ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
William A. Egan, Governor

DEPARTMENT OF FISH AND GAME
Wallace H. Noerenberg, Commissioner

DIVISION OF GAME
Frank Jones, Acting Director

REPORT OF SURVEY AND INVENTORY ACTIVITIES
PART III - WATERFOWL AND SMALL GAME

Edited and Compiled by
Donald E. McKnight, Research Chief

Volume II
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-17-3, Jobs No. 10 & 11

(Printed October 1971)

MEMORANDUM OF TRANSMITTAL

October 8, 1971

TO: Wallace H. Noerenberg, Commissioner
Alaska Department of Fish and Game

FROM: Frank F. Jones, Acting Director
Division of Game
Alaska Department of Fish and Game
Juneau

SUBJECT: Annual Report of Survey-Inventory Activities

In 1969 the Game Division initiated a series of annual reports relating specifically to survey and inventory activities conducted by staff biologists each year. Surveys and inventories include all routine data collections directed toward assessment of the status of game populations and toward the determination of annual game harvests. These reports include study results and conclusions and, when applicable, recommended hunting regulation changes.

Several improvements have been incorporated into the 1970 reports. Because experience has shown that these reports are of interest to citizens unfamiliar with Game Management Unit boundaries, a map of Alaska showing these boundaries is included in each report this year. Also, even though 1969 reports were organized by game species and Management Units, for easy reference a table of contents has been added to the 1970 reports to provide easier access to specific information.

ALASKA GAME MANAGEMENT UNITS

Subunit Map of Units 13, 14, 15, 20, and 26

TABLE OF CONTENTS

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Statewide Seasons and Bag Limits:

Season and Species	Daily Bag Limit	Possession Limit	Explanation
Pribilof, Kodiak (Unit 8) and Aleutian Islands (except Unimak) - Oct. 14 - Jan. 26			
Remainder of State and Unimak Island - Sept. 1 - Dec. 14			
Game Ducks	6	18	
Old squaw, Harlequin, Scoters, Eiders, and Mergansers	15	30	Singly or in aggregate
Geese (except Emperor)	6	12	No more than 4 daily or 8 in possession may be Canada's or white-fronts
Emperor Geese	6	12	
Brant	4	8	
Entire State - Sept. 1 - Oct. 31			
Snipe	8	16	
Entire State - Sept. 1 - Oct. 15			
Cranes	2	4	

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 6 - Prince William Sound

Harvest and Hunting Pressure

Random bag check data were collected on the Copper River Delta during the season. These are presented in Appendix I.

The hunting pressure on this marsh is very limited. Shooting probably would improve if there were more hunters afield.

Composition and Productivity

Two projects were undertaken this reporting period. The first, a survey of trumpeter swans (Olor buccinator), was done in accordance with the cooperative management agreement of the Copper River Delta. In this project the Department of Fish and Game is a cooperator with the U. S. Forest Service and Alaska Department of Natural Resources. The second project, a nesting study of the dusky Canada goose (Branta canadensis occidentalis), is a continuation of a long-term study designed to determine the effects of the 1964 earthquake and resulting uplift on the nesting of this species.

Trumpeter Swan Survey. A survey was flown from Cordova to the Tsiu River near Yakataga on May 12 and 13, 1970. The aircraft was a De Havilland Beaver, with Department of Fish and Game biologists P. Havens and J. Reynolds acting as observers. Each swan sighting was noted on 1:250,000 or 1:63,360-scale topographic maps that are now in the files at Anchorage.

One hundred and sixty-six adult pairs were seen, of which 78 pairs were near nests. In addition, a lone adult was seen near a nest. This totals at least 333 breeding swans.

Any group of more than three birds, or pairs of juveniles, was considered nonbreeders, and 34 of these groups were counted. Group size ranged from two to 37. Total number of swans found in groups was 342. In addition, there were 41 observations of single swans. Total number of swans observed was 716.

In May 1968, Area Biologist L. Johnson conducted a similar survey which was later repeated by J. King of the U. S. Bureau of Sport Fisheries and Wildlife in August of 1968. In comparing identical areas in the three surveys, an increase was from 477 to 664 swans was noted in the period May 1968 to May 1970. Analysis of these data indicated that most of the increase was in the numbers of flocked birds.

No explanation can presently be given the apparent large increase in paired birds without broods, especially since observations do not show a large increase in nesting pairs in 1970.

The 1970 census has taken in a larger area than the previous surveys; this accounts for the complete total of 716 swans. Table I however, compares only identical count areas.

Johnson pointed out (In King, 1968) that in May, young of the previous year were readily identifiable by their grey color. Johnson reported 11.6%

Table 1. TRUMPETER SWAN SURVEY DATA-Copper River Delta

	Single Swans	Pairs not on Nest or without brood	Pair on Nest or with brood	Flocked Birds	Total
Johnson, May 1968	27	73 = 146	53 = 106	198	477
King, Aug. 1968	24	96 = 192	65 = 130	172	518
Havens & Reynolds, May 1970	37	76 = 152	69 = 138	337	664

grey juveniles in his 1968 survey. During the 1970 survey it was found that while in small groups, the grey birds could be easily counted. When mixed colors in large groups were encountered, as they often were, it was difficult to make accurate counts by color because the birds often scattered. Ten juveniles were positively identified and estimates of juveniles in flocks were 55. Totaled, these comprise 9.1% of all swan seen. This is 2.5% lower than Johnson's figure. Due to errors in estimating, it is impossible to draw any firm conclusions from these observations. In the census scheduled for May 1972, an attempt to refine counting techniques will be made and hopefully better data will be gathered.

Dusky Canada Goose Study. The first detailed study on the nesting of the Dusky Canada Goose on the Copper River Delta was done by C. E. Trainer in 1959. Since then more information has been gathered by biologists of the Department of Fish and Game.

In 1964 the Delta was raised an average of 1.89 M. as a result of the March 27 earthquake. As the long term effects of this uplift on the Dusky Canada Goose were unknown, a program was initiated that would continue until these effects were known.

In 1967 Ben Hilliker randomly selected 15 five-acre study plots on the Copper River Delta. These were marked by corner stakes and located on a map. These plots were established to enable investigators to measure nesting density changes in relation to vegetation changes and to determine overall nesting population shifts if they were to occur.

In 1967, 13 nests were located within the 15 study plots. Unfortunately the original data cannot be located so distribution of these nests is unknown.

In 1970, only seven of the 15 plots were examined. These seven contained 27 nests; the distribution is as follows:

Plot No.	No. Nests
1	7
2	2
3	5
4	3
5	4
8	6
9	0

In 1970 the majority of time was spent trying to locate as many nests as possible on the Delta. In coming years efforts will be directed to the 15 study plots so continuity will be achieved.

A summary of the nesting studies is presented in Table 2. Successful nests were considered those in which at least one egg hatched.

Table 2. Dusky Canada Goose Nesting Study

Year	No. Nests	Hatched		Abandoned		Destroyed	
		No.	%	No.	%	No.	%
1965	221	139	62.9	15	6.8	67	30.3
1966	100	97	97.0	3	3.0	0	0.0
1970	186	164	88.2	6	3.2	16	8.6

Year	Average Clutch	No. Nests
1959	5.6	194
1964	4.3	114
1965	5.8	140
1966	4.8	100
1970	5.4	146*

* Total clutch sizes known

It has been speculated that the subspecies of Canada Geese that nest on some of the islands of Prince William Sound and parts of Cook Inlet is B. c. occidentalis. However, it may be that they are the less migratory, Vancouver Canada Goose B. c. fulva. One possible method of determining subspecies may be the difference in egg size. Accordingly in 1970, 296 eggs from 55 nests were measured on the Delta. Average egg size was 81.68 x 55.76 mm. The longest egg measured 89.98 x 54.82 mm., and the shortest egg was also the narrowest, 75.50 x 51.14 mm. The widest egg was 81.96 x 60.82 mm. Greatest length variation within a clutch was 11.20 mm., while greatest width variation was 5.74 mm.

Southeastern Alaska supports a large breeding population of B. c. fulva, and it is anticipated that egg measurements will be taken from this group of geese and statistical analyses applied to determine if a subspecies distinction on egg size can be made.

Management Summary and Conclusions

Limited data have been gathered on wintering waterfowl in Prince William Sound. It is recommended that a program be initiated to survey and catalog wintering waterfowl and their habitat. It is particularly important that this be documented prior to the beginning of large volumes of tanker traffic to and from the terminus of the Prudhoe Bay-Valdez pipeline.

It is further recommended that Trumpeter swan surveys and Canada Goose nesting studies be conducted biennially and that more effort be expended in obtaining bag check data.

Recommendations

No changes in seasons or bag limits are recommended.

Literature Cited

King, James G. 1968. Trumpeter swan survey Alaska 1968. U. S. Fish and Wildlife Service, Juneau, Alaska 43 p.

Submitted by: Phillip D. Havens, Game Biologist II

Appendix I

Cordova 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total	% of Bag
Pintail	1	5	6	6	18	23.4
Mallard	2	4	5	12	23	29.9
Widgeon	3	5	6	4	18	23.4
G-W Teal		1	6	3	10	12.9
Shoveler			2	2	4	5.2
Gadwall						
G. Scaup				2	2	2.6
L. Scaup						
Canvasback			1	1	2	2.6
Subtotal	6	15	26	30		
Total	21		56		77	100.0
Unidentified Ducks					3	
Dusky Canada Geese	1	3	3	1	13	92.8
Lesser Canada Geese						
Cackling Canada Geese					1	7.2
W-F Geese						
Snow Geese						
Subtotal	1	3	3	1		
Total	4		3			
Unidentified Geese					3	

Total Waterfowl	97
Total Hunters	40 - 42 man days
Waterfowl/Hunter/Day	2.31
% Immature Ducks	72.7
% Immature Geese	50.0
Number Crippled	13
% Crippling Loss	11.8
No. Hunter under 16	1
% Hunter under 16	2.5

* Total may include birds of unknown sex and age

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 7 - Eastern Kenai Peninsula

Harvest and Hunting Pressure

No data were gathered this reporting period.

Composition and Productivity

No studies were conducted this reporting period.

Management Summary and Conclusions

Surveys of the Twentymile River, Portage Flats and the Placer River were made and a summary of these data is appended (Appendix I, II).

It appears that these marshes receive little use by waterfowl. Midsummer and midfall surveys are recommended to expand our data.

Recommendation

No changes in seasons or bag limits are recommended.

Submitted by: Phillip D. Havens, Game Biologist II

APPENDIX I

WATERFOWL SURVEY DATA - UNIT 7 - TWENTYMILE AND PORTAGE

Species	May 28, 1970*	August 21, 1970**
Pintail	5	0
Mallard	10	8
G.W. Teal	0	2
Total Ducks	15	10

* All males
** Estimate by D. Bader

APPENDIX II

WATERFOWL SURVEY DATA - UNIT 7 - PLACER RIVER

Species	May 28, 1970	August 21, 1970*
Pintail	1	2
Mallard	10	40
Widgeon	3	21
G. W. Teal	2	37
Total Ducks	16	100
Canada Geese	1	0
Total Geese	1	0
Swan	1	0
Total Waterfowl	18	100

* Estimates by D. Bader

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 9 - Alaska Peninsula

Harvest and Hunting Pressure

Alaska Department of Fish and Game and U. S. Fish and Wildlife Service personnel conducted limited bag checks at Pilot Point this reporting period. A summary of this information is appended (Appendix I).

Contact was again made with commerical carriers that provide charter service to the area. One party of eight hunters traveled from Kodiak. Three more trips were planned but adverse weather prevented completion. Peninsula Airways of King Salmon flew in hunters who accounted for 56 man days hunting in the area. Mr. Orin Seibert, of Peninsula Airways, lives in the village of Pilot Point and estimated total hunting pressure on the marsh at between 163 and 193 man days. This is a reliable estimate in my opinion.

Random bag checks of hunters from other areas, generally around King Salmon, are included as Appendix II.

U. S. Air Force personnel cooperated by supplying bag check data from their facility at Cold Bay. Accuracy or completeness of this information cannot be determined. This information is attached as Appendix III.

Composition and Productivity

No studies were conducted this reporting period.

Management Summary and Conclusions

Survey and inventory flights covering waterfowl marshes within Unit 9 were flown at various times. Many were repeat counts of those done in previous years and added considerable more data to our files. These 1970 counts are found as Appendices IV - IX. In addition, three new areas were surveyed and delineated on maps. These are:

Kalgin Island. This island in the middle of Cook Inlet was surveyed three times (Appendix X); only small numbers of waterfowl were seen. It has been reported that substantial numbers of waterfowl do use it in early September, however this remains to be verified. Currently an application is on file with the State Division of Lands for a grazing lease that would encompass all the waterfowl habitat on the Island. The Department of Fish and Game has gone on record as opposing this lease.

Hook Lagoon. This is a small lagoon west of the Cinder River on the north side of the Alaska Peninsula. Survey data are appended (Appendix XI).

Coffee Creek - Kvichak. This is a small intertidal marsh located east of Naknek. It apparently is a migratory resting area and is not of major significance (Appendix XII).

During a sea otter survey along the Pacific side of the Alaska Peninsula, Area Management Biologist, J. Faro, recorded data on waterfowl seen. This information (Appendix XIII) while minimal, is a start toward a complete inventory of that unknown section of Unit 9.

Recommendations

No changes in seasons or bag limits are recommended.

Submitted by: Phillip D. Havens, Game Biologist II

Appendix I

Pilot Point 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail	1	3	6	6	16	43.2
Mallard		1			1	2.7
Widgeon	1	1	2	1	5	13.5
G-W Teal			1	2	3	8.1
Shoveler		1		2	3	8.1
Gadwall	2		2	4	8	21.6
G. Scaup						
L. Scaup						
C. Eider			1		1	2.7
Subtotal	4	6	12	15		
Total	10		27		37	99.9
Unidentified Ducks						
Dusky Canada Geese						
Lesser Canada Geese						
Cackling Canada Geese	5	4	12	8	99	95.2
W-F Geese						2.9
Snow Geese					3	1.9
Emperor	1		1		2	
Subtotal	6	4	13	8		
Total	10		21		104	100.0
Unidentified Geese						

Total Waterfowl	141
Total Hunters	26 - 51 man/days
Waterfowl/Hunter/Day	2.76
% Immature Ducks	73.0
% Immature Geese	67.7
Number Crippled	17
% Crippling Loss	10.7
No. Hunter under 16	0
% Hunter under 16	0

* Total may include birds of unknown sex and age

Appendix II

Unit 9 Miscellaneous 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail	4	7	5	4	20	27.0
Mallard	3	2	5	1	11	14.9
Widgeon	6	1	6	8	21	28.4
G-W Teal	1	4		3	8	10.8
Shoveler			1	2	3	4.0
Gadwall	1				1	1.3
G. Scaup			5	4	9	12.2
L. Scaup						
Crane					1	1.3
Subtotal	15	14	22	22		
Total	29		44		74	99.9
Unidentified Ducks						
Dusky Canada Geese						
Lesser Canada Geese					3	8.8
Cackling Canada Geese					8	23.5
W-F Geese						
Snow Geese					3	5.9
Emperor		6	4	2	21	61.8
Subtotal		6	4	2		
Total	6		6		34	100.0
Unidentified Geese						

Total Waterfowl	108
Total Hunters	35 - 35 man/days
Waterfowl/Hunter/Day	3.08
% Immature Ducks	59.45
% Immature Geese	50.00
Number Crippled	36
% Crippling Loss	25.0
No. Hunter under 16	0
% Hunter under 16	0

* Total may include birds of unknown sex and age

Appendix III

Izembeck Bay 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail					6	
Mallard					16	
Widgeon						
G-W Teal					10	
Shoveler						
Gadwall						
G. Scaup						
L. Scaup						
Subtotal						
Total					32	
Unidentified Ducks						
Dusky Canada Geese						
Lesser Canada Geese					53	
Cackling Canada Geese						
W-F Geese						
Snow Geese						
Emperor Geese					154	
Black Brant					106	
Subtotal					313	
Total					345	
Unidentified Geese						

Total Waterfowl	345
Total Hunters	99
Waterfowl/Hunter	3.44
% Immature Ducks	Unknown
% Immature Geese	Unknown
Number Crippled	65
% Crippling Loss	15.9
No. Hunter under 16	Unknown
% Hunter under 16	Unknown

* Total may include birds of unknown sex and age

Appendix IV

WATERFOWL SURVEY DATA UNIT 9, EGEGIK

Species	March 3, 1970	June 29, 1970*
Dabbler	0	443
Diver**	0	1,218
Sea Duck	0	
Total Ducks	0	1,661
Emperor Geese	0	1
Total Geese	0	1
Crane	0	9
Total Waterfowl	0	1,671

* Estimates by D. Cornelius
** Includes scoters and eider

Appendix V

WATERFOWL SURVEY DATA UNIT 9, PILOT POINT

Species	March 3, 1970	June 29, 1970**	Aug. 25, 1970***	Sept. 24, 1970**	Oct. 8, 1970***
Dabbler	0	190	1,600	2,150	5,300****
Diver*	1,000+	895	0	0	0
Unidentified	0	7	0	0	0
Total Ducks	1,000+	1,092	1,600	2,150	5,300
Canada Geese	0	0	426	5,150	33,600
Snow Geese	0	0	0	12	36,950
Emperor Geese	0	0	25	50	0
Total Geese	0	0	451	5,212	70,550
Swan	0	27	71	0	0
Cranes	0	23	6	0	0
Total waterfowl	1,000+	1,142	2,128	7,362	75,850

* Includes scoters and eiders
** Estimates by D. Cornelius
*** Estimates by J. Faro
**** Because of high number of geese present, duck estimates are very minimal

Appendix VI

WATERFOWL SURVEY DATA UNIT 9, CINDER RIVER

Species	March 3, 1970	June 29, 1970**	Aug. 25, 1970***	Sept. 24, 1970***	Oct. 8, 1970***
Dabbler	0	144	6,000	1,880	2,850
Diver*	500+	716	400	1.000	2,500
Total Ducks	500+	860	6,400	2,880	5,350
Canada Geese	0	0	13	135	3,350
Snow Geese	0	0	0	0	6,700
Emperor Geese	0	0	850	17,180	10,050
Total Geese	0	0	863	17,315	20,100
Swan	0	9	0	0	0
Crane	0	0	8	0	0
Total Waterfowl	500+	869	7,271	20,195	25,450

* Includes scoters and eiders
** Estimates by D. Cornelius
*** Estimates by J. Faro

Appendix VII

WATERFOWL SURVEY DATA UNIT 9, PORT HEIDEN

Species	June 29, 1970**	Aug. 25, 1970***	Sept. 24, 1970***	Oct. 7, 1970***
Dabbler	1,084	4,270	1,650	15,100
Diver*	1,355	200	90,000	30,000
Unidentified	60	0	0	0
Total Ducks	2,499	4,470	91,650	45,100
Canada Geese	0	10	500	2,500
W-F Geese	0	0	0	10
Emperor Geese	0	875	26,650	8,580
Total Geese	0	885	27,150	11,090
Total Waterfowl	2,499	5,355	118,800	56,190

* Includes scoter and eider
** Estimates by D. Cornelius
*** Estimates by J. Faro

Appendix VIII

WATERFOWL SURVEY DATA UNIT 9, ILNIK LAGOON

Species	June 29, 1970**	Aug. 25, 1970***	Sept. 24, 1970***	Oct. 7, 1970***
Dabbler	851	2,925	3,900	2,000
Diver*	2,175	450	2,800	700
Total Ducks	3,026	3,375	6,700	2,700
Canada Geese	0	250	85	0
Emperor Geese	0	825	10,180	4,700
Total Geese	0	1,075	10,265	4,700
Swan	10	8	0	0
Crane	2	2	0	0
Total Waterfowl	3,038	4,460	16,965	7,400

* Includes scoter and eider
** Estimates by D. Cornelius
*** Estimates by J. Faro

Appendix IX

WATERFOWL SURVEY DATA UNIT 9, PORT MOLLER

Species	June 29, 1970	September 24, 1970	October 7, 1970
Dabbler	275	1,970	1,700
Diver**	1,186	14,400	27,900
Total Ducks	1,461	16,370	29,600
W-F Geese	0	0	12
Emperor Geese	0	19,400	15,350
Total Geese	0	19,400	15,362
Total Waterfowl	1,461	35,770	44,962

** Includes scoter and eider

Appendix X

WATERFOWL SURVEY DATA, UNIT 9 - KALGIN ISLAND

Species	April 16, 1970	June 1, 1970*	August 12, 1970
Pintail	25	26	0
Mallard	25	13	0
G-W Teal	0	0	20
Unidentified dabbler	0	0	51
Total Waterfowl	50	39	71

* Estimates by P. LeRoux

Appendix XI

WATERFOWL SURVEY DATA, UNIT 9, HOOK LAGOON

Species	June 29, 1970*	August 25, 1970*	September 24, 1970*
Dabbler	64	1,050	1,450
Diver	17	0	0
Total Ducks	81	1,050	1,450
Emperor Geese	0	400	3,100
Cranes	0	60	0
Total Waterfowl	81	1,510	4,550

* Estimates by D. Cornelius
** Estimates by J. Faro

Appendix XII

WATERFOWL SURVEY DATA, UNIT 9, COFFEE CREEK - KVICHAK

Species	May 4, 1970	August 24, 1970*
Dabbler	50	230
Canada Geese	50	0
W-F Geese	1,000	15
Total Geese	1,050	15
Total Waterfowl	1,100	245

* Estimate by J. Faro

APPENDIX XIII

WATERFOWL SURVEY DATA - UNIT 9 - PACIFIC SIDE OF THE ALASKA PENINSULA

AREA	DATE	OBSERVATIONS AND COMMENTS	
Wide Bay	3/23/70	Scoter*	190
		Eiders	60
		Emperor Geese	210
		Old Squaw	2
Cape Kayakluit Area	3/23/70	Emperor Geese	175
Imuya Bay	3/23/70	Scoter*	50
		Emperor Geese	50
Cape Kilokak Area	3/23/70	Scoter*	50
		Emperor Geese	50
Agripina Bay	3/23/70	Scoter*	20
		Emperor Geese	70
Outside shoreline between Agripina Bay and Port Wrangell	3/23/70	Emperor Geese	103
Port Wrangell	3/23/70	Scoter*	20
Cape Providence	3/23/70	Scoter*	10
		Harlequin	20
Chiginagak Bay	3/23/70	Eider	2
		Emperor Geese	350
Cape Kuyuyukak Area	3/23/70	Scoter*	10
		Eider	40
		Emperor Geese	510
Nakalilok Bay	3/23/70	Scoter*	43
		Emperor Geese	10
Yantarni Bay	3/23/70	Scoter*	10
Amber Bay	3/23/70	Scoter*	45
		Eider	10
		Harlequin	10
		Emperor Geese	400
Aniakchak Bay	3/20/70	Scoter*	30
		Eider	670
		Harlequin	25
		Emperor Geese (surveyed entire bay)	420

* Both white-winged and surf scoters

APPENDIX XIII

WATERFOWL SURVEY DATA - UNIT 9 - PACIFIC SIDE OF THE ALASKA PENINSULA

AREA	DATE	OBSERVATIONS AND COMMENTS	
Outside shoreline between Kujulik and Aniakchak	3/20/70	Eider	80
		Harlequin	15
		Emperor Geese	103
Sutwik Island	3/20/70	Scoter*	50
		Eider	20
		Harlequin	35
		Emperor Geese	158
Kujulik Bay	3/20/70	Scoter*	641
		Eider	2,279
		Old Squaw	850
		Golden eye	9
		Emperor Geese	136
(This bay may deserve consideration as an area of key waterfowl habitat. Surveyed entire bay.)			
Cape Kumlium	3/20/70	Scoter*	70
		Eider	85
		Emperor Geese	95
Hook Bay	3/20/70	Scoter*	10
		Eider	10
Outside shoreline between Hook Bay and Chignik Bay	3/20/70	Scoter*	10
		Emperor Geese	16
Chignik Bay	3/20/70	Scoter*	91
		Eider	100
		Old Squaw	2
		Emperor Geese	211
		(Surveyed entire bay)	
Castle Bay	3/21/70	Scoter*	85
		Eider	10
Castle Cape to Seal Cape	3/21/70	Scoter*	65
Kuiukta Bay	3/21/70	Scoter*	5
Mitrofania Bay and Island	3/21/70	Scoter*	38

* Both white-winged and surf scoters

APPENDIX XIII

WATERFOWL SURVEY DATA - UNIT 9 - PACIFIC SIDE OF THE ALASKA PENINSULA

AREA	DATE	OBSERVATIONS AND COMMENTS	
Perryville, Humpback Bay, Ivanof Bay to Bluff Point Outside shoreline	3/21/70	Scoter*	63
		Old Squaw	2
Stepavak Bay	3/21/70	Scoter*	35
		Eider	5
		Old Squaw	2
Unga Strait minus Dorenoi and Balboa Bay	3/21/70	Scoter*	100
		Eider	10
		Old Squaw	7
		Harlequin	3
		Emperor Geese	4
Dorenoi Bay	3/21/70	Scoter*	83
		Golden eye	12
		Emperor Geese	200
		(Surveyed entire bay)	
Balboa Bay	3/21/70	Scoter*	180
		Eider	110
		Golden eye	10
		Old Squaw	10
		Emperor Geese	200
Beaver Bay to Cape Tolstoi	3/21/70	Scoter*	82
		Eider	3
		Emperor Geese	38
		(Small groups of emperor geese were scattered throughout offshore kelp beds (Nereocystis)	
Shumagin Islands (Unga, Popof, and Koroyin Islands only)	3/21/70	Scoter*	3,545
		Eider	40
		Old Squaw	35
		Emperor Geese	466
Pavlof Islands	3/21/70	Scoter*	595
		Eider	245
		Old Squaw	35
		Emperor Geese	243

* Both white-winged and surf scoters

APPENDIX XIII

WATERFOWL SURVEY DATA - UNIT 9 - PACIFIC SIDE OF THE ALASKA PENINSULA

AREA	DATE	OBSERVATIONS AND COMMENTS	
Deer Island	3/22/70	Scoter*	150
		Eider	85
		Old Squaw	10
		Emperor Geese	100
		(Only about 1/2 of shoreline surveyed)	
Sandman Reefs	3/22/70	Scoter*	45
		Eider	195
		Old Squaw	55
		Emperor Geese	117
Sanak Islands	3/22/70	Scoter*	555
		Eiders	740
		Old Squaw	145
		Harlequin	45
		Mallard	45
		Emperor Geese	1,030
		Canada Geese	200
		Swans	2
		(Possible key waterfowl habitat)	
Cold Bay to Morzhovoi Bay	3/20/70	Scoter*	50
		Eider	410
		Swan	2
Morzhovoi Bay to False Pass	3/20/70	Scoter*	415
		Eider	2,500
		Old Squaw	10
		(Possible key waterfowl habitat)	
False Pass to Otter Cove on Unimak Island	3/20/70	Scoter*	180
		Eider	250
		Emperor Geese	4

* Both white-winged and surf scoters

Totals - Scoters	7,621	Emperor Geese	5,469
Eiders	7,959	Canada Geese	200
Old Squaw	1,165	Swan	4
Harlequin	153		
Golden eye	31		
Mallard	45		

Total Waterfowl: 22,647

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 10 - Aleutian Islands

Harvest and Hunting Pressure

No information was gathered this report period.

Composition and Productivity

No studies were conducted this reporting period.

Management Summary and Conclusions

Most of the Aleutian Islands are included in the Aleutian Islands National Wildlife Refuge and as such receive little study by State personnel. Little hunting occurs except around a few villages and at the Naval Station on Adak.

In future years a cooperative venture with refuge personnel to survey and inventory this vast area should be considered.

Recommendations

No changes in seasons or bag limits are recommended.

Submitted by: Phillip D. Havens, Game Biologist II

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 14 - Upper Cook Inlet

Harvest and Hunting Pressure

Bag check data were gathered throughout the season with the greatest effort on opening day (September 1). Bluebird weather prevailed during most of the early part of the season and hunting was slow. This is the first time any data have been gathered from Goose Bay; this is a small area across Knik Arm that is accessible by car and had the highest success of any area within the region. All information however came from one group of hunters that used the area several times. It is unlikely that the marsh could stand any higher hunting pressure.

All bag check data are appended (Appendix I - V).

Composition and Productivity

No studies were conducted this reporting period.

Management Summary and Conclusions

Survey flights over local marshes were conducted randomly this reporting period. The results are included (Appendix VI - X). Several new areas were surveyed; these were at the mouth of Fire Creek, Eklutna Flats and Goose Bay. It is of interest to note that very few ducks were seen in Goose Bay, yet the reported kill in the area was quite good. Either waterfowl move through the area frequently without lingering or our surveys are not accurate.

The Palmer Hay Flats receive a great deal of pressure opening day and very little after that. Birds are always available but lack of pressure allows them to sit and consequently hunting suffers. More pressure should be directed to the area. If better access were available, hunting pressure could be spread out and all would benefit. Three main routes to this marsh are available to the hunter--down Rabbit Slough in a canoe, homestead roads to the old BP drilling site and a homestead road to the Hay Flats. None of these are officially open to trespass and each is only open at the owner's pleasure. Official designation as access sites would be a desirable feature, as would additional access points to the marsh.

Recommendations

No changes in seasons and bag limits are recommended.

Submitted by: Phillip D. Havens, Game Biologist II

Appendix I. Eagle River 1970**

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail	8	1	1	2	41	16.5
Mallard	2	2	2	2	44	17.6
Widgeon	12	2	6	7	70	28.2
G-W Teal	7	5	7	3	66	26.5
Shoveler				2	23	9.2
Gadwall						
G. Scaup					2	0.8
L. Scaup						
Bufflehead					1	0.4
B-W Teal	1				1	0.4
Old Squaw					1	0.4
Subtotal	30	10	16	16		
Total	40		32		249	
Unidentified Ducks					0	
Dusky Canada Geese						
Lesser Canada Geese					1	100
Cackling Canada Geese						
W-F Geese						
Snow Geese						
Subtotal						
Total					1	100
Unidentified Geese					0	

Total Waterfowl	250
Total Hunters	Unknown
Waterfowl/Hunter/Day	Unknown
% Immature Ducks	Unknown
% Immature Geese	Unknown
Number Crippled	Unknown
% Crippling Loss	Unknown
No. Hunter under 16	Unknown
% Hunter under 16	Unknown

* Total may include birds of unknown sex and age.
** Identification by D. Bader from wings submitted by U. S. Army.

Appendix II. Goose Bay 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail				3	3	10.3
Mallard			4	19	23	79.3
Widgeon						
G-W Teal						
Shoveler				1	1	3.4
Gadwall				2	2	6.8
G. Scaup						
L. Scaup						
Subtotal			4	25		
Total				29	29	99.8
Unidentified Ducks					51	
Dusky Canada Geese						
Lesser Canada Geese						
Cackling Canada Geese						
W-F Geese						
Snow Geese						
Subtotal						
Total						
Unidentified Geese					0	

Total Waterfowl	80
Total Hunters	14 = 14 man/day
Waterfowl/Hunter/Day	5.71
% Immature Ducks	100.0
% Immature Geese	
Number Crippled	3
% Crippling Loss	3.6
No. Hunter under 16	1
% Hunter under 16	7.1

* Total may include birds of unknown sex and age.

Appendix III. Palmer Hay Flats 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail	3	5	48	48	104	53.9
Mallard	8	5	22	25	60	31.1
Widgeon	2		3	1	6	3.1
G-W Teal	1	6	5	4	16	8.3
Shoveler			2	3	5	2.6
Gadwall				1	1	0.5
G. Scaup				1	1	0.5
L. Scaup						
Subtotal	14	16	80	83		
Total	30		163		193	100.0
Unidentified Ducks					191	
Dusky Canada Geese						
Lesser Canada Geese						
Cackling Canada Geese						
W-F Geese						
Snow Geese						
Subtotal						
Total						
Unidentified Geese					0	

Total Waterfowl	384
Total Hunters	146 = 146 man/days
Waterfowl/Hunter/Day	2.63
% Immature Ducks	84.4
% Immature Geese	
Number Crippled	66
% Crippling Loss	14.7
No. Hunter under 16	1
% Hunter under 16	0.68

* Total may include birds of unknown sex and age.

Appendix IV. Susitna 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail	18	6	56	51	131	45.0
Mallard	9	5	7	14	35	12.0
Widgeon	14	3	18	19	54	18.5
G-W Teal		4	8	9	23	7.9
Shoveler	2	3	12	19	36	12.4
Gadwall				1	1	0.3
G. Scaup	1	1	4	3	9	3.1
L. Scaup				1	1	0.3
Crane					1	0.3
Subtotal	46	22	105	117		
Total	68		222		291	99.8
Unidentified Ducks					81	
Dusky Canada Geese						
Lesser Canada Geese	1			1	2	50.0
Cackling Canada Geese						
W-F Geese		1	1		2	50.0
Snow Geese						
Subtotal	1	1	1	1		
Total	2		2		4	100.0
Unidentified Geese					0	

Total Waterfowl	376
Total Hunters	138=207 man/day
Waterfowl/Hunter/Day	1.82
% Immature Ducks	76.55
% Immature Geese	50.00
Number Crippled	43
% Crippling Loss	10.3
No. Hunter under 16	2
% Hunter under 16	1.4

* Total may include birds of unknown sex and age.

Appendix V. **Upper Cook Inlet 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail			3	6	9	50.0
Mallard	1		2	3	6	33.3
Widgeon		1			1	5.5
G-W Teal				2	2	11.1
Shoveler						
Gadwall						
G. Scaup						
L. Scaup						
Subtotal	1	1	5	11		
Total	2		16		18	99.9
Unidentified Ducks					14	
Dusky Canada Geese						
Lesser Canada Geese						
Cackling Canada Geese						
W-F Geese						
Snow Geese						
Subtotal						
Total						
Unidentified Geese					0	

Total Waterfowl	32
Total Hunters	45=45 man/day
Waterfowl/Hunter/Day	0.71
% Immature Ducks	88.9
% Immature Geese	
Number Crippled	4
% Crippling Loss	11.1
No. Hunter under 16	1
% Hunter under 16	2.2

* Total may include birds of unknown sex and age.
** Includes Campbell, Potter, Airport, Rabbit Creek

Appendix VI. Waterfowl survey data, Unit 14 - Goose Bay

Species	May 28, 1970	July 17, 1970	Oct. 5, 1970
Pintail	20	16	0
Pintail w/brood	0	4	0
Mallard	16	1	13
Mallard w/brood	0	2	0
G-W Teal w/brood	0	3	0
TOTAL DUCKS	36	26	13
Canada Geese	15	3	0
Snow Geese	3	0	0
TOTAL GEESE	18	3	0
TOTAL WATERFOWL	54	29	13

Appendix VII. Waterfowl survey data, Unit 14 - Jim-Swan Lakes

Species	May 28, 1970	July 17, 1970
Pintail	2	1
Pintail w/brood	0	2
Mallard	54	5
Widgeon	45	40
Widgeon w/brood	0	1
G-W Teal	4	5
Shoveler	2	
Scaup*	40	30
Bufflehead	1	
Goldeneye*	0	3
TOTAL DUCKS	148	87
Canada Geese	1	0
TOTAL GEESE	1	0
Swan*	6	2
TOTAL WATERFOWL	155	89

* Not identified to species

Appendix VIII. Waterfowl survey data, Unit 14 - Palmer Hay Flats

Species	May 28, 1970	July 17, 1970	Oct. 5, 1970
Dabbler			213
Pintail	110	20	
Pintail w/brood	0	7	
Mallard	35	1	
Mallard w/brood	0	1	
Widgeon	18	25	
Widgeon w/brood	0	2	
Teal	38	0	
Teal w/brood	0	1	
Shoveler	20	0	
Gadwall	2	0	
Scaup*	55	0	
Scaup* w/brood	0	1	
Canvasback	15	0	
Unidentified		100	
TOTAL DUCKS	293	158	213
Canada Goose	42	0	60
W-F Geese	2	0	0
TOTAL GEESE	44	0	60
Crane	1	0	0
TOTAL WATERFOWL	338	158	273

* Not identified by species

Appendix IX. Waterfowl survey data, Unit 14 - Susitna Flats

Species	April 16, 1970	May 5, 1970**	May 28, 1970	June 25, 1970	Aug. 12, 1970	Sept. 28, 1970	Oct. 5, 1970
Dabbler	0	0	0	0	525	2570	4484
Pintail	134	1440	122	659	1855		
Pintail w/brood	0	0	0	1	0		
Mallard	31	990	69	126	846		
Widgeon	0	625	56	1321	1185		
G-W Teal	0	110	8	121	1045		
G-W Teal w/brood	0	0	0	1	0		
Shoveler	0	30	9	179	0		
Gadwall	0	0	2	0	0		
Scaup*	0	0	119	46	0		
Canvasback	0	0	6	3	0	6	
Goldeneye*	0	0	9	0	0		
Divers	0	0	0	0	0	20	165
TOTAL DUCKS	165	3195	400	2457	5452	2596	4649
Canada Geese	312	3395	493	6	685	125	100
B. Brant	0	0	50	0	0	0	0
W-F Geese	15	600	58	9	420	0	0
W-F w/brood	0	0	0	3	0	0	0
Snow Geese	0	200	0	0	0	0	0
TOTAL GEESE	327	4195	601	18	1105	125	100
Swan*	0	509	2	7	2	157	1296
Crane	0	0	4	0	5	0	0
TOTAL WATERFOWL	492	7899	1007	2482	6564	2878	6045

* Not identified to species.

** Estimates by D. Bader

WATERFOWL - GMU 14 - ANCHORAGE

Appendix X. Waterfowl survey data, Unit 14 - Upper Cook Inlet*

Species	May 28, 1970	June 25, 1970
Pintail	53	26
Pintail w/brood	0	2
Mallard	14	6
Widgeon	26	27
G-W Teal	5	16
Shoveler	0	2
TOTAL DUCKS	98	79
Canada Geese	96	8
Canada Geese w/brood	0	3
Crane	1	0
TOTAL WATERFOWL	195	90

* Includes Potter, Rabbit Creek and Campbell

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 15 - Kenai Peninsula

Harvest and Hunting Pressure

Limited bag check data were gathered from the Chickaloon Flats (Appendix I) this reporting period.

Although no absolute data are available, it appears that the Chickaloon is receiving more hunting pressure than in the past. It is expected that this pressure will increase as the area's potential becomes known to more hunters.

Composition and Productivity

University of Alaska graduate student, R. Quimby, is currently studying Chickaloon Flats and its productivity. This work should be available within a few years.

Management Summary and Conclusions

Limited surveys were conducted on the Fox River Flats at the head of Kachemak Bay (Appendix II). More information should be gathered on this important marsh. In addition, surveys of wintering waterfowl in Kachemak Bay will receive priority treatment in coming years.

Extensive survey data were gathered from the Chickaloon Flats this year. These are appended (Appendix III). It is becoming increasingly evident that the Chickaloon Flats play an important role as a staging area for migrating waterfowl each fall. Probably the best shooting in Cook Inlet can be had on the Chickaloon if one is there at the right time.

The jeep road through the Kenai National Moose Range is useable at times and some access is provided via that route. Most access however is by aircraft. Float planes can land on the Chickaloon River at high tide and wheeled planes have a strip available. In addition, landings on the mud flats are possible in high performance aircraft.

It is possible that as pressure increases, specific landing areas will need to be designated. At the present time there appears to be no reason for this type of action.

Recommendations

No changes in seasons or bag limits are recommended.

Submitted by: Phillip D. Havens, Game Biologist II

Appendix I

Chickaloon 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail		2	10	14	26	23.8
Mallard	8	10	17	21	56	51.4
Widgeon		1	4	3	8	7.3
G-W Teal			7	9	16	14.7
Shoveler				1	1	0.9
Gadwall			1	1	2	1.8
G. Scaup						
L. Scaup						
Subtotal	8	13	39	49		
Total	21		88		109	99.9
Unidentified Ducks					34	
Dusky Canada Geese						
Lesser Canada Geese	2	1	1		40	88.9
Cackling Canada Geese			1		1	2.2
W-F Geese						
Snow Geese					4	8.9
Subtotal	2	1				
Total	3		2		45	100.0
Unidentified Geese						

Total Waterfowl	188
Total Hunters	2.6 = 81 man/day
Waterfowl/Hunter/Day	2.3
% Immature Ducks	80.73
% Immature Geese	40.00
Number Crippled	31
% Crippling Loss	14.1
No. Hunter under 16	0
% Hunter under 16	0

* Total may include birds of unknown sex and age

Appendix II

WATERFOWL SURVEY DATA UNIT 15, FOX RIVER FLATS AND BATTLE CREEK

SPECIES	April 1, 1970	June 4, 1970**	Oct. 20, 1970***
Pintail	0	19	0
Mallards	2600	95	6000
Widgeon	0	6	0
G-W Teal	0	10	0
Gadwall	0	1	0
Scaup*	0	2	0
Dabblers*	0	0	200
Divers*	0	0	300
Total Ducks	2600	133	6500
Canada Geese	0	0	400
Swans*	2	0	80
Total Waterfowl	2602	133	6980

* Not identified to species
** Estimates by P. LeRoux
*** Estimates by R. Perkins

Appendix III

WATERFOWL SURVEY DATA UNIT 15, CHICKALOON FLATS

SPECIES	4/14/70	4/16/70	5/28/70	6/15/70**	6/25/70	7/13/70	8/21/70***	9/28/70	10/5/70
Pintail	0	0	104	144	110	99	2288	-	-
Pintail w/brood	0	0	0	0	1	4	0	-	-
Mallard	4	46	152	204	204	15	1090	-	-
Widgeon	0	0	46	48	93	39	1086	-	-
Widgeon w/brood	0	0	0	0	1	7	0	-	-
G-W Teal	0	0	32	39	61	5	1472	-	-
G-W Teal w/brood	0	0	0	0	2	0	0	-	-
Shoveler	0	0	18	13	28	0	0	-	-
Gadwall	0	0	11	32	23	0	5	-	-
Gadwall w/brood	0	0	0	0	1	0	0	-	-
Dabblers*	0	0	0	33	0	34	0	4540	834
Divers*	0	3	3	1	1	0	0	-	-
Total Ducks	4	49	366	514	525	203	5941	4540	834
Canada Geese	0	0	1	25	0	0	719	4210	18
Snow Geese	0	0	0	0	0	0	0	2	0
Total Geese	0	0	1	25	0	0	719	4212	18
Swans*	4	1	0	2	0	0	0	0	0
Cranes	0	0	2	5	2	7	47	0	0
Total Waterfowl	8	50	369	546	527	210	6707	8752	852

* Not identified to species
** Estimates by D. Cornelius
*** Estimates by D. Bader

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 16 - West Side of Cook Inlet

Harvest and Hunting Pressure

Limited bag check data were gathered from Trading Bay and Redoubt Bay and are appended (Appendix I, II).

Composition and Productivity

No studies were conducted this reporting period.

Management Summary and Conclusions

Several survey flights were flown on the two marshes in Unit 16. This information is appended (Appendix III, IV).

Recommendations

No changes in seasons or bag limits are recommended

Submitted by: Phillip D. Havens, Game Biologist II

Appendix I

Trading Bay 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail	7	1	30	27	65	42.8
Mallard	3	3	10	11	27	17.8
Widgeon	2		21	16	39	25.6
G-W Teal			3	7	10	6.6
Shoveler			2	4	6	3.9
Gadwall			4	1	5	3.3
G. Scaup						
L. Scaup						
Subtotal	12	4	70	66		
Total	16		136		152	100.0
Unidentified Ducks					1	
Dusky Canada Geese						
Lesser Canada Geese						
Cackling Canada Geese						
W-F Geese		1	2	1	6	100.0
Snow Geese						
Subtotal		1	2	1		
Total	1		3		6	100.0
Unidentified Geese					1	

Total Waterfowl	160
Total Hunters	35 = 71 man/days
Waterfowl/Hunter/Day	2.25
% Immature Ducks	89.47
% Immature Geese	75.0
Number Crippled	16
% Crippling Loss	9.0
No. Hunter under 16	4
% Hunter under 16	11.4

* Total may include birds of unknown sex and age

Appendix II

Redoubt Bay 1970

BAG CHECK RESULTS

Species	Adult Male	Adult Female	Immature Male	Immature Female	Total*	% of Bag
Pintail	1	2	4		7	16.3
Mallard		1	6	3	10	23.2
Widgeon		2	5	8	15	34.9
G-W Teal			1	2	3	7.0
Shoveler			2	3	5	11.6
Gadwall						
G. Scaup	2				2	4.6
L. Scaup						
Old Squaw			1		1	2.3
Subtotal	3	5	19	16		
Total	8		35		43	99.9
Unidentified Ducks					1	
Dusky Canada Geese						
Lesser Canada Geese						
Cackling Canada Geese						
W-F Geese		1			1	
Snow Geese						
Subtotal		1				
Total		1			1	
Unidentified Geese						

Total Waterfowl	45
Total Hunters	8 = 16 man/day
Waterfowl/Hunter/Day	2.81
% Immature Ducks	81.39
% Immature Geese**	
Number Crippled	5
% Crippling Loss	10.0
No. Hunter under 16	0
% Hunter under 16	0

* Total may include birds of unknown sex and age
** Sample too small

Appendix III

WATERFOWL SURVEY DATA UNIT 16, TRADING BAY

SPECIES	April 16, 1970	June 25, 1970	Aug. 12, 1970	Sept. 28, 1970
Pintail	636	71	1240	-
Pintail w/brood	0	3	0	-
Mallard	402	91	271	-
Widgeon	0	26	334	-
Widgeon w/brood	0	1	0	-
G-W Teal	0	6	180	-
Dabbler*	1	6	325	1785
Diver*	7	60	0	0
Total Ducks	1046	264	2350	1785
Canada Geese	20	0	100	480
W-F Geese	0	0	110	0
Total Geese	20	0	210	480
Cranes	0	1	0	0
Total Waterfowl	1066	265	2560	2265

* Not identified to species

Appendix IV

WATERFOWL SURVEY DATA UNIT 16, REDOUBT BAY

SPECIES	April 16, 1970	Aug. 12, 1970	Sept. 28, 1970
Pintail	334	573	-
Mallard	782	263	-
Widgeon	2	90	-
G-W Teal	0	35	-
Dabbler*	0	382	1400
Diver*	52	0	15
Scoter*	0	500	-
Total Ducks	1170	1843	1415
Canada Geese	0	20	1155
W-F Geese	0	30	0
Snow Geese	0	0	15
Total Geese	0	50	1170
Swan	0	2	2
Cranes	0	22	0
Total Waterfowl	1170	1917	2587

* Not identified to species

WATERFOWL

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 17 - Bristol Bay

Harvest and Hunting Presssure

No data were gathered this reporting period, however, due to the remoteness of the area it is unlikely that anything other than limited hunting near villages takes place.

Composition and Productivity

No studies were carried out this reporting period.

Management Summary and Conclusions

Survey flights were initiated this reporting period and limited data were gathered (Appendix I - V). It is felt that these areas within Unit 17 are used primarily by migrating waterfowl and that only limited breeding occurs. Additional surveys are planned in the future.

Recommendations

No changes in seasons or bag limits are recommended.

Submitted by: Phillip D. Havens, Game Biologist II

Appendix I

WATERFOWL SURVEY DATA, UNIT 17, WEST NUSHAGAK FLATS

SPECIES	May 4, 1970	June 30, 1970**	Aug. 24, 1970
Dabblers	40	52	190
Divers*	0	312	0
Unidentified	0	24	0
Total Ducks	40	388	190
Canada Geese	0	98	32
W-F Geese	15	175	0
Snow Geese	1000	0	0
Emperor Geese	12	0	0
Total Geese	1027	273	32
Swan	6	14	8
Crane	0	6	6
Total Waterfowl	1073	681	236

* Includes scoters and eiders

** Estimates by D. Cornelius

Appendix II

WATERFOWL SURVEY DATA UNIT 17, PROTECTION POINT

SPECIES	May 4, 1970	June 30, 1970**	Aug. 24, 1970***
Dabblers	20	91	150
Diver*	0	83	100
Total Ducks	20	174	250
Canada Geese	0	531	0
W-F Geese	30	0	0
Total Geese	30	531	0
Swan	0	0	2
Crane	0	0	30
Total Water fowl	50	705	282

* Includes scoter and eider
** Estimates by D. Cornelius
*** Estimates by J. Faro

Appendix III

WATERFOWL SURVEY DATA UNIT 17, Nanvak Bay

Species	Aug. 24, 1970*
Dabbler	50
Canada Geese	3400
Emperor Geese	15
Total Geese	3415
Crane	2
Total Waterfowl	3467

* Estimates by J. Faro

Appendix IV

WATERFOWL SURVEY DATA UNIT 17, KANIK RIVER

SPECIES	May 4, 1970	Aug. 24, 1970*
Dabbler	30	1800
Crane	0	4
Total Waterfowl	30	1804

* Estimates by J. Faro

Appendix V

WATERFOWL SURVEY DATA UNIT 17, TVATIVAK BAY

SPECIES	May 4, 1970	Aug. 24, 1970*
Dabblers	30	400
Swans	13	0
Total Waterfowl	43	400

* Estimates by J. Faro

UPLAND GAME BIRDS

SURVEY-INVENTORY PROGRESS REPORT - 1970

Statewide

Techniques

The standard small game abundance questionnaire was mailed in late October, 1970 to 340 people throughout the state, and by mid January, 1971, 233 replies had been received. As in the past, over half the responses came from the Interior and Gulf regions. Replies were tabulated and analyzed as in previous years (see Game Bird Report, Vol. 5, 1965, pp. 2 and 3). A summary of the responses was mailed to cooperators in February, 1971.

Findings

Replies to the questionnaire are summarized in Appendix A. Cooperators from the Interior, Gulf, and southern Brooks Range regions felt that grouse were at moderate densities and that in the former two regions they were about as numerous as in 1969. Grouse were thought to be more numerous in the southern Brooks Range than in 1969. Western region cooperators indicated low numbers of grouse and suggested a decrease from 1969, while on the Alaska Peninsula, 1970 populations had increased over 1969 but were still at low densities.

Responses from the Interior, Gulf, Southeastern, Western, and Brooks Range regions suggest moderate ptarmigan densities. In all these regions populations were thought to be up slightly in 1970, with the exception of the Gulf and Southeastern where replies indicated no change from 1969. Cooperators from Kodiak indicated that while ptarmigan populations were low, they were about as numerous as in 1969; however, the low density in 1970 suggested from Alaska Peninsula replies was thought to represent a decrease from the previous year.

In the Gulf and Interior regions 1970 snowshoe hare populations were thought to be high, even higher than in 1969. In all other regions, with the exception of Kodiak, cooperators indicated fairly low hare populations, but numerical increases were suggested over 1969. Kodiak cooperators indicated moderate hare populations with only a slight decrease from 1969.

Management Summary and Conclusions

The standard small game questionnaire has, over the years, indicated that grouse, ptarmigan, and hare populations fluctuate considerably throughout the state, and it is felt that present hunting pressure has little effect on populations. No change in seasons or bag limits is recommended at this time.

Submitted by: Jerry McGowan, Game Biologist II

Appendix A. Summary of replies to questionnaire on grouse, ptarmigan, and hare populations, 1970. (Compiled by Jean Ernest.)

Area / Species	Present Abundance				Comparison with 1969			
	High	Mod	Low	Index	More	Same	Fewer	Index
Brooks Range (15)								
Grouse (General)	1	4	1	5.33	3	3	0	7.33
Ptarmigan (General)	4	6	2	5.83	3	4	0	6.71
Willow Ptarmigan	6	1	2	6.78	4	3	0	7.29
Snowshoe Hare	0	2	4	2.33	2	3	0	6.60
Western (31)								
Grouse (General)	2	0	5	3.28	1	4	2	4.43
Spruce Grouse	1	5	8	3.00	1	12	4	3.82
Ptarmigan (General)	6	9	4	5.42	8	7	3	6.11
Rock Ptarmigan	1	2	2	4.20	1	5	2	4.25
Willow Ptarmigan	7	6	2	6.33	8	4	2	6.71
Snowshoe Hare	4	9	9	4.09	13	10	2	6.76
Alaska Peninsula (8)								
Grouse (General)	0	1	1	3.00	1	1	0	7.00
Spruce Grouse	1	1	1	5.00	2	1	0	7.67
Ptarmigan (General)	0	4	2	3.67	1	3	2	4.33
Willow Ptarmigan	2	3	1	5.67	2	2	2	5.00
Snowshoe Hare	1	1	4	3.00	2	2	2	5.00
Kodiak (5)								
Ptarmigan (General)	1	3	0	6.00	1	1	1	5.00
Rock Ptarmigan	0	2	1	3.67	1	1	1	5.00
Snowshoe Hare	1	2	1	5.00	0	4	1	4.20
Southeastern (24)								
Grouse (General)	0	5	8	2.00	0	7	6	3.15
Spruce Grouse	0	1	3	2.00	0	0	4	1.00
Blue Grouse	1	5	10	2.75	3	5	8	3.75
Ptarmigan (General)	4	6	4	5.00	3	5	5	5.77
Rock Ptarmigan	0	2	4	2.33	0	3	3	3.40
Snowshoe Hare	0	5	6	2.82	6	4	1	6.82
Gulf (72)								
Grouse (General)	9	19	5	5.48	12	19	5	5.78
Ruffed Grouse	0	8	3	3.91	2	6	2	5.00
Spruce Grouse	15	37	4	5.79	11	27	16	4.63
Sharptail	0	9	6	3.40	11	4	0	7.90
Ptarmigan (General)	5	29	7	4.80	10	23	6	5.41
Rock Ptarmigan	4	17	4	6.00	8	10	6	5.33
Willow Ptarmigan	4	23	2	5.27	9	18	3	5.80
Whitetail Ptarmigan	2	5	1	5.50	3	4	1	6.00
Snowshoe Hare	33	21	14	6.12	47	14	3	7.75

Appendix A. (Cont'd.)

Area / Species	Present Abundance				Comparison with 1969			
	High	Mod	Low	Index	More	Same	Fewer	Index
Interior (78)								
Grouse (General)	10	26	14	4.68	14	22	14	5.00
Ruffed Grouse	7	28	16	4.29	15	24	11	5.32
Spruce Grouse	11	30	11	4.90	12	20	16	4.67
Sharptail Grouse	2	13	15	3.26	6	18	5	5.13
Ptarmigan (General)	13	22	9	5.36	17	22	5	6.09
Rock Ptarmigan	13	10	3	6.54	8	14	4	5.62
Willow Ptarmigan	8	12	4	5.44	7	12	5	5.33
Whitetail Ptarmigan	2	5	3	4.60	3	6	1	5.80
Snowshoe Hare	55	17	3	7.77	62	7	2	8.38
Statewide (233)								
Grouse (General)	22	55	33	4.60	31	55	27	4.35
Ruffed Grouse	7	36	19	4.23	17	30	13	5.27
Spruce Grouse	28	74	29	4.97	26	62	40	4.56
Sharptail Grouse	2	22	21	3.31	17	22	5	6.09
Blue Grouse	1	5	10	2.75	3	5	8	3.75
Ptarmigan (General)	33	94	28	5.03	51	76	22	5.78
Rock Ptarmigan	17	34	13	5.25	19	32	15	5.24
Willow Ptarmigan	26	50	12	5.64	32	39	14	5.85
Whitetail Ptarmigan	4	11	5	4.80	6	11	3	5.60
Snowshoe Hare	94	56	41	7.11	130	43	11	7.59

PTARMIGAN

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 20 - Fairbanks, Central Tanana

Season and Bag Limits

Unit 20	Aug. 10 - April 30	20 per day; 40 in possession

Harvest and Hunting Pressure

A checking station was not operated in 1970 to determine the ptarmigan harvest from the Eagle Creek area, or to collect other biological data; consequently, no factual estimates of hunting pressure or harvest can be made. Casual observations by Department biologists suggest hunting pressure was about the same as in the past. During past years the total fall kill at Eagle Creek, based on check station data, was well under 20 percent of estimated fall population. This was probably the case in 1970 also.

Abundance, Composition, and Productivity

The annual census of rock ptarmigan at Eagle Creek (May 14-17) yielded a tally of 102 territorial males on the 15-square-mile study area representing typical interior Alaska rock ptarmigan breeding range. This is a 10 percent decrease from 1969. It is not known if spring hunting occurred at Eagle Creek in 1970. In 1969 and 1968 it was discovered that spring hunting can decrease breeding stocks, thus affecting census data. If such hunting occurred in 1970, it was to a lesser extent than that in the two previous years.

Counts were made at Ptarmigan Creek (May 19-20) and Goldust Creek (May 22 and 24). Eighty-one territorial males were tallied at Golddust where no hunting occurs. This is the same number as recorded in the 1969 census. At Ptarmigan Creek 94 males were counted, representing only a 4 percent decrease from 1969. In the falls of 1967-69, 40 percent of the estimated fall population of rock ptarmigan were removed at Ptarmigan Creek as part of an experiment designed to test the effects of fall hunting. This study is now completed and the conclusion is that a 40 percent removal of the fall population for three consecutive years does not depress breeding stocks. Results of the study are discussed fully in final report for Research Job 10.3. Further information on rock ptarmigan populations is presented in the Game Bird Research Report, 1970 under Job 10.1.

Management Summary and Conclusions

Rock ptarmigan densities fluctuate strongly over the years in interior Alaska, but these fluctuations occur independent of fall hunting. It

appears that at Eagle Creek a decline is underway, and this is probably true throughout the Interior. Research activities have suggested spring hunting, while not responsible for major population fluctuations, may affect breeding densities in local areas receiving heavy hunting pressure. Effort is being made by the Highway Department to open major roads, such as the Steese and Taylor Highways, earlier in the spring. As a result, a considerable amount of spring hunting is bound to occur in these areas. A change in the season or bag limit is not recommended at this time, but plans have been made to test the effect of spring hunting on breeding populations and to obtain data on spring hunting pressure and success.

Submitted by: Jerry McGowan, Game Biologist II

SPRUCE GROUSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 15 - Western Kenai Peninsula

Seasons and Bag Limits

Unit 15	Aug. 10 - April 30	15 per day; 30 in possession

Information in this report was collected and organized by Larry Ellison as part of a Ph.D. thesis project.

Harvest and Hunting Pressure

Four days were selected at random to sample total daily kill and to measure hunting success and hunting pressure. The average number of grouse killed on the 10-mile standard count route along the Swanson River Road during the four sampling days was 16.0. The estimated total harvest between August 10 and November 1 was about 600 compared to 650 last year. Too many unknown factors are involved to allow comparison of total yearly harvest levels; consequently, the statistical basis for such comparisons should be the average number of birds shot per day during a number of all-day sampling days. An average of 6.7 hunting parties per day was present on the Swan Lake Road (near Swanson River Road) during the sampling days. This is a valid measure of hunting pressure that should be comparable over the years. A random sample of 30 hunters indicated an average hunter success of 2.49 grouse.

Data Obtained on 312 Grouse Checked Were:

Adult Males	Adult Females	Juvenile Males	Juvenile Females	Juveniles Per Adult Females
54	89	64	105	1.89

Abundance and Production

Early snows complicated fall road counts, but 10 valid counts were obtained on the standard 10 mile Swanson River Road route. Counts were made between September 21 and October 21, and the average number of grouse seen per morning was 11.6.

Spruce Grouse Seen on Standard Counts, 1970.

Location	Miles	Number of Counts	Range	Average Grouse per Driven Mile	Conf. Interval at 95%
Swanson River Road	10	10	3-21	1.16	0.705 to 1.615

The count this year was not statistically significantly lower than last year's record high of 17.27 grouse per count. There is no question, however, that this year's population was lower and the primary reason it cannot be demonstrated statistically is that too few counts were obtained in both years.

The proportion of juveniles is the lowest ever recorded. In all other years there were 6 to 11 juveniles per adult female in the harvest. Since the counts and harvest were high, suggesting a fairly large population of birds, it appears that overwinter survival for 1969-70 was high but that 1970 reproduction was poor. Under some circumstances the extremely high kill of adult females might be regarded with alarm. However, of about 30 hens banded on the Swanson River study area, only two were reported shot by hunters. The proportion of birds shot along the road is small in proportion to the number that could be taken, simply because of the vast roadless area on either side of the road. Alaskan grouse populations have declined in areas of extensive road building and housing developments, but not in areas of high hunting pressure.

Management Summary and Conclusions

It is obvious to hunters and biologists on the Kenai Peninsula that hunting pressure is increasing each year. The Department should continue to conduct counts and monitor harvest. The Kenai is the most productive grouse hunting area in the state. A time may come when hunting pressure is so great that the standard counts cannot be made, but the effort to get them should continue for the time being.

Recommendations

No change in seasons or bag limits is recommended at this time.

Submitted by: Jerry McGowan, Game Biologist II

SPRUCE GROUSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 19 - McGrath

Seasons and Bag Limits

Unit 19	Aug. 10 - April 30	15 per day; 30 in possession

Harvest and Hunting Pressure

There are no systems in effect to gather information on harvest or hunting pressure in Unit 19. A sample of 30 spruce grouse taken in late September revealed a juvenile to adult ratio of 1.99 to 1.00.

Abundance and Production

Snowy weather made it impossible to obtain the desired 10 counts on the standard route along the Ophir Road near McGrath.

Location	Miles	Number of Counts	Range	Average No. of Grouse per Mile Driven
Ophir Road	10	3	7-10	0.83

The low number of counts in 1970 makes data incomparable with that in 1969. Limited counts in other areas near McGrath suggest that good numbers of spruce grouse were present in the fall of 1970.

Management Summary and Conclusions

Fall counts will be made in the future in the vicinity of McGrath; however, the route may be changed in order to reduce interference due to weather. No change in seasons or bag limits is recommended at this time.

Submitted by: Richard Bishop, Game Biologist III

SPRUCE GROUSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 20 - Fairbanks, Central Tanana

Season and Bag Limits

Unit 20	Aug. 10 - April 30	15 a day; 30 in possession

Harvest and Hunting Pressure

There are no systems in effect to gather information on harvest and hunting pressure in Unit 20. Observations indicate that substantial numbers of hunters are taking advantage of the current high grouse population in the area. Most hunting occurs during the period of August through October when grouse are easily observed along roads and trails.

Abundance and Production

The standard spruce grouse road counts were conducted on the Steese Highway during September. Early snows complicated field operations, and resulted in only seven counts being completed on the Steese. On the Taylor Highway early snows combined with heavy traffic prevented any valid counts from being made. On the Steese an average of 11.7 grouse was seen per morning.

Spruce Grouse Seen on Standard Counts, 1970.

Location	Miles	Number of Counts	Range	Average Grouse per Mile Driven	Conf. Interval at 95%
Steese Highway	19	7	9-15	0.62	0.515 to 0.715

The 1970 standard fall road count suggests a slight decline in numbers from 1969 on the Steese Highway. This decline probably truly reflects a decrease in the population; however, it is doubtful that hunters detected the decrease because enough birds were present in popular hunting areas to offer excellent hunting.

Management Summary and Conclusions

Counts will be conducted in the future along the standard Steese route, but it may be necessary to discontinue the Taylor counts. More effort will be made to obtain impressions of hunting pressure in the future, but at present no change in season or bag limit is recommended.

Submitted by: Jerry McGowan, Game Biologist II

RUFFED GROUSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 20 - Fairbanks, Central Tanana

Season and Bag Limits

Unit 20	Aug. 10 - April 30	15 per day; 30 in possession

Harvest and Hunting Pressure

No systems are in effect to gather information on harvest or hunting pressure.

Abundance and Production

No standardized counts of ruffed grouse were made, but observation cards submitted by Department biologists suggest a high population in 1970. During the period September-November, 23 observations were made of ruffed grouse in the general vicinity of Fairbanks. Eleven single birds and 12 flocks were observed. The average number of birds per flock was 4.9.

Management Summary and Recommendations

No change in seasons or bag limits is suggested.

Submitted by: Jerry McGowan, Game Biologist II

REPORT ON SPECIAL SNOWSHOE HARE SURVEY-INVENTORY STUDIES

Introduction

Snowshoe hare populations were on the upswing in 1969 and 1970, and the opportunity for a much needed study of hare populations in the Interior was present. Work was initiated on snowshoe hares in the Central area by Dan Wetzel the 1st of May in conjunction with the lynx study. Wetzel proceeded to live-snare and tag hares along Deadwood Road and to collect specimens.

The project was assigned to the author on June 1, 1970. The study was broken down into three "jobs," Population Enumeration, Productivity and Ecological Interrelationships. This report gives a summary of the data collected from May 1 to October 31, 1970.

"JOB" 1

Objectives

To develop techniques for estimating densities of snowshoe hares on small areas and relative numbers over large areas, and to measure periodic densities of hares in various areas of the state.

Techniques

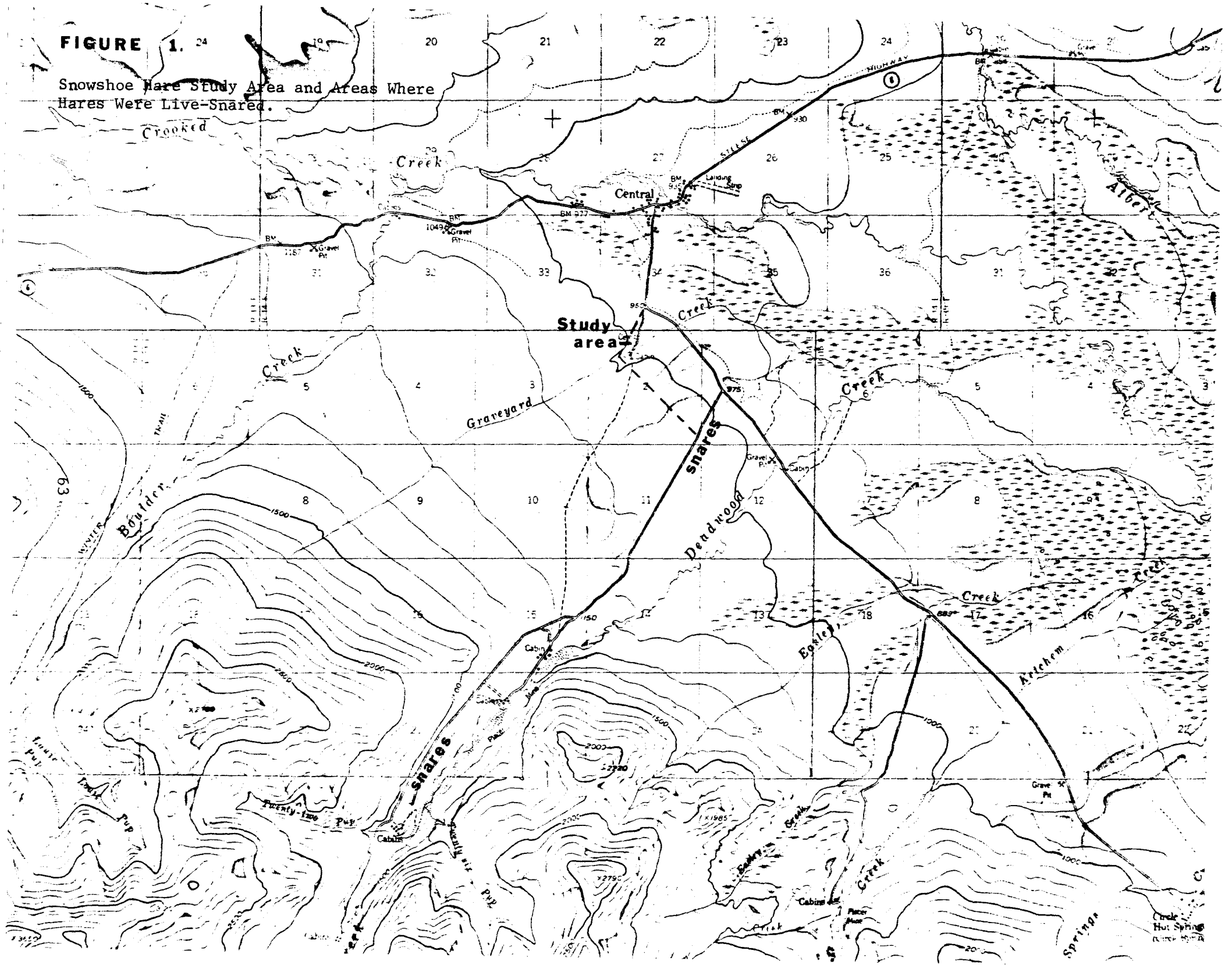
Hares were live snared and ear tagged during the month of May by Dan Wetzel in an attempt to assess population numbers in various areas along Deadwood Road, near Central, Alaska. Small snares were made of picture wire, with a metal nut tied into the wire to prevent complete closure of the snare. Snares were fastened to light drags, rather than stationary objects, to prevent the hare from choking itself to death.

A small study area, approximately one half by one mile in size, was set up as a study area for live-trapping. Rough transects were surveyed through the area using compass and chain. Transects were run at one-eighth mile intervals and traps set approximately every one-eighth mile. Location of the study area, and areas where hares were live-snared, are shown in Fig. 1. Trapping was initiated August 15, 1970.

Single-door, wire mesh Tomahawk live traps, 9" x 9" x 26" were set in active runways. No bait was used at this time. Traps were checked daily and hares removed, weighed, measured, tagged and released. No. 3 Monel metal ear tags, manufactured by National Band and Tag Company, were attached with a small piece of colored Saflag flagging material on each ear. Hares were then released at the site of capture. Trapping was continued for three weeks, and estimates of population density calculated from recapture data, using the Lincoln and Schnabel formulas.

FIGURE 1.

Snowshoe Hare Study Area and Areas Where Hares Were Live-Snared.



Road counts were conducted throughout the summer in the lynx study area. Hares per mile were recorded on the Circle Hot Springs Road, Deadwood Road, and Ketchem Creek Road. Counts were conducted at all hours, but only those made between the hours of 6:00 a.m. and 6:00 p.m. have been used in this study. Counts were considered invalid on days with rain or wind during the count periods.

Results

Forty-two hares were snared, tagged and released by Dan Wetzel in May along several sections of Deadwood Road. The hares live-snared by Wetzel yielded little information on populations in the area as survival of some of the animals after release was doubtful, and they were captured in areas along the roadsides which afforded no index of total populations.

Road counts on the area, when sorted out to a one-month period (June 15 - July 15) and standardized as to time of day (6:00 p.m. - 6:00 a.m.), indicated an overall average of 1.8 hares per mile on the roads covered. Count figures are broken down into days, etc. in Table 1.

Ninety individual hares were live-trapped in the study area during the three-week trapping period. The total area of the study area was calculated to be .57 square mile. Five hares died or were killed by weasels in the traps, two were removed from the area, and three escaped before tagging, leaving a total of 80 marked animals in the population at the end of the trapping period.

Fifty-three juveniles and 37 adults were captured, with 10 recaptures. The sex ratio averaged 10 females to 7 males in each group. No tagged animals were recaptured until the eighth day of trapping, when 30 animals had been marked and released. Twelve hares were captured on the eighth day, with one tagged animal included. A rough estimate at that point in the study, using the Lincoln Index, indicated 360 animals in the area. A final estimate, using the Schnabel Index, gave 407 hares, (range 190-759, 95% confidence level). Population estimates were calculated each day from the 14th day to the end of the trapping period using the Schnabel Index. These estimates are shown in Table 2.

Trapping success averaged 10.4 percent, with 105 captures in 1002 trap nights. If traps which were found closed, or had other species in them, were eliminated from the figures, the trapping success would average out to 10.8 percent in 976 trap nights. Red squirrels were often caught in traps set in hare runways. However, a record of squirrel captures was not kept until the trapping period was half over, which was an oversight.

Of 90 individual hares trapped, 46 were estimated to have been born previous to June 15, 1970, 41 to have been born between June 16 and July 15, and 2 individuals after July 15.

Hares were very scarce in the scrub spruce bog area. Old runways testified to the fact that they had previously inhabited this area, but the wetness of the season may have influenced their absence as there was water standing in runways. Hares were quite abundant in willow and spruce thickets.

Table 1. Snowshoe hares sighted in road counts, Central, Alaska. June 16 - July 15, 1970.

Date	Hares Seen	Miles Driven	Hares/Mile
June 16	17	14	1.2
17	24	15	1.6
18	33	38	.9
19	45	33	1.4
20	54	24	2.3
21	72	31	2.3
25	37	45	.8
26	25	23	1.1
27	44	23	1.9
28	19	9	2.1
29	77	48	1.6
July 1	63	41	1.5
2	30	21	1.4
3	59	35	1.7
4	13	15	.9
6	147	29	5.1
8	40	24	1.7
9	76	27	2.8
10	63	30	2.1
12	67	26	2.6
13	41	31	1.3
14	46	24	1.9

Average number of hares per mile: 1.8.

Table 2. Estimates of a snowshoe hare population calculated from live-trapping results, using a Schnabel Index. (Estimates were calculated daily from the 14th day to the end of the trapping period.)

Day	Total Captures	Total Marked	Recaptures To Date	Schnabel Estimate*
14	84	63	7	373 (136-748)
15	86	63	7	380 (147-807)
16	86	65	7	390 (154-846)
17	88	65	7	409 (154-846)
18	91	67	8	384 (151-734)
19	97	68	10	348 (163-654)
20	101	72	10	376 (176-708)
21	101	76	10	376 (176-708)
22	105	76	10	407 (190-759)

* Confidence limits are at the 95% level.

"JOB" 2

Objectives

To determine the annual productivity of snowshoe hares in various stages of the cycle and relate the annual productivity to population trends.

Techniques

Adult hares were collected by Dan Wetzel from the Central area during May and autopsied. Embryos were counted and roughly "aged."

Adult female hares were collected from the Central area during specific periods in June and July in samples of at least 20 females. Hares were also collected at various times in between when the occasion arose. All hares collected were weighed, measured and autopsied. Embryos and feti were counted and measured. Placental scars were counted, and ovaries and embryos were preserved. Later, in the laboratory, ovaries were sectioned with a razor blade and corpora lutea counted.

Incidence of pregnancy, average litter size, and probable conception and birth dates were calculated.

Ages of embryos and feti were calculated from measurements using a scale set up by Bookhout (1964).

Results

The 1970 breeding season for snowshoe hares in the Central-Circle area extended from about April 10 to late July with a maximum of three litters being produced. Dates of conception and parturition were estimated by stage of fetal development.

Forty-six adult female hares were collected by Dan Wetzel in May. Of these, 39 were found to be pregnant, 6 were post partum and lactating, and 1 was not pregnant. Therefore, in this period at least 97 percent of the females had conceived during the first peak of breeding.

Embryos and feti were counted with an average of 4.15 per litter. They were then measured roughly, referring to criteria used by Keith *et. al*. (1968). From this, it was estimated that 19 (41%) of the 46 females would have borne young around May 17-20, 10 (22%) around May 21-25, and 9 (19%) between May 26-June 5. First litter dates could not be accurately determined for those females that were post partum.

Twenty-six female hares were collected from June 10 through 25 and autopsied. All were pregnant, with an average of 6.3 embryos per female. Placental scars from the previous pregnancy averaged 4.1 per female, which corresponded to the average embryo count of the hares collected in May. This indicated some accuracy of using placental scars to determine litter size of a previous pregnancy.

Of 27 females collected in July only 29.6 percent were pregnant, with an average of 4.0 embryos per litter. Placental scars, readable in most of the non-pregnant females, averaged 6.1 per female, which compared well with the 6.3 embryo average for the second litter. Placental scars were more difficult to read from non-pregnant females during this breeding period, as the uterus started to shrink with the ending of this breeding period. Conception dates of the group collected in June were from May 19 through June 3 with 88 percent falling between May 19 through May 27. Conception dates for this group were considerably more accurate than for the May group of hares, as Bookhout's method of determining ages of embryos was used (Bookhout, 1964). If it is assumed that conception of the second litter occurred immediately after parturition of the first, it would be assumed that these animals conceived their first litter between April 13 through April 27.

Fourteen female hares were collected by Harkness and Kootuk from the Delta area between July 21 and August 5, 1970. Of these 14 hares, 6 were pregnant (43%) with an average of 5 embryos per pregnancy. Four females had just delivered a litter, as evidenced by enlarged uteri. Placental scars were readable in 10 specimens, with an average of 6.2 per female.

The data from three collections of hares from the Central area are given in Table 3.

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Submitted by: Jeannette Ernest, Game Biologist II

Table 3. Reproductive data from female snowshoe hares collected in the Central area, 1970.

Sample Size	Month	Average No. Embryos	Average No. Placental Scars	% Pregnant
46	May	4.2	-	97%*
26	June	6.3	4.1	100%
27	July	4.0	6.1	30%

* The 97% figure for the May group includes those females found to be post-partum. This figure, therefore, indicates the percent which were pregnant during the first breeding period.

SNOWSHOE HARE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 20 - Fairbanks, Central Tanana

Seasons and Bag Limits

No closed season No limit

Hunting and Harvest Pressure

Interest in hunting snowshoe hares has risen sharply in the last year due to the greatly increased abundance of hares throughout much of Unit 20. The magnitude of the harvest is not known, but there were many hares taken from the Central area where hare populations were higher than in some other areas. Most of the harvest occurred along the road systems as with much small game hunting.

Abundance and Productivity

Hares were abundant throughout most of Unit 20 in 1970. Road counts in the Central area (June 16 - July 15) averaged 1.8 hares per mile of road driven. Live-trapping in a one-half square mile study area indicated a density of 600-800 hares per square mile in good habitat in the Central area. Reports from other parts of the unit have indicated a fairly high hare population in the Delta area and on the Taylor Highway. Hares are also abundant in the Fairbanks area.

Female hares produced an average of 11 young per female in 2-3 litters in the Central-Circle area during the summer of 1970. The adult-juvenile ratio in August in that area was 37 adults to 53 juveniles in a sample of 90 animals.

Hare populations in those drainages draining generally north toward the Yukon River may be nearing their peak within the next year. The areas draining into the Tanana on the south side of Unit 20 seem to be one season behind those in the Yukon drainage and populations should continue increasing in these areas for several years.

Management Summary and Recommendations

Hare populations are expected to remain high in Unit 20 for the next year or two. Hunting has little to do with population cycles, and these presently high populations can accommodate much hunting effort without detriment to the populations.

No changes are recommended in seasons or bag limits.

Submitted by: Jeannette Ernest, Game Biologist II

ARCTIC HARE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 22 - Seward Peninsula

Seasons and Bag Limits

No closed season — No limit

Harvest and Hunting Pressure

Arctic hare appear to be cyclic in this unit, and during this winter they appear to be approaching a high. Arctic hare have been reported taken at Teller, Brevig Mission, Shishmaref, Deering and Buckland. The largest harvest has been at Shishmaref.

Composition and Productivity

Scattered Arctic hares have been seen throughout this unit; seldom are more than two or three taken at one place except along the Serpentine River. There were scattered reports of very few Arctic hares in the vicinity of Koyuk and Golovin. Snowshoe hares this year are very abundant and entirely restricted to the river systems. There appears to be some overlap of snowshoes and Arctic hares, but in areas where Arctic hares are the most abundant, snowshoe hares are not present. In the areas where both species are present, the Arctic hares tend to be found in the more open areas, whereas the snowshoe hares are in the very dense willow thickets.

On April 1, 1971, while conducting a moose survey, Arctic hares were noted in the Serpentine River, and in one prominent willow patch there were an estimated 75-100 Arctic hares. Ground observations showed that the use of willows had been very extensive as almost all of the willows had been girdled. The hares appeared to be concentrating in the one large willow patch.

On April 22, 1971, when we returned to the same area, it became very apparent that the Arctic hares had moved out of the river bottom and scattered throughout the hills. Their trails were numerous throughout the area, and in the same place where the large group had been previously, there were only four Arctic hares present. Local hunters at Shishmaref and Mary's Igloo state that the largest concentrations of Arctic hares can be found in the rivers during late February and throughout March and that by the 10th of April they disperse onto the surrounding tundra.

Management Summary and Recommendations

The bag limits and seasons should remain unchanged as an attempt will be made to obtain specimen material to ascertain some of the biology of this animal.

Submitted by: Robert E. Pegau, Game Biologist II

RAPTOR ABUNDANCE REPORT
AND MANAGEMENT CONCLUSIONS - STATEWIDE

Introduction and Objectives

There is presently great concern that many North American raptors are on the road to extinction due primarily to environmental contamination by chlorinated hydrocarbons. Reduced productivity resulting from such contamination has been well documented for peregrine falcons and ospreys, but other species, especially those that are migratory, may also be in serious danger. In order to build a volume of information on Alaskan raptors, Department biologists were asked to record information concerning raptors observed in the field. These observations have been filed by species, and this report summarizes the information available to date. In addition to data supplied by Department personnel, information from a peregrine falcon survey conducted by Dr. John R. Haugh and Dr. Tom J. Cade has been included. Also, a survey jointly supervised by the United States Bureau of Sport Fisheries and Wildlife and the Bureau of Land Management yielded information along the proposed pipeline route. This survey was conducted by Clayton M. White and James N. Streater.

Some 122 observations of diurnal birds of prey have been recorded (Table 1). Observations of owls are being recorded but are not summarized in this report. It is difficult to locate nests of certain raptors in order to monitor productivity trends. The number of observations per year of various species may be the only method we have to detect population declines, and it is for that reason the information is presented here. The figures in Table 1 do not reflect relative abundance. The high number of goshawk and peregrine observations definitely reflect the amount of effort spent searching for these species. Conversely, the low figures for kestrels and harriers result from little time being spent seeking these birds and even failure to record all observations due to their high abundance.

The average number of young per pair in the Tanana Valley was 2.86. This sample suggests good production, even slightly higher than advanced young per pair recorded in past years by Cade, 1960, Cade, et al., 1968, Enderson, et al., 1968. It is not known, however, if the total number of breeding pairs decreased in 1970; so while productivity per pair was high, it is not possible to determine the overall population trend in the Tanana Valley.

In the Arctic region the average number of young per pair was 2.1. According to Haugh and Cade (1970) average number of young per pair in past years has been: 2.2 in 1967, 2.6 in 1968, and 1.9 in 1969. Productivity per successful pair in 1970 was the lowest ever recorded with the exception of 1969. Furthermore, a survey along the Colville River by John Haugh suggests that only about half as many peregrines nested successfully in 1970 as in previous years. This is cause for serious concern, and the Arctic peregrine population may well be past a point of recovery.

Table 1. Number of observations of hawks and eagles made during 1970.

Species	Number of Observations
Goshawks	35
Gyrfalcons	20
Peregrine Falcons	18
Golden Eagles	16
Bald Eagle	9
Rough-legged Hawks	9
Harlan's Hawks	5
Kestrel's	4
Merlins	2
Ospreys	2
Harriers	2
TOTAL	122

Peregrine Falcons

Data on seventeen peregrine eyries active in 1970 are presented below. Most of these data are from the two reports by Haugh and Cade (1970).

Nest Location	Number of Young
Tanana Valley	3
" "	3
" "	4 (one dead below nest)
" "	1
" "	4
" "	2
" "	4
Yukon Valley	?
Kuskokwim Valley	?
North Slope	3
" "	2
" "	1
" "	3
" "	2
" "	2
" "	2
" "	?

Gyrfalcons

Four nests were located in 1970 that yielded productivity data.

Nest Location	Number of Young
North Slope	2
" "	3
" "	2
Seward Peninsula	4

The average number of young per pair was 2.8 in 1970. This is approximately the same as that for the last two years on the Seward Peninsula (Roseneau, 1970). Based on this small sample it appears that gyrfalcon productivity was good in 1970.

Goshawks

Four goshawk nests were located; however, only three yielded productivity information.

Nest Location	Number of Young
Tanana Valley	3
" "	3
" "	2
Tonsona Valley	?

This small sample indicates an average of 2.7 young per breeding pair. No previous data are available for comparison, but it is not felt that goshawk populations are declining seriously at this time.

Rough-legged Hawks

The bulk of the rough-legged hawk nesting data was collected by Clayton White and James Streater (working under supervision of the U.S.F.W.S.) while conducting a survey of raptor nesting sites along the proposed pipeline route. The data are summarized below.

Nest Location	Number of Young
North Slope	1
" "	1
" "	3
" "	2 abandoned eggs
" "	1
" "	?
Tanana Valley	3

For the five nests there was an average of 1.9 young per pair. There are no data available from previous years for comparison.

Golden Eagles

Thirteen golden eagle nests were located, 12 of which yielded information concerning productivity.

Nest Location	Number of Young
Yukon Valley	2
" "	3
" "	3
Seward Peninsula	1
Copper River Valley	1
Alaska Range	Produced young but number unknown
Tanana Valley	1
Dietrich Valley	2
" "	1
" "	2
North Slope	1
" "	1
" "	1

The average number of young produced per pair was 1.6. Arnold (1954) states that golden eagle clutches of one egg are common, two is the usual number, while clutches of three are rare. On this basis it appears that golden eagle production in 1970 was fairly good.

Miscellaneous Observations

Only two observations of ospreys were made despite the fact that our fisheries biologists spend considerable time in osprey habitat. There appears to be real scarcity of this species.

Snowy owls were observed fairly frequently in the Interior during the late fall of 1970. Two situations are probably responsible for movements into this area: 1) the low number of microtines in the north; and 2) the fairly high rabbit population throughout the Interior.

Management Conclusions and Recommendations

The Department should continue to collect information on productivity and status of Alaskan raptor populations. In the near future many areas of the state will become developed as more land is opened to settlement. We should continue to work closely with land management agencies to insure that critical nesting areas are properly protected.

The scientific collecting and falconry permit system should be tightened up in order to reduce illegal traffic of raptors. Import and export of raptors to and from Alaska for the purpose of falconry should be prohibited, and falconry permits should be issued for gyrfalcons and goshawks only.

This would afford protection to peregrines and other migratory species subjected to high levels of pesticides, but still allow the practice of falconry with the species best adapted for Alaskan conditions.

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Submitted by: Jerry McGowan, Game Biologist II