.1	--	--		--		0.2
Total divers			0	16.9	0	11.6	100.0	2.6		5.3		11.0
Common scoter			--	--	--	0.1	--	--		--		0.1
W-W scoter			--	--	--	0.8	--	--		1.8		0.6
Surf scoter			100	0.6	--	1.0	--	--		--		1.2
Mergansers			--	--	--	1.6	--	1.3		--		1.2
Oldsquaw			--	0.6	--	0.3	--	0.4		--		0.3
Common eider			--	--	--	0.1	--	--		--		0.1
Harlequin			--	--	--	0.1	--	--		--		0.1
Total sea ducks/ mergansers			100	1.2	0	4.0	0	1.7		1.8		3.6
Sample size	0	0	7	179	2	732	10	232	0	57	0	1,227

[a] Computed from FWS parts collection survey.
[b] No duck harvest reported by FWS parts collection survey.
[c] Includes birds harvested in unknown locations.

Table 7. Projected distribution of 1982 duck sport harvest by harvest area and ADF&G mail survey 5-year average.

Harvest area	1982 (%)	1973-76 and 1982 avg. (%)
North Slope	0	0.2
Seward Pen.	0.9	1.6
Yukon valley	2.5	2.5
Central	16.5	17.9
Y-K Delta	3.6	2.2
Cook Inlet	52.9	44.8
Gulf Coast	3.8	7.7
Southeast	14.9	16.0
Kodiak	3.2	2.6
Alaska Pen.	1.2	4.2
Aleutian Chain	0.3	0.3
Totals	99.8	100.0

The distribution of harvest has shifted significantly since 1973-76 ($\underline{x}^2 = 7.30$, $\underline{P} < 0.05$) with most of the shift attributed to an 18% increase in duck harvest in the Cook Inlet region, and a 50.6% and 71.4% decline in harvest in the Gulf Coast and Alaska Peninsula regions, respectively.

Goose Harvest:

Magnitude of Harvest. Hunters reported taking an average of 1.2 geese/active waterfowl hunter in 1982. This was higher than the 0.9 geese/hunter reported last year as well as the 5-year average of 1.1 birds/hunter (Table 5). The calculated 1982 Statewide goose harvest was 13,125 birds (Table 2). This harvest compares to 10,203 in 1981 and a 5-year average of 13,081 (Table 5).

Species Composition of Harvest. Canada geese were the most common bird harvested by sport hunters in 1982 (Table 2). They made up 58.1% of the bag, followed by emperors (13.5%), brant (13.5%), white-fronts (8.3%), and snow geese (5.0%). This compares to a 1981 FWS estimate of 86.6% Canada geese, 6.8% emperors, 5.0% brant, 1.5% white-fronts, and no snow geese.

Location of Harvest. The major portion of the goose sport harvest (Table 8) occurred in Cook Inlet (33.1%) and Yukon Delta (21.5%).

Crane Harvest:

Hunters reported taking an average of 0.16 sandhill cranes/active hunter in 1982 as compared to 0.10/active hunter in 1981. The calculated Statewide crane harvest was 1,746 in 1982 as compared to 1,049 in 1981 and a 5-year average of 966 (Table 5). A major portion of the crane harvest (Table 3) occurred in Cook Inlet (31.5%), Central Alaska (30.9%), and the Yukon Delta (24.8%).

Snipe Harvest:

An average of 0.44 snipe was harvested/active hunter in 1982, for a calculated Statewide harvest of 4,833 birds. About 70% of the harvest occurred in Cook Inlet (Table 3).

Discussion:

Alaska has relied upon the FWS mail questionnaire and parts collection survey to estimate waterfowl harvest and hunter activity for the past 6 years. The decision to use FWS surveys was made in 1976 after an analysis of the State and Federal surveys indicated that, with a few exceptions (e.g., the State survey's ability to estimate harvest and hunter-days by specific location), they were a duplication of effort (Timm 1978). It was believed that the deficiencies of the FWS survey could be corrected by using a 3-year average (1974-76) of State survey statistics in conjunction with the FWS survey information, and that this approach would be adequate until a need for more precise data arose. As a result of declining goose populations in

Table 8. Calculated fall sport goose harvest by species and harvest area, 1982-83.

Area	Canada		Emperor		Brant		Snow		White-front		Unknown		Total	
	No.	% of spec. total	No.	% of spec. total	No.	% of spec. total	No.	% of spec. total	No.	% of spec. total	No.	% of spec. total	No.	% of spec. total
North Slope	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seward Pen.	397	5.2	11	0.6	46	2.6	24	3.6	118	10.8	--	--	586	4.5
Yukon valley	443	5.8	--	--	--	--	--	--	165	15.1	--	--	608	4.6
Central	947	12.4	34	1.9	34	1.9	37	5.5	187	17.2	12	6.3	1,251	9.5
Yukon Delta	947	12.4	575	32.5	740	41.8	266	40.0	281	25.8	12	6.3	2,821	21.5
Cook Inlet	2,551	33.4	425	24.0	635	35.9	290	43.6	293	26.9	154	81.3	4,348	33.1
Gulf Coast	351	4.6	--	--	46	2.6	--	--	12	1.1	--	--	409	3.1
Southeast	1,673	21.9	--	--	34	1.9	37	5.5	--	--	--	--	1,744	13.3
Kodiak	--	--	80	4.5	--	--	12	1.8	--	--	--	--	92	0.7
Alaska Pen.	328	4.3	631	35.1	232	13.1	--	--	35	3.2	12	6.3	1,228	9.4
Aleutian Chain	--	--	23	1.3	--	--	--	--	--	--	--	--	23	0.2
Statewide totals	7,637	100	1,779	99.9	1,767	99.8	666	100	1,091	100.1	190	100.2	13,110	99.9

western Alaska and susceptibility of the tule white-front population in Cook Inlet to hunting pressure, major changes in State goose hunting regulations occurred in 1982. The State survey was reinstituted in 1982 to assess the effects of these regulation changes as well as the effect of major human population shifts, which were indicated by the 1980 census, on the general waterfowl harvest.

Harvest statistics were not obtained without problems. Only 4 survey questionnaires (0.05% of Statewide total) were sent to the Southeast Alaska hunting region as compared to 15-20% in previous years. This problem was attributed to an inadequate licensed resident hunter listing, the listing from which names and addresses are randomly selected for the State waterfowl hunter survey. The Alaska Department of Revenue maintains this listing and is generally 4-6 months behind in posting license sales. The slow posting in combination with late hunting seasons and probably late license sales in Southeast means that the file used in January to select questionnaire recipients for the 1982 survey was likely not representative of Southeast Alaska. To compensate for sampling deficiencies, the ratio of duck stamp sales in Southeast to harvest for the most recent State survey (1976) and stamp sales in Southeast in 1982 was used to estimate harvest statistics. This comparison is probably valid as stamp sales were very similar for both years.

A comparison of the results of 1982 ADF&G hunter survey and estimates of waterfowl harvest and hunter activity made by the FWS (Carney et. al. 1983) shows, except for number of active hunters, sizable differences (Table 9). Total hunter-days calculated from the State survey were about 7% lower than FWS projections while days per active hunter, duck harvest, and goose harvest were 53%, 36%, and 121% greater, respectively, than FWS projections. Goose harvest composition also differed. While the State survey has consistently projected higher goose harvests than the FWS surveys, and calculated total hunter-days have differed in the past (Timm 1977), this is the 1st time that days per active hunter and estimated duck harvest have not been close. Even with the sizable differences in estimates, we feel that our mail survey provides the best estimate of hunter activity and harvest in Alaska for 1982-83. This confidence is based on our belief that the State survey is more random in sampling (it samples a cross section of license buyers) and has a larger sample size.

Results of the 1982 State Waterfowl Hunter Survey may identify a new trend in hunting activity and harvest in Alaska. While duck stamp sales increased for the 1st time since 1978 when they began to decline, days spent afield by hunters continued to decline. This, in combination with a larger harvest and greater average harvest per active hunter, may indicate that fewer but more determined or more experienced hunters went afield in 1982.

Table 9. A comparison between ADF&G and FWS waterfowl hunter surveys, 1982-83.

Category	ADF&G	FWS[a]
% active hunters	63.0	67.3
No. active hunters	11,070	11,497
Days/active hunter	5.5	3.6
Total hunter-days	61,425	65,916
Duck bag/active hunter	10.1	4.7
Total duck harvest	112,010	82,212
Goose bag/active hunter	1.2	0.5
Total goose harvest	13,125	5,933

Goose harvest by species:	ADF&G No.	ADF&G % of total	FWS No.	FWS % of total
Canada	7,640	58.2	4,550	76.7
Emperor	1,770	13.5	--[b]	--[b]
Black brant	1,770	13.5	208	3.5
White-front	1,090	8.3	481	8.1
Snow	665	5.0	0	0
Other [c]	--	--	688	11.6
Unknown [c]	190	1.4	--	--

[a] Carney et al. 1983.

[b] No estimate.

[c] The FWS survey design identifies all geese by species; however, the ADF&G hunter survey contains geese of unknown species.

A significant shift in the distribution of the goose harvest was apparent in 1982. Zero percent and 26.1% of the Statewide sport goose harvest were reported on the Yukon Delta and in Cook Inlet, respectively in 1981, 21.5% and 33.1%, respectively, of the harvest occurred in these areas in 1982. This occurred in conjunction with a 60% decline in goose harvest on the Alaska Peninsula. The apparent change in the distribution of the goose harvest is attributed to improved sampling, shifts in hunting pressure, and regulation changes. The apparent increase in goose sport harvest on the Yukon Delta in 1982 was probably partly an artifact of changes in sampling scheme and partly real. Goose harvest obviously occurred on the delta in 1981, but sample size was small and no harvest was detected by the FWS survey. The 1982 sample was larger and likely provided a more accurate estimate of harvest for the region. However, some of the apparent increase was real. The 1982 harvest estimate for the Yukon Delta was so much greater than the 1973-76 average (+175%) that all of the increase cannot be attributed to improved sampling.

The increase in goose harvest in Cook Inlet and decline on the Alaska Peninsula are attributed to harvest restrictions and, possibly, economics. The Alaska Peninsula has traditionally had some of the world's best goose hunting and is hunted each year by many people from Alaska's population centers. This is an expensive trip by either commercial airlines or chartered aircraft. Migrating Canada and white-fronted geese have historically composed a large portion of the bag. However, in 1982, bag and possession limits for these species were reduced by 75% due to low or declining populations. The direct result of restrictive regulations and indirect result of the public's unwillingness to pay the high costs of goose hunting on the peninsula when limits have been reduced was a 70% reduction in harvest in 1982. It is possible that some of these goose hunters redirected their efforts to hunting in Cook Inlet where goose hunting is both productive and economical. This, in combination with a rapidly growing human population in the area, likely explains the 26.8% increase in the goose harvest in Cook Inlet.

DUSKY CANADA GOOSE STUDIES

Production

While spring 1983 weather conditions on the Copper River Delta were favorable for nesting birds, goose production was poor. Surveys indicated nest density was 3.7% greater than in 1982 but still 23% below the 8-year average (Table 10). Fifty-two percent of the nests hatched at least 1 egg as compared to a 15-year average hatching success of 68.9% (Table 10).

Favorable spring conditions may have been reflected in clutch size and date of peak nest initiation. Clutch size averaged 5.5 eggs (Table 10), the 3rd largest since records have been kept and considerably above the 15-year mean of 5.0 (range 3.6-5.8). The peak of nest initiation occurred between 6-10 May ($\underline{N}$ = 44), up to 5 days earlier than previously recorded.

Table 10. Dusky Canada goose nest densities, hatching success, and average clutch size on the west Copper River Delta, 1959-83.

Year	$\bar{x}$ nest density/mi²	% nest hatching success (N)	$\bar{x}$ clutch size (N)
1959-74	--	82.9	5.0
1975	179	31.6 (215)	4.8 (215)
1976	156	--	4.8 (168)
1977	175	79.0 (229)	5.4 (181)
1978	183	56.2 (390)	--
1979	133	18.8 (409)	5.7 (338)
1980	108	[a]	5.4 (152)
1981[b]	45	--	4.9 (28)
1982	113 (93[c])	49.8 (151)	4.8 (135)
1983	117 (98.5[c])	51.9 (162)	5.5 (87)
$\bar{x}$	145.5[d]	68.9	5.0

[a] 35% nest destruction observed 10 days into incubation.
[b] Incomplete survey.
[c] Nest density including new plots on the far west delta.
[d] Excludes 1981.

As documented in 1975 and 1982, predation was again a major reason for poor dusky production. About 35% of the nests on the study plots were destroyed by predators, primarily mammalian (Table 11). The type of predation could be determined for about 70% of the destroyed nests, with 64.8% attributed to mammals (primarily brown bears and coyotes) and 5.6% to avian predators. This compares to 45% mammals and 33.8% avian in 1982, and 0% mammals, 11.4% avian, and 88.6% tidal flooding in 1959.

A production survey on the delta during July 1983 indicated that production was even lower than anticipated. Based on aerial observation of an estimated 7,740 geese, young composed only about 15-18% of the population. This was the lowest number since production surveys were started in 1971 and is considerably below the preceding 12-year (1971-1982) average of 25.6% young.

A breeding population survey was not conducted in 1983; for the 6th year, population estimates were calculated from counts on the wintering grounds. Bob Jarvis of Oregon State University estimated a 1983 postseason population of 17,000 duskys in western Oregon (unpubl. rep. to Pacific Flyway Waterfowl Study Committee). That estimate, compared with a 1982 fall flight estimate of 21,000, indicated mortality of 4,000 geese during the 1981-82 waterfowl season (Table 12). An estimated 16,400 breeding grounds population in 1983, plus 15% young, resulted in a calculated fall 1983 flight of 19,300 birds (Table 12).

Future of Dusky Geese

Habitat changes on the Copper River Delta, their suspected impacts on dusky goose production, and possible problems on the wintering grounds have been discussed previously (Timm 1982, Campbell and Timm 1983). Because of declining dusky goose numbers and as a result of close cooperation between managing agencies and the Pacific Flyway Technical Committee, new and innovative management techniques are being planned or initiated.

In 1981 and 1983, 2 additional nesting study plots were established on the Copper River Delta. These are located on the far west delta and barrier islands where a majority of the young geese have been observed during recent production surveys. While nest densities are lower in these areas (Table 10), nest success has been good (70% in 1982, 68% in 1983). Their addition to the nesting study area will help identify where production is occurring on the delta and will be a step toward understanding why success varies between areas.

Funds for habitat enhancement and predator/prey investigations were committed by the U.S. Forest Service and state of Oregon in 1983. Habitat enhancement will involve construction and design evaluation of nesting structures by the Forest Service while ADF&G has been contracted to investigate the activities of brown bears on the nesting grounds. The state of Oregon is cooperating in the bear investigation. The potential of these projects along with modification of hunting regulations on the wintering areas presents an optimistic future for the dusky Canada goose.

Table 11. Status of dusky Canada goose nests on the west Copper River Delta study area.

Year	No. nests	% succ.	% aban.	% unk.	% destr.	% type destruction			
						Mammal	Avian	Flooding	Unk.
1959[a]	1,162[b]	79.6	1.8	2.0	6.0	0	11.4	88.6	0
1974[c]	81	82.7	2.5	[d]	14.8	[d]	[e]	0	[d]
1975[c]	215	31.6	3.7	[d]	64.6	[d]	[e]	0	[d]
1982	158	49.2	1.8	[d]	49.0	45.0	33.8	0	21.3
1983	162	51.9	3.7	8.0	35.2	64.8	5.6	0	29.6

[a] Trainer 1959.
[b] Eggs rather than nests.
[c] Bromley 1976.
[d] Not reported.
[e] Percentages not given, but major losses attributed to avian predators.

Table 12. Summary of population data for dusky Canada geese, 1971-83.

Year	Mid-winter pop.	Breeding pop.[b]	% yng.	% non-prod. ad.[c]	No. yng. prod.	Fall flight	Harvest[d]
1971	20,850	20,065	16.2	79.7	3,880	23,945	5,995
1972	17,950	17,275	10.6	71.7	2,050	19,325	3,450
1973	15,875	15,280	36.0	64.6	8,595	23,875	4,875
1974	19,000[a]	15,290	51.4	35.7	19,345	37,635	12,070
1975	26,550	25,565	17.9	84.5	5,575	31,140	9,010
1976	22,725[a]	21,870	24.2	54.2	6,890	28,850	6,350
1977	22,500	21,650	44.3	56.9	17,225	38,875	15,100
1978	23,775[e]	23,000[e]	24.8	71.8	7,600	30,600	5,100
1979	25,500[e]	24,500[e]	16.0	87.0	3,700	28,200	6,200
1980	22,000[e]	21,300[e]	23.7	67.4	6,600	27,900	4,900
1981	23,000[e]	22,200[e]	17.9	92.0	4,800	27,000	9,250
1982	17,740[e]	17,000[e]	23.7	79.1	4,000	21,000	4,000
1983	17,000[e]	16,400[e]	15.0	87.7	2,900	19,300	

[a] Calculated from spring breeding grounds survey.
[b] Mid-winter less 0.035 mortality (Chapman et al. 1969).
[c] Percentage of total adults seen in flocks with no young.
[d] Fall flight less mid-winter inventory.
[e] Preliminary estimates pending further analyses.

Banding

In accordance with the revised flyway management plan, which recommends banding duskys every 3 years to monitor distribution and timing of harvest, duskys were banded in 1982. However, due to the small number of geese banded (107), duskys were banded again in 1983. A total of 854 birds (711 adults, 143 young) were banded during July 1983. Distribution of bands reported from previously banded birds that were shot or found dead since the 1975 hunting season is given in Table 13.

LESSER CANADA GOOSE STUDIES

The U.S. Army, with ADF&G assistance, has been transplanting Canada geese onto Fort Richardson since 1979. Between 1979 and 1981, geese were transplanted from Palmer Hay Flats to Otter Lake. However, due to heavy recreation use and other unknown factors, no transplanted birds are known to have returned to, or nested on, the lake. In 1982, waterfowl habitat improvements were made on McVeigh Marsh to provide an alternative transplant site. During July 1983, a crew of Army and ADF&G personnel captured 92 goslings and 152 adult Canada geese on the Palmer Hay Flats. Ninety of the goslings were banded and transplanted to McVeigh Marsh. Thirty-six were also neck-collared with red collars before release. The 152 adult geese were banded and released at the capture site. Since birds released at McVeigh Marsh in 1982 and 1983 will not reach breeding age until 1984 and 1985, success of the transplants is unknown at this time.

As of 31 August 1983, there have been 21 band recoveries and 5 observations of collared birds outside of Alaska. Distribution of band recoveries between 1979-83 is as follows: Alaska, 23.8%; Washington, 28.6%; and Oregon, 47.6%. Two collars have been observed in British Colombia, Canada and three in the Willamette valley of Oregon and southwestern Washington.

TULE GOOSE STUDIES

Introduction

Because of the wide concern for, and attention given to, the tule subspecies of white-fronted geese (Anser albifrons gambelli) in recent years (Timm 1980, 1982; Timm et al. 1982), ADF&G assumed leadership in an investigation of the status of the birds on State-owned marshes in Cook Inlet in 1980. Progress of this investigation has been presented annually since 1980 (Timm 1980, 1982; Campbell and Timm 1983).

1982-83 Progress Report

Study objectives for 1983 were the following:

1. Further determine spring arrival dates and use areas in Cook Inlet.

Table 13. Percentage distribution of band recoveries, 1975-1982.

Year	No. recoveries	Oregon	Alaska	Br. Columbia	Washington	Idaho
1975	198	67.3	14.0	13.5	5.2	--
1976	241	65.5	10.0	13.3	11.2	--
1977	245	71.4	17.0	4.1	7.5	--
1978	225	63.3	19.3	14.2	3.2	--
1979	84	64.2	18.5	2.5	14.8	--
1980	102	82.4	2.9	8.8	5.9	--
1981	64	92.2	1.6	0	6.3	--
1982	31	54.8	32.3	0	9.7	3.2

2. Continue to locate and describe nesting habitat at Redoubt Bay and Susitna Flats.

3. Capture, band, and neck-collar tule geese at Redoubt Bay.

4. Conduct aerial surveys of geese in Cook Inlet.

5. Further define fall departure pattern of tule geese from Cook Inlet.

Unfortunately, due to personnel shortages and shifts in priorities in Alaska and on the wintering grounds, several of these objectives were not obtained.

Objective 1. Further determine spring arrival dates and use areas in Cook Inlet.

The timing of spring thaw in Cook Inlet varied by location in 1983. When investigators arrived on Susitna Flats (Fig. 3) on 20 April 1983, the area was 100% covered by snow and ice. Berms and riverbanks that are generally used by arriving tules did not begin to open up until 27 April, about 7-10 days later than 1982. Redoubt Bay (Fig. 3) was visited during the week of 17-22 April 1983 and was found to be about 10% free of ice and snow. When investigators arrived on 28 April, approximately one-quarter of the area was snow-free. This was 5-7 days earlier than 1982.

White-fronts were present at both Susitna Flats and Redoubt Bay when crews arrived; however, numbers were low (approximately 50 at Susitna and 150 at Redoubt). The 1st collared tules (blue collars) were observed on Susitna Flats on 21 April, and at Redoubt Bay on 28 April. A detectable build-up in numbers was noted on 1 May at both locations.

Between 20 April and 8 May, 1,541 observations of habitat use by tules were made on Susitna Flats. Geese used elevated and drier areas covered with drift and the previous year's growth of bluejoint grass (Calamagrostis sp.) and sedge (Carex Lyngbyaei) 78% of the time. They used melt ponds in the freshwater marsh which supported stands of the previous year's emergent sedge (Carex Mackenziei) 11% of the time. Other areas used by tules included slightly elevated riverbanks covered by dry bluejoint grass and coarse sedge (Carex Lyngbyaei) (8%), saline flats (2%), and tidal flats (1%). Although detailed habitat use data were not collected at Redoubt Bay in 1983, melt ponds, ice-free saline sedge-grass flats, and fresh marsh habitats are commonly used by arriving tules (Campbell and Timm 1983).

Objective 2. Continue to locate and describe nesting habitat at Redoubt Bay and Susitna Flats.

To meet this objective, considerable manpower and time are required. Neither of these were available in 1982 due to manpower shortages.

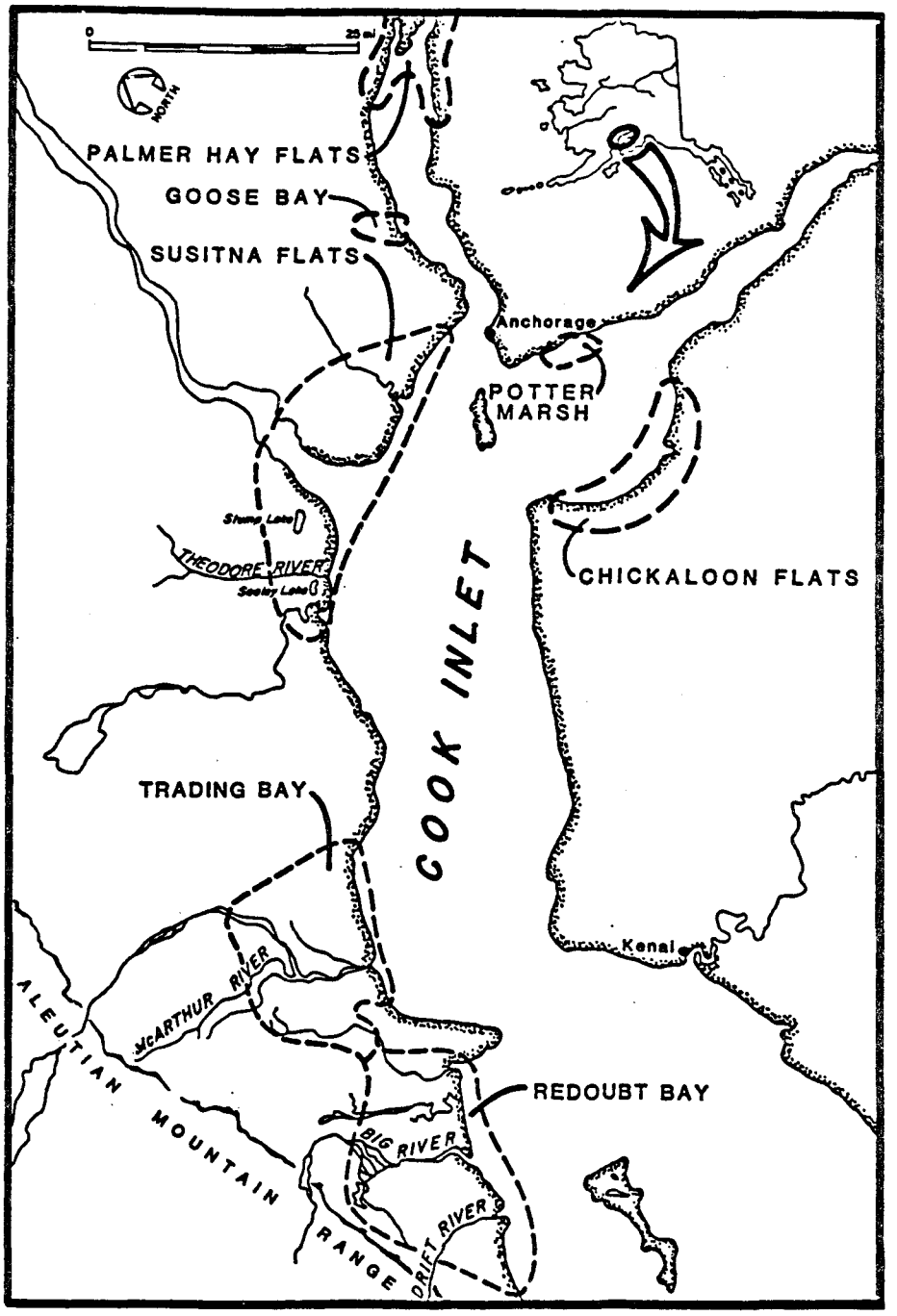

Fig. 3. Areas in upper Cook Inlet surveyed for geese in 1983.

Objective 3. Capture, band, and neck-collar tule geese at Redoubt Bay.

During 18-19 July 1983, 64 tule white-fronts were captured at Redoubt Bay; 61 of these were fitted with plastic neck collars. The additional 3 birds had been collared in previous years. A total of 536 geese has been collared in Alaska since 1979.

Observations of Marked Birds:

Based on post 1982-83 waterfowl season observations of collared geese in California and Oregon, at least 49 of 346 Alaska collared tules could have migrated north in spring 1983. The actual number of collared birds still alive was likely greater as concerted efforts to locate collared white-fronts in California were discontinued in 1982. During spring and summer, 26 of the 49 collared birds still known to be alive were positively identified (20 in Redoubt Bay and 6 on Susitna Flats). Fifty-two additional observations of collared tules were made, 17 at Redoubt Bay and 35 at Susitna Flats; however, collars were unreadable due to weather, terrain, and birds' habits. Since significantly less time was spent searching for tules in Cook Inlet than during previous years, the numbers of collars read and collared bird observations were likely low and not representative of the true number of collared birds in the population.

During 20 April-8 May and 13-16 June, 2,982 tules were checked for collars and aged (1,184 adults, 519 immatures, 1,279 unknown age). The age ratio of known-age birds in 1983 was 69.5% adults and 30.5% immatures as compared to 74.2% adults and 25.8% immatures in 1980, 78.7% adults and 21.2% immatures in 1981, and 69.6% adults and 30.4% young in 1982. The 1982-83 wintering population of tule geese was estimated to have been comprised of about 35% young.

Objective 4. Conduct aerial surveys of Geese in Cook Inlet.

Between 18-23 July 1983, major coastal marshes in upper Cook Inlet (Fig. 3) were surveyed for geese. An estimated 2,449 white-fronted and Canada geese were observed (Tables 14, 15). The lesser Canada goose count of 1,400 compares with 1,217 in 1981 and 2,029 in 1980, indicating that the upper Cook Inlet population remains 50% above that of the 1970's (Table 14). The 1,049 tule white-front observations in 1983 (Table 15) were similar to those of 1982 and 1981 (964 and 1,146, respectively) but lower than the 1,537 seen in 1980.

It is likely that substantial numbers of white-fronts were not seen due to the birds' behavior, and the abundance and wide distribution of molting areas in Cook Inlet. A flock of 820 molting birds observed at Redoubt Bay responded to

Table 14. Lesser Canada geese seen during July surveys of Cook Inlet, 1980-83.

Area	Adult				Immature				Total			
	1980	1981	1982	1983	1980	1981	1982	1983	1980	1981	1982	1983
Palmer Hay Flats	480	238	NS[a]	433	45	120	NS	50	525	358	NS	483
Goose Bay	16	--	NS	--	11	--	NS	--	27	--	NS	--
Potter Marsh	45	30	NS	32	60	50	NS	55	105	80	NS	87
Chickaloon	47	35	NS	--	68	--	NS	--	115	35	NS	--
Susitna Flats	497	286	NS	635	676	273	NS	195	1,173	559	NS	830
Trading Bay	--	--	NS	--	--	--	NS	--	--	--	NS	--
Redoubt Bay	1	--	NS	--	3	--	NS	--	4	--	NS	--
Anchorage area	40	80	NS	NS	40	105	NS	NS	80	185	NS	NS
Totals	1,126	669	NS	1,100	903	548	NS	300	2,029	1,217	NS	1,400

[a] No survey.

Table 15. Tule geese seen during July surveys of Cook Inlet, 1980-83.

Area	Adult				Immature				Total			
	1980	1981	1982	1983	1980	1981	1982	1983	1980	1981	1982	1983
Palmer Hay Flats	--	--	NS[a]	--	--	--	NS	--	--	--	NS	--
Goose Bay	--	--	NS	--	--	--	NS	--	--	--	NS	--
Potter Marsh	--	--	NS	--	--	--	NS	--	--	--	NS	--
Chickaloon	--	--	NS	--	--	--	NS	--	--	--	NS	--
Susitna Flats	50	39	25	49	68	49	58	50	118	88	83	99
Trading Bay	--	--	--	130	--	--	--	--	--	--	--	130
Redoubt Bay	1,273	927	801	800	146	131	80	20	1,419	1,058	881	820
Totals	1,323	966	826	979	214	180	138	70	1,537	1,146	964	1,049

[a] No survey.

the survey aircraft by rapidly moving into dense, flooded alder and willow. No evidence of the birds' presence could be seen from the survey aircraft during 2 additional passes. Molting flocks may also be dispersed over a larger area than originally anticipated. Timm (1980) reported flightless birds in Trading Bay in 1980, and 130 flightless tules were seen on the Chakachatna River in Trading Bay in 1983. The occurrence of flightless birds in Redoubt Bay, Trading Bay, and on Susitna Flats suggests that tules may be molting in favorable habitats along much of the west side of upper Cook Inlet.

While only 6.7% of the tules observed in July 1983 were young birds, we believe production was higher. This belief is based on favorable weather conditions for nesting in 1983 and the development of a 1980-83 trend of low production estimates from the molting areas (13-15% young) but higher production estimates from wintering and spring staging areas (25-30% immatures).

Objective 5. Further define fall departure pattern of tule geese from Cook Inlet.

Evidence that tules leave Cook Inlet early in fall has been presented previously (Campbell and Timm 1983). Since that report, additional observations of collared tules in British Columbia on 1 September 1982 (1); Stikine River in Southeast Alaska on 17 September 1982 (1); Vancouver Island, B.C. on 21 September 1982 (1); Washington on September 1982 (1); and Sacramento National Wildlife Refuge on 28 September 1982 (5) further suggest an early departure from Alaska.

ALEUTIAN CANADA GOOSE RECOVERY TEAM

One Aleutian Canada Geese (Branta canadensis leucapareia) Recovery Team meeting was attended in 1982. The population continues to increase (approximately 3,500 birds in 1982). Captive-reared and wild-caught birds from Buldir Island, released on Agattu Island in previous years, were seen on Agattu in 1983. An additional 108 geese were successfully transplanted from Buldir to Agattu in 1983, and a fox control program was initiated on Amukta Island.

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