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WATERFOWL REPORT

by

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Volume VI
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-6-R-5, 6, Work Plan H

The subject matter contained within these reports is often fragmentary in nature and the findings may not be conclusive; consequently, permission to publish the contents is withheld pending permission of the Department of Fish and Game.

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WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE:	Alaska		
PROJECT NO.:	W-6-R-5, 6	TITLE:	Alaska Wildlife Investigations
WORK PLAN:	H	TITLE:	Waterfowl Studies
JOB NO.:	1	TITLE:	Production, Distribution & Migration Studies
	2	TITLE:	Production Technique Studies
	3	TITLE:	Harvest Studies

PERIOD COVERED: January 1, 1964 to December 31, 1964

ABSTRACT

A combination of the latest spring on record followed by a sudden warming trend and widespread flooding left little chance for good waterfowl production in 1964. Low productivity was definitely linked to the late spring which delayed nest initiation and caused lowered egg production in the geese and swans. These effects were most apparent in the black brant. Apparently, few breeding adults (34 per cent of the adult females) attempted to nest and the resulting production per adult female was low (0.8 goslings). A fall population estimate of brant based on the summer findings suggested a decrease from 1963.

Investigation of the immediate effects of the Good Friday earthquake on the Copper River Delta suggested that the vertical land uplift of six feet may cause changes in the aquatic and terrestrial plant ecology. Reported changes in flight and feeding patterns of waterfowl are suspected to be in response to tidal changes resulting from the earthquake. Nesting studies indicated that the delayed spring rather than the earthquake was responsible for the shift in swan nesting and the lowered production of most waterfowl.

A late freezeup and generally fair weather most of the fall resulted in slow hunting throughout Alaska. Dabbling ducks were reported to be in short supply, but the bag check data failed to support this supposition. Mail survey responses of 110 hunters revealed that the average daily take of 3.0 ducks does not differ appreciably from field bag check data. A seasonal bag of 22 ducks and 2 geese per hunter was felt to be biased by the type of sampling method utilized and is probably too high.

RECOMMENDATIONS

No Management recommendations.

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OBJECTIVES

To determine nesting areas, migration routes, and the production of waterfowl on interior and coastal nesting areas.

To design a statistically reliable method of sampling waterfowl breeding populations and brood production.

To determine annual take, crippling loss, hunter success, species composition, and the sex and age ratios of birds harvested in Alaska.

TECHNIQUES

Three waterfowl nesting areas were sampled in 1964 as representative of production trends in interior and coastal habitats. These areas were as follows: Minto Flats, Copper River Delta, and the Yukon-Kuskokwim Delta. Investigations in the Minto Flats area were confined to breeding pair counts, brood surveys, and general phenological observations. Work on the Copper River Delta entailed a nesting density survey over a previously established study area (Hansen, 1959) and an ecological reconnaissance of the recent changes effected on this habitat by the Good Friday earthquake. A complete search of the black brant nesting study area and the Kashnuk check plots was made to establish breeding population levels of this species. Other work accomplished on the Yukon-Kuskokwim Delta by Refuge personnel included aerial brood counts and capture of 2,000 molting brant for determining flock composition. This information was supplied to the reporting biologist for his analysis.

Waterfowl bag check stations were operated in Anchorage, Wrangell (Stikine River Delta), Cordova (Copper River Delta), and Minto Flats by Federal and State personnel. This season each cooperator was requested to collect duck wings and goose tail feathers for species, sex, and age identification. A mail survey based on names and addresses compiled from bag check cards was conducted following the 1963 season. Approximately fifty per cent of the hunters contacted returned completed forms.

FINDINGS

Breeding Ground Conditions

Breeding ground phenology in Alaska was delayed at least three weeks on the interior and coastal marshes. Extremely warm weather following this cold spring promoted good conditions for plant growth in both areas, but caused sudden and widespread flooding throughout the interior and coastal areas. This untimely rise in water levels undoubtedly caused much nest destruction.

The cumulative efforts of this inclement spring were revealed in much atypical waterfowl behavior. Large flocks of reproductively inactive ducks were common throughout late May and June. Average clutch sizes of geese and swan were reduced by one egg in many areas, although ducks did not appear to suffer any reduction in clutch size. Black brant nesting densities were down 25 per cent with only 34 per cent of a large breeding population attempting to nest. In my opinion the late spring adversely affected the nesting effort and markedly reduced the number of broods normally produced, but low populations and excellent weather conditions following the delayed spring led to good survival in many areas (exceptionally large brood sizes in all areas except Minto).

Minto Flats Breeding Drake Censuses

Ground breeding-pair censuses were conducted between June 7 and 13 for the third year in succession on Minto Flats. Conditions for the counts were more varied than in 1962 and 1963 with water levels much lower at the time of the surveys. These counts revealed a breeding drake population of 163.0 drakes per study plot (Table 1).

Table 1. Number of drakes observed by ground count on Minto Flats plots, 1962-1964.

Plot Number	1962	1963	1964
33	181	123	244
75	165	242	198
148	230	263	157
41	372	220	190
68	289	356	140
56	174	141	90
106	152	115	141
79	302	259	--[1]
43	169	205	141
Total	2034	1938[2]	1300
Mean per plot	226.0±58.6	215.0±55.2	163.0±38.5
Variance	6,031	5,362	2,243
Standard Error	25.9	24.4	16.7

[1] No count

[2] Scoters added to total this year only.

Some shifting of dabbling duck populations was suggested by these counts which indicated a 30 per cent population decrease, largely dabbling ducks (Table 2).

Ground brood surveys were completed by July 26 on the Minto Flats study plots. These counts (Table 3) verified previous doubts concerning changes for a good production year. Thus brood production at Minto was down from the 1963 count largely as a result of low breeding populations and flooding. Brood sizes were much reduced and the average brood of 5.5 was the lowest recorded in my experience (Table 4). The heaviest decreases in brood production were among the dabbling ducks.

Productivity of Minto Flats Waterfowl

A fall population estimate based on the number of breeding adults, average brood size and the number of broods produced is presented in Table 5. In 1964 the total population for the 36 square miles of sample plots was 3,272±772 ducks. Comparison of this figure with the 1963 figure suggests that there was a significant population difference between years. This difference was largely reflected in the number of young produced and is possibly related to a low survival of ducklings in 1964. Apparently, hatching success was low (24.5 per cent) in 1964; however, it was only slightly higher (30.6 per cent) in 1963. However, the outstanding difference between 1963 and 1964 was the lower breeding population and non-breeding in 1964.

Table 2. Relative species composition of drakes observed by ground count on Minto Flats plots, 1962-1964.

	1962		1963		1964	
	No.	%	No.	%	No.	%
Pintail	608	29.8	363	18.7	275	21.1
Mallard	188	9.2	263	13.5	134	10.3
Widgeon	365	17.9	317	16.3	157	12.0
Shoveler	103	5.0	210	10.8	115	8.8
Green-winged Teal	132	6.4	164	8.4	97	7.4
Blue-winged Teal	1	Trace	0	0.0	0	0.0
Scaup	513	25.2	485	25.0	389	29.9
Canvasback	57	2.8	40	2.0	24	1.8
Redhead	0	0.0	0	0.0	1	Trace
Bufflehead	41	2.0	73	3.7	30	2.3
Goldeneye	9	0.4	9	0.4	22	1.6
Scoter	17	0.8	14	0.7	19	1.4
Old Squaw	0	0.0	0	0.0	0	0.0
Unidentified	0	0.0	0	0.0	38	2.9
Total	2034	99.5	1938	99.5	1300	99.5

Table 3. Number of broods counted by ground survey on Minto Flats plots, 1962-1964.

Plot Number	1962	1963	1964
33	32	46	30
75	--[1]	25	50
148	31	28	16
41	29	19	23
68	39	62	27
56	5	33	2
106	20	56	11
79	33	32	32
43	7	26	15
Total	196	327	206

[1] No count

Table 4. Comparative brood sizes, Minto Flats, 1962-1964.

Species	1962	1963	1964
Pintail	56 (5.4)	32 (5.9)	17 (5.2)
Mallard	16 (5.8)	27 (6.3)	4 (5.7)
Widgeon	48 (6.8)	94 (6.8)	35 (5.5)
Shoveler	18 (7.7)	10 (7.4)	1 (1.0)
Green-winged Teal	13 (6.0)	24 (8.0)	10 (6.4)
Scaup	73 (6.0)	90 (6.9)	36 (5.8)
Canvasback	36 (5.9)	4 (8.5)	1 (5.0)
Bufflehead	21 (4.9)	15 (7.0)	8 (4.7)
Goldeneye	1 (7.0)	7 (6.4)	2 (3.5)
Redhead	1 (8.0)		
Scoter	1 (5.0)		
Total	284 (6.0)	303 (6.8)	114 (5.5)

Table 5. Summary of waterfowl production on Minto Flats plots, 1962-1964.

	Males	Females	Total Adults	Broods	Total Young	Plot Totals
1962	2034	1171	3205	196	1176	4381
1963	1938	1066	3004	327	2224	5228
1964	1300	839	2139	206	1133	3272

Yukon-Kuskokwim Delta

Nesting Surveys

A search of nesting check plots and the 231 acre study area on the Kashunuk River revealed a 20 to 25 per cent decrease in black brant nesting densities. Results of this year's search and those made in the past three years are presented in Table 6.

The mean clutch size of nests examined in 1964 (3.3) was smaller than the three year mean (3.6), but the mean brood size at hatching of 3.2 goslings was about the same. A report of aerial brood counts conducted over the brant nesting grounds in early July by Fish and Wildlife personnel was submitted to the reporting biologist.

Estimate of Black Brant Productivity

Low productivity in 1964 was felt to be definitely linked with the extremely late spring. Apparently, very few breeding adults attempted to nest and the resulting production per adult female was low (0.8 goslings per adult female). The composition of several molting flocks of black brant also suggested that few adult females nested in 1964.

Table 6. Brant nests per acre, Kashunuk study area and random plots[1], 1961-1964.

	1961	1962	1963	1964
Study area	1.1	1.4	1.3	0.9
Check plots	1.1	1.4	---[2]	0.8

[1] Variable numbers checked

[2] Nests destroyed before checks by storm tides

Two kinds of adult females occur in these molter flocks of brant: females that did not nest, identified by the lack of a brood patch, and females whose nests were destroyed, identified by the presence of brood patches. The ratio of females without to those with brood patches, therefore, allows an estimate to be made of the number of non-nesting hens associated with the nesters found on study plots. In 1964, this ratio was $\frac{489}{76}$. Thus, 64 non-nesters were present

for every unsuccessful nester in molting flocks. On the study area, 67 of 222 nests were destroyed. The entire stock of hens associated with the study plots, therefore, was 155 successful nesters, 67 unsuccessful nesters, and 64 x 67 or 429 non-nesters. Of the total stock of 651 females, only 222 (34 per cent) attempted to nest.

Given a mean nesting density of 0.8 nests per acre and knowing that there is approximately 32,000 acres of nesting habitat available to black brant we are able to compute a nesting population of 25,600 females. Assuming that this population represents 34 per cent of the adult females, we can expand our population estimates to 76,800 females or 153,600 adults (assume 50:50 sex ratio).

In order to project a fall population level it is necessary to calculate the productivity per adult female. The estimated productivity per thousand females is given in Table 7. Multiplying the number of young produced per female (0.8) times the nesting population (25,600) gives an estimate of 20,480 young. Adding this total (20,480) to the number of yearlings in the population (5,400) plus the adult segment (153,600) yields a projected fall population of 179,500 brant departing the Yukon-Kuskokwim Delta. The Pacific flyway count for January of 1965 was 165,770, suggesting this estimate is reasonable.

Table 7. Estimated productivity per thousand female brant on the Kashunuk study area, 1961-1964.

			Young		
Year	No. Nesting	No. Eggs	No. Eggs Hatching	Surviving To 6 Weeks	Chicks Per Ad. Female
1961	905[1]	3260	2900	1885	1.9
1962	895	3225	2773	2302	2.3
1963	733	2638	1055	675	0.7
1964	340	1122	954	792	0.8

[1] Estimate based on early identification of adults and yearlings, possibly much lower.

Copper River Delta

A reconnaissance of conditions and waterfowl populations on the Copper River Delta was conducted between July and mid-August. Physical

changes brought on the Delta by the earthquake were astonishing--I really had no comprehension of these alterations until actually visiting former study areas. Portions of sloughs I had never seen before, even on a minus tide, are now exposed and many sloughs are completely dry. At present many of the tidal pools are beginning to dry up and may remain so, because there is little possibility of tidal flooding. The uplift on the Delta is about 5 to 6 feet vertically. Many changes in aquatic and terrestrial plant ecology are expected in the future; these changes may be quite rapid because of the high precipitation and consequent leaching action of rain on the present soils; most of the change at present is the establishment of seedlings on newly exposed areas. Also of note was parallel shift in extension of the sedge community.

Nesting Studies

A nesting study was conducted in June and July as part of a general reconnaissance of earthquake damage to the nesting habitat. Nesting populations of western Canada geese and ducks appeared up, but most nesting was far behind schedule. The mean clutch size of 114 goose nests was 4.3 eggs, or more than one egg smaller than a mean of 5.6 eggs (194 nests) from a sample located in 1949. Hatching success based on 100 nests was 90 per cent. Too few goose broods were located to calculate production of young.

A small sample of duck nests (35) had a mean clutch size of 7.3 eggs which did not differ significantly from the 1959 mean of 6.9 eggs (122 nests). Hatching success based on this sample was 65 per cent. Again too few brood counts were obtained to gain an idea of the mean brood size.

Trumpeter Swan Populations

The population status of trumpeter swan nesting in the Copper River Delta appears nearly the same as in 1959 (Table 8), but productivity in this species was apparently very poor in 1964.

Fewer trumpeter swans were found nesting on the east side of the Delta, but an increase in swan nesting was noted on the western portions. This was probably a direct result of the late spring, since much ice and snow was still present on June 17 and may have precluded early nesting on the Martin River Flats on the eastern portion of the Copper River Delta.

Table 8. Trumpeter swan population composition, Copper River Delta, 1959-1964.

	Non-nesting and paired		Nesting and paired		Singles		Flocks		Total	
Year	No.	%	No.	%	No.	%	No.	%	No.	%
1959	120	33	82	23	8	2	149	42	359	100
1964	52	33	32	21	7	5	64	41	155	100

Twelve nests were examined which contained a total of 47 eggs or 3.9 eggs per nest. This is one egg less than the mean clutch size of 4.8±.3 (T.05, 40 d.f) obtained from over 100 nests examined between 1957 and 1960 (Shepherd, 1962).

Statewide Productivity

Flights of dabbling ducks from interior and coastal marshes were expected to be down from 1963. A definite drop in goose and swan production was likely with a small decrease in the black brant fall flight. Overall, production throughout the State was fair, but below average.

HARVEST

Bag Checks

Waterfowl migrations were much delayed this fall in a response to excellent late fall conditions. A total of 217 hunters who spent 272 days in the field and bagged 728 ducks and geese was checked by State and Federal personnel (Table 9). In addition to the field bag checks of species, sex, age, number of birds, etc., duck wings and goose tail feathers were collected. Analysis of the wings and tail feathers is now in progress.

Table 9. Summary of 1964 bag checks

	Ducks	Hunters	Days
Southeastern	223	102	92
Southcentral	322	73	99
Interior	183	42	81
Statewide	728	217	272

Table 10. Comparison of harvest statistics 1963-64.

	Ducks/Day		Ducks/Hunter		Av. Days Hunted	
	1963	1964	1963	1964	1963	1964
Southeastern	2.8	2.4	3.6	2.2	1.3	0.9
Southcentral	2.8	3.3	4.2	4.4	1.5	1.4
Interior	2.3	2.3	3.7	4.3	1.6	1.9
Statewide	2.7	2.7	4.0	3.4	1.4	1.3

In general, hunters reported slower hunting this year in most check areas. Examination of Table 10 would suggest that this was especially true in southeastern Alaska.

Of note was the reported change in flight and feeding patterns of waterfowl on the Copper Delta. Many hunters felt that this was in response to tidal change resulting from the earthquake. In addition, hunters expressed the opinion that dabbling ducks were in short supply. However, a summary of bag composition presented in Table 11 does not differ significantly from that of 1963, with the exception that many more mallards were checked in southeastern than in 1963.

Mail Survey

A post season mail survey based on a mailing list compiled from hunter contracts throughout the 1963 waterfowl season resulted in a 50 per cent return or 110 replys. The average daily bag as indicated by this survey was 3 ducks per hunter. Each hunter spent

8 days in the field and took home an estimated seasonal bag of 22 ducks and 2 geese. The daily bag of 3 ducks does not differ appreciably from the daily bag of 2.7 ducks and geese calculated from the fall bag checks. Because of the manner of sampling this type of survey is felt to be biased toward the more active and successful hunter and probably reflects an above-average bag.

Table 11. Relative species composition of statwide waterfowl bags, 1964.

	Interior		Southcentral		Southeastern		Statewide Total	
Species	No.	%	No.	%	No.	%	No.	%
Pintail	61	31.4	105	35.5	25	10.3	191	26.0
Mallard	21	10.8	64	21.6	119	48.9	204	27.8
A. Widgeon	9	4.6	28	9.5	21	8.6	58	7.9
G. W. Teal	24	12.4	24	8.1	12	4.9	60	8.2
Shoveler	38	19.6	42	14.2	2	0.8	82	11.2
Gadwell	0	0.0	1	Trace	0	0.0	1	Trace
Scaup	13	6.7	1	Trace	4	1.6	18	2.5
Canvasback	1	0.5	0	0.0	0	0.0	1	Trace
Bufflehead	6	3.0	0	0.0	0	0.0	6	0.8
Goldeneye	8	4.1	1	Trace	0	0.0	9	1.2
Merganser	0	0.0	0	0.0	2	0.8	2	Trace
C. Geese	2	1.0	20	6.8	37	15.2	59	8.0
W. F. Geese	8	4.1	6	2.0	0	0.0	14	1.9
Snow Geese	0	0.0	0	0.0	20	8.2	20	2.7
L. B. Crane	3	1.5	0	0.0	0	0.0	3	Trace
Unknown	0	0.0	4	1.4	1	Trace	5	0.6
Totals	194	99.7	296	99.1	243	99.3	733	98.8

LITERATURE CITED

Hansen, Henry A. and Urban C. Nelson, 1957. Brant of the Bering Sea--Migration and Mortality. Trans. 22nd N. A. Wildl. Conf. 237-256.

Shepherd, Peter E. K. 1962. An Ecological Reconnaissance of the Trumpeter Swan in Southcentral Alaska. Unpublished. M. S. Washington State University. pp. 1-168.

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