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JUNEAU, ALASKA

STATE OF ALASKA  
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REPORT OF SURVEY AND INVENTORY  
ACTIVITIES-WATERFOWL

by  
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Volume VI  
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and  
Project Final Report  
Project W-17-7, Jobs 11.4 and 11.5

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(Printed December 1975)

STATEWIDE WATERFOWL SEASONS - 1974-1975

Open Seasons		Species	Daily Bag	LIMITS Possession	Exceptions or Explanations
GAME DUCKS, OLD SQUAW, HARLEQUIN, SCOTERS, EIDERS, MERGANSERS, GEESE AND BRANT:		Game Ducks	6	18	
(a)* Pribilof and Aleutian Islands (except Unimak Island). Oct. 12 - Jan. 26	}	Old Squaw, Harlequin, Scoters, Eiders, and Mergansers	15	30	Singly or in aggregate of all kinds.
(b) Kodiak Island (State Game Management Unit 8). Sept. 7 - Sept 29 and Oct. 26 - Jan. 17		Geese (except Emperor)	6	12	No more than 4 daily or 8 in possession may be Canada geese or sub-species of Canada geese or white-fronted geese.
(c) Remainder of Alaska and Unimak Island Sept. 1 - Dec. 16		Emperor Geese	6	12	
		Brant	4	8	
JACKSNIPES: All of Alaska Sept. 1 - Nov. 4		Jacksnipe	8	16	
CRANES: All of Alaska Sept. 1 - Oct. 15		Cranes	2	4	

\*The taking of Canada geese in the Aleutian Islands, except Unimak, is illegal. (To protect the Aleutian Canada goose).

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## WATERFOWL HARVEST AND HUNTER ACTIVITY

### INTRODUCTION

This was the fourth year of conducting a post-season mail survey of waterfowl hunters in Alaska. This survey, in conjunction with field bag checks and data from the Fish and Wildlife Service parts collection survey, provides the most accurate estimate of hunter activity and waterfowl harvest by species in Alaska.

The number of hunters sampled in the FWS parts collection survey has been significantly increased during the past three hunting seasons. Mr. Sam Carney (pers. comm., 1974, USFWS, Laurel, Md.) believes duck species composition harvest data for Alaska, as measured from the federal mail survey, are becoming more and more reliable.

Waterfowl hunter field bag check data have been summarized in this report by the harvest areas used for data breakdown of the mail questionnaire survey. More specific location data are available in the Anchorage office files.

The 1974 fall flight of waterfowl from Alaska was predicted to be very good. There were above-average numbers of breeding ducks and optimum weather prevailed over much of Alaska early in the nesting season. However, the predicted excellent hunting season did not materialize. Mild weather throughout September over most the state is presumed responsible for the field reports of very poor hunting. This survey confirms those field reports.

### PROCEDURES

#### Mechanics of the Survey and Hunter Reports

A computerized list of all residents legally licensed to hunt in 1974 was used as a sampling base. In February 1975, 6,610 survey forms (10.1 % sample) were sent. Four weeks were allowed for return and those persons not replying were then sent reminder forms. Forms received more than four weeks after the second mailing were not considered in the analyses.

Each form (Fig. 1) was self-contained inside a snap-open envelope. This container eliminated the folding of conventional survey forms and stuffing them into envelopes. A postage paid return address was printed on the form's reverse side.

Each survey form in the sample had a individual five digit number which facilitated the second mailing. For the second mailing, the computer rejected punched numbers, and printed out reminder survey forms only to those people not returning the first forms.

Figure 1. Waterfowl hunter questionnaire form used in the 1974 survey.

**STATE OF ALASKA**  
**DEPARTMENT OF FISH AND GAME**



**WATERFOWL HUNTER SURVEY**  
**1974-1975**

DEAR HUNTER:

Your cooperation is needed to better manage Alaska's waterfowl--now and in the future. By accurately answering the questions below concerning your hunting activities in 1974, 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 as soon as possible, 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 1974 ? \_\_\_\_\_ YES ☐ NO ☐  
3. DID YOU HUNT FOR WATERFOWL DURING THE 1974-75 SEASON? YES ☐ NO ☐

PART II (COMPLETE ONLY IF YOU ANSWERED YES TO EITHER QUESTION ABOVE)

4. HOW MANY DAYS DID YOU HUNT WATERFOWL?   
AT WHAT PLACE DID YOU HUNT FOR MOST OF YOUR DUCKS?

5. \_\_\_\_\_  
(I.E. PILOT POINT, MINTO FLATS, PYBUS BAY, ETC.)

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

6. \_\_\_\_\_

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

- |                                    |                      |     |
|------------------------------------|----------------------|-----|
| GAME DUCKS _____                   | <input type="text"/> | 7.  |
| NON-GAME DUCKS _____               | <input type="text"/> | 8.  |
| CANADA GEESE _____                 | <input type="text"/> | 9.  |
| SNOW GEESE _____                   | <input type="text"/> | 10. |
| WHITE FRONTED (SPECKS) GEESE _____ | <input type="text"/> | 11. |
| BRANT _____                        | <input type="text"/> | 12. |
| EMPEROR GEESE _____                | <input type="text"/> | 13. |
| UNKNOWN KIND OF GEESE _____        | <input type="text"/> | 14. |
| CRANE _____                        | <input type="text"/> | 15. |
| SNIBE _____                        | <input type="text"/> | 16. |

COMMENTS \_\_\_\_\_

### Field Bag Checks

Random field checks of hunters were made in 5 of the 11 harvest areas. A total of 515 ducks were checked by Department of Fish and Game biologists. About 40 percent of the duck species composition data came from the Cook Inlet harvest area.

The number of ducks checked this year was substantially less than in previous years. The department was conducting an ingested lead shot study and biologists spent more time collecting gizzards from individual birds rather than examining large numbers of birds.

### Analyses of Survey Results

The state was divided into 11 harvest areas to facilitate analysis of survey data (Fig. 2). Because the area of residence for each hunter was known, an accurate estimate of days hunted, birds bagged, etc., could be made in each harvest area. Some idea of hunters traveling out of their area of residence could also be obtained by knowing their residence and where they did most of their hunting.

Bias factors influencing reported days hunted and ducks bagged were considered to be: (1) a superstition bias resulting from a tendency not to report the number 13; (2) a memory bias resulting in a tendency to report numbers ending in zero, five and multiples of the daily bag and (3) a memory bias from the unreliability of those hunters reporting large numbers. Bias corrections for the average number of days hunted were made as suggested by Williams (1953). The reported mean season duck bag was reduced by 15 percent, as suggested by S. Carney (pers. comm., 1973, USFWS, Laurel, Md.).

No bias corrections for goose harvest were made. It is believed that most hunters know exactly how many geese they shoot each season. Therefore, reporting rates may be higher for geese than ducks, as geese are usually considered more of a trophy.

Data from the 984 usable waterfowl questionnaires were expanded for total waterfowl hunters on a proportionate basis. Although about 15,750 duck stamps were sold in Alaska according to Fish and Wildlife Service data, only 15,550 people were considered to be potential hunters. The FWS annually measures the proportion of stamps purchased for collecting purposes and about 200 were purchased in Alaska for this purpose.

## RESULTS

### Number of Hunters

Because of the number of people in Alaska hunting without a duck stamp and the incidence of hunting outside the legal season limits, the assessment of waterfowl hunter activity and waterfowl harvest is complicated (Timm 1972).

Although 15 people returned questionnaires which indicated they hunted waterfowl but purchased no duck stamp, these people were not



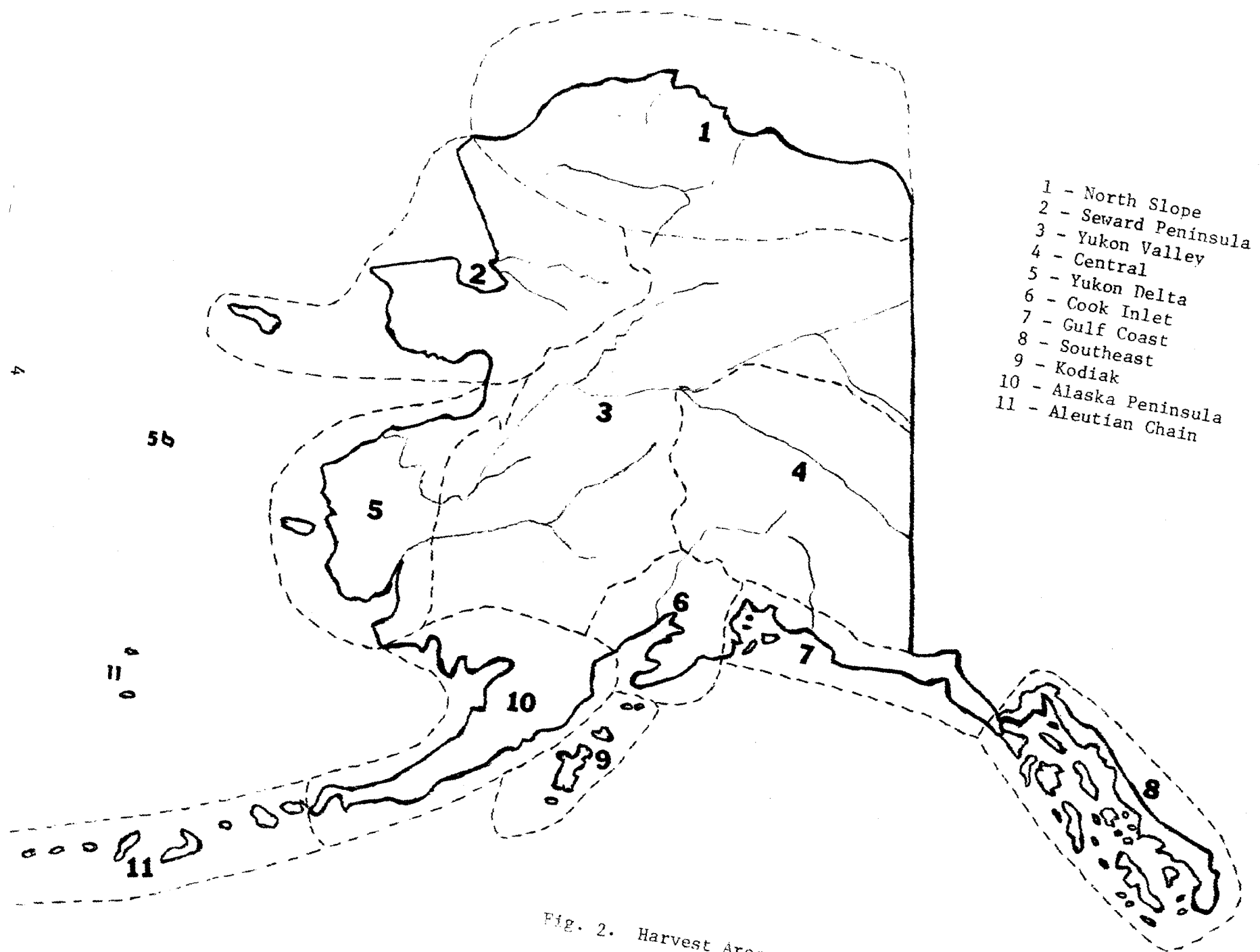


Fig. 2. Harvest Areas Used for Data Analysis.

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 sport hunting harvest only.

Of those sampled, 688 people reported that they purchased a stamp and hunted one day or more. The number of stamp purchasers who did not hunt was 331 (68 percent active hunters). A calculated 10,499 people hunted waterfowl one or more days during the 1974-75 season. Table 1 summarizes these data.

### Hunting Activity

Hunters reported hunting an average of 5.5 days during the 1974-75 season. After corrections for bias, each active hunter was calculated to have hunted an average of 5.1 days during the season. This projects to a total of 53,650 waterfowl hunter days during the 1974-75 season.

Table 2 presents a summary of hunter activity and success as reported by harvest area. In Table 3 statewide hunter activity and success are broken down into calculated days hunted and birds bagged by harvest area. Table 4 provides projected hunter days and duck and goose harvests for specific hunting areas in the state on which the most activity and harvest occurred. Table 5 summarizes season statistics for the 1971-74 period.

### Duck Harvest

#### Magnitude of the Harvest

Hunters reported taking an average of 7.9 ducks this season, compared to 9.2 in 1973. Corrections for bias provide a mean calculated kill of 6.8 ducks per active hunter, compared to 8.0 in 1973. Reported daily success was 1.4 ducks per day, while calculated daily success was 1.3 birds per day. Calculated daily success in 1973 was 1.5 birds.

The projected statewide duck harvest was 71,813 birds, or a 20 percent decrease from the 1973 harvest and a 18 percent decrease from the previous three-year average (Table 5). Game ducks represented 94.2 percent (67,648) and nongame ducks 5.8 percent (4,165) of the total bag.

#### Species Composition of Harvest

From 1960 through the 1971-72 season, field bag checks were intermittently conducted in 6 of the 11 harvest areas. Timm (1972) summarized these data. During the 1974-75 season, field checks were conducted in five of the harvest areas (Table 6). Pintails, mallards, green-winged teal and American widgeons comprised nearly 80 percent of the total ducks checked. Nongame ducks represented only 0.6 percent of the total ducks checked, compared to 5.8 percent nongame ducks reported in the mail questionnaire survey.



Table 1. Summary of Alaska Waterfowl Hunter Mail Questionnaire Survey, 1974-75.

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Number of licensed hunters: Resident - 65,697 (includes 6,256 subsistence)

Number of license buyers sampled: 6610 (10.1 %)

Number and proportion of respondents from survey 1/:

1st mailing 3,265 (49.7%)

2nd mailing 984 (29.7%)

TOTAL - 4,249 (64.9%)

Number of returns usable for waterfowl calculations: 1,019

Projected numbers of hunters:

Duck stamps sold in Alaska: 15,750 (15,550 potential hunters)

Number of active hunters: 10,499 (67.52 %)

Calculated statewide harvests:

Ducks: Game - 67,648; nongame - 4,165; Total - 71,813

Geese: Canada - 9,000; emperor - 2,067; brant - 1,173;  
white-fronted - 747; snow - 347; Total 13,334

Cranes: 640

Snipe: 2,205

Hunter Days: 53,650

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1/ Estimated rate of deliverable questionnaires only - excludes change of address, insufficient address, etc.

Table 2. Hunter Success and Activity as Reported by Areas, 1974-75.

Harvest Area	Percent Active Hunters	No. Ducks per Season	No. Days per Season	No. Ducks per Day	No. Geese per Season
North Slope <sup>1/</sup>	100.0	3.0	3.0	1.0	3.5
Seward Pen. <sup>1/</sup>	54.5	4.3	4.3	1.0	2.7
Yukon Valley <sup>1/</sup>	75.0	8.8	6.7	1.3	5.9
Central	60.3	8.1	5.3	1.5	0.6
Yukon Delta <sup>1/</sup>	66.7	8.2	6.5	1.3	1.8
Cook Inlet	68.0	6.9	4.6	1.5	0.3
Gulf Coast	67.6	10.8	7.9	1.4	2.5
Southeast	73.2	7.9	7.0	1.1	0.8
Kodiak	52.6	16.8	7.5	2.2	-
Alaska Pen.	72.4	9.6	5.5	1.7	8.0
Aleutian Chain <sup>1/</sup>	100.0	1.0	2.0	0.5	-
Statewide	67.52	7.87 6.84 <sup>2/</sup>	5.51 5.11 <sup>2/</sup>	1.43 1.34 <sup>2/</sup>	1.27

<sup>1/</sup> Sample size less than 10 hunters.

<sup>2/</sup> After correction for bias

Table 3. Calculated duck, crane and snipe harvests and hunter activity by harvest area, 1974-75.

Harvest Area	Hunter Days		Game Ducks		Nongame Ducks		Crane		Snipe	
	No.	% of total	No.	% of total	No.	% of total	No.	% of total	No.	% of total
North Slope	107	0.2	68	0.1	-	-	-	-	-	-
Seward Pen.	375	0.7	338	0.5	-	-	61	9.5	-	-
Yukon Valley	858	1.6	1,015	1.5	-	-	46	7.2	-	-
Central	8,316	15.5	11,027	16.3	925	22.2	228	35.7	46	2.1
Yukon Delta	376	0.7	406	0.6	21	0.5	-	-	-	-
∞ Cook Inlet	20,441	38.1	27,464	40.6	1,707	41.0	137	21.4	851	38.6
Gulf Coast	4,882	9.1	6,156	9.1	200	4.8	122	19.0	501	22.7
Southeast	13,788	25.7	13,800	20.4	808	19.4	-	-	624	28.3
Kodiak	1,180	2.2	2,097	3.1	358	8.6	-	-	-	-
Alaska Pen.	3,273	6.1	5,209	7.7	146	3.5	46	7.2	183	8.3
Aleutian Chain	54	0.1	68	0.1	-	-	-	-	-	-
Statewide	53,650	100.0	67,648	100.0	4,165	100.0	640	100.0	2,205	100.0

Table 4. Locations of most hunting activity and greatest duck and goose harvest, 1974-75.

Location	Calculated duck harvest and hunter days				Calculated goose harvest		
	Ducks		Hunter Days		Location	No. geese	% of State total
	No.	% of State total	No.	% of State total			
Susitna Flats	6,750	9.4	3,112	5.8	Cold Bay	3,280	24.6
Palmer-Hay Flats	5,458	7.6	4,292	8.0	Pilot Point	1,920	14.4
Minto Flats	5,027	7.0	2,307	4.3	Copper River Delta	747	5.6
Copper R. Delta	3,806	5.3	2,736	5.1	Minto Flats	720	5.4
Mendenhall Flats	3,447	4.8	4,346	8.1	Yakutat Area	480	3.6
Stikine R. Delta	2,083	2.9	1,180	2.2	Trading Bay	333	2.5
Pilot Point	1,939	2.7	751	1.4	Port Heiden	280	2.1
Trading Bay	1,867	2.6	697	1.3	Susitna Flats	173	1.3
Potter Marsh	1,795	2.5	1,770	3.3	Palmer Hay Flats	173	1.3
Kachemak Bay	1,580	2.2	805	1.5	Chickaloon Flats	173	1.3
Kalsin Bay	1,364	1.9	644	1.2	Duncan Canal	173	1.3
Eagle R. Flats					Stikine Delta	173	1.3
(Cook Inlet)	1,293	1.8	1,127	2.1	Mendenhall Flats	133	1.0
Chickaloon Flats	1,005	1.4	697	1.3	Farragut Bay	133	1.0
Cold Bay	790	1.1	1,073	2.0	St. James Bay	93	0.7
Portage	790	1.1	1,341	2.5	Portage Flats	93	0.7
Yakutat Area	790	1.1	751	1.4	Kachemak Bay	80	0.6
Redoubt Bay	575	0.8	161	0.3	Blind Slough	40	0.3
Duncan Canal	431	0.6	215	0.4	Rocky Pass	27	0.2
Blind Slough	359	0.5	590	1.1			
Salchaket Slough	359	0.5	107	0.2			
St. James Bay	359	0.5	376	0.7			
Goose Bay	287	0.4	161	0.3			
Eielson AFB	215	0.3	322	0.6			
Farragut Bay	144	0.2	107	0.2			
Rocky Pass	144	0.2	54	0.1			
Subtotal	42,657	59.4	29,722	55.4		9,224	69.2
Statewide	71,813	100.0	53,650	100.0		13,334	100.0

Table 5. Comparison of statewide resident waterfowl hunting statistics, 1971-74.

Category	Hunting			Season	
	1971-72	1972-73	1973-74	1971-73 Average	1974-75
Duck Stamp Sales	14,320	14,824	16,449	15,198	15,750
Percent Active Hunters	72.44	75.06	68.57	72.02	67.57
No. Active Hunters	9,843	10,930	11,150	10,641	10,499
No. Days per Hunter	4.3	5.4	5.2	5.0	5.1
Total Hunter Days	42,719	59,350	57,868	53,312	53,650
No. Ducks per Hunter	8.2	8.4	8.0	8.2	6.8
Total Ducks Harvested	80,417	91,703	89,534	87,218	71,813
No. Geese per Hunter	1.08	0.99	1.65	1.24	1.27
Total Geese Harvested	10,630	10,822	18,397	13,283	13,334
Total Crane Harvest	502	765	602	623	640
Total Snipe Harvest	3,051	3,498	1,661	2,737	2,205

Table 6. Duck Species Composition in the harvest as determined by random field bag checks - Cook Inlet, Gulf Coast, Southeast, Kodiak and Ak. Peninsula harvest areas, 1974-75.

<u>Area and Percent Species Composition</u>						
Species	Cook Inlet	Gulf Coast	Southeast	Kodiak	Ak. Pen.	All Areas <sup>1/</sup>
Mallard	23.1	41.0	23.2	11.8	15.5	26.2
Pintail	20.4	17.9	3.6	11.8	34.6	21.0
Am. Widgeon	8.3	24.2	53.5	5.9	30.9	21.0
G-W Teal	9.7	9.5	8.9	47.0	12.7	11.1
Scaup (both)	14.4	4.2	1.8	-	0.9	7.2
Goldeneye (both)	8.3	-	3.6	-	-	3.9
Shoveler	7.9	1.1	-	-	0.9	3.7
Canvasback	5.1	-	-	-	-	2.1
Bufflehead	1.8	-	3.6	23.5	-	1.9
Gadwall	0.5	2.1	1.8	-	1.8	1.1
Steller's eider	-	-	-	-	1.8	0.4
Harlequin	-	-	-	-	0.9	0.2
B-W Teal	0.5	-	-	-	-	0.2
	100.0	100.0	100.0	100.0	100.0	100.0
SAMPLE SIZE	216	95	56	17	110	515

<sup>1/</sup> Includes birds of unknown area of harvest

As described previously, the FWS significantly increased their hunter sample in the parts collection survey during the 1972-74 seasons. Because of random hunter sampling of this survey throughout the season and adequate sample size, it is believed that duck species composition of the harvest estimated by the FWS is the best estimate available for 1974-75 statewide game duck projections. However, it is also believed that hunters somewhat bias this survey by tending not to send in wings of nongame ducks. The state's hunter questionnaire mail survey is believed to provide the best estimate of nongame duck kill.

Table 7 provides what is believed to be the most reliable estimate of duck harvest by species in Alaska, during the 1974-75 season. A combination of FWS and state mail survey data is used. Table 8 compares age ratios by species of waterfowl in the harvest for state bag checks to the federal survey.

#### Goose Harvest

Hunters reported taking an average of 1.27 geese per active waterfowl hunter. This is about the same hunter success as during the previous three years (Table 5). The 1974-75 statewide goose harvest was calculated to be 13,334 birds.

Field bag checks are not considered to be adequate for determining statewide or even areawide species composition of the goose kill. Numbers of geese checked are few and bag checks are not conducted in enough locations to adequately sample harvests of all species.

Although hunters were not asked to report goose kill by species in the 1971-72 mail questionnaire they were asked to do so in the 1972, 73 and 74 surveys. Table 9 presents calculated goose harvest by species and by harvest area for 1974-75. Canada geese made up 67 percent of the reported state goose harvest, while emperor geese comprised 15 percent of the total bag. Black brant, white-fronted geese and snow geese made up 9, 6 and 3 percent, respectively, of the total goose harvest.

#### Crane Harvest

Hunters reported taking an average of 0.06 cranes per active hunter, as compared to 0.05 birds per hunter in 1973. The statewide calculated crane harvest was 640 birds, compared to 602 the previous year. Table 3 summarizes crane harvest by area.

#### Snipe Harvest

An average of 0.21 snipe reported per active hunter resulted in a calculated statewide harvest of 2,205 birds. During the 1973-74 season hunters reported 0.15 birds per man, for a total harvest of 1,661 snipe. Table 3 summarizes snipe harvest by area.



Table 7. Estimate of statewide duck harvest by species, 1974-75.

Species	Harvest <sup>1/</sup>	Percent of Total <sup>2/</sup>
Mallard	19,102	26.6
Am. Widgeon	12,783	17.8
Pintail	11,346	15.8
G-W Teal	10,628	14.8
Scaups	4,165	5.8
Goldeneyes	2,873	4.0
Bufflehead	2,657	3.7
Shoveler	2,298	3.2
Ringneck	646	0.9
Canvasback	575	0.8
Gadwall	431	0.6
B-W Teal	144	0.2
Nongame	4,165	5.8
Total game ducks	67,648	94.2
Total nongame ducks	4,165	5.8
Total ducks	71,813	100.0

<sup>1/</sup> Total harvest from ADFG mail survey.

<sup>2/</sup> Percent species composition in the harvest projected from 1974 Fish and Wildlife Service wing collection data (Schroeder, et al, 1975) except for nongame ducks which are taken from ADFG mail survey.

Table 8. Percent immature waterfowl in the 1974-75 statewide harvest as determined by random field bag checks, compared to FWS estimates.

Species	Field Bag Checks		FWS Estimates <sup>1/</sup>	
	% imm.	sample size	% imm.	Sample Size
Mallard	81.0	126	75.6	259
Pintail	84.8	96	82.5	170
Am. Widgeon	92.9	99	No data	-
G-W Teal	81.6	38	87.8	127
Dusky Canada Goose	50.8	36		
			All Canada Geese	
Lesser Canada Goose	29.4	34	41.2	135
Cackling Can. Goose	60.0	10		

<sup>1/</sup> Sorensen, et al., 1975.

Table 9. Calculated goose harvest by species by harvest area, 1974-75.

Area	Canada		S P E C I E S		A N D		N U M B E R <sup>1/</sup>				Total	
	No.	% of species total	Emperor No.	% of species total	Black Brant No.	% of species total	White-fronted No.	% of species total	Snow No.	% of species total	No.	% of total harvest
North Slope	108	1.2	-	-	-	-	-	-	-	-	108	0.8
Seward Pen.	27	0.3	-	-	213	18.2	-	-	-	-	240	1.8
Yukon Valley	441	4.9	-	-	-	-	366	49.0	-	-	807	6.1
Central	828	9.2	-	-	-	-	152	20.4	-	-	980	7.3
Yukon Delta	63	0.7	45	2.2	-	-	-	-	-	-	108	0.8
Cook Inlet	1,287	14.3	-	-	-	-	168	22.5	136	39.1	1,591	11.9
Gulf Coast	1,620	18.0	-	-	-	-	-	-	30	8.7	1,650	12.4
Southeast	1,575	17.5	-	-	-	-	15	2.0	76	21.8	1,666	12.5
Kodiak	-	-	-	-	-	-	-	-	-	-	-	-
Alaska Pen.	3,051	33.9	2,022	97.8	960	81.8	46	6.1	105	30.4	6,184	46.4
Aleutian Chain	-	-	-	-	-	-	-	-	-	-	-	-
Statewide	9,000	100.0	2,067	100.0	1,173	100.0	747	100.0	347	100.0	13,334	100.0

<sup>1/</sup> Unknown goose harvest areas and species reported as unknown are proportionately included in known categories.

## Hunter Characteristics

Because both area of residence (hunter's address on license) and area of most duck harvest were included on the survey forms, an estimate of travel involved to go duck hunting could be made. Of all hunters shooting most of their ducks out of their area of residence, about one-third went each to the Gulf Coast and Alaska Peninsula areas. Nine percent of all hunters reported taking most of their ducks outside their areas of residence. This 9 percent represents about 945 hunters. Table 10 compares area of residence to the harvest area where hunters reported taking most of their ducks. Data in this table are very similar to results obtained from the 1973-74 season survey.

## DISCUSSION

Bias corrections for reported season duck bags were made using the same methods as last year and the same as the FWS method. Reported harvest was reduced by 15 percent as described by S. Carney (pers. comm.). The FWS uses a constant 15 percent reduction factor in Alaska. This represents a long-term average rate which was derived by using the Williams (1953) method.

Although the FWS does not correct for hunter bias in reported days hunted per season (S. Carney, pers. comm.), bias corrections were made in the ADF&G survey. Carney believes that if a hunter can remember anything about his hunting, he can remember the number of days he hunted. A review of the frequency of reported days hunted per season in Alaska indicates this may be a false assumption. People report hunting those number of days divisible by five (5, 10, 15, 20, etc.) much more frequently than other day classes. Also, very few people report hunting 13 days during the season (superstition bias). Therefore, bias corrections for days hunted were made as described by Williams (1953), which resulted in a 7 percent reduction in reported days hunted.

A comparison of the results of our 1974 mail survey and the 1974 estimates of waterfowl harvest and hunter activity made by the FWS (Schroeder et al. 1975) shows, except for duck and goose harvests, fairly close correlation (Table 11). Our total goose harvest estimate was 33 percent above their harvest estimate. Also, the species harvest estimate for emperor geese was quite different. The federal species composition data were derived from only 177 goose tails, however. Calculated hunter days were nearly identical in both surveys.

It is believed that our mail survey provided the best estimate of goose harvest by species in Alaska during the 1974-75 season. The FWS has considered going to a hunter reporting system to estimate goose harvest by species, as opposed to the present system where people send in goose tails. For various reasons they are not satisfied with the present system (S. Carney, pers. comm.).

The Alaska Peninsula was, as it has been the past 4 years, the major goose harvest area in the state. About one-half of the total harvest occurred there. Still relatively unknown to people outside Alaska, the Alaska Peninsula has some of the world's best goose hunting.

Table 10. Incidence of duck hunting in areas other than that in which the hunter lives.<sup>1/</sup>

Area of Residence	No. Slope	PERCENT OF DUCK HUNTERS WHO HUNTED MOST IN:										Total Out of Res. Hunt
		Seward Pen.	Yukon Valley	Central	Yukon Delta	Cook Inlet	Gulf Coast	S.E.	Kodiak	Alaska Pen.	Aleut. Chain	
No. Slope	100	-	-	-	-	-	-	-	-	-	-	0
Seward Pen.	-	100	-	-	-	-	-	-	-	-	-	0
Yukon Valley	-	-	100	-	-	-	-	-	-	-	-	0
Central	-	-	2	94	-	-	2	-	1	1	-	6
Yukon Delta	-	-	-	-	100	-	-	-	-	-	-	0
Cook Inlet	Tr.	-	Tr.	3	-	86	4	Tr.	-	5	-	14
Gulf Coast	-	-	-	4	-	-	96	-	-	-	-	4
Southeast	-	-	-	-	-	-	2	98	-	-	-	2
Kodiak	-	-	-	-	-	-	-	-	100	-	-	0
Alaska Pen.	-	-	-	-	-	-	-	-	-	100	-	0
Aleutian Chain	-	-	-	-	-	-	-	-	-	-	100	0
<sup>17</sup> Percent of Total Hunters going to:	2	-	5	22	-	-	33	2	2	35	-	9

<sup>1/</sup> Example - of all hunters living in Gulf Coast, 4 percent reported duck hunting the most in central; a total of 4 percent traveled out of the Gulf Coast to hunt; of all duck hunters in the State who travelled out of their unit of residence, 33 percent came to the Gulf Coast; a total of 9 percent of all duck hunters in the state hunted most in a different area than that in which they live.

Table 11. A comparison between ADF&G and FWS waterfowl hunter success surveys, 1974-75. 1/

		ADFG		FWS <sup>2/</sup>
Percent active hunters		67.5		64.6
Number of active hunters		10,499		10,045
Days per active hunter		5.1		5.3
Total hunter days		53,650		53,597
Duck bag per active hunter		6.8		5.9
Total duck bag		71,813		59,624
Goose bag per active hunter		1.3		1.0
Total goose harvest		13,334		10,026
Goose harvest by species:		<u>% of total</u>		<u>% of total</u>
Canada	9,000	67.5	7,760	77.4
Emperor	2,067	15.5	732	7.3
Black Brant	1,173	8.8	962	9.6
White-fronted	747	5.6	341	3.4
Snow	347	2.6	231	2.3

1/ For hunters 16 years or older

2/ Schroeder, et al, 1975

Although there are some well-known duck hunting areas in Alaska, such as Susitna Flats and Minto Flats, about 40 percent of the harvest occurred on lesser known areas. As seen in Table 4, 60 percent of the harvest occurred at the "big 25" duck hunting places in Alaska.

This survey did not sample hunters under 16 who did not purchase a hunting license. S. Carney (pers. comm.) estimates that an additional 8 percent total hunter days and 5 percent total duck harvest can be attributed to juveniles.

The 1974-75 season was, according to records since 1971 (and long before that according to many hunters), the worst on record. Although Alaska had near record breeding duck populations and excellent weather for nesting birds, large numbers of birds were not available on the major hunting areas. It is probable that mild weather throughout the state during September was to blame for poor hunting during the 1974-75 season.

#### SUMMARY

1. Total calculated duck, goose, crane and snipe harvests in Alaska during the 1974-75 season were: 71,813; 13,334; 640 and 2,205 birds, respectively.
2. Hunters spent a calculated 53,650 days hunting waterfowl in Alaska during the 1974-75 season; a decrease of 7 percent from the 1973-74 season.
3. Hunters harvested an average of 6.8 ducks each, and hunted an average of 5.1 days during the season.
4. Pintails, mallards, widgeons and green-winged teal constituted about 75 percent of the total duck harvest.
5. Canada geese comprised over two-thirds of the state's goose harvest.
6. This survey indicated that 9 percent of the waterfowl hunters took most of their ducks in a different area than that in which they live.

#### DUSKY CANADA GOOSE STUDIES

##### Production and Fall Flight

The January 1974 mid-winter inventory of 18,620 dusky Canada geese (*B. C. occidentalis*) in Oregon's Willamette Valley represented an increase in the wintering population over the previous two years. However, it still was below the post season population goal of 20,000-25,000 geese (Pacific Flyway Council 1973).



Weather and timing of the 1974 spring chronology on the Copper River Delta were 10 to 14 days "early". Bob Bromley, University of Alaska graduate student working on dusks, found nest initiation peaked on May 6-7 and again on May 10-11 (Breeding ecology of the dusky Canada goose on the Copper River Delta, southcentral Alaska, Progress Report, April, 1975). He also found average clutch size was 5.6 in 1974, compared to a previous nine-year average of 4.9 eggs per nest.

The promise of good production was verified on July 22, 1974 by results of an aerial survey. Biologists from Fish and Game, FWS personnel and Bob Bromley counted 5,366 adult birds and 2,833 goslings for an observed 35 percent young. After applying a visibility correction factor of 50 percent for young (Timm 1971, unpubl. memo. Ak. Dept. Fish & Game, Anchorage), there was a calculated 51.4 percent young in the population. This compares to 1971, 1972 and 1973 estimates of 16.2 percent, 10.6 percent and 36.0 percent young, respectively.

The 1974 calculated fall flight of dusky geese was 36,400 birds. The 1975 January mid-winter inventory showed 26,560 dusky geese, indicating a harvest of 9,840 birds during the 1974 season.

The 1975 breeding population of 25,565 (mid-winter inventory less natural mortality) birds represents the largest post-season population in recorded history. The effects of three years of season length restrictions in Oregon and excellent production one year (1974) are self evident.

#### Banding and Recoveries

During the summer of 1974, 781 dusky geese were banded by biologists from the ADF&G, the FWS, the USFS and Bob Bromley-University of Alaska. Participants came from as far away as Finley Refuge in Oregon. Birds were banded by drives as in previous years, as well as by Bromley nest-trapping females on his study area. All bands put on were those issued to ADF&G by the Fish & Wildlife Service.

The following number of geese were banded in 1974 and recovered during the 1974-75 season.

	<u>Normal Birds</u>		<u>Neck-Collared Birds</u>	
	<u>Adults</u>	<u>Young</u>	<u>Adults</u>	<u>Young</u>
# Banded	251	234	146	150
# Recovered	18	39	5	23
% Recovered	7.2	16.7	3.4	15.3

The 146 adults received a yellow neck collar (yellow=birds of unknown age), the 150 young received a red collar (red=known age). Establishing a color marked population of known age birds is desirable not only for Bromley's studies, but is very desirable for probable future work on these geese (J. C. Bartonek, U. S. Fish and Wildl. Ser., Anchorage, Ak. pers. comm.).

The 7.2 percent first year recovery rate on all adults compares to first year adult rates of 2.8 percent, 7.7 percent and 2.9 percent in 1971, 1972 and 1973, respectively. The 16.7 percent first year rate for young is fairly high, but probably reflects the large number of vulnerable young in the population. It is interesting that for both young and adults, leg-banded only, the recovery rates were higher than both age classes receiving a neck collar.

The recovery distribution in 1974, as calculated by recoveries from all years of banding, was: Oregon - 67.8 percent; Alaska - 11.5 percent; Washington -14.4 percent; B. Columbia - 6.3 percent; sample size= 174 recoveries.

#### LESSER CANADA GOOSE STUDIES

##### Cook Inlet Population Survey

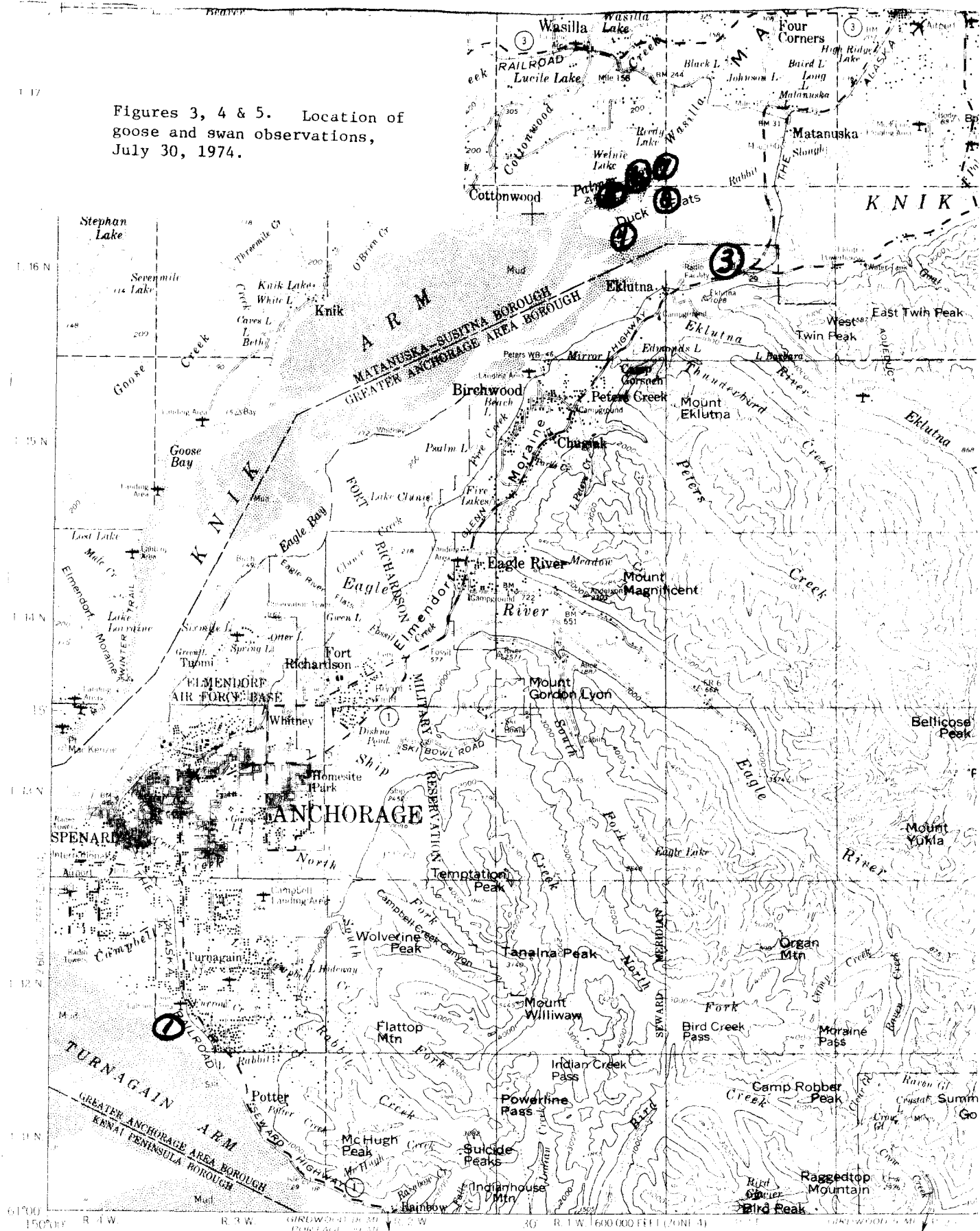
King and Lensink (1971) stated that Canada geese do not nest in the Kenai-Susitna Basin, which includes Cook Inlet. This statement was probably made with the assumption that the goose situation in Cook Inlet did not change after the 1964 Earthquake. Indeed, all indications are that little Canada goose production did occur around Cook Inlet pre-1964. Peter E. K. Shepherd (pers. comm., 1975) did, however, confirm such goose nesting, but it was very limited.

In recent years various people have reported substantial Canada goose populations during the summer around the inlet. On July 30, 1974 an aerial survey was made around Cook Inlet in an attempt to document numbers of Canada geese.

Figs. 3, 4 and 5 provide the locations of individual goose and swan observations from this survey. Table 12 presents data on number of birds observed at each location. A total of 1,035 Canada geese (299 young), 863 white-fronted geese and 5 pairs of swans plus a trio (presumed trumpeters) were observed on the survey.

Although all areas were covered fairly well, birds of all species were undoubtedly missed due to the large area covered and length of time spent on the survey. No geese or swans were observed on Eagle River Flats, Chickaloon Flats or Goose Bay.

Figures 3, 4 & 5. Location of  
goose and swan observations,  
July 30, 1974.



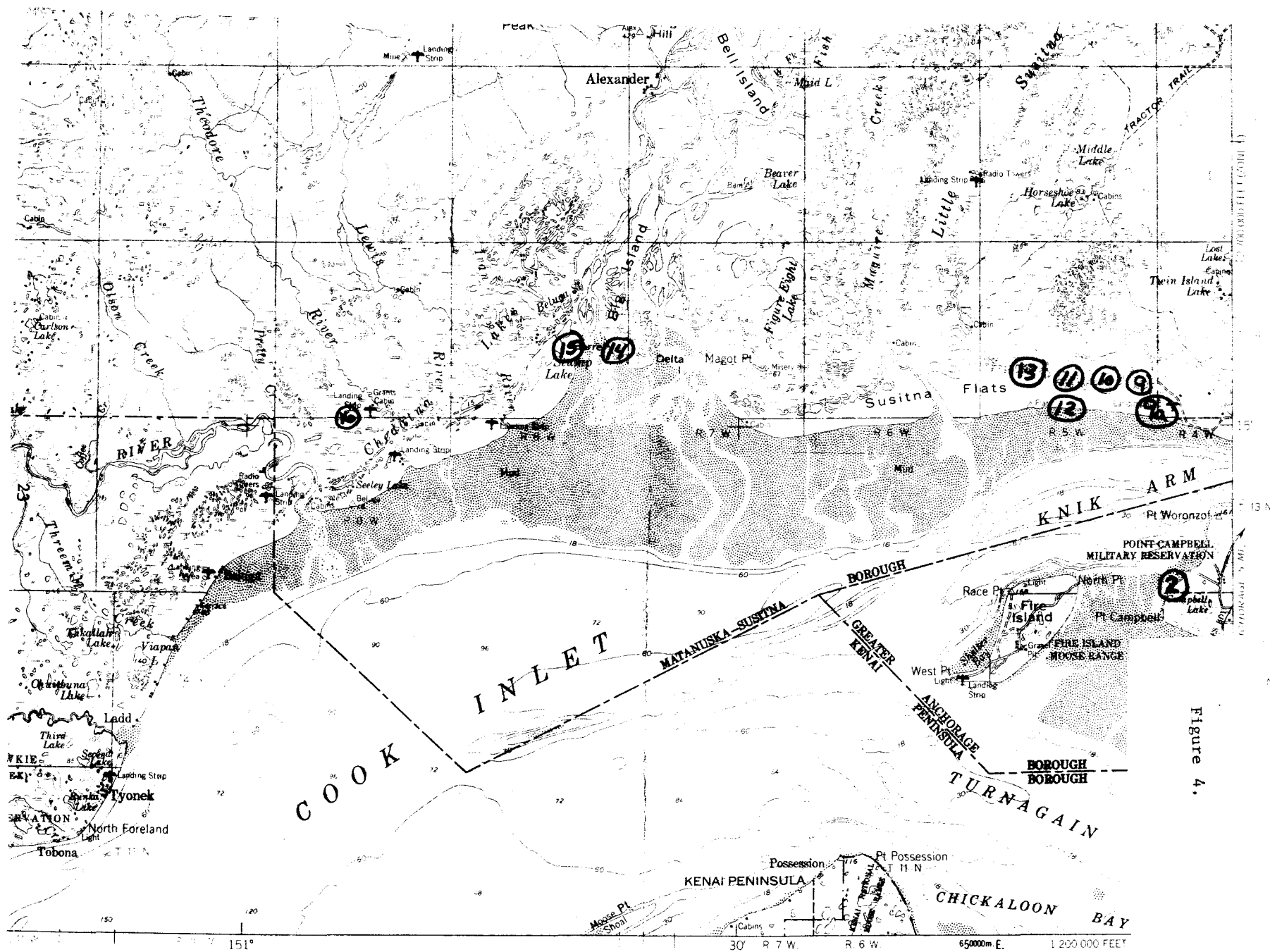


Figure 4.

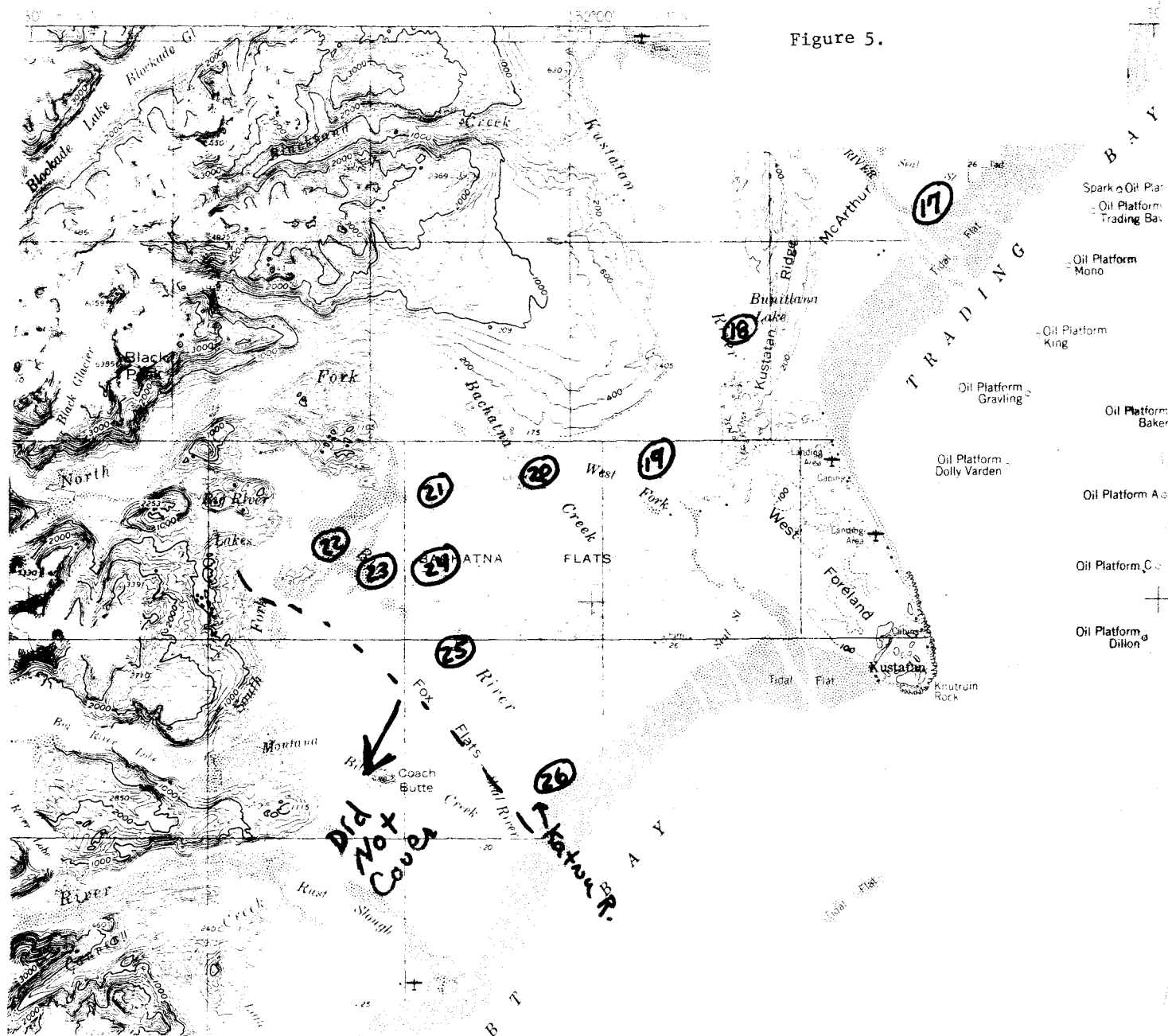


Table 12. Observations of geese and swans on Cook Inlet, July 30, 1974.

Point No. On Maps <sup>1/</sup>	Canada Geese		White Fronts	
	Adults	Young	Adults	Swans
1 Potter	75	125		
2 "	15	20		
3 Eklutna	55	4		
4 Palmer-Hay	240	80		
5 "	30	2		
6 "	10	5		
7 "	40			
8 "	25			
9 Susitna	55	20		
9a "	12			
10 "	50	10		
11 "	40	5		
12 "	43			
13 "	6	3		
14 "	35	25		
15 "	4		60	
16 "				1 pr.
17 Trading Bay			110	
18 "	1			
19 "				1 pr.
20 Redoubt Bay				1 pr.
21 "				1 pr.
22 "			380	1 pr. +3
23 "			65	
24 "			150	
25 "			8	
26 "			90	
TOTALS	736	299	863	5 prs. +3

<sup>1/</sup> Corresponds to Figures 3, 4 and 5.

Although 29 percent of the Canada geese counted were young, the actual ratio is probably higher. On the Copper River Delta annual aerial surveys are made to assess dusky Canada goose production. Since goslings are not as visible in tall sedge (*Carex* spp.) as adult birds are, the number of young counted is doubled. This procedure has proven reliable in predicting production for the past four years. If this were done for the geese observed in Cook Inlet, a calculated 44.8 percent of the birds observed were young. Since 1974 was an excellent production year for Gulf Coast waterfowl, this estimate seems feasible. Regardless, there is obviously a significant and probably growing Canada goose population in Cook Inlet.

The white-fronts observed on the Chatna Flats and Fox River Flats were first recorded by Ray Baxter in 1961 (pers. comm., 1974). He remembered seeing 200-500 birds. Although no young were observed on the July 30, 1974 survey, Ed Collins, USFWS, reported seeing 2 or 3 broods in mid-June, 1974 (pers. comm., 1975). Collins was looking for "tule" geese and inadvertently saw the broods. He estimated 15 to 20 broods could have been present in the 5 square mile area they surveyed.

#### Banding on Potter Marsh

In an effort to learn more about the new and expanding Canada goose population on Potter Marsh, 175 birds were banded on July 18, 1974. It was believed that these birds may be part of an expanding wintering population of lesser Canadas in Oregon's Willamette Valley (Timm 1974).

The following numbers of birds were banded by age and sex class: Adult Males-21; Adult Females-32; Local Males-46; Local Females-76. A helicopter was used to drive the birds into a trap.

Blood samples and measurements were taken from 13 geese. Dr. Raymond P. Morgan, Chesapeake Biological Laboratory, University of Maryland, has apparently developed a technique for determining subspecies of Canada geese by electrophoretic analysis of blood serum (manuscript in preparation). Morgan (pers. comm., 1975) reports the 13 samples from Cook Inlet are from a different subspecies than samples from dusky geese and geese of Prince William Sound supplied to him previously. Size and color, and morphological measurements of the Cook Inlet birds confirm **that they are not dusky Canada geese. It is presumed that they are *B. C. taverni*.**

Four banded adults and two young were reported as being shot during the 1974-75 hunting season. All recoveries came from the Willamette Valley in Oregon from late November through late December. These recoveries seem to confirm that the Willamette Valley is the wintering area for this population of birds.

Surprisingly, there were no recoveries in the Anchorage vicinity or even in Alaska, especially since sample size was substantial. It may be that the geese move from the Inlet before the hunting season opens in Alaska. Future goose banding will reveal the birds' migratory patterns and how much hunting pressure the population is receiving.



### Cold Bay Banding Attempt

A large (about 100,000 birds) population of lesser Canada geese annually stages in the Cold Bay area during the fall. Neither the wintering nor breeding area of these geese is definitely known (Timm 1974). In an attempt to learn more about these geese and to see if they were being short-stopped in the Willamette Valley, a cooperative banding effort was initiated during 1974.

Personnel from the USFWS Izembek Refuge planted a small oats field on an island in Izembek Bay. Grain used for seed and bait, plus other equipment, was paid for by Region I, USFWS, Portland. I spent eleven days at Cold Bay during mid-September attempting to capture geese with rocket nets.

Only 14 geese found and used the oats field. This flock found the oats very attractive, as they rarely left the field. However, there were very few Canada geese in the general area of the field during the entire fall. This was abnormal as Bob Jones, refuge manager, said the island had been heavily used by Canadas in previous years. Additional attempts will be made to capture birds in future years and refuge personnel will plant another grain field in 1975.

### COPPER RIVER DELTA COOPERATIVE MANAGEMENT AGREEMENT

#### Breeding Waterfowl Survey

One of the responsibilities assumed by ADF&G, under the cooperative management agreement, was to assess the size, species composition and distribution of breeding ducks on the Copper River Delta. A survey was made in 1974 (Timm 1974), but it is believed that the calculated population of 23,441 ducks was inflated because of survey timing.

#### Procedures:

On May 30, 1975 Dan Timm (ADF&G) and Bob Bromley (U. of Ak. MS candidate) flew a breeding waterfowl survey over flight routes as depicted in Figure 6. These survey lines are nearly identical to those flown in 1974. The major difference was that in 1975 data were recorded and analyzed by 29, 4-mile segments instead of 38, 3-mile segments as was done in 1974. Other survey procedures were the same as in 1974 except the pilot, Terry Holiday, did no counting.

Data were analyzed for the survey area and then expanded by a factor of 10.62 for the entire delta (9.416 percent sample of 308 square miles of habitat). Visibility rates were applied for each species. The rates for Alaska were furnished by Jim King, USFWS.

#### Results:

The 1975 breeding duck population on the Copper River Delta was calculated to be 17,385 birds. There were also a calculated 11,641

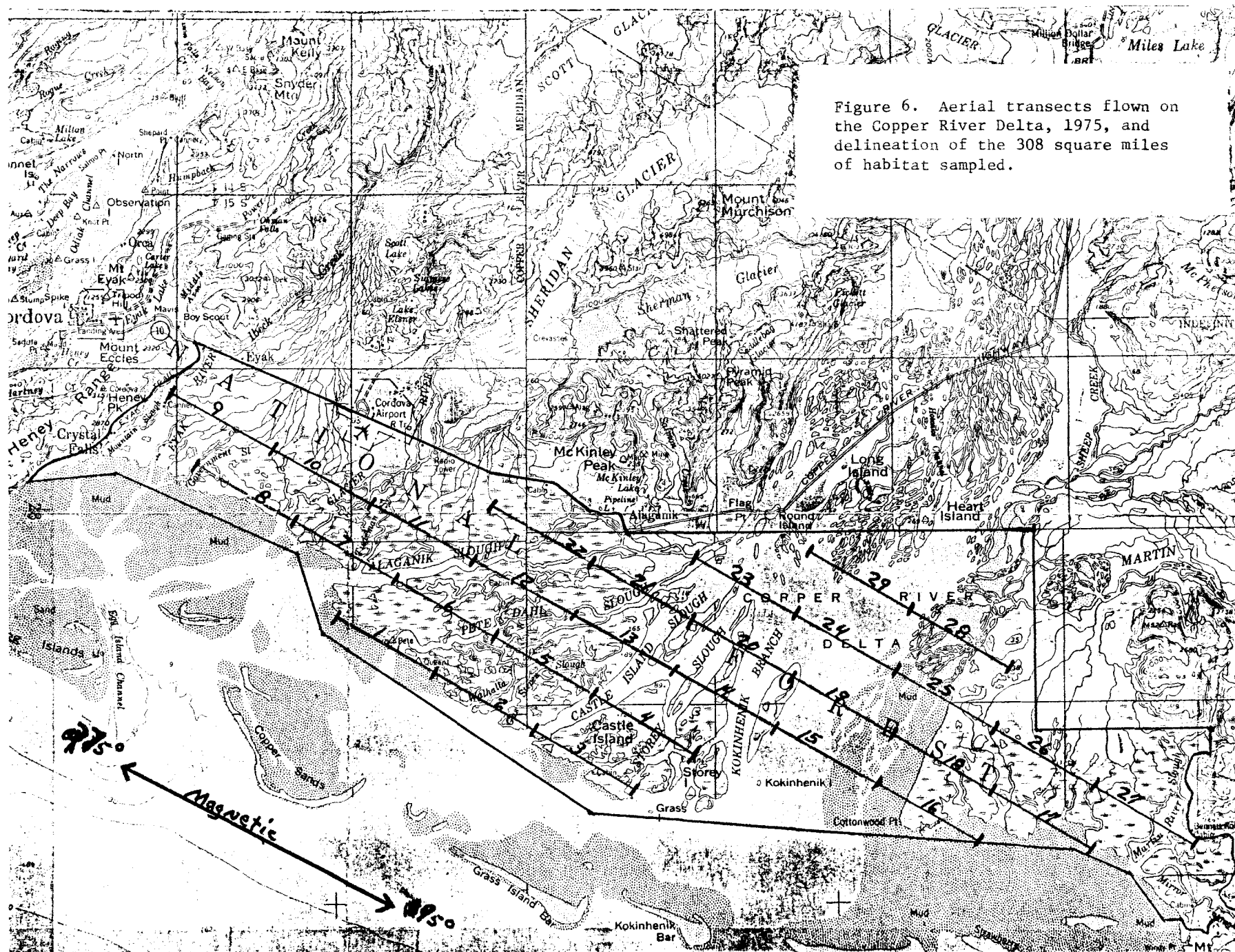


Figure 6. Aerial transects flown on the Copper River Delta, 1975, and delineation of the 308 square miles of habitat sampled.

dusky geese, 372 swans and 680 loons (all red-throated). Table 13 presents a comparison between the 1975 population, the 1974 population and the 7-year, average, pre-64 population. Pre-64 data for swans, geese and loons are unavailable.

Table 14 provides the calculated densities of dabbling ducks, diving ducks, swans and dusky geese on the 29, 4-mile segments covered in the survey (Figure 6).

#### Discussion and Conclusions:

In 1975 the survey was flown on May 30, while in 1974 it was made on May 15. During the seven years prior to 1964 it was generally flown about May 17, plus or minus a few days (Jim King, pers. comm. USFWS). It is believed that the later survey in 1975 reflects more accurate breeding duck population figures than previous estimates.

Surveys flown in 1974 and pre-64 probably include some ducks - especially divers - that were in migration to more northern areas. A mid-May survey probably does reflect reliable dabbling duck estimates though. However, divers - especially immature nonbreeders - apparently have a more leisurely migration to more northern areas. However, there has been a substantial decrease in breeding ducks on the delta as explained by Timm (1974).

The 19 percent decrease in breeding ducks from 1974 to 1975 may also be, in part, a reflection of the decreased number of ducks in Alaska in 1975. King and Fortenberry (1975) reported a 30 percent decrease in breeding ducks statewide, but because of various survey problems they felt the decrease may be more like 20 percent.

The Copper River Delta survey resulted in a calculated dusky goose breeding population of 11,641 birds. This estimate is believed to be about 55 percent low. The 1975 mid-winter inventory in Oregon and Washington indicated over 26,000 dusky geese. It is interesting that in 1974 this same breeding bird survey resulted in a dusky goose population estimate within 4 percent of the corresponding mid-winter inventory count (Timm 1974). The following are comparisons of the 1974 and 1975 spring surveys:

#### Percent of Geese Observed to be in:

	<u>Singles</u>	<u>Pairs</u>	<u>Flocks</u>
1974	7.0	49.6	43.4
1975	23.5	59.5	17.0

The total number of birds observed as singles and pairs in both years were nearly the same; only 149 birds in flocks were seen in 1975 compared to 568 in 1974. These data, together with the knowledge that there had to be a large number of immature non-breeders from 1974 present in 1975, sustain the probability that many non-breeders were missed in 1975.

Table 13. Breeding duck populations on the Copper River Delta-1975, 1974 and the pre-1964 seven year average.

Species	1975		1974		Pre-1964 Ave.	
	No. Birds	% of Total	No.	%	No.	%
Pintail	5,512	31.7	7,370	34.2	6,800	24.6
G-W Teal	3,038	17.5	2,059	9.6	800	2.9
Am. Widgeon	2,294	13.2	2,100	9.7	1,200	4.4
Mallard	2,018	11.6	2,563	11.9	5,600	20.3
Shoveler	1 136	6.5	1,161	5.4	500	1.8
Gadwall	106	0.6	103	0.5	200	0.7
Tot. Dabbler	14,104	81.1	15,356	71.3	15,100	54.7
Scaups	2,315	13.3	4,329	20.1	10,000	36.2
Goldeneyes	520	3.0	1,189	5.5	1,700	6.2
Old Squaw	340	2.0	-	-	-	-
Canvasback	106	0.6	315	1.5	200	0.7
Bufflehead	-	-	350	1.6	200	0.7
Scoter	-	-	-	-	400	1.5
Total Divers	3,281	18.9	6,183	28.7	12,500	45.3
Total Ducks <sup>1/</sup>	17,385	100.0	21,539	100.0	27,600	100.0

<sup>1/</sup> Does not include mergansers - see discussion portion of text.

Table 14. Calculated densities per square mile of ducks, geese and swans on the Copper River Delta: 1975, 1974 and 7-year pre-1964 average.

Segment#	1975				
	C. Geese	Dabbler	Diver	Tot. Ducks	Swan
1	98	0	0	0	-
2	71	302	11	313	-
3	114	61	46	107	-
4	-	11	5	16	-
5	101	42	16	58	2
6	114	114	19	133	-
7	189	63	16	79	2
8	116	84	37	121	-
9	20	21	11	32	-
10	45	91	-	91	-
11	74	43	-	43	-
12	42	44	11	55	2
13	3	8	-	8	2
14	3	-	-	-	2
15	-	-	-	-	-
16	21	105	-	105	-
17	19	-	-	-	-
18	-	48	33	81	-
19	-	-	-	-	-
20	12	-	5	5	2
21	21	21	-	21	7
22	22	135	16	151	2
23	-	8	-	8	-
24	-	-	-	-	-
25	-	-	5	5	4
26	3	33	-	33	6
27	9	-	-	-	-
28	-	51	-	51	4
29	-	-	-	-	-
Ave.	37.8	45.8	10.7	56.5	1.2
1974 Totals	57.5	49.8	20.1	69.9	1.8
Pre-64 Totals	-	49.0	40.6	89.6	-

Bob Bromley, M.S. candidate working on the delta, offered a possible explanation. He said that by the end of May, the non-breeders were no longer randomly scattered across the delta. Rather, they were concentrated in some areas such as upper Tiedeman Slough. He knew this by observations of geese on which he had put collars the year before. Thus, it appears that many non-breeders were missed because of their non-random distribution across the delta. The 1974 survey was probably made before the non-breeders segregated, thus giving a more precise population estimate.

Judging from 1974 and 1975 surveys and from Bob Bromley's field observations, it appears that future surveys which might be made to measure dusky goose breeding populations should be made in mid-May. This would appear to preclude sampling problems encountered this year.

Mergansers are not included in Table 13 because of obvious sampling problems. These ducks were usually found in large flocks in a few locations on the delta. The 1975 projected population was 6,309, while in 1974 it was 1,902. The pre-64, 7-year average merganser population was 100.

#### COOK INLET WATERFOWL SURVEYS

##### Breeding Waterfowl Survey

As part of an effort to document waterfowl values on coastal marshes of Cook Inlet, a breeding waterfowl survey was made on June 2, 1975. Areas surveyed were: Susitna Flats; Palmer-Hay Flats; Goose Bay; Chickaloon Flats and the Jim Swan Lake area.

##### Procedures:

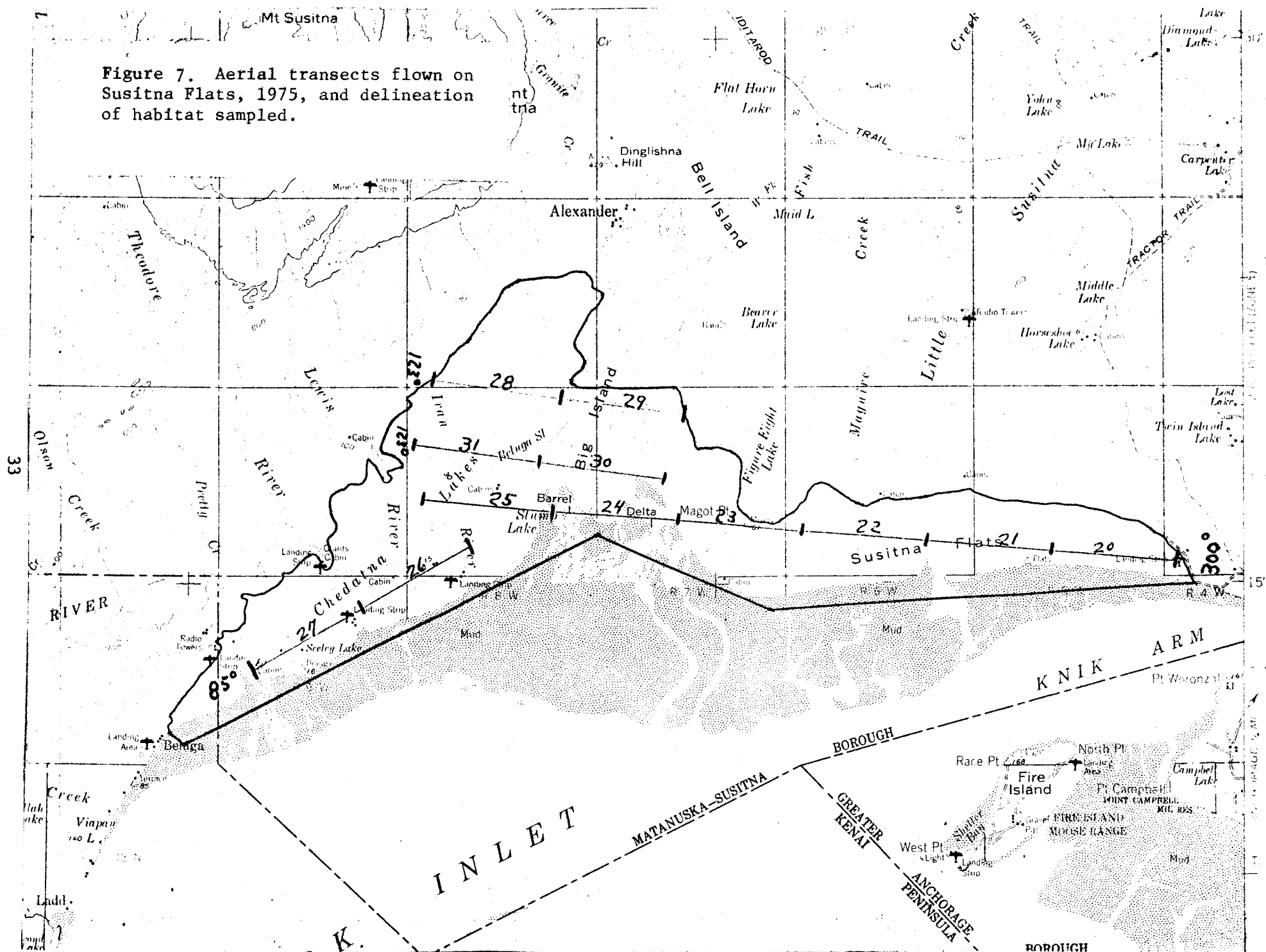
The coastal waterfowl habitat (sedge flats) and the Jim Swan area were first encompassed by lines drawn on 1 inch:4 mile maps (Figures 7,8,9). The land area within these lines was then determined using a planimeter.

Transect lines were drawn on the maps in an attempt to sample representative habitat types in each area. However, a random transect selection system was not used.

Each transect was broken into 4-mile segments. Segments were individually numbered. More precise duck distribution data could be attained from small segments.

On June 2, 1975 Dimitri Bader (ADF&G) and I flew the survey on flight routes as depicted in Figures 7,8 and 9. The same survey techniques were used as are employed by the USFWS except the pilot did no counting.

Figure 7. Aerial transects flown on Susitna Flats, 1975, and delineation of habitat sampled.





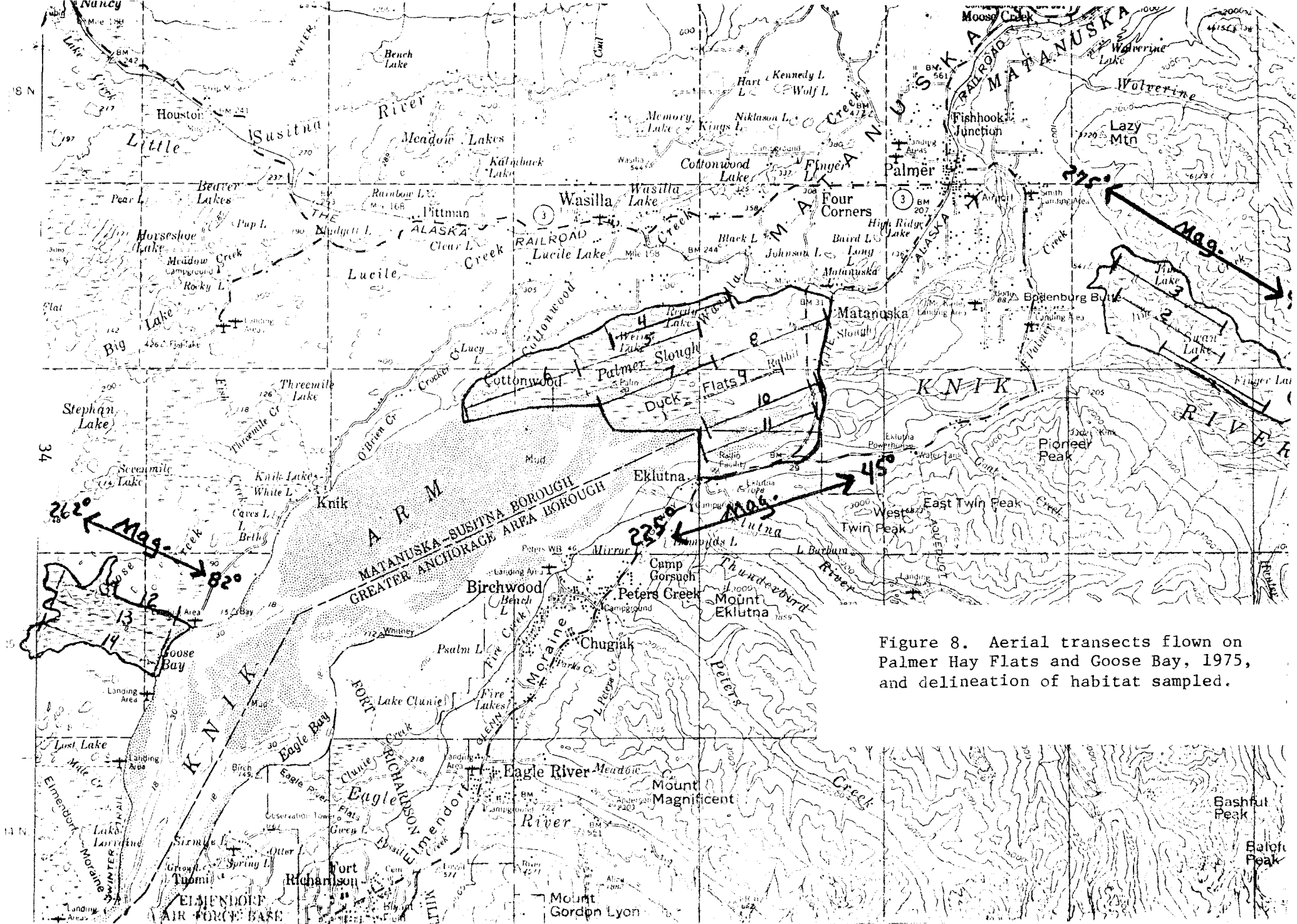


Figure 8. Aerial transects flown on Palmer Hay Flats and Goose Bay, 1975, and delineation of habitat sampled.



Data were analyzed for each survey area and then expanded for the total of all areas. Visibility rates were applied for each species; rates were provided by Jim King, USFWS.

#### Results:

Total 1975 calculated duck breeding populations were: Susitna Flats - 8,272; Palmer Hay Flats - 3,267; Jim Swan Lake area - 1,980; Chickaloon Flats - 1,537 and Goose Bay - 679. Dabblers (13,942) comprised 89 percent of the 15,735 ducks on all areas. Pintail, green-winged teal and mallard were the most abundant species. Table 15 summarizes species composition and number of birds for all areas surveyed.

The Palmer Hay Flats had the greatest coastal density of breeding ducks (76.5/mi.<sup>2</sup>), while Chickaloon Flats had the lowest (39.4/mi.<sup>2</sup>). The average density of ducks on all coastal habitat was 60.6 birds/mi.<sup>2</sup>. Table 16 presents duck densities, size of the areas and percent of each area sampled in the survey. Bird densities for each 4-mile segment are available and in the Anchorage ADF&G files.

#### Discussion and Conclusions:

The results of the survey were somewhat surprising. King and Lensink (1971) estimated there was an average of 12.1 ducks per square mile in Kenai-Susitna habitat. They estimated the total average breeding duck population at 26,700 birds in 2,200 square miles of habitat. All areas surveyed in June 1975 are within the 2,200 mile area. However, none of the survey transects used to arrive at their estimates are directly over any of the coastal habitat or Jim Swan area that we surveyed.

There are several possible reasons for overestimating breeding duck populations in the areas we surveyed. For example, the 491 shovelers and 470 goldeneyes on Palmer Hay Flats are projected mainly from one or two observations of flocked males, thus, the chance observation of one or two flocks may inflate the estimate. Another possibility is that coastal marshes may be post-breeding congregation areas and/or molting areas for male birds. If drakes came to the coast after breeding on inland areas, the coastal breeding duck figure would be inflated. An earlier survey would preclude this possibility. However, since spring was about one week "late" in the Anchorage area this year, timing of the survey should have been good.

The ratio of birds observed to be in pairs, flocks or as lone males is an indication of chronology of the breeding season. These ratios were as follows:

	<u>Lone male</u>	<u>Pairs</u>	<u>Flocked birds</u>
Dabbler	61%	24%	15%
Diver	10%	38%	52%

Table 15. Calculated bird populations on four coastal marsh areas in Cook Inlet, and on the Jim Swan Lakes area, 2 June 1975.

Species	<u>Susitna</u>		<u>Palmer Hay</u>		<u>Goose Bay</u>		<u>Chickaloon</u>		<u>Jim Swan</u>		<u>Total Except Jim Swan</u>	
	No.	% of Tot.	No.	%	No.	%	No.	%	No.	%	No.	%
Pintail	4,521	54.7	1,202	36.8	95	14.0	663	43.1	649	32.8	6,481	47.1
G-W Teal	1,348	16.3	117	3.6	350	51.5	445	29.0	89	4.5	2,260	16.4
Mallard	861	10.4	742	22.7	175	25.8	47	3.1	397	20.0	1,825	13.3
Am. Widgeon	544	6.6	-	-	-	-	382	24.8	607	30.6	926	6.7
Shoveler	91	1.1	491	15.0	25	3.7	-	-	-	-	607	4.4
Gadwall	-	-	101	3.1	-	-	-	-	-	-	101	0.7
Tot. Dabbler	7,365	89.1	2,653	81.2	645	95.0	1,537	100.0	1,742	87.9	12,200	88.6
Scaups	759	9.2	144	4.4	-	-	-	-	201	10.2	903	6.5
Goldeneyes	-	-	470	14.4	34	5.0	-	-	-	-	504	3.6
Mergansers	91	1.1	-	-	-	-	-	-	-	-	91	0.6
Bufflehead	57	0.7	-	-	-	-	-	-	-	-	57	0.4
Scoters	-	-	-	-	-	-	-	-	37	1.9	37	0.3
Tot. Divers	907	10.9	614	18.8	34	5.0	-0-	-0-	238	12.1	1,555	11.4
Total Ducks	8,272	100.0	3,267	100.0	679	100.0	1,537	100.0	1,980	100.0	13,755	100.0
Swan	91		11		-		-		9		102	
Canada Goose	170		107		28		-		-		305	
Sandhill Crane	-		43		12		-		-		55	
Common Coon	-		53		-		-		-		53	
Red-Throated Loon	34		16		-		-		-		50	
Arctic Loon	34		-		9		-		-		43	

Table 16. Total area, sample size and breeding birds per square mile on four coastal marshes in Cook Inlet, and the Jim Swan Lakes area, 2 June, 1975.

Area	Size in mi. <sup>2</sup>	% Area Sampled	Birds per mi. <sup>2</sup>		
			Dabblers	Divers	Total Ducks
Susitna	136.0	8.8	54.2	6.7	60.9
Palmer Hay	42.7	18.7	62.1	14.4	76.5
Goose Bay	9.2	32.6	70.1	3.7	73.8
Chickaloon	39.0	12.8	39.4	-0-	39.4
Sub-Total Coastal Areas	226.9	12.3	53.8	6.8	60.6
Jim Swan	14.0	21.4	124.4	17.0	141.4

These ratios are about what can be expected in early June. However, without systematic aerial surveys and/or ground work, it is impossible to ascertain the extent, if any, of drakes moving to coastal areas.

The 141 ducks per square mile on the Jim Swan area exceeds duck densities on some of the best prairie, pothole habitat in Canada and the Midwest. Although we obviously saw many birds, sampling was possibly at fault. However, it is possible to have small pockets of very productive habitat in Alaska with very high numbers of breeding ducks such as were recorded in this area.

This survey documents that coastal marshes in Upper Cook Inlet and the Jim Swan Lake area are much more valuable to breeding birds than surrounding habitat of similar size. For the reasons discussed, the calculated populations may be too high. However, these areas are obviously important production areas, previously unknown. Breeding bird surveys and perhaps brood surveys are desirable in the future on these areas.

The calculated goose populations on Palmer Hay Flats and Susitna Flats are 107 and 170, respectively. These projections are known to be low. A mid-summer survey in 1974 (results elsewhere in this report) showed 345 adult geese on Palmer and 245 on Susitna. Many of the geese observed in the 1975 survey could have been non-breeders; the breeding pairs were possibly on upland brushy sites and/or not as visible as non-breeders.

#### Spring Population Estimates - Palmer Hay Flats

Recent and probable future events affecting alteration of waterfowl habitat in Cook Inlet has created a need for reasonably accurate waterfowl utilization information for all seasons of the year.

On April 29 and May 2, 1975 Dan Timm and Don Fortenberry (USFWS) flew surveys on the Palmer Hay Flats, Goose Bay, Jim Swan Lake area and Potter Marsh (May 2 only).

#### Procedures:

Total counts were obtained on Goose Bay and Potter Marsh. However, because of the size of Palmer Flats and the Jim Swan Lake area, and because of the difficulty in getting total coverage on these areas, a sampling system was devised.

The total land areas were measured and transects lines were drawn on maps. The survey transects were nearly the same as those used for breeding bird surveys which are described elsewhere in this report.

On April 29 and May 2, the transects were flown and birds were counted 1/8-mile either side of the aircraft. The number of birds observed was then expanded proportionately to the total areas.

Ducks observed were classified as either dabblers or divers. Geese were recorded by species.

## Results:

Table 17 presents numbers of ducks, geese, swans and cranes observed by time period and area. However, to appreciate the bird population figures in Table 17, the following section on discussion and conclusions must be read.

## Discussion and Conclusions:

The first migrant geese and ducks moved into the Matanuska Valley about April 15. On April 22 about 1,500 Canada geese, 75 pintails and 75 mallards were observed just below the Knik Bridge during a two-hour period in the evening.

On April 29 most of the sedge flats on all areas were still ice and snow covered. About 90 percent of the lakes in the Jim Swan area were 80 percent ice covered. Most of the fields in the Matanuska Valley were still snow covered.

On May 2 nearly all of the sedge flats were snow and ice free, except for snow drifts. These same conditions were present on Matanuska Valley fields. About 60 percent of the lakes in the Jim Swan area were ice free.

On April 29 most of the geese were on the Palmer Hay Flats. However, on May 2 nearly all the birds were in surrounding grain fields. The same was true for ducks. A superficial estimate of geese in surrounding fields was 10,000 plus birds.

Although the population estimates for birds on each area (Table 17) are probably fairly good, they don't give a true indication of total bird use for the entire migration period or even for any one day. Birds are continually migrating and in the Matanuska Valley they also move between grain fields and the Palmer Hay Flats.

Peak goose, mallard and pintail concentrations apparently occurred about May 5-7, dabblers and divers peaked several days later.

Birds are much more visible in the early spring than they are in late spring and summer due to low ground cover. However, birds were undoubtedly missed and the figures in Table 17 must be considered minimal.

## DUCK BANDING

### Potter Marsh and Lake Hood

In an effort to learn the distribution of ducks raised on Potter Marsh State Game Refuge and on Lake Hood ducks were banded July 12 on Potter and August 16 on Lake Hood.

Table 17. Calculated and counted spring waterfowl populations on four areas in upper Cook Inlet, 1975.

Species	Area And Dates						
	Palmer Hay		Goose Bay		Swan Lakes		Potter Marsh
	April 29	May 2	April 29	May 2	April 29	May 2	May 2
Dabblers	1,444	2,028	830	9,077	467	318	1,200
Divers	66	86	-	19	9	65	35
Total Ducks	1,510	2,114	830	9,096	476	383	1,235
Canada goose	11,533	1,586	1,699	1,847	-	-	804
Snow goose	3,040	-	-	245	-	-	450
White-front	413	19	-	125	-	-	65
Total geese	14,986	1,605	1,699	2,217	-	-	1,319
Swan	124	1,776	135	911	42	37	-
Crane	10	-	-	-	-	-	3



On Potter Marsh a 3-man crew - Dimitri Bader, Nate Johnson and I - drove ducks to the shore from small ponds and captured them by hand. A labrador retriever assisted in locating the birds in dense sedge. There were an estimated 150+ young birds on the artifical ponds east of the Campbell sewer substation.

Birds were captured on Lake Hood with a rocket net. A local air charter operator feeds ducks during the summer, thus it was a simple matter to lay the net on a cement apron and place grain in front of the net. About three times as many birds would have been captured if a rocket hadn't malfunctioned and caused a faulty net cast.

The following number of ducks were banded on each area:

	<u>Adult Male</u>	<u>AF</u>	<u>Local M</u>	<u>LF</u>	<u>Total</u>
<u>Potter Marsh</u>					
Pintail	-	-	10	8	18
G-W Teal	-	-	7	7	14
Mallard	-	-	1	-	<u>1</u>
					33
<u>Lake Hood</u>					
Mallard	3	8	10	7	28
Am. Widgeon	1	2	8	6	17
Pintail	-	1	3	4	8
G-W Teal	-	1	-	-	<u>1</u>
					54
<u>Totals Both Areas</u>					
Mallard	3	8	11	7	29
Pintail	-	1	13	12	26
Am. Widgeon	1	2	8	6	17
G-W Teal	-	1	7	7	<u>15</u>
					87

The following are first season recoveries from the above banded birds. All recoveries were from hunting.

<u>Banding Location</u>	<u>Species</u>	<u>Age-Sex</u>	<u>Recovery Date</u>	<u>Recovery Location</u>
Potter	Pintail	Local F	9/1/74	Anchorage Area
Potter	Pintail	LF	11/2/74	Lower Klamath NWR-Calif.
Potter	Pintail	LM	9/1/74	Anchorage Area
Potter	Pintail	LM	11/8/74	Nahcotta, Wash.
Lake Hood	Pintail	LF	9/1/74	Susitna Flats
Lake Hood	Pintail	LF	9/1/74	Anchorage Area
Lake Hood	Pintail	LF	10/31/74	Ilwaco, Wash.
Lake Hood	Pintail	AF	9/1/74	Potter Marsh

Lake Hood	Widgeon	LF	9/1/74	Eagle River Flats (Anch)
Lake Hood	Widgeon	LF	9/1/74	Pt. Worenzof (Anchorage)
Lake Hood	Widgeon	LM	9/11/74	Potter Marsh
Lake Hood	G-W Teal	LM	11/8/74	Winchester, Wash.
Lake Hood	G-W Teal	LM	1974 Season	Ladner, B.C.

Of the 13 total recoveries 8 (62 percent) came from the immediate Anchorage area. All but one recovery occurred opening day. There were no recoveries in Alaska south of Anchorage.

Somewhat surprising was the lack of mallard recoveries, since more mallards were banded than any other species. It is interesting to speculate that perhaps the Anchorage area mallards are wintering in Prince William Sound where very little hunting pressure occurs. Or they could be going to Southeastern Alaska late in the hunting season when little harvest occurs. Additional banding will prove most interesting.

#### Kodiak

In early April Walt Cunningham spent about one week on Kodiak trying to catch mallards with small walk-in bait traps. He reported arriving too late in the winter as the ice and snow were rapidly melting from the tidal flats.

Previous banding attempts in Southeastern Alaska have shown that birds more readily came to bait and can be captured when the flats are ice covered and the weather is inclement. Walt did manage to catch and band two adult male mallards. Both birds were very thin and had protruding breast bones.

Walt made an interesting observation of 12 different swans which were using Kalsin and Middle Bays. A local bird watcher - Richard MacIntosh (with NOAA)- identified yellow on some of the bird's bills, thus indicating they were whistlers. All of the birds were adults. MacIntosh said he had seen the birds all winter.

#### INGESTED LEAD SHOT IN ALASKA WATERFOWL-1974-75 HUNTING SEASON

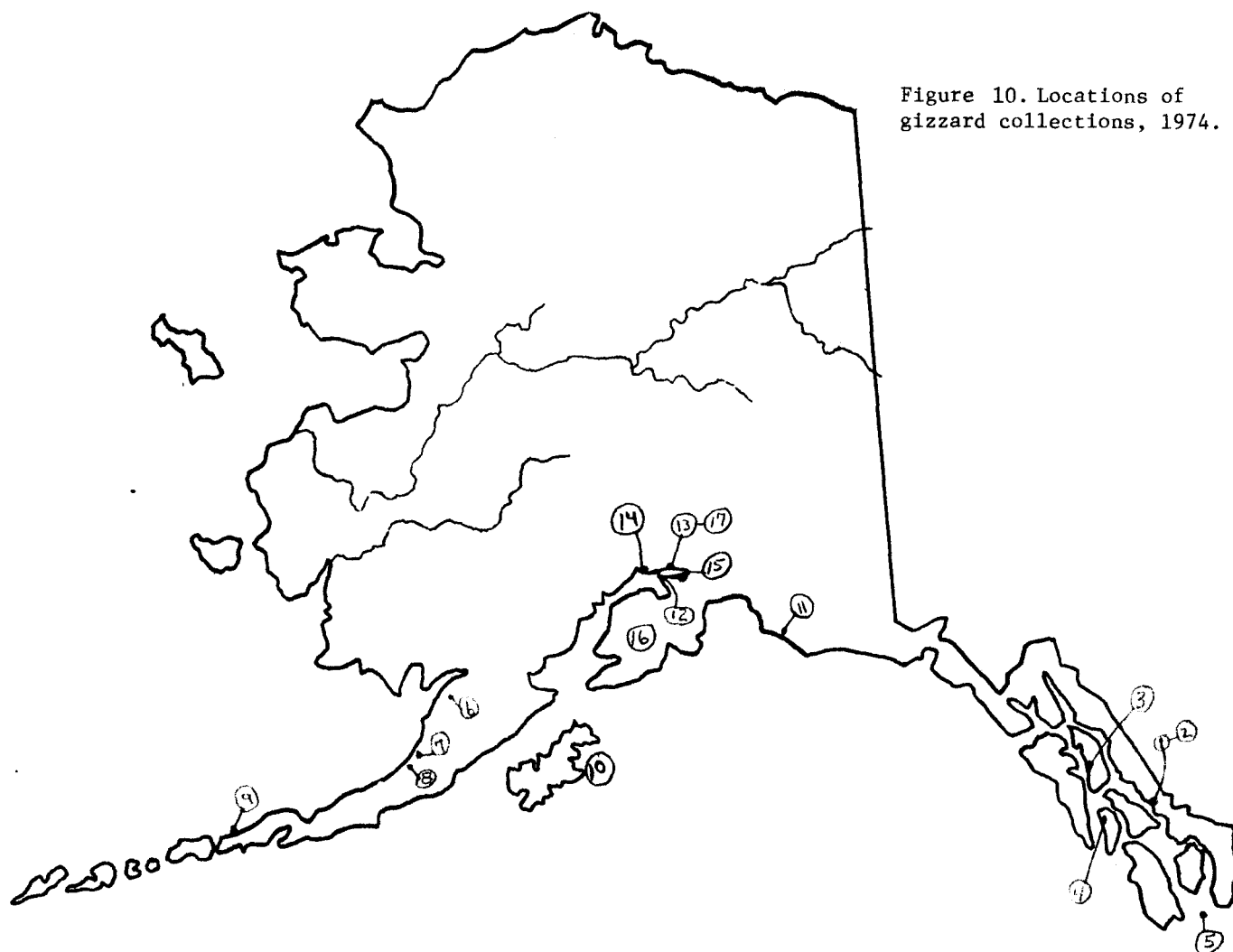
Prior to this study, waterfowl gizzards had not been collected in Alaska to determine the incidence of ingested lead shot.<sup>1/</sup> Analysis of waterfowl gizzards is the most common method used to ascertain the magnitude of lead poisoning by ingested lead shot (Bellrose 1959 and many others).

During September and October 1974, 664 duck and 57 goose gizzards were collected from hunter-killed birds at 17 locations in Alaska, (Fig. 10). Biologists with the Alaska Department of Fish and Game and members of the Alaska Waterfowl Association participated in the collection program.

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<sup>1/</sup> During the early 1960's, a new trap club near the Juneau airport was spreading shot in ponds used by waterfowl. During the spring of 1963 several ducks were collected by U.S. Fish & Wildlife personnel and bright lead pellets were found in the duck's gizzards. The trap club was subsequently closed down. (ADF&G files, Anchorage).

Figure 10. Locations of gizzard collections, 1974.



Collection Locations

- |                       |                       |
|-----------------------|-----------------------|
| 1 Upper Stikine River | 10 Kodiak Island      |
| 2 Stikine Flats       | 11 Copper River Delta |
| 3 Hood Bay            | 12 Potter Marsh       |
| 4 Rowan Bay           | 13 Palmer-Hay Flats   |
| 5 Duke Island         | 14 Susitna Flats      |
| 6 Naknek River        | 15 Eagle River Flats  |
| 7 Pilot Point         | 16 Kenai Peninsula    |
| 8 Cinder River        | 17 Matanuska Valley   |
| 9 Izembek Lagoon      |                       |

## METHODS

Instructions to potential gizzard collectors requested each gizzard be frozen separately and information on the species, age, sex, date and location to be put on a plastic label with the gizzard. Quality of data varied, but the main objective was to obtain as many duck gizzards - even of unrecorded species - as possible.

Gizzards were both x-rayed and fluoroscoped by Gary Capps, x-ray technician at Providence Hospital, Anchorage. He identified all gizzards having metal in the lumen for subsequent laboratory examination by the author. It is interesting that Capps identified, with the fluoroscope, some gizzards with very small lead flakes which were also x-rayed, but the lead flakes would have perhaps been missed by x-ray examination only.

Laboratory examination was made by water flushing the gizzard contents in a tall flask. Shot pellets found were classified as either ingested or shot in, using the pellet descriptions given by Bellrose (1959) and Jeffrey and Zender (1974).

## RESULTS

None of the 57 geese collected had ingested lead shot. Species collected were Canada (33), emperor (23) and white-fronted (1).

Table 18 provides a numerical summary of the gizzards collected by location, percent of the gizzards having ingested lead shot and a summary of these data by geographic regions of the state. Statewide, 5.9 percent of all gizzards collected carried ingested shot.

Table 19 provides a numerical summary of the gizzards collected and the rate of ingested lead shot by duck species. Scaup (18.9 percent) had the highest ingested shot rate, followed by canvasback (18.2 percent), mallard (14.5 percent) and pintail (8.2 percent). Divers (11.1 percent) had over twice the rate of ingested lead shot as dabblers (5.1 percent).

Of the 24 total known age dabblers having ingested lead shot, 19 (79 percent) were immatures and 21 percent were adults. There were 308 known age dabblers not carrying ingested lead shot, of which 89 percent were immature and 11 percent were adults.

Of the four known age divers carrying lead shot, two were immature and two were adults. There were 15 known age divers not carrying ingested shot, of which 80 percent were immature and 20 percent were adult.

From these data, it appears that adults in both dabbling and diving duck categories have a higher incidence of ingested lead shot than do immatures. However, migration phenomena complicate this aspect. For example, many of the adult males of some species have moved south before the season opens September 1.

Table 18. Incidence of ingested lead shot in duck gizzards by area, 1974.

Area	Total No. Gizzards	With Ingested Shot	
		No.	% of Total
Upper Stikine River	41	-	-
Stikine Flats	100	-	-
Hood Bay	5	-	-
Rowan Bay	43	-	-
Duke Island	1	-	-
Total Southeast	190	-0-	-0-
Naknek River	77		
Pilot Point	5		
Cinder River	2		
Izembek Lagoon	5		
Total Ak. Peninsula	89	-0-	-0-
Total Kodiak	17	1	5.9
Total Copper River Delta	83	2	2.4
Potter Marsh	22	1	4.5
Palmer Hay-Flats	91	23	25.3
Susitna Flats	88	11	12.5
Eagle River Flats	6	1	16.7
Kenai Peninsula	40	-	-
Matanuska Valley	13	-	-
Total Cook Inlet	250	36	13.8
Unknown Location	25	-0-	-0-
Statewide Totals	664	39	5.9

Table 19. Incidence of ingested lead shot in duck gizzards by species, 1974.

Species	Total No. Gizzards	With Ingested Shot	
		No.	Percent of species total
Mallard	131	19	14.5
Pintail	97	8	8.2
Widgeon	97	-	-
G-W Teal	53	-	-
Shoveler	29	-	-
Gadwall	4	-	-
B-W Teal	1	-	-
Unknown Dabbler*	171	3	1.8
Total Dabbler	583	30	5.1
Scaup (both)	37	7	18.9
Goldeneye (both)	24	-	-
Canvasback	11	2	18.2
Bufflehead	6	-	-
Steller's Eider	2	-	-
Harlequin	1	-	-
Total Diver	81	9	11.1

\* Most gizzards came from the Southeast where no ingested shot were found.

Table 20 compares the ingested shot rates for ducks collected in September and October. The average rate for September shot birds was 8.0 percent and for those ducks shot in October, 1.9 percent. It is interesting that of the 23 ducks from the Palmer Hay Flats which had ingested lead shot, 19 were collected opening day (September 1, 1974).

In Table 21 the number of gizzards having the same number of ingested pellets is given. The most frequent number of pellets encountered was 1 (28.2 percent of total). The most pellets encountered was 154. The average number of pellets per gizzard was 12.6.

Several of the ducks collected from Eagle River Flats had fairly large pieces of metal shrapnel in their gizzards. Eagle River is a military artillery range.

Only the gizzard from an adult male mallard containing 84 lead pellets showed any apparent abnormalities; the gizzard lining and contents were darkly stained. Unlike the pellets which were shiny and polished in all other gizzards, these pellets were dark and stained. The gizzard had perhaps ceased to function as a grinding organ. Part of the gizzard lining appeared to be sluffed also.

The gizzard that had 154 pellets which showed all stages of wear, appeared normal in all respects. This bird was an immature male pintail shot September 1 on the Palmer Hay Flats.

None of the personnel remarked about poor external physical condition of any birds from which they collected gizzards.

## DISCUSSION

Although this study provided some surprising results, it would obviously be incorrect to state that 5.9 percent of all ducks shot in Alaska have ingested lead shot. The results of this study could be weighted by ducks shot per area, species abundance in the area, etc. All of the major harvest areas in Alaska are not represented in the sample; nor were adequate samples taken throughout the season on any one area.

Four of the six top duck harvest areas (Timm 1974) in Alaska were represented in the sample (Susitna Flats, Palmer Hay Flats, Copper River Delta and the Stikine River Delta); two were not (Minto Flats and Mendenhall Wetlands).

Of the 39 gizzards having ingested lead shot, 36 were from three of the top six harvest areas. The Stikine Flats, where no lead positive gizzards were found, physically differs from the other three major areas mainly by a lack of many upland ponds.

It is obvious that a year-to-year carry over of pellets is occurring on the Palmer Hay Flats, since birds shot opening day had a high percentage of ingested shot. This same conclusion cannot yet be made for Susitna Flats, since few gizzards were collected during the first week of the season.

Table 20. Incidence of ingested lead shot in duck gizzards by time period, 1974.

Region	September		October-November	
	Total No. Collected	Percent with Ingested Shot	Total No. Collected	Percent with Ingested Shot
Southeast	94	-0-	96	-0-
Ak. Peninsula	77	-0-	12	-0-
Kodiak	17	5.9	-0-	-
Gulf Coast	27	-0-	56	3.6
Cook Inlet	218	15.7	42	4.8
Total*	438	8.0	206	1.9

\* Includes 25 from unknown locations.

Table 21. Incidence of ingested lead shot by the number of pellets per gizzard, 1974.

Number of Ingested Pellets	Number of Birds	% of Total
1	11	28.2
2	4	10.2
3	5	12.9
4	2	5.1
5	1	2.6
6	1	2.6
11	4	10.2
12	1	2.6
13	2	5.1
14	2	5.1
15	1	2.6
19	1	2.6
21	1	2.6
33	1	2.6
84*	1	2.6
154*	1	2.6
Total= 489	39	100.2

\*  $\bar{x}$  = 6.8 less these incidences



It is surprising that pellets remain from previous years on the Hay Flats. Many of the pond bottoms there are soft, and the entire area is flooded by high tides several times each year.

Although it maybe a questionable conclusion to make from these data, it appears that ducks are not being poisoned by ingested lead shot in Alaska to the degree they are elsewhere. Bellrose (1959) found that birds on a soft vegetation diet were not effected by ingested lead shot to the degree that those birds on a corn diet were. Ducks in Alaska have very little to eat except soft natural vegetation and animal matter. Although, ingested pellets were found in all stages of being ground away (as previously stated only one gizzard was abnormal) no comments were made by collectors about any bird being in poor physical condition.

A number of authors have investigated the effects of diet on lead shot toxicity. Shields and Mitchell (1941), Grant et al. (1938) and Sobel et al. (1940) have all shown that a high calcium diet decreases lead storage in body tissues and a low calcium diet increases lead storage. Jordan and Bellrose (1950) found that wild mallards fed a diet of mixed grains, coontail (a soft aquatic) and one #6 shot did not die. However, 70 percent of those fed only mixed grains and one #6 lead shot died.

Another possible indication of this apparent non-toxicity in Alaska can be seen in Table 22 where a comparison of ingested lead shot studies from various parts of the country is made.

It appears that a duck which has ingested lead shot in Alaska is apt to have many more pellets in its gizzard than one from elsewhere in the country. This strongly indicates that ducks remain alive in Alaska with high ingested lead pellet concentrations and remain available to hunters. It also may indicate that in other parts of the country (as a generalization) those birds which ingested large numbers of shot quickly died and were unavailable to hunters and did not show up in the samples.

Both the Palmer Hay Flats and Susitna Flats are fall staging areas. It is probable that those ducks shot opening day which had high ingested lead concentrations had been on these areas for some time. This may also explain why ingested shot rates in October were low. Birds shot then probably were transients from the north, where hunter concentration areas don't occur.

#### FUTURE STUDIES NEEDED

In subsequent years all of the major harvest areas in Alaska should be sampled. Additional samples from some of the areas covered this year are also desirable.

Longcore, et al. (1974) has identified lead levels that are toxic for ducks as measured in the liver or kidney, brain and clotted blood. From the Palmer Hay Flats next year, it is desirable to collect these parts from ducks which have a high number of ingested lead pellets in their

Table 22. A comparison of various ingested lead shot studies.

State	Sample	Ave. No.	Percent of lead positive duck gizzards with:		
	Size	Pellets	1 pellet	2-5 pellets	6 or more pellets
Alaska	39	12.6	28.2	30.8	41.0
Nationwide <sup>1/</sup>	2,359	-	65.5	26.4	8.1
Idaho <sup>2/</sup>	45	1.8	75.6	20.0	4.4
Utah <sup>3/</sup>	60	4.0	53.3	36.7	10.0
Washington <sup>4/</sup>	28	1.7	92.9	3.6	3.6
Oregon <sup>5/</sup>	252	3.0	48.0	52.0	-

<sup>1/</sup> Bellrose, 1959

<sup>2/</sup> Annon, 1974

<sup>3/</sup> Annon, 1974

<sup>4/</sup> Jeffrey and Zender, 1974

<sup>5/</sup> Smith, 1974

gizzards. Ducks with no ingested pellets will also be collected for comparative purposes.

A field inspection of the Palmer Hay Flats will also be most interesting. Both upland and pond bottom samples will be taken to see what the pellet concentrations in the soil are.

#### CONCLUSION

The Palmer Hay Flats and Susitna Flats have been identified as being possible problem areas. However, future collections of ducks with high pellet concentrations are needed for analysis of soluble stored lead in their tissues. The indications are strong that ducks from these areas are not being poisoned by ingested shot.

Gizzard collections from other areas (Minto Flats and the Mendenhall Wetlands in particular) are needed.

Only after an additional year's study can a comprehensive analysis of potential lead shot problems in Alaska be made; then firm recommendations can be given.

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