Annual Reports, 1968

N A R R A T I V E R E P O R T

for

CALENDAR YEAR 1968

WAUBAY NATIONAL WILDLIFE REFUGE

WAUBAY, SOUTH DAKOTA

PERMANNENT PERSONNEL

R. R. Johnson . . . . . Refuge Manager

D. L. Smith . . . . . Ass't. Refuge Manager
(Resigned 5/19/68)

B. L. Gastineau . . . . . Ass't. Refuge Manager
(E.O.D. 8/27/68)

E. J. Fromelt . . . . . Biological Tech.

CAREER APPOINTMENT (W.A.E.)

Ed Henning . . . . . Maintenanceman

TEMPORARY PERSONNEL

Milton Thennis . . . . . Foreman I
(4/22 - 11/23)

Donald Dargats . . . . . Laborer
(5/15 - 11/18)

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I GENERAL

A. Weather Conditions

	Snowfall	Precipitation This month	Precipitation Average	Max. Temp.	Min. Temp.
January	2.0	.21	.46	44	-29
February	T	T	.52	39	- 8
March	1.0	.50	.55	73	- 1
April	7.0	3.52	2.26	86	14
May	1.0	3.12	3.66	86	28
June	0	3.91	4.08	95	41
July	0	2.43	2.68	93	47
August	0	1.17	2.78	98	43
September	0	2.86	1.50	88	38
October	2.0	1.30	1.22	79	26
November	5.0	.62	.78	55	5
December	17.6	1.41	.46	42	-25
TOTAL	35.6	21.05	21.95	Ext. 98	-29

Data derived from records of U.S. Weather Bureau Station located at refuge headquarters.

Weather highlights included an almost snowless January, February, and March; an extremely wet September and October; plus a wintry December marked by several road-plugging blizzards and a record-shattering 17.6 inches of snow.

The last killing frost in the spring hit on May 19; the first in the fall on October 3. Maximum snow accumulation totalled 13 inches during December. The greatest daily precipitation was 1.30 inches on July 17.

B. Habitat Conditions

1. Water

Water levels in the larger lakes - Hillebrand, Spring, and Waubay - dropped slightly during the year. Even so they still remain at comparatively high levels (see chart page 3___). Waubay lake declined the most, about a foot, primarily because of no overflow from Pickerel and Rush lakes.

Except for Swan Pond which came up about two feet, the class IV potholes followed much the same trend. For the class III potholes, however, its a different picture. They were dry throughout the year except for brief periods in the wake of a scanty spring run-off and a few heavy showers during the summer. At no time did they hold much over an inch of water. The heavy December snowfall, however, brightens the prospects for improved water conditions next year.

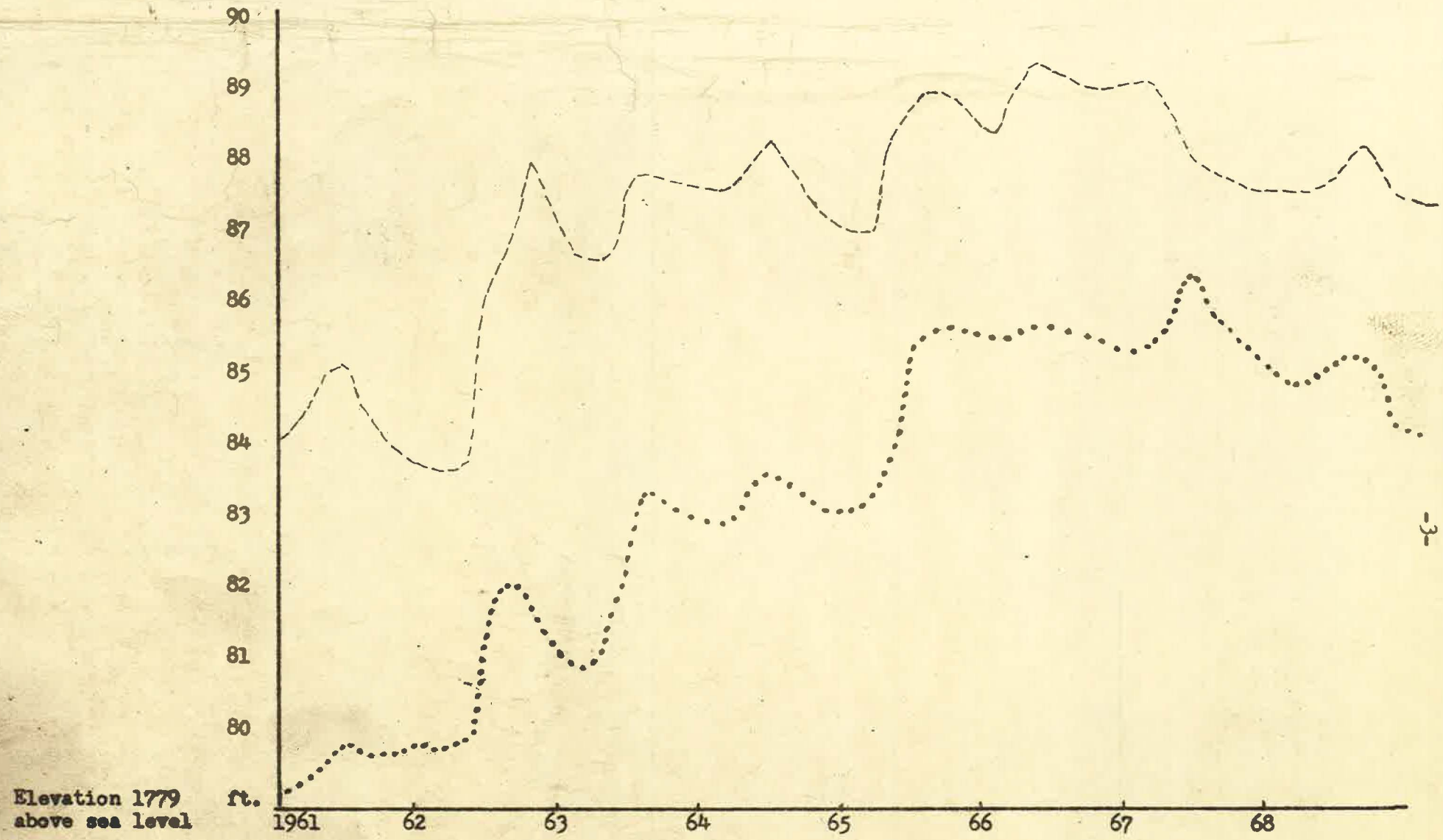
The following table charts 1968 wa ter levels of the larger refuge lakes. The ice-free period extends between March 31 and November 2.

1968 Water Levels - Waubay Refuge
(Sea level elevation in feet at the end of each month)

Month	Hillebrand Lake	Spring Lake	Swan Pond	Waubay Lake
January	1784.87	1787.40	1783.83	1784.74
February	1784.87	1787.40	1783.83	1784.74
March	1784.87	1787.40	1783.83	1784.74
April	1785.18	1788.00	1785.71	1785.13
May	1785.18	1788.06	1785.79	1785.2 3
June	1785.14	1788.06	1785.79	1785.17
July	1784.88	1787.87	1785.57	1784.49
August	1784.42	1787.44	1785.13	1784.41
September	1784.30	1787.42	1785.09	1784.33
October	1784.32	1787.44	1785.33	1784.27
November	1784.32	1787.44	1785.33	1784.27
December	1784.32	1787.44	1785.33	1784.27
Maximum	1785.18	1788.06	1785.79	1785.23
Minimum	1784.30	1787.40	1783.83	1784.27
Difference	.88	.66	1.96	.96

Note: Elevations corrected to compensate for -5.33 foot error discovered in 1962 bench mark elevations by Mr. Carl Hermanson's survey of April, 1968.

Water Levels - Spring and Hillebrand Lakes
1961 - 1968



... Hillebrand Lake: --- Spring Lake : Waubay Lake elevations nearly identical with those of Hillebrand Lake

2. Food Cover

An abundance of wildlife cover existed throughout the year. By early winter, though, much of it was snow covered and of marginal wildlife value, especially for upland gamebirds. For example, snow depth ranged up to five feet or more in marsh and woodland vegetation during late December.

Wildlife food appeared adequate except for fall concentrations of field feeding waterfowl. As usual these birds gleaned interior fields by mid October and headed for greener pastures, leaving much of our waterfowl food untouched. The reason: most of our croplands adjoin well travel public roads. The activity on these roads, especially during the hunting season, severely limits waterfowl use of bordering fields. This is a perennial problem whose only obvious solution is to acquire more land.

II WILDLIFE

A. Migratory Birds

1. Waterfowl

Whistling Swan

During the spring migration the first sighting of Whistling swan occured on April 4, when 4 birds were seen on Spring lake. By April 9, 90 were present, mostly on Dahling slough. They departed on April 16. The first fall migrants appeared on October 17. The fall population peaked at 48 birds a few days later and gradually dwindled to 13 birds which departed during the week of November 10. The 1967 population peaked at 260 birds.

Canada Geese

Canada geese returned on March 6, the earliest arrival date in refuge history. The vanguard included 21 birds which first appeared on Spring lake. The following table shows the spring arrival and fall departure dates for the resident Canada goose population since migration began in 1955.

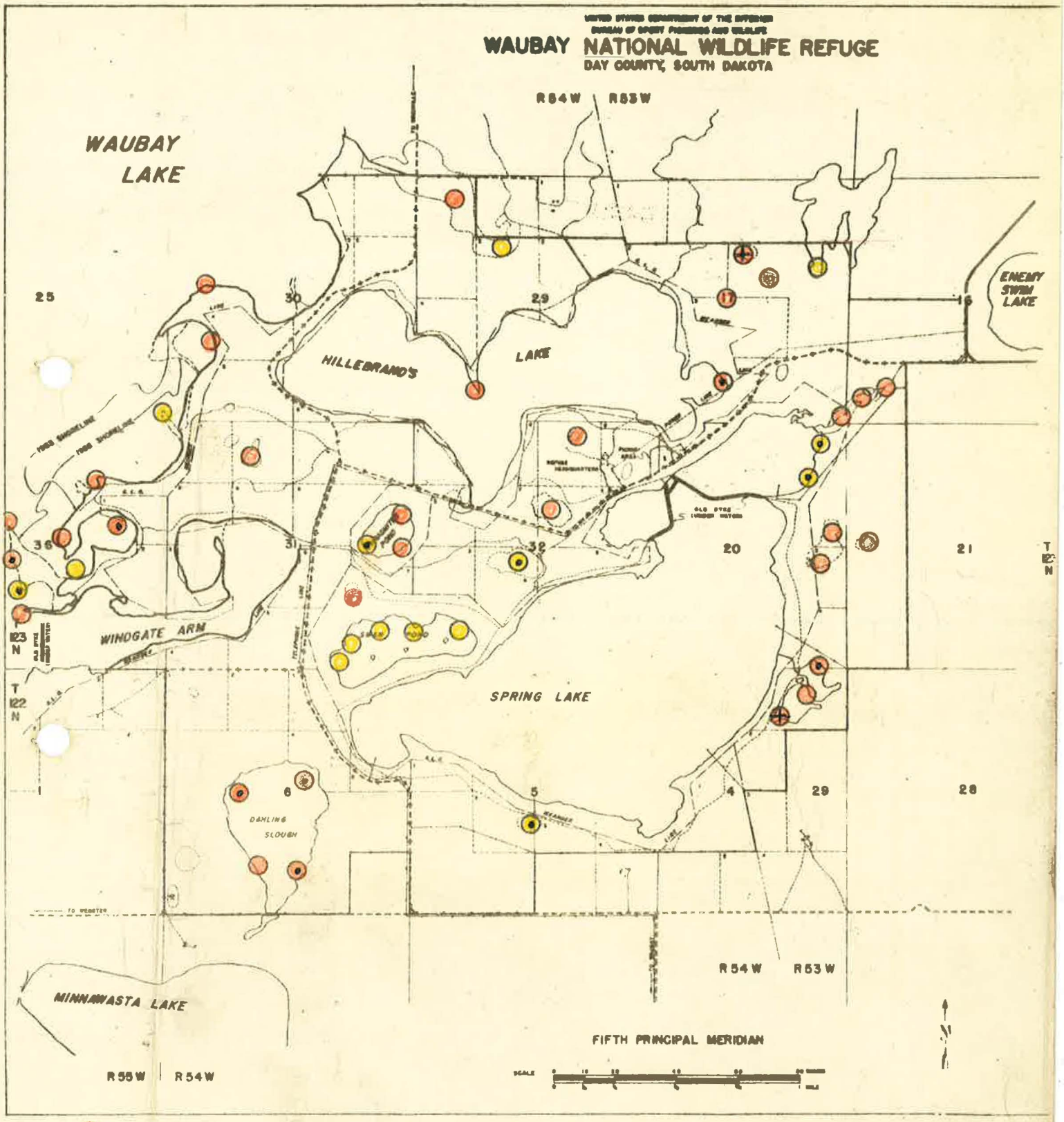
Year	Arrival	Departure
1955		Nov. 27 - Dec. 3
1956	March 11	Nov. 7
1957	March 23	Dec. 1 - 6
1958	March 24	Nov. 25
1959	March 16	Dec. 5
1960	March 31	Dec. 3
1961	March 9	Dec. 6
1962	March 27	Dec. 8
1963	March 10	Nov. 30
1964	March 10	Nov. 26
1965	March 14	Nov. 22
1966	March 13	Nov. 12
1967	March 9	Nov. 24
1968	March 6	Nov. 24

The spring population peaked at 88 birds which included 29 indicated pairs and 30 nonbreeders. The 1967 breeding population was 30 indicated pairs and 5 nonbreeders. Nesting started during early April with incubation underway by April 10, or nearly a week earlier than in 1967.

For some reason only 13 of the 29 indicated pairs nested. Apparently a large segment of the breeding population consisted of sibling or sexually immature pairs. Although these pairs exhibited characteristic early breeding behavior, mainly the establishment of nesting territories, none are known to have nested. As a result the number of pairs successfully bringing off broods was low - only 39 percent or the lowest since 1957.

Again this year all known goose nests were on artificial nesting platforms. Data on the use and location of these structures is shown on the following table and the map on the next page.

LOCATIONS OF NESTING PLATFORMS AND GOOSE NESTS



- Steel post nesting platform
- Fiberglass nesting platform
- Natural nesting site
- Canada goose nest
- Mallard nest

Utilization of Artifical Nesting Structures
by Canada Geese - Waubay Refuge, 1958 - 1968

Year	No. Available	No. used	% used	Successful nests	Young produced
1958	3	1	33	1	5
1959	7	1	14	1	5
1960	12	7	57	7	30
1961	12	6	50	6	24
1962	34	11	33	10	38
1963	34	11	33	11	41
1964	37	14	37	12	38
1965	39	20	51	16	30
1966	42	26	62	25	96
1967	46	26	57	25	105
1968	48	13	27	11	35

Broods started coming off around mid May, with the first noted on May 16. Late May nest inspections revealed 11 of 13 nests were successful, producing 35 goslings from 40 eggs. This was the poorest production since 1965 when 30 goslings were produced. Part of the low production is attributed to the small broods. They averaged 2.7 goslings. The 22 year average is 4.6 goslings.

With the start of the molting season the population built up to about 80 birds on Spring lake and remained relatively stable until the last week of September when geese started moving in from the north. The fall population peaked at about 2700 birds during the second week of October. The following week it dropped to a bout 1,000 birds then gradually dwindled until November 24, when the last of the birds departed. Fall Canada goose use-days totalled 51,000 compared with 85,000 in 1967.

Snow and Blue Geese

Thousands of these birds passed over northeastern South Dakota during the spring migration but none stopped on the refuge.

The first wave went by on March 25, the main push on April 10, and a few stragglers on May 7.

The first fall migrants hit the area on September 29. The refuge population peaked at about 1500 birds during the second week of October and held rather steady until the last week of October. Thereafter, the birds started trickling southward until November 17, when the last of the birds departed.

White-fronted Geese

None were observed this year.

Goose use-days for the year totalled 92,000 or about 48,000 less than in 1967.

Ducks

The start of the spring duck migration was one of the earliest on record. A few mallards pushed into the area on March 6, or 18 days earlier than in 1967. The main wave, however, held off until the first week in April when all common species were present, except Green-winged teal. They appeared on April 16.

Returning waterfowl found rather deplorable water conditions. With only a trickle of snow melt, the small water areas were dry or nearly dry. Only the class IV and V wetlands provided aquatic habitat. Even so, the refuge attracted 283 breeding pairs. This is the largest breeding population recorded since the present inventory system was started in 1964. Apparently the lack of water in class III wetlands concentrated the breeding population on class IV and V wetlands, of which the refuge has an abundance.

The table on the following page shows the extent of the 1968 breeding population. The data represents a 10 percent sample of the shoreline habitat of the larger lakes and a 90 percent sample of the refuge pothole habitat.

Duck production proved disappointing, considering the high breeding population. A few mallard broods started showing up in late May - the earliest on May 22. Thereafter, broods failed to show up until early July. Apparently most early nesters were unsuccessful. Perhaps the cool, wet May weather was responsible. Precipitation, including some snow, fell on 15 days of the month.

1968 BREEDING PAIR POPULATION

Species	Hillebrand Lake Unit Sample 1	Hillebrand Lake Unit Sample 2	Waubay Lake Unit Sample 1	Waubay Lake Unit Sample 2	Spring Lake Unit Sample 1	Spring Lake Unit Sample 2	Spring Lake Unit Sample 3	Spring Lake Unit Sample 4	Spring Lake Unit Sample 5	Pair Total	Percent Total
Mallard		1		1	2	1		1	3	9	9
Gadwall	1	2	2	1	1	9	8		1	23	21
Widgeon											
Pintail				1	1					2	2
BW Teal		4	1	12	3	5	2	1	1	29	27
Shoveler		3		4	7					14	13
GW Teal											
Total Dab.	1	8	3	19	14	15	10	2	5	77	72
Redhead		1		4	4	5	2			16	15
Canvasback						1				1	1
Ruddy			2		1	2				5	5
Scaup			1		2		3			6	6
Am.Goldeneye											
Buffle Head						1				1	1
Total Div.		1	3	4	7	9	5			29	28
Total Pairs	1	9	6	23	21	24	15	2	5	106	100

Brood data on 1968 duck production are shown on the following table. Projected on the same basis as the pair count, production was 296 ducklings in 51 broods. This is roughly 50 duckling per square mile of habitat and the lowest production since 1964.

1968 DUCK PRODUCTION

Species	Total broods	Total young	Ave. brood size	Percent of total broods
Mallard	10	64	6.4	46
Pintail	-	-	-	-
B.W. Teal	3	23	7.7	13
Gadwall	4	20	5.0	18
Shoveler	-	-	-	-
Redhead	5	20	4.0	23
Ruddy	-	-	-	-
TOTAL	22	127	5.8	100

Duck use days totalled 387,000 compared with 667,000 in 1967. The duck population peaked at about 13,000, mainly mallards, during the third week of October.

2. Other Water birds and Shorebirds

The coot breeding population numbered a bout 40 pairs or about the same as in 1967. Production, however, was extremely poor - only 4 broods totalling 10 chicks were observed during the summer. The fall population crested at about 3,000 during the second week of October. Most of these birds congregated on Spring lake.

Three species of grebes - Pied-billed, Red-necked and westerns - nested on the refuge. A few Horned and Eared grebes passed through during the spring and fall migrations. Of the nesting species, Western Grebes were most common. The colony on Waubay lake peaked at about 600 birds of which 100 were birds of the year. The other breeding species numbered no more than a half dozen pairs. During the fall migration the Pied-billed population peaked at about 550 birds or 1100 less than in 1967.

1968 was a poor shorebird year. Sightings included the following 12 species: Killdeer, Upland plover, Greater Yellowlegs, Lesser Yellowlegs, Avocet, Willet, Wilson's snipe, Dowitcher, Wilson's phalarope, Ruddy Turnstone, Red-backed sandpiper, and Baird's sandpipers. None were particularly abundant. The only known nesters were killdeer and upland plover.

American egrets were not observed on the refuge, however sightings included 2 on Rush lake on September 9. Great Blue Heron, Black-crowned night herons and American Bittern were common summer residents.

About 500 double-crested cormorants and 100 white pelicans from the rookery on south Waubay lake occasionally frequented the larger refuge lakes throughout the summer. For some unknown reason the pelican population was down about 50 percent from 1967.

B. Upland Game Birds

Mourning dove were residents from March 28 through November 3. As usual, these birds were probably the most common arboreal nester on the refuge. The breeding population probably numbers around 150 pairs. The peak population was around 600 birds during early September.

Ring-necked pheasants remain relatively scarce on the refuge. Based on the spring cock-call census, the breeding population rose slightly but still probably numbers no more than 4 or 5 harems (see following table). Production was poor - only a couple of broods appeared during the summer. The fall population peaked at an estimated 25 birds, or about the same as in 1967.

Ring-necked Pheasant cock-call census

STATIONS

Year	Date	1	2	3	4	Total calls
1963	5/16	12	5	2	3	22
1964	5/28	12	1	1	4	18
1965	5/21	2	0	2	3	7
1966	5/17	4	1	0	2	7
1967	5/12	1	4	2	1	8
1968	5/10	10	2	0	0	12

Gray partridge also remain scarce. The only sighting this year was 7 birds near Dahling slough on November 5.

C. Big Game

The refuge wintered an estimated 20 white-tailed deer, mostly does and fawns. Production totalled about 20 fawns, the first of which appeared during the first week of June. Apparently the herd wintered well as sets of twins and triplets were commonly seen throughout the summer. The prehunting season population probably numbered about 75 animals (see following table). The high population is believed due to ingress resulting from the archery hunting season outside the refuge. Following the December hunting season on the refuge about 30 animals remained.

DEER CENSUS
(20 mile spotlight route)

Year	Date	Deer Obs.	Deer per mile	% change
1966	11/7	55	2.75	-
1967	11/13	49	2.45	-11
1968	11/6	63	3.15	+28

D. Fur Animals, Predators, Rodents and Other Mammals

Muskrat are extremely scarce. For the first time since house counts began in 1962 not a single rat house was observed on the refuge census area (see following table). The sparse "rat" population is attributed to low water levels.

Muskrat House Count

Area	1962	1963	1964	1965	1966	1967	1968
Dahling Slough	2	8	24	2	0	2	0
Swan Pond	9	25	26	5	1	2	0
Barse Slough	1	2	2	1	0	2	0
P.B. Slough	0	1	19	2	0	0	0
TOTAL	12	36	71	10	1	6	0

Mink

There appears to be little change in the mink population. It probably numbers a bout 30 animals or about the same as in 1967.

Beaver

None present on refuge.

Coyote

None seen or heard this year.

Raccoon

The refuge population remains low, probably no more than a couple of families. Removals during the year included two animals shot in the headquarters area. The coon population would probably be much higher if it was not for the poisoning campaign carried on by adjacent landowners.

Fox

There appears little change in the red fox population. It is quite high, judging from the number of sightings on the refuge. Removals this year included 5 animals taken from a den near Dahling Slough.

Badger

We see little of this animal, but their digging are quite common on the refuge. One was run over on the Waubay-Grenville road near the Hillebrand place during the summer.

Skunk

We don't see much of this animal, either. The population remains low, probably no more than a half dozen animals.

Weasel

Nothing to report on this animal. None sighted on the refuge this year.

Rabbits

There appears to be a slight increase in the rabbit population but they are by no means plentiful.

Woodchuck

None seen this year.

Other Small Mammals

Of the small mammal, pocket gophers and thirteen-stripped ground squirrels are extremely abundant. They continue to be annoying pests in the headquarters area and in most grazing units. There has been little change in the low fox squirrel population.

Hawks, Eagles, Owls, Ravens, and Magpies

1968 hawk sightings included 5 species. Transient visitors included an occasional sparrow and sharp-shinned hawk during the spring and fall migration. Nesting species included a few pair of Red-tails, Swainson's, and Marsh hawks.

Only one eagle sighting this year - a Golden which spent a few days in the Westwoods vicinity during the last week of September.

A black-billed magpie occasionally frequented the headquarters bird feeder during January.

Horned owls were the only owls seen on the refuge this year. The population remains low, most likely numbering no more than three or four pairs.

Other Birds

Sixty species of passerine birds were observed this year, compared with 70 species last year. The most unusual observation was the sighting of 6 purple finches at headquarters on December 2. These birds are of rare occurrence on the refuge.

The audobon Christmas bird count on December 24, disclosed 1 marsh hawk, 7 ring-necked pheasants, 7 hairy woodpeckers, 3 white-breasted nuthatches, 1 brown creeper, 4 downy woodpeckers, 8 black-capped chicadees, 3 blue jays, and 110 lapland longspurs. The total was 141 birds representing 9 species.

The following table shows a comparison of spring arrival dates for 15 common birds.

Species	1964	1965	1966	1967	1968
Canada Goose	3/10	3/14	3/13	3/9	3/6
Mallard	3/13	4/4	3/13	3/21	3/6
Gadwall	3/31	4/14	4/3	3/23	4/2
BW Teal	4/15	4/16	4/11	3/24	3/30
L. Scaup	3/31	4/12	3/21	3/24	3/19
Ruddy	4/22	4/22	4/20	4/4	4/2
Marsh Hawk	3/16	3/18	3/15	3/1	3/16
Coot	3/21	4/9	3/29	4/10	4/2
Killdeer	4/10	4/7	3/14	3/23	3/18
Y.S. Flicker	4/15	4/11	4/12	3/29	4/2
Purple Martin	4/11	4/18	4/16	4/26	4/17
Robin	3/26	W.Res.	3/14	3/23	3/8
Meadow Lark	3/16	4/1	3/14	3/19	3/15
WH Blackbird	4/6	4/12	4/12	4/9	4/23
RW Blackbird	3/17	4/5	3/14	3/22	3/15

Fish

Sport fishing on Waubay lake, which adjoins the refuge, continued fantastically good during the winter and spring. Limit catches (8 fish) ranging from 10 to 20 pounds each, were common. Fishing use peaked at about 200 anglers per day shortly after ice-out.

The lake was also commercially fished for carp during the winter. The catch amounted to about 500,000 pounds, with most of the fish in the 10 to 12 pound class.

Reptiles

We have little to report on these creatures. For the first time in several years snapping turtles were not observed on the refuge.

Disease

None evident.

III REFUGE DEVELOPMENT AND MAINTENANCE

There was no major development this year but the following minor jobs were completed.

1. Installed chain link fence around observation tower and reinforced tower landings.
2. Built and installed roll bar on refuge tractor.
3. Stained shingle roofs on wood buildings.
4. Painted service building and recreation area privies.
5. Installed concrete pits under recreation area privies.
6. Installed new disposal field for service building septic tank.
7. Procured new Dri-bak 200 gallon pumper unit for fire fighting.
8. U.S. Weather Bureau installed new automatic rain guage as part of the headquarters weather station.

B. Plantings

1. Aquatic and Marsh Plantings

None.

2. Trees and Shrubs

None.

3. Upland Herbaceous Plantings

None.

4. Cultivated crops

All told, 271 acres were farmed by 3 permittees. (see NR-8 for details). Except for millet, crop yields were good. Barley, rye, and wheat yielded about 30 bushels per acre. Oats yielded exceptionally well, shelling-out about 60 bushels per acre. Millet, on the other hand averaged only 25 bushels per acre. The reason: low August rainfall. The refuge share of the crop was 3,470 bushels of grain left standing in the field for wildlife food.

C. Collections and Receipts

1. Seed and Propugales

None.

2. Specimens

During the summer student assistant Schenck started preparing a refuge mammals list, plant list, and herbarium. Plant specimens collected for the herbarium included 190 species, which are listed on the following pages. Species identification was made by professor Charlie Taylor of the S.D. State University Botany Department.

Small mammals collected included the following species: Grasshopper mouse, Harvest mouse, Deer mouse, White-footed mouse, Meadow mouse, Jumping mouse, Prairie vole, Short-tailed shrew, and Least shrew. Identification was made by Paul Robinson, a graduate student in mammology from Kansas University. A listing of refuge mammals follows the plant list.

D. Control of Vegetation

During the year 13.25 acres of land were spot treated with herbicides, mainly Tordon 212, for the control of Canada thistle on lands not used for grazing or farming. Details concerning these applications are summarized in NR-12. Generally speaking, Tordon 212 appears to be doing a good job of eliminating Canada thistle. Even though the applications were costly, about $28.00 per acre, theywill probably prove to be the most economical in the long run.

E. Planned Burning

None.

F. Fires

None.

IV RESOURCE MANAGEMENT

A. Grazing

During the 1968 grazing season 531.80 A.U.M.'s were utilized on 10 grazing units encompassing 1340 acres. Last year 640 A.U.M.'s were used. The reduced use resulted from the early removal of stock from several units because of stale water. 1968 grazing income amounted to $1,302.92.

Most grazing units showed little evidence of grazing use. Range condition, however, showed little improvement, rating no better than fair (25 to 50% climax vegetation) in most units. It is estimated that at least another 25 years under current usage will be required to restore these units to excellent condition.

B. Haying

Haying was limited to forage crops on farm units. This year permittees harvested an estimated 24 tons of Brome-alfalfa hay. The refuge share was one-fourth the acreage in small grains left standing in the field.

C. Fur Harvest

There was no fur harvest on the refuge this year. The furbearer population was so low a removal program did not appear worthwhile.

D. Timber Removal

None.

E. Commercial Fishing

None.

F. Other Uses

A bee keeping permit was issued to James Fosland of Oldham, S.D. for pasturing 67 bee hives on the refuge. The fee was $10.05, or 15 cents per hive.

V FIELD INVESTIGATIONS AND APPLIED RESEARCH

A. Progress Report

1. Cooperative study of NESD Resident Goose Flock

This study was completed on July 1, 1968. A copy of the final report is appended to the back of this report.

Segments of the study, however, are being continued as a management function. These include the spring pair count, the pre-hunting season census, and the banding program. This year the Bureau conducted the pair count; the State conducted the pre-hunting season census. Banding was a joint venture. A report on these activities follows.

a. Spring Pair Count

Results of the spring aerial pair count made by Pilot-biologist Winship and Refuge Manager Johnson on April 29, 1968 are shown in the following table.

Area	Pairs	Singles Inc.	Singles - other	Groups	Indicated Pairs
Kettle Lakes					
Lynn Lake		1*			1
Aspen Slough	11		3	(11)	14
Fort Lakes	13	7*	9	(3)(48)	22
Stink Lakes	4		3	(4)	7
Pyas Lake	1				1
Haselton Lake		1*			1
sub total	29	9	15	66	46

Area	Pairs	Singles Ing.	Singles - other	Groups	Indicated Pairs
Drywood Lakes					
S - Drywood	4		4		8
N - Drywood				(4)	
sub total	4	0	4	4	8
Waubay Lakes					
Waubay Refuge	23	7*	6		30
N - Waubay lake	11	2*	2	(3)(24)	13
S - Waubay Lake	3	1*	2	(35)	5
Slough 11-123-55		1*			1
Sunnybrook pass		2*			2
Rush lake	6		1		7
Little Rush lake	2				2
Slough 29-122-54	2				2
Slough 9-122-53		1*	1	(8)	1
Bitter Lake	11	4*	7	(22)	18
Bitter lake - pothole complex	5	4*	5	(9)	10
Goose lake		2*	1		2
Antelope lake	1		1		2
Slough 22-121-55		1*	1		1
Slough 28-122-55		1*			1
Slough 15-121-55	1	1*			2
Slough 23-121-53		1*			1
Slough 9-120-54	1	2*	1		3
Sub-total	66	29	28	101	103
TOTAL	99	38	47	171	157

Total geese observed: 454

* - incubating on platform

( ) - flock

A ground pair count was also conducted on the Waubay Refuge on the same day as the aerial pair count. The ground count revealed 29 pairs and the a erial count 30 pairs.

b. Banding

Drive trapping was conducted on Spring and Opits lakes on July 9. Opits lake is located on the Day-Marshall County line about 5 miles north of Roslyn.

The catch included 17 geese on Opits lake and 60 on Spring lake. Of the 77 birds banded only 7 were young of the year. Such a low percentage of locals (10%) indicates exceptionally poor reproduction.

Those participating in the banding operations included: Refuge Mgr. Lyle Schoonover and Ass't. Mgr. Lee Herzberger from Sand Lake; Bob Dahlgren, Wildlife Coop. Ass't. Unit Leader, and students Joseph E. Hall, Darrol Sauder, Ronald Tice, and Bob Fedeler from SDSU; State Biologist Rod Drewien and Dong Wagner, school student from Aberdeen; Wetland Supervisor Ralph Wallenstrom from Aberdeen AAO; Student Ass't. Ted Schenck of Waubay; and the Waubay Refuge staff.

C. Pre-hunting Season Census

The fall aerial census, made before the arrival of fall migrants, was conducted by State Waterfowl Biologist Rod Drewien and Pilot, Joe Marback on September 18.

The count revealed 571 geese, or the smallest number since the census started in 1964. Compared with the 1967 fall population of 721 geese, this is a 20 percent decrease. Apparently, poor reproduction is responsible, as the difference between the spring and fall population was only 117 birds.

The following table show the results of the pre-hunting season census.

Area	Geese seen
Codington County	
Grass Lake	16
Day County	
Bitter Lake	8
Rush Lake	12
Whye Slough	39
Waubay lakes (including refuge)	239
Haselton Lake	10
Marshall County	
Kettle lakes	245
Stink lake	2
TOTAL	571

2. Cooperative Random Mourning Dove Survey

Again this year refuge personnel participated in the above survey by running Day County route (No. 203) on May 22. The survey revealed 67 doves heard and a total of 293 calls. Thirty-one doves were seen on the route. Last year 61 doves were heard, with total calls numbering 136, and 19 doves were seen.

3. Dove Banding

Mourning dove banding operations were conducted in the refuge vicinity between July 1 and August 11, 1968. 179 doves, all caught in wire mesh walk-in traps baited with millet, were banded. The catch included 66 young of the year (HY) and 113 older birds (AHY).

The following is a record of dove banding returns for the years 1966 through 1968.

DOVE BAND RETURNS

Date Banded	Recovery Date	Area
8/20/66	9/19/66	Winters, Texas
8/23/66	9/1/67	Waubay, S.D.
8/5/67	10/27/67	Jalisco, Mexico
8/3/67	9/2/67	Webster, S.D.
8/6/67	9/5/67	Watertown, S.D.
8/12/67	10/12/67	Pearsall, Texas
8/9/67	2/8/68	Jalisco, Mexico
8/5/67	11/20/67	Guadalajaca, Mex.
8/6/67	1967 season	Gibson, La.
8/2/67	5/28/68	Groton, S.D.

4. Swan Pond Aquatic Survey

Results of the 1968 survey made on August 8 showed a slight increase in the amount of sago pondweed in Swan Pond. In 1966 sago occupied 27 percent of the sample area; in 1967 it covered 49 percent of the sample area; and in 1968 it covered 54.5 percent of the sample area. Phragmites, which occupied less than one percent of the area, showed a slight ddcline. At the time of the 1968 survey, the water level was .02 of an inch lower than in 1967.

VI PUBLIC RELATIONS

A. Recreational Use

There was relatively little change in recreational use during 1968. There was an estimated 9,250 people, mainly picnicers and sightseers, as compared to 9,800 visitors in 1967.

A total of 1,749 visitors from 6 foreign countries and 36 States registered at headquarters. Last year there was 1,858.

B. Refuge Visitors

A list of refuge visitors excluding routine callers is tallied on the following page.

C. Refuge Participation

1/8 - Fromelt presented program (movie and talk) to members of Day County Sportsmen Club in Bristol.

2/1 - Johnson met with chairman of Day County ASC committee, re., possibility of ASC initiating cost sharing on goose nesting platform on ppivate land.

2/28 - Johnson conducted summer job interviews with students at South Dakota State University at Brookings.

3/20 - Johnson attended Day County Planning Commission meeting in Webster.

3/22 - Smith showed movies "The Mallard" to students of the Enemy Swim Day school and Grenville parochial school.

3/22 - Johnson conducted refuge tour for Jack Merwin, sports writer for the Watertown Public Opinion and provided information for a feature story on NESD resident goose flock.

3/30 - Johnson secured free tickets to the Watertown Shrine circus for 35 Indian children at the Enemy Swim Day school.

4/5 - Johnson attended GF&P Dept. regional staff meeting at Webster and reported on status of NESD resident goose flock.

4/14 - Johnson attended Bureau Public Relations workshop at Fargo, N.D.

4/29 - Johnson attended Little Minnesota River Watershed Association annual meeting at Dahlberg, S.D.

5/11 - Fromelt conducted refuge tour for Professor Severson and 29 ornithology students from SDSU.

6/26 - Johnson, Fromelt, and Schenck conducted nature hikes on the refuge for 130 students from the Watertown elementary schools.

6/27 - Johnson conducted tour for Biology class from Watertown public High school.

9/5 - Johnson, Fromelt, Henning, Thennis and Dargatz attended GSA Safe Driving Course in Aberdeen, S.D.

9/18 - Johnson served as 1968 program chairman for the Waubay Lions Club.

9/21-22 Fromelt held Gun Safety Course for 10 students in Grenville.

1. <u>News Releases</u>

A total of 58 news releases were issued during the year. These included 52 weekly weather reports to the Waubay Clipper.

VISITOR LIST

Date	Name	Org. or Title	Address	Purpose
1/17	Ralph Town	Area Biologist	Lake Andes, S.D.	Wildlife Surveys
1/25	Monte Goodrich	Dept. of Health	Pierre, S.D.	Purity of well Water
1/25	Rod Drewien	State Biologist	Aberdeen, S.D.	NESD Goose flock
1/25	Tom Cook	Area Game Mgr.-State	Aberdeen, S.D.	NESD Goose flock
1/26	Rod Drewien	State Biologist	Aberdeen, S.D.	NESD Goose flock
1/30	Wilbur Foss	Dist. Game Mgr.	Watertown, S.D.	NESD Goose report
3/1	Ralph Town	Area Biologist	Lake Andes, S.D.	NESD Goose report
3/1	Rod Drewien	State Biologist	Aberdeen, S.D.	NESD Goose report
3/15	Bob Krum	Area Dist. Mgr. Fisheries	Webster, S.D.	Courtesy call
3/15	George Thuringer	Fish Hatchery Supt.	Waubay, S.D.	Courtesy call
3/22	Harold Lundie	State Warden	Clark, S.D.	look at goose platforms
3/22	Jack Marvin	Sports writer, Wat. Publ. Opinon	Watertown, S.D.	Goose flight
3/25	Carl Hermanson	Engineer, R.O.	Minneapolis, Minn.	Preliminary survey
4/8	Lou Jenkins	U.S. Weather Bureau	Brookings, S.D.	inspect weather station
4/25	William Aultfather	Regional Office	Minneapolis, Minn.	Master Planning
5/3	Ray Linder	SDSU -Prof. Wildlife	Brookings, S.D.	Courtesy call
5/3	Kieth Severson	Student - SDSU	Brookings, S.D.	Courtesy call
5/21	Rod Drewien	State Biologist	Aberdeen, S.D.	NESD goose flock
5/21-24	Ed Crozier	Staff Specialist - Planning	Mpls., Minn.	Master planning
5/21-24	Marvin Duncan	Public Use Specialist	Mpls., Minn.	Master planning
5/21-24	Charles Johnson	Interpretive Specialist	Mpls., Minn.	Master planning
5/28	Leon Hainrich	former Clerk at Waubay	Nebraska	Courtesy call
6/5	Ralph Town	Area Biologist	Lake Andes, S.D.	Master planning
6/5	Clair Rollings	Economic Use Specialist	Mpls., Minn.	Master planning
6/10	Paul Robinson	Grad. Student Kansas U	Lawrence, Kan.	collect rodent species
6/21	Dr. Tremaine	Teacher - Nebraska State	Omaha, Neb.	Birding
6/21	C. W. Comer	Student - Nebraska State	Omaha, Neb.	Birding
6/24	Mr. McCallonger	W.L. Mgmt. U of Mich.	Flint, Mich.	Courtesy call

Date	Name	Org. Or Title	Address	Purpose
6/24	Randy Parken	East Riber Power Coop.	Madison, S.D.	Utility survey
7/1	Earl Cunningham	Refuge Mgr. - Yazoo Refuge	Hollandale, Miss.	Courtesy call
7/4	Don Gregg	Regional Office	Mpls., Minn.	Courtesy call
7/11	Bonar Law	USGMA	S. Dak.	Courtesy call
7/11	Harland Morgan	USGMA	Missouri	Courtesy call
7/17	Lyle Miller	Safety Officer	Mpls., Minn.	Inspection
8/6	Dick Nepstein	Civil Defense	Pierre, S.D.	Calibrate inst.
8/6	Howard Loverien	USGMA	Aberdeen, S.D.	Duck trapping
8/14	Earl Eliason	Realty Branch	Mpls., Minn.	Quarters survey
8/20	Ralph Town	Area Biologist	Lake Andes, S.D.	Master Plan
8/26	Jack Opitz	Area State Warden	Watertown, S.D.	Courtesy call
8/30	Mr.&Mrs. Hannah	Birders	Sioux City, Ia.	Birding
9/13	Jerry Streckfuss	S.D. Area Land Manager	Webster, S.D.	Grazing
9/23-24	Lynn Greenwalt	Ass. Reg. Sup.	Mpls., Minn.	Inspection
10/4	Dave Fisher	USGMA	Pierre, S.D.	Law enforcement
10/13	John Farley	SCS	Huron, S.D.	Courtesy call
10/18	Dave Fisher	USGMA	Pierre, S.D.	Law enforcement
10/18	Doug Salley	Local warden	Waubay, S.D.	Law enforcement
11/1	Ray Buller	Central Flyway	Alberquerque, N. Mex.	Canvasback survey
11/1	Jerry Stoudt	Research Biologist	Aberdeen, S.D.	Canvasback survey
11/6	Rod Drewien	State Biologist	Aberdeen, S.D.	Goose flight
11/12	Clair Rollings	Economic Use Specialist	Mpls., Minn.	Inspection
12/23	Dave Engstrom	State Fisheries employee	Waubay, S.D.	Courtesy call

D. Hunting

1. Deer Hunting

The refuge, except for a 60 acre safety zone around headquarters, was open for the 9 day East River deer season (firearms only) beginning November 23.

Hunting pressure amounted to about 112 man days, the most of which was on opening weekend. Compared with last years season, this is a drop of about 25 percent in hunter days. Considering that Day County deer hunting permits were increased from 400 last year to 500 this year, its puzzling why hunting use decreased.

The confirmed kill was 23 animals - 16 males and 7 females. It is estimated that 7 deer were taken from the refuge without being checked. The animals checked were in excellent physical condition.

Mr. Walter Polestra of Waubay took a trophy buck weighing 280 pounds hog-dressed. Its rack registered 6 points on one beam and 7 on the other. Incidentally, we believe this animal to be the largest ever bagged on the refuge.

Kill data for 1968 and past seasons is tabulated below:

		Kill						
Yr.	Hunters 1st day	Male Adult	Fawn	Female Adult	Fawn	Est. Total kill	% bucks	Permits issued
'60	80	9	3	17	3	35-40	54	300
'61	20	3	2	2	2	9	44	150
'62	10	5	1	3	1	9	55	100
'63	15	6	5	1	3	15	73	130
'64	21	6	1	5	1	13	54	180
'65	50	8	3	12	6	30	38	300
'66	60	14	7	2	4	27	87	320
'67	100	13	4	4	1	28	77	400
'68	75	9	7	2	5	30	70	500

2. Waterfowl Hunting Outside the Refuge

Duck Hunting

Duck hunting was probably the poorest since the early 1930's. Good shooting occurred only on the opening weekend. Ducks as well as record numbers of hunters concentrated on the remaining water areas and by the third day of the season, which began on October 5, the ducks were pretty well blasted out of the a rea.

The special scaup season, November 1 through November 11, on Bitter, Rush, Minnewasta, and Waubay lakes in Day County attracted few hunters. The reason: scaup concentrations failed to materialize. Refuge personnel staked-out Hedke pass on Waubay lake each morning of the season to collect hunter performance data. Not a single blue bill was bagged during the course of the observations. This is surprising, considering Hedke pass is one of the finest blue bill passes in the State.

Goose Hunting

Goose hunting adjacent to the refuge was also the poorest in years. The main factors were fewer geese on the refuge, the failure of the usual number of snow and blue geese to stop in the area, and significant changes in the feeding pattern of geese using the refuge. For some reason geese shunned the hunt club along the north boundary of the refuge. The kill on the Henning area, for instance, usually numbers about 100 geese. This year only 1 snow goose was bagged. Possibly, the increased fishing activity on Waubay lake may have been responsible.

Hunting pressure along the boundary decreased from an estimated 1,000 man days last year to about 700 this year. The opening of the goose season coinciding with the duck season contributed to the decline.

This years estimated kill as well as that of the past 12 years is shown in the following table.

GOOSE HARVEST
(Lands immediately adjacent to the refuge)

Year	C. Goose	S. Goose	Snow	Blue	W-F	Total
1956	100	50	650	300	12	1,112
1957	35	10	0	0	0	45
1958	44	31	79	10	1	165
1959	73	28	3	0	5	109
1960	48	48	4	2	0	102
1961	31	22	5	2	0	60
1962	58	19	7	10	0	94
1963	54	4	1	6	0	65
1964	95	37	30	11	0	173
1965	58	5	16	6	0	89
1966	100	88	3	6	0	199
1967	95	77	27	2	0	201
1968	40	30	31	5	0	106

3. Dove Hunting

South Dakota's 8 day dove season beginning September 1, attracted few hunters in Day County. Extensive patrol in the refuge vicinity on the opening weekend failed to turn up a single hunter even though doves were plentiful.

E. Violations

The following violations were prosecuted in State Court:

Date	Name & Address	Fine & Cost	Violation	Apprehending Officer
10/6	Rickey Rudebusch Ortley, S.D.	$24.70	uncased gun in refuge	Johnson
10/6	Danny Rudebush Summit, S.D.	24.70	uncased gun in refuge	Johnson
10/6	James Amdahl Ortley, S.D.	24.70	uncased gun in refuge	Johnson
10/6	Milo Richter Ortley, S.D.	24.70	uncased gun in refuge	Johnson

Refuge personnel assisted GMA Fisher in a baiting investigation on the Tracy farm which adjoins the southeast corner of the refuge. The U.S. Attorney refused to prosecute because of insufficient evidence.

F. Safety

Monthly safety meetings were held throughout the year. The agenda included the films - "Outboard Outing", "Bridges to Safety", "Rescue Breathing", "Safety Everywhere", and group discussion on the following topics: safe use of pesticides, Defensive driving, poisonous plant hazards, fire prevention, lightening hazards, Station Safety Plan, fall, and fire fighting.

The Station safety record now stands at 7,990 days without a lost time accident.

The Station received the Bureau's Safety Management Gold Award for the year 1967.

VII ITEMS OF INTEREST

1. Assistant Manager Dave Smith, after about six months of duty, resigned on May 19. Dave decided he wasn't cut out to be a refuge manager and has returned to school to work for his PHD in biology at Indiana University.

2. Mr. Benjamin L. Gastineau reported for duty as Assistant Manager on August 27. Ben holds a B.S. Degree in Wildlife Management from the University of Missouri and previous to his new assignment served 3½ years with the Job Corps at the Mingo Civilian Conservation Center at Puxico, Missouri. We are happy to have Ben aboard and hope he enjoys his new duties at Waubay.

3. Day County received $1,996.13 this year under the Refuge Sharing Act, P.L. 88-523. This year's payment was the same as in 1967.

4. The refuge was selected as one of the refuges in the National Wildlife Refuge System to be Master planned by the Bureau's Blue-Ribbon planning team.

   Regional office members of the team under the leadership of staff specialist E. Crozier include Recreational specialist M. Duncan, Architect J. Knecht, planning engineer L. Kolwalski, and interpretive planner C. Johnston. Other personnel participating in the planning included Forester W. Aultfather, Land use specialist C. Rollings and Area Biologist R. Town.

   Accomplishments include inventoring refuge resources on McBee keysort cards, drafting refuge objectives, up-dating management plans, preparing preliminary operational criteria, and conducting preliminary interpretive studies and topographic surveys. The plan, which is scheduled for completion on October 1, 1969, is to be a prototype for Master Planning other refuges.

<u>Credits</u>

Fromelt: Sec. VI, NR forms, typing.

Johnson: Balance of report and photos.

SIGNATURE PAGE

Submitted by:

_____
(Signature)

Date: February 7, 1969

Refuge Manager
Title

Approved, Regional Office:

Date: _____

_____
(Signature)

Regional Refuge Supervisor

Plants of the Waubay National Wildlife Refuge

Scientific Name	Common Name	Abundance
Equisitales		
Equisetum arvense	Common horsetail	c
Pinaceae		
Juniperus virginiana	Red cedar	i
Thuja occidentalis	White cedar	i
Typhaceae		
Typha latifolia	Common cattail	a
Najadaceae		
Potomogeton pectinatus	Sago pondweed	c
Ruppia occidentalis	Ditch grass	a
Alismaceae		
Alisma trivale	Water plantain	c
Graminae		
Bromus inermis	Smooth brome	c
Stipa comata	Needleandthread	c
Stipa viridula	Green needlegrass	c
Panicum virgatum	Switchgra ss	c
Elymus canadensis	Canada wildrye	a
Phragmites communis	Common reed	a
Hardium jubatum	Foxtail barley	c
Agropyron smithi	Western Wheatgrass	a
Agropyron repens	Quack grass	a
Agropyron cristatum		c
Agropyron intermedium		c
Setaria glauca	Pigeon grass	a
Setaria lutescens	Yellow bristlegrass	a
Puccinellia nuttaliana	Nuttall alkaligrass	c
Bouteloua gracilis	Blue grama	c
Sphenopholis obtusata	Prairie wedgescale	c
Spartina pectinata	Prairie cordgrass	c
Sorghastrum nutans	Yellow Indiangrass	c
Calamagrosteris neglecta	Slimstem reedgrass	c

Scientific Name	Common Name	Abundance
Poa pratensis	Kentucky bluegrass	c
Andropogon gerardi	Big bluestem	a
Andropogon scoparius	Little bluestem	a
Echinocola crus-gali	Barnyard grass	c
Cenchrus carolinianus	Sandbur	o
Cyperaceae		
Carex sprengelii		c
Carex stricta		c
Scirpus maritimus		c
Scirpus americanus	Three square	a
Scirpus pallidus		c
Scirpus validus	Soft stem bulrush	a
Scirpus acutus	Hard stem bulrush	a
Scirpus paladosus	Prairie bulrush	c
Scirpus atrovirens	Darkgreen bulrush	c
Araceae		
Arisaema triphyllum	Jack in the pulpit	o
Commelinaceae		
Transcantia occidentalis	Spiderwort	o
Transcantia bractaeta	Spiderwort	c
Juncaceae		
Juncus balticus	Rush	c
Juncus effusus	Soft rush	a
Liliaceae		
Trillium cernuum	Wake robin	o
Uvularia grondiflara	Large bellwort	o
Polygonotum commutatum	Solomon's seal	c
Asporagus officinolis	Asparagus	o
Allium stellatum	Pink Wild onion	c
Allium cernuum	Wild onion	c
Smilax lasioneura	Hook	o
Lilium philadelphicum	Wild lily	o
Amaryllidaceae		
Hypoxis hirstuta	Yellow stargrass	c

Scientific Name	Common Name	Abundance
Iridaceae		
Sisyrinchium angustifolium	Blue-eyed grass	c
Sisyrinchium montanum	Blue-eyed grass	c
Salicaceae		
Populus deltoides	Cottonwood	c
Salix nigra	Black willow	u
Salix cordata	Heart-leaved willow	u
Salix humilis	Prairie willow	u
Fagaceae		
Quercus macrocarpa	Burr oak	a
Urticaceae		
Ulmus americana	American elm	c
Ulmus rubra	Slippery elm	u
Santalacaceae		
Comandra pallida	Bastard toad-flax	c
Polygonaceae		
Rumex persicarioides	Golden Dock	c
Rumex obtusifolius	Bitter dock	u
Chenopodiaceae		
Salsola kali	Russian thistle	c
Kochia scoparia	Kochia	c
Chenopodium hybridum	Maple-leafed goosefoot	u
Chenopodium rubrum	Red Goosefoot	c
Amaranthiaceae		
Amaranthus retroflexus	Pigweed	c
Caryophyllaceae		
Arenaria laterifolia	Broad-leaved stichwort	c
Portulaccaceae		
Portulaca oleracea	Common purslane	c

Scientific Name	Common Name	Abundance
Ranunculaceae		
Anemone patens	Pasque flower	c
Anemone canadensis	Canada anemone	a
Delphynium verisceus	White larkspur	c
Ranunculus purshii	pursho yellow watercress	a
Ranunculus aquatilis	White water crowfoot	c
Menispermiaceae		
Menispermum canadense	Moon seed	c
Cruciferae		
Brassica kaber	Field mustard	c
Hesperis matronalis	Dames violet	u
Rophanus rophanistrum	Wild radish	c
Capsella bursa-pastoris	Shepherd's purse	c
Saxifragaceae		
Ribes missouriense	Missouri Gooseberry	c
Rosaceae		
Rosa virginiana	Wild rose	c
Rosa blanda	Smooth wild rose	c
Potentilla arguta	Tall cinquefoil	c
Fragoria virginiana	Wild strawberry	c
Leguminasae		
Amorpha canescens	Leadplant	c
Amorpha microphylla		c
Astragalus canadensis	Canadan milkretch	c
Astragalus caryocorpus	Ground plum milk vetch	c
Astragalus racemasus	Racemed milk vetch	c
Desmodium canadense	Canada tick clover	c
Glycyrrhiza lepidota	American licorice	c
Petalostemum canedum	White prairie clover	c
Petalostemum purpureum	Purple prairie clover	c
Psoralea argophylla	Silverleaf scurf pea	c
Meliletis officinalis	Yellow sweet clover	a
Meliletis alba	White sweet clover	a
Medicago sativa	Alfalfa	c
Trifolium agarium	Hop clover	u
Trifolium repens	White clover	c
Sophora sericea	Silky sophora	u

Scientific Name	Common Name	Abundance
Linaceae		
Linium rigidum	stiffstem flax	c
Oxaliaceae		
Oxalis stricta	Common yellow oxalis	c
Rutaceae		
Xanthoxylum americanum	Prickly ash	c
Euphorbiaceae		
Euphorbia esula	Leafy spurge	r
Anacardiaceae		
Rhus glabra	Smooth sumac	a
Rhus taxiodendron	Poison ivy	c
Aceraceae		
Acer negundo	Boxelder	c
Vitaceae		
Vitis vulpina	Wild grape	c
Tiliaceae		
Tilia americana	Basswood	c
Cactaceae		
Maximillaria vivipara		u
Elaeagnaceae		
Elegnus angustifolia	Russian Olive	I
Shepherdia argentea	Buffalo berry	c
Ongranaceae		
Genothera serrulata	Halfshrub sundrop	c

Scientific Name	Common Name	Abundance
Umbelliferae		
Sium suave	Water parsnip	c
Zizia aptera	Meadow parsnip	c
Oleaceae		
Fraxinus pennsylvanicus	Green ash	c
Syringa vulgaris	Lilac	I
Gentianaceae		
Gentiana amarella varacuta	Northern gentian	c
Apocynaceae		
Apocynum androsaeminifolium	Spreading dogbane	u
Asclepiadaceae		
Asclepias syriaca	Common milkweed	c
Asclepias verticellata	Whorled milkweed	a
Asclepias speciasa	Showy milkweed	c
Asclepias purpurascens	Purple milkweed	u
Convolvulaceae		
Convolvulus sepium	Hedge bindweed	c
Convolvulus arvensis	Field bindweed	c
Hydraphyllaceae		
Hydrophyllum virginianum	Waterleaf	a
Ellisia nyctelea	Waterpod	c
Boraginaceae		
Lappula echinata	Stickseed	c
Onosmodium occidentale	Western marblseed	c
Lithospermum linearifolium	Narrow leaved puccoon	c
Lithospermum canescens	Hairy gromwell	a
Verbenaceae		
Verbena stricta	Hoary vervain	c
Verbena bracteosa	Practed vervain	c
Verbena urticifolia	White verbena	u

Scientific Name	Common Name	Abundance
Labiatae		
Leonurus cardiaca	Common motherwort	c
Nepeta cataria	Catnip	c
Mentha arvensis	Wild mint	c
Monerida fistulosa	Wildbergamont bee balm	c
Scutellaria galerelulata	Marsh skullcap	u
Lycopus asper	Western water horehound	u
Stachys pallusteris	Marsh betony	c
Teorium odcidentale	Hairy germouder	u
Solanaceae		
Solanum rostratum	Buffalo burr	c
Scrophulariaceae		
Verbascum thapsus	Common mullein	c
Pentostemon grandiflora	Beard tongue	c
Scrophularia leporella	Figwort	c
Bignoniaceae		
Orabanche fesiculata		c
Plataginaceae		
Plantago major	Common plantain	c
Rubiaceae		
Galium aporine	Goosegrass	c
Caprifoliaceae		
Symphocarpas occidentalis	Wolfberry	a
Lobeliaceae		
Lobelia spicata	Palespike Labelia	c
Compositae		
Taraxacum afficinale	Common dandglion	c
Agoseria glauca	Prairie dandelion	c
Achillea lanulosa	Wooly yarrow	a
Lactuca pulchella	Chicory lettuce	a

Scientific Name	Common Name	Abundance
Chrysopsis villosa	Golden aster	c
Lygodesmia juncea	Skeleton weed	c
Erigeron Philadelphicus	Philadlphia fleabane	c
Erigeron romasus	Daisy fleabane	u
Erigeron canadensis	Horseweed	c
Aster ericoides	Heath aster	c
Aster simplex	Aster	c
Aster sericeus	Silky aster	u
Solidago missouriensis	Missouri goldenrod	c
Solidago gigjanti	Giant goldenrod	c
Solidago canadensis	Canadian goldenrod	u
Ratiba columnifera	Prairie coneflower	c
Echinacea pallida	Purple coneflower	c
Liaturs punctata	Dotted gayfeather	c
Liatrus ligutistylis	Round-headed Blazing star	u
Artemisia frigida	Fringed sagewort	a
Artemisia ludaviciona	White sage	a
Agaseris glauca	Pale agoseris	c
Crespis runcinata	Yellow Hawksbeard	c
Tragopogon major	Yellow Goatsbeard	c
Cerisium arvense	Canada thistle	c
Eupatorium maculatum	Spotted jaepyeweed	c
Arcticum lappa	Great burdock	u
Iva xonthifolia	Rag sumpweed	a
Helianthus scaberrima	Stiff sunflower	c
Helianthus maximiliana	maxmilian sunflower	c
Sonchus arvensis	Sow thistle	c
Rudbeckia hirta	Black eyed susan	c
Bidens frondosa	Beggar ticks	c
Xanthium canadense	Cocklebur	c
Heliopsus scabra	False sunflower	c

Abundance:
- a - abundant
- c - common
- u - uncommon
- o - occasional
- r - rare
- I - Introduced

Mammals of the Waubay National Wildlife Refuge

Scientific Name	Common Name	Abundance
Blarinea brevicauda	Short-tailed shrew	u
Cryptotis parva	Least shrew	c
Lepus townsendii	Jackrabbit	c
Sylvilagus floridanus	Cottontail	c
Citellus tridecimlineatus	Thirteen lined ground squirrel	a
Citellus franklinii	Franklin's ground squirrel	a
Citellus richardsonii	Richardson's ground squirrel	a
Sciurus niger	Fox squirrel	c
Sciurus carolinensis	Gray squirrel	u
Geomys bursarius	Plains pocket gopher	u
Tamias striatus	Chipmunk	u
Onychomys leucogaster	Grasshopper mouse	c
Reithrodontomys megalotis	Harvest mouse	c
Peromyscus maniculatus	Deer mouse	c
Peromyscus leucopus	White-footed mouse	c
Microtus pennsylvanicus	Meadow mice	c
Ondatra zibethica	Muskrat	c
Rattus norvegicus	Brown rat	u
Mus musculus	House mouse	c
Zapus hudsonius	Jumping mouse	c
Pedomys ochrogaster	Prairie vole	c
Marmota monax	Wood chuck	u

Scientific Name	Common Name	Abundance
Castor canadensis	Beaver	r
Canis latrans	Coyote	r
Vulpes fulva	Red fox	c
Urcyon cinereoarrenteus	Gray fox	u
Procyon lotor	Raccoon	c
Mustela vison	Mink	c
Mustela frenata	Longtailed weasel	u
Mustela rixosa	Least weasel	u
Taxidea taxus	Badger	c
Spilogale putorius	Spotted skunk	r
Mephitis mephitis	Striped skunk	c
Odocoileus hemionus	Mule deer	r
Odocoileus Virginianus	White-tailed deer	a

Bureau of Sport Fisheries and Wildlife
Division of Wildlife Refuges

ANNUAL
[redacted] PUBLIC USE REPORT

Refuge name: Waubay
State: South Dakota

(This block completed by Washington Office)

State Code (1-2)	Congressional District Code (3-4)	Refuge Code (5-7)	Report Period Yr. / Mo. (8-11)
41	01	399	68 - -

(Card Columns) 12-13		14-18	19-25
ACTIVITY	Code	VISITS FOR THE MONTH Total Number	Total Hours
Hunting: Big Game	01	112	448
Upland Game	02		
Waterfowl	03		
Other Migratory	04		
Bow	05		
Fishing: Salt Water	06		
Warm Water	07		
Cold Water	08		
Bird and Animal Calling	09		
Wildlife Photography	10	40	80
Wildlife Observation	11	225	375
Dog Training	12		
Field Trials	13		
Wildlife Trails and Walks	14	1,000	1,000
Wildlife Tours	15	3	10
Wildlife Scenic Veh. Rts.	16		
Camping (related to above)	17		
Picnicking (related to above)	18		
Wildlife Interpretive Center	19		
*Miscellaneous Wildlife	20	77	102
Inquiries on hunting,			
wildlife programs.			

(Card Columns) 26-27		28-32	33-39
ACTIVITY	Code	VISITS FOR THE MONTH Total Number	Total Hours
Swimming	21		
Boating	22		
Water Skiing	23		
Camping	24		
Group Camping	25		
Picnicking	26	1,215	2,450
Horseback Riding	27		
Bicycling	28		
Skiing, Sledding, etc.	29		
Ice Skating	30		
Fruit, Nut & Veg. Collecting	31		
Non-Recreational Use (inspections, audits, etc.)	32	100	274
Actual Visits	33	9,250	
Peak Load Day	34	200	
* Miscellaneous Non-Wildlife	35	3,160	1,560
climbing obs. tower,			
sightseeing, inquires			

Form 3-123
(March 1968)

*Use blank spaces to indicate the types of activities summarized under miscellaneous codes 20 and 33.

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge Wankey Year 195 68

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
				NONE				

Total acreage cut over..... Total income.....

No. of units removed B. F..... Method of slash disposal.....

Cords.....

Ties.....

.....

INT.-DUP. SEC., WASH., D.C. 36103

3-1755
Form NR-5
60701

DISEASE

Refuge [redacted] Year 19 [redacted]

Botulism [redacted]

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRI TURAL COLLECTIONS, RECEIPTS, A PLANTINGS

Refuge [redacted] Year 19 [redacted]

	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
							[redacted]						

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

76148

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Waubay MONTHS OF Jan. TO May, 19 68

(1) Species	Weeks of reporting period (2) 1-6 1	7-13 2	14-20 3	21-27 4	28-2/3 5	2/4-10 6	2/11-17 7	2/18-24 8	2/25-3/2 9	3/3-9 10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										31
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard										22
Black										
Gadwall										
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot:										

Int. Dup. Sec., Wash., D.C. 37944

3-7150a
Cont.-NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Waubay MONTHS OF Jan. TO May, 19 68

(1) Species	(2) Weeks of reporting period 3/10-16 11	3/17-23 12	3/24-30 13	3/31-4/6 14	4/7-13 15	4/14-20 16	4/21-27 17	4/28-5/4 18	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimated total
Swans:											
Whistling					90	2			644		
Trumpeter											
Geese:											
Canada	67	74	76	88	57	49	54	66	3,934		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard		2	7	46	60	76	71	70	2,268		
Black											
Gadwall		5	5	47	26	304	80	139	4,242		
Baldpate				85	42	36	12	6	1,267		
Pintail				12	10	20		4	322		
Green-winged teal						30			210		
Blue-winged teal				2				8	70		
Cinnamon teal											
Shoveler				8	74	84	135	670	6,797		
Wood											
Redhead				158	100	316	25	10	4,263		
Ring-necked				14	28	24			462		
Canvasback				2	30	10	2		308		
Scaup		6		796	2,227	1,709	3,745	2,075	73,906		
Goldeneye		1	40	216	40			14	2,177		
Bufflehead			4	23	78	12	16	10	1,001		
Ruddy				2				8	70		
Other A. merg.		22	42	25	32	27			1,036		
Coot:				25	25	25	120	315	3,570		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	644	90	
Geese	3,934	88	
Ducks	98,399	4,086	
Coots	3,570	315	

SUMMARY

Principal feeding areas Spring, Hillebrand and Waubay lakes, Swan Pond.

Principal nesting areas Spring, Hillebrand and Waubay lakes, Swan Pond.

Reported by

Robert R. Johnson, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C. 37944
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Hubbay Months of January to May 1960

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Double-crested Cormorant	4	4/2								
Great Blue Heron	1	4/6								
White Pelican	3	4/10								
B-C Night Heron	3	4/29								
Pied-billed Grebe	6	4/9								
Western Grebe	1	4/25								
II. Shorebirds, Gulls and Terns:										
Killdeer	1	3/18								
Lesser Yellowlegs	1	4/8								
Avocet	12	4/29								
Willet	2	4/29								
Ring-billed Gull	1	3/23								
Franklin's Gull	4	4/9								
Herring Gull	10	4/10								

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove	1	3/28								
White-winged dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk										
Horned owl	Winter	resident	6	4/30						
Magpie	1	1/2								
Raven										
Crow	1	3/3								
Red-tailed Hawk	1	3/3								
Marsh Hawk	1	3/16								
Sparrow Hawk	1	4/2								
Sharp-shinned Hawk . .	1	4/17								
Swainson's Hawk . . .	1	4/29								

Reported by Robert R. Johnson, Refuge Manager

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C. 59317

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Waubay Months of January to May, 1968

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres Per Bird	Number broods observed	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	Prairie, sloughs, agr. fields and woods-2700 acres of upland				50-50				25	

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Waubay Year ending April 30, 1968

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5) Total Population
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re-stocking	For Re-search	Permit Number	Trappers' Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
Muskrat														100
Mink														15
Red Fox					1									5
L-T Weasel														5
S-T Weasel														5
Striped Skunk														5
Badger														5
Raccoon														5
Jackrabbit														25
Cottontail														25
Fox squirrel														50
Wood chuck														5

* List removals by Predator Animal Hunter

REMARKS:

Reported by Robert R. Johnson

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Waubay MONTHS OF May TO Sept., 19 68

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	66	66	99	99	90	90	114	114	180	180
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	70	100	80	80	80	80	80	80	80	80
Black										
Gadwall	120	150	130	130	130	130	130	130	130	130
Baldpate										
Pintail	4	4	4	4	4	4	4	4	4	4
Green-winged teal	2	2	2	2						
Blue-winged teal	150	150	200	200	200	200	200	200	200	200
Cinnamon teal										
Shoveler	150	150	100	100	100	100	100	100	75	75
Wood										
Redhead	30	30	25	25	25	25	25	25	25	25
Ring-necked	6	6								
Canvasback	2	2								
Scaup	700	600	300	200	100	100	75	75	50	10
Goldeneye	4	4								
Bufflehead	2	2								
Ruddy	4	200	200	100	100	100	50	50	25	25
Other										
Coot:	320	300	300	200	200	150	150	150	100	100

Int. Dup. Sec., Wash., D.C. 37944

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Waubay MONTHS OF May TO Sept., 19 68

(1) Species	(2) Weeks of reporting period: 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada	180	180	180	180	180	180	180		15,246	11	35
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard	144	144	144	144	150	200	246		13,874	18	116
Black											
Gadwall	150	150	150	150	200	275	335		18,340	11	55
Baldpate						150	154		2,128		
Pintail	4	4	4	4	4	4	4		476		
Green-winged teal									56		
Blue-winged teal	223	223	200	200	150	100	97		21,651	10	77
Cinnamon teal											
Shoveler	100	100	75	75	50	25	10		16,695		
Wood											
Redhead	45	45	45	45	45	45	43		4,011	12	48
Ring-necked									84		
Canvasback									28		
Scaup									15,470		
Goldeneye									70		
Bufflehead									28		
Ruddy	50	20	30	15	10	10			6,923		
Other											
Coot:	110	110	110	110	110	110	110		19,180	4	10

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	15,246	180	35
Ducks	99,834	1,244	296
Coots	19180	110	10

SUMMARY

Principal feeding areas Waubay & Spring lakes, Swan Pond.

Principal nesting areas Waubay, Spring, and Hillebrank lake, Swan Pond, Dahling Slough

Reported by Robert R. Johnson, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C. 37944
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Waubay Months of May to Sept. 1968

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
D.C. CORMOrant			521	8/25						521
White Pelican			97	8/30						97
Pied-billed Grebe			325	8/25						325
Red-necked Grebe	1	5/17	10	6/30					5	15
Western Grebe			500	6/30					100	600
Eared Grebe	3	5/21								
Horned Grebe	2	5/9								
American Bittern	1	5/9	5	6/30						5
B.C. Night Heron			10	6/30						10
Sora Rail	2	5/9								
II. Shorebirds, Gulls and Terns:										
Upland Plover	1	5/5	10	6/30					5	15
Wilson's Snipe	1	5/7								
Stilt Sandpiper	1	5/7								
Wilson's Phalarope	50	5/17								
Ruddy Turnstone	10	5/27								
Red-~~billed~~ backed Sandpiper	25	5/20								
Black Tern	2	5/3	1000	5/18						

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove			500	7/30					100	600
White-winged dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk										
Horned owl	—		6	6/30					2	8
Magpie										
Raven										
Crow										
Swainson's Hawk			4	6/30					4	8
Red-tailed Hawk			6	6/30					6	12
Marsh Hawk			4	6/30					4	10

Reported by Robert R. Johnson, Refuge Manager

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Westhay Months of May to Sept., 1968

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres Per Bird	Number broods observed	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	Prairie, sloughs, agr. fields, and woods - 2700 acres of upland				50-50				25	

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Waubay For 12-month period ending August 31, 19 68

Reported by Robert R. Johnson Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	(2) Habitat Acreage		(3) Use-days	(4) Breeding Population Pts.	(5) Production
Waubay Lake UNIT I	Crops	151	Ducks	245,000	80	60
	Upland	679	Geese	50,000	7	10
	Marsh	139	Swans	4,000		
	Water	134	Coots	12,000	2	1
	Total	1,103	Total	311,000	89	71
Hillebrand Lake UNIT II	Crops	69	Ducks	179,053	38	31
	Upland	631	Geese	30,000	5	
	Marsh	28	Swans	1,000		
	Water	575	Coots	20,000	18	4
	Total	1,303	Total	230,053	51	35
Spring Lake UNIT III	Crops	82	Ducks	300,000	175	180
	Upland	924	Geese	73,755	17	25
	Marsh	45	Swans	1,251		
	Water	1,200	Coots	40,205	19	6
	Total	2,251	Total	415,211	211	211
Total	Crops	302	Ducks	724,053	283	296
	Upland	2,234	Geese	153,755	29	35
	Marsh	212	Swans	6,251		
	Water	1,901	Coots	72,205	39	11
	Total	4,649	Total	956,264	351	342
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

3-1759
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Waubay MONTHS OF Sept. TO Dec., 19 68

(1) Species	Weeks of reporting period (2) 9/1-7 1	9/8-14 2	9/15-21 3	9/22-28 4	9/29-10/5 5	10/6-12 6	10/13-19 7	10/20-26 8	10/27-11/2 9	10
Swans:										
Whistling							48	8	9	
Trumpeter										
Geese:										
Canada	114	73	20	88	708	2652	1000	705	867	
Cackling										
Brant										
White-fronted										
Snow					1	989	400	1000	1000	
Blue					2	585	100	200	340	
Other						1374				
Ducks:										
Mallard	580	131	91	266	588	8247	10,000	3000	2431	
Black			101					3		
Gadwall	101	33	46				50	4		
Baldpate	34	692	540	556	547	1622	1500	340	100	
Pintail					14	636	500	10		
Green-winged teal										
Blue-winged teal	97	92	17	30	2	100				
Cinnamon teal									5	
Shoveler			11	60	18		10	25		
Wood	2	6	4		1	1				
Redhead	18	27	209	40	149	171		30	67	
Ring-necked										
Canvasback			2		31	426	450	100	178	
Scaup			57	2				900	1340	
Goldeneye					3			25	8	
Bufflehead	2	1	14	10	67	63	50	120	118	
Ruddy		1	51	200	138	20	40	810	60	
Other										
	166	477	641	1489	410	3011	2300			
Coot:										

Int. Dup. Sec., Wash., D.C. 37944

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE [redacted] MONTHS OF Sept. TO Dec., 19[redacted]

(1) Species	(2) Weeks of reporting period: 11/3-9 11	11/10-16 12	11/17-23 13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling	13	13							637		
Trumpeter											
Geese:											
Canada	436	[redacted]	185						50,764		
Cackling											
Brant											
White-fronted											
Snow									23,730		
Blue									8,589		
Other									32 319		
Ducks:											
Mallard	121	301	10						180,362		
Black									728		
Gadwall	46								1,960		
Baldpate	[redacted] 15								41,762		
Pintail		1							8,127		
Green-winged teal	5								35		
Blue-winged teal									2,366		
Cinnamon teal									35		
Shoveler									868		
Wood									98		
Redhead									4,977		
Ring-necked											
Canvasback									8,309		
Scaup	743								21,294		
Goldeneye									252		
Bufflehead	156								4,207		
Ruddy	22								8,888		
Other											
Coot:									59,458		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	637	48	
Geese	83,083	4,226	
Ducks	284,200	12,600	
Coots	59,458	3,011	

SUMMARY

Principal feeding areas Spring, Millstream and Waubay lakes, Dahling slough.

Principal nesting areas

Reported by Robert L. Johnson, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C. 37944
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Wenbey Months of Sept. to Dec. 31 19~~65~~ 68

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Double-crested Cormorant			300	9/11	2	10/23				
White Pelican			110	9/11	6	10/10				
Pied-Billed Grebe			550	9/25	3	11/6				
Red-necked Grebe			15	9/15	1	10/23				
Western Grebe			80	9/4	1	10/29				
Horned Grebe			33	9/18	33	9/18				
Great Blue Heron			11	9/4	2	10/3				
B.C. Night Heron					1	9/11				
II. Shorebirds, Gulls and Terns:										
Greater Yellowlegs					1	10/10				
Franklin's Gull			10,000	9/3	500	9/15				

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove			300	9/15	1	11/3				
White-winged dove										
IV. Predaceous Birds:										
Golden eagle			1	9/23	1	9/23				
Duck hawk										
Horned owl			4	12/31	winter	resident				
Magpie										
Raven										
Crow										
Red-tailed Hawk					1	10/1				

Reported by Robert R. Johnson, Refuge Manager

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1750c
Form NR-1C
(Sept. 1960)

Waterfowl Hunter Kill Survey

Refuge [redacted]

Year 196___

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est.No. Hunters	(9) Est. Total Kill
			NO WATERFOWL HUNTING ON THE REFUGE					

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

80348-60

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Waubay Months of Sept. to Dec., 19 60

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres Per Bird	Number broods observed	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	Prairies, sloughs, agr. fields and woods, 2700 acres of upland				50-50				25	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, phesants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

*Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Waubay Calendar Year 1968

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed Deer		20	25									75	30	1:1

Remarks:

Reported by _____

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

116008

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Huntley County Day State S. Dak.

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Oats	42	2520 bu.			30	1900 bu.	72	Rye	45
Barley	52	1300 bu.			26	650 bu.	78	Alfalfa-brome	24
Wheat	17	510 bu.			9	270 bu.	26		
Rye	45	1350 bu.					45		
Millet					26	650 bu.	26		
Alfalfa seed		150 lbs.		50 lbs.					
							247		
							24		
							271		
								Fallow Ag. Land	20

No. of Permittees: Agricultural Operations 3 Haying Operations 2 Grazing Operations 8

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
Alfalfa-brome	24	24	none*	1. Cattle	194	531.80	$1,302.92	1330
*refuge share taken in grain acreage				2. Other				
				1. Total Refuge Acreage Under Cultivation				271
Hay - Wild	0			2. Acreage Cultivated as Service Operation				0

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.-DUP. SEC., WASH., D.C. 91767

3-1570
NR-88
(4/54)

REFUGE GRAIN REPORT

Refuge Waubay Months of Jan. through Dec., 1958

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Millet	4 bu.	2 bu.	6 bu.			4 bu.	4 bu.	2 bu.		x	
Shelled corn	5 bu.	0	5 bu.			3 bu.	3 bu.	2 bu.		x	
Alfalfa seed	50 lbs.	0	50 lbs.		50 lbs.		50 lbs.	0			

(8) Indicate shipping or collection points

(9) Grain is stored at Refuge Headquarters

(10) Remarks

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., WASH., D.C. 17065

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge	
Monday	
Proposal Number	Reporting Year 1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6/25/68	Canada thistle	Headquarters area	2.5	Tordon 212	2½ gal.	1 gal./a.	10 g/w	H. spray
6/26/68	Canada thistle	Center Woods	1.5	Tordon 212	1½ gal.	1 gal./a.	10g./w	"
7/2/68	Canada thistle	Center Woods	1.5	"	1½ gal.	1 gal./a/	10g./w	"
7/3/68	Canada thistle	E. Spring lake	1.25	"	1¼ gal.	1 gal./a.	10g./w	"
7/8/68	Canada thistle	Headquarters area	1.00	"	1 gal.	1 gal./a.	10g./w	"
7/9/68	Canada thistle	Jail Bait Pond	1.00	"	1 gal.	1 gal./a.	10g./w	"
7/18/68	Sow thistle	West woods area	2.5	"	2½ gal.	1 gal./a.	10g./w	"
7/25/68	Canada thistle	Unit G.4	2.00	2,4-D amine	1 qt.	3/4 lb./a.	10g./w	P. spray

10. Summary of results (continue on reverse side, if necessary)

Spraying of noxious weeds commenced on June 25th and ended on July 25th. Excellent results were obtained on areas sprayed with Tordon 212. Small patches of thistle were noted in heavy overtopping species of grass. There was approximately a 90% kill. Spraying has been effective in thinning out infested areas. Invading plant species usually consist of native grasses which do provide good nesting cover for waterfowl and upland game.

35501

Cost of spraying operations for the period are as follows:

Cost of Chemical	Equipment	Equipment & Labor cost	Total Cost	Acres	Cost/acre	Herbicide
.75	P. Spray	$ 7.35	8.00	2	$4.00	2,4-D amine
[illegible]	H. Spray	74.00	303.00	11.25	27.00	Tordon 212

One of the several hundred Western Grebes
which inhabited Waubay lake this summer.
R1a, Exp. 4, 5/69, RRJ.

SD-WBY-378

Commercial fishing on Waubay lake.
R 2, Exp. 1, 3/68, RRJ.

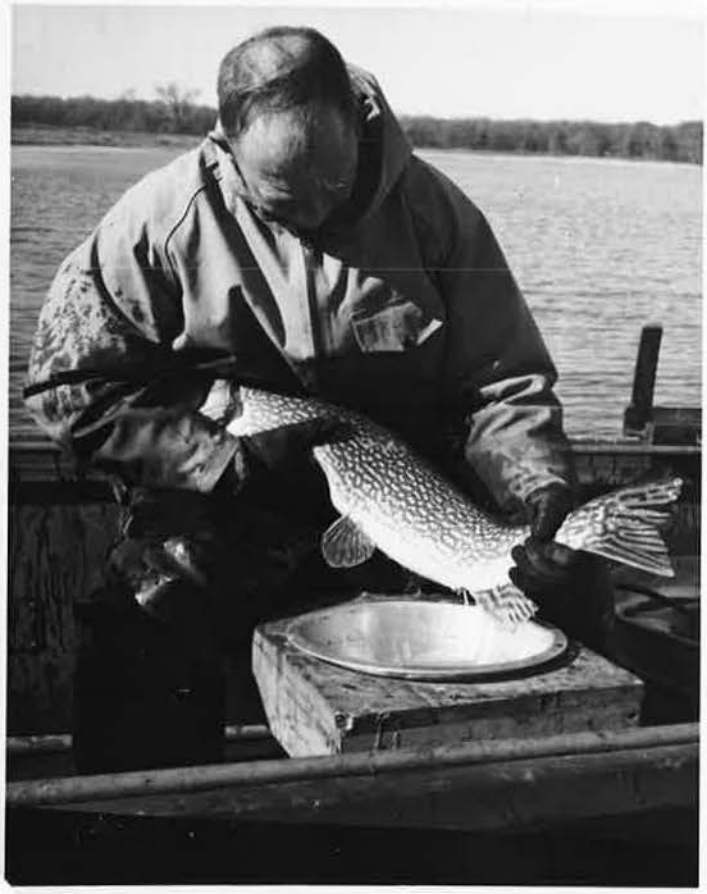
SCWBY-379

State Game warden Salley, showing typical carp taken during commercial seining of Waubay lake. About 500,000 lbs. were netted in 1968.
Rl. 2, Exp. 4, 3/68, RRJ.

SaWBY-380

State Fisheries Biologist Krumm displaying
25 lb. Northern Pike taken during egg taking
operation on Waubay lake. R4, Exp. 4, 4/68, RRJ.

SD-WBY-381



Close up of State Fisheries Biologist Krumm stripping northern eggs on Waubay lake.
R4, Exp. 5, 4/68, RRJ.

SD_WBY_3582

View of new automatic precipitation guage installed at Headquarters weather station by the U.S. Weather Bureau. The battery-powered instrument records precipitation at 15 minute intervals for up to a month or more without servicing. R4, Exp. 2, 4/68, HRJ.

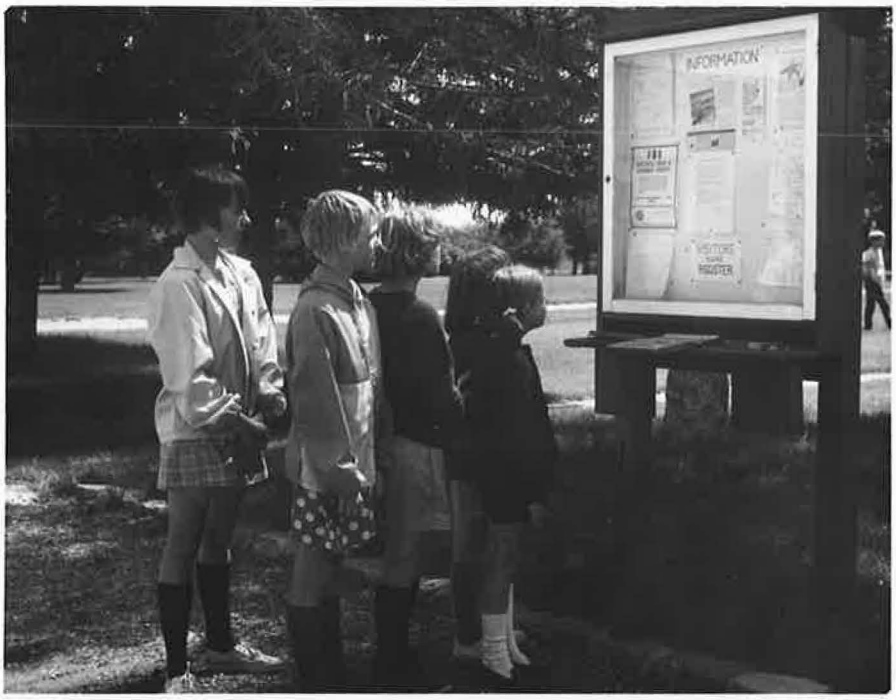
SD-WBY-383

One of the many school groups which visit
refuge headquarters. R15, Exp. 1, 6/68, RRJ

SD_WBV_384

The approach to the headquarters area Nature trail. R14, Exp. 3, 7/68, RRJ.

SD_WRY_385



Part of the 1749 visitors which registered
at headquarters this year. R15, Exp. 5, 6/68.
RRJ.

SO_WBY_386

Early photo of the refuge residence. The photo was believed to have been snapped in 1937 from the observation tower.
Commercial Post Card.

Similar view of refuge residence taken
32 years later. R16, Exp. 2, 6/68, RRJ.

SD-W84-386

View of goose banding on Spring lake.
R17, Exp. 6, 7/68, RRJ.

SD-W64-389

Part of the goose catch on Spring lake.
State Waterfowl Biologist Drewien in the
trap. R17, Exp. 3, 7/68, RRJ.

SD-WBI-390

Goose banding crew: Left to right, kneeling, Biological Tech. Ed Fromelt, Wetland Sup. Ralph Wallenstrom, SDSU student Joseph Hall, Ass't. Mgr. Lee Herzberger and Refuge Mgr. Lyle Schoonover of Sand Lake. Standing, SDSU student Don Wagner, Waubay Student Ass't. Ted Schenck, SDSU student Darrol Sauder, SDSU Ass't. Coop. Leader Bob Dahlgren, SDSU student Ron Thice, Aberdeen school student Bob Fedeler, and State Waterfowl Biologist Rod Drewien. R16, Exp. 3, 7/68, RRJ.

SD-WBY-391

"Blue Ribbon Planning Team" - Left to right:
Regional Architect J. Knackt, Team leader
E. Crozier, Interpretive specialist R. Johnston,
Recreation specialist M. Duncan, and I&E
specialist C. Griffith. R18, Exp. 1, 10/68, RRJ.

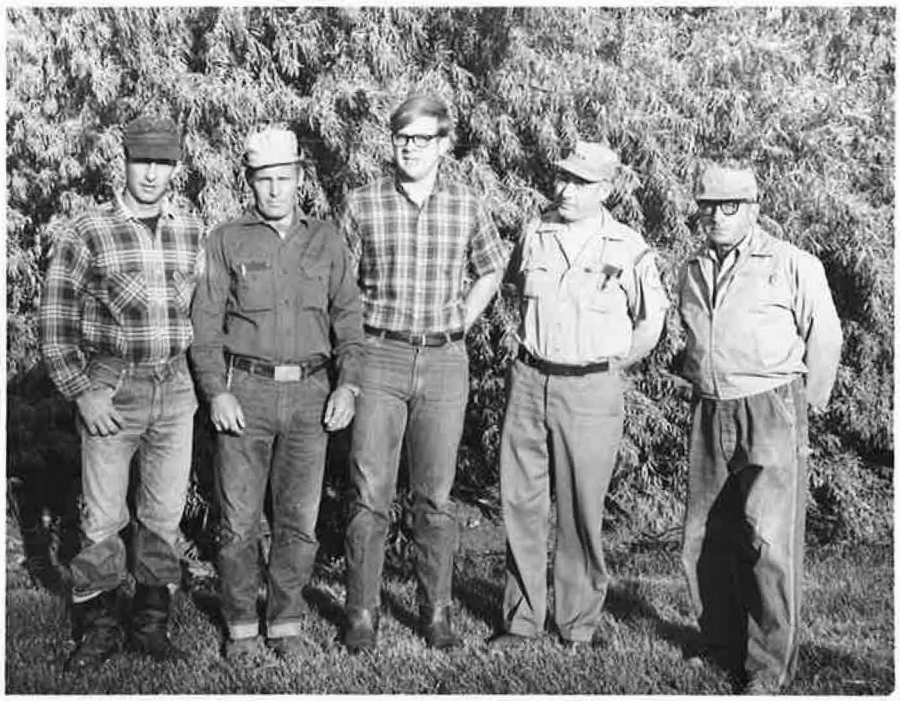
SD-WB/-392

Ex-officio Manager - Mrs. R. Johnson banding doves. During her career as a refuge manager's wife, this is but one of the many contributions to refuge operations. R7, Exp. 3, 7/68, RRJ.

SD-WBY-393

Assistant Manager, Ben Gastineau.
R20, Exp. 1, 12/68, RRJ.

SD-WBY-394



The refuge staff - Left to right:
Laborer Don Dargatz, Foreman I Milton
Thennis, Student Ass't. Ted Schenck,
Biological Tech. Ed Fromalt, and
Maintenanceman Ed Henning.
R7, Exp. 11, 7/68, RRJ.

SD-WBY-395

U.S.D.A. BIOLOGICAL SURVEY (WAUBAY
RATORY WATERFOWL REFUGE
HEADQUARTERS) WAUBAY, SO.
OTA
C.45

FINAL REPORT

Cooperative Study of the Northeastern South Dakota Resident Canada Goose Population, 1964-1967

July 1, 1968

by

Rod C. Drewien
Waterfowl Biologist
South Dakota Department
of Game, Fish & Parks

Robert R. Johnson
Refuge Manager
Waubay Nat'l. Wildl. Ref.
Bureau of
Sport Fisheries & Wildlife

A B S T R A C T

Cooperative Study of the Northeastern
South Dakota Resident Canada Goose Population,
1964-1967

From 1964-1967, a cooperative study between the South Dakota Department of Game, Fish and Parks and the U. S. Bureau of Sport Fisheries and Wildlife was conducted in northeastern South Dakota to determine the status of a resident nesting population of reintroduced giant Canada geese.

During the 4-year study, the breeding pair population averaged 111, and ranged from 101 to 121, indicating that the pair population was static. Average annual production was estimated to be 394 goslings, ranging from 261 to 563, while nesting success (% pairs hatching a brood) averaged 82 per cent and ranged annually from 60 to 93 per cent. Fall prehunting season counts varried from 614 to 840 and averaged 699.

Artifical nesting platforms provided secure nesting sites and contributed to the high productivity of the geese. During the study, about 593 goslings or 33 per cent of the estimated production hatched on platforms.

Band recoveries show that over 90 per cent of the harvest is restricted to four localized areas in South Dakota: Nebraska; Kansas; and Texas; with the largest harvest coming from the breeding grounds in Day, Marshall, and Roberts Counties, South Dakota.

Estimated average annual mortality for the Northeastern South Dakota Resident Canada Goose Population was 36.4 per cent. This high mortality rate is due mainly to heavy gunning pressure and limits any substantial population growth.

An increase in the present goose population will depend on an improved management program designed to utilize <u>avaiable</u> <u>breeding</u> <u>habitat</u>.

Cooperative Study of the Northeastern South Dakota Resident Canada Goose Population, 1964-1967

by

Rod C. Drewien and Robert R. Johnson

INTRODUCTION

Little is known about the early history and status of breeding Canada geese in northeastern South Dakota. Over and Thomas (1921) and Hanson (1965:65) indicated that geese nesting in this area prior to settlement but disappeared around 1900. Interviews with early-day residents of Day County (pers. comm.) indicated a few pairs still nested in the Bitter Lake area as late as 1910. Thereafter, wild Canada geese were not known to nest in northeastern South Dakota until their re-establishment in the late 1930's.

In 1937, a local hunting guide and resort operator, Mr. Jack Rommel, donated his decoy flock of 30 pinioned Canada geese to the Waubay National Wildlife Refuge. Mr. Rommel indicated that the captive birds originated from parent stock raised from eggs collected in the wild in the Bitter Lake area during the early 1900's. In 1939, a group of business men from Webster, South Dakota donated additional pinioned geese to the refuge. These birds were obtained from the estate of August Wolfe, a local farmer. The original source of these birds is unknown.

From 1937-1945 offspring of the captive flock were released as free flyers. In 1943, some of these released geese first nested on the refuge and 9 pairs were known to produce 3 broods (13 goslings). First known nesting to occur off the refuge was in 1945 when one pair nested on north Waubay Lake.

By 1950 the refuge breeding population had increased to 68 pairs and a minimum of 110 goslings were produced that year. At this time breeding pairs were continuing to disperse from the refuge and nest within a 15 mile radius.

In 1951, the refuge breeding population decreased to 26 pairs and thereafter remained low, numbering no more than 24 pairs during any year through 1964. Reasons for the decline are unknown, but may be related to increased breeding pair dispersed and heavy hunting pressure.

After 1945, when breeding birds started nesting away from the refuge, the status of this segment of the flock remained largely unknown. Fragmentary evidence indicated that by the late 1950's the flock had slowly extended its breeding range about 25 miles from the refuge and was thought to stabilize at about 50 breeding pairs.

By 1964, status of the northeastern South Dakota resident flock remained largely unkown, and in that year the South Dakota Department of Game, Fish and Parks and the Bureau of Sport Fisheries and Wildlife initiated a cooperative 4-year study. Objectives included 1) determining population status, including size, distribution and production rates, and 2) annual summer banding program to determine migration routes and phenology, and mortality rates. These data are needed for developing a suitable management program to promote the welfare and expansion of this flock on private and public lands.

The northeastern South Dakota resident Canada goose flock has been classified by Hanson (1965:18) as being of the giant race (*Branta canadensis maxima*). Hanson (1965:31) considers this population to represent the "gold standard" of giant Canada geese.

STUDY AREA

The study was conducted on the Waubay National Wildlife Refuge and surrounding vicinity in northeastern South Dakota in those portions of Day, Marshall and Roberts counties located in the Prairie Hills. This area is located in the physiographic region known as the Coteau des Prairies or Prairie Hills and is a glaciated upland area 1800-1900 feet in elevation, lying between the Minnesota and James River valleys.

Topography of this region varies from nearly level to rolling, and the surface is pitted with thousands of glacially-formed depressions which form lakes and marshes. Soils have developed from materials deposited by the third substage of the Wisconsin Ice Sheet and consist of a mixture of clays, silts, sands, gravel and stone (Kingelhoets et al. 1952).

The subhumid continental climate of this area is typical of the northern great plains with wide variations in temperatures between summer and winter. Monthly mean temperatures at Webster, Day County, range from 10.2°F (January) to 71.2°F (July), and temperature extremes of -41°F and 109°F have been recorded. Average annual precipitation is 20.62 inches (U. S. Department of Commerce 1965) with about two-thirds falling during the 4½-month growing season.

The breeding goose population is closely associated with the distribution of large, shallow lakes in the northern Prairie Hills. Therefore, the breeding range was arbitrarily divided into four areas and named after the major lake group located in each area. The four major lake areas are 1) Bitter Lake, Day County; 2) Waubay Lakes, Day County; 3) Kettle Lakes, Marshall County, and 4) Drywood Lakes, Roberts County (Figure 1).

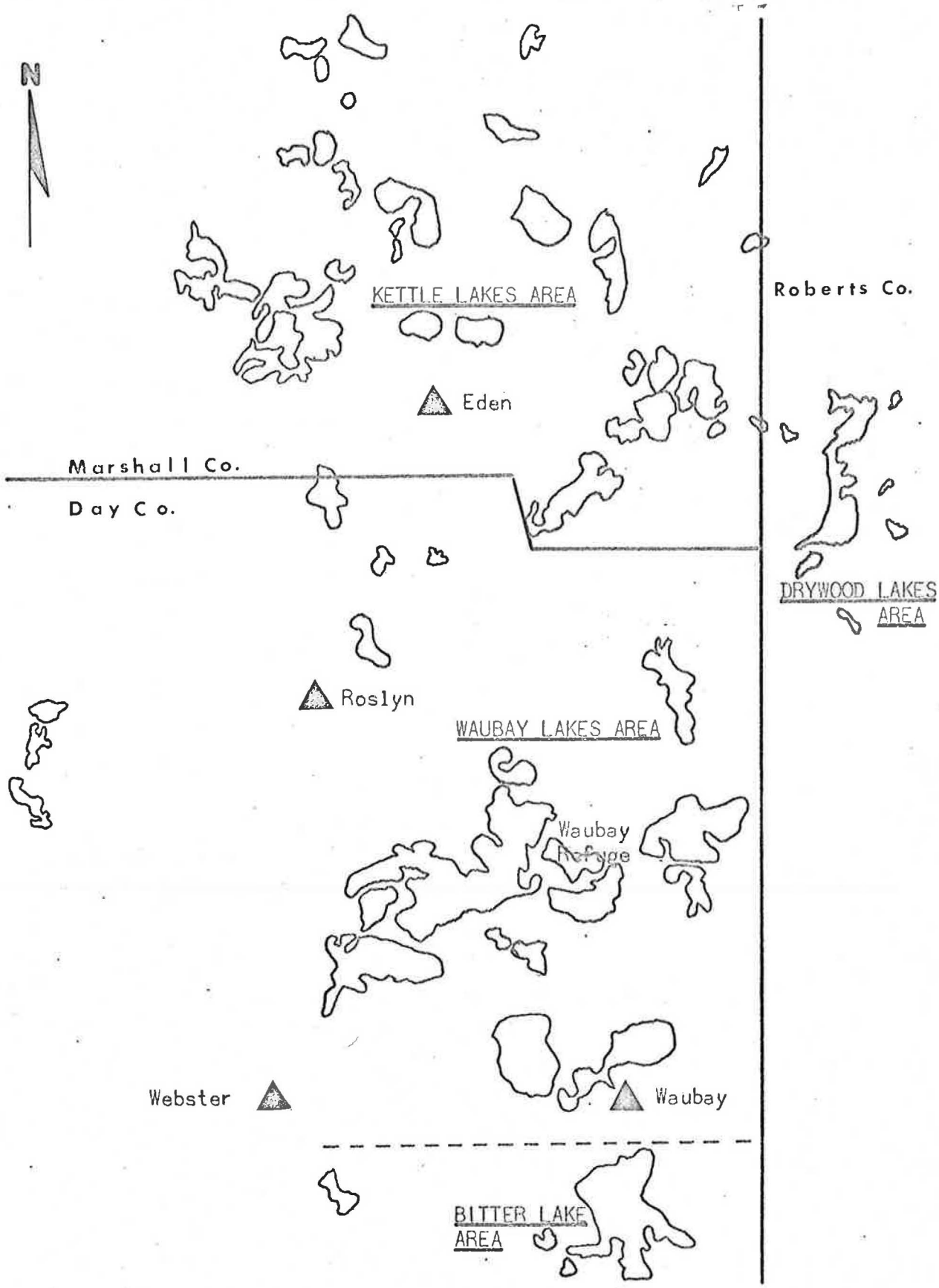


Figure 1. Study area and breeding range of the Northeastern South Dakota Canada goose population.

METHODS

Pair Counts

Spring aerial counts were conducted from 1964-67 to determine status and distribution of the breeding population. Initially, in 1964 approximately 1800 square miles were surveyed to determine breeding population distribution. This survey included the lake and pothole region located in the Prairie Hills north of an east-west line through the town of Florence, in Codington County. After 1964, only areas known to contain geese were surveyed. Areas without geese in 1964 and where geese had not been known to occur were omitted from future censuses.

In 1964, pair counts were conducted on April 14-15; 1965-- April 20 & 22; 1966-- May 2-3; and 1967-- May 2. Aerial counts were made only on calm days with good visibility. In 1966 and 1967, a ground count was made on the Waubay National Wildlife Refuge in conjunction with the aerial survey. These data were used to determine the accuracy of aerial counts.

Geese censused were recorded as singles (inclubating or other), pairs or grouped. Pairs, singles and/or incubating geese were considered to represent an indicated breeding pair. However, any lone goose was excluded when observed in the vicinity of an incubating female.

Brood Counts and Production Estimates

Aerial production surveys were conducted annually in June in the same areas covered during pair counts. June ground counts were also made on the Waubay Refug All artificial nesting structures were checked for gosling production both on and off the refuge.

These data were used to obtain annual production estimates which were calculated by using the following formula:

$$A \times B \times C = P$$

where

A = Indicated pair population

B = Per cent of pairs producing broods

C = Average brood size

P = Production

The per cent of pairs producing broods was calculated using the following formula:

$$A \times B = C$$

where

A = Per cent of pairs on the Waubay Refuge producing broods

B = Numbers of indicated pairs

C = Per cent of total pairs producing broods

During the first three years of study, averave brood size was determined from data collected on June aerial surveys. In 1967, June aerial brood counts were not conducted and average brood size was determined from Waubay Refuge brood counts.

Artificial Nesting Platforms

Artificial overwater nesting platforms were first used on Waubay Refuge in 1958, and on state-owned public shooting areas in 1961. The first platforms were made of 7-foot steel fence posts, laced with wire to hold 6 bales of hay. Seven-foot posts were used on the corners to support platforms.

In 1962, platform size was reduced to 4 feet square and they were topped with loose hay. These modifications reduced construction and installation costs and appeared acceptable to nesting geese. In 1963 platform modification included welding and reinforcing all joints with braces to make platforms more rigid. Triangular platforms, similar in construction to the above, were also used on some public shooting areas. In 1966, 10 circular fiberglass platforms, 42-inches in diameter, were placed out on Waubay Refuge. These platforms were supported by 8-foot metal poles.

Nesting platforms were placed in shallow water in various sized water bodies. All platforms were placed in areas affording good visibility and above surrounding vegetation.

Efforts were made to inspect artificial nesting structures twice yearly. The first check was in conjunction with spring aerial pair census and the second was a ground inspection during the latter part of the nesting season. Data recorded included species use, clutch size, number of eggs hatched and condition

of nesting structure.

Fall Population Counts

Annual aerial counts of Canada geese were made throughout the study area in September, prior to arrival of migrant geese. Initially, in 1964, the entire study area was covered as described under pair counts. Thereafter, only those areas delineated as concentration areas were censused. Census requirements included making counts between 11:00 AM and 3:00 PM, CST since geese were less likely to be out feeding and away from water areas during this period.

Calm days with good visibility (three miles or more) were a prerequisite to censusing.

Banding

Drive trapping of goslings and flighless adults was conducted annually during late June and/or early July. In 1964 and 1965 trapping operations were undertaken on the refuge and in the Bitter Lake area south of Waubay. In 1966 and 1967 trapping attempts were restricted to the refuge, as were banding operations in 1951, 1953, 1954, and 1959-63.

Distribution of harvest and mortality rate estimates were made from recovery data of Canada geese banded during the summers of 1951, 1953, 1954, and 1959-66. All band recoveries (does not include retrapped geese) were used to determine geopraphic distribution of the population. Only those recoveries taken by hunters and those found dead from September through January were used to calculate mortality rates. Banding data from 1954 (19-banded, 3-recovered) were excluded from mortality calculations since these geese were hand-reared and released to the wild. Average annual mortality rates were calculated by the Composite Dynamic method (Geis and Tabor 1963:284-285).

RESULTS AND DISCUSSION

Spring Arrival and the Breeding Population

Resident Canada geese are the first waterfowl to return annually each spring to northeastern South Dakota and precede other species by several weeks. These geese usually return in early March when lakes are still ice-bound and little or no open water is available. Spring arrival dates from 1955 to 1968 are shown in Table 1.

Results of spring breeding pair surveys from 1964-67 are shown in Table 2. Average number of breeding pairs for the 4-year study period was 111, range 101 to 121. These counts suggest an increase in pairs from 1964 through 1966 with a decline occurring in 1967. Heavy hunting pressure during the 1966 season may well have been responsible for the decrease observed in 1967. However, it is questionable whether the pair survey is refined to the point where counts accurately portray changes in the status of breeding pairs as suggested by the trend indicated in Table 2.

Geographical distribution of the breeding population from 1964-67 was closely associated with large, shallow, commercially undeveloped lakes. Pair counts (Table 2) showed that the largest number were found yearly in the Waubay Lakes area which included the Waubay National Wildlife Refuge and lakes in the surrounding vicinity. This area supported 50.0 per cent of the pairs from 1964-67. North Waubay Lake was the most important water body for nesting geese within this

Table 1. Spring arrival and Fall departure dates for northeast South Dakota resident Canada goose population, at Waubay National Wildlife Refuge, Day Co.

Year	Arrival	Departure
1955	1/	Nov. 27 - Dec. 3
1956	March 11	Nov. 7
1957	March 33	Dec. 1 - 6
1958	March 24	Nov. 25
1959	March 16	Dec. 5
1960	March 31	Dec. 3
1961	March 9	Dec. 6
1962	March 27	Dec. 8
1963	March 10	Nov. 30
1964	March 10	Nov. 26
1965	March 14	Nov. 22
1966	March 13	Nov. 12
1967	March 9	Nov. 24
1968	March 6	-------

1/ Portion of population overwintered in area. 1955 was the first year entire population migrated south.

complex. Bitter Lake, south of the town of Waubay, and the pothole complex lying immediately west of the lake was the second most important breeding area for the flock; 30.4 per cent of the pairs observed from 1964-67 were associated with this area. The Kettle Lakes region of Marshall County was the third most important area and 16.7 per cent of the pairs nested in this area, while the Drywood Lake area in Roberts County supported 2.9 per cent during the study.

Only two pairs were known to nest outside the four major lake areas. In 1965, two pairs nested on a lake in Codington County. This lake is located about 23 miles south of Bitter Lake, Day County. One pair was successful in raising a brood. However, most of the family was lost to hunting during the fall. Nesting attempts have not been made in this area since 1965.

In 1964, pair counts were conducted during mid-April. Migrant geese were present and hampered the count (Table 2). Consequently, in 1965 the survey was delayed until April 20-22, and migrant geese were not observed. In order to further evaluate periods for conducting optimum pair surveys, counts were delayed until May 2-3 in 1966. Results indicated that migrant geese were not present and many pairs encountered were nesting. For these reasons counts were again made on May 2 in 1967.

During the 1966 and 1967 aerial counts, ground surveys were made on the Waubay National Wildlife Refuge to serve as a check. Refuge ground counts showed 30 pairs in 1966 and 30 pairs in 1967, whereas, during aerial counts

Table 2. Spring aerial breeding pair counts of northeastern South Dakota resident Canada goose population, 1964-67.

Location	1964	1965	1966	1967
Bitter Lake Area	24	37	44	30
Waubay Lakes Area	65	49	61	47
Kettle Lakes Area	8	22	15	29
Drywood Lakes Area	4	3	1	5
Total Indicated Pairs	101	111	121	111
Grouped Geese	1010*	91	41	102
Date of Count	April 14-15	April 20-22	May 2-3	May 2

*Includes migrant geese

Table 3. Aerial counts and distribution of Canada goose broods, northeastern South Dakota, 1964-66.

	1964		1965		1966		Total	
Location	No. Broods	No. Goslings	No. Broods	No. Goslings	No. Broods	No. Goslings	No. Br.	No. Gos.
Bitter Lake Area	6	34	6	26	15	57	27	127
Waubay Lakes Area	22	79	7	27	20	95	49	164
Kettle Lakes Area	7	35	8	28	26	143	41	199
Drywood Lakes Area	1	5	3	7	--	---	4	12
Total	36	154	24	88	61	305	121	447

28 pairs were observed in 1966 and 29 pairs in 1967. These data indicated that a reliable aerial pair count is obtained for the refuge. However, corrections for air-ground ratios were not projected, as data were not available for 1964 and 1965, and personnel involved in aerial surveys were familiar with pair distribution on the refuge.

Brood Counts and Production Estimates

Geographical distribution of broods is shown in Table 3. Of 121 broods observed during the study, all were located within a 20 mile radius of the Waubay Refuge, with 101 or about 80 per cent located within a 15 mile radius. About 40 per cent of the broods were in the Waubay Lakes area. The Kettle, Bitter and Drywood Lakes areas held 33, 22 and 3 per cent of the broods, respectively.

Broods shunned larger lakes supporting intense summer sport fishing and cabin development. Broods also appeared to avoid wetlands smaller than 20 acres. Apparently, broods moved to larger lakes shortly after hatching, as no broods were observed on small wetlands during aerial surveys.

Data gathered on aerial brood counts were not sufficient for determining annual nesting success and production. Complete coverage was difficult and brood visibility was generally poor. Use of vegetation along shore margins and adjacent uplands by broods contributed to their poor visibility. However, aerial brood surveys did provide good information on brood size.

Estimated Canada goose production during the 4-year period averaged 394 goslings annually, and ranged from a low of 261 in 1964 to a high of 563 in 1966. Nesting success (per cent of pairs producing broods) averaged 82 per cent while average brood size was 4.3 (Table 4).

During the study, goose production increased each year except 1967, when it decreased 25 per cent below the 1966 level. Nevertheless, 1967 production was still above the 1964 level. This is attributed to increases in nesting pairs during 1965-67 over 1964 and to higher nesting success (Table 4).

Use of Artificial Nesting Structures

The number of artificial nesting platforms available annually varied from a low of 55 in 1964 to a high of 113 in 1967, and averaged 93. Annual use of available structures ranged from 40 to 48 per cent, and averaged 44 per cent (Table 5).

Dur During the study, 164 goose nests were observed on nesting platforms. Success was not determined for all nests as a few were still being incubated during inspections. However, of 86 nests observed on platforms from 1964-67 on Waubay Refuge, 78 or 90.7 per cent were successful, annual range, 80 to 96.2 per cent. Estimated production from all artificial structures based on egg counts and inspection, was 593 goslings or 33 per cent of the 4-year estimated production. Average brood size was 3.6 goslings (Table 5).

Occasionally, dead goslings were found on nesting platforms bedded with baled hay. Crevices between bales occasionally trapped goslings. Some goslings were also trapped when platforms were low on nesting material.

Some platforms attracted nesting geese each year, and in many cases were probably used by returning pairs. In 1964, two successful nests, one following the other, were hatched from the same platform. Other birds also nested on the artificial structures. During the study, 52 mallard nests, 1 shoveler nest, 1 canvasback nest, 1 coot nest, and 1 great horned owl nest were observed on structures. Commom grackles were also observed nesting on platforms.

From 1964-1967, 59 platforms were destroyed or damaged to the extent they were nonfunctional. Ice action was responsible for most damages. Annual losses ranged from a low of 9 per cent in 1965 to a high of 30 per cent in 1964; average annual loss was 17 per cent.

Data collected on 371 visits to nesting platforms during the study supports the following conclusions:

1. Little variation occurs in the percentage of structures used by nesting geese. Between 40 to 48 per cent of available structures were used annually.

Table 4. Canada goose production, northeastern South Dakota, 1964-1967.

Year	Indicated Pairs	% Pairs Producing Broods	Average Brood Size	Calculated Production
1964	101	60	4.3	261
1965	111	80	3.7	329
1966	121	93	5.0	563
1967	111	93	4.1	423
Total	444	--	---	1,576
Average	111	82	4.3	394

Table 5. Results of artificial nesting structure inspection, northeastern South Dakota, 1964-1967.

Year	Available Platforms	Platforms Used No.	Platforms Used % Total	Goslings Produced	Average Brood Size	% Total Annual Production
1964	55	24	43	82	3.7	21
1965	93	37	40	115	3.1	29
1966	110	49	45	196	4.0	35
1967	113	54	48	200	3.7	45
Total	371	164	--	593	---	--
Average	93	41	44	148	3.6	33

2. Broods produced on artificial platforms appeared to be smaller than those produced on natural nesting sites. Broods produced on artificial structures averaged 3.6 goslings. Average brood size based on aerial surveys and including broods produced on both artificial and natural nesting sites averaged 4.3 goslings. Reasons for differences in brood sizes from aerial surveys and artificial platforms are unknown, but brood mixing and/or platform design may have been factors responsible for the differences.

3. The average life of artificial nesting platforms was about 6 years.

Fall Population Counts

Fall counts of geese varied from a low of 614 in 1964 to a high of 840 birds in 1966. The average fall prehunting population was 699 (Table 6).

Fall population distribution generally followed a similar pattern to that of breeding pairs. Of 2,796 geese observed during fall counts, 1,435 or 51 per cent found in the Waubay Lakes area, 849 or 36 per cent in the Kettle Lakes area, and 385 or 13 per cent in the Bitter Lake area.

Band Recoveries

A total of 662 Canada geese were banded during the summers of 1951, 1953, 1954 and 1959-66, and included 363 adults, 298 goslings and 1 unknown. Recoveries included 109 geese banded as adults and 95 banded as goslings. In addition, 113 geese banded in previous summers were recaptured during the summers from 1964-67 on the breeding grounds (Table 7): 9 geese were retrapped near Meade, Kansas (1-1961, 8-1962: and 1 was retrapped in San Patricio County, Texas on the gulf coast in 1951.

Geopraphic Distribution of Recoveries

Geographic distribution of band recoveries is shown in Figure 2. South Dakota accounted for 59.3 per cent (121) of all recoveries from 1951-66, and 96.7 per cent or 117 of these recoveries were from the breeding range within Day, Marshall and Roberts Counties (Tables 8 & 9). The heaviest kill occurs on lands surrounding the Waubay National Wildlife Refuge where hunters concentrate.

The main fall migration route south has major stop-offs occurring at Johnson Lake and vicinity, south of Lexington in south-central Nebraska, and around Cheyenne Bottoms area, Barton County, in central Kansas. After leaving Kansas the birds move to their wintering grounds that is centered mainly in Baylor

Table 6. Fall counts of northeast South Dakota resident Canada goose population, 1964-1967.

Location	1964	1965	1966	1967	Total
Bitter Lake Area	31	114	180	60	385
Waubay Lakes Area	389	348	426	384	1,547
Kettle Lakes Area	194	159	234	262	849
Drywood Lakes Area	---	---	---	15	15
Total	614	621	840	721	2,796
Date of Count	9/14	9/6	9/24	9/21	

Table 7. Summary of Canada geese previously summer banded and recaptured in northeastern South Dakota during summers, 1964-1967.

Year of Recapture	Recaptured - Years After Banding				
	1	2	3	4	5
1964	3	6	3	3	4
1965	23	4	5	1	2
1966	25	1	-	-	1
1967	18	12	2	-	-
Total	69	23	10	4	7

Figure 2. Band recovery distribution by states of Canada geese banded during the summers of 1951, 1953, 1954, 1959-66, northeastern South Dakota.

Table 8. Band recovery distribution by state and five-year periods of Canada geese banded during the summers of 1951, 1953, 1954, 1959-66, northeastern South Dakota.

	1951-55	1956-60	1961-65	1966	Total	Per Cent
South Dakota	18	14	64	25	121	59.3
Nebraska	2	4	13	--	19	9.3
Kansas	--	--	11	19	30	14.7
Oklahoma	--	--	--	3	3	1.5
Texas	2	--	23	4	29	14.2
North Dakota	--	--	--	1	1	0.5
Iowa	--	--	--	1	1	0.5
Total	22	18	111	53	204	100.0

Table 9. Distribution by counties of South Dakota recoveries of Canada geese banded in northeastern South Dakota during the summers, 1951, 1953, 1954, 1959-66.

	Number	Per Cent
Breeding Area		
Day, Marshall, and Roberts	117	96.3
Elsewhere		
Bon Homme	1	
Charles Mix	1	3.7
Codington	1	
Gregory	1	
Total	121	100.0

and Knox Counties in north-central Texas (Figure 2).

Nearly 90.7 per cent of all recoveries come from the breeding area in northeast South Dakota (57.3%), Johnson Lake area, Nebraska (7.8%), Cheyenne Bottoms area, Kansas (12.3%), and Knox-Baylor area, Texas (13.2%). Due to the very restricted recovery distribution occurring within four major areas, management problems regarding harvest coult be easily manipulated as needed with proper cooperation between the states concerned.

In 1966, recoveries were first received from Oklahoma (3), Iowa (1), and North Dakota (1) (Table 8). The Iowa recovery involved an immature that may have wandered and is the first recovery from the Mississippi Flyway. The North Dakota recovery, an adult male banded in 1965, is the first and only recovery north of the breeding grounds. This movement may be due to wandering. However, the possibility exists that a Canada goose associated with another population was trapped and banded during the summer in South Dakota. During summer drive trapping operations from 1964-67, three foreign banded Canadas and an occasional White-fronted, Snow or Blue goose have been captured. Possibly these birds are cripples that are unable to continue spring migration and remain in the area throughout the summer.

Hanson (1965: 78-80) stated that in some populations of giant Canada geese the non-breeding segment migrate to the Arctic for the summer molt. At present, we have no evidence indicating that any of the Waubay population make a long northern molt migration. Although spring pair counts do not account for all non-breeders (Table 2), members of the yearling cohort are recaptured annually during summer trapping operations. Spring distribution of many non-breeders is presently unknown.

Some changes in recovery distribution have occurred since start of summer bandings in 1951 (Table 8). The first recoveries from Oklahoma occurred in 1966 and it will be interesting to see if this trend continues. In the early 1960's geese first started stopping in Kansas with a peak number of recoveries occurring in 1966. The Geese are apparently responding to an improved management program

at Cheyenne Bottoms. In 1967, Kansas closed the Canada goose season after December 10 in order to provide additional protection and encourage large Canadas to remain in the area. Continuance of this closure could possible result in Waubay geese remaining in the area to winter and eventually eliminate the flight to Texas.

Temporal Distribution of Harvest

Recovery data were plotted by 10-day periods (Table 10) in order to obtain an indication of harvest periods and migrational movements. Nearly one-fourth of the harvest occurs during the first 10 days in October, while over half of the harvest occurs during October on the breeding range in northeastern South Dakota (Table 10). Band recoveries and departure dates from the Waubay National Wildlife Refuge (Table 1) indicate that fall migration starts by mid-to-late November. Recoveries on Texas wintering areas peak in late December and January and probably correspond with the arrival of the majority of the population.

Average Annual Mortality Rates

The estimated average annual mortality rate for all cohorts of the banded population was 36.4 per cent (Table 11). This mortality estimate is essentially the same as the 37.5 per cent calculated by Hanson (1965: 181) for this population. Hanson used spring population counts and production data to arrive at a mortality estimate.

The mortality rate of 36.4 per cent is rather high when compared with other Central Flyway goose populations for which mortality rates have been determined. The average annual mortality rate which a Canada goose population can actually sustain and still maintain or increase in numbers is unknown, but is governed largely by annual production and age class composition. Although adult mortality rates for static to decreasing populations of Central Flyway White-fronted geese (Miller et al. 1968), small Canada geese of the Tall Grass Prairie population (Schoonover, pers. comm.), and Missouri River Canada geese

Table 10. Time distribution of harvest (per cent) by 10-day periods of Canada geese banded in northeastern South Dakota during the summers, 1951, 1953, 1954, 1959-66.

	October				November			December			January
	1-10	11-20	21-31	Un-known	1-10	11-20	21-30	1-10	11-20	21-31	
South Dakota	39.1	17.3	22.7	7.3	2.7	9.1	1.8	----	----	----	----
Nebraska	----	----	----	----	----	5.9	29.4	29.4	35.3	----	----
Kansas	----	3.3	----	----	20.0	10.0	16.7	43.3	6.7	----	----
Oklahoma	----	----	----	----	----	----	33.3	33.3	----	33.3	-----
Texas	----	----	----	----	4.2	4.2	----	4.2	12.5	33.3	41.7
Total %	23.4	10.9	13.6	4.3	5.4	8.2	7.1	10.9	6.0	4.9	5.4
Cumulative %	23.4	34.3	47.9	52.2	57.6	65.8	72.9	83.8	89.8	94.7	100.1

of the Western Prairie population (Kirsch and Drewien, ms.)are several per cent lower than the Waubay population, they are mainly arctic or boreal forest nesting geese and are subjected to wide annual variations in production due to weather conditions. The northeast South Dakota population, on the other hand, is not usually subjected to extreme weather conditions on the breeding grounds and during the 4-year study an estimated 82 per cent of the pairs produced broods. This high production rate is apparently compensating for the high mortality rate and at present is at least maintaining the population at a static level.

Table 11. Recovery data from Canada geese banded in northeastern South Dakota during summers, 1951, 1953, 1959-66, and organized for composite dynamic mortality estimates.

		Hunting Season of Recovery															
Year Banded	No. Banded	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1951	58	7	6	4	1	1	4	1	0	1	0	1	1	0	0	0	
1953	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1959	36	1	3	1	0	2	3	0	1								
1960	77	9	9	13	6	1	0	1									
1961	46	6	6	6	2	0	1										
1962	38	4	5	4	1	1											
1963	31	8	1	3	1												
1964	86	12	1	8													
1965	165	12	24														
1966	103	16															
Totals	643	76	55	39	11	5	8	2	1	1	0	1	1	0	0	0	
Banded Birds Available		643	540	375	289	258	220	174	97	61	61	61	61	61	61	61	
Recoveries /1000 Banded		118.2	101.9	104.0	38.1	19.4	36.4	1.1	1.0	1.6	0	1.6	1.6	0	0	0	424.9
Alive going in to period		424.9	306.7	204.8	100.8	62.7	43.3	6.9	5.8	4.8	3.2	3.2	1.6	0	0	0	1168.7
Mortality Rate		27.8															36.4

CONCLUSIONS AND SUMMARY

From 1964-1967, a study was conducted in northeastern South Dakota to determine status, including size, distribution, and production rates of a resident nesting population of reintroduced giant Canada geese. Annual aerial spring pair counts, summer brood counts, and fall prehunting season counts were conducted to gather population statistics. Evaluation of artifical nesting platforms and their contribution to the productivity of the population was made. Information obtained from geese banded during the study and in previous years were evaluated to determine harvest distribution, migration phenology, and mortality estimates of the population.

Breeding pair counts ranged from 101 to 121 indicated pairs, average, 111. These data indicate that the breeding pair population is static. Although it is recognized that all pairs were not observed, we believe that the vast majority were counted annually. Pairs missed during surveys were possibly offset by the counting of immature pairs that did not breed.

Average annual production was estimated to be 394 goslings, range, 261 to 563, while nesting success (%pairs hatching a brood) averaged 82 per cent and ranged from 60 to 93 per cent annually. The 82 per cent estimated nest success is considerably higher than the 58.6 per cent average calculated by Hanson (1965;165) for various giant Canada goose populations. Production estimates, obtained by using nesting success of pairs breeding on Waubay Refuge, may well be biased toward a higher nesting success than actually occurred. This could result if the nesting geese on Waubay Refuge are older, more experienced breeders. These pairs are the most productive in the population.

Breeding pair use of available artifical nesting platforms was rather constant, averaging 44 per cent and ranging from 40 to 48 per cent. Platforms provided secure nesting sites, and played an important role in contributing to the high productivity of the population. Of 86 nests observed on platforms at Waubay Refuge, 78 or 90.7 per cent hatched successfully. During the study, about 593 goslings or 33 per cent of the estimated 4-year production hatched

from nesting platforms.

Fall prehunting season counts varied from 614 to 840, average, 699. Changes in fall populations followed closely the annual changes in nesting success as determined for pairs nesting on Waubay Refuge.

Band recoveries show that over 90 per cent of the harvest is restricted to four localized areas within the states of South Dakota, Nebraska, Kansas and Texas. Nearly 60 per cent of the entire harvest comes from the breeding grounds within Day, Marshall, and Roberts Counties, South Dakota.

Substantial population growth is impossible with present heavy gunning pressure levels. Census figures on the breeding grounds (spring pair and fall population counts) as well as band recoveries and mortality rate estimates support this. In the event that the harvest on this population is substantially increased on the breeding grounds or at any of the major migration stops in Nebraska, Kansas, or Texas, then compensations in the form of harvest reduction will be necessary elsewhere if present populatoon levels are to be maintained.

The effects of reduced heavy gunning pressure were found when spring breeding pair counts in 1968 showed 154 indicated pairs. This large increase over the previous four years probably resulted from the 1-Canada goose daily limit that was initiated in the 1967 season. Although this restriction was directed at small Canada geese of the Tall Grass Prairie Population it also included the breeding range of the resident population and they inadvertently benefitted from it. This daily restriction along with the early closure in Kansas apparently was responsible for the first substantial increase in the breeding population over the past five years.

Good management requires that we maintain a population level commensurate with what the habitat will support. Although we do not know what this actual level is it would be several times the present population. Due to the trophy and aesthetic values of giant Canada geese thought should be given to a management program that will increase the population.

Recommendations

1. Continue spring pair counts (Bureau) and fall prehunting counts (State) to follow changes in population status.

2. Maintain present 1 Canada goose limit as an aid for increasing population.

3. Consider delaying the opening of Canada goose season in Day, Marshall and southwest Roberts Counties to coincide with duck season. One-quarter of harvest occurs during first 10-days of present goose season. Delaying the opening to correspond with duck season would decrease early gunning pressure and reduce harvest of local population as migrant geese are more numerous by second week in October.

4. Continue annual banding program and extend banding to other segments of the population, especially those birds breeding in Marshall County and other areas away from refuge. Attempt to band a minimum of 100 annually. These data are needed to evaluate changes in hunting regulations, mortality rates and harvest distribution.

5. Continue putting out artificial nesting platforms. Where feasible, construct permanent nesting islands on Waubay Refuge and state-owned areas. Possibly an ASC cost-share nesting platform program could be initiated on private lands in Day, Marshall and southwest Roberts Counties.

6. At the present level, management objectives should be geared for an annual breeding population increase of 10 per cent for a 5-year period.

7. If breeding population levels drop below 100 pairs in any year, harvest restrictions, including a closed season, if necessary, should be implemented.

8. Increase food production on Waubay Refuge as an aid in manipulating hunting mortality.

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NARRATIVE REPORT

for

CALENDAR YEAR 1968

WAUBAY WETLAND MANAGEMENT DISTRICT

WAUBAY, SOUTH DAKOTA

PERMANENT PERSONNEL

R. R. Johnson . . . . . Refuge Manager

D. L. Smith . . . . . Ass't. Refuge Manager (Resigned 5/19/68)

B. L. Gastineau . . . . . Ass't. Refuge Manager (E.O.D. 8/27/68)

E. J. Frenzelt . . . . . Biological Tech.

CAREER APPOINTMENT (W.A.E.)

Ed Henning . . . . . Maintenanceman

TEMPORARY PERSONNEL

Milton Thennis . . . . . Foreman I (4/22 - 11/23)

Donald Dargatz . . . . . Laborer (5/15 - 11/18)

Ted Schenck . . . . . Student Ass't. (6/3 - 8/31)

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I. General

A. Description of the Area

Waubay National Wildlife Refuge administers Waterfowl Production Areas and Easements located within the following northeastern South Dakota counties: Brookings, Clark, Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Marshall and Roberts (see map on next page).

This 10 county management district measures approximately 70 miles wide by 120 miles long. The area contains roughly 8,200 square miles and 115,000 people. Chief physical divisions include the Minnesota River - Red River Lowlands, the James River Lowlands, and the Coteau Des Prairies. The Couteau region, a rolling, pot-hole spangled plateau, covers about 90 percent of the a rea and contains some of the finest remaining waterfowl breeding habitat in the nation.

Agriculture is the main industry. Farms number about 12,000 and produce mainly corn, wheat, oats, flax, cattle, hogs, and dairy products.

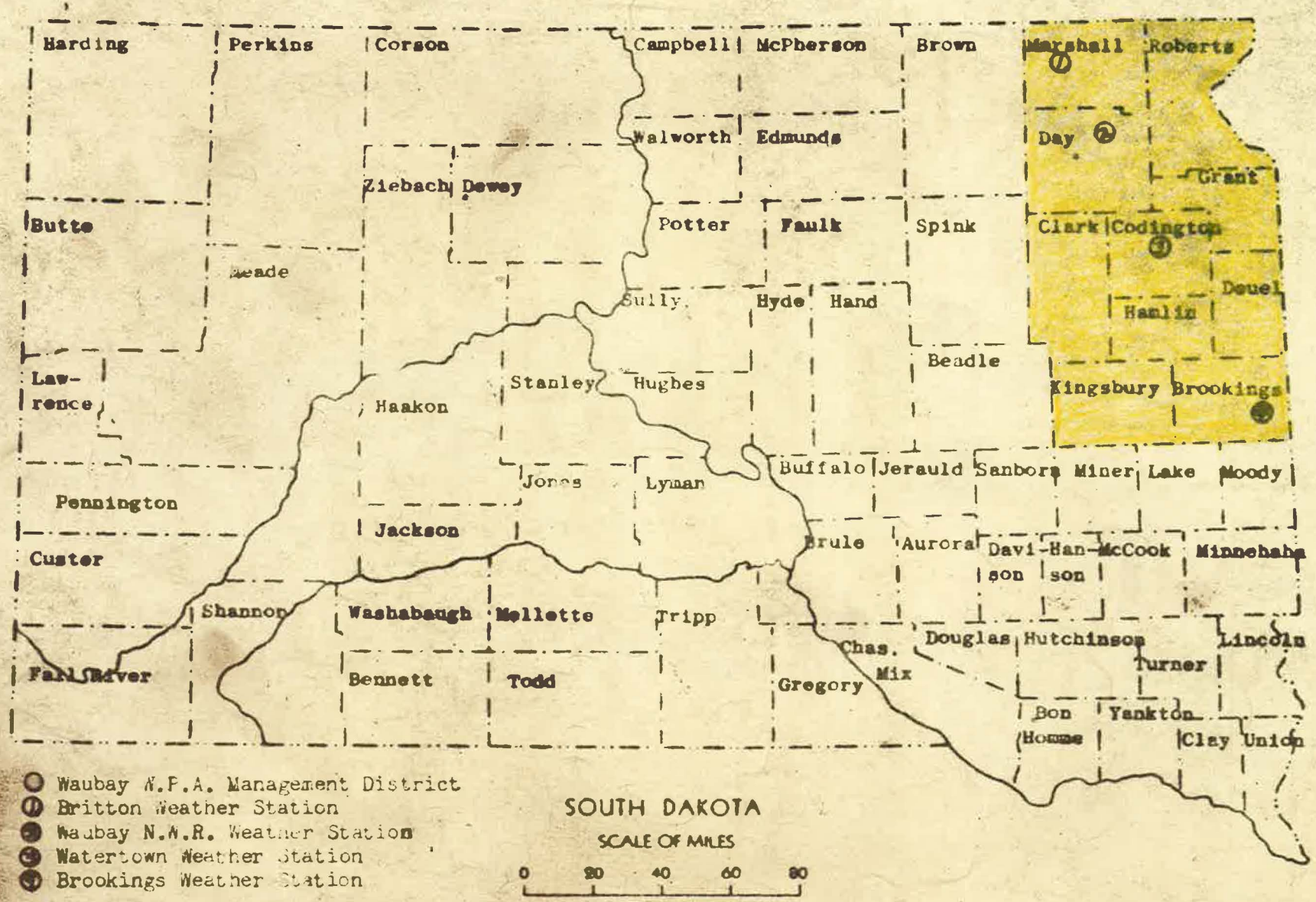
B. Status of Acquisition Program

The purchase program moved at about the same pace as in 1967. Twenty-seven new tracts containing 1710 acres were added to the district. Last year the district acquired 2312 acres in 29 tracts.

The easement program, however, picked up momentum. This year 183 easements containing 72,991 acres were acquired. Last year's accomplishments amounted to 97 tracts covering 25,867 acres.

The following table lists district holding as of December 31, 1968.

	FEE TITLE			EASEMENTS		
County	No. Mgmt. Units		Acres	Number	Wetland Acres	Total Acres
Brookings*	11		1,352.00	8	279.00	1,415.00
Clark	14		1,385.89	371	17,478.00	92,609.59
Codington	10		476.78	45	2,376.00	12,841.83
Day	34		4,330.91	183	9,745.00	51,484.47
Deuel	5		508.45	13	809.00	5,724.53
Grant	8		710.90	45	2,646.00	16,565.36
Hamlin	1		149.00	15	898.00	3,949.96
Kingsbury*	7		810.00	138	6,418.00	46,144.00
Marshall	10		1,276.29	110	5,953.50	31,450.08
Roberts	16		1,413.60	121	6,096.00	35,623.75
TOTAL(1)	128		12,413.82	1048	52,698.50	297,808.57


Harding
Perkins
Corson
Campbell
McPherson
Brown
Marshall
Roberts
Walworth
Edmunds
Day
Grant
Ziebach
Dewey
Butte
Potter
Faulk
Spink
Clark
Codington
Meade
Sully
Hyde
Hand
Deuel
Hamlin
Beadle
Lawrence
Stanley
Hughes
Haakon
Kingsbury
Brookings
Buffalo
Jerauld
Sanborn
Miner
Lake
Moody
Jones
Lyman
Pennington
Jackson
Brule
Aurora
Davison
Hanson
McCook
Minnehaha
Custer
Shannon
Washabaugh
Mellette
Tripp
Douglas
Hutchinson
Lincoln
Chas. Mix
Turner
Fall River
Bennett
Todd
Gregory
Bon Homme
Yankton
Clay
Union
Waubay N.P.A. Management District
Britton Weather Station
Waubay N.W.R. Weather Station
Watertown Weather Station
Brookings Weather Station
SOUTH DAKOTA
SCALE OF MILES
0
20
40
60
80

(1) Includes 155 Fee Title Areas. * Acquisition under the jurisdiction of the Huron, South Dakota Acquisition Office. All other counties are under the Aberdeen, South Dakota Acquisition Office.

Considering the following table (status and goals of Fee Title and Easement Acquistion) much remains to be done. To reach district goals about 43,000 acres of fee tracts and 117,000 acres of wetland easements remain to be acquired. At the 1968 acquistion rate this will require another 25 years for fee tracts and 28 years for easements.

STATUS AND GOALS OF FEE TITLE & EASEMENT ACQUISITION
(as of Dec. 31, 1968)

	FEE AREAS(acres)		EASEMENTS(Wetland acres)	
County	Goal	Acquired	Goal	Acquired
Brookings	2,130	1,352 00	9,027	279.00
Clark	7,600	1,385.89	32,000	17,478.00
Codington	4,160	476.78	13,000	2,376.00
Day	11,760	4,330.91	36,000	9,745.00
Deuel	5,160	508.45	6,000	809.00
Grant	3,160	710.90	8,000	2,646.00
Hamlin	3,600	149.00	10,000	898.00
Kingsbury	4,645	810.00	19,000	6,006.00
Marshall	7,100	1,276.29	17,000	5,953.50
Roberts	5,745	1,413.60	20,000	6,096.00
TOTAL	55,060	12,413.82	170,027	52,286.50

C. Weather Conditions

Weather highlights included:

1. An almost snowless but cold February. Greatest February precipitation was .03 inches at Brookings. The average is about .55 inches.

2. Above average annual precipitation at all stations, with June, September, October, and December being the wettest. Britton recorded the greatest monthly precipitation - 5.61 inches in June.

3. A severe, late May thunder storm whose winds damaged considerable property in Brookings County. One of our farming permittees, Lody Chiak of Arlington, lost nearly all his farm buildings.

4. December snowfall ranging up to 21 inches. Only once since 1898 has the December snowfall been greater at Watertown.

The last killing frost in the spring hit around May 19; the first in the fall around October 3. Maximum snow accumulation reached about 20 inches at Watertown in late December.

PRECIPITATION

Month	Britton	Waubay NWR	Watertown	Brookings	Average Watrn. Sta.
January	.16	.21	.50	.28	.51
February	T	T	.01	.03	.55
March	1.28	.50	.64	.94	.89
April	2.75	3.52	4.52	4.94	1.97
May	1.95	3.12	2.67	1.52	2.91
June	5.61	3.91	5.06	4.26	3.72
July	2.27	2.43	3.33	3.27	2.91
August	.96	1.17	2.07	3.66	2.79
September	4.38	2.86	2.71	3.69	2.03
October	1.43	1.30	2.62	3.60	1.30
November	.49	.62	.58	.54	.76
December	1.27	1.41	2.14	1.19	.51
TOTALS	22.57	21.05	26.85	27.92	20.85

TEMPERATURE

Month	Britton		Waubay NWR		Watertown		Brookings	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
January	43	-35	44	-29	45	-26	46	-25
February	42	-15	39	- 8	37	-16	37	-16
March	74	0	73	- 1	75	0	81	- 2
April	89	23	86	14	87	13	83	13
May	90	25	86	28	85	24	87	19
June	97	35	95	41	96	37	98	35
July	97	46	93	47	94	48	93	42
August	98	46	98	47	95	42	93	42
September	91	29	88	38	87	36	83	32
October	81	22	79	26	78	22	77	21
November	58	7	55	5	55	9	69	8
December	38	-32	42	-25	44	-17	52	-15
EXTREMES	98	-35	98	-29	95	-26	98	-25

Data for the preceding tables provided by U.S. Weather Bureau stations located at Britton, Brookings, Watertown and Waubay National Wildlife Refuge. Station locations shown on page 2 map.

D. Habitat Conditions

1. Water Conditions

Water conditions varied considerably. Generally, spring levels were slightly lower than in 1967 and ranged from fair in the coteau region of north Day, Roberts and Marshall counties to deplorable in Brookings and Kingsbury counties in the south part of the district.

Unfortunately little improvement occured during summer and fall despite above average precipitation. The rains failed to produce enough run-off to offset evaporation and by freeze-up water levels ranged up to a foot below their spring levels. Consequently only the deeper class IV and V wetlands retained water at the end of the year.

On the other side of the coin, however, heavy December snowfall greatly enhanced the prospect for improved water conditions next spring.

The following table shows 1968 water fluctuations on three W.P.A.'s. The guage readings are based on assumed bench mark elevations of 1800 feet above sea level.

W.P.A. WATER GUAGE READINGS - 1968

Tract 26 - Day County

Date	Guage Reading(feet)
4/8	1799.45
5/2	1799.45
6/10	1799.61
7/2	1799.45
7/29	1799.25
9/3	1798.65
10/2	1798.45
10/29	1798.45
Decline	1.00

Tract 10 - Clark County

Date		Guage Reading(feet)
4/8		1795.37
5/2		1795.57
6/10		1795.47
7/2		1795.47
7/29		1794.97
9/3	Dry	1794.81
10/2	"	1794.81
10/29	"	1794.81
	Decline	.66

Tract 36 - Codington County

Date		Guage Reading(feet)
4/8		1796.34
5/2		1796.82
6/10		1796.14
7/2		1796.24
7/29		1795.72
9/3		1795.38
10/2		1795.14
10/29		1795.66
	Decline	.68

2. Food and Cover

Wildlife food and cover varies immensly on the district's 155 fee tracts. Most of the newly acquired areas offer little to wildlife because of past farming practices, i.e., haying, heavy grazing, and clean cultivation. In contrast, older managed tracts provide an abundance of cover, mainly upland grasses and marsh vegetation. In many instances these areas provided the only good wildlife cover for miles around. Many of the tracts also provided an abundance of wildlife food for upland game birds, particularly where government crop shares were left standing for wildlife use.

II. Wildlife

A. Migratory Birds

1. Waterfowl - (Anseriformes)

Geese

Canada geese moved into the area during early March, hitting the Waubay area on March 6, or the earliest date on record. A few of these birds nested on WPA's in the north part of the District. Areas attracting nesting geese included tracts 22, 40, and 58 in Day County and tract 11 in Roberts County. The nests on tracts 22 and 58 were on artificial nesting platforms. The Day County nests were successful. We have no information on the fate of the Roberts County nest.

During late March and early April thousands of snow and blue geese migrated through the district. Undoubtedly many of these birds rested briefly on WPA's, particularly in Clark County. Several times during April several hundred birds were observed on tracts US1a and 10. A few birds also rested on Day County tract 15 during the fall migration.

Ducks

Ducks started trickling into the southern part of the district in early March. A few mallards showed up on Kingsbury County tract 106 on March 5. This is several days earlier than the vanguard of the 1967 migration. By mid April all common species appeared throughout the district.

Based on breeding population surveys, district wetlands attracted 38 percent fewer pairs than in 1967. Species-wise canvasback registered the greatest decline - almost 700 percent below the 1967 level. In abundance, blue-winged teal led the parade, making up 48 percent of the breeding population. Considering the tables on the following pages, the reason for the decline is apparent: the percent of water bodies holding water during early June decreased from 70% in 1967 to 46 percent in 1968. This is a 35 percent drop and strangely enough, it closely parallels the decline in the breeding population.

Despite the reduced breeding population, duck production was 29 percent above the 1967 level. Dabblers accounted for about 95 percent of the production. Mallards made-up 65 percent of the dabbler production, compared with only 19 percent in 1967. We have no explanation for the large increase in mallard production. Blue-winged teal production was next in line, comprising only 16 percent of the dabbler production. Last year this species accounted for 37 percent of the dabbler production.

The average brood size, based on 69 brood observations throughout the district, was 6.9 ducklings. Last year the average was 6.0 ducklings.

The following tables summarize data for 1968 WPA breeding population and production surveys.

The fall duck flight proved the poorest in years - dry wetlands attract few ducks. Those WPA's holding water, and they were few, hosted relatively large numbers of ducks. Duck numbers peaked during mid October then declined abruptly, leaving only a few stragglers which departed with the arrival of wintery weather on November 23.

Other Waterfowl

A few Whistling Swan frequented the district during the spring and fall migrations. The only sighting on WPA's included 2 birds on Clark County tract 240 on April 2.

2. Water and Marsh Birds

Based on pair and production surveys (see forms 4.3 and 5.3), the coot population remained about the same as in 1967. Production, however, dropped about 75 percent.

Other water and marsh birds sighted on WPA's include Pied-billed grebes, Horned grebes, Eared grebes, Great Blue heron, Black-crowned night heron, American bittern, Sora, Double-crested cormorant, and White pelicans. Of these, pied-bills were the most abundant. Almost every larger water area attracted a pair or two.

3. Shorebirds(Charadriiformes)

1968 sightings include the following 21 species. Species known to nest on WPA's are marked with an asterik.

1. Killdeer *
2. American Golden plover
3. Ruddy Turnstone
4. Wilson's snipe
5. Upland plover *
6. Spotted Sandpiper
7. Western Willet
8. Greater Yellow-legs
9. Lesser Yellow-legs
10. Baird's Sandpiper
11. Red-backed Sandpiper
12. Long-billed Dowitcher
13. Stilt Sandpiper
14. Marbled Godwit
15. Avocet *
16. Wilson Phalarope
17. Hering Gull
18. Ring-billed Gull
19. Franklin's Gull
20. Common tern
21. Black tern *

4. Doves - (Columbiformes)

Mourning dove are common summer residents. Almost every grove or shelterbelt attract a few nesting birds. During the fall migration flocks ranging up to several hundred birds are not unusual. The first sighting in the spring occurred on March 28; the last in the fall on November 3.

B. Upland Game Birds -(Galliformes)

Ring-necked pheasants were the only upland game bird observed on WPA's this year. Some tracts, especially in Clark County, support sizeable populations. Over all, though, the population is relatively low, when compared with peak populations of the late 1940's.

C. Other Birds (Falconiformes, Strigiformes, Passeriformes)

A few Marsh, Red-tailed, Swainson's, Roughlegged, and Sparrow hawks frequent WPA's. Marsh hawks were the most abundant and probably the only nesters. No eagles were seen on WPA's, but several sightings occurred in the district: a Golden eagle near Clear Lake in Marshall County on October 24 and a Bald eagle near Waubay Lake on October 18.

Horned owls are few and far between - only two sightings this year. These were on tract 14 in Day County and tract 27 in Brookings County. A Snowy owl was observed near Day County tract 58 on March 18.

An indication to the relative abundance of passerine birds in the district can be gleaned from the summary sheets of the "Bureau Breeding Bird Survey" on the following pages.

The count on Route S-18, which samples Minnesota River Valley habitat, revealed 34 species of which 22 were perching birds. Last year 25 species of passerines were tallied. Mourning dove, Common grackle and Redwinged blackbird lead the parade in abundance.

The tally on Route S-19, which samples Prairie hills habitat, disclosed 46 species of which 32 species were passeriformes. Last year 29 species of passerines were counted. The most abundant species were Western Meadowlark and Red-winged blackbirds.

Route S-18 was run by Refuge Manager Johnson, Route S-19 by M.D. McClure of the Aberdeen Wetlands office.

D. Big Game Animals

White-tailed deer are common throughout the district. During some period of the year most tracts harbor a few animals. In aggregate, Fee areas probably supported a peak of about 200 animals.

Day, Grant, and Roberts counties support a small population of Prong-horned Antelope. None were seen on WPA's this year.

E. Fur Animals, Predators, Rodents & Other Mammals

We have little information on these animals other than the following general observations. The muskrat population appears near "rock-bottom" because of deteriorating habitat. Red fox continue plentiful - aerial hunters have little trouble bagging 20 to 30 per day of hunting. And Pocket gopher population remains high, especially in Marshall county, where some townships pay as high as 30 cents per head bounty.

F. Rare and Endangered Species

None known to inhabit WPA's.

G. Fish

Tract 11 in Deuel County supported a small amount of sport fishing for bullheads. Some commercial minnow trapping for fathead minnows also occurred on tracts 11 in Marshall county and 219 in Clark county.

H. Reptiles and Amphibians

We have nothing to report on these creatures, except that Garter snakes and Leopard frogs are common on most WPA's.

I. Disease

None observed.

III. W.P.A. Development and Maintenance

A. Physical Development

No major physical development was undertaken in 1968, but minor development jobs included:

1. Constructing 6 modified-type 50' x 105' stock water dugouts, one each on Clark county tract 10, Deuel county tract 13, Grant county tracts 42 & 43, and Marshall county tracts 11 & 11a.

2. Plugging one drainage ditch on tract 11 Marshall county. The above work was completed by a local dragline operator.

3. Building 4,167 rods of fence on the following tracts:

Tract	Rods
Day - 14	94
19a	35
22	50
26	35
55	40
57	39
170	65
59	854
60	756
58	580
Brookings	
24a	195
18a	420
22	79
11a	160
Clark	
10	20
234	114
Grant	
41	130
42	158
Deuel	
13	47
27	296

4. Posting 18.90 miles of tract boundary.

5. Removing 869 rods of old interior fence.

6. Cleaning up and consolidating trash on tracts 24a Clark county and tract 27 Brookings county.

7. Constructing parking areas on Day county tracts 13, 22, 58, 59, 60.

8. Documenting Management information for all distict fee wetlands on McBee punch cards.

9. Completed 15 Certificates of Inspection and 2 Disclaimers.

10. Placing 6 goose nesting platforms: 1 each on Day County tracts 24, 29, 55, 58 and 2 on tract 22.

B. Plantings

1. Aequatic and Marsh

none.

2. Trees and Shrubs

The following trees were planted during the spring of 1968:

County	Tract	Acres	Species Planted	No. trees
Brookings				
	Geardink - 15	2.00	Cedar	1360
	Norgaard - 24	5.00	Cedar	3400
	Hendrickson - 28	2.00	plum	190
Clark				
	Reinhart - 10	.50	R. Olive	150
	Anderson -101	1.30	Cedar	3984
	Markrud -219	5.00	Cedar	3100
			Plum	150
			R. Olive	150
	Moe -240	.78	Plum	70
			Cedar	420
			R. Olive	50
Codington				
	Struckman - 30	5.80	Cedar	3944
Day				
	US 1b	1.50	Plum	170
			Cedar	850
	Holzerland -12	.50	Plum	240
			R. Olive	100
	Meuer -14	1.00	Cedar	540
			Plum	140

County	Tract		Acres	Species Planted	No. trees
Day	McCarlson	- 15	2.67	Plum	185
				Cedar	1450
				R. Olive	185
	Hawkinson	- 16	3.00	Cedar	2040
	Orness	- 19a	.50	Plum	140
				Cedar	200
	Donat	- 22	3.00	Plum	220
				Cedar	1580
				R. Olive	240
	Kreich	- 26	2.46	Plum	120
				Cedar	1460
				Willow	20
	Dolney	- 40	2.60	Cedar	3400
	Hendrickson	- 55	.50	Plum	240
				Cedar	100
	Stianson	- 57	2.50	Cedar	1700
	Nicolay	- 58	1.15	Cedar	600
				Plum	80
				R. Olive	100
	E. Hanson	- 59	.50	Plum	140
				Cedar	200
	Augustana	- 60	3.40	Plum	100
				Cedar	1100
				R. Olive	1200
	Schmig	-176	.50	Plum	140
				Cedar	200
Deuel					
	Foster	- 27	3.10	Cedar	1050
				R. Olive	1050
Grant					
	Pew	- 10	1.20	Cedar	720
	Streich	- 20	4.90	Cedar	3330
Hamlin					
	Preston	- 19	.50	Plum	240
				Cedar	100
Kingsbury					
	Wellman	-133	2.00	R. Olive	230
				Plum	230
				Cedar	900
Marshall					
	Olson	- 10	2.00	Plum	130
				Cedar	1180
				R. Olive	50

County	Tract	Acres	Species Planted	No. trees
Roberts	Minder - 10	2.10	Willow	200
			Cedar	1220
	Loberg - 11	2.60	Plum	250
			Cedar	1300
			R. Olive	200
	Pearson - 120	.42	Plum	186
			R. Olive	200
	Cameron - 121	4.10	Plum	200
			Cedar	1050
	TOTALS	71.2 acres		

The trees were scalp planted by the State Game, Fish and Parks Department in the spring of 1968 at a cost of $70.00 per acre. Total cost was $4,984.00. Sample survival checks in the fall revealed 78% of the Eastern Red Cedar, 60% of the Willow and 63% of the plums made the grade.

3. Grasslands

Ninety-two acres of cropland were seeded to grasses and legumes during 1968. A summary of seeding is presented in the following table:

GRASS SEEDING SUMMARY

Mgmt. Unit	Acres Seeded	Seeding Mixture	Rate of Appl.	Method	Date Seeded	Result
Brookings						
28	4.0	(1)	13 lb./a	(2)	Spring '68	?
29	7.0	"	"	"	"	?
Clark						
24a	14.0	"	"	"	"	?
232	5.0	"	"	"	"	?
Day						
176	7.0	"	"	"	"	?
Grant						
53	1.0	"	"	"	"	?
Kingsbury						
106	6.0	"	"	"	"	?
131	10.1	"	"	"	"	?
132	5.4	"	"	"	"	?
133	32.4	"	"	"	"	?
TOTAL	91.90					

(1) Seeding Mixture: 3 lb. Green needle grass, 2 lbs. Western Wheat grass, 2 lbs. Slender wheat grass, 2 lbs. Russian wildrye, 1 lb. Crested wheat, 1 lb. Big bluestem, 1 lb. Little bluestem, 1 lb. Ladak alfalfa. Seeded at a rate of 13 lbs. per acre. Seed cost was $7.58 per acre.

(2) Overseeded, drilled or broadcast, with a companion crop of oats.

C. Cultivated Crops

The acreage in cultivated crops amounted to 212 acres. Oats were grown on all 212 acres on a share cropping basis. The government share came to 62 acres of oats left standing in the field for wildlife food. This amounted to approximately 4090 bushels of oats.

D. Collection and Receipts

1. Seed and Propagules

None.

2. Specimens

None.

3. Building Disposal

Burned old buildings in Clark county tract 24a.

E. Control of Vegetation

Applications of herbicides for control of noxious weeds during 1968, particularly leafy spurge, Canada thistle and Sow thistle, were applied on 296 acres. See NR-12 for applic ation and results.

F. Rodent Control

About 25 acres of grassland was treated with strichnine poisoned barley for pocket gopher control on Marshall county tract 11. The bait was applied at the rate of 2 lbs. per acre with a burrow-building machine. The results of the treatment will not be apparent until mound counts are completed next spring.

G. Fires

None.

IV. Resource Management

A. Grazing

Cattle grazing was permitted on 15 tracts during 1968 (see following table). As a whole, all grazing units provided an abundance of forage throughout the 4.5 month grazing season and showed less evidence of use than in 1967. The following table shows the extent of the 1968 grazing program.

Mgmt. Unit	Acres grazed habitat	AUMS	Date of Use	Revenue collected
Clark Co.				
10	157	24.03	5/21-8/22	58.87
11	66	33.71	5/15-9/30	75.24
Day Co.				
13 & 26	317	135.92	5/15-9/30	333.00
14 West	106	54.58	"	133.72
14 East	35	17.06	"	44.00
15	130	45.65	"	119.19
19	75	46.53	"	114.00
22	108	43.09	"	105.57
59	225	20.69	8/15-9/30	50.69
55	120	37.13	5/15-9/30	90.97
56	195	78.46	"	192.23
Deuel Co.				
13	119	51.64	5/15-9/30	126.52
Marshall Co.				
10	115	45.61	5/15-10/4	111.74
12	62	33.71	5/15-9/30	82.59
TOTAL	1356	667.81		1,636.00 *

* Based on grazing fee of $2.45 per AUM.

Cow = one animal unit
Calf (animal less than six months old) = one-fourth animal unit
Yearling (animal between six and eighteen months old) = three-fourths of an animal unit.

B. Haying

None.

C. Fur Harvest

Fee areas were open to public trapping in accordance with State regulations. Spot checks revealed little trapping activity during the November 15 - December 31 season. The reason: the low muskrat population, rough weather, and low "rat" prices.

V. Field Investigations & Applied Research

None.

VI. Easement Administration

The regularly scheduled October aerial inspection of easements was cancelled this year because of the tight schedule of the R.O. plane.

An investigation of a suspected burning and draining violation on Clark County tract 53X revealed a clean-cut burning violation and a possible draining violation. The draining involved the construction of a grassed waterway which might possibly drain one of the tract's wetlands. The owner was advised of this and warned that future violations would invite court action.

VII. Public Relations

A. Recreational Use

Based on spot checks, recreational use of fee areas increased from an estimated 935 visits to 2863 in 1968. The gain is attributed to increased hunting use. See form 3-123 for details on recreational use.

B. Visitors

A list of visitors is included on the following page.

VISITOR LIST

Date	Name	Org. or Title	Address	Purpose
1/17	Jim Sieh	Biologist AAO Aberdeen	Aberdeen, S.D.	Courtesy call
1/7	Ralph Wallenstrom	Supervisor, AAO Aberdeen	Aberdeen, S.D.	Courtesy call
1/30	Ralph Wallenstrom	Supervisor, AAO Aberdeen	Aberdeen, S.D.	Acquisition
1/31	Jim Sieh	Biologist AAO Aberdeen	Aberdeen, S.D.	Acquisition
2/8	John Payne	Appraiser - Aberdeen	Aberdeen, S.D.	water rights on Acq
2/29	Milt McClure	Appraiser - Aberdeen	Aberdeen, S.D.	Land acquisition
3/22	Jack Merwin	Sport writer - Watertown	Watertown, S.D.	Goose flight
3/25	Paul Bloomhart	District Forester - State	Aberdeen, S.D.	Tree planting
4/18	John Payne	Appraiser - Aberdeen	Aberdeen, S.D.	Land acquisition
4/30	Gordon Jensen	Chief Appraiser - RO	Mpls., Minn.	Acquisition
4/30	John Payne	Appraiser - Aberdeen	Aberdeen, S.D.	Acquisition
4/30	Ralph Wallenstrom	Supervisor - Aberdeen AAO	Aberdeen, S.D.	Acquisition
5/17	Ralph Wallenstrom	Supervisor - Aberdeen AAO	Aberdeen, S.D.	Acquisition
6/5	Jim Sieh	Biologist - Aberdeen AAO	Aberdeen, S.D.	Acquisition
6/20	Paul & Clint Bloomhart	Contractors	Aberdeen, S.D.	Scalp tree planting
8/16	Gene Thompson	Surveyor - RO	Mpls., Minn.	Dolney tract
9/10	George Spodin	Chief Br. Realty-Washington	Washington,D.C.	Inspection
9/10	Burt Rounds	Wetlands Chief - RO	Mpls., Minn.	Inspection
9/10	Harold Benson	Realty - RO	Mpls., Minn.	Inspection
9/10	George Jonkel	Supervisor - Huron AAO	Huron, S.D.	Inspection
9/10	Al Bonsak	Biologist - Huron AAO	Huron, S.D.	Inspection
9/10	Ralph Wallenstrom	Supervisor - Aberdeen AAO	Aberdeen, S.D.	Inspection
9/23	Lynn Greenwalt	Associate Surp. RO	Mpls., Minn.	Inspection
10/16	John Payne	Appraiser - Aberdeen AAO	Aberdeen, S.D.	Acquisition
10/16	Jim Sieh	Biologist - Aberdeen AAO	Aberdeen, S.D.	Acquisition
11/25	Ralph Wallenstrom	Supervisor - Aberdeen AAO	Aberdeen, S.D.	Easement violation
11/25	Jim Sieh	Biologist - Aberdeen AAO	Aberdeen, S.D.	Easement violation
11/26	James Hasting	Sup. Appraiser - Benson AAO	Benson, Minn.	Case tract
12/11	Jim Sieh	Biologist - Aberdeen AAO	Aberdeen, S.D.	Easement violation

C. Refuge Participation

1/10 - Johnson met with supervisor of Marshall County S.C.S. District, r.e., wetlands management.

3/4 - Johnson met with Day County board of Commissioners, r.e., wetlands acquisition.

4/5 - Johnson attended South Dakota Game, Fish and Parks Department regional staff meeting.

4/11 - Johnson attended wetlands PR. workshop in Fargo, N.D.

4/29 - Johnson attended annual meeting of Little Minnesota River Watershed Association meeting at Dahlberg, S.D.

5/14 - Johnson attended WPA Management meeting at Jamestown

9/8 - Johnson met with Sinia Village officials, r.e., fire control plans.

9/10 - Johnson attended Wetlands Inspections for George Spodin, Chief of branch of realty.

10/15 - Johnson met with Kingsbury County Commissioners, r.e. delivery of Refuge Sharing checks.

Monthly - Johnson, Smith, Gastineau, or Fromelt attended Coordination meetings at the Huron and Aberdeen Wetland offices.

D. Hunting

1. Waterfowl

Geese

WPA's attract few of these birds; consequently, they receive little play from goose hunters.

Ducks

Duck hunting rated the poorest in years. Ducks and hunters concentrated on the remaining water areas and the birds were pretty well blasted out of the area during the first weekend of the season. Even so, WPA's probably logged their heaviest duck hunting use since the acquisition program started. Almost every Day County tract holding

Bureau of Sport Fisheries and Wildlife
Division of Wildlife Refuges

ANNUAL [redacted] PUBLIC USE REPORT

Refuge name: WAUBAY WPA

State: South Dakota

(This block completed by Washington Office)

State Code (1-2)	Congressional District Code (3-4)	Refuge Code (5-7)	Report Period Yr. (8-9)	Report Period Mo. (10-11)
41	01	360	68	-

(Card Columns)	12-13	14-18	19-25
ACTIVITY	Code	VISITS FOR THE MONTH Total Number	Total Hours
Hunting: Big Game	01	186	395
Upland Game	02	300	1,000
Waterfowl	03	400	800
Other Migratory	04	40	65
Bow	05		
Fishing: Salt Water	06		
Warm Water	07	106	212
Cold Water	08		
Bird and Animal Calling	09		
Wildlife Photography	10	16	16
Wildlife Observation	11	635	635
Dog Training	12	10	10
Field Trials	13		
Wildlife Trails and Walks	14		
Wildlife Tours	15		
Wildlife Scenic Veh. Rts.	16		
Camping (related to above)	17		
Picnicking (related to above)	18		
Wildlife Interpretive Center	19		
*Miscellaneous Wildlife	20	103	203
Inquiries on hunting & trapping.			

(Card Columns)	26-27	28-32	33-39
ACTIVITY	Code	VISITS FOR THE MONTH Total Number	Total Hours
Swimming	21		
Boating	22		
Water Skiing	23		
Camping	24		
Group Camping	25		
Picnicking	26		
Horseback Riding	27		
Bicycling	28		
Skiing, Sledding, etc.	29		
Ice Skating	30		
Fruit, Nut & Veg. Collecting	31		
Non-Recreational Use (inspections, audits, etc.)	32	70	332
Actual Visits	33	2863	
Peak Load Day	34	200	
* Miscellaneous Non-Wildlife	35	1395	1395
Sightseeing			

Form 3-123
(March 1968)

*Use blank spaces to indicate the types of activities summarized under miscellaneous codes 20 and 33.

water hosted several parties of hunters during the opening weekend. Last year we could hardly find a hunter on these areas.

2. Upland Game

Mourning Doves

The 8 day dove season starting on September 1 attracted few hunters. In fact, spot checks of Day County tracts on the opening weekend failed to turn up a single dove hunter, despite an abundance of doves in the area.

Ring-necked Pheasants

WPA's also received increased pheasant hunting use. On the season opening 10 of the 12 Day County tracts checked attracted hunters. Success, however, was poor - only a minority of the hunters bagged their limits of three birds. The heavy cover, particularly the dry marshes, and relatively few birds accounted for the tough-going.

3. Big Game

White-tailed Deer

WPA's were open for deer in accordance with State regulation. Three seasons were envolved: the early archery season running from October 26 through November 22; the rifle season from November 23 through December 1; and the late archery season between December 2 and December 31.

As usual, WPA's received little play during the archery seasons. But the rifle season was a different story. A record number of 2920 permits were issued in the District, What little checking we did indicated WPA's attracted more deer hunters than ever before. If road hunters are considered nearly all tracts received some deer hunting use.

All told, 1968 WPA hunting use surged upward beyond our expectations. Apparently the gunning public is starting to recognize the hunting potential on these areas.

E. Violations

None detected.

F. Safety

Regular monthly safety meetings included the following films, "Outboard Outing", "Bridge to Safety", "Rescue Breathing", "Safety Everywhere", "The Third Killer", and discussion on the following subjects: Mouth to mouth resuscitation, safe boat handling, the danger of pesticides, fire fighting technique and fire drill, fire prevention, review of the new safety plan, accidental falls, safety regulations for new men, proper use of herbicides, automotive vehicle safety, defensive driving, poisonous plants, danger of lightening, review of the responsibility of each individual according to the adm. manual.

The Station's safety record now stands at 7,990 days without a lost time accident.

VIII. Other Items

1. Assistant Manager Dave Smith, after about six months of duty, resigned on May 19. Dave decided he wasn't cut out to be a refuge manager and has returned to school to work for his PHD in biology at Indiana University.

2. Mr. Benjamin L. Gastineau reported for duty as Assistant Manager on August 27. Ben holds a B.S. Degree in Wildlife Management from the University of Missouri and previous to his new assignment served 3½ years with the Job Corps at the Mingo Civilian Conservation Center at Puxico, Missouri. We are happy to have Ben aboard and hope he enjoys his new duties at Waubay.

3. Payments to the 10 counties in the district under the Refuge Revenue Sharing Act (P.L. 88.523) totalled $4,111.62. Last year they received $2,788.62. The payments represent 3/4 of 1 percent of the adjusted cost of fee tracts in each county. The distribution was as follows:

County	Payment
Brookings	$ 790.77
Clark	372.33
Codington	143.41
Day	1,369.51
Deuel	166.77
Grant	243.94
Marshall	356.82
Roberts	421.91
Kingsbury	235.47
Hamlin	11.69
10	4,111.62

4. After a years delay because of government economy measures, the Pheasant Habitat Development program on South Dakota WPA's got underway again in October.

The District received $73,000 for the following projects:

Fencing and Posting	$63,480.00
Grass Seeding	3,000.00
Tree Planting	1,820.00
Clean-up	2,000.00
Constructing Parking Areas	2,700.00
TOTAL	73,000.00

In addition, funds are set up for the development of a Wetland Demonstation Area on tract 27 in Brookings County. The area is being planned by the Bureau's "Blue Ribbon Planning Team". Members include Leader E. Crosier, Regional Architect J. Knockt, Interpretive Specialist R. Johnston, Recreational Specialist M. Duncan, and I&E Specialist C. Griffith. Progress to date includes only the completion of preliminary reconnansiance surveys.

Photographs

Photos taken and processed by Johnson using his personal equipment.

Credits

Fromelt: Typing and assembling

Gastineau: Summarize data and mounting photos

Johnson: Balance of report

SIGNATURE PAGE

Submitted by:

(Signature)

Date: February 13, 1969

Refuge Manager
Title

Approved, Regional Office:

Date: _____

(Signature)

Regional Refuge Supervisor

3-1755
Form NR-5
60791

DISEASE

Refuge Waubay WPA Year 1968

NONE

Botulism

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease _____

Species affected _____

Number Affected

Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

Refuge Waubay - WPA Year 19 68

	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Cedar Plum R. Olive							See III, B-2	8' x 8' spacing	71.2 acres	1 yr. old seedlings	spring 1968	67%	?
Grass mixture: G. Needle W. Wheat S. Wheat Russian Wild Rye C. Wheat Big Blue Stem Little Blue Stem Lodak Alfalfa							See III, B-1	13 lb./ acre	91.90 acres		spring 1968	?	

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic
Hedgerows, cover patches 71.20 acres
Food strips, food patches
Forest plantings

Remarks: For location of plantings see Section III, B-1 and B-2

76148

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Waubay - WPA County _____ State South Dakota

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Oats	154	10,010 bu.			62	4090 bu.	216 ~~[illegible]~~		
								Fallow Ag. Land	

No. of Permittees: Agricultural Operations 12 Haying Operations 0 Grazing Operations 14

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle	224	668	$1,636.00	1677
				2. Other				
				1. Total Refuge Acreage Under Cultivation				147.6
Hay - Wild				2. Acreage Cultivated as Service Operation				

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge	
Waubay (WPA)	
Proposal Number	Reporting Year
	1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5/8/68	Pocket gopher	Tract 11-Marshl.Co.	25	strychnine poisoned barley	50 lbs.	2 lb./acre	bait	burrow builder
5/20/68	Leafy spurge	Tract 30-Cod. Co.	Spot S.	Tordon 22K	4 oz.	1 gal./acre	10gal/w	H. spray
5/20/68	Leafy spruge	Tract 15-Deuel Co.	Spot S.	Tordon 22K	8 oz.	1 gal./acre	"	"
5/21/68	Leafy spurge	Tract 31,a-Br. Co.	2	Tordon 22K	2 gal.	1 gal./acre	50g./w	P. spra
5/27/68	Leafy spurge	Tract 20-Grant Co.	Spot S.	Tordon 22K	8 oz.	1 gal./acre	10g./w	H.spray
6/7/68	Leafy spurge	Tract 11-Marshall	1	Tordon 22K	1 gal.	1 gal./acre	50g./w	P.spray
6/10/68	Leafy spurge	Tract 11-Marshall	1	Tordon 22K	1 gal.	1 gal./acre	50g./w	P.spray
6/12/68	Leafy spurge	Tract 11-Marshall	1.25	Tordon 22K	1¼ gal.	1 gal./acre	50g./w	P.spray
6/13/68	Leafy spurge	Tract 12-Marshall	6	2,4-D ester	1 gal.	1 lb./acre	50g./w	P.spray
6/17/68	Leafy spurge	Tract 10-Marshall	25	2,4-D ester	4 gal.	1 lb./acre	50g./w	P.spray
6/18/68	Leafy spurge	Tract 10-Marshall	40	2,4-D ester	5 gal.	3/4 lb./acre	50g./w	P.spray

10. Summary of results (continue on reverse side, if necessary)

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Page 2

Refuge: Waubay (WPA)

Proposal Number:

Reporting Year: 1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6/19/68	Leafy spurge	Tract 10-Marshall	50	2,4-D ester	6 gal.	1 lb./acre	50g./w	P.spray
6/20/68	Leafy spurge	Tract 12-Marshall	6	2,4-D ester	1 gal.	1 lb./acre	50g./w	P.spray
6/24/68	Leafy spruge	Tract 20-Gra nt	Spot S.	Tordon 22K	8 oz.	1 gal./acre	10g./w	H.spray
7/18/68	Sow thistle	Tract 92-Clark	2	Tordon 212	1 gal.	½ gal./acre	50g./w	P.spray
7/18/68	Sow thistle	Tract 10-Clark Co.	.8	2,4-D ester	1 qt.	1 lb./acre	10g./w	H.spray
7/19/68	Leafy spurge	Tract 11-Marshall	2	Tordon 212	2 gal.	1 gal./acre	10g./w	P.spray
7/22/68	Leafy spurge	Tract 11-Marshall	2	Tordon 212	2 gal.	1 gal./acre	10g./w	P.spray
7/23/68	Sow thistle	Tract 10-Roberts	6	MCP-amine	1 gal.	1 lb./acre	50g./w	P.spray
7/23/68	Sow thistle	Tract 10-Grant	6	MCP-amine	1 gal.	1 lb./acre	50g./w	P.spray
7/24/68	Sow thistle	Tract 121-Roberts	8	MCP-amine	1½ gal.	1 lb./acre	50g./w	P.spray
7/24/68	Sow thistle	Tract 58-Day	12	MCP-amine	2 gal.	1 lb./acre	50g./w	P.spray

10. Summary of results (continue on reverse side, if necessary)

3550

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Page 3

Refuge	
Waubay (WPA)	
Proposal Number	Reporting Year
	1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7/25/68	Sow thistle	Tract 58-Day	15	2,4-D ester	2 gal.	3/4 lb./a.	50g./w	P.spray
7/2 6/68	Sow thistle	Tract 232-Clark	8	2,4-D ester	1 gal.	3/4 lb./a.	50g./w	P.spray
8/6/68	Sow thistle	Tract 11-Marshall	30	2,4-D ester	5 gal.	1 lb./a.	50g./w	P.spray
8/7/68	Sow thistle	Tract 11-Marshall	40	2,4-D ester	6 gal.,1qt.	1 lb./a.	50g./w	P.spray
8/8/68	Sow thistle	tract 11-Marshall	30	2,4-D ester	5 gal.	1 lb./a.	50g./w	P.spray

10. Summary of results (continue on reverse side, if necessary)

Spraying of noxious weeds commenced on May 20th and ended on Aug. 8th. Spraying of Tordon 212 proved very effective. Many thistle plants in different stages of growth, make it difficult for a 100% kill due to heavy overtopping species of grass. Estimated 70% kill on thistle and 90% kill on spurge. Noted some spurge appearing in new locations. Herbicide spraying has been effective in thinning out infested areas. Invading plant species usually consist of native grasses which provide good nesting cover for waterfowl and upland game.

(over)

Cost of spraying operations for the period are as follows:

Cost of Chemical	Equipment	Equipment & labor cost	Total cost	acres	Cost/acre	Herbicide
$124.50	P.spray	$300.00	$424.50	281	$1.51	2,4-D
222.75	P.spray	250.00	472.75	15	31.53	Tordon 212
13.00	B. Builder	100.00	113.00	25	4.52	Strychnine barley

NR13

HABITAT CONDITION - ANNUAL SUMMARY

County	Unit	Acres	Dates Checked	Water Conditions	Upland Habitat Conditions	Waterfowl Observed	Land Use	Management Plan
Brookings	10	40	10/17/68	Dry	Good	none	nu	PP
	11	55.31	"	Dry	Good	none	nu	PP
	11a	13.09	"	Poor	Good	none	G	PP
	13	13.00	"	Good	Good	none	nu	PP
	15	86.32	"	Fair	Good	9-Ducks	nu	PP
	16(1)	20.00	"	Dry	Fair	none	nu	PP
	17(1)	15.20	"	Dry	Good	none	nu	PP
	18a(2)	90.37	"	Dry	Fair	none	nu	PP
	20	73.54	"	Poor	Good	none	nu	PP
	22(2)	11.35	"	Dry	Good	none	nu	PP
	23(1)	9.00	"	Dry	Fair	none	nu	PP
	24a(1)	108.44	"	Dry	Good	none	nu	PP
	26	35.00	"	Poor	Good	none	nu	PP
	27	160.00	"	Dry	Good	none	ra	NC
	28	85.00	"	Dry	Good	none	ra	NC
	29	55.00	"	Dry	Good	none	nu	NC
	30	228.26	"	Fair	Fair	none	ra	No
	31	120.00	"	Dry	Good	none	nu	No
	31a	40.00	"	Dry	Good	none	nu	No
	32	54.00	"	Poor	Poor	none	G	No
	33	40.00	Not checked					No
Clark	US 1	80.00	Not checked					No
	1a,b,c	15.73	Not checked					No
	10	157.49	10/7/68	Dry	Good	none	nu	PP
	11	80.00	"	Dry	Good	none	G	PP
	18	73.18	"	Poor	Good	none	nu	PP
	24a	146.07	"	Dry	Fair	none	nu	NC
	92	57.70	"	Dry	Fair	none	nu	PP
	101	80.00	"	Dry	Good	none	ra	NC
	219	200.00	"	Good	Good	20-Ducks	nu	PP
	232	46.62	10/9/68	Dry	Good	none	nu	NC
	234	23.00	"	Dry	Fair	none	nu	NC
	240	145.60	"	Dry	Good	none	nu	NC
	241	40.00	"	Good	Good	none	nu	NC

NR13

HABITAT CONDITION - ANNUAL SUMMARY

County	Unit	Acres	Dates Checked	Water Conditions	Upland Habitat Conditions	Waterfowl Observed	Land Use	Management Plan
Clark	146	2.09	10/9/68	No marsh	Good	none	nu	No
	179	160.00	"	Dry	Poor	none	nu	No
	252	80.00	Not inspected					No
Codington	US1,a-d	31.23	9/10/68	Excellent	Fair	250-Ducks	nu	No
	10	56.99	"	Dry	Poor	none	nu	PP
	15	19.99	"	Good	Good	40-Ducks	nu	PP
	17	48.95	Not checked					NC
	30	140.00	9/10/68	Fair	Good	45-Ducks	nu	PP
	36	44.00	"	Good	Fair	40-Ducks	nu	NC
	38	56.66	Not checked					NC
	41	80.00	9/10/68	Good	Poor	400-Ducks	G	No
Day	US1	40.00	10/8/68	Good	Poor	6D-25Coot	G	No
	US1,a	40.00	"	Good	Good	150-Ducks	nu	No
	US-1,b	40.00	"	Good	Good	9D-25 Coot	nu	No
	US-1,c	40.00	"	Good	Good	none	G	No
	US-1,d	80.00	"	Good	Fair	30-Ducks	G	No
	10	59.40	"	Good	Good	20-Ducks	nu	PP
	11(1)	104.00	"	Good	Good	50-Ducks	nu	PP
	12(2)	93.00	"	Good	Fair	20-Ducks	nu	PP
	13	155.00	"	Good	Good	40-Ducks	nu	PP
	14	198.22	"	Good	Good	10-Ducks	nu	PP
	15	160.00	10/11/68	Good	Good	35-Ducks	G	PP
	16	40.94	"	Good	Good	50-Ducks	nu	PP
	17	62.12	"	Fair	Good	5-Ducks	nu	PP
	18(3)	40.00	"	Good	Good	30-Ducks	nu	PP
	19,a	120.00	"	Fair	Good	none	nu	PP
	20(1)	20.00	"	Good	Good	60-Ducks	nu	PP
	22	160.00	"	Dry	Fair	none	nu	PP
	23a(2)	46.65	"	Good	Fair	60-Ducks	nu	PP
	24(2)	65.31	"	Good	Fair	40-Ducks	nu	PP
	25,a	244.30	"	Good	Good	4-Ducks	nu	PP

NR13

HABITAT CONDITION - ANNUAL SUMMARY

County	Unit	Acres	Dates Checked	Water Conditions	Upland Habitat Conditions	Waterfowl Observed	Land Use	Management Plan
Day	26	320.00	10/11/68	Good	Good	3 -Ducks	mu	PP
	40	160.00	10/12/68	Good	Good	20-Ducks	mu	PP
	43(4)	40.00	"	Good	Good	100-Coot	mu	PP
	44	80.00	"	Good	Good	12D-100C	mu	PP
	45	37.52	"	Good	Fair	none	mu	PP
	55	120.00	"	Good	Good	4-Ducks	G	PP
	56,a	195.90	"	Good	Good	none	G	PP
	57	40.00	"	Good	Good	250-Coot	mu	PP
	58	200.00	"	Dry	Good	none	mu	PP
	59	280.00	"	Good	Good	25-Ducks	G	PP
	60	398.50	"	Good	Good	6-D,600C	mu	PP
	139(3)	60.00	"	Good	Good	200-Ducks	mu	PP
	146	13.75	"	Poor	Poor	none	G	NC
	170	39.64	10/5/68	Good	Fair	75-Ducks	mu	No
	175	68.78	"	Dry	Good	none	G	No
	176	84.00	Not checked					NC
	68	47.60						No
	193	20.00	10/5/68	Good	Good	25-Ducks	mu	No
	263a	79.87	"	Good	Fair	60-Ducks	G	No
	186	5.21	"	Good	Fair	25-Ducks	mu	No
	188	64.00	"	Good	Good	30D-13 Sw.	mu	No
	194	64.03	"	Excellent	Fair	50-Ducks	ra	No
	197	42.80	"	Excellent	Good	400-Duck	ra	No
	198	50.11	Not checked					No
Deual	10	30.25	10/16/68	Good	Good	10-Ducks	mu	PP
	11	75.00	"	Good	Fair	none	mu	PP
	13	195.00	"	Dry	Fair	none	mu	PP
	14	48.20	"	Dry	Poor	none	G	PP
	15	30.00	"	Dry	Fair	none	mu	No
	27	130.00	"	Good	Fair	20-Ducks	mu	NC

NR13

HABITAT CONDITION - ANNUAL S[illegible]MARY

County	Unit	Acres	Dates Checked	Water Conditions	Upland Habitat Conditions	Waterfowl Observed	Land Use	Management Plan
Grant	10	22.50	7/17/68	Fair	Good	none	nu	PP
	20	79.24	"	Fair	Good	none	nu	PP
	38a	26.16	"	Good	Good	14-Ducks	nu	PP
	41	120.00	"	Good	Good	10-Ducks	nu	PP
	42	160.00	"	Good	Good	16-Ducks	nu	PP
	43	182.31	"	Good	Good	none	nu	NC
	44	29.76	10/5/68	Fair	Good	none	ra	PP
	53	12.80	"	Fair	Good	none	nu	NC
	54	38.00	"	Fair	Good	none	nu	NC
	55	34.00	"	Dry	Poor	none	G	No
Hamlin	19	40.00	10/17/68	Dry	Good	none	nu	NC
Kingsbury	105	111.50	10/2/68	Dry	Poor	none	nu	NC
	106	56.10	"	Dry	Fair	none	nu	NC
	229	26.60	"	Poor	Fair	none	nu	NC
	131	20.00	" *	Dry	Good	none	nu	NC
	132	35.20	" *	Dry	Good	none	nu	NC
	133	68.00	" *	Dry	Good	none	nu	NC
	134	84.80	" *	Dry	Good	none	ra	No
	137	36.50	" *	Dry	Fair	none	nu	No
	141	95.00	"	Dry	Good	none	nu	No
	142	9.20	"	Dry	Good	none	nu	No
	144	117.40	"	Dry	Fair	none	ra	No
	145	148.25	"	Dry	Good	none	G	No
Marshall	US-1	16.89	Not checked					No
	10	148.60	10/23/68	Good	Good	none	G	PP
	11	444.91	" *	Poor	Good	none	nu	PP
	11a	143.30	" *	Good	Good	10-Duck	nu	PP
	12	80.00	" *	Fair	Fair	none	nu	PP
	13(1)	40.00	"	Good	Good	20-Duck	nu	PP
	29	40.00	11/29/68 *	Good	Fair	none	ra	PP
	30(1)	41.00	Not checked					No
	76	60.00	11/29/68	Good	Good	none	G	PP

NR13

HABITAT CONDITION - ANNUAL SUMMARY

County	Unit	Acres	Dates Checked	Water Conditions	Upland Habitat Conditions	Waterfowl Observed	Land Use	Management Plan
Marshall	92	47.06	11/29/68	Good	Good	none	nu	No
	93	160.00	" *	Good	Fair	50-Duck L.	Tenant	NC
Roberts	10	79.60	9/11/68	Dry	Fair	25-Duck	nu	PP
	11	80.00	"	Good	Fair	none	nu	PP
	80	28.80	"	Fair	Fair	none	nu	PP
	114	52.80	Not inspected					PP
	120	75.20	9/12/68	Good	Good	350-Duck	G	PP
	121	119.04	"	Fair	Fair	10-Duck	nu	PP
	122	31.40	"	Fair	Fair	none	ra	PP
	84	200.00	"	Fair	Poor	10-Duck	G	No
	129	160.00	"	Good	Fair	none	ra	No
	130	80.00	"	Good	Good	35-Duck	ra	No
	132a	23.40	"	Poor	Fair	150-Duck	ra	No
	133	35.85	10/12/68	Good	Good	50D-13Sw	ra	No
	134ab	240.00	"	Good	Good	25-Duck	ra	No
	127	28.23	"	Good	Good	25-Duck	ra	No
	113(1)	82.00	"	Good	Fair	none	ra	No
	136(2)	24.00	"	Good	Good	none	G	No
	138(2)	19.00	"	Good	Fair	none	G	No

( ) Within one management unit
* A minimum of 2 inspections during year
nu No use
ra Range Agricultural
G Grazing
Water conditions based on August inspection

ANNUAL BLOCK BREEDING POPULATION SUMMARY Year: 1968

District or Location: Waubay (WPA) State: S. Dak. Observers: R. Johnson, E. Fromelt, T. Schenck

Total Pairs in Sample Units (Blocks)

Species	1	2	3	4	5	6	Total
Mallard	3	9		2	7	0	
Gadwall	7	8	6	5	5		
Widgeon							
Greenwing							
Bluewing	18	6	7	40	22		
Shoveler	2			5			
Pintail		2		1			
Dabblers	30	25	13	53	34	0	
Redhead	11	2	2	5	5		
Canvasback	1				1		
Lesser Scaup	2						
Ruddy duck	4	1	2	3			
Divers	18	3	4	8	6	0	
Total Pairs	48	~~28~~ 45	~~17~~ 37	61	40	0	
COOT PAIRS	21	2	1	28	30	0	

CONDITION OF HABITAT BLOCK - EARLY JUNE

Unit No.	Name	County	Main Geol. Zone	1 Total Block Acres	2 Water Basin Acres	3 Number Water Bodies	4 Total Water Surface	5 Number of Wet Water Bodies	6 (4/2) Per Cent of Basin Acres with water	7 (5/3) Per Cent of Water Bodies Holding Water	8 Product of 6 x 7
1	WPA-11	Roberts	Minn.R.	240	83.90	11	70.28	9	82	81	66
2	WPA-11	Marshall	Coteau	445	68.08	48	49.01	43	72	89	62
3	E-56X	"	"	320	61.00	40	27.63	19	46	48	22
4	WPA-40	Day	"	320	78.00	10	52.75	7	76	70	53
5	WPA-26	Day	"	640	108.65	42	72.62	9	67	22	15
6	E-61X	Clark	"	160	6.10	8	0	0	0	0	0
Total											

~~Prepared by Manager~~

cc: Area Biologist by June 15
NR Report

Form 4.3

Year: 1968

ANNUAL BLOCK BREEDING POPULATION SUMMARY

District or Location: Waubay (WPA) State: S. Dak. Observers: R. Johnson, E. Fromelt, T. Schenck

Species	Total Pairs in Sample Units (Blocks) 1	2	3	4	5	6	Total
Mallard	—	2	—	—	—	—	23
Gadwall	—	1	—	—	—	—	32
Widgeon	—	—	—	—	—	—	0
Greenwing	—	—	—	—	—	—	0
Bluewing	—	4	—	—	—	—	87
Shoveler	—	—	—	—	—	—	7
Pintail	—	—	—	—	—	—	3
Dabblers	0	7	—	—	—	—	162
Redhead	—	—	—	—	—	—	25
Canvasback	—	—	—	—	—	—	2
Lesser Scaup	—	—	—	—	—	—	2
Ruddy duck	—	—	—	—	—	—	10
Divers	0	0	—	—	—	—	38
Total Pairs	0	7					200
COOT PAIRS	0	0					83

CONDITION OF HABITAT BLOCK - EARLY JUNE

Unit No.	Name	County	Main Geol. Zone	1 Total Block Acres	2 Water Basin Acres	3 Number Water Bodies	4 Total Water Surface	5 Number of Wet Water Bodies	6 (4/2) Per Cent of Basin Acres with Water	7 (5/3) Per Cent of Water Bodies Holding Water	8 Product of 6 X 7
1	E-32X	Cod.	Coteau	160	16.90	7	4.2	1	24	15	3.6
2	E-23X	Deuel	"	320	28.40	48	5.30	10	19	21	4
3											
4											
5											
6											
Total				2605	443.71	213	281.79	98	64	46	31

Prepared by Manager
cc: Area Biologist by June 15
NP Report

Form 4.3

BROOD SURVEY - Summary

Year: 1968

District or Location: Waubay Refuge (WPA) State: S. Dak. Observer(s): E. Fromelt, T. Schenck

Date(s) counts were made: 7/14 - 8/16 (Applies to one survey; from form 5.2 .

(This form prepared by Manager, sent to Area Biologist by August 31)

Brood Sample Unit Number	Name	County(ies)	Item 1 Major Geog. Zone	1 Total Basin Acres	2 Total Water Area Acres	4 Total Open Water Acres	4/2 Relative Brood Observ.	2/1 Water Condition	4/1 Combined Factor
1	Marshall	Marshall Co.	Coteau	347.9	178.53	126.37	.70	.51	.36
2	Day	Day Co.	"	404.2	134.60	103.04	.77	.33	.24
3.	Clark	Clark Co.	"	678.8	347.30	93.80	.27	.51	.14
4	Deuel	Deuel Co.	"	303.5	47.84	31.08	.63	.13	.11
5	Roberts	Roberts Co.	Minn.R.	176.2	21.12	16.46	.77	.12	.10
Totals				1910.6	729.39	370.75	.63	.32	.19

SU. AND PER CENT OF TOTAL WATER SURFACE AREA IN HABITAT RATING CLASSES

From Sample Unit Brood Survey form 5.2 . Tabulate sum of acres of water area (item 2) in each habitat class (item 5).

Habitat Class	1 Acres	1 %	2 Acres	2 %	3 Acres	3 %	4 Acres	4 %	5 Acres	5 %	6 Acres	6 %	TOTAL Acres	TOTAL %
1														
2	111.09	64	41.6	32.5	89.1	25	47.84	100	21.12	100				
3	56.1	32	66.0	49.3	221.2	64.4								
4	12.34	4	27.6	18.2	32.0	10.6								
5														
TOTAL	179.53	100	135.20	100	347.30	100	47.84	100	21.12	100				

SUMMARY OF BROOD COUNT

Location: Waubay - (WPA)
Survey Date(s): 7/15 & 8/12

Species	Unit No. 1 Broods	Unit No. 2 Broods	Unit No. 3 Broods	Unit No. 4 Broods	Unit No. 5 Broods	Unit No. Broods	Total Broods
Mallard	11	20	14	2	4		51
Black duck							
Gadwall	1	5		1	3		10
Widgeon							
Greenwing							
Bluewing	5	4	4				13
Shoveler							
Pintail							
Wood duck							
Unidentified	2				1		3
Ducks	19	29	18	3	8		77
Corr. Dab.	74.8	87.3	48	8.3	11.1		229.5
Redhead	2						2
Canvasback	1	1					2
Lesr. Scaup							
Ringneck							
Ruddy duck			1				1
Unidentified	1	1	2				4
Divers	4	2	3				9
Corr. Div.	4.8	3	3.6				11.4
TOTAL BROODS	21	31	21	3	8		86
CORR. BROODS	79.6	90.3	51.3	8.3	11.1		240.9
YG. COOTS	13	29	0	3	0		45
CORR. COOTS	16.9	109	0	3	0		126.2

CANADIAN WILDLIFE SERVICE AND
BUREAU OF SPORT FISHERIES AND WILDLIFE,
U. S. DEPARTMENT OF THE INTERIOR

SUMMARY SHEET, BREEDING BIRD SURVEY

State Prov. **S.D.** Route No. **S-18** Route Name **Veblen** Lat.-Long. **45°51' - 097°20'**

Counties (stop numbers in each) **Marshall Co. (12) Roberts Co. (38)**

Observer (please print) **Johnson** (LAST NAME) **Robert** (FIRST NAME) **R.** (INITIAL) Dr, Mr, Mrs Miss (CIRCLE ONE)

Mailing Address **Waubay Nat'l. Wildlife Refuge, Waubay, S. Dak.** Zip: **57273**

OFFICIAL USE ONLY

Weather: Start & Finish Temp. (F.) **59° - 75°** Wind Speed Beaufort **1 - 1** Sky Code **0 - 1**

Date **6 / 18 / 68** (MO DAY YEAR) Total Species **34** Name of Assistant, if any **none**

Species	AOU	Page Totals 1	2	3	4	5	Total Indiv	Stops per Spec.
Eared Grebe	004							
Pied-billed Grebe	006							
Gt. Blue Heron	194							
Blk-cr. Night Heron	202							
Am. Bittern	190							
Mallard	132		3	1		2	6	3
Gadwall	135							
Pintail	143				1	1	2	2
Green-winged Teal	139				1		1	1
Blue-winged Teal	140				1		1	1
Am. Widgeon	137							
Shoveler	141					1	1	1
Redhead	146			1			1	1
Lesser Scaup	149							
Ruddy Duck	167							
Red-tailed Hawk	327							
Swainson's Hawk	342							
Sparrow Hawk	360							
Marsh Hawk	331							
Sharp-tail Grouse	306							
Ring-neck Pheasant	3001	20	15	8	12	5	60	31
Sora	214							
Am. Coot	221							
Killdeer	273		2		2	4	8	5
Long-billed Curlew	264							
Upland Plover	261							
Spotted Sandpiper	263			1			1	1
Willet	258							
Lesser Yellowlegs	255							
Marbled Godwit	249		1				1	1
Avocet	225							
Wilson's Phalarope	224							
Herring Gull	051							
Franklin's Gull	059				1	11	12	3
Black Tern	077			2			2	2
Rock Dove	3131							
Mourning Dove	315	30	22	6	15	10	83	30
Yel-billed Cuckoo	387							
Blk-billed Cuckoo	388							
Great Horned Owl	3[illegible]	6					6	3
Burrowing Owl	378							
Common Nighthawk	420							
Yel-shaft Flicker	412							
Red-shaft Flicker	413							
Red-hd. Woodpecker	406							
Hair. Woodpecker	393							
Downy Woodpecker	394							
E. Kingbird	444				3		3	3
W. Kingbird	447				2		2	2
Gt. Crested Flycatcher	4[illegible]							
E. Phoebe	456							
Say's Phoebe	457							
Traill's Flycatcher	460							
Least Flycatcher	461							
Western Flycatcher	464							
E. Wood Pewee	461							
W. Wood Pewee	462							
Horned Lark	474			1	1		2	2
Violet-gr. Swallow	615							
Tree Swallow	614							
Bank Swallow	616							
Rough-wing Swallow	617							
Barn Swallow	613				3	2	5	2
Cliff Swallow	2					2	2	1

Species	AOU	Page Totals 1	2	3	4	5	Total Indiv	Stops per Spec.
Cliff Swallow	612							
Purple Martin	611							
Blue Jay	477							
Black-bill Magpie	470							
Common Crow	488	6	2				8	6
Blk-cap. Chickadee	736							
White-br. N. Thatch.	[illegible]							
Red-br. Nuthatch	726							
House Wren	731							
Lt.-bill. Marsh Wren	725							
Sh.-bill. Marsh Wren	724							
Rock Wren	715							
Catbird	704							
Brown Thrasher	705		1			1	2	2
Robin	761	1	1			1	3	3
Veery	756							
E. Bluebird	766							
Mountain Bluebird	768							
Sprague's Pipit	700							
Cedar Waxwing	619							
Loggerhead Shrike	622							
Starling	493	1				5	6	2
Yel-thr. Vireo	628							
Solitary Vireo	629							
Red-eyed Vireo	634							
Warbling Vireo	627							
Yellow Warbler	9[illegible]	2				2	4	4
Aud. Warbler	656							
Ovenbird	674							
Yell. Yellowthroat	681							
Yellow-br. Chat	683							
Am. Redstart	637							
House Sparrow	6282							
Bobolink	494	1		2		5	8	5
W. Meadowlark	5011	24	12	11	13	8	68	35
Yel-hd. Blackbird	497		10					
Red-wing. Blackbird	498	10	6	24	13	30	83	19
Orchard Oriole	506							
Baltimore Oriole	507							
Brewer's Blackbird	510							
Common Grackle	511	20	5	10	40	24	99	25
Brown-hd. Cowbird	445							
Western Tanager	607							
Rose-br. Grosbeak	595							
Blk-hd. Grosbeak	596							
Lazuli Bunting	599							
Dickcissel	604		1				1	1
Pine Siskin	5[illegible]							
Am. Goldfinch	529							
Rufous-sided Towhee	537							
Lark Bunting	[illegible]				4		4	2
Savanna Sparrow	4[illegible]							
Grasshopper Sparrow	548							
Baird's Sparrow	545							
Vesper Sparrow	540				1		1	1
Lark Sparrow	552							
White-wing Junco	566							
Chipping Sparrow	560							
Clay-colored Spar.	561	1		2			3	2
Field Sparrow	563							
Song Sparrow	581		2				2	2
Ch-col. Longspur	538							
House sparrow						5	5	1

CANADIAN WILDLIFE SERVICE AND
BUREAU OF SPORT FISHERIES AND WILDLIFE,
U. S. DEPARTMENT OF THE INTERIOR

SUMMARY SHEET, BREEDING BIRD SURVEY

State Prov. S. D. Route No. 5-19 Route Name Britton Lat.-Long. 45°44' -97°43'

Counties (stop numbers in each) Marshall (24) Day (26)

Observer (please print) Mc Clure (LAST NAME) Milton (FIRST NAME) D. (INITIAL) Dr, Mr, Mrs Miss (CIRCLE ONE)

Mailing Address Waubay Refuge, Waubay, S. D. ZIP: 57273

OFFICIAL USE ONLY

Weather: Start & Finish Temp. (F.) 57 - 0 Wind Speed Beaufort 3 - Sky Code 2 -

Date 6/17/68 (MO. DAY YEAR) 6/18/68 Total Species 46 Name of Assistant, if any

Species	AOU	Page Totals 1	2	3	4	5	Total Indiv	Stops per Spec.
Eared Grebe	004							
Pied-billed Grebe	006							
Gt. Blue Heron	194							
Blk-cr. Night Heron	202				7	5	12	2
Am. Bittern	190				2	4	6	5
Mallard	132	1			6		7	3
Gadwall	135							
Pintail	143				1	2	3	2
Green-winged Teal	139							
Blue-winged Teal	140		2	7	10	18	37	11
Am. Widgeon	137							
Shoveler	142							
Redhead	146				10	2	12	2
Lesser Scaup	149							
Ruddy Duck	167			2			2	1
Red-tailed Hawk	337							
Swainson's Hawk	342							
Sparrow Hawk	360							
Marsh Hawk	331				1		1	1
Sharp-tail. Grouse	308							
Ring-neck Pheasant	309	7	4	1	1	1	14	10
Sora	214							
Am. Coot	221			11	34	62	107	7
Killdeer	273			3	2	4	9	3
Long-billed Curlew	264							
Upland Plover	261							
Spotted Sandpiper	263					4	4	1
Willet	258							
Lesser Yellowlegs	255							
Marbled Godwit	249							
Avocet	225							
Wilson's Phalarope	224					2	2	1
Herring Gull	051					22	22	2
Franklin's Gull	059							
Black Tern	077			4	21	20	45	7
Rock Dove	313							
Mourning Dove	316	9	8	21	6	3	47	16
Yel-billed Cuckoo	387							
Blk-billed Cuckoo	388							
Great Horned Owl	375							
Burrowing Owl	378							
Common Nighthawk	420							
Yel-shaft Flicker	412							
Red-shaft Flicker	413							
Red-hd. Woodpecker	406							
Hairy Woodpecker	393							
Downy Woodpecker	394							
E. Kingbird	444							
W. Kingbird	447	4	5		2	2	13	9
Gt. Crest Flycatcher	452							
E. Phoebe	456							
Say's Phoebe	457							
Traill's Flycatcher	466							
Least Flycatcher	467							
Western Flycatcher	464							
E. Wood Pewee	461							
W. Wood Pewee	462							
Horned Lark	474							
Violet-gr. Swallow	615							
Tree Swallow	614							
Bank Swallow	616	1			1	1	3	5
Rough-wing Swallow	617							
Barn Swallow	613				2		2	2
Cormorant						1	1	1

Species	AOU	Page Totals 1	2	3	4	5	Total Indiv	Stops per Spec.
Cliff Swallow	612							
Purple Martin	611							
Blue Jay	477							
Black-bill Magpie	475							
Common Crow	488							
Blk-cap. Chickadee	735							
White-br. Nuthatch	727							
Red-br. Nuthatch	728							
House Wren	721							
Lg-bill. Marsh Wren	725							
Sh-bill. Marsh Wren	724							
Rock Wren	715							
Catbird	704							
Brown Thrasher	705				2		2	2
Robin	761	1	2	1			4	4
Veery	756							
E. Bluebird	766							
Mountain Bluebird	768							
Sprague's Pipit	700							
Cedar Waxwing	619							
Loggerhead Shrike	622							
Starling	493	3		9	8		20	6
Yel-thr. Vireo	628	3	3		1		7	4
Solitary Vireo	629							
Red-eyed Vireo	624				1		1	1
Warbling Vireo	627							
Yellow Warbler	652		4	7	2	4	17	12
Aud. Warbler	656							
Ovenbird	674							
Yellowthroat	681	3					3	2
Yellow-br. Chat	683							
Am. Redstart	687			1	1		2	2
House Sparrow	6882	15	4	11	16	15	61	9
Bobolink	494							
W. Meadowlark	5011	11	15	18	11	11	66	33
Yel-hd. Blackbird	497	2	2	20	34	42	100	19
Red-wing. Blackbird	498	15	21	25	79	30	170	31
Orchard Oriole	506							
Baltimore Oriole	507							
Brewer's Blackbird	510		3	7	4	2	16	7
Common Grackle	511	2	3			1	6	3
Brown-hd. Cowbird	495	1		2			3	3
Western Tanager	607							
Rose-br. Grosbeak	595							
Blk-hd. Grosbeak	596							
Lazuli Bunting	599							
Dickcissel	604	2	1	1			4	3
Pine Siskin	533							
Am. Goldfinch	529			2			2	1
Rufous-sided Towhee	587							
Lark Bunting	605	1	1	1	3	2	8	6
Savannah Sparrow	542							
Grasshopper Spar.	546							
Baird's Sparrow	545							
Vesper Sparrow	540							
Lark Sparrow	552							
White-wing Junco	566							
Chipping Sparrow	560		1	2			3	3
Clay-colored Spar.	561		1	2	1	1	5	4
Field Sparrow	563	7		1			8	3
Song Sparrow	581	2				2	4	2
Ch-col. Longspur	538							
Sharp-tailed Sp.				1			1	1
Swamp Sparrow						1	1	1

South Dakota's State flower - The Crocus.
These beauties abound on Grant County
tract 43. R5, Exp. 4, 4/68, RRJ.

SD-WBY-396

Typical class III wetland during summer
of 1968. R7, Exp. 9, 7/68, RRJ.

SD-W84-397

Good grass cover helps replenish wetlands by collecting snow. Note difference in snow deposits on plowed field and grassland on Day County tract 58. R3, Exp. 10, 3/68, RRJ.

SR-WBY-398

View of grassland on Day County tract 55
following 1968 grazing season. R18, Exp. 9,
10/68, RRJ.

SD-WBY-399

Dry wetlands encourage haying. Easement
90K, Day County. RB, Exp. 7, 8/68, RRJ.

SD-WBY-400

Burrow-builder in action distributing poison barley for controlling pocket gophers on tract 11, Marshall County. Maintenanceman Ed Henning at the wheel. R12, exp. 3, 5/68, RRJ.

SD-WBY-401

Close-up of covered burrow left by burrow builder. R12, Exp. 6, 5/68, RRJ.

SO-WBY-402

S.D. Game, Fish & Parks Dept. crew scalping
in red cedar on tract 26, Day County.
R9, Exp. 5, 4/68, RRJ.

SD-WBY-403

Close up of S. Dak. Game, Fish & Parks Dept.
scalp planting. R9, Exp. 7, 4/68, HRJ.

SD_WBY_404

View of newly planted scalp tree planting
Tract 27, Deuel County. R9, Exp. 2, 4/68, RRJ.

SD-WB/-405

District Forester Paul Bloomhart inspecting
Russian Olive seedling scalped in on tract 120,
Roberts County. R11, Exp. 7, 5/68, RRJ.

SD-WBY-406

"Blue Ribbon Planning Team" - Left to right:
Regional Architect J. Kneckt, Team Leader
E. Crozier, Interpretive specialist R. Johnston,
Recreation specialist M. Duncan, and I&E
specialist C. Griffith. R18, Exp. 1, 10/68, RRJ.

50-WBL-427

Assistant Manager, Ben Gastineau
R20, Exp. 1, 12/68, RRJ

SD-WBY-408

The refuge staff - Left to right:
Laborer Don Dargatz, Foreman I Milton Thennis,
Student Ass't. Ted Schenck, Biological Tech.
Ed Fromelt, and Maintenanceman Ed Henning.
R7, Exp. 11, 7/68, RRJ

SD-WBY-409