



AGASSIZ NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

1968

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UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

MIDDLE RIVER , MINNESOTA

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# I. GENERAL

## A. Weather Conditions:

TABLE I. Precipitation and Temperatures, 1968

Month	Precipitation			Temperature			
	Month	Normal	Snowfall	Max.	Min.	Ave.	Normal*
January	.61	.43	5.7	43	-43	.3	-0.7
February	.05	.43	.5	33	-32	1.8	4.9
March	1.08	.49	4.9	61	-15	26.3	20.3
April	1.71	1.97	2.0	78	12	39.5	37.5
May	1.43	1.92	-	82	16	49.9	51.4
June	8.35	4.19	-	89	40	60.9	62.8
July	6.16	4.44	-	88	42	63.9	66.7
August	3.40	3.33	-	90	36	61.5	64.2
September	2.57	2.76	-	83	30	54.8	53.9
October	1.72	1.38	-	76	21	43.5	44.0
November	.30	.87	2.3	58	3	27.9	25.1
December	.54	.79	5.4	41	-25	8.9	8.9
Totals & Averages	27.92	23.00	20.8	90	-43	39.9	39.9

\*Eleven year average, 1958-1968.

All weather data were obtained from the official weather station located at headquarters.

Total precipitation for 1968 was 27.92 inches, 4.54 inches above the eleven year average, and 11.04 inches above the 1967 total. The smallest amount of precipitation occurred in February (.05) and the largest amount in June (8.35). Heavy rains beginning in June and continuing through October accounted for the substantial increase in precipitation over the eleven year average.

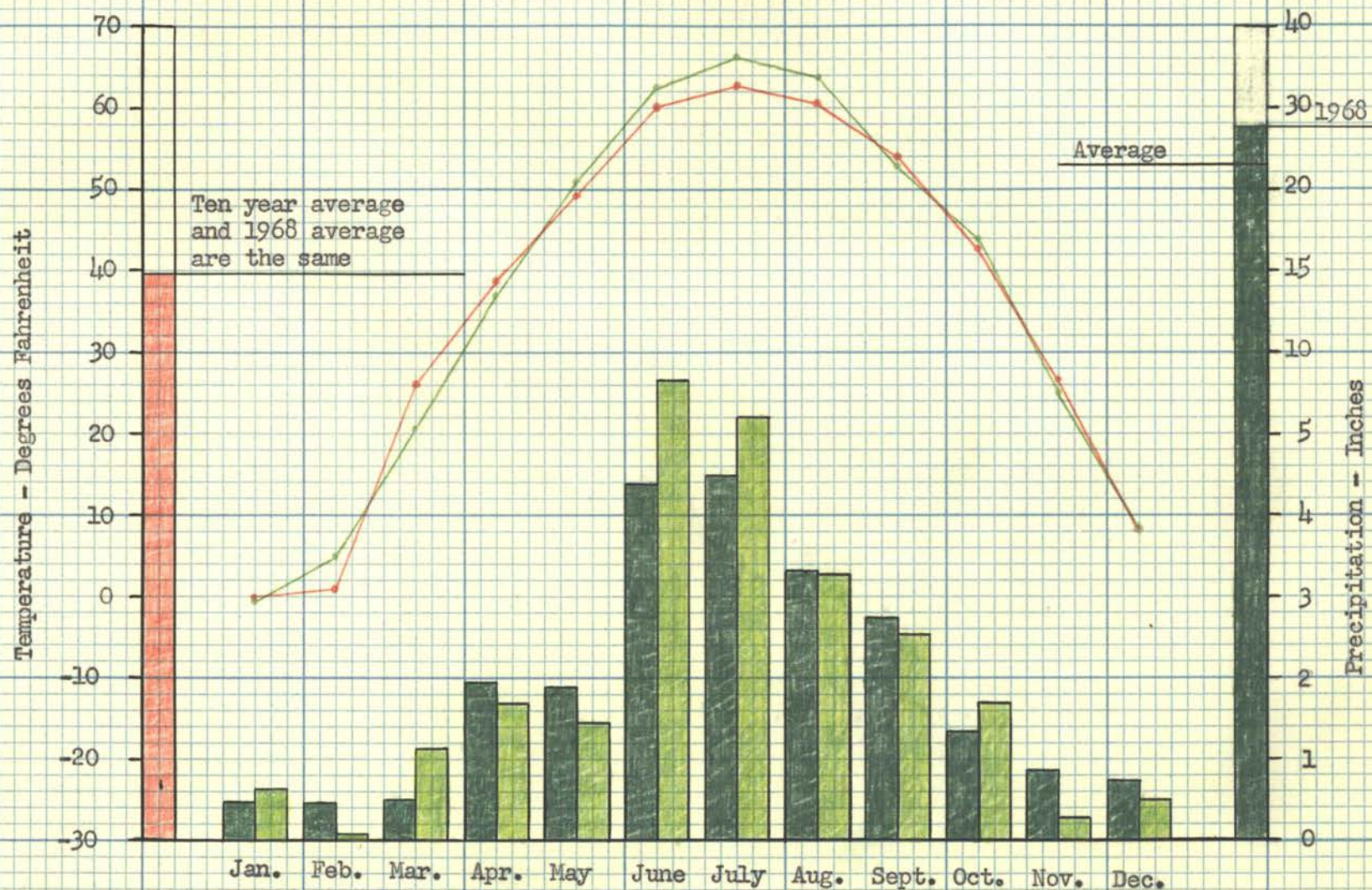
Total snowfall for the year was 20.8 inches, well below the average snowfall.

The average temperature for the year was the same as the eleven year normal. The first killing frost occurred on September 29 and the last killing frost on May 17. The resulting 134 frost free growing days was higher than the ten year average of 120 frost free days.



FIGURE I - Climatic Graph, 1968

- Average Monthly Temperature, 1968.
- Average Annual Monthly Temperature, 1958-1968.
- Average Annual Monthly Precipitation, 1958-1968.
- Average Monthly Precipitation, 1968.





## B. Habitat Conditions:

### 1. Water

Refuge pools were drawn down prior to winter freeze-up in 1967 to increase storage capacity during the critical spring runoff period in 1968. By March 25 warm temperatures and light rains melted the snow pack, and most ice was off the refuge pools by the 30th. Light winter snowfall accompanied by below normal precipitation during April and May resulted in limited runoff and no flooding during the spring period.

Available water was not ample to fill refuge pools and most remained below approved levels until heavy rains in June and July resulted in two peak flood periods, one in early June and one during late July. Precipitation during these two months was 14.51", about 6" above average. Heavy rains also occurred in the watershed north and east of the refuge which contributed to heavy runoff and near flood conditions. Moisture for the remainder of the year was about normal and pool levels gradually stabilized and were held near approved elevations.

Greatest outflow occurred during the months of June, July and, August. The total inflow of 197,742 acre feet and 146,058 acre feet outflow was considerably more than was recorded in 1967. Runoff from rains this year was spread over the three month period and permitted gradual release.

After a year of use there is little doubt that the new Agassiz control on Ditch 11 will handle present volumes of water with little difficulty. The control passed nearly as much water in 1968 as did all of the structures during the previous year. The maximum outflow of 1,008 cubic feet per second recorded in July helped maintain fairly stable water levels on Agassiz in spite of heavy inflow. Other pools were not as fortunate and many of the smaller ones experienced 2 to 3 foot increases in water levels, resulting in heavy nest losses. Unusually low spring levels had lured an increased duck breeding population into a "death trap".

Scheduled drawdowns were difficult to accomplish because of variable runoff. Green Stump was drawn down for most of the summer with periodic temporary reflooding occurring after heavy rains. South and Northwest pools were nearly drained at different times during the summer; however, both succumbed to above normal precipitation. Thief Bay Pool had little water supply into it early and was dry until heavy rains fell in June. Headquarters Pool, originally scheduled for drawdown, was flooded and resulted in the most abundant growth of aquatics found anywhere on the refuge.

Some pools, including Agassiz, were drained prior to winter freeze up to provide increased storage capacity in the spring. Thief Bay, Madsen, Webster, Dahl and East Bay pools will remain flooded to provide over-wintering habitat for the low muskrat population.



The winter storage of 7,065 acre feet is considerably greater than the 1,781 acre feet stored during the winter of 1967-68.

## 2. Food and Cover

Snow conditions during the winter of 1967-68 were moderate and posed no problem for big game. In spite of over-mature vegetation in many portions of the refuge there was ample browse available for the moose and deer herds. Winter dozing of brush areas provided additional winter feed and regrowth in these areas will receive good use for several years to come. It is interesting to note that sandbar willow, the preferred browse of moose, is heavily utilized throughout the refuge and regrowth is providing increasing browse supplies. Redosier dogwood and balsam poplar are other browse species in good supply and in most instances dogwood has been heavily utilized.

Food and cover conditions for other upland species during the winter were good. Roosting grouse had ample snow cover, and aspen and alder was available throughout most of grouse range on the refuge. Grain seeking sharp-tailed grouse would have had to move off the refuge to feed since no grain remained exposed in refuge fields.

During spring migration only a limited supply of food was available in the form of waste grain. A dry fall in 1967 facilitated harvest operations and fall plowing and most grain was removed from private and refuge farm fields. Limited browse was available on refuge alfalfa and winter wheat plantings from the year before.

Carry-over of aquatic foods in refuge pool areas was generally lacking because of winter drawdown of the pools and moist soil foods produced along the margins were inaccessible because of low spring water levels. However, food supplies were ample to attract and hold an increased duck breeding population. Low water levels provided an abundance of territorial loafing sites and nesting cover, but after heavy rains in June both were in short supply. Emergent cover for broods and moulters was excellent.

Nesting and brooding habitat was thought to be good for upland game species, but there is little doubt that high water levels resulted in some nest losses. Nut and berry crops did not materialize this year; however, broods of all species had an abundance of insects or aquatic invertebrates to feed on.

Water conditions appeared favorable for the growth of aquatic plants as desirable food species increased on five of the nine pools sampled. Two pools showed a decrease in frequency. Several species of pondweeds, water milfoil and algae provided the bulk of the waterfowl foods produced. Headquarters Pool, originally scheduled for drawdown, showed the most lush growth and attracted large numbers of ducks, geese and swans. The invertebrate population on Webster Pool was noticeably higher than other pools and probably is one of the reasons for heavy brood use on that unit.



Growth of moist soil food plants in Green Stump and Thief Bay pools and in pothole areas of agricultural units was excellent, and late summer and fall waterfowl use was heavy. Cultivated crop production was unusually good this year and an estimated 15,145 bushels of grain were available. In addition about 14,000 bushels were fed on six depredations feed sites. About 75% of the oats, barley and corn on the farm units was utilized by field feeding ducks and geese. Wet weather conditions prevented planting suitable goose browse and most browse requirements were met off the refuge. Unlike most previous years there will be some grain available for waterfowl in the spring.

Big game browse conditions were improved in areas where burning and winter brush dozing was accomplished. Resprouting willow on these areas provided the bulk of the food available but sweet clover was a favorite of deer earlier in the season. Grain left over in the farm units was providing additional food supplies for deer. Generally cover conditions were favorable for big game throughout the season. It is interesting to note that deer and moose concentrations generally do not occur near the two extensive blocks of coniferous cover. Willow brush and timber groves provide the only cover on much of the range.

Black bear on the refuge and in the forest land east of the refuge had a tough year as a result of the poor berry and nut crops. Bears, for lack of food, were moving out of the woods into grain fields where they were extremely vulnerable to so-called "bear hunters". Grouse were also affected by the lack of berries; however, buds, greens and insects provided an excellent diet for them.

Heavy snows early in the winter may pose some threats to the deer and moose herd if the animals are not able to move around freely. On the other hand, deep snows will insure excellent roosting cover for grouse and provide easy reach to untouched food reserves for high rabbit populations in the area. No doubt some problems will be encountered when trying to determine the difference between rabbit and big game browsing, especially at 4 or 5 feet.

Future management is expected to improve natural food and cover conditions to receive maximum wildlife benefits.

## II. WILDLIFE

### A. Migratory Birds:

#### 1. Ducks

On March 25, four pintails appeared on the refuge. This duck arrival date was four days earlier than was recorded in 1967. When arrival dates for individual species in 1968 were compared with last year, it was noted that 46.7% arrived earlier, 33.3% on the same date and 20.0% appeared later.

The first weekly waterfowl census was conducted on April 5 with a total of 2,720 ducks recorded. By April 20 the refuge population had peaked at 44,730 birds. This peak represented an increase of 57.5% over last year and a decrease of 26.9% from the nine year average of 61,200. The 10,550 mallards reported on April 13 represented an increase of 69.7% over last spring's peak number. The majority of other species also showed increases, however, increases in diver numbers were of lesser magnitude than in dabblers.

By May 4, many migrant birds had departed for their northern nesting grounds; however, some divers lingered on. Early June still showed ruddy ducks moving in.

The breeding pair count was conducted on May 21 as prescribed in the refuge wildlife inventory plan. The technique was modified in that only a portion of the transects for the ground/air ratio were counted; and no species identification was attempted from the air. When the 1/3 aerial sample was expanded and ground/air ratio applied, a total of 6,357 pairs was determined for the refuge. This showed increases of 65.7% over 1967 and 6.1% over the 12 year average.

Species composition in the breeding population showed a 20% increase in dabblers over last year. The three main refuge breeders were again blue-winged teal, gadwall and mallard, accounting for over 62% of the population. Percent breakdown showed only slight changes from the long term average (Table II).

The annual brood count was conducted on August 19 and a total of 101 broods were observed. When the brood/pair index was applied to the spring breeding population the calculated production rate was 24.7%. This rate resulted in a total of 1,570 broods produced (1,047 diver and 523 dabbler broods). Average brood sizes of 5.25 (divers) and 6 (dabblers) were applied to total broods resulting in 8,635 ducks produced to flight stage in 1968 (Table III). Total production showed a drop of 35.2% from 1967.

Low production was brought on by fluctuating water levels as two flood periods corresponded with peak activity of the first and second nesting attempts.



TABLE II. Waterfowl Breeding Populations, 1957-1968

Species	Average, 1957-68		1968		
	Breeding Population	Percent Species Composition	Breeding Population	Percent Species Composition	Percent Change From Average
<b>Dabblers:</b>					
Blue-winged teal	3,964	33.1	4,094	32.2	+3.3
Mallard	2,294	19.1	1,780	14.0	-22.4
Gadwall	1,619	13.5	2,092	16.4	+29.2
Shoveler	583	4.9	972	7.6	+66.7
Baldpate	328	2.7	302	2.4	- 7.9
Pintail	189	1.6	252	2.0	+33.3
Green-winged teal	122	1.0	204	1.6	+67.2
Black duck	45	.4	0	0	-100.0
Wood duck	32	.3	30	.3	-6.2
Sub-total	9,176	76.6	9,726	76.5	+6.0
<b>Divers:</b>					
Redhead	1,070	8.9	1,136	8.9	+6.2
Lesser scaup	665	5.5	704	5.5	+5.9
Ring-necked	479	4.0	508	4.1	+6.1
Ruddy	388	3.2	412	3.2	+6.2
Canvasback	212	1.8	228	1.8	+7.5
Sub-total	2,814	23.4	2,988	23.5*	+6.2
TOTAL DUCKS	11,990	100.0	12,714	100.0	+6.1
Canada geese	123		98		-20.3
Coots	2,779		3,990		+43.6

\* 1968 breakdown of divers based on average 1957-67.



TABLE III. Duck Production by Species, 1968

Species	Production at Flight Stage	Percent of Total Production
Dabblers:		
Mallard	1,148	13.4
Blue-winged teal	797	9.2
Gadwall	486	5.6
Shoveler	132	1.5
Green-winged teal	88	1.0
Baldpate	176	2.0
Pintail	311	3.6
Sub-total	3,138	36.3
Divers:		
Redhead	874	10.1
Ruddy	3,996	46.3
Canvasback	253	2.9
Ring-necked	187	2.2
Lesser scaup	187	2.2
Sub-total	5,497	63.7
TOTAL	8,635	100.0

Pool levels increased from 1 to 3 feet above pre-flood elevations. As was the case in two of the last ten years, the breeding population exceeded production (Figure III).

Unlike normal production years, divers out-produced dabblers and accounted for 63.7% of the total refuge production. Dabblers which generally produce three-fourths of the ducks on the area were the hardest hit by high water levels. Production of these species decreased 69.6% from last year with mallards and blue-winged teal showing the most significant drops. Mallards ranked second in total refuge production (13.4%), however, the 1,148 raised was less than one-fourth of the 1967 total.

Diver production increased 82.6% above last year. Of the five species raised on the area four showed decreases; however, these decreases were more than off-set by the substantial increase in ruddy ducks produced. The 3,996 represented 46.3% of the refuge total, and a 564% increase over 1967.

The first "staging" movement into the refuge was noted during the week of August 11-17. This was approximately the same as was recorded in 1967. The first major buildup was recorded on August 31 when the duck population jumped from 35,340 to 66,580. Duck populations remained fairly stable during the fall as approximately 68,000 ducks were present on the refuge throughout September. The peak of 69,665 was recorded during the week of October 13-19.

Although the refuge peak was down slightly from previous years, (1.1% below 1967 and 8.0% down from the six year average), an abundance of refuge grain held the birds longer. Total duck use-days of 7,075,607 was considerably higher than in 1967 (62%), and the highest recorded in the past seven years (Figure II).

Mallard, baldpate, pintail, scaup and ruddy peak populations were substantially higher this fall while gadwall and blue-winged teal peak numbers were down from 1967.

The fall mallard peak of 34,940 in 1968 was a full two weeks later than in 1967 and showed a 40.2% increase. For six of the seven weeks during September and October, mallard numbers ranged between 29 and 35 thousand and resulted in the significant increase in use-days for that species. Total fall use-days of 1,777,629 represents a 131.3% increase over last year.

Gadwall use showed the most pronounced decrease as the peak of 11,890 represented a 63.4% decrease from a year ago. Fall use-days dropped nearly 300,000 from the 802,200 recorded last year.

The refuge duck population began to decline during the third week of October. This movement was about 2 weeks later than was noted in 1967. By the second week of November, most species had departed on their southward migration. However, approximately 2,000 mallards braved the elements until complete freeze-up forced them south during the first week of December.



FIGURE II - Waterfowl use-days and peak populations

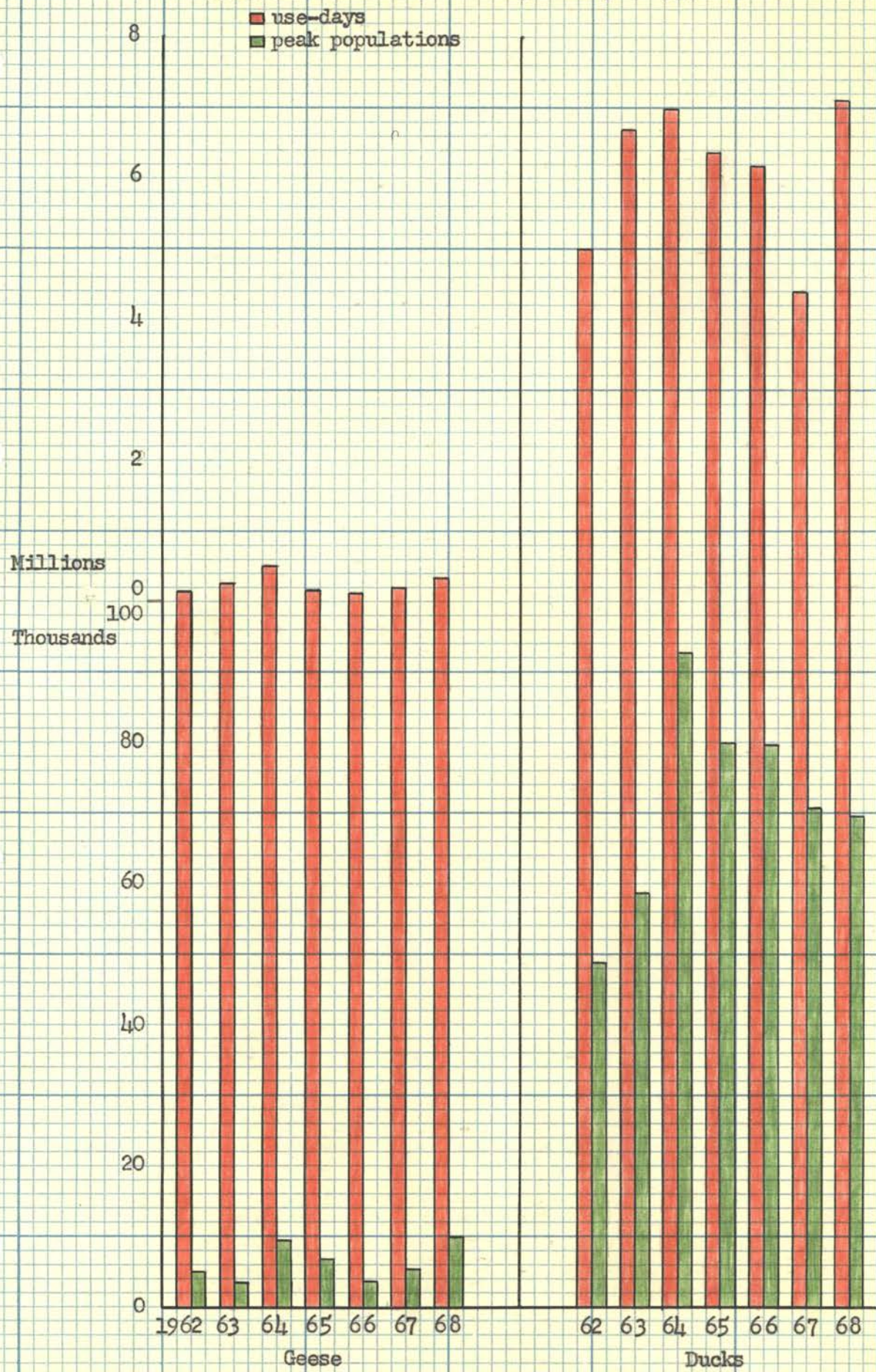




FIGURE III - Waterfowl Breeding Populations and Production

■ Breeding Population - Ducks - Total ducks

■ Production - Ducks

Thousands

35

30

25

20

15

10

5

0

1958

59

60

61

62

63

64

65

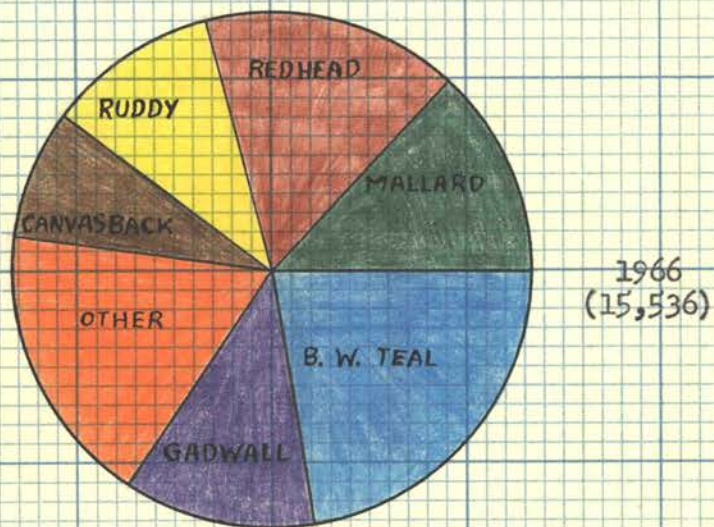
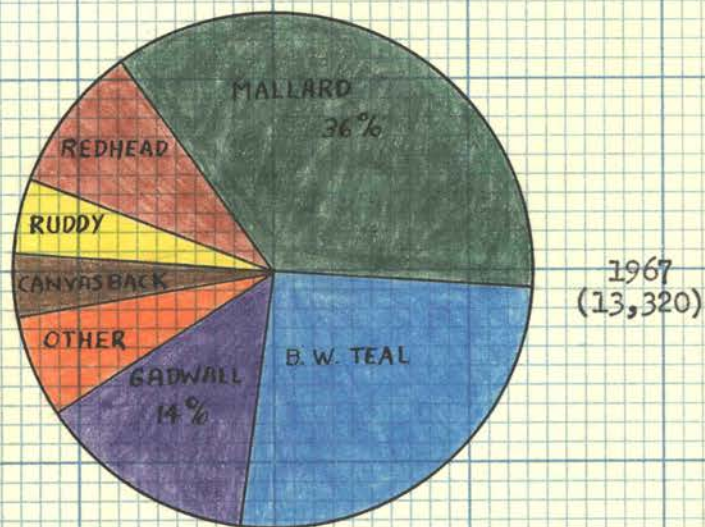
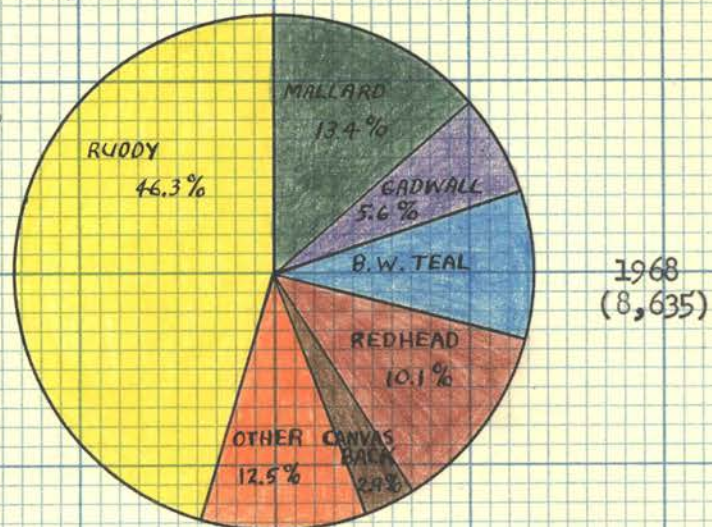
66

67

68



FIGURE IV  
Species Composition of Ducks Produced, 1966-1968





## 2. Geese

On March 16, the first Canada geese returned to their refuge breeding ground. During the past 22 years, only one other arrival date was recorded this early. Geese usually return between March 22-31.

A spring peak population of 1,490 Canadas was recorded on April 20, about one week earlier than 1967. The peak was down 5.8% from last year, but was 22.1% above the nine year average. By the first week of May most migrant geese had departed on their northward journey and approximately 400 resident birds remained on the refuge.

As part of the goose management study the extensive ground survey for Canada goose nests was again conducted. Abnormally low water levels made searching difficult and only 28 nests were located. Observations of other pairs indicated that the total breeding population was approximately 98 birds. This total represents a drop of 19.7% from 1967 and was 21.6% below the 12 year average of 125 breeders. The decrease is probably a reflection of the heavy hunting mortality experienced by the resident Canada goose flock.

The overall hatching success of 56.4% resulted in 49 pairs producing 168 goslings to flight stage. This hatching success was about the same as was recorded in 1967, but far below the 85.8% recorded for 1966. For the second straight year hatching success on artificial nest structures was alarmingly low. (See Section V,A)

The first significant buildup of Canada geese occurred during the fourth week of September as was the case in 1967. The 1967 peak of just over 5,000 was recorded the following week and numbers decreased rapidly through the balance of October. In 1968 a similar buildup occurred the first week of October, however, the population continued to increase to 8,500 during the period October 6-19. This peak represented an increase of 39% over 1967 and was the highest recorded in seven years. Moderate use continued into November and 150 hearty locals stuck it out until late in the month.

Prolonged fall use by large numbers of geese resulted in a substantial increase in total use-days in 1968. The 294,658 recorded was about 142,000 above last years figure and was the second highest in seven years. The 150.5% increase in fall use-days was largely responsible for the change. Refuge farm fields received heavy use during the fall and as many as 4,400 Canadas were counted on A-6 alone.

A peak of 1,500 snow and blue geese was reported during the period October 13-19. Both the peak and total use-days were down about 50% from 1967. Heaviest use was again obtained on Green Stump Pool while birds fed between there and agricultural unit A-2.



### 3. Swans

During the week of April 7-13, the first whistling swans were observed on the refuge. This flock of 12 birds represented the peak number recorded during the spring period. By May 4, all had departed for their northern nesting grounds.

The first fall migrants arrived during the last week of September and on October 19, the fall peak of 207 was recorded. The peak was down slightly from a year ago; however, prolonged use resulted in an increase of 172.4% in fall use-days. Agassiz and Headquarters pools attracted many of the swans with the lush growth of aquatics in Headquarters receiving excellent use.

### 4. Coots

Coots were first observed during the second week of April when 1,200 birds were recorded. A peak of 25,100 birds was reported on May 4. By the last week of May, most migrants had moved on and 3,990 birds remained on the area to nest. An assumed increase rate of 2.8 young per adult was applied to the breeding population to obtain the production of 11,172 coots. This represents an increase of 21.5% over last year.

The fall population peaked at 38,250 during the second week of September, far above the 9,720 recorded in 1967. Fall use-days increased from 278,390 to 1,032,920 in 1968.

### 5. Other Migratory Birds

As was the case in 1967, a pied-billed grebe was the first water and marsh bird sighted this spring (March 29). By the third week of April most other species of water and marsh birds had appeared on the refuge. Pied-bills excepted, most species were reported about one week later than in 1967.

Most species of shorebirds appeared in late April and early May. Herring, ring-billed and Franklin's gulls also made their appearance at this time, as did black and common terns. An estimated breeding population of 250,000 Franklin's gulls were recorded for the refuge colony. However, due to fluctuating water levels during the nesting period little production occurred. This was substantiated by the low percentage of juveniles observed in the early fall feeding flights of gulls to adjacent farm fields.

A flock of white pelicans again used the refuge as a summer feeding ground. A peak of approximately 250 birds was recorded in September.

In late August the normal major migration of shorebirds was recorded. However, due to the lack of extensive mudflats, peak numbers were far below those recorded in 1967.



Sandhill cranes were first observed when 12 arrived on April 22. Production of these great birds has never been confirmed by an observation, however, a pair was seen on a couple of occasions during the summer.

Fall use by sandhills was down considerably this year. The peak of 125 made only a brief appearance on September 21 on the Golden Valley farm unit. Last year a peak of 666 was recorded, and birds made prolonged use of the refuge. Reports from near the Roseau State Management area indicate that thousands of sandhills were causing considerable grain losses on private farmlands.

The observation of a king rail on May 25 on Tamarack Pool was listed by the Minnesota Ornithological Union as the northern-most sighting of this species, in Minnesota.

In late August the normal major migration of shorebirds was recorded. However, due to the lack of extensive mudflats, peak numbers were far below those recorded in 1967.

#### 6. Waterfowl Depredation and Control

Rains throughout June, July and August aided bumper grain crops on and off the refuge. However, these same rains made harvesting virtually impossible and set the table for field feeding ducks. Although the depredation potential was great, complaints were few. Depredation losses were reduced through the use of Zon exploders, scarecrows and refuge feeding operations. Only 13 farmers complained of losses to waterfowl during the July through September period.

A total of 14,000 bushels of oats, barley and corn were fed on six refuge feed sites. This feeding was initiated on July 26 and continued daily through September 25. In addition to the grain dumped on feed sites, an estimated 10,700 bushels (75% of total yield) of grain were utilized in refuge farm fields. Refuge hand feeding and farming programs were again the primary factors in holding the birds on the refuge and reducing depredations.

The semi-annual and annual Waterfowl Depredations Committee meetings were held in Thief River Falls and attended by Refuge Manager Alexander. No single solution to this problem was discussed, however, feeding on the State and Federal refuges remained as the most effective means of control.

#### B. Upland Game Birds:

##### 1. Ruffed Grouse

High grouse populations last fall coupled with fair to good winter snow conditions resulted in more than adequate breeders being carried over in 1968. A total of 26 drums were recorded on the two drumming male survey routes conducted on May 2.



Only three broods were sighted on the refuge, however, the best grouse habitat was not frequented by observers. Minnesota Conservation Department grouse expectations did not materialize in the general area around the refuge. Above normal precipitation in June (double the ten year average) and slightly below normal temperatures adversely affected the hatch resulting in poor production.

Sightings throughout the fall indicated that, with favorable winter conditions, a good supply of breeders should be available next spring.

## 2. Sharp-tailed Grouse

The refuge sharptail population again showed an increase in numbers. A total of 45 sightings were recorded this year as compared to 22 in 1967.

Two dancing males and a receptive female were observed in the airport pasture this spring. Later in the summer a group of 14 was sighted in this same pasture which may represent the nucleus for future population increases.

Populations on surrounding farm lands also seemed to be somewhat higher than last year. This was reflected by more frequent observations of birds bagged by duck and goose hunters.

## 3. Other Upland Birds

No ring-necked pheasants, woodcock, pinnated grouse or spruce grouse were observed on the refuge this year.

A remnant population of gray partridge exists, and only one sighting was made during the year. In January a group of seven were seen near the Ditch 11 control.

## C. Big Game:

### 1. White-tailed deer

White-tailed deer maintained their status as the most abundant big game animal with an increase noted in the population. The annual mid-winter big game count conducted on March 15 showed 644 deer on the refuge, however, because of only fair snow conditions the figure was thought to be low. This represents better than a 28% increase over 1967. Part of the increase can be attributed to the movement of deer into the refuge from adjoining state lands. It is felt that this movement was a response to habitat improvement on the refuge as many deer were observed near 350 acres of freshly dozed timber and brush.

On adjoining state lands only 98 deer were recorded compared to 304 in 1967.

The total recorded for the entire count (state and refuge) showed a 8% decrease from the previous year.

Deer experienced an easy winter and fawn production was thought to be good this spring. Prior to the hunting season the refuge population was estimated at 1,050 and in healthy condition. According to the hunter card survey, 275 deer were removed during the five day season in November. This appears to be a desirable harvest and should help to maintain the herd and range in proper prospectus.

As of this writing deep snow conditions pose a potential threat to the deer herd in the refuge area. Much of the deer range in the state is threatened with heavy deer losses and a bill has been proposed to the state legislature for \$100,000 emergency funds to lessen losses. Willow, aspen, and poplar are in abundant supply on the refuge, however, the deep snows may necessitate later dozing near concentration areas. Heaviest deer concentration areas were noted east of refuge farm fields and in the Webster Creek area.

TABLE IV. Moose and Deer Populations Figures 1960 - 1968 (Percent Change From Previous Year is in Parenthesis)

Year	Deer			Moose		
	State	Refuge	Total	State	Refuge	Total
1960	298	620	918 (+48.1)	54	74	128 (+48.8)
1961	272	690	962 (+ 4.8)	26	104	130 (+ 1.6)
1962	152	380	532 (-44.7)	66	68	134 (+ 3.1)
1963	126	394	520 (- 2.3)	56	80	136 (+ 1.5)
1964	130	392	522 (+ .4)	40	100	140 (+ 2.9)
1965	140	484	624 (+19.5)	16	112	128 (- 9.3)
1966	184	502	686 (+ 9.9)	38	150	188 (+46.9)
1967	304	502	806 (+17.5)	54	130	184 (- 2.2)
1968	98	644	742 (- 7.9)	64	132	196 (+ 6.5)

## 2. Moose

The March big game count showed a 6.5% increase in the area moose population. State and federal lands had a total of 196 moose, with over 67% on refuge lands. Adjacent Elm Lake and Eckvoll state management areas have shown steadily increasing use over the past three years, at least during the time of the mid-winter counts. Highest moose density areas were noted northeast of the farm fields and in the Webster Creek area southeast of the north gate.

An easy winter and good browse conditions resulted in a good production year for moose. On December 6 the annual aerial production survey was conducted. Although fewer moose were seen because of poor snow conditions the data received is thought to be statistically sound. Of the 61 moose observed, 17 were bulls, 28 cows and 16 calves. Of the identifiable-sex moose (45) 37.8% were bulls. The productivity rate (percent calves) of 26.2% was about 3% above last year and was the highest recorded in the three years of the survey.



Two sets of twins were observed.

Assuming the percentage of yearling females in the population was the same as that of yearling males there were 13 breeding age females. A total of 10 (78%) were seen with calves which may give some indication as to the fertility and productivity of the females in the population.

Browse conditions are favorable in most portions of the refuge with future habitat management aimed at improving overmature stands of willow and brush. After some inventory work there is little doubt that sandbar willow is the preferred browse species of Agassiz moose.

A Minnesota moose season has been proposed again and many are optimistic about the state legislature authorizing the season for 1969. The northern portion of the state has a huntable population, however, public sentiment has been toward saving the herd. Information gained from the moose study underway on the refuge will prepare the Bureau for a well regulated hunt when the season comes.

### 3. Elk

The elk herd in the semi-agricultural area northeast of the refuge continues its struggle for survival with very little interest from the residents of Minnesota. No count was attempted during the mid-winter survey in March, but scattered reports indicated at least nine animals in the herd at the time.

Attempts to locate elk during the December moose production survey were rewarding this year. A total of five, one large bull, a smaller bull, and three cows, were spotted five miles north and one and a half miles west of Grygla. The animals were sighted near a small wooded clump which contained the only coniferous trees in that general area. Other reports indicate that there are two additional animals roaming together north of this location.

Farmers protecting their haystacks (legalized poachers) along with poachers, and apparent lack of production will eventually eliminate this fine animal from the state.

### 4. Bear

Black bear are not commonly sighted on the refuge but two were reported during the year. During the March 15 big game count a large adult bear was seen with its head out of its denning site SSW of West Olson Lake. In spite of pinpointing the location from the air an afternoon's search for some pictures was futile. The denning site was located in a peat burnout area. A yearling bear was sighted along State Aid Hwy. 7 near the Lost Bay Trail, and in Blue Grove during the year.

Bear sign was seen east of the farm fields and also in the area east of the north gate in the Webster Creek drainage. Bear in the later area were feeding in private grain fields north of the refuge. Grain feeding by bear was quite common this year as the berry and nut crops were poor and the animals were forced out of the woods. Grain grower's and bee-keeper's complaints of bear damage were common, and so called "bear hunters" were having a field day. Two were shot by a neighbor north of the refuge, and five were reported killed in one field which had ten bears in it. Another interesting hunt occurred when a modern day "hunter" shot a sow and then proceeded to shoot her cubs out of a tree. Most of the animals shot were from the Beltrami Forest 30 miles east of the refuge.

Regardless of the method of taking bears there is little doubt that the bear population in this area of the state has been hard hit and will take some time to recover.

D. Fur Animals, Predators, Rodents, and Other Mammals:

1. Muskrats

Winter drawdowns to provide added water storage during the spring flood period again resulted in a heavy winter kill of muskrats. Only five rats were sighted during the year, and one active house noted.

In an effort to encourage a build up in the refuge population, no rat trapping was allowed this fall. Also, several impoundments will remain flooded this winter in hopes of providing nucleus breeding populations next spring. Muskrats are sorely needed to maintain openings in cattail.

2. Beaver

Beaver numbers were again high enough to warrant trapping where they interfere with refuge water management efforts. A total of 48 animals were taken by the two trapping permittees.

Complaints from adjacent landowners again necessitated removing dams in some ditches entering the refuge. The fall survey showed 22 active lodges remaining on the refuge. Although 35-49 beaver have been removed during each of the past three years, lodge counts have indicated that the population has remained relatively stable.

3. Otter

This valuable fur bearer is uncommon on the refuge; however, a large female was accidentally trapped during the beaver season. Tracks have also been observed along the thief River.

4. Mink

Mink observations throughout the year indicated that the refuge population was quite high; in fact, higher than is desirable on a waterfowl production area.



It was felt that duck nest predation by mink was unusually high because of lack of muskrats for them to feed on. Two trapping permittees harvested only 77 mink because of the wide dispersal of animals.

#### 5. Red and Grey Fox

No grey fox were sighted this past year. Red fox remained common on the refuge with frequent observations recorded throughout the summer and fall.

Three fox were shot on waterfowl feed sites where they continually harassed feeding birds. Fall trappers also removed six animals.

#### 6. Coyotes

Although only one coyote sighting was recorded, tracks and howling of family groups indicated that the population is remaining relatively stable.

One farmer lost three sheep near the north boundary. Since refuge coyotes were immediately accused of being the culprits, two trappers made sets in the area. No animals were taken.

#### 7. Timber Wolf

No sightings were recorded on the refuge this year. However, last winter tracks were sighted along Ditch 11, approximately one and a half miles north of the headquarters area. The refuge is located within 20 miles of wolf habitat, and is within range of the travels of this highly mobile species.

#### 8. Bobcat and Lynx

A few bobcats reside on the refuge, and in past years lynx tracks have been noted on the area during the winter. A bobcat was observed on the road between CCC and Mud River pools on November 8.

#### 9. Skunk and Raccoon

Refuge populations remained about the same as last year. Refer to Section V. of this report (Predator Control) for further details on these animals.

### E. Hawks, Eagles, Owls, Crows, Ravens and Magpies

#### 1. Hawks

Marsh hawks were again the first to appear on the refuge. However, their March 8 arrival date was more than a month earlier than was recorded last year. They were soon followed, in order of arrival, by rough-legged, sparrow, red-tailed and red-shouldered hawks.



The peak of the migration occurred in mid-March.

The fall migration peaked during the first week of September and was essentially complete by mid-October.

Numbers of migrating birds and summer residents appeared to be about the same as were observed in 1967.

## 2. Eagles

Bald eagles were again frequently observed during the spring and fall periods. A peak of three was reported during the spring period, and five during the fall.

Golden eagles were also frequently sighted during the early spring and fall periods. Two individuals were recorded in the spring, and two during the fall period.

Throughout the fall migration, eagles did a thorough job of culling out cripples from refuge waterfowl concentrations.

One Osprey was observed on September 17.

## 3. Owls

Great-horned owls were present throughout the year. Their presence was especially noticeable during the late summer and early fall months when the young and adults were frequently heard calling in the headquarters area.

Short-eared owls were again recorded during their spring migration. Observations seem to indicate that fewer snowy owls are present in the area this winter.

## 4. Crows, Ravens and Magpies

The peak of the spring crow movement through the area occurred in late March when hundreds were observed. Summer population levels remained about the same as last year, and are quite low for an area the size of Agassiz. The major fall migration occurred during mid-October.

Ravens are common winter residents, and numbers appear to be up slightly this winter. The first migrant magpies were sighted in late September with several remaining into the winter. Numbers are down from past years.

## F. Other Birds:

Headquarters bird feeders again attracted many song birds of various species throughout the winter months. Chickadees, downy and hairy woodpeckers and evening grosbeaks were again the most common visitors.



Snow buntings and redpolls were observed along refuge roads, and one loggerhead shrike was sighted near an agricultural unit in early March.

Horned larks were again the first migrant song birds to arrive in the refuge area. A flock of 17 was recorded on February 15. They were followed by meadow larks, red-winged blackbirds and juncos in early March. Most other passerines arrived in late March and early April.

Of the 239 species of birds that have been identified on the refuge, approximately 80 are recorded as common nesters.

The most spectacular fall movement of passerines was again the pre-migration buildup of cliff and tree swallows in the headquarters area. This concentration occurs during the late July and early August season. By mid-October the fall migration of song birds was essentially complete.

#### G. Fish

Due to low water levels in the Thief River, no major spawning runs of northern pike or suckers were noted this year. Water levels were adequate for vast numbers of fathead and shiner minnows which made their run in early June.

Minnesota State Fisheries personnel conducted limited salvage operations during the fall dewatering period. However, few fish were taken in their traps.

#### H. Reptiles and Amphibians

Due to the harsh northern climate only the common garter snake and northern red-bellied snake exist on the refuge.

The annual fall movement of tiger salamanders was noted along refuge roads as these amphibians made their journey from marsh to upland wintering areas.

#### I. Disease

No disease outbreaks were noted in 1968.

In May a ring-necked duck, showing signs of lead poisoning, was picked up in the old Thief River channel. This was substantiated by an autopsy which revealed several lead shot in the birds gizzard. This was only an isolated incidence and total losses due to poisoning were thought to be low.



### III. REFUGE DEVELOPMENT AND MAINTENANCE

#### A. Physical Development and Maintenance:

##### 1. Water Facilities (dikes, ditches, spillways)

County drainage ditch No. 194, which separates Agassiz's east boundary from the state Eckvoll Management Unit was repaired. The refuge owned and operated yard and a half Lima dragline was used to deepen, widen and reslope the ditch in cooperation with Eckvoll Township and State Conservation Department.

Northwest Pool's outlet received a new culvert section to permit drawdown without erosion to dike-roadway.

The three-mile Madsen dike was levelled, compacted and seeded. Approaches and dike sections to the new Agassiz control were similiarly treated.

##### 2. Water Control Structures

Agassiz's nearly thirty water control structures received maintenance and repair including beaver and other obstruction removal, leak stoppage, and new stoplogs as needed. Frequent manipulations of all structures were necessary to cope with increased water from land drainage.

Six stoplog structures were backfilled with gravel. The new twin radial gate on Ditch 11 needed and received 400 yds. of fill material, 75 yds. of gravel, and 380 yds. of additional rip-rap (field rock). The control also received additional sections of safety railing.

##### 3. Roads and Trails

The new gate job, started two years ago, was finally completed with the installation of four new swing gates.

Approximately 35 miles of refuge roads and trails received routine grading, blading and winter snow plowing. The latter chore was lessened by below average snowfall.

About seven miles of primary refuge roads received 2,340 cu. yds. of new gravel.

The annual road and trail mowing job was enlarged this year. Through a cooperative agreement with the local area game manager for the state, a total of 130 miles of refuge, State and adjacent township roads and trails were mowed with a "team" of tractor mowers.

The State Highway Department test drilled for gravel sources within the refuge.



Insufficient quantities and qualities for their use were found, but we were enlightened as to additional sources suitable for our use.

#### 4. Miscellaneous Refuge Facilities

Boundary rehabilitation was continued. Another four miles of remote boundary sections were cleared of brush and tree growth by dozing and were subsequently sprayed. They were also reposted.

Damaged signs along 20 miles of boundary were replaced.

Approximately five miles of grazing unit fence were permittee repaired with refuge furnished materials.

Two large entrance signs were installed at the east and west ends of State Aid Road No. 7. The old ones were overhauled and placed at the northwest and northeast corners.

About five miles of old fence were cleaned up, unused utility poles at headquarters were removed, and numerous cleanup jobs were completed.

Refuge water from two wells was periodically tested, according to instructions by Thief River Falls Water Department. Tests disclosed excellent quality water with no harmful bacteria.

Four new grazing unit stock ponds were constructed and one old one cleaned and enlarged.

Experimental pothole construction was started. Thirty machine-dug potholes were constructed in upland type. Eight potholes were blasted with "Nitro Carbo Blasting Agent" in marsh type.

Grain storage facilities were improved by installing concrete slabs under the refuges two thousand bushel granaries. Field rock and other obstructions to farming were again removed from agricultural units during seed bed preparation work.

#### 5. Equipment

Aging equipment, from draglines to lawnmowers, received increased maintenance and repairs necessary for reasonably safe, dependable service.

A new 300 bu. grain box was built on a surplus AFB truck. An excellent cargo sled with "bobbing" runners was constructed to make a work horse out of the snowmobile.

Several valuable surplus items from ten-ton trailer tractors to typewriters were picked up from the Grand Forks AFB for Agassiz and other stations.



Improvements were made to fire control equipment by "rigging" a 400 gallon tank and pump transferred from Necedah, and mounting it on an Air Force Base 4x4 International crew cab pickup.

The repair shop's small and almost worn out air compressor was replaced with a surplus one of greater capacity and excellent operating condition.

#### 6. Buildings

Like equipment, our aging buildings are demanding increased maintenance and repair. We must have set a record in the number of plumbing, electrical and heating plant repair jobs completed. In addition, several rotted out windows and doors were replaced; the office bathroom was remodeled; and every occupied building received painting jobs to varying extents.

Our electrical-caused office fire of November 22, 1968, focused building maintenance on the tremendous task of cleaning, rebuilding and refurnishing, and the immediate task of setting up office space in the spare residence. Plans for rebuilding the office, orders for supplies and materials, and arrangements for labor were completed by the year's end.

A major effort was put forth during the year to clean out, discard, and organize all materials and storage space; therefore, AFB surplus shelves and storage racks were used to good advantage.

#### B. Plantings:

##### 1. Aquatic and Marsh Plants

No plantings made in 1968.

##### 2. Trees and Shrubs

No plantings made in 1968.

##### 3. Upland Herbaceous Plants

No plantings made in 1968.

##### 4. Cultivated Crops

Refuge farming activity went unusually well during the spring planting season as below normal precipitation was received. The rains came after most seeding was accomplished, but oversaturated soil slowed growth and development of most crops throughout the summer. The growing season was long enough for small grains, however, corn development was deterred enough to prevent denting and drying.



The total refuge acreage planted in 1968 was 487 acres with 319 acres planted by refuge personnel. The breakdown of refuge plantings was as follows: 203 acres of Garland oats, 95 acres of Larker barley, 15 acres corn (Minnesota Hybrid 101) and 6 acres of fall planted Elbon rye. In addition, 18 acres of alfalfa cover plantings from 1967 showed excellent growth and some growth of winter wheat was realized from last fall's planting.

One cooperative farming agreement was drawn up with Julian Rodahl on agricultural unit A-2. A total of 234 acres was covered under the agreement with new plantings made on 168 acres. Twenty acres of barley, 28 acres of a grass mixture with oat nurse crop, and 120 acres of oats were seeded by Rodahl. The only grain harvested on the refuge came from this unit, and only 600 bushels of oats and 225 bushels of barley were salvaged from the refuge's share. The cooperator removed 70 tons of tame hay from 66 acres as part of his share.

Harvest was planned for a large portion of the refuge small grain crop, but because of heavy summer rains, field conditions were much too wet. In spite of the seemingly over-abundant precipitation crop yields were good, and flooded potholes throughout most of the units added to the attraction for field feeding waterfowl. By the first of September only 40 acres of barley in units A-6 and A-3 were swathed and by mid-month all was utilized on Dahl (A-3).

To make additional grain available and prevent depredations problems the oats crop was dragged down in Golden Valley (A-5) and Dahl (A-3) during the week of September 16-20th. Up to 12,000 ducks and several thousand geese utilized most of the grain in these units, then during the second week of October, shifted to the standing grain in A-4. The third week of October there was another shift in use to A-6 along State Aid Hwy. 7. On the 21st a check of the unit showed better than 22,000 ducks and 4,400 Canada geese utilizing the oats, barley and corn there. Large numbers of ducks and geese, including most of the fall peak of snow and blue geese, made regular use of grains produced on the Rodahl Unit (A-2).

It is estimated that about 75% of the grain produced was utilized by waterfowl. Total yields were 10,360 bushels of oats, 3,915 bushels of barley and 870 bushels of corn. An additional 5,665 bushel of oats were harvested by the farming cooperator.

Wet conditions hampered summer fallowing and planned browse plantings in August. Fall browse was generally in short supply as only 6 acres of rye were seeded. Additional browse was available from the 18 acres of alfalfa planted in 1967 and good use was made by geese quite late into the fall. If a normal, wet spring is experienced in 1969 very little planting will be accomplished, as only 19 acres have been fallowed and are ready for planting.



Corn as a "hot food" is thought to be important in affording the local goose flock added protection from overharvest late in the season. (Good yields were well utilized even though the crop did not cure). A shorter growing, shorter season corn will be tried in 1969. Atrazine applied on a portion of the crop planted aided 65 bushel corn and will have a place in future farming at Agassiz.

Future cropping of refuge farm units may include a slight reduction in small grains leaving some unharvested for winter and spring use, an increase in browse plantings, and added seeding of moist soil plants, namely millets.

#### C. Collections and Receipts:

##### 1. Seed and Other Propugules

Twenty bushels of Elbon rye and 100 bushels of winter wheat were received from DeSoto Refuge. Fifteen bushels of rye were used for fall seeding green forage crops for geese.

Other grain received was used for feeding purposes in connection with banding and depredation control. Five thousand bushels of surplus government oats were made available by the Management and Enforcement Division. Two hundred and fifty bushels of shelled corn was trucked from Union Slough Refuge, and 125 bushels of shelled corn from DeSoto Refuge. Five hundred bushels of barley were received from a W. P. A. farming permittee under management of Arrowwood Refuge.

Agassiz share-croppers furnished 300 bushels of oats and 70 bushels of barley. Of the entire amount received for feeding purposes only 690 bushels remain on hand.

##### 2. Specimens

In March, refuge personnel found a large male mink dead. An inspection of the area, which had fresh snow cover, revealed that a fight had occurred between two mink, one of which was dragging something. The pelt was tanned and added to the refuge collection.

During the spring beaver trapping season a large female otter was caught by a permittee and turned over to refuge personnel. The pelt was tanned and added to the refuge collection to be used for educational displays. Both of the above pelts were lost in the office fire.

No waterfowl or migratory species were collected.

Forty-one Canada goose eggs that had not hatched were collected from nesting platforms. Five of the eggs were sent to the University of South Dakota for analysis. (Results reported in Nesting Platform study).



D. Control of Vegetation:

Four chemical control proposals were submitted during the year and specific information is provided on NR-12. Mechanical control of vegetation was undertaken with the D-8 dozer, and limited control of weeds in farm fields was accomplished through summer fallowing and fall plowing.

Leafy spurge was first recognized in three small patches in grazing unit G-18 in 1966. Since that time spot treatment has reduced the pest until only a few plants remained this spring. Hand spraying with Tordon 22K in July should have eliminated the last of the spurge.

Yearly aerial spraying of small grain crops with 2,4,D was completed during the first two weeks of June. A total of 418 acres, 120 at farming cooperator's expense, were sprayed at 1/2 pound per acre. The effective control of most target species had much to do with the high yields of oats and barley.

Atrazine was used on refuge corn for the first time this year. It was apparent from this year's results that use of this chemical can make the difference in this marginal corn growing country. The three pounds per acre applied was too light and for future use four pounds will be the recommended rate.

Aerial spraying of "Brush Killer" on 95 acres was intended to: improve nesting habitat on pool islands, control vegetation along Judicial Ditch 11 to maintain it as a drainage facility, and delineate the east boundary in a dense brush area north of Ditch 11. Apparent kill was thought to be 90%. Potential high density duck nesting islands are scattered on most refuge pools and brush control is being planned. Controlled burning a year after spraying should remove dead and dried material and encourage growth of nesting cover. Many smaller areas of potential habitat could be sprayed from the ground with excellent results using a mist blower.

Winter dozing of brush and timber was completed on about 350 acres for big game habitat improvement. Over-mature stands of willow, aspen and balsam poplar were knocked down along the east boundary and along State Aid Hwy. 7. Heavy use by deer and moose was spontaneous and local public comments were favorable about the attempts to do something for big game. Limited dozing will continue until controlled burning is able to maintain refuge habitat in its most productive condition. Plans for the coming winter are to scatter dozing activities throughout the refuge in principal big game areas.

Weed and quack grass control on refuge farm units was accomplished through fallowing on only 19 acres.

Aerial spraying of Amitrol-T on cattail strips in Northwest Pool five years ago is still showing its effect.



The strips show little regrowth of cattail and an abundance of submerged aquatics. Hopefully today's chemists will come up with a chemical as effective with absolutely no side-effects on the environment.

E. Planned Burning:

Controlled burning is an important tool for management of both waterfowl and big game habitat on this refuge. Past burning histories and records have been brought up to date and plans are being made for systematic scheduling of controlled burning for all units. Wet conditions will be a major deterrent to the burning program on this area.

A total of 6,750 acres were approved for spring burns, and 4,763 acres for fall burns. Delays in approval and wet conditions limited burning to one unit totaling 1,100 acres.

Unit 22 located southeast of Agassiz Pool was burned on April 11 under near optimum conditions. Of the 1,100 acres about 600 were in willow and scattered aspen groves with some of the willow area previously dozed down during the winter of 1966-67. The main head-fire burned extremely hot with the fire carrying through most standing willow and wooded groves.

Late summer checks indicated that willow was set back on about 90% of the brush areas, and most of the larger aspen was killed causing considerable sucker growth. Resprouting of willow was profuse but the response of grasses, upland herbs and clover was excellent. Big game use of the area was good throughout the summer. It is felt that if scattered, low growing willow is held in check it should not discourage waterfowl and upland game use.

Three men and two pieces of equipment were used at a total cost of \$68.50 (6.2¢ per acre). Considering brush acreage burned the cost was just under 9¢ per acre.

Objectives of future burning on Agassiz will be aimed at: eliminating brush on areas for waterfowl nesting, encouraging resprouting of woody browse species for big game, encouraging natural growth of goose browse, and breaking up vegetative monotypes in pools which are silting and filling in.

F. Fires:

"Controlled" burning by refuge neighbors often gave the impression that the whole country was going to burn up in 1968. Two fires burned onto the refuge during the year causing more good than harm. Controlled burns have been planned or talked about for all three of the units involved. The network of firebreaks and separation of burning units greatly reduces the threat of wild fires causing extensive damage to refuge facilities.



The largest fire burned parts of six sections on the east side of the refuge during the week of April 14-18. Backfires set on Ditch 11 and roads on the west side of the unit contained the fire. The area consists of extensive brush and timber, much of which is overmature and past its peak for wildlife productivity. Burning was spotty; however, willow on an estimated 1,200 acres was set back enough to cause beneficial resprouting.

On November 30, fire on private lands crossed the west boundary into control burn units 7 and 8 and burned an estimated 400-500 acres of marsh grass and scattered willow. Burning was not intense and limited benefits were received. The wooden APW bridge on the Thief River was protected by backfiring.

There is little doubt that untimely burning by private landowners causes some wildlife losses as much of it occurs late in the spring. Burning on private lands has a temporary beneficial effect on the wildlife habitat in the area, at least until the lands are cleared and plowed for agricultural use which is most often the intent.



#### IV. RESOURCE MANAGEMENT

##### A. Grazing:

A total of nine permittees grazed cattle during the period May 1 through October 31 on 4,799 acres. The 834 cattle grazed on the 17 units accounted for 2,446 AUM's and revenue of \$2,445.61.

Unit G-4 was not utilized this year, however, a new permittee will graze cattle on the area in 1969. Problems with the grazing program continue to evolve around abuse of grazing privileges and poor cattle dispersal resulting in over-use of some pastures. Improved fencing, construction of stock ponds, and regulation of salt placement should result in better distribution of cattle use in the future. Four ponds were dug and one cleaned out in units 9, 10 and 17, rounding out the watering facilities for these units. Improved fencing is planned for 9 and 17 this year.

Reporting of grazing activity by the permittee was sometimes slow, however, improved communications did occur. Tighter control of activity should help to establish permittee grazing as a privilege and not a right.

Cover conditions on the units were generally good with a few local exceptions. Some acreage remains in brush and future controlled burns should help establish grass cover. Stockponds in grazing units received good use this spring and future pothole development holds much promise for increased duck production from some of these areas.

##### B. Haying:

Under a cooperative farming agreement, Julian Rodahl cut 70 tons of tame hay from 66 acres of refuge land. To preserve nesting cover no haying is allowed until July 1st.

##### C. Fur Harvest:

The 1968 trapping season ran from November 2 to December 8 on mink, and from November 2 to December 31 on all other furbearers except beaver. The beaver season opened on March 16 and ran through April 29.

Trapping was generally good for mink. The early part of the season found the two permittees having little success because of the widely dispersed population. General observations seem to indicate that the mink covered a larger territory in search of food because of low muskrat populations. During the latter part of the season trapping success increased and a total of 77 mink were trapped. Large males brought a high of \$30.00 and the average pelt price of \$18.64 was the highest in several years.

TABLE V. Summary of Fur Harvest Returns, 1968

Furbearer	No. Animals Taken	Ave. Price Per Pelt	Total Return	Refuge Share
Muskrat	1	\$ .50	\$ .50	-
Beaver	48	10.77	517.00	-
Mink	77	18.63	1,432.50	716.25
Fox	6	8.00	48.00	-
Raccoon	6	4.00	24.00	-
TOTALS	138		\$2,022.00	\$716.25

No harvest restrictions were put on fox, raccoon, weasel or skunk. The permittees worked on the trapper-take-all basis for the above fur bearers.

Black-bear, timber wolf, coyote, bobcat and lynx are all present on the refuge, but due to their scarcity and esthetic value are not trapped for fur. An attempt was made to trap coyote that were accused of being "sheep nappers", but to no avail.

D. Timber Removal:

One timber permittee removed 140.7 cords of aspen saw logs. The price of \$2.00 per cord brought receipts of \$281.40. Timber removals are few and far between because of the refuge's marginal timber resource.

E. Commercial Fishing:

None during this reporting period.

F. Other Uses:

None during this reporting period.



## V. FIELD INVESTIGATIONS OR APPLIED RESEARCH

### A. Artificial Nest Structures:

#### 1. Goose Structures

Spring checks of 102 artificial goose nesting platforms showed that 70 were suitable for nesting geese. The 20 (29%) utilized this year represents a slight increase over the 17 (26%) used in 1967. The number used was the highest since they were placed in 1963; however, the highest percentage of use occurred in 1966 when 38% of those available were utilized. The good use of platforms was a surprise because of unusually low water levels and the abundance of natural ground nesting sites.

Tipped and damaged structures, and low water levels were primarily responsible for the large number unavailable. Fourteen were located in drawdown pools or pools with low water levels. Flooding, which has been a problem in past years, was not a factor in 1968. A total of 15 platforms were uprighted after the nesting season and with replenishment of nest material will be ready for use in 1969.

Hatching success was low for the second straight year and is arousing some concern. Of 65 eggs in 12 known completed clutches 32.3% hatched. At the same time all eggs hatched from seven ground nests.

An intensive examination of eggs on seven nest platforms revealed the following information; Of the total of 36 eggs laid, 3 hatched, 3 were infertile, 3 goslings were found dead in the nests, and 27 eggs contained dead embryos in various stages of development. Low humidity or freezing prior to incubation may have been responsible for the low hatching success.

Five eggs from three nests were sent to the University of South Dakota Cooperative Research Unit to be analyzed. The Biochemistry Department determined that all of the eggs contained heptachlor, epoxide, DDE, dieldrin and DDD. All eggs contained less than 0.5 ppm which is comparable to levels carried by some upland game species in South Dakota.

Based on a small sample, clutch sizes were slightly larger for structure nests, 5.42 compared to 5.14 for the seven ground nests. The larger 4' x 4' and 5' x 5' platforms showed heavier use, probably because of availability rather than preference.

#### 2. Duck Structures

In March, 20 artificial duck structures were placed on refuge pools. The structures were constructed of hardware cloth and are similar in design to those used in trials in North Dakota. Flax straw was used in the nests and all structures were on or near the edge of emergent cattail.

Three checks were made during the nesting season and none were found to be used; however, because of drawdowns and dry pool conditions, about two-thirds of the structures were not suitable for use. Many were over dry ground, and some additional ones were much higher than the recommended 36" above the water.

This year's results were not considered a true test of the nest structures and there is hope that they will be used under favorable conditions. In 1967 nine duck nests were found on artificial goose structures. Good upland nesting areas are lacking in many refuge pools, and if acceptable, the structures could add considerably to the production potential of Agassiz.

B. Experimental Predator Control and Its Affect on Waterfowl Nesting Success:

The predator control trapping program commenced on March 27 and was terminated on June 23. Refuge personnel continued to shoot skunks and raccoons through July and August whenever they were encountered. A total of 149 skunks, 72 raccoons and 3 fox were removed.

This limited removal is warranted by the high population of nest predators on the area. Generally, floodings forces dabblers to nest along the dikes and roads making them extremely vulnerable to predators.

Natural duck nests were located in an attempt to determine hatching success and relative predator activity. Many of the roadside nests were located incidental to other activities. Islands, meadows and the alfalfa cover strips were searched on foot and with the use of jeeps.

A total of 38 nests were located in four types of nesting habitat. (see Table VI.) Rechecks of nests to determine hatching success revealed that isolated islands and spoil banks provided the most protection from predation. Three of the four island nests lost were deserted due to increased water levels.

TABLE VI. Hatching Success of Natural Duck Nests

Nesting Area	Sample Size	Fate on Nests		
		Hatched	Destroyed	Deserted
Roadside and Dike	15	3 (20%)	12 (80%)	0 ( - )
Meadow and Alfalfa Field	9	6 (67%)	3 (33%)	0 ( - )
Islands	12	8 (67%)	1 ( 8%)	3 (25%)
Spoil isolated from Road	2	2 (100%)	0 ( - )	0 ( - )
TOTALS	38	19 (50%)	16 (42%)	3 (8%)



The overall hatching success of 50% can not be used for comparisons with past years, as this was the first year islands were surveyed. A hatching success of 42% was recorded for other habitat types. This is slightly higher than was recorded in 1967 and 1966 when 37.5% and 38% of the nests hatched.

C. Aquatic Plant Transects:

The aquatic plant transects were conducted between July 31 and August 5 with a total of 44 man-hours expended. Thirteen transects were covered on nine pools, and 20 species of emergents and submerged aquatics were encountered.

Of the nine pools surveyed, five showed increases in frequency of occurrence of desirable aquatic plants. Of the remaining pools, two showed no change from last year and two showed decreases in frequency of desirable aquatics.

An abundance of pondweeds and other desirable species was noted in Mud River and Headquarters pools. Cattail encroachment continues to be a problem. This year the open water areas of Kelly Pool were completely invaded by cattails.

D. Herbarium:

Several new plants were collected and pressed, but have not been mounted and added to the herbarium.

E. Canada Goose Management Study:

Four years of data have been gathered for the management study, "A Life History of the Agassiz Refuge Goose Flock", initiated in 1965. Below is an abstract of the study which will be terminated after 1969.

Low pool levels during the nesting season hampered field work and resulted in reduced data collected for the year. Nesting was initiated by the second week of April, and hatching occurred during the same period as in 1967. The first brood was observed on May 14 with the peak hatching period occurring during the third week of May (16-20).

Fewer nests were found since much of the survey area could not be covered by boat as in past years. It was also thought that, because of drier conditions and an abundance of nesting sites, nesting geese were more widely distributed in 1968. Agassiz Pool because of its large size, and the attractiveness of Ditch 11 spoil had 44% of the located nests. The remainder were distributed throughout the rest of the refuge pools. Extremely dry conditions on Thief Bay Pool resulted in a "bust in production" from this normally high production unit. Only two nests were found this year while in 1966 and 67, 21 and 7 respectively, were located.



Per acre of habitat Mud River Pool would have to be rated the best goose production area.

Artificial platforms gained in importance as the most favorable nesting sites. However, because of limited sampling of natural nest sites and the complete survey of platforms, spoil banks rate higher than the data indicates. This year three-fourths of the nests were found on platforms. Data for the four years shows the following percentages for nest sites: platforms 42.8%, spoil banks 31.0%, peat hummocks 13.4%, with the balance on muskrat houses and natural and artificial islands. As previously mentioned, 1968 was atypical and use of the data for determining nest site preferences will not present a "true picture".

Materials used in nest construction again depended largely on vegetation available as site selection appears to be made for seclusion and protection. Wild hay and flax straw had the highest frequency of use because of its use on artificial platforms. Over the period of the study sedges, grasses, and cattail have had the best use of natural materials.

A total of 19 completed clutches were observed during the year with an average size of 5.32, slightly above average for the study. All clutches contained 5 or 6 eggs except one. Unlike data from three previous years, clutch sizes were larger in platforms than in ground nests in 1968. Measurements from 37 eggs averaged 86.31mm in length and 58.41mm in width, and although showing some variation, differences are thought to be insignificant.

Eggs hatched on 81.5% of goose nests this year. This is only about 3% below the average for the previous three years. All eggs in ground nests hatched but success on platforms dropped below the 33.7% recorded for 1967. During the four years of the study 72.3% of 886 eggs laid have hatched with 1968 the poorest year with 56.4% hatching. Infertile eggs and eggs containing dead embryos limited hatching success on platforms to 32.3%.

Results of the nine day goose kill survey are summarized in the hunting section. It is felt that heavy hunting pressure in the area of the refuge is preventing increases in the local flock. Although hunter success was down in 1968 the drain of large geese was still significant. Seven local, banded and collar-marked geese were observed in hunter's bags along with many other large birds thought to be locals. The majority of recoveries are from Minnesota with some also coming from Missouri, particularly the Swan Lake Refuge area, and near Sardis Refuge, Mississippi.

#### F. Banding Program

A quota of 750 local mallards was established for the refuge this year. Only 15 were trapped. The poor success is attributed to two flood periods during trapping operations, inclement weather, and unusually low nesting success. The ducks were captured in wire walk-in bait traps and in floating traps.



A total of \$5.78 was expended for each duck trapped.

One hundred and eighteen mourning doves were trapped and banded, 18 above the 100 bird quota set for the refuge. The doves were trapped with an expenditure of \$1.08 per bird. Conventional weld-wire dove traps were used. The most productive trapping sites were in the headquarters area, and on the Dahl agricultural unit.

No quota was set for geese but refuge personnel tried to trap as many local geese as possible. Only 22 were trapped as fluctuating water levels and wide dispersion of broods hampered trapping activity. The geese were trapped with an expenditure of \$19.77 per bird. Walk-in wire bait traps were used.

Leads for drive trapping were constructed, however, high water levels eliminated any chances of using them.

TABLE VII. Summary of Banding, 1968

Species	Quota	Local		After H.Y.		Hatching Yr.		Total
		M	F	M	F	M	F	
Mallard	750	9	5	1				15
Canada geese	1/	11	11					22
Mourning dove	100			74	22	sex unk.	22	118
TOTALS		20	16	75	22		22	155

1/ As many as possible. (Is important phase of Goose Mgt. Study)

Of the 75 direct recoveries from 1,170 ducks banded in 1967, 40% were harvested in Minnesota, (17% of which were harvested in the refuge vicinity) and 60% in 19 other states. Of the other states only Illinois was considered a significant recovery area with 15% of the total recoveries. The percentage of direct recoveries in the refuge vicinity, (7%) does not reflect actual harvest of ducks in the area because of pre-season movement of banded birds.

Of the 75 direct recoveries, 49 were mallards and 26 were comprised of blue-winged teal, redhead, black duck, pintail, and wood duck. The direct recovery of 49 mallards from a total of 504 banded shows about a 9.7% recovery.

#### G. Moose Study:

A study of the moose herd in northwestern Minnesota has been initiated on Agassiz. The study will involve the cooperative effort of the Divisions of Wildlife Research and Refuges, the Minnesota Conservation Department and the University of Minnesota Museum of Natural History, with assistance from the U. S. Air Force from Grand Forks, North Dakota. Robert L. Phillips of the Research Division is the project leader with refuge personnel assisting in much of the field work.

The moose herd in the area of the refuge has increased to a level which has remained stable for the past three years, and there is concern about browsing of deer and moose putting increased pressure on existing habitat. More is to be learned about the limits of the habitat and the population dynamics of the herd.

Three major objectives are spelled out in the study: 1. to determine the pattern of habitat use by moose; 2. to determine the factors that are limiting the present moose herd, and 3. to determine characteristics of the vegetation and condition of the present range.

Browse and vegetative surveys, capturing and tagging of moose, and aerial counts and observation are important phases of the study.

On December 17 and 18, aided by an Air Force helicopter, seven moose were captured and tagged with bright neck collars and ear streamers to enable researchers to trace movements and patterns of use. One of the animals was also equipped with a radio transmitter. After the first of the year one additional moose was captured and tagged from the ground. The moose are immobilized with the drug succinylcholine chloride from a dart fired from a "capture gun" before personnel tag the animal, take measurements and blood samples.

The next phases of the project will involve a winter inventory of the vegetation on the refuge, including browse utilization, additional capturing and tagging, and observation of moose in the field.

#### H. Nest Cover Plantings:

Two alfalfa cover plantings were made in 1967, one of 7 acres on the north side of John's Field (A-6), the other of 11 acres in the Goose Pen Field (A-4) along Ditch 11. Both showed excellent growth this spring and early summer.

Two separate nest searches were made in June by dragging a rope on foot, and using jeeps. A total of seven duck nests were located in the two plantings (3 gadwall, 2 BWT, 1 mallard, and 1 pintail). In spite of excellent cover conditions three of the nests were destroyed by predators.

All of the nests were located within 60 feet of the edge of the plantings and six of the seven were within 40 feet. Possible future cover strips can be planted narrower to make maximum use of the seedings. A width of 60 to 80 feet may be desirable.

Late June checks of natural upland nesting cover in grazing unit G-18, an old field west of Muckstead Grove, and the west gate pothole development area revealed no nests. This may be an indication of the importance of plantings made for duck nesting cover.



## I. Pothole Development:

Pothole development was initiated on the refuge this year with a total of 38 potholes dragline-dug or blasted. This type of development is feasible on approximately 20,000 acres of refuge habitat, and is expected to make a large contribution to waterfowl production.

Thirty were dug with a 3/4 yard dragline near the west gate. Spacing was about 200' (one per acre) with average size of 20' x 60', and average depth of 3-1/2'. The development was undertaken in an upland area which should provide ample nesting cover for birds using the potholes. Difficulties encountered because of August rains necessitated using mats and the cost per pothole was about \$33.00.

To evaluate the effects of the project on the breeding population, a systematic pair count and nest search was conducted on and adjacent to the project. Data should reflect increases and detect if the increases are at the expense of adjacent habitat.

On November 19th and 20th eight potholes were blasted in a cattail-sedge flat adjacent to the upland area southeast of Ditch 11 control. Different size shots and patterns were attempted with 50 to 200 pounds of blasting agent. One hundred and fifty pound shots consisting of three 50 pound charges showed the best use of the explosive force, and resulted in a pothole 35 feet in diameter (clover leaf) and 6 to 6-1/2 feet deep. This technique shows good promise for development on the wetter sites.

## VI. PUBLIC RELATIONS

### A. Recreational Use:

Wildlife oriented recreation increased approximately 8% over last year. Natural conditions and facilities are still not conducive to the usual run of so-called outdoor recreation, with the exception of deer hunting. The estimated 14,975 visitors for the year enjoyed nature and wildlife observations, aesthetic appreciation of a natural ecological environment, photography, general sightseeing, pleasure driving, and deer hunting.

While our "fellow man" is swept along in the popular trend of invading and exploiting every last wilderness acre with any and all mechanical devices available, and while our Bureau increases pressure on our "fellow man" to factitiously recreate on lands dedicated to wildlife (whether he wants to or not), we have continued and re-emphasized our efforts to teach man outdoor recreation that is truly compatible with nature (whether he wants it or not).

We believe the majority of people not only can be, but are anxious to be instilled with the desire to enjoy rather than destroy, to see and photograph rather than kill and eat. Promoting this attitude is not so much teaching, but awakening a deep instinctive sense of appreciation. We believe increased public use for aesthetic purposes will gain for us lasting support to conserve for all times some segments of natural environment, sustaining our wildlife heritage.

Methods and means (reflected under Refuge Participation) of trying to accomplish our objectives here are limited to personal initiative and capabilities. Too often more demanding activities force lower priorities on public relations and educational oriented recreational. These are functions which should be of utmost importance if we recognize public support to be vital to the future success and even existence of our refuge system.

### B. Visitors:

Frequent visitors to the refuge this year were Don Fearn, Conservation Officer; Bob Farnes, District Game Manager; Bob Phillips, Project Leader of Moose Study, BSF&W; Patrick Karnes, Game Management Biologist. A list of other official visitors follows:

Date	Name	Title and Affiliation	Purpose
3/21	James B. Monnie	BSF&W, Mpls.	Inspection
4/10	Jerry Maertins	Minn. Cons. Dept.	pick up pict.
4/10	George Davis	Minn. Cons. Dept.	pick up pict.
4/29	William Aultfather	BSF&W, Mpls.	range survey
4/29	Robert Johnson	BSF&W, Tamarac	range survey
5/27	Wilfred D. Grabb	River Basins	watershed study
5/27	Gary Wood	River Basins	" "



Date	Name	Title, Affiliation	Purpose
5/27	Pat O'Halloran	River Basins	watershed study
6/26	Clair Rollings	BSF&W, Mpls.	s & m review
6/27	Norm Johnson	BSF&W	predator control
7/24	Earl Elhason	BSF&W, Mpls.	quarters survey
8/5	Dennis G. Raveling	Canadian Wildlife	banding info.
8/5	Lyle F. Miller	BSF&W, Mpls.	safety inspect.
9/20	Carl Madsen	River Basins	wildlife enhancement
9/25	Lawrence Krefting	BSF&W	moose study
9/25	Robert Finley	BSF&W	moose study
9/27	Stan S. Weisz	BSF&W, Jamestown	equip. pickup
9/27	Cecil Keisacker	BSF&W, Minot	equip. pickup
10/8	"Flick" Davis	BSF&W, Mpls.	courtesy call
10/8	Al Studholm	BSF&W, Wash.	courtesy call

#### C. Refuge Participation:

A total of six news releases were prepared and sent to area newspapers. Refuge releases were supplemented by a series of releases originating out of the Regional Office.

All personnel and members of their families have participated in community activities, resulting in better refuge relations with the public. Through these activities there is a growing awareness of the refuge and its activities. Community activities include; scouting, sportsmans and garden clubs, homemakers, church and social group activities, and athletics.

Not enough can be said about Manager Alexander's continuing contributions to public relations at this station. His friendly and tactful handling of the many problems associated with refuge management will have a lasting effect on the people of this area.

Following is a complete listing of refuge participation:

Date	Organization	Participation-Attendance-Personnel
1/16	Boy Scouts	District meeting 17 Lee
1/24	Depredations Meeting	Discussion 25 Alexander Lipke
2/12	Holt PTA	Slide-talk 25 Lee
2/18	MR Sportsmen's Club	Slide-talk 35 Bellinger
2/21	Penn. Co. Sportsmen C.	Talk 50 Alexander
3/5	TRF Garden Club	Talk, pictures 15 Alexander
3/14	Viking School	Talk, movies 90 Alexander
3/14	Warren School	Talk, movie 1,080 Alexander
3/15	Karlstad School	Talk, movie 700 Alexander
3/15	Strandquist School	Talk, movie 330 Alexander
3/18	Gatzke School	Talk, movie 70 Lipke
3/18	Holt School	Talk, movie 90 Lipke
3/18	Goodridge School	Talk, movie 380 Alexander
3/19	Grygla School	Talk, movie 242 Bellinger

Date	Organization	Participation-Attendance-Personnel
3/20	TRF Lincoln H. School	Talk, movie 200 Lipke
3/20	Penn. Co. Sportsman's C.	Talk, movie 35 Lipke
3/21	TRF Library	Talk, movie 12 Lee
3/21	Washington School	Talk, movie 500 Lee
3/21	St. Bernards School	Talk, movie 150 Lee
3/22	Mark Twain School	Talk, movie 230 Lipke
3/22	Knox School	Talk 400 Lipke
3/22	Knox School	Movie 300 Lipke
3/22	Northrup School	Talk, movie 240 Lipke
3/25	Newfolden School	Talk, movie 650 Alexander
3/25	Middle River School	Talk, movie 475 Lee
3/25	Church Group	Talk, movie 18 Bellinger
3/25	Grass Lake School	Talk, movie 35 Lee
3/28	TRF Junior College	Talk, movie 200 Alexander
4/8	TRF Rotary Club	Talk, movie 45 Lipke
4/10	TRF Lions Club	Talk, movie 45 Lipke
4/10	Goodridge Lions Club	Talk, movie 20 Alexander
4/30	Corbett College Bio. C.	Talk, tour 13 Lee
5/14	Strandquist H.S. Bio. C.	Talk, tour 25 Lee
5/14	TRF Garden Club	Talk, tour, movie 18 Alexander
5/14	TRF Science Class	Tour 6 Alexander
5/15	Middle River 6th Grade	Tour, talk 25 Lee
5/15	Penn. Co. Sportsmen C.	Talk, movie 25 Lee
5/20	Warren Girl Scout Group	Tour, nature hike 25 Lipke
5/21	Newfolden School	Tour, talk 30 Alexander
5/21	Newfolden School	Tour, talk 30 Brandt
5/22	Grass Lake School	Tour, talk 25 Lee
5/22	Knox School 6th Grade	Tour, talk 60 Lee
5/24	Goodridge School 1-6 Grd.	Tour, talk 60 Lee
6/24	Falls-Starkow Clinic	Tour, talk 12 Bellinger
7/1	U. of M. Ecology Class	Tour, talk 25 Lipke
7/23	Washington Summer Bio. C.	Tour, talk 19 Bellinger
7/25-28	Pennington Co. Fair	Display 1,510 Brandt
		Bellinger
		Lipke
9/14	TRF Cub Scouts	Tour, talk 35 Bellinger
9/18	Penn. Co. Sportsmen C.	Talk, slides 30 Lipke
9/19	Kittson Co. Sportsmen C.	Talk, slides 25 Lipke
9/20	U. of S. Dakota Wetland Mgt.	Field trip, tour 6 Lipke
9/24	Boy Scout District mtg.	Demonstration 11 Bellinger
		Lee
9/24	TRF Science Club	Talk, slides 15 Lipke
10/16	Penn. Co. Sportsmen C.	Talk, slides 20 Alexander
11/21	Penn. Co. Sportsmen C.	Movie 25 Lipke
		Bellinger
11/21	MR Community Club	Movie, talk 30 Alexander
11/22	Evangelical Free Church	Talk, slides 120 Bellinger
12/16	U. of M. Wildlife Club	Talk, slides 7 Lipke
12/18	Penn. Co. Sportsmen C.	Talk 14 Lipke
12/18	Middle R. Community C.	Talk, movie 30 Alexander



Date	Organization	Participation-Attendance-Personnel		
12/15	Legion Members & fam.	Movie	300	Alexander
12/19	Middle River School	Movie	60	Alexander
12/19	Newfolden School	Movie	176	Alexander

D. Hunting:

1. Deer Harvest

The refuge was included in the five day deer hunting zone again this year. The season opened on November 9 and extended through November 13.

Mail questionnaires were used to determine hunter numbers and deer harvest for the refuge. A total of 230 cards were sent with 145 (63.04%) returned by the cut-off date of January 13.

A total 811 individual hunters harvested 275 deer on the refuge (TABLE VIII.). The resulting overall success of 33.9% ranged from a high of 47.7% on opening day to 22.6% on the last day.

TABLE VIII. Deer Harvest Statistics, 1962-1968

Year	No. Days in Season	Hunter Number of Days	Individual Hunters	Percent Success	Estimated Kill
1962	5	1,629	949	35.0	332
1963	9	2,253	1,443	26.9	338
1964	5	927	603	31.6	191
1965	5	846	523	36.0	188
1966	5	1,464	870	34.0	296
1967	5	2,485	1,256	34.9	438*
1968	5	1,722	811	33.9	275
TOTAL & AVE.		11,326	6,455	31.0	2,058

\* The field interview showed a total kill of 207 deer and hunter success of 16.5 percent.

Of the 144 deer reported, 72 (50.3%) were adult males, 36 (25.2%) adult females and 35 (24.5%) fawns. It is also interesting to note that 54.5% of the bucks had six point racks (eastern count) or better.

Data from Minnesota Game Dept. deer check stations revealed a marked decrease of 2-1/2 and 3-1/2 year animals in the kill this year. It was felt that this age class was not noticeably down in the refuge kill.

General hunter behavior was good this year. No violations were observed, littering was minimal and no moose were reported shot.

## 2. Goose Harvest

Canada goose migrations and refuge fall buildup were about a week later in 1968, and as a result only 2,500 were present for the September 28 noon opening. Unlike last year, the birds had little chance to establish feeding patterns off the refuge and goose hunting was the poorest it has been in many years. Despite a higher peak population and prolonged use, hunting success was low throughout the season. Excellent refuge crops and the inability to harvest those crops held the majority of the birds on the refuge. Blue-bird weather was prevalent throughout the first nine days and also had much to do with low success.

The extensive hunter survey during the first nine days of the season was conducted on about three-fourths of the refuge fringe area this year. Manpower limitations restricted the normally full coverage survey to a sample of the heaviest hunted areas (Sectors B, D, G, H). The expanded data showed that 5,210 hunters killed 642 geese, which included 190 cripples. This represents a substantial drop in success as 4,664 hunters killed and crippled 988 Canada geese in 1967. An adjusted crippling loss of 20% in 1967 was still significantly lower than the unadjusted rate of 31.3% from field contacts in 1968.

Snow and blue geese were present in reduced numbers; one blue goose was reported killed and one crippled during the survey.

The survey showed that about 72% of the geese were taken during the opening weekend. Last year better success was had during the week and only 62% were taken on opening weekend. Unlike last year when about three-fourths were shot in the morning, 52% were taken in the a.m., and 48% in the p.m.

On the areas surveyed, boundary hunters increased from 47.3% in 1967 to 72.5%, but the switch in hunting location was not thought to be that great for the entire survey area. Boundary hunting is important in the area of the refuge since there is an ever increasing shortage of open, field hunting opportunities.

Hunter success was significantly changed from last year. From the four intensively surveyed sectors in 1968, it took 6.7 field hunters to harvest a single goose while it took 13.5 boundary hunters to take a goose. The difference between field and boundary was insignificant in 1967 as the number of hunters per goose was 5.5 and 6.2 respectively.

Sector G, southwest of the refuge, showed the largest number of geese taken during the survey and attracted fair numbers of hunters throughout the season. Sectors A and D attracted the largest number of boundary hunters, however, success was way down from previous years. Perhaps the most productive field hunting occurred in Sector C, northeast of the North Gate, as feeding flights out of the refuge continued through most of the season.



Pressure tapered off as the season progressed but most of the better hunting occurred after the nine day survey. Refuge grain held most of the geese but excellent hunting could be had by the persistent goose hunter. Boundary hunting was good at different times during the remainder of the season on the south-east boundary, east boundary near Ditch 11, and in the southwest corner along agricultural unit A-2.

It is estimated that between 800 and 900 geese were harvested in the area of the refuge during the 70 day season. The total kill shows a big decrease from the 1967 estimate of 1,500-1,600. It is felt that the drain on Agassiz's resident flock was not decreased to the same extent.

### 3. Duck Harvest

The split 27 day season opened at noon on October 5. Although the refuge was closed, the 20,000 acres of adjacent state land and refuge boundary lines offered ample opportunities for wild-fowling. The number of ducks present for the opening was comparable to last year. Due to blue-bird weather and an abundance of refuge food, few ducks were moving off the refuge during the first portion of the split season. Random checks revealed a bag of .8 ducks/hunter on opening day and .25 ducks/hunter the second day. Success was down from last year when most hunters found little difficulty in bagging their two mallards. Heavy cover and standing grain resulted in high crippling losses, and based on a small sample losses were in excess of 53%.

Hunter success seemed to improve somewhat during the second portion of the season (Oct. 26 - Nov. 12), but was still below that of last year.

### 4. Ruffed and Sharp-tailed Grouse Harvest

The refuge is not open to small game hunting. Due to the high population of breeders carried over last winter, increased ruffed grouse populations were predicted for the fall hunting season. Field and Stream or Sports Afield magazine even carried an article about the grouse "hotspot" of the country being just east of the refuge on the Red Lake Management Area. However, heavy June rains limited production and birds were harder to locate than was earlier forecast. Hunter success was down from last year, but good hunting and limits (5) could be gotten in localized "hotspots".

Sharp-tailed grouse populations seemed to be slightly higher than last year. This was reflected in hunter bag checks during the goose harvest survey. The areas with highest hunter success were again on the farm land south of the refuge, and in better grouse range near Strathcona.

E. Violations:

For the first time in four years no apprehensions were made on or adjacent to the refuge by refuge personnel. We would like to think this is partly because of an effective patrol program. Many hunter contacts were made in the course of routine patrol and it was felt that this was instrumental in deterring unlawful acts.

Complaints were received from several individuals that two groups of juveniles were shooting ducks before the open season. As in many similiar situations the complaints were received several days after the violations occurred.

State game wardens and Federal game management agents also spent considerable time in the vicinity of the refuge. Their excellent cooperation and assistance enabled refuge personnel to participate in enforcement more effectively. State Warden Don Fearn made five apprehensions near the refuge boundary, three late shooters, and two unplugged guns.

In August two members of the refuge staff, Jay Bellinger and Francis Pratt, participated in the four day law enforcement training course (M & E) at Madison, Wisconsin.

Staff members attending the course felt the course was very valuable in presenting basic law enforcement techniques, and that no one should be given enforcement authority without first receiving similiar training.

F. Safety:

Continued emphasis was placed on safety in all activities throughout the year. In addition to safety meetings and general discussions every opportunity was taken to help each other become more safety conscious, to accept safe practices as an integral part of each and every job, to recognize that true and lasting safety must be in the minds of each individual, and to accomplish these by application of self responsibility.

Our station's safety program received a genuine stimulus with Regional Safety Officer, Lyle Miller's safety inspection on August 7. Numerous potential hazards disclosed by Mr. Miller, whose help we sincerely appreciated, were corrected.

We are thankful to report no lost-time accidents for the year. Lost-time accident free days totalled 838 as of Dec. 31, 1968.



## VII. IOTHER ITEMS

### A. Items of Interest:

#### 1. Personnel Changes

Most changes normally carried here are accompanied by basically good feelings. The good of people being promoted and moving on overcomes feelings of regret at losing competent employees and friends. This narrative must report a change that has brought sorrow to all.

Oscar Christenson, age 67, maintenanceman and senior employee at Agassiz died suddenly of a heart attack October 2, 1968. The position is still vacant and in a way, always will be. Oscar's last day was Sept. 27 when he finished his work week in apparent good health.

Marvin Lee, Administrative Assistant, moved on November 13 to Denver and his new position as Management Assistant with Wildlife Services. Marv's outstanding abilities and personal qualities were greatly missed. In fact, his entire family; wife Etta, and six kids left "a mighty big hole".

We certainly appreciated our Personnel Division's efforts in expediting replacement action for Marv's job. Francis (Frank) Pratt moved here from Sand Lake Refuge November 30, to assume the Administrative Assistant duties. Frank and his family, wife Valerie, and kids, Craig, Barry and Faith Louise, ages 5, 4 and 2, occupied a residence at headquarters. Frank's work capabilities and the family's good neighbor qualities make us feel fortunate and well pleased.

#### 2. Photography

Frank has accepted the challenge of Agassiz's photography reputation. His interest and enthusiasm, guided by Assistant Manager Lipke's experience and zeal, are making possible the continuation of the high standard pictures for which we are noted. The development work, illustrated in the photo section, proves he is off to a good start. The challenge is great when his predecessor, Marvin Lee, won photographer of the year with first, second and third place pictures in Region III's 1967 photo contest.

Hopes are high for the 1968 contest too. Lipke and Lee have submitted approximately 75 pictures for the year.

#### 3. Work Appreciation

Most of our photography activities and numerous other duties are accomplished only by personnel's willingness to donate self interest and personal time.

We are not intending, with any ulterior motive to document overtime, but somewhere, somehow the contributions made by dedicated, career employees to a station's overall success justly deserve recognition. We are proud to acknowledge our people's personal integrity in doing a thorough job without overtime pay in mind. Frankly, we would fall far short of present accomplishments without it.

#### 4. Defensive Driving Course

Mr. Lyle Miller, Regional Safety Officer, presented the National Safety Council's Defensive Driving Course to the Agassiz staff, two U. S. Game Management Agents, and one Wildlife Service employee at refuge headquarters on August 6.

#### 5. Fire

An electrical fire occurred in the service building (office part) on November 22 at about 5:30 A.M. It was not discovered until 7:00 A.M. Local fire departments responded and made the approximate 25 mile trip in a half hour. The building was kept tightly closed, depriving the fire of oxygen, until ample water was on hand to extinguish the fire.

Damage was held to the office, but furnishings and materials necessary to a refuge office staff of four were badly damaged by heat and smoke. All station files and records are usable. The Regional Office made \$6,500.00 emergency funds available to put the office back in shape. The remodeling job will be done by force account. All materials of appreciable cost have been ordered through GSA sources. Too bad we cannot purchase materials from local businessmen who's volunteer fire control services made it possible to have a building left to repair. Think "what a shot in the arm" this alone could provide for local community acceptance and general public relations.

As a result of personnel's all out effort in cleaning and repairing smoke and heat damaged items, organizing temporary office space in vacant residence no. 11, and performing efficiently under unusual conditions, we were operating satisfactorily at the year's end. Office machines, except copier, were overhauled locally and are back in operation.

#### 6. Personnel Training

Formal training sessions attended were: C. S. A.'s Basic Management Training Course by Howard Lipke, August 5-9; C. S. A.'s Clerical and Secretarial Excellence Course by Frank Pratt, July, 1968; Game Law Enforcement School by Jay Bellinger, August 26-29, and by Frank Pratt, August 21-25; and Basic Refuge Managers Course by Jay Bellinger, April 22-May 17.



## 7. Narrative Credits

The annual narrative report brings out the true team effort we like to see in any refuge activity. The following personnel had their hands in putting the bits and pieces together for the report:

Claude Alexander - Sections III. A, F, VII. A.

Howard Lipke - Sections I. B, II. C, III. B, D-F, IV. A, V. A, E, G-I, VI. D 2, NR's Photo descriptions and editing.

Jay Bellinger - Sections II. A, B, D-I, V. B-D, VI. D, NR's.

Francis Pratt - Sections I. A, III. C, IV. B-F, V. F, VI. B, C, E, NR's, figures (graphs) photo printing, typing and assembly.

SIGNATURE PAGE

Submitted by:

Claude R. Alexander

(Signature)

Claude R. Alexander

Refuge Manager

Title

Date: 2-12-69

Approved, Regional Office:

**FEB 17 1969**

Date: \_\_\_\_\_

James B. Mann

(Signature)

ASST

Regional Refuge Supervisor





W A E R F O W L

REFUGE Agassiz

MONTHS OF September TO December, 1968

(1) Species	(2) Weeks of reporting period									
	September 1-7 1	8-14 2	15-21 3	22-28 4	29-5 5	October 6-12 6	13-19 7	20-26 8	November 27-3 9	10
Swans:										
Whistling					84	124	207	205	178	
Trumpeter										
Geese:										
Canada	568	600	600	2,500	4,900	8,500	8,459	2,640	2,400	
<del>Canada</del> Hutchins							41			
Brant										
White-fronted										
Snow					140	700	1,170			
Blue					60	300	330			
Other Total Geese	568	600	600	2,500	5,100	9,500	10,000	2,640	2,400	
Ducks:										
Mallard	28,830	23,262	32,084	28,830	34,940	33,630	32,170	18,520	13,550	
Black	1,520	660	670	600	70	160	70	80	160	
Gadwall	11,860	8,160	8,900	7,120	3,020	11,160	11,890	8,390	2,290	
Baldpate	10,890	11,960	8,110	12,510	4,310	7,350	7,750	2,150	300	
Pintail	2,732	3,272	4,520	3,400	6,630	6,530	6,890	3,740	2,210	
Green-winged teal	610	2,800	3,810	5,600	4,590	6,910	7,240	5,350	1,180	
Blue-winged teal	9,520	14,350	6,902	2,240	440	100	290	10		
Cinnamon teal										
Shoveler	200	140	580	690	460	300	205	180	45	
Wood	60	90	140	170	20	20	10			
Redhead	120	114	740	190	300	290	160	30	100	
Ring-necked	500	820	320	400	300	270	70	230	220	
Canvasback	20	70	610	50	200	140	50	50		
Scaup	100	210	140	10	250	780	2,020	1,400	1,090	
Goldeneye	170			10		10	90			
Bufflehead				10		80	510	290	90	
Ruddy	1,450	1,800	1,090	400	700	180	110	60		
Other H. Merganser	90	190	20	290		310	140	120	150	
C. Merganser									20	
Total ducks	68,672	67,898	68,636	62,520	56,230	68,220	69,665	40,600	21,405	
Coot:	22,030	30,230	38,250	21,060	16,510	12,210	5,100	350	20	



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

WATER WIL  
(Continuation Sheet)



REFUGE Agassiz

MONTHS OF September TO December, 1968

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods: Estimated seen : total
	3-9 11	10-16 12	17-23 13	24-30 14						
Swans:										
Whistling								5,586		
Trumpeter										
Geese:										
Canada	150	150	150					221,319		
Cackling								287		
Brant										
White-fronted										
Snow								14,070		
Blue								4,830		
<del>Other</del> Total Geese	150	150	150					240,506		
Ducks:										
Mallard	2,627	2,627	2,627	250				1,777,629		
Black	2	2	2					27,972		
Gadwall								509,530		
Baldpate								457,310		
Pintail	6	6	6					279,594		
Green-winged teal								266,630		
Blue-winged teal								236,964		
Cinnamon teal										
Shoveler								19,600		
Wood								3,570		
Redhead								14,308		
Ring-necked								21,910		
Canvasback								8,330		
Scaup								42,000		
Goldeneye								1,960		
Bufflehead								6,860		
Ruddy								40,530		
Other H. Merganser								9,170		
Coots: C. Merganser								140		
Total ducks	2,635	2,635	2,635	250				3,724,007		
Coots:										
					(over)			1,032,920		



	(5) Total Days Use	(6) Peak Number	(7) Total Production	SUMMARY
Swans	5,586	207	-	Principal feeding areas All agricultural units were used extensively throughout the fall. Headquarters, Greenstump, Tamarack, Mud River and Agassiz Pools were the most attractive of refuge impoundments. Principal nesting areas
Geese	240,506	10,000	-	
Ducks	3,724,007	69,665	-	
Coots	1,032,920	38,250	-	

Reported by J. R. Bellinger

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).



3-1751

Form NR-1/

(Nov. 1945)

## MIGRATORY BIRDS

(other than waterfowl)

Months of Sept.

to December

1958

Refuge Agassiz



(1) Species	(2) First Seen		(3) sighted Peak Number		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
<b>I. Water and Marsh Birds:</b>										
Red-necked grebe	summer	resident	4	in Aug.						
Western grebe	summer	resident	5	in Aug.						
Pied-billed grebe	summer	resident	78	in Aug.						
White pelican	summer	resident	203	9/7	150	9/20				
Double-crested cormorant	summer	resident	22	9/13	16	9/20				
Great blue heron	summer	resident	11	9/7	26	9/13				
Common egret	1	9/13								
Green heron	1	9/7								
Black-crowned night heron	summer	resident	10	9/20						
American bittern	summer	resident	9	9/20	1	11/11				
Sandhill crane	2	9/1	125	9/21						
Sora rail	summer	resident								
<b>II. Shorebirds, Gulls and Terns:</b>										
Killdeer	summer	resident	100's	9/11-16						
Common snipe	summer	resident	6	9/20	1	11/11				
Willet	1	9/13	-							
Greater yellowlegs	summer	resident	9	10/25	9	10/25				
Lesser yellowlegs	summer	resident	9	10/21	9	10/21				
Ring-billed gull	6	9/13	6	9/13	1	9/20				
Franklin's gull	summer	resident	100's	9/20						
Common tern	3	9/13								
Black tern	summer	resident			1	9/13				

(over)



	(2)		(3)	(4)		(5)		
II. <u>Doves and Pigeons:</u>								
Mourning dove	summer	resident	91	9/13	2	9/20		
White-winged dove								
IV. <u>Predaceous Birds:</u>								
Golden eagle	2	10/25						
Duck hawk								
Horned owl	yearly	resident						
Magpie	1	9/20	10-12	Dec.	Still present			
Raven	16	11/4	16	11/4	still present			
Crow	summer	resident	14	9/13	5	9/20		
Bald eagle	5	10/15	5	10/15	1	11/7		
Osprey	1	9/17						
Sharp-shinned hawk					2	9/20		
Cooper's hawk	1	10/25						
Red-tailed hawk	summer	resident	2	<del>9/13</del> 9/2	2	9/2		
Swainson's hawk	1	9/13						
Rough-legged hawk	summer	resident	2	10/11	1	11/4		
Marsh hawk	summer	resident	19	9/7	1	11/4		
Reported by J. R. Bellinger, Ass't. Mgr.								
Snowy owl	1	11/10	4	12/4				

#### 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 Gruiformes)  
 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 1 2

(April 1946)

## UPLAND GAME BIRDS

FEB 10 1969

Region 3  
OF SPORT FISHING AND WILDLIFERefuge AgassizMonths of Sept.to Dec.

, 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 obs'd.	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed Grouse									500	Not many observations made, however, population up slightly. Scattered late sightings made of birds budding. Snow con- ditions excellent for winter survival.
Sharp-tailed Grouse									45-60	Slight increase in population. Two sightings of large groups; 14 in grazing unit G-18, 21 near west gate. It is felt that many grouse use the re- fuge for winter cover while feeding on private lands.
Gray Partridge									10-20	No sightings were made during the period. Remnant population exists with most observations generally occurring during the winter.
Ring-necked Pheasant	Marginal								0	None thought to be present on the refuge.



3-1757  
Form 3  
(June 1945)

BIG GAME

Refuge Agassiz

Calendar Year 1968

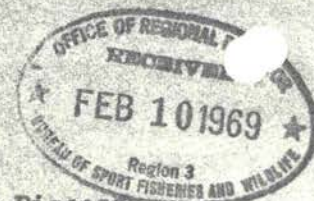


(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed Deer	30,000 acres of willow, dogwood, and aspen. March 15 aerial survey showed 644 but was thought to be low.	350*	275									1,050	750	
Moose	30,000 acres of willow, dogwood, and aspen. March 15 aerial survey showed 132 animals. Dec. 6 pro- duction survey showed 26.2% calves.	34										166	140	

Remarks: \* Assuming sex ratio is 1:1 and each doe produces 1.0 fawns. (700 pop.- 350 does)

Reported by J. R. Bellinger



Refuge AgassizYear 1968

## Botulism

## Lead Poisoning or other Disease

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	_____	_____

(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 \_\_\_\_\_

Kind of disease Lead poisoningSpecies affected Ring-necked duck

## Number Affected

Species	Actual Count	Estimated
<u>1</u>	<u>1</u>	<u>*</u>
_____	_____	_____
_____	_____	_____

Number Recovered 1

Number lost \_\_\_\_\_

Source of infection lead shotWater conditions \*Food conditions \*

Remarks \* Water and food conditions were good on the refuge, however, actual lead pickup occurred off the refuge. This was only an isolated incidence and total losses due to lead poisoning are unknown.



3-1757

Form NR-1

Rev. June 1960)

## NONAGRICULTURAL COLLECTION RECEIPTS, AND PLANTINGS (1)

Refuge AgassizYear 19 68

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
	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
	None to report this period.												

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

Remarks:

Total acreage planted:

Marsh and aquatic \_\_\_\_\_  
 Hedgerows, cover patches \_\_\_\_\_  
 Food strips, food patches \_\_\_\_\_  
 Forest plantings \_\_\_\_\_



3-1758  
Form NR-6  
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Agassiz

County Marshall

State Minnesota



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	
	Acres	Bu./Tons	Harvested		Unharvested					
Oats	110*	5,665 bu		600 bu.	241	9,760 bu.	351*	Rye	6	
Barley				225 bu.	115	3,690 bu.	115	Alfalfa	18	
Corn					15	870 bu.	15	*Timothy-Brome-Clover	28	
No acreage listed because of partial harvest on 38 ac. oats, 20 ac. barley.										
									Fallow Ag. Land	19



2-1578  
11/51)

# REFUGE GRAIN REPORT

OFFICE OF RECORDS  
RECEIVED  
FEB 10 1969  
U.S. DEPT. OF AGRICULTURE

Refuge Agassiz

Months of January through December, 1968

(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
Winter wheat	0	100	100	0	0	0	0	100	100	0	0
Barley	2,404	570	2,974	0	0	2,600	2,600	374	0	374	0
Oats	4,800	5,300	10,100	0	0	9,790	9,790	310	0	310	0
Corn	1,176	375	1,551	0	0	1,540	1,540	11	1	10	0
Rye	0	20	20	0	15	0	15	5	5	0	0
Warrior Alf.	39#	0	39#	0	0	0	0	39#	39#	0	0
Alf.	134#	0	134#	0	0	0	0	134#	134#	0	0
Smartweed	15#	0	15#	0	0	0	0	15#	15#	0	0
Wheat & Millet	15#	0	15#	0	0	0	0	15#	15#	0	0
Ranger Alf.	25#	0	25#	0	0	0	0	25#	25#	0	0
Buckwheat	75#	0	75#	0	0	0	0	75#	75#	0	0
Garland oats	128#	0	128#	0	0	0	0	128#	128#	0	0
Rodney oats	55#	0	55#	0	0	0	0	55#	55#	0	0
Bulrush	35#	0	35#	0	0	0	0	35#	35#	0	0
Meadow Tescue	40#	0	40#	0	0	0	0	40#	40#	0	0
Timothy	130#	0	130#	0	0	0	0	130#	130#	0	0
Alsike & S. Clover	100#	0	100#	0	0	0	0	100#	100#	0	0
Alsike (uncleaned)	100#	0	100#	0	0	0	0	100#	100#	0	0
Millet	100#	0	100#	0	0	0	0	100#	100#	0	0
Sweet corn	30#	0	30#	0	0	0	0	30#	30#	0	0

(8) Indicate shipping or collection points \_\_\_\_\_

(9) Grain is stored at Grain bin at Agassiz.

(10) Remarks Grain received: 100 winter wheat, 20 rye, 125 corn - Desoto Refuge; 5,000 oats - surplus gov't. 250 corn- Union Slough Refuge; 500 barley - Arrowwood; 300 oats and 70 barley - Agassiz share croppers.

\*See instructions on back.



TIMBER REMOVAL

Refuge Agassiz

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
Poland Klammer	AZ-161	S <sup>1</sup> / <sub>2</sub> , Sec. 31, T157N., R40W.	320	140.7 cords	\$2.00/ cord	\$281.40	None	Aspen

Total acreage cut over 320

Total income \$281.40

No. of units removed B. F. \_\_\_\_\_  
Cords 140.7  
Ties \_\_\_\_\_

Method of slash disposal Scattered to level below 6 ft.



## ANNUAL REPORT OF PESTICIDE APPLICATION



Refuge

Agassiz

Proposal Number's

Reporting Year

1-4

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
No. (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. July 2	Leafy spurge	Grazing unit G-18	1/4	Tordon 22K	1/2 lb.	2 lbs. a.i. per acre	Water 20 gal/ac.	Hand spray
2. June 6 June 14	Common mustard Canada thistle Morning glory Sowthistle	Ag. units - A-2; A-3, A-4, A-5, and A-6.	120 298	2,4,D (42%)	210 lbs.	1/2 lb. a.i. per acre	Water 10 gal/ac.	Aerial
3. May 28	Same as above Quackgrass	Corn in ag. units A-4 and A-6	7	Atrazine	21 lbs.	3 lbs. a.i. per acre	Water 42 gal/ac.	Tractor broad jet
4. Aug. 22 Aug. 25	Willow and "Other" brush sp.	Ditch 11 spoil Agassiz islands, East refuge boundary	95	Brush Killer 2,4,5-T and 2,4,D mixture	380 lbs.	4 lbs. a.i. per acre	Water 5 gal/ac.	Aerial

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

No.	lst. rain	lst. Effects	Character of Symptoms	% Kill	Cost-Chemicals & Appl.	Comments
1.	7/4 .08"	7/6	Plants wilting	100%	\$25.00	Spot treatment
2.	6/7 1.10"					.4" rain on 6/18.
	6/17 .01"	6/19	Leaves wilting, discolor	60-80%	\$525.00; 1.25/ac.	Control varied with unit.
3.	5/31 .13	6/7	Plants wilting, tops first	75%	\$100.00; 14.30/ac.	Treatment spotty due to spray equipment.
4.	6/23 .09"	9/2	Leaves yellow & drying	90%	\$593.75	.57" rain on 8/24
	6/26 .01"	9/10	Leaves yellow & drying	90%		.10" rain on 8/30



WATERFOWL

REFUGE Agassiz

MONTHS OF May TO August, 19 68

(1) Species	(2) Weeks of reporting period									
	5-11 1	12-18 2	19-25 3	26-1 4	2-8 5	9-15 6	16-22 7	23-29 8	30-6 9	July 7-13 10
<u>Swans:</u>										
Whistling Trumpeter										
<u>Geese:</u>										
Canada	400	400	400	400	400	400	400	400	400	400
Cackling										
Brant										
White-fronted										
Snow	7									
Blue	22									
Other Total Geese	429	400	400	400	400	400	400	400	400	400
<u>Ducks:</u>										
Mallard	2,110	1,780	1,780	1,780	1,780	1,780	1,780	1,780	1,780	1,780
Black										
Gadwall	2,990	2,092	2,092	2,092	2,092	2,092	2,092	2,092	2,092	2,092
Baldpate	430	302	302	302	302	302	302	302	302	302
Pintail	430	252	252	252	252	252	252	252	252	252
Green-winged teal	1,000	204	204	204	204	204	204	204	204	204
Blue-winged teal	8,120	4,094	4,094	4,094	4,094	4,094	4,094	4,094	4,094	4,094
Cinnamon teal	1									
Shoveler	1,940	972	972	972	972	972	972	972	972	972
Wood		30	30	30	30	30	30	30	30	30
Redhead	130	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136
Ring-necked	400	508	508	508	508	508	508	508	508	508
Canvasback	320	228	228	228	228	228	228	228	228	228
Scaup	540	704	704	704	704	704	704	704	704	704
Goldeneye										
Bufflehead	50									
Ruddy	60	412	412	412	412	412	412	412	412	412
Other										
Total Ducks	18,521	12,714	12,714	12,714	12,714	12,714	12,714	12,714	12,714	12,714
<u>Coot:</u>	7,300	5,645	3,990	3,990	3,990	3,990	3,990	3,990	3,990	3,990



3-1750

Cont. -1

(Rev. March 1953)

WATER FOWL  
(Continuation Sheet)

REFUGE

Agassiz

MONTHS OF May

TO

August

19 68

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods: Estimated seen : total
	11	12	13	14	15	16	17	18		
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	400	400	568	568	568	568	568		53,480	35 168
Cackling										
Brant										
White-fronted										
Snow									19	
Blue									154	
Other Total Geese	400	400	568	568	568	568	568		53,683	35 168
Ducks:										
Mallard	1,780	1,780	2,928	2,928	16,320	18,862	36,670		695,786	12 1,148
Black					620	618	1,454		18,844	- -
Cadwall	2,092	2,092	2,578	2,578	220	1,970	4,050		261,786	9 486
Baldpate	302	302	478	478	420	2,900	1,720		68,236	2 176
Pintail	252	252	563	563	150	230	2,610		51,226	2 311
Green-winged teal	204	204	292	292	220	150	1,650		40,936	1 88
Blue-winged teal	4,094	4,094	4,891	4,891	4,630	8,230	7,960		586,292	8 797
Cinnamon teal									7	
Shoveler	972	972	1,104	1,104	40	140	1,150		113,190	1 132
Wood	30	30	30	30	280	540	150		9,520	
Redhead	1,136	1,136	2,010	2,010	260	50	835		124,537	11 874
Ring-necked	508	508	695	695	695	695	220		53,186	3 187
Canvasback	228	228	481	481	50	70	530		31,080	4 253
Scaup	704	704	891	891	250	150	520		76,902	3 187
Goldeneye										
Bufflehead									350	
Ruddy	412	412	4,408	4,408	1,350	1,350	7,060		162,176	43 3,996
Other H. Merganser					210	80	8		2,086	
<del>Other</del> Total Ducks	12,714	12,714	21,349	21,349	25,020	35,340	66,587		2,296,140	99 8,635
Geese:										
Coats:	3,990	3,990	15,162	15,162	7,010	5,890	20,895		818,748	11,172
					(over)					



	(5)	(6)	(7)	SUMMARY
	Total Days Use :	Peak Number :	Total Production :	
Swans	0	0	0	Principal feeding areas Geese - farm fields on and off
Geese	53,683	568	168	the refuge; Ducks - Tamarack, Mud R., Agassiz, Green Stump Pools.
Ducks	2,296,140	66,587	8,635	Principal nesting areas Agassiz, Northwest, Webster,
Coots	818,748	20,895	11,172	Mud River, and Lost Bay Pools.
				Reported by Jay R. Bellinger, Ass't. Refuge Mgr.

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).



1751

NR-1/

ov. 1945,

## MIGRATORY DS

(other than waterfowl)

Refuge AgassizMonths of May to August 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
<u>Water and Marsh Birds:</u>										
Red-necked grebe	Seen in	April	10	6/1	4	8/23	Summer	resident		
Horned grebe	Seen in	April	-	-	-	-	"	"		
Sand grebe	Seen in	May	-	-	-	-	"	"		
Western grebe	1	5/8	12	July	5	8/23	"	"		
Pied-billed grebe	34	5/10	68	8/16	12	8/30	"	"		
White pelican	8	6/10	500	8/16	93	8/23	"	"		
Double-crested cormorant	Seen in	April	13	8/23	1	8/30	"	"		
Great Blue Heron	19	5/10	16	8/16	11	8/30	"	"		
Green heron	1	5/15	1	5/15	1	8/30				
Common egret	1	7/29	1	7/29	1	8/30	Rare visitor			
Black-cr. night heron	1	5/1	9	8/23	2	8/30	Summer resident			
American bittern	2	5/2	15	8/23	3	8/30	"	"		
Sandhill crane	2	6/2	2	8/16	2	8/30	Spring & fall migrant			
Virginia rail	Seen in	May	-	-	-	-	Summer resident			
Sora rail	Seen in	April	3	8/23	3	8/23	"	"		
King rail	1	5/25					Rare visitor			
<u>Shorebirds, Gulls and Terns:</u>										
Semipalmated plover	1	8/16	1	8/16	-	-	Fall migrant			
Killdeer	Seen in	April	6	8/1	2	8/16	Summer resident			
Ruddy turnstone	2	5/24	1	7/30	-	-				
Common snipe	Seen in	April	1	8/16	-	-	Summer resident			
Spotted sandpiper	1	5/18	-	-	-	-	"	"		
Solitary sandpiper	1	5/8	-	-	-	-	Spring & fall migrant			
Willet	1	5/6	2	5/20	-	-	Accidental visitor			
Greater yellowlegs	Seen in	April	3	7/22	-	-	Spring & fall migrant			
Lesser yellowlegs	Seen in	April	24	8/16	-	-	"	"	"	"
Least sandpiper	4	5/10	7	8/16	7	8/16	"	"	"	"
Dowling	12	4/15	-	-	-	-	Rare visitor			
Long-billed dowitcher	4	5/20	-	-	-	-	Spring & fall migrant			
Semipalmated sandpiper	1	8/16	-	-	-	-	"	"	"	"
Marbled godwit	4	5/3	-	-	-	-	Summer resident			

(over)

(See continuation sheet)



	(2)	(3)	(4)	(5)
II. <u>Doves and Pigeons:</u>				
Mourning dove	Seen in April	68	8/16	Summer resident
White-winged dove				
IV. <u>Predaceous Birds:</u>				
Golden eagle				
Duck hawk				
Horned owl		2	8/23	Permanent resident
Magpie				
Raven				
Crow		5	8/23	Summer resident
Red-tailed hawk		6	8/16	" "
Marsh hawk		14	8/23	" "
Reported by Jay R. Bellinger, Ass't. Refuge Mgr.				

#### 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 Gruiformes)  
 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.



MIGRATORY BIRDS  
(other than waterfowl)

Refuge Agassiz

Months of May to August 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. <u>Water and Marsh Birds:</u>										



3-1750b  
Form NR-18  
(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 Agassiz For 12-month period ending August 31, 1968

Reported by Jay H. Bollinger

Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type Acreage	(3) Use-days	(4) Breeding Population	(5) Production
(1) Tamarack	Crops - Upland 45 Marsh 1,510 Water 480 Total 2,035	Ducks 1,174,174 Geese 16,940 Swans 28 Coots 242,885 Total 1,428,185	620 4 - 310 934	421 7 - 868 1,296
(2) Thief Bay	Crops - Upland 1,062 Marsh 1,072 Water 960 Total 1,394	Ducks 275,127 Geese 22,421 Swans - Coots 25,620 Total 323,568	961 6 - - 967	690 10 - - 696
(3) Whiskey Lake	Crops - Upland 4,322 Marsh 577 Water 196 Total 5,095	Ducks 90,349 Geese 266 Swans - Coots - Total 90,615	899 - - - 899	610 - - - 610
(4) Northwest	Crops - Upland 297 Marsh 1,689 Water 254 Total 2,240	Ducks 450,884 Geese 3,019 Swans 49 Coots 270,977 Total 726,929	496 8 - 960 1,464	337 14 - 2,688 3,139
(5) Webster	Crops - Upland 355 Marsh 880 Water 365 Total 1,600	Ducks 223,440 Geese 5,061 Swans - Coots 37,030 Total 265,531	1,024 8 - - 1,032	695 14 - - 709
(6) Mud River	Crops - Upland 1,732 Marsh 225 Water 140 Total 2,097	Ducks 348,859 Geese 11,018 Swans - Coots 43,617 Total 403,494	961 4 - 120 1,085	654 7 - 336 997
(7) Kelly	Crops - Upland 2,940 Marsh 344 Water 35 Total 3,319	Ducks 122,997 Geese 3,129 Swans 84 Coots 13,146 Total 139,356	434 4 - 20 458	294 7 - 36 397

(over)



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

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Agassiz For 12-month period ending August 31, 1968

Reported by Jay M. Bellinger Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat			(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acres				
(8) Agassiz	Crops	835	Ducks	1,854,954	2,042	1,390
	Upland	790	Geese	33,692	28	48
	Marsh	3,500	Swans	1,962	-	-
	Water	9,800	Coots	528,199	2,150	6,020
	Total	14,625	Total	1,688,851	4,220	7,458
(9) OOC	Crops	400	Ducks	338,639	1,422	950
	Upland	3,560	Geese	30,926	16	27
	Marsh	3,560	Swans	-	-	-
	Water	520	Coots	28,875	30	34
	Total	8,040	Total	398,440	1,468	1,021
(10) Madsen	Crops	-	Ducks	225,015	155	105
	Upland	130	Geese	2,632	4	7
	Marsh	378	Swans	-	-	-
	Water	1,475	Coots	117,355	300	840
	Total	1,973	Total	345,002	459	1,052
(11) Davidson	Crops	65	Ducks	25,060	62	42
	Upland	927	Geese	-	-	-
	Marsh	228	Swans	-	-	-
	Water	2	Coots	-	-	-
	Total	1,222	Total	25,060	62	42
(12) Green Stump	Crops	-	Ducks	500,198	1,674	1,137
	Upland	82	Geese	44,982	-	-
	Marsh	1,260	Swans	-	-	-
	Water	1,835	Coots	7,350	-	-
	Total	3,177	Total	552,530	1,674	1,137
(13) Headquarters	Crops	-	Ducks	94,465	125	85
	Upland	208	Geese	5,482	2	3
	Marsh	407	Swans	42	-	-
	Water	685	Coots	23,737	80	224
	Total	1,300	Total	123,726	207	312
(14) Lost Bay	Crops	131	Ducks	153,846	496	137
	Upland	1,270	Geese	2,030	8	14
	Marsh	720	Swans	-	-	-
	Water	90	Coots	930	-	-
	Total	2,211	Total	156,806	504	351

(over)



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

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Agassiz For 12-month period ending August 31, 1968

Reported by Jay R. Bellinger Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat		(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acreage			
(15) Dahl	Crops	150	Ducks	72,160	580
	Upland	1,120	Geese	9,207	4
	Marsh	340	Swans	-	-
	Water	70	Coots	3,926	20
	Total	1,680	Total	85,372	604
(16) South	Crops	-	Ducks	161,861	31
	Upland	18	Geese	3,311	2
	Marsh	800	Swans	-	-
	Water	200	Coots	280	-
	Total	1,018	Total	165,452	33
(17) Lost River	Crops	120	Ducks	2,828	-
	Upland	2,710	Geese	1,183	-
	Marsh	630	Swans	-	-
	Water	60	Coots	-	-
	Total	3,520	Total	4,011	-
(18) Bunt	Crops	-	Ducks	75,649	713
	Upland	1,937	Geese	175	-
	Marsh	200	Swans	-	-
	Water	50	Coots	-	-
	Total	2,187	Total	75,824	713
TOTALS	Crops	1,101	Ducks	5,401,004	12,714
	Upland	23,505	Geese	197,419	98
	Marsh	19,220	Swans	2,120	-
	Water	17,180	Coots	1,303,028	3,990
	Total	61,006	Total	6,903,571	16,802
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		

(over)



Refuge AgassizMonths of May to August, 19 68

(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 obs'd.	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed grouse	Unknown	-	3	-	-	0	0	0	Unknown	Despite reports of the best state grouse year in many years few brood observations were made, however, the refuge pop. is thought to be up slightly as the best grouse habitat was not frequented by observers.
Sharp-tailed grouse	"	-	-	-	-	0	0	0	35-60	Scattered observations made throughout the period. No broods sighted, however, two sightings of broody hens in- dicated some refuge production.
Gray partridge	"	-	-	-	-	0	0	0	10-20	No sightings during period, however a remnant refuge population exists.
Ring-necked pheasant	"	-	-	-	-	0	0	0	0	No sightings made. None thought to be present on the refuge during the year.



3-1750

Form No.

(Rev. March 1953)

WATERFOWL

REFUGE

AgassizMONTHS OF Jan. TO Apr., 19 68

(1) Species	(2) Weeks of reporting period									
	Jan. 1 5-11	Jan. 2 12-18	Jan. 3 19-25	Jan. 4 26-1	Jan. 5 2-8	Feb. 6 9-15	Feb. 7 16-22	Feb. 8 23-1	Mar. 9 2-8	Mar. 10 9-15
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard										
Black										
Gadwall										
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot:										



3-1750a

Cont. 1

(Rev. March 1953)

WATER FOWL  
(Continuation Sheet)REFUGE AgassizMONTHS OF Jan. TO Apr., 19 68

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods: Estimated seen : total
	16-22 11	23-29 12	30-6 13	7-13 14	14-20 15	21-27 16	28-4 17	5-11 18		
Swans:										
Whistling				12	4			1	119	
Trumpeter										
Geese:										
Canada				504	1,490	400	400		19,558	
Cackling				2					14	
Brant										
White-fronted								1	7	
Snow						10	10		140	
Blue						20	24		308	
Other							1		7	
Ducks:										
Mallard			2,058	10,550	6,900	4,530	3,100		189,966	
Black			10	10	10				420	
Gadwall				140	2,730	6,710	6,610		115,430	
Baldpate				2,580	2,080	1,710	1,780		57,050	
Pintail			82	4,610	1,960	1,570	520		61,194	
Green-winged teal			120	7,920	14,660	10,970	1,530		246,400	
Blue-winged teal				620	1,580	1,880	6,270		72,450	
Cinnamon teal										
Shoveler			8	390	1,140	1,970	1,140		34,636	
Wood										
Redhead				120	30	190	790		10,010	
Ring-necked			64	3,280	2,470	1,460	1,010		57,988	
Canvasback				150	190	880	550		12,390	
Scaup			76	5,930	9,800	4,510	3,080		163,772	
Goldeneye			284	780	140	60			8,848	
Bufflehead				400	1,010	1,640	340		23,730	
Ruddy							30		210	
Other H. Merganser			18	90					756	
<del>OTHER</del> C. Merganser				30					210	
Coots:				1,180	3,990	5,000	25,100		246,890	
					(over)					



	(5) Total Days Use	(6) Peak Number	(7) Total Production	SUMMARY
Swans	119	12	-	Principal feeding areas <u>Geese - farm fields off the refuge;</u>
Geese	20,027	1,494	-	<u>Ducks, Tamarack, South, Kelly &amp; Headquarters pools.</u>
Ducks	1,055,460	44,730	-	Principal nesting areas _____
Coots	246,890	25,100	-	
				Reported by <u>Howard A. Lipke</u> <u>H. A. Lipke, Assistant Refuge Manager</u>

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).



1751  
Form NR-1/  
Nov. 1945)

MIGRATORY BIRDS  
(other than waterfowl)

Refuge Agassiz

Months of Jan. 1

to April 30

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
<b>I. Water and Marsh Birds:</b>										
Common loon	-	-	-	-	Uncommon spring migrant					
Red-necked grebe	1	4/19	-	-	Summer resident					
Horned grebe	1	4/28	-	-	"	"				
Hared grebe	-	-	-	-	"	"				
Western grebe	-	-	-	-	"	"				
Pied-billed grebe	1	3/29	100's	late Apr.	"	"				
White pelican	125	4/30	125	4/30	"	"				
Double-crested cormorant	3	4/15	50-75	late Apr.	"	"				
Great blue heron	1	3/30	-	-	"	"				
Common egret	-	-	-	-	Rare visitor					
Bl.-cr. night heron	Early May		-	-	Summer resident					
American bittern	"	"	-	-	"	"				
Sandhill crane	12	4/22	25-50	Late Apr.	Still present Mid-May					
<b>II. Shorebirds, Gulls and Terns:</b>										
Killdeer	1	3/16	100's	Late Apr.	Summer resident					
Common snipe	1	4/9	100's	" "	"	"				
Greater yellowlegs	1	4/19	-	-	Spring migrant					
Lesser yellowlegs	-	-	-	-	"	"				
Marbled godwit	-	-	few	-	Summer resident					
Herring gull	1	4/4	-	Mid-Apr.	Spring migrant					
Ring-billed gull	-	-	-	-	"	"				
Franklin's gull	15	4/12	1,000's	Late Apr.	Summer resident					

(over)



	(2)	(3)	(4)	(5)
<b>III. Doves and Pigeons:</b>				
Mourning dove	1	4/1	100's Late Apr.	Summer resident
White-winged dove				
<b>IV. Predaceous Birds:</b>				
Golden eagle	1	3/4	1-2 Early Mar.	Occasional-winter
Duck hawk	-	-	-	Spring migrant
Horned owl	-	-	Common	Permanent resident
Maggie	Winter	resident	7-migrants 3/10	Winter resident
Raven	"	"	-	" "
Crow	22	3/16	100's Late Mar.	Summer resident
Red-tailed hawk	1	3/24	-	" "
Bough-legged hawk	1	3/10	Mid-March	Spring migrant
Marsh hawk	1	3/8	" "	Summer resident
Sharp-shinned hawk	-	-	-	Spring migrant
Sparrow hawk	1	3/16	- Late March	Summer resident
Bald eagle	1	3/17	1-3 Late March	Spring migrant
Red-shouldered hawk	1	3/31	-	" "
Short-eared owl	1	3/16	-	Spring migrant
Snowy owl	-	-	-	Occasional winter-spring
Barred owl	-	-	-	-

*Howard A. Lipke*

Reported by Howard A. Lipke, Ass't. Refuge Mgr.

#### 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 Gruiformes)  
 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 2  
(April 1946)

UPLAND GAME BIRDS

Refuge Agassiz

Months of Jan. 1 to April 30, 19 68

(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 obs'd.	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed Grouse									Population above last years.	Good winter carry-over sub- stantiated by increase in drumming activity. 13 drums heard on each of two survey routes. Sightings common.
Sharp-tailed Grouse									29-35	Frequent scattered observations indicate good winter carry-over. Dancing males observed in graz- ing unit G-18.
Gray Partridge									10-20	Only a remnant population exists. One group of 7 observed SE of ditch 11 control.
Ring-necked Pheasants									0	No pheasant are thought to be present on the refuge.



3-1754  
Form No. 4  
(June 1945)

SMALL MAMMALS

Refuge Agassiz

Year ending April 30, 1968

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula tion
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator * Control	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated	Furs Destroyed
								Permit Number	Trappers' Share	Refuge share			
Mink				122	5			T-9470	61	61	*		
Maskerat				42	-			T-9471					
								T-9470	32	10	*		
Beaver				43	-			T-9471					
								T-9472	43	0			
								T-9473					
River otter				1	(Trapped in beaver trap-refuge study skin)								
Weasel				2	-				2	0			
Striped skunk				-	114				-				
Woodchuck				-	-				-				
Raccoon				4	85				4	0			
Ferral cat				-	-				-				
Red fox				5	-				5	0			
Ferral dog				-	-				-				
Bobcat				-	-				-				
Coyote				1	(trapped in mink trap - refuge study skin)								
Badger				1					1	0			
Ground squirrel				-					-				

\* List removals by Predator Animal Hunter

\* List removals by Predator Animal Hunter

REMARKS:

\* Sold locally on bid for combined trapper and refuge shares.

Reported by Howard A. Lipke  
Howard A. Lipke, Ass't. Refuge Mgr.





Claude R. Alexander, Refuge Manager, Ag 682, Exp. 9, H. A. Lipke



Howard A. Lipke, Assistant Refuge Manager, Ag 683, Exp. 18, F. Pratt





Jay R. Bellinger, Assistant Refuge Manager, Ag 682, Exp. 2;  
H. A. Lipke



Francis J. Pratt, Admin. Assistant, Ag 682, Exp. 114, H. A. Lipke





Lyle M. Blahauvietz, Maintenceman, Ag 682, Exp. 12, H. A. Lipke



Virgil D. Erickson, Maintenceman, Ag 628, Exp. 29, H. A. Lipke





Bellinger places marker for vegetative transect. Snowmobile and staff-constructed sled are also invaluable for servicing artificial nest structures and other winter activities.

Ag 581, Exp. 4 H. A. Lipke



Arrival of spring was delayed several times by cold spells. Stress on these cliff swallows huddled under Ditch 11 bridge was extreme, however, warmer weather spared them.

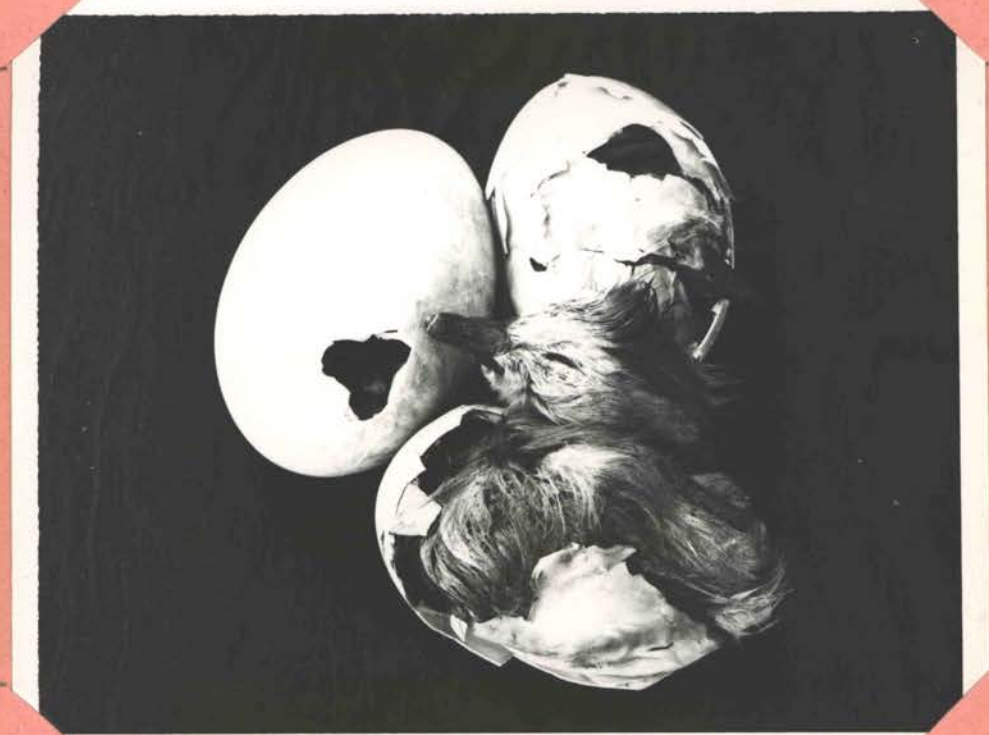
Ag. 633, Exp. 10 H. A. Lipke





Student aid Brant records information on goose nest in structure.  
Of the 70 structures available 20 were used in 1968.

Ag 633, Exp. 5, H. A. Lipke



Good use of nest structures was offset by poor hatching success  
as a high percentage of eggs contained dead embryos.

Ag 628, Exp. 42, H. A. Lipke





Goose production of 168 was slightly better than last year but far below the high of 387 in 1966. Ag 616, Exp. 5, H. A. Lipke



Increased water from private land clearing and drainage continues to add to water management problems on the refuge.

Ag 676, Exp. 36, H. A. Lipke





Brant records data on one of 20 duck structures being tested.  
No use was attributed to lack of water during early nesting.

Ag 633, Exp. 5, H. A. Lipke

Predators continue as one of the main threats to nesting water-  
fowl despite removal of 72 raccoon and 149 skunks in 1968.

Ag 590, Exp. 29, M. H. Lee



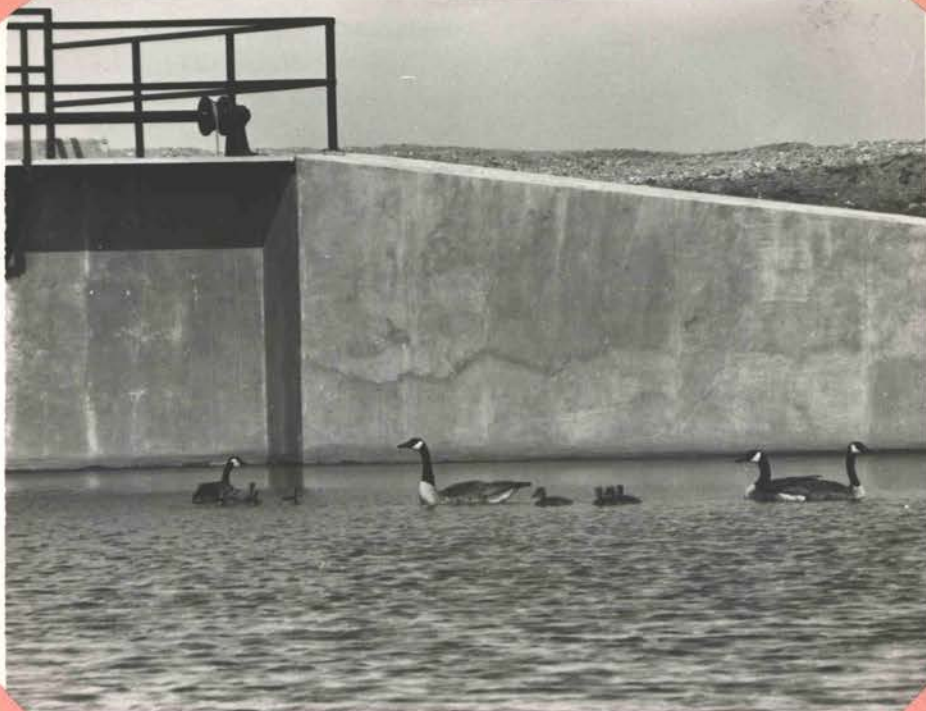


Flooding limited duck production from 6,307 pairs to 8,635 in 1968. Mallard production was only one fourth of the 1967 total.  
Ag 644, Exp. 2, M. H. Lee



Heavy June and July rains filled potholes in crop units. Oats in Golden Valley unit received excellent use with added attraction of water  
Ag 654, Exp. 14, H. A. Lipke





Water control and waterfowl production depicts one of primary goals of refuge management. New Agassiz control facilitated release of water in 1968. Ag. 653, Exp. 33, H. A. Lipke



Demand for cormorant nest sites exceeded supply as they took to the Ditch 11 spoilbanks. The colony is one of the few remaining in the state. Ag 653, Exp. 36, H. A. Lipke





Bellinger checks willow clump for the effect of a controlled burn on 1,100 acre unit 22. Upland grasses and clover responded well.

Ag 654, Exp. 18, H. A. Lipke



The burn under near optimum conditions set back brush on approximately 90% of the area. Big game use of resprouting willow has been excellent.

Ag 654, Exp. 17, H. A. Lipke





Atrazine aided production of 65 bushel corn on 14 acres planted to afford local geese some late fall protection from over harvest.

Ag 672, Exp. 5, H. A. Lipke



Only 22 Canadas were banded as part of the goose management study. Fluctuating water and dispersal of birds resulted in poor trapping conditions.

Ag 673, Exp. 3, H. A. Lipke





Overgrazing occurred on some portions of 5,120 acres of pasture. Grazing pressure will be distributed through salt placement and water.

Ag 672, Exp. 14, H. A. Lipke



Stockponds improved pasture units and received good spring use by ducks. Grazing appears to be keeping areas from reverting to brush.

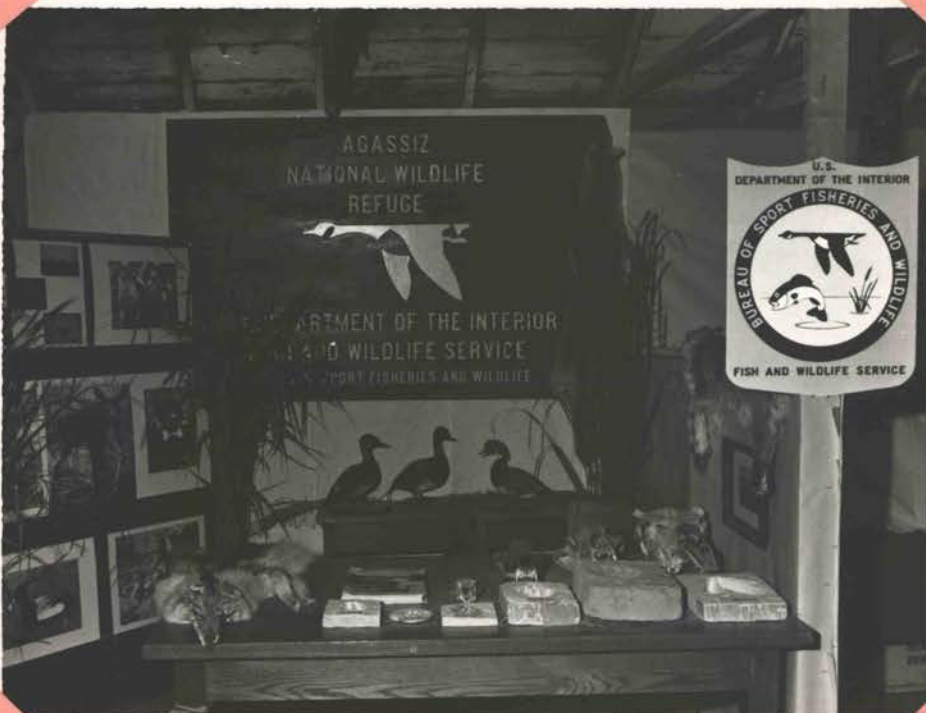
Ag 672, Exp. 16, H. A. Lipke





Resprouting aspen and poplar provides abundance of big game browse. Controlled burns will help provide maximum productivity of refuge uplands.

Ag 674, Exp. 12, H. A. Lipke



Pemington County Fair display in Thief River Falls attracted 1,510 people July 25-28.

Ag 670, Exp. 33, H. A. Lipke





Erickson checks progress of pothole construction on west gate development site; 30 were dragline dug with 200' spacing.

Ag 674, Exp. 7, H. A. Lipke



About 20,000 acres lends itself to pothole development. Wildlife counts preceding construction will help evaluate benefits.

Ag 680, Exp. 11, H. A. Lipke





Depredations complaints were light considering wet conditions in the area. About 14,000 bushels of grain fed on six feed sites helped alleviate the problem. Ag 667, Exp. 4, M. H. Lee



Good yields and excellent use of 300 acres of small grain also lessened pressure on private lands. Wet conditions prevented planned harvest of some grain. Ag 676, Exp. 38, H. A. Lipke





This small marsh and crop unit A-6 across County Road 7 attracted as many as 4,400 geese and 22,000 ducks, providing excellent public viewing. Ag 677, Exp. 7, H. A. Lipke



Goose hunting success was down, however, the drain of large geese from the local flock continued. Ag 677, Exp. 16, H. A. Lipke





Off-refuge hunting provides much recreation. An extensive 9 day survey showed about 450 geese taken in immediate area of refuge.  
Ag 677, Exp. 6, H. A. Lipke



Deer hunting on and near the refuge was good. About 34% of refuge hunters removed 275 deer. (Berg farm) Ag 678, Exp. 32, H. A. Lipke





Snowmobile and sled facilitated experimental pothole blasting.  
Contract blasting on large acreages is feasible.

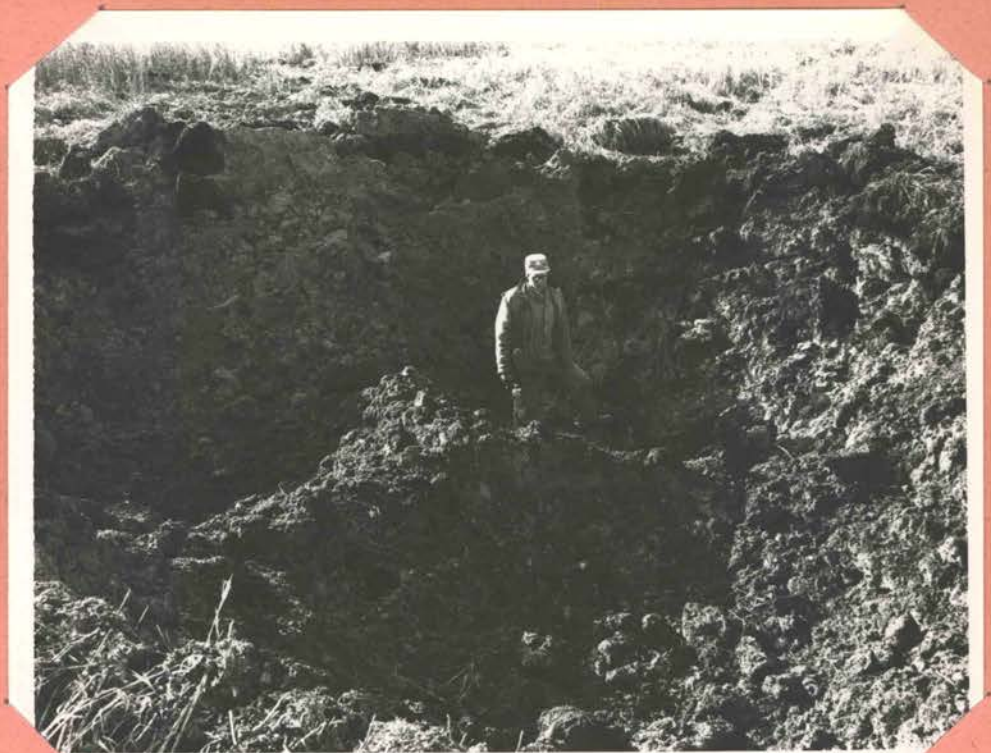
Ag 679, Exp. 9, H. A. Lipke



Monsanto Blasting Agent was easy to handle and showed good results. Eight holes were blown in sedge-cattail flats.

Ag 679, Exp. 11, H. A. Lipke





Erickson checks hole from 3 - 50# charges. The 35' hole will be 6' deep. Soil types appear favorable for this technique.  
Ag 679, Exp. 14, H. A. Lipke



A November 22 fire from faulty wiring gutted the office and caused about \$6,500.00 damage. We feel fortunate to have our records.  
Ag 681, Exp. 2, H. A. Lipke





A cooperative moose study is underway on Agassiz. Capturing and tagging will help meet the objective of determining patterns of habitat use. Ag 683, Exp. 5, H. A. Lipke



Moose brought down by the drug succinylcholine chloride are tagged with a bright collar and ear streamers. Ag 690, Exp. 11, F. Pratt





Eight animals have been tagged, one with a radio transmitter. Other phases will involve population study, and inventory and study of habitat conditions. Ag 689, Exp. 13, H. A. Lipke



A radio receiver and sightings of color marked animals will enable us to keep track of a portion of the herd which numbers about 200. (132 on the refuge) Ag 686, Exp. 4, H. A. Lipke





In spite of increasing pressures for recreational use of our resources, there remains the opportunity for man to truly enjoy pursuit of game in the manner and setting in which our forefathers did. Much of our enjoyment of nature hinges on the "heritage" we so much talk about. Just how long will the resources and heritage be there to enjoy? We of all people must proceed with caution when it comes to promoting mass recreation. Personal Negative, H. A. Lipke