STATE OF ALASKA
William A. Egan, Governor

DEPARTMENT OF FISH AND GAME
Walter Kirkness, Commissioner

DIVISION OF GAME
James W. Brooks, Director
Don H. Strode, Federal Aid Coordinator

WATERFOWL REPORT

by

Peter E. K. Shepherd

Volume VII
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-6-R-6, Work Plan H and W-13-R-1, Work Plan C

(Printed June 1966)

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECTS: W-6-R-6(last half) TITLE: Alaska Wildlife Investigations
AND: W-13-R-1(first half) TITLE: Small Game and Furbearer Investigations

WORK PLANS: H(W-6-R)
AND: C(W-13-R) TITLE: Waterfowl

JOBS: 1,2,3(W-6-R)
AND: 1,2,3,4(W-13-R)

PERIOD COVERED: January 1, 1965 to December 31, 1965

ABSTRACT

Present knowledge indicates that dusky Canada geese may become less abundant on the Copper River Delta as former nesting marshes become forested, and that increased mammalian predation may lower the productivity of remaining populations. Newly exposed mud flats seaward of present marshes are being invaded rapidly by sedges. These will be used by geese for nesting, and will partly compensate for the loss of formerly prime habitat. Another mitigating factor not yet measurable is the adaptability of the waterfowl population to changing environmental (mainly vegetational) conditions.

Favorable water levels prevailed during air-and-ground waterfowl population surveys at Minto Flats, and slightly over half as many ducks were seen from the air as from the ground on sample plots. At Minto, only half as many breeding drakes were present as in 1964. Nesting success was high (28 per cent of hens raised broods) and brood densities of 5.6 per square mile over 12 square miles of sample plots were seen in July. Ratios of young to adults were the highest recorded in the past few years (0.84:1) in the Interior. Only 3.3 broods per square mile were seen in the Kotzebue Sound area, suggesting lower breeding densities or poorer nesting success than in previous years.

Water fowl hunting improved in 1965 in comparison with 1963 and 1964. Age composition of 1,314 ducks checked by state and federal personnel confirmed that several species enjoyed good nesting success in 1965. The bonus of two scaup did not seem to influence the harvest

except in the Anchorage area. The total kill in 1965 by an estimated 8,000 sport hunters was approximately 112,000 ducks and geese.

RECOMMENDATIONS

Management recommendations relative to waterfowl harvest regulations are presented each summer to the Pacific Flyway Council and Regulations Committee by a representative of the State of Alaska.

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECTS: W-6-R-6(last half) TITLE: Alaska Wildlife Investigations
AND: W-13-R-1(first half) TITLE: Small Game and Furbearer Investigations

WORK PLANS: H(W-6-R)
AND: C(W-13-R) TITLE: Waterfowl

JOBS: 1,2,3(W-6-R)
AND: 1,2,3,4(W-13-R)

PERIOD COVERED: January 1, 1965 to December 31, 1965

OBJECTIVES

To determine the effect of land uplifting associated with the earthquake of March 27, 1964 on the production of waterfowl on the Copper River Delta.

To design a reliable sampling method for determining production of waterfowl in important habitat types in Alaska.

To provide annual estimates of waterfowl production on important nesting areas in Alaska.

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

TECHNIQUES

Field studies on the Copper River Delta included a nesting survey over a previously established study area and an ecological reconnaissance of the Delta vegetation. Nests were found by systematically searching the forb-grass cover. Each new nest was marked with numbered bamboo wands. Numbering on the wand corresponded with a prenumbered punch card upon which the nest history was recorded. Some nests were visited every two days until the clutch was complete; but most were marked, then visited once, and not disturbed again until nearly hatched.

Plant collections and the establishment of permanent vegetation plots were accomplished by plant ecologist John Crow. Plant collections and preservation were conducted in accordance with standard botanical procedures.

Studies of vegetation stands were made by using the Braun-Blanquet technique for coverage evaluation as modified by R. F. Daubenmire, (Northwest Science 33:43-64:1959). Most of these study sites were permanently marked or precisely described and marked on maps. Some studies were done emphasizing the forb-grass zone and the sedge-covered slough banks near areas where considerable slumping had occurred. Lines of plots were run parallel to the water line, with several of these lines in each zone of vegetation. In these, a plot frame 20 cm. x 50 cm. was used for coverage values.

One detailed transect was laid out from the water line of a slough tributary, through a sedge zone, across an upland area of forb-grass and then down into a marshy sedge area. A 20 cm. x 50 cm. plot was placed at one-foot intervals along the transect. Coverage values, numbers of flowers or fruit per species, and the tallest specimen of each species was recorded in each plot. At specific points along the transect, at one meter intervals, soil samples were taken to a depth of 10 cm. At these same points, but on the opposite side of the transect line, vegetation was clipped to ground level in order to measure vegetative productivity.

Previously established ground plots on Minto Flats were rechecked by air, boat, and on foot to determine breeding population levels. A series of new one-square-mile plots was established in the Selawik-Kobuk-Kotzebue Sound area. Plot selections were made by random choice from numbered, gridded blocks. A fiberglass 13-foot canoe, transported by tying to the floats of a 180 Cessna, was used to travel across the water areas. Weighing only 26 pounds, the canoe was easily carried across portages and tundra flats. Aerial counts were made over previously established four-square mile plots at Minto. These transects, each two miles long and 0.25 miles wide, covered half of the plot. All drakes and pairs seen within this area were counted. Each aerial count was multiplied by 2 to compensate for only covering one-half of the four-square mile plot. Brood counts were conducted in the same manner as the ground breeding pair counts. If possible two counts were made during the brood season.

Waterfowl bag checks were made by State and Bureau of Sports Fisheries and Wildlife personnel in key hunting areas near Anchorage, Fairbanks, Cordova, Bethel, Juneau, Ketchikan, and Wrangell. Hunters were interviewed in the field and at points of return. A record of the

number of hunters, days hunted, method of hunting, birds lost, birds killed, sex and age, species, composition, etc., was kept on standard forms supplied to cooperators. Goose tail feathers and duck wings were collected in several areas largely for educational and informational material.

FINDINGS

Ecological Studies of the Copper River Delta

Vegetative

Study or community sites of varing moisture and soil types suggested that the sedge community is the first to pioneer exposed silt deposits, growing under very wet conditions on the slough banks. This community required complete inundation by at least one high tide daily. The forb-grass community (called Hedysarum-Deschampsia) is the first of several seral communities following the sedge community in fairly wet sites only occasionally flooded by extreme high tides or storm tides. From the present vegetation it is inferred that the forb-grass community is followed in turn by Myrica-Potentilla, Salix-Equisetum, Picea and Tsuga. On the other hand it appears that some of the steps may be omitted; for example, Salix was observed to develop in particular spots without Myrica preceding. A hypothetical representation of these seral stages and the levels of nesting utilization within each are presented in Figure 1.

It appears from study and evaluation of the different vegetation types and the habitats in which these lie on the Delta that ultimately the slough banks may become covered with coniferous vegetation, thus eliminating the present nesting habitat sites of the geese. Moreover, proof of the instability of land masses in this area is found in the silt deposits of the Copper River Delta, where two separate forest horizons are visible at 14 and 9 feet below the present ground vegetation. Carbon 14 dating of spruce wood from these horizons suggested that the lower forest horizon was approximately 1,000 years old (Reimnitz, 1965; pers. corr.). Decayed vegetation is present in the deep silts covering the spruce forests, hinting that the silt deposition and revegetation was gradual. These past changes probably occurred along with slow submergence of the Delta. Test drilling on the Delta revealed deep (50-75 feet) deposits of marsh debris which are indicative of slow submergence for some time (Reimnitz, 1965; op. cit.)

Figure 1. Hypothetical succession with levels of nesting utilization in seral communities on the Copper River Delta tidelands prior to 1964.

SERAL COMMUNITIES	NESTING UTILIZATION
Tsuga	
Picea	Trace
Alnus-Equisetum	Light
Salix-Equisetum	Light
Myrica-Potentilla	Medium
1964 Storm Tides - - - - - - - - - -	
Hedysarum-Deschampsia	Heavy
1964 Average High Tides - - - - - -	
Carex	Light
1965 High Tides - - - - - - - - - -	
Exposed Silt Deposit	

In an area of high rainfall such as the Copper River Delta, one would expect rather rapid vegetation changes in plant communities so highly regulated in their distribution by tidal activity and salt tolerance. Concentrated salts in the Delta are no longer being replenished. Former salt concentrations should soon be leached out of the soils, paving the way for pioneering plant species. Moreover, since no tidal inundation is occurring over the present plant communities, a wide area should undergo change.

Invasion and pioneering of the bare ground began the first summer following the earthquake. New sedge seedlings can be found in abundance between the present 10-foot tide level and the permanent stands of sedge at the previous 10-foot tide level. Eventual development of this habitat will probably not provide more than 20 square

miles of suitable nesting cover. This amount of cover may not compensate for the loss of present nesting habitat. However, an unknown factor in this loss and gain of habitat is the relative rate at which both areas develop new vegetation and whether or not there will be suitable cover to support a huntable population of dusky Canada geese.

Waterfowl

In April and May of 1964 weather delayed the return of migrants three weeks beyond average arrival time and consequently nesting was retarded. However, nesting densities based on a sample area of nearly one square mile suggested that dusky goose populations may have been higher than in some past years. The nesting population of dabbling and diving ducks appeared somewhat lower. The number of nesting trumpeter swans was less than half of past and subsequent breeding populations. This decrease is shown in the following tabulation of trumpeter swan populations on the lower Copper River during 1959, 1964, and 1965:

Year	Nesting Pairs	Non-nesting Pairs	Single	Flocks	Total Swan
1959	41	60	8	149	359
1964	16	26	7	64	155
1965	45	44	10	34	222

The 1959 counts included 8 nesting pairs, 10 non-nesting pairs, and 34 swans in flocks from the Bremner River and vicinity.

In the spring of 1965 a substantial population of geese and swans initiated nests on the Delta but a much lower population of ducks was present than in 1964. This trend in duck population was repeated statewide and thereby gave us no reason to believe the lower populations were connected with changes on the Delta.

In 1964 few trumpeter swans were found nesting on the east side of the Delta, whereas an increase in swans was noted on the western portion. This movement in 1964 was probably a direct result of the late spring, since much ice and snow was still present to the east on June 17 and would certainly have precluded nesting of swans on the Martin River Flats on the east side of the Delta. The following year (1965) nearly twice as many swans were noted establishing nests and

nesting territories on the western side of the Delta. Most of the new nests were located in formerly brackish or semi-brackish ponds. This expansion into new areas may be in response to both population pressures and availablity of new habitat.

Comparison of swan and goose clutch sizes showed that a definite reduction in clutch size occurred in 1964. This difference can be seen in the following tabulation:

	1959		1964		1965	
Species	Average Clutch	No. Nests	Average Clutch	No. Nests	Average Clutch	No. Nests
Trumpeter Swan	4.8	(38)	3.9	(12)	4.8	(17)
Dusky Canada Goose	5.6	(194)	4.3	(114)	5.8	(140)
All Ducks	6.9	(122)	7.3	(35)	7.3	(21)

The clutch sizes of ducks did not show any significant differences between years, but the nest densities of the Delta waterfowl were much lower than in the past. Significant changes in the goose and swan clutch size in 1964 are believed to be directly related to the late nesting.

Probably the data of most interest at present are those which pertain to nesting success of the dusky Canada goose. Prior to 1964, storms and tidal flooding of nests probably presented the most significant threat to nesting success, with predation (largely avian) of slight consequence (Hansen, 1961: J. Wildl. Mgmt., 25:242-248). Following the earthquake, accessibility of the outer Delta and the densely populated nesting grounds was simplified by the drying of sloughs and wet areas. Coyotes, foxes, brown bears and other mammals have become increasingly abundant in the outer Delta during the past two summers. This extension of the hunting range of these species has resulted in increased nest predation (Table 1). Some nest destruction is assumed to have resulted from predators following human trails to nest, but this was also a factor in past nesting studies which were conducted at about the same level of disturbance.

Table 1. Dusky Canada goose nesting success on the Copper River Delta, Alaska

Year	No. Nests	Hatched		Abandoned		Flooded		Destroyed	
		No.	%	No.	%	No.	%	No.	%
1959	222	198	89.2	7	3.2	14	6.3	3	1.3
1964	102	84	82.4	8	7.8	0	0.0	10	9.8
1965	221	139	62.9	15	6.8	0	0.0	67	30.3

During the peak of hatching in mid-June 1965 a severe storm persisted for nearly one week and may have caused heavy losses to newly hatched dusky Canada goose goslings. Evidence of high brood losses was found in two independent aerial counts of young and adults. Goslings composed only 25 to 26 per cent of the summer population in 1965 compared to about 48 per cent in 1964.

Present studies suggest that nest losses to mammalian predation may exceed past losses from flooding or other factors in the past. Moreover, mammalian predation is likely to become greater with the advance of brush and trees over the nesting grounds. In the past year microtines have become very abundant and could either create a primary food source or attract even more predators. If these conditions worsen some predator control may be warranted during the nesting and brood season. However, such measures should be evaluated fully as habitat conditions change.

Statewide Waterfowl Production

Breeding Ground Conditions

A general warming trend which began early in April brightened the outlook for an extremely early spring. However, a sharp drop in temperatures occurred late in the month and persisted until mid-May.

Ice break up was five days earlier in the Interior than in 1964 and occurred with approximately the same relative timing about two weeks later in the northwest coastal areas. The southcentral

coastal ice break up preceded that in most northern portions of the State by over a month. Deep ice remained in many lakes well into mid-June and in the Kotzebue area and northwest coastal marshes. This thick ice cover precluded some ground surveys and restricted use of the deep water areas by diving ducks. Weather conditions for the remainder of the summer were good, although some severe storms occurred in June and July in the coastal areas. The annual spring floods were not nearly as widespread and prolonged as in past years and by mid-summer water tables had returned to near normal levels.

Visibility Indices

Prior to making ground censuses experimental aerial transects were flown over three of the nine ground plots at Minto. The weighted number of drakes (a weighting factor of two is used to compensate for only covering one-half of each plot) counted on these plots was 166. Coverage of the plots on the ground provided the necessary data for calculation of visibility indices for Minto Flats (Table 2).

The aerial visibility index of 0.561 for all species was the highest yet recorded at Minto. It is suggested that favorable water level conditions occuring during 1965 air-ground surveys made more waterfowl visible from the air. An analysis of water conditions related to ground and aerial breeding drake counts is presented in Figure 2.

These data suggest that during flood years visibility ratios are apt to drop drastically regardless of population levels. Thus, in 1962 when large expanses of sheet water were encountered on the Flats, ducks were dispersed extensively over the flooded terrain. In later seasons (1964 and 1965) water levels became progressively lower in May and restricted waterfowl to ponds and lakes where they were more visible.

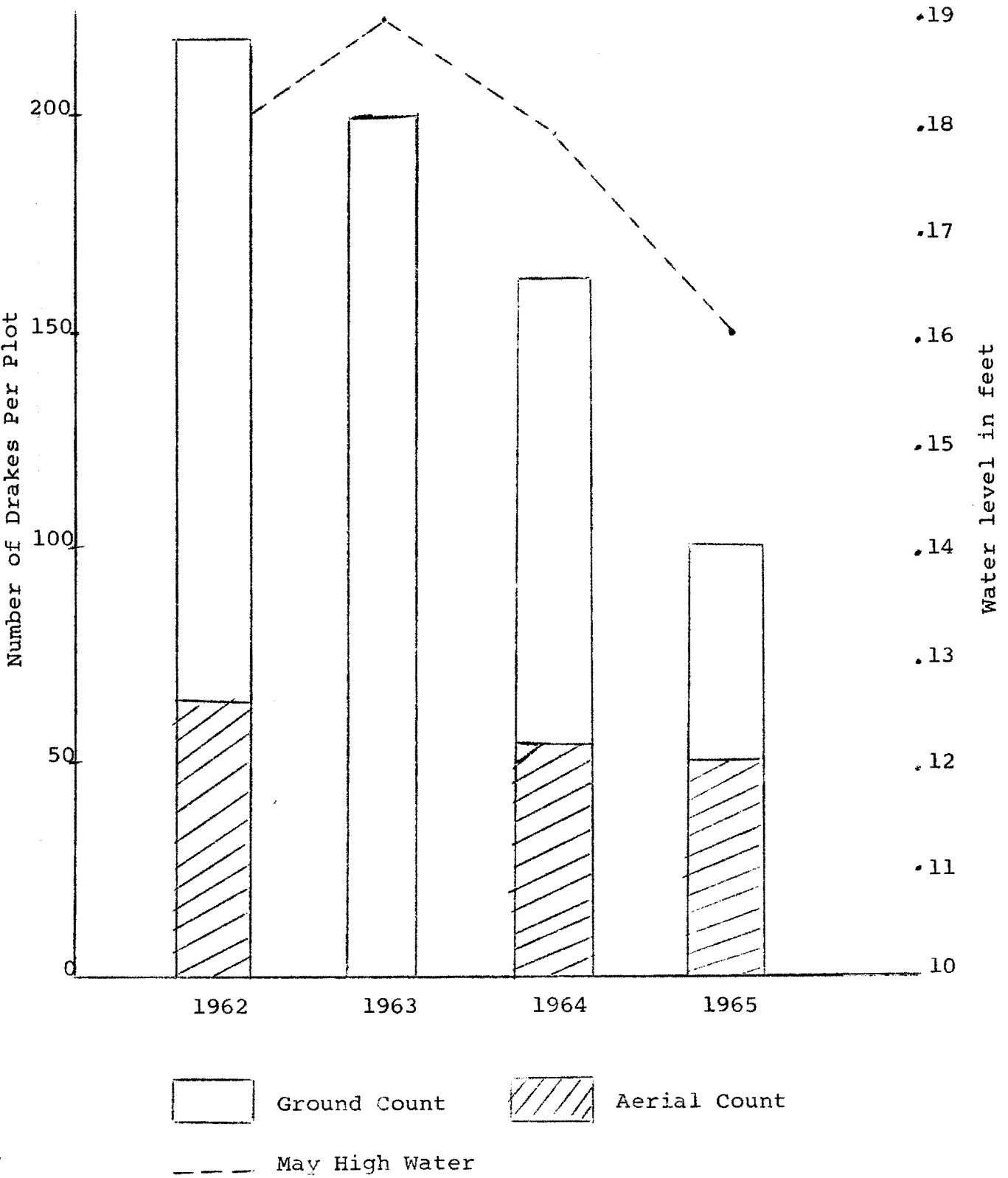
Table 2, Air-to-ground visibility indices, Minto Flats, Alaska 1965

Dabblers	Air	Ground	Index
Pintail	16	43	0.372
Mallard	8	28	0.286
Widgeon	22	44	0.500

Table 2, Continued.

Dabblers	Air	Ground	Index
Shoveler	10	22	0.455
Green-winged Teal	4	28	0.143
Subtotal	60	165	0.364
Divers			
Canvasback	0	4	0.000
Scaup	92	103	0.893
Goldeneye	4	5	0.800
Bufflehead	10	19	0.526
Subtotal	106	131	0.809
Grand Total	166	296	0.561

Figure 2. Comparison of ground breeding populations with those observed by air during periods of varying water levels, Minto Flats, 1962 - 1965.



Ground Breeding-Drake Counts

Censuses of breeding drakes on the Minto Flats and Kotzebue Sound plots were conducted between May 27 and 29 and from June 9 to 14. Ice conditions at both stations were the main determining factor as to when the ground counts began. Unadjusted summaries of breeding pairs and drakes by individual plots are presented in Tables 3 and 4.

Breeding drake counts should be adjusted to compensate for the unbalanced sex ratios in spring waterfowl populations. Thus, the breeding population at Minto was calculated to be 20 (24.6 unadjusted) drakes per square mile, assuming a breeding population consisting of 63 per cent drakes and 37 per cent hens (average of three years spring counts). This same parameter, applied to the Kotzebue Sound breeding drake counts, gave a figure of 20 (24.6 unadjusted) drakes per square mile. The Minto breeding population was reduced over 50 per cent from the 1964 surveys, whereas the Kotzebue Sound counts appeared about the same as in past surveys (Shepherd, P. E. K., 1955. Fed. Aid Quar. Rept., Vol. 10, No. 1: PP. 34-56). Of note, is the steady decline in the number of breeding drake dabblers over the four years of study at Minto (Table 5). Most noticeable were the decreases in pintail, mallard, and green-winged teal. A pronounced and sudden drop in scaup numbers occurred in 1965 and contributed heavily to the general decrease in waterfowl. These declines are believed due to adverse habitat conditions and related poor productivity over much of the state during the past five years.

Brood Counts

Brood censuses were conducted over the randomly selected ground plots beginning in Mid-July and ending on August 11, 1965. Results in these censuses appear in Tables 6, 7, and 8. The effects of a delayed breakup in the Kotzebue Sound area are evident in the large number of broods in the downy age class (I) compared to a more balanced age distribution of Minto broods.

These counts gave an average brood density of 5.6 broods per square mile on the Minto plots and 3.3 broods per square mile in the Kotzebue Sound area. The average Minto brood of 6.7 ducklings (40 broods) was larger than the average Kotzebue Sound brood of 5.8 ducklings (19 broods). Comparatively speaking, the Minto brood crop was small, but larger than in 1964. Brood production in Kotzebue Sound was much lower than indicated in previous studies. During a

year of similar phenology and equal breeding populations (1955) an average of 7.5 broods was produced per square mile on a 25-square-mile study area.

Hatching success for all species was computed from brood counts divided by the estimated number of breeding hens censused on each plot. The percentage value resulting from this calculation is a reflection of the nesting and rearing success of the breeding population. A species breakdown of the 1965 hatching success is presented in Table 9.

Production Index

A compilation of important field measures which allow comparison of production over the past four years at Minto is presented in Table 10. These data are from the randomly selected study plots and are designed to serve as an annual index to production trends. Minto is typical of the interior Alaska waterfowl habitat and generally reflects the trend in productivity of the other important Interior marshes which produce over one-third of the State's annual waterfowl crop.

In the past four years Interior marshes have had only one fair production year and the crop during that particular year was not sufficient to average more than one young per adult. This year's productivity was apparently better than in previous years but was limited by a low initial breeding population. Comparison of productivity on the basis of the number of young produced per square mile suggests that production was slightly better than during the disastrous 1964 season.

Table 3. Unadjusted breeding pair and drake ground counts, Minto Flats, 1965.

Species	Plot Number[1] 33		106		68		Total	
	Drakes	Pairs	Drakes	Pairs	Drakes	Pairs	Drakes	Pairs
Pintail	9	7	11	4	12	0	32	11
Mallard	9	4	9	1	5	0	23	5
Widgeon	7	10	7	10	7	3	21	23
Green-winged Teal	6	3	10	5	4	0	20	8
Shoveler	4	2	5	5	6	0	15	7
Scaup	9	38	8	28	3	17	20	83
Canvasback	1	0	1	0	0	2	2	2
Goldeneye	1	4	0	0	0	0	1	4
Bufflehead	3	7	4	2	1	2	8	11
	49	75	55	55	38	24	142	154
Total Drakes	124		110		62		296	

[1] Four-square-mile plots

Table 4. Unadjusted breeding pairs and drake ground counts, Kotzebue Sound, 1965

Species	Plot Number [1]																						Total	
	82		71		76		61		50		29		9		65		45		23		22			
	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂	Pr	♂♂
Pintail	1	19	0	13	1	4	5	15	6	10	6	14	0	1	0	2	4	6	1	1	1	2	25	87
Mallard	0	0	1	1	1	0	0	3	1	0	0	0	0	0	0	0	0	0	1	0	0	0	4	4
Widgeon	4	3	3	0	2	3	0	6	0	6	1	2	0	0	0	1	2	3	0	0	1	0	13	24
Green-winged Teal	1	0	0	0	0	0	0	2	0	0	0	3	00	0	0	0	1	4	0	0	0	1	2	10
Shoveler	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
Scaup	8	0	7	9	3	1	5	0	6	0	6	2	2	0	1	3	6	1	1	1	4	5	49	22
Goldeneye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5
Scoter	0	0	0	1	1	0	2	0	0	0	0	0	1	0	3	0	0	0	2	1	2	1	11	3
Oldsquaw	0	0	0	0	0	0	1	0	1	0	1	0	1	0	2	0	1	0	0	0	1	0	8	0
	14	23	11	24	8	8	13	28	14	16	14	21	4	1	6	11	14	15	5	3	9	9	112	159
Total Drakes	37		35		16		41		30		35		5		17		29		8		18		271	

[1]One-square-mile-plots

Table 5. Breeding drake counts - 12 square miles of plots - Minto Flats, Alaska

Species	1962	1963	1964	1965
Pintail	201	97	78	43
Mallard	65	83	45	28
Widgeon	73	75	73	44
Shoveler	25	24	27	22
Green-winged Teal	50	43	34	28
Scaup	158	152	202	103
Canvasback	10	4	16	4
Bufflehead	15	35	20	19
Goldeneye	4	5	17	5
Scoter	9	5	7	0
Total	619	523	519	296

Table 6. Brood ages and sizes, Minto Flats, Alaska, July 16, 1965

	Age Class					
	I			II		
Species	a	b	c	a	b	c
Pintail				5,3	4,8, 10,2	
Mallard		4		1	10,8,10	
Widgeon	6,6	6,3+	4,5,5			
Green-winged Teal		8	1,11, 7,13			
Scaup	1+,5	2,8,8				
Bufflehead		4	7			

Table 7. Brood ages and sizes, Minto Flats, Alaska, August 11, 1965

	Age Class					
	I			II		
Species	a	b	c	a	b	c
Mallard					10	
Widgeon			4	8,8	7	7
Green-winged Teal			8	6	8	
Scaup			2+,4+	8		
Canvasback					10,6	
Bufflehead				4		

Table 8. Broods, ages, and size, Kotzebue Sound-Kobuk Delta, Alaska, July 27-29, 1965.

Species	Age Class I a	I b	I c	II a	II b	II c
Pintail				5	7	
Widgeon	6,6	7,7,4, 10,2,5	3			
Teal		9				
Scaup	5	6,6,7				
Scoter	3,7					
Goldeneye		3				
Oldsquaw		7,6				
Canada Goose			5			
White-fronted Goose				3		
Unidentified						

Table 9. Hatching success on Minto Flats plots, 1965

Species	No. Females	No. Broods	Percentage Successful
Pintail	30	8	26.7
Mallard	19	8	50.0
Widgeon	35	16	45.7
Green-winged Teal	20	12	60.0
Shoveler	16	3	18.8
Scaup	95	12[1]	12.6
Canvasback	3	2	66.6
Goldeneye	4	1	25.0
Bufflehead	16	5	31.3
TOTAL	238	67	28.2

[1] Brood counts not completed.

Table 10. Comparison of different measures of productivity, Minto Lakes, Alaska, 1962-1965

	1962	1963	1964	1965
Number of broods per sq. mile	5.4	9.0	5.7	5.6
Per cent females with broods	18.7	30.6	24.5	28.2
Brood size	6.0	6.8	5.5	6.7
Imm. per adult seen in spring	0.37	0.74	0.52	0.84

Statewide Waterfowl Harvest

Weather and Habitat Conditions

A gradual lowering of water levels throughout the summer created excellent feeding and loafing conditions on many of Alaska's major hunting marshes. However, the 1965 waterfowl season opened during a weekend of generally poor weather in the southcentral and interior marshes. This inclement weather restricted hunters who travel by air and possibly kept many people out of the field. The combined effects of weather and low bird populations especially affected the early season waterfowl kill in interior Alaska. Conversely, hunting in the Anchorage area was the best in years. Mild fall weather following the opening week of the season held many migrants in the Interior until the first week in October. Then a sudden freeze and early snowfall caused an immediate and abrupt movement of waterfowl in the interior and southcentral marshes. Following this movement, hunting in southeastern areas was considered good to excellent, but shortages of geese and some species of dabblers were apparent from bag checks.

Bag Checks

A total of 327 hunters who spent 467 days in the field and bagged 1,339 ducks and geese were checked by state and federal personnel. An area and statewide summary of these bag checks is as follows:

	Days Hunted	Ducks	Hunters
Interior	129	333	95
Southcentral	243	760	151
Southeastern	95	246	81
Statewide	467	1,339	327

In addition to the field bag checks of species, sex, age, number of birds, etc., personnel in Anchorage collected duck wings and goose tail feathers. The wings will be made up into wing identification boards for use in instructing field personnel and for lecture purposes.

Table 11. Relative species composition of 1965 Alaska Waterfowl bag checks

	Interior		South-Central		South-Eastern		Statewide	
Species	No.	%	No.	%	No.	%	No.	%
Pintail	75	25.8	288	38.6	29	10.5	392	29.8
Mallard	62	21.3	148	19.8	113	40.8	323	24.6
Widgeon	30	10.3	117	15.7	36	12.9	183	13.9
Green-winged Teal	26	8.9	68	9.1	59	21.3	153	11.6
Shoveler	17	5.8	38	5.1	3	1.1	58	4.4
Gadwall	0	0.0	4	.5	3	1.1	7	.5
Scaup	17	5.8	58	7.8	8	2.9	83	6.3
Canvasback	2	.7	9	1.2	3	1.1	14	1.1
Goldeneye	9	3.1	15	2.0	0	0.0	24	1.8
Bufflehead	23	7.9	0	0.0	2	.7	25	1.9
Oldsquaw	0	0.0	1	trace	0	0.0		
Scoter	2	.7	0	0.0	1	trace	6	.5
Merganser	2	.7	0	0.0	0	0.0		
White-fronted Goose	4	1.4	0	0.0	0	0.0	4	.3
Canada Goose	22	7.6	0	0.0	14	5.0	36	2.7
Snow Goose	0	0.0	0	0.0	6	2.2	6	.5
TOTAL	291	100.0	746	99.8	227	99.6	1314	99.9

Table 12. Age composition of waterfowl harvested in Interior Alaska in 1965

Species	Adult		Immature	
	Male	Female	Male	Female
Mallard	3	10	11	4
Pintail	1	6	20	19
Widgeon	0	0	8	9
Green-winged Teal	0	1	6	14
Shoveler	0	0	3	10
Scaup	0	1	3	12
Bufflehead	0	1	4	16
Goldeneye	0	0	3	6
Subtotal	4	19	58	90
TOTAL	23		148	
Per cent Immature		86.0%		

Table 13. Age composition of waterfowl harvested in Southcentral Alaska, 1965

Species	Adult		Immature	
	Male	Female	Male	Female
Mallard	7	6	51	54
Pintail	23	19	84	121
Widgeon	16	0	31	15
Green-winged Teal	2	6	11	31
Shoveler	3	2	8	16
Gadwall	0	0	2	2
Scaup	6	0	18	23
Canvasback	0	0	2	6
Goldeneye	0	0	3	2
Oldsquaw	0	0	0	1
Subtotal	57	33	210	271
TOTAL	90		481	
Per cent Immature		84.0%		

Table 14. Age composition of waterfowl harvested in Southeastern Alaska, 1965

Species	Adult		Immature	
	Male	Female	Male	Female
Mallard	18	18	23	22
Pintail	1	2	7	11
Widgeon	1	0	20	7
Green-winged Teal	1	3	11	24
Shoveler	0	2	0	1
Scaup	1	0	0	3
Canvasback	0	0	0	2
Bufflehead	0	0	1	1
Scoter	0	0	0	1
Subtotal	22	25	62	73
TOTAL	47		135	
Per cent Immature		74.0%		

Crippling losses and hunting methods

A summary of crippling losses by geographic areas is listed as follows:

	Birds killed	Birds lost	Percentage
Southcentral	571	114	17.0
Southeastern	246	40	14.0
Interior	191	20	10.0
Total	1008	174	15.0

The area of highest loss was in southcentral Alaska where over half of the bag checks were made. A possible explanation of this higher loss may be found in the examination of hunting techniques used (Table 15). Pass shooting is popular in the Anchorage area and in my experience usually results in the heaviest loss of crippled ducks. Moreover, past studies (1962 Annual Progress Rept., Vol. 3,

No. 1-30) suggested that there were more inexperienced hunters in the southcentral waterfowl hunting population than elsewhere.

Other distinctions in hunting methods in relation to areas are evidently a result of habitat conditions and the type of waterfowl present. For instance, hunters in Interior marshes most often prefer to jump shoot dabbling ducks which are plentiful in the grassy, pothole habitat of this area. Decoy shooting is popular with the goose hunting advocates in the Interior and southeastern marshes. Pass shooting appears to be a rewarding method in coastal areas as nearly one-half of the parties interviewed preferred to hunt in this manner.

Harvest Summary

Because statistics on the statewide kill are entirely lacking, it is only possible to estimate the current take. Based on a recent tabulation of duck stamp sales by the Bureau of Sports Fisheries and Wildlife, Alaska waterfowl hunters and philatelists have purchased an average of 9,000 duck stamps annually over the past ten years. Waterfowl questionnaire data from other Pacific Flyway states (May, 1965 Flyway Report) suggests that about ten per cent of duck stamp buyers do not hunt, thus, an estimated 8,000 duck hunters are assumed to have been in the field this season.

Past surveys (1962, op cit) suggested that the average hunter makes 3.5 trips per season. The statewide average number of days hunted per trip was 1.4 days (Page 21). Thus, if all hunters spend 5 days in the field and take 2.9 ducks and geese per day then each will realize a seasonal bag of 14.0 birds. An estimated seasonal kill can be provided with the following computation: 8,000 hunters x 14.0 ducks and geese = 112,000 ducks and geese.

Table 15. Waterfowl hunting method in Alaska by percentage of hunting parties, 1965

	Interior		Southeastern		Southcentral		Statewide	
	No.	%	No.	%	No.	%	No.	%
Jump	15	43.0	9	30.0	34	30.0	58	33.0
Pass	9	26.0	15	50.0	52	46.0	76	43.0
Decoy	11	31.0	6	20.0	27	24.0	44	24.0
TOTAL	35	100.0	30	100.0	113	100.0	178	100.0