

ROUTING SLIP

DIVISION OF WILDLIFE REFUGES

DATE: SEPTEMBER 22 1947

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MUD LAKE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

MAY - AUGUST 1947

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APPENDIX

WATERFOWL CENSUS SUMMER 1947

Pages 21 - 20

This report prepared jointly by Edwin W. Ball and R. W. Hunt. The detailed waterfowl brood census report prepared in entirety by Mr. Ball. Typing and binding by Mr. Nygard

MUD LAKE NATIONAL WILDLIFE REFUGE
Narrative Report
May-August, 1947

I. GENERAL

A. Weather Conditions

While a good part of this Region has been suffering from lack of rainfall, and extreme heat, the Mud Lake Refuge area and vicinity have been drenched regularly throughout the entire period. We have had occasional hot days, which, along with the high relative humidity, have made it extremely uncomfortable.

As indicated in our weather records accompanying the gauge reading reports, the rains have not been more showers - they have been real downpours, and are responsible for slow progress of refuge construction jobs, as well as creating considerable havoc with farming operations in this community, and nesting activities of game birds.

The following tabulation illustrates the weather for the period:

| | Rainfall | | Max. Temp. | | Min. Temp. | |
|--------|----------|-------|------------|------|------------|------|
| | 1946 | 1947 | 1946 | 1947 | 1946 | 1947 |
| May | 1.82 | 1.48 | 86 | 81 | 19 | 24 |
| June | 5.02 | 4.61 | 85 | 81 | 35 | 35 |
| July | 1.26 | 6.55 | 90 | 92 | 44 | 41 |
| August | 1.86 | 3.26 | 96 | 94 | 40 | 40.5 |
| Total | 9.96 | 15.90 | 96 | 94 | 19 | 24 |

As shown we have received very nearly six inches more of rainfall for this period in 1947 than in 1946 - and most of it in our two "dry" months, July and August.

- B. Water Conditions. As would be expected, water levels have, in this period just passed, been the highest since the refuge was established. Mud Lake, for a period of about one week remained at approximately $1\frac{1}{2}$ feet above approved pool elevations; Green Stump pool reached a level approximately one foot over the approved pool elevation during the same period (June 17-23); Headquarters rose slightly above relatively high levels. Mud Lake, of course, must absorb all incoming waters at some stage or other, and naturally would indicate the greatest increase in levels - especially when we must manipulate controls while considering the capacity of the Thief River channel below the refuge.

We believe it proper to mention, at this point, that Mr. Ball and Mr. Davidson handled the flood situation to perfection.

Their work was especially outstanding considering the need for protection construction work in progress, filling the river channel to capacity, but no more, extreme difficulty in reaching some controls because of impassable roads, and no internal worries concerning irregular hours, etc. The refuge manager returned from vacation to find everything shipshape.

Present pool elevations are as follows:

| | Actual |
|---------------|----------|
| Mud Lake | .04 low |
| Green Stump | .02 high |
| Madsen | .20 low |
| South | normal |
| Headquarters | .74 low |
| East | normal |
| CCC | normal |
| Mud River | .1 low |
| Webster Creek | .5 high |
| Northwest | .15 low |

C. Fires

It would have actually been impossible to set grass, brush, or timber fires during the greater part of this period. All vegetation has remained green and has grown luxuriantly. The extensive peat beds have remained completely soaked. We did have one small fire during early May. With the exception of several fence posts damage was negligible.

II. WILDLIFE

A. Migratory Birds

1. Population and Behavior. Waterfowl.

Two waterfowl censuses were conducted, one in July and one in August. Results of the censuses, showing trends of populations are included in the appendix. With the exception of Baldpates, all duck populations reveal a decided decrease in numbers. Species exhibiting the greatest decrease in numbers are Shoveller, Ruddy Duck, Blue-winged Teal, Gadwall, and American Pintail in the order named. Generally the decrease in brood production was greater proportionately than the decrease in adult population.

Although the Black Tern population indicated an increase in numbers, most other waterfowl species, including Pied-billed Grebes, Gulls, Herons, Bitterns, Coot, and shore birds were down well below normal. Outstanding decreases in populations were in Franklin's Gull (an estimated 99 per cent decrease), American Coot (an estimated 97 per-cent decrease),

information
add to
Research
REG

Black-crowned Night Heron (an estimated 93 per cent decrease), American Bittern and Yellowlegs (both down an estimated 90 per cent.

At least two adverse factors unfavorable to high waterfowl populations were operative in this period. One factor, a later spring break-up, delayed the initiation of nesting attempts three weeks or more beyond the normal starting date. Blue-winged Teal and Coot did not appear on the refuge until April 23, Ruddy Duck did not appear until the first week in June. Observation of the first waterfowl brood was not made until June 14. (1)

The other factor, high water levels, undoubtedly destroyed many nests and it was a serious factor in curbing brood production. Pool levels began raising as the result of flood conditions in areas draining into the refuge water system on June 11. Mud Lake Pool, largest in area of all the pools, raised 1.56 feet above its approved elevation. Other pools attained high water levels. The period of high water extended from June 11 to mid-July, when most waterfowl were in a nesting stage of development. Several heavy rains, and one or two severe hail storms augmented the unfavorableness of the period. (2)

It is believed, also, the high amount of precipitation occurring this summer has been a factor in enlarging waterfowl habitat in many areas surrounding the refuge, and it has spread waterfowl populations over a greater area than occurs in normal years.

Generally, there was little apparent preference by different duck species for specific areas on the refuge. There was some indication, however, for Blue-winged Teal to favor ditches, and for the few diving species present to prefer Webster Creek and Mud Lake pools. Due to the presence of mud flats in the Mud River Pool this year, Yellowlegs and other shore birds tended to favor this area. In August there appeared to be a concentration of male Mallards and Baldpates in the vicinity of Goose Island in the Mud Lake Pool. There was some evidence for the general duck population to prefer certain units more than others, when compared with distribution last year. It was felt general utilization in proportionate relation to a decrease in a total population was lower this year in the following units: Green Stump Pool, Headquarters Pool, CCC Pool, and Ditches. There appeared to be a slight increase in the utilization of Mud Lake and South pools.

2. Food and Cover

Aquatic food and cover follows much the same pattern this year as last year. Duckweed, Lemna minor and Lemna trisulca appeared later than usual, but it is now abundant in all pools and in most ditches. Various pondweeds, Potamogeton pectinatus, Potamogeton gramineus, Potamogeton perfoliatus, Potamogeton zosteriformis, and Potamogeton foliosus are found growing to a limited extent in most pool areas. Smartweed, Polygonum amphibium and Polygonum lapathifolium appear in a few areas in very small aggregations. Arrowhead, Sagittaria heterophylla is most in occurrence along ditches, but it is limited in quantity. There appears to be little or no wildrice, Zizania aquatica on the refuge this year, and a decrease in the amount of Giant burreed, Sparganium eurycarpum is in evidence. There is the usual large aggregations of Coontail, Ceratophyllum demersum and Watermilfoil, Myriophyllum. An increase in the amount of bulrush, Scirpus validus and Scirpus atrocinctus is noted. Cattail, Typha and Reed, Phragmites communis seem as abundant as ever. A greater amount of algae, especially in the Green Stump Pool and ditches, appeared this year, although it will apparently not be harmful to aquatics.

B. Upland Game Birds

1. Population and Behaviour.

The summer months are, without doubt, the most difficult period in which game bird population estimates can be attempted - this statement could also be applied to most any species of wildlife.

Adult birds are difficult to observe due to dense cover, moulting activities, or, in the case of maternal hens, they are keeping under cover a good part of the time with their young.

In general it is our opinion that the pheasant has very near disappeared from the area; sharptail grouse are about holding their own, Hungarians are extremely low, if present at all; prairie chicken are practically gone, and ruffed grouse are increasing somewhat.

2. We have limited areas of favorable ruffed grouse habitat, considering the entire refuge. There is an obvious lack of preferred foods in our extensive areas of willow and marsh lands. These birds are invariably observed in the mixed hardwood groves, or the aspen-balsam-poplar groves, providing the understory present offers such foods as fruit-bearing shrubs along with cover.

Favorable summer habitat for the sharptails is also present to some extent in the form of open meadows, refuge grain fields, etc. interspersed with patches of brush, and groves of the mixed-hardwood types.

The lack of extensive open areas, and grain fields (much of the refuge area having reverted to brush, or marsh types) reduces the attractiveness of the environment for the prairie chicken. There are no doubt other factors operating toward the decrease of the chicken population - perhaps over-hunting in the past, vulnerability to nesting losses by predators, too much civilization in adjacent areas, etc.

Recalling the Dakotas it is not difficult to understand why the pheasant is not prospering in this area. We do have grain fields, but they are not to be compared with those in the Dakotas. None of them exceed more than 150 acres in size, and the country in general is not open enough to permit the winds to blow them clean of snow. It is also possible that our cold wet springs, extending late into June at times have accounted for abnormal mortality in nests - several successive poor hatches could easily account for a large percentage of the potential crop of young birds, while severe winters, an annual hunting season in the vicinity, in the past, and only normal losses to predators, in our opinion have reduced the adult populations to the present "low".

3. Disease.

None in evidence.

c. Big Game Animals.

1. Population and Behaviour.

Deer

Observation of deer have been frequent this period, considering the heavy cover available at this time, and the fact that the does do not venture into open areas a great deal until the fawns are three or four months old. Of the does with young observed to date it is believed that the ratio of twins to singles is quite high this year. In fact we have seen very near as many twins as singles. Bucks are still in the velvet. All animals appear to be in excellent condition, although a few rather gaunt individuals were seen during early May. A number of spotted fawns, though of comparatively large size, have been observed this past week.

We are not attempting a numerical estimate at this time, but believe we are safe in predicting that the winter count (by plane) will show some increase over the 742 deer tallied during the early winter of 1947 - possibly up to 900.

2. Food and Cover

Frequent rains throughout the period have stepped up the growth of all types of vegetation. Brush areas, marsh areas, meadows, pastures, grain fields, abandoned fields, and the timbered groves have all shown abnormal growth. The rather extensive areas of volunteer clover (alsike, red, and sweet) along with scattered patches of alfalfa, vetch, and the native grasses, have provided near perfect summer foods for the deer. Without doubt, our deer herd should go into the winter in top shape. It is possible that the variety, extent, and high nutritive value of existing summer foods in the refuge area are important factors in the successful "wintering" of the deer herd - they should, as mentioned, enter the severe winter months in first class condition.

3. Disease

None in evidence.

Moose

Observations of moose, as per last year, are becoming more frequent as we approach the fall. Several groups of young and old bulls have been observed; one cow with twin calves was observed about 100 yards north of County Road "E" along our Secondary road. This cow with twins was in the same part of the refuge area as frequented during the winter by a cow with twin yearlings - could be the same cow with this year's crop. Fresh tracks of a large bull were observed next to the cement-mixer the morning after it was moved to the Webster Creek construction job site. Fresh tracks were also observed along County Road "E" several weeks back.

It is quite possible that there has been a limited movement of moose out of the refuge area since our winter census. Considering our last year's calf crop of 8 young, the 21 adults observed at that time, and this year's calves we believe the 1948 winter census should approach a total of 40 animals.

Limited studies to date are the basis for our beliefs that this area could easily support up to 50 head of moose, and it is our hope that the elements will permit such an increase.

3. Disease

None in evidence

D. Fur Animals, Predators, Rodents, and other Animals.

Coyote

Occasional observations and signs. Coyotes seem to range pretty much over the entire area, as there is no part of the refuge in which they have not been seen at one time or another. As yet we have had no complaints from neighboring farmers, and have observed no evidence of their work within the refuge. It is possible that removal of the 18 animals during the winter of 1946-47 reduced the population to a level where no more than average losses should be expected on game species.

Possible recommendations for further removals will be withheld until later in the fall.

Red Fox

The fox population is very low. Few animals have been observed, and it is only rarely that tracks or signs are located.

Black Bear

It is believed that we might possibly have several strays within the refuge area. At least 14 bear were shot in the vicinity of the refuge during the late summer and fall of 1946. A number of them were killed while in the act of robbing beehives, which are placed on certain farms by a commercial honey outfit. Evidence of at least one bear was observed several weeks back in the spruce-tamarack bog to the east of the Secondary Road - he had been feeding in a blueberry bush area. It is our opinion that control operations accomplished by the beex-men and neighboring farmers, during 1946 reduced the bear population considerably, and we look for little trouble from this year.

Raccoon

Evidence of this animal is noted fairly regularly along ditches and the shorelines and mud flats of most all pools. As yet, however, we do not believe the population to be too high, and for the time being control operations are not being considered. Presence of crayfish, snails, fish, and frogs in large numbers offer a first rate menu for the raccoon.

Skunk

This predator is still present in fairly large numbers, in spite of the removal program undertaken during the regular State trapping season in 1946-47. Authority was obtained from

the Service, and from the State for removal of this species during the period May 1, 1947 - December 31, 1947. It is expected that refuge personnel can accomplish good results in removal of this species later in the fall when the skunk increase his activities and general wanderings prior to denning up. We will, of course, make every effort to remove as many as possible during regular trapping operations, even though fur prices on this species are expected to hit a new low this fall.

Beaver

New houses and bank dens, along with continued activity in old houses are, we believe, good evidence of a healthy increase in the total population. An actual count of active houses and dens will be accomplished during the regular muskrat and beaver house airplane inventory. A substantial area of young aspen in close proximity to water areas well spread throughout the refuge area augurs well for a sustained beaver population. Removal of this species will not be attempted until such time as their activities on water control structures, and good evidence of a decreasing food supply is apparent.

Mink

Mink are holding up well in spite of annual removals of from 250-300 animals. It will again be necessary to reduce the mink population this fall as they are observed daily in all parts of the refuge area, and without doubt are obtaining a good part of their subsistence from game species - and muskrats.

Weasel

Quite common, and will again be included in the fur removal program.

Badger

Present, but not in large numbers. No control of this species is necessary at this time.

Porcupine

Twelve of these rodents were removed during last winter's mapping project, and it is believed that the refuge population has been reduced to a level where their damage to spruce and tamarack should not be severe for another year or two. The area will be checked again this year, and if our estimates prove in error, we will remove additional animals. The porcupine is very seldom observed outside of the coniferous areas.

Rabbits

Snowshoes, cottontails, and jackrabbits are all low in numbers. We do not believe there is any need for control of these animals at this time, and possibly not for several more years. A reasonable population serves as a "buffer" for the more valued game species - we would rather have the hawks, owls, coyotes, and fox feeding on rabbits than on waterfowl and upland game birds. It is possible that localized reduction of rabbits might be justified in the coniferous areas, at such time as noticeable damage to spruce and tamarack reproduction occurs.

Squirrels

Both red and grey squirrels are low in numbers. Red squirrels are observed only in the spruce, while the grey squirrels are observed only rarely in several of the mixed hardwood groves.

E. Predacious Birds, including Crows, Ravens, and Magpies

Crows

Crows were over-abundant on the refuge area from early spring to the present. Little time was available for intensive control efforts. Several attempts were made at shooting the birds by means of traveling refuge trails in areas of evident concentration - with little success. Several nests were destroyed. It is hoped that sufficient time will be available for removal of large numbers of crows beginning in early spring of 1948. Nest destruction (game birds) by crows was in evidence, but we had no time for undertaking studies for determining actual percentage of destruction.

Hawks

Our normal population of marsh hawks, and rough-leg hawks prevailed again during this period. Occasional observations of Cooper's Sparrow, and duck hawks were also recorded. Red-tailed hawks were also observed on occasions. We are certain we had a pair of nesting duck hawks - twice one of these birds was flushed from a freshly killed duck, and this in early summer.

Owls

Great-horned owls are present, but not in large numbers. One pair nested in the grove just north of the headquarters site. Short-eared owls are also observed on occasions and several Snowy owls were observed late in the spring.

Hawk or owl kills have been noted but we do not believe losses from these predators have been more than normal expected losses.

No ravens or magpies have been observed during this period.

F. Fish

Due to the fact that control gates, emptying surplus refuge waters into Thief River, have been open almost continually throughout the period, we are certain that refuge pools have been re-stocked with such species as northern pike, sheephead, bullheads, suckers, and some carp. Heavy migrations of young northern pike (from 6-10 inches) were noted several weeks back. These fish were attempting to pass up through the culvert controls - they resembled salmon in their attempts to leap through the fast waters, and often were from three to four feet out of the water. Sheephead up to 6-8 pounds are still at the control outlets. Thousands of small bullheads have been observed along certain sections of the pool shorelines.

III. REFUGE DEVELOPMENT MAINTENANCE

A. Physical Development

Following are listed progress and accomplishments for the period:

Construction

Madsen Dam - a six-bay stop-log control structure with overhead concrete driveway completed with exception of riprap at toe of apron, and sections of new dike on either end of the structure to be "dressed", and seeded.

The remaining work of adding 7,300 cubic yards of fill to the old Thief River and Ditch 11 spoil banks will be accomplished during May and June of 1948 - or before the end of the present fiscal year.

Northwest Dike - approximately 2,400 linear feet of dike rebuilt - this dike completed with exception of dressing and seeding. Drain culvert was renewed and boundary road repaired for traffic.

Northwest Open Spillway - This 100 foot new spillway (concrete wall and riprap on sub-base) completed with exception of 20 additional man-days for completing a section of riprap.

Both jobs will be completed prior to freeze-up this fall.

Mud River Culvert Control - footing, new sections of wingwalls, and new headwall all poured and forms removed. Remaining work consists of removing old riprap (using some of it for protection of wingwalls just constructed) and placing new fill to new grade.

Mud River Dike - Will be completed with dragline by September 15, providing we have good weather and no breakdowns.

Webster Cree Culvert Control - forms for footings completed and poured. Should complete pouring of new wingwalls and headwall by September 5.

Webster Creek Dike - dike raised to new grade. Dressing and seeding will be completed by September 15. This was a truck-haul job.

It may be possible to gravel the Webster Creek dike section prior to freeze-up, but graveling of the Mud River section will necessarily be delayed until late spring of 1948, due to fresh fill placed by the dragline this fall.

Raising of County Road "E" and improvement of the two miles of ditch through sections 25 and 30 in the northeast part of the refuge will be commenced by September 20 - we hope.

Maintenance

Buildings - Painted exterior of dragline shed, clerk's dwelling, bunkhouse, trim on Secondary residence, and fur shed (one coat aluminum, and two coats white). Painted kitchen and bathroom of manager's residence, and all trim in bedrooms and halls. Painted floor of service building, shop, and lightplant room. Cleaned walls and ceilings in clerk's residence and bunkhouse. Painted storm and screen windows of clerk's residence - also secondary residence. Oversize on South Mud Lake spillway dressed - culvert outlet cleaned with dragline.

Equipment - The following repair and maintenance work was accomplished on equipment this period:

Dragline - welded clutch band, welded bucket, installed new regulator, installed new tooth base, installed new clutch bands.

R-5 Caterpillar Tractor - complete carburetor overhaul

5-KW Light Plant - installed new head gasket and fan belt.

Power Mower - installed new lifting arm, knife heads, and guards.

Disc Plow - installed new spools spacer and bearings.

Cement Mixer - Straightened axle

Sand Lake Dump Truck - installed new head gasket, complete brake adjustment, and repaired gas tank.

Tamarac Dump Truck - Installed new condensor, new coil, and universal joint.

Mud Lake Dump Truck (06) - new timing gear and thrust plate.

Mud Lake Dump Truck (05) - rehoned brake drums, installed new brake shoes and muffler.

1938 Pick-up truck - installed new cylinder head, re-seated valves, and installed new exhaust valves, also new control set and condensor.

1939 Pick-up truck - installed new brake shoes, new front wheel assembly bearing, new muffler and tail pipe, pan gasket, and master cylinder.

1940 Pick-up truck - new transmission, new sealed beams, new king pins, steering sector unit, new shackles, turned armature, new bushing in starter, new wheel bearings, and new main leaves in front springs.

The above listed jobs consist of larger repairs accomplished, or repairs which consumed considerable time and meant delay in prosecution of construction projects. Smaller jobs such as ordinary brake adjustments, tightening, adjusting, greasing, servicing, washing, etc. have not been included. With operation of four dump trucks, one stake, three pickups, two tractors, dragline, scrapers, graders, farm tractor, mower, etc. in almost daily use much time is spent in keeping these units in operating condition.

Misceallaneous

Painted all marker posts from east to west boundary along County Road "E".

About 70% complete on renovation of fur shed - removed old partition, hung additional wires, moved in new furnace, built back entrance.

Re-lettered all signs (refuge recognition, etc.)

One swath on both sides of 24 miles of refuge roads and trails ~~mowed~~
graded.

Approximately 20 miles of main travelled roads and trails mowed.

One trip to Rice Lake Refuge for load of lumber.

One trip to Tamarac Refuge for dump truck, and also one return trip.

B. Plantings

1. Aquatics and marsh plants - nothing accomplished.
2. Tree and shrubs. - 500 Norway Spruce trees were planted by a local Boy Scout Troop to improve wildlife cover on the refuge. Refuge personnel supervised the planting. A survival of 85% of the plantings was found on August 21.
3. Upland herbaceous plants - nothing accomplished.
4. Cultivated Crops - Nine farming permits covering 1155 acres have been issued this year. Barley, flax, oats, proso millet, wheat, and corn are crops specified in cooperative agreements for planting. Not all of the 1155 acres, originally signed for farming, were planted due to excessive wetness of some of the areas. As one-third or one-fourth of the seeding will be left in the fields for the refuge share, the available food for waterfowl and upland game birds will be augmented.

Approximately two acres of fire-break were planted to barley and millet at the Secondary site - the planting was only partially successful due to excessive rainfall.

C. Collections

None

D. Receipts of Seed and Nursery Stock

A quantity of black spruce and Red Pine nursery stock - mostly 3-0 was obtained without charge from the Red Lake Indian Reservation. In general the stock was in poor condition. The plants had never been removed from the original seed beds and root development was very poor.

IV. ECONOMIC USE OF REFUGE

A. Grazing

Five grazing permits have been issued. These cover 528 animal use months. The grazing period extends from June 15 to November 15. The animal units are composed of both beef and dairy cattle. Although all grazing units approved in the Economic Use Plan are now being utilized, undergrazing is clearly prevalent, as it has been estimated the units could carry 2, 775 A.U.M. without damage from overgrazing. No conflicts have been observed between grazing livestock and wildlife. Rates of 50¢ per head per month for adults, 35¢ per head per month for yearlings, and no charge for calves running with their mothers have been stipulated in each permit.

B. Haying

This period contrasted with the corresponding period for 1946 indicates the number of applications made for hay are more than doubled. Eight permits entailing an estimated 255 tons of hay were in effect last year compared with eighteen permits covering the harvest of approximately 1155 tons issued for this year.

The increase demand for hay came as the result of greater availability of farm labor, decreased hay yields on some farms due to excessive rainfall, cultivation of pasture lands for growing flax, and possibly an increase in farmer's herds. Quackgrass dominates the composition of the hay harvested, with Redtop, Kentucky bluegrass, and Brome grass being present to some degree. Redtop is probably more prevalent than either Kentucky bluegrass or Brome grass. Two species of Brome grass are present, Bromus inermis and Bromus Ciliatus. Bromus inermis is the more common. In a very few areas Agropyron Smithii Rydd and Calamagrostis inexpansa are present in limited degree. Benefits accruing to wildlife from hay removal lie almost completely in retarding the natural vegetative sequence of hay lands, creation of additional "edge" or periphery, and prevention of the areas reverting to solid stands of shrubs and trees.

E. Haying and Grazing

Two permits have been issued for combination haying and grazing on units approved in the Economic Use Plan. This use is designed to utilize certain areas having low value under the regular haying and grazing permits. The use will aid in keeping the areas in a more favorable vegetative sequence for wildlife. Acreages included are two 80-acre tracts. Each permit is written on an annual basis, entailing a payment of \$20.00 per annum.

Harvesting and Removal of Seed

Six permits have been issued this year for the removal of approximately 4,000 lbs. of Sweet Clover seed, and 1,000 lbs. of Alsike seed. Proceeds from the sale of the seed will be split 50-50 between the cooperator and government.

Wood Cutting

One wood cutting permit entailing the removal of ten cords of dead and down timber has been issued.

Bee Keeping

The first bee keeping permit was issued this year. It covers placement of 400 bee hives on the refuge at 10¢ per hive.

It is quite possible that pollination activities of the domestic bee might result in greater yields of clover, and increase natural propagation of fruit bearing shrubs.

VI. PUBLIC RELATIONS

A. Recreational Uses

None permitted on this area as a general rule.

B. Refuge Visitors

| <u>Name</u> | <u>Official Capacity</u> | <u>Date</u> | <u>Purpose of Visit</u> |
|--------------------------|------------------------------------|-------------|--------------------------|
| F. C. Gillett | Regional Supervisor | May 22-23 | Inspection |
| A. Huey | Regional Engineer | May 22-23 | Inspection |
| L. Longley | Regional Engineer | July 9 | Inspection |
| W. Athernecht | C.O. Special Use | July 9-10 | Inspection (special use) |
| Felix Clett | State Warden | July 24 | Cooperation |
| Mr. & Mrs. Russell Mason | Ex. Director Mass. Audubon Society | July 28-29 | Checking bird life |
| A. Huey | Regional Engineer | Aug. 3-4 | Inspection |
| Mr. Bjertness | County Commissioner | Aug. 6 | Coop ditch work |
| Dr. Wm. Marshall | Prof. Wildlife management | Aug. 25 | Visiting refuge |
| U. of Minn. Students | U. of Minn. | Aug. 25 | Visiting refuge |
| Dr. Bratrud | Pres. N.W. Sportsmen Assn. | Aug. 14 | Refuge Radio program |

Visitors, sightseers from 100 - 150
(other than local)

Local farmers, visitors, etc. from 50 - 100

C. Refuge Participation

Participation of refuge personnel in outside activities related to wildlife work has been limited to showing of Service films at Sportsmen Clubs.

The films "Fighting Brush and Grass Fires", and "Haunts of the Hunted" were shown to the Holt Sportsmen, with about 120 attending, to the Grygla Sportsmen, with 125 attending.

These films were also taken for a scheduled showing at the Middle River Sportsmen Club hall, but due to failure of the projector, it was impossible to show the pictures.

D. Hunting

None permitted on the refuge.

E. Fishing

None permitted on the refuge.

F. Violations

None to our knowledge, with the exception of illegal entry of three individuals from a nearby town who were looking for fishing waters. They were evicted and warned.

VII. OTHER ITEMS

A. Items of Interest

During the month of May the immediate headquarters site seemed to be unusually attractive for a great variety and number of birds. Within several hundred feet of the headquarter building group we had the following:

Several crow's nests (destroyed later); an active ruffed grouse drumming log; nest of a blue-winged teal, a mixed group of tree swallows, cliff swallows, barn swallows, and purple martins, flickers, robins, bluebirds, wrens, Baltimore Orioles, starlings, English sparrows, red-winged blackbirds, yellow-headed blackbirds, yellow warblers, black-poll warblers, and at least 6-8 other species of warblers we did not identify, brown thrasher, white-throat sparrow, wood pee-wee. The various

species of swallows nested on buildings or in trees in large numbers. Other birds mentioned, and still other species of "dickey" birds that were not identified nested in the immediate site, although actual nests, in all cases, were not discovered.

The continuing steady rains, and subsequent high water levels in refuge impoundments, had the makings of a general campaign by local farmers, against the refuge pool system.

We expected complaints along the line experienced in the past, when heavy rains flooded out crops in this general area. Refuge personnel were agreeably surprised when the complaints failed to materialize.

It now appears that the general opinion of most farmers in the vicinity is to the effect that the refuge pools acted as storage reservoirs, which absorbed the real peak of the flood waters, and actually prevented serious flooding of lands to the west and south of the refuge boundaries.

Several farmers also remarked that the vast areas of peat within the refuge, and east of the refuge boundaries acted as a large sponge, and helped in knocking down the peak flood waters by absorbing a considerable quantity of water.


During the last week in August we observed a rather considerable flock of Tree Swallows. The birds were perched on telephone lines between the headquarters and secondary sites, and were lined up side by side for a distance of 20 spans on both wires. Figuring approximately five birds to the linear foot a total of about 25,000 birds made up this one flock. We are not too certain as to the fall migration of this species, but we are fairly certain that the great majority of these birds were adults with young raised within refuge boundaries. We base this opinion on the fact that tree swallows in large numbers utilize the refuge area throughout the entire summer - they are observed in all parts of the refuge from the more remote sections of Webster Pool to the immediate building site at headquarters.

We might also add that Mr. Russell Mason, Executive Director of the Massachusetts Audubon Society spent two days on the refuge and was very much impressed by the number and variety of resident birds within the refuge boundaries.

APPROVED:


Rufus B. Smith
REGIONAL DIRECTOR

SEP 18 1947


Robley W. Hunt
Refuge Manager

See Appendix P. 21

WATERFOWL

 Refuge Mad Lake Months of May to August 1947

| (1) Species Common Name | (2) First Seen | | (3) Peak Concentration | | (4) Last Seen | | (5) Young Produced | | (6) Total |
|------------------------------------|-------------------|---------|---------------------------|--------------|------------------|---------|-----------------------|-----------------|----------------------|
| | Number | Date | Number | Date | Number | Date | Broods Seen | Estimated Total | Estimated for Period |
| I. <u>Swans:</u> Whistling swan | | | | | 3 | 5/8/47 | * | | None |
| II. <u>Geese:</u> Canada goose | | | | | | | | | None |
| Cackling goose | | | | | | | | | None |
| Brant | | | | | | | | | None |
| White-fronted goose | | | | | 2 | 5/10/47 | | | None |
| Snow goose | | | | | | | | | None |
| Blue goose | | | | | 8-12 | 5/22/47 | | | None |
| III. <u>Ducks:</u> Mallard | | | | | still here | | | 3,300 | 18,200 |
| Black duck | | | | | " " | | | | 50 |
| Gadwall | | | | 5/8--5/25/47 | " " | | | | 1,500 |
| Baldpate | | | | | still here | | | 100 | 2,500 |
| Pintail | | | | | " " | | | 200 | 1,100 |
| Green-winged teal | 2 | 5/9/47 | | | " " | | | | 50 |
| Blue-winged teal | | | | 5/8--5/15/47 | " " | | | 1,600 | 3,200 |
| Cinnamon teal | | | | | " " | | | 100 | 200 |
| Shoveller | | | | | " " | | | | 100 |
| Wood duck | 2 | 5/6/47 | | | " " | | | 100 | 100 |
| Redhead | 4 | 5/23/47 | | | " " | | | 100 | 100 |
| Ring-necked duck | | | | | " " | | | | 20 |
| Canvas-back | | | | | " " | | | | 50 |
| Scaup | | | | | | | | | 100 |
| Golden-eye | | | | | 6-10 | 5/12/47 | | | 40 |
| Buffle-head | | | | | 2 | 5/12/47 | | | 50 |
| Ruddy duck | | | | | 2 | | | | 100 |
| Unidentified | | | | | | | | | 3,000 |
| IV. <u>Coot:</u> | | | | | | | | | 100 |

* See detailed report on waterfowl census in Appendix

 Note: This report applies to utilization over period. The detailed report covers only resident birds
in evidence during July and August

SUMMARIES

Total Production:

Geese None
 Ducks 5,600
 Coots 60

Total waterfowl usage during period 30,260
 Peak waterfowl numbers 30,260
 Areas used by concentrations S. E. Part of Mud Lake - coots
mallards; Madsen (N.E.) bluewinged teal, mallard
 Principal nesting areas this season Almost any area

Reported by _____

INSTRUCTIONS

- (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) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.
- (3) Peak Concentration: 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 in the reporting period.
- (5) Young Produced: 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.
- (6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

Form NR-1A
(Nov. 1945)

Refuge Mud Lake

Months of May to August 1947

| (1) Species | (2) First Seen | | (3) Peak Numbers | | (4) Last Seen | | (5) Production | | | (6) Total |
|--|-------------------|---------|---------------------|--------------|------------------|---------------|-------------------|---------------|-------------|------------------|
| Common Name | Number | Date | Number | Date | Number | Date | Number Colonies | Total # Nests | Total Young | Estimated Number |
| I. Water and Marsh Birds: | | | | | | | | | | |
| Common Loon | * 2 | 5/11/47 | | | | | | | | 2 |
| Holboell's Grebe | | | | | Still here | | | | | 50 |
| Horned Grebe | | | | | " | " | | | | 100 |
| Eared Grebe | 6 | 5/9/47 | 10-15 | 5/9--5/15/47 | " | " | | | | 20 |
| Pied Billed Grebe | | | | | " | 2 | | | | 300 |
| White Pelican | 3 | 5/21/47 | | | 3 | 5/21/47 | | | | 3 |
| Double-crested Cormorant | | | | | still here | | | | | 50 |
| Great Blue Heron | | | | | " | " | | | | 300 |
| Black-Crowned night heron | 1 | 5/19/47 | | | " | " | | | | 10 |
| American Bittern | | | | | " | " | | | | 20 |
| Sora | | | | | " | " | | | | |
| Hooded Merganser | | | | | " | " | | | | 20 |
| Red-breasted Merganser | | | | | " | " | | | | 20 |
| * May be nesting near Whiskey Lake | | | | | | | | | | |
| II. Shorebirds, Gulls and Terns: | | | | | | | | | | |
| Semi Palmated Plover | 6 | 5/23/47 | | | | | | | | 10-20 |
| Killdeer | | | | | | | | | | 20-40 |
| Woodcock | | | | | | | | | | 10-20 |
| Wilson's Snipe | | | | | | | | | | 20-40 |
| * Spotted Sandpiper | | | | | | | | | | 50-100 |
| * Greater Yellowlegs | | | | | | | | | | 50-100 |
| * Lesser Yellowlegs | | | | | | | | | | 30-50 |
| * Least Sandpiper | 10-15 | 5/20/47 | | | | | | | | 40-50 |
| * Long-billed Dowitcher | | | | | | | | | | 40-60 |
| Northern Phalarope | 40-50 | 5/20/47 | | | | | | | | 50-100 |
| Herring Gull | | | | | | | | | | 8-10 |
| Ring-billed Gull | | | | | 2 | 5/13/47 | | | | 20-30 |
| ** Franklin's Gull | | | | | 3,000 | 6/10--6/20/47 | | | | 3,000 |
| Common Tern | | | | | | | | | | 20 |
| *** Black Tern | 20-30 | 5/25/47 | 3,000 | 7/1--8/20/47 | | | | | | 3,000 |
| *** Only a few left - big majority left by August 20 | | | | | | | | | | |
| ** All left after pool levels raised | | | | | | | | | | |
| * Returned to refuge during period July 20-25 and are still here | | | | | | | | | | |

| (1) | (2) | (3) | (4) | (5) | (6) |
|-----------------------------------|-----|-----|------------|-----|----------|
| III. Doves and Pigeons: | | | | | 10-20 |
| Mourning dove | | | | | |
| White-winged dove | | | | | |
| IV. Predaceous Birds: | | | | | |
| Golden eagle | | | | | 2 |
| Duck hawk | | | still here | | 1 |
| Horned owl | | | | | |
| Magpie | | | | | |
| Raven | | | | | |
| Crow | | | still here | | 400 |
| Sharp-shinned Hawk | | | " " | | Rare |
| Cooper's Hawk | | | " " | | " |
| Eastern Red-tailed Hawk | | | " " | | " |
| American Rough-leg | | | " " | | Abundant |
| Marsh Hawk | | | " " | | " |
| Eastern Pigeon Hawk | | | " " | | Rare |
| Eastern Sparrow Hawk | | | " " | | " |
| Reported by <u>Robley W. Hunt</u> | | | | | |

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.

Refuge Mud Lake Months of May to August, 194⁷

| (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'vd. Estimated Total | Percentage | Hunting For Re- stocking For Research | Estimated number using Refuge | Pertinent information not specifically requested. List introductions here. |
| Ruffed grouse Prairie Chicken Sharptail Grouse Pheasant | | | | | | 260 8-12 200-300 8-12 | Random observations as against the winter's strip census results |
| <p>It has been impossible to attempt a systematic strip census such as was accomplished this past winter. It is also a fact that censusing of upland game birds during the summer months is practically impossible, by any known methods, and expecting any degree of accuracy in results. Therefore, we are simply indicating gross estimates, based on data obtained in the winter's strip surveys, random observations, and expected losses.</p> <p>We might also mention that until such time as a fairly intensive cover survey can be completed, we can provide nothing very accurate in the way of acreages of cover types. This area has changed to extremes since establishment of the refuge.</p> | | | | | | | |

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

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

REFUGE GRAIN REPORT

Refuge Mud Lake

Months of May thru August 194 7

| (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 USE | | |
|----------------|--|-------------------------------------|--------------|--------------------------|--------|-----|-------|------------------------------------|---------------------|------|-------|
| | | | | TRANS- FERRED | SEEDED | FED | TOTAL | | SEED | FEED | SURP. |
| Barley | 25 | | 25 | | | | | 25 | | 25 | |
| Spelts | 25 | | 25 | | | | | 25 | | 25 | |

- (8) Indicate shipping or collection points.....
- (9) Grain is stored at Mud Lake Headquarters site
- (10) Remarks Above grain on hand is of inferior germination quality and is only suitable as feed.

NR-8a

REFUGEE GRAIN REPORT

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

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)--55 lbs., Corn (ear)--70 lbs., Wheat--60 lbs., Barley--50 lbs., Rye--55 lbs., Oats--30 lbs., Soy Beans--60 lbs., Millet--50 lbs., Cowpeas--60 lbs., and Mixed--50 lbs. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately: Corn, wheat, proso millet, etc. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share-cropping, or harvest from food patches.
- (4) A total of Columns 2 and 3.
- (6) Column 4 less Column 5.
- (7) This is a proposed breakdown by varieties of grain listed in Column 6.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters grainary", etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

(8) Indicate shipping or collection points

(9) Grain is stored at

(10) Remarks Above grain on hand is of inferior condition quality and is only suitable as food.

APPENDIX

WATERFOWL CENSUS SUMMER 1947

Censusing waterfowl populations and production on the Mud Lake Refuge was made complex and difficult this summer by two factors, namely, (1.) The beginning of duck nestings came about almost one month later than in normal years due to a delayed spring breakup. (2.) High water levels prevailed from June 11 to mid-July, destroying many nests and causing shifts in populations.

Although Mallards and Pintails appeared on the refuge April 2, a severe freeze commenced April 5, closing all water openings and forcing the birds out of the area. They did not begin to reappear until April 14. This compares with the first appearance of waterfowl on March 19 in 1946. The late arrival of waterfowl, of course, delayed nesting attempts. The first brood of Mallards was not observed until June 14, approximately three weeks later than the first brood observation made in 1946. It is believed low populations of Coot, Blue-winged Teal, and Ruddy duck may be attributed in part to a late spring break-up.

As a result of flood conditions caused by heavy rainfall in areas draining into the refuge water system, various pool levels began raising June 11, when waterfowl nesting was most prevalent. The Mud Lake Pool raised to an elevation of 1142.56, 1.56 feet above its approved elevation. Other pools attained high water levels. Due to an extended rainy period the pools did not recede to normal until mid-July. Although high priority of other refuge work prevented collection of specific data relative to destruction of duck nests by flooding, it is believed a very high percentage of nests were destroyed. A Franklin's Gull colony comparable in number to 10,000 birds estimated for 1946 was on the refuge prior to high water levels. A check of their former nesting site in mid-July, however, revealed the presence of no nests and observations indicate a present population of a mere 100 birds. This is a 99 per cent decrease from the population estimate for 1946.

The two weather factors have been operative in producing many late duck broods, and in extending and leveling the normal production curve for broods. In normal years it is believed there are two peaks in brood production, that is, there is an optimum period for obtaining high counts of broods from such early nesting species as Mallards and Pintails followed by a second optimum period for securing high counts of broods from late nesting species such as Blue-winged Teal. This year the two peaks were much less in evidence. The high in both Mallard and Blue-winged Teal brood production came the first week in August. As an abnormally high concentration of male Mallards

and other species was observed in the vicinity of Goose Island in the Mud Lake Pool located off the census routes at this time, there existed a definite need for separate censuses to ascertain the adult duck population and number of broods produced.

It was decided to use population estimates made in the summer of 1946 as a criterion for determination of relative decreases and increases, and to apply as closely as possible the same census technique used in the summer of 1946. Accordingly, a Waterfowl census was taken July 15 and 16 to coincide in time with the 1946 census. The census was identical in technique and routes travelled as the 1946 census. Another similar census was conducted on August 5 and 6.

The data compiled indicate generally a high in adult population in the July census, and a high in number of broods observed in the August census. In compiling Total Population Estimated For August 1947 in Tabulation No. 2 and Total Population in Tabulation No. 7 an attempt was executed to utilize both the July and August censuses, plus random field observations. The completed estimate entails the Total Population Estimated For July 1947 plus the total number of young secured in the August census minus the total number of young obtained in the July 1947 census. In order to rectify the major defects of the census technique; namely, the extremely low per cent of area actually covered, and the lack of obtaining a standard computation factor to suffice for all units, random field observations were used to modify some of the computed estimates which were believed to be in obvious error.

It will be noted under Total Population Observed in Tabulations Nos. 1 and 2, 470 birds were counted in the July census with a computed population of 29,974 and the August census reveals 471 birds recorded with a computed population of only 21,841. This discrepancy is caused by the manner in which the data is compiled. The per cent of increase or decrease for each species was obtained on the basis of difference in total population observed on the total length of strip for all ten units, whereas the 1946 census was formulated on the basis of separate computations for each of ten units, possessing different computation factors. The per cent of increase or decrease in population for each species was applied directly to the total of computations made for each species in the 1946 census to derive a computed estimate for 1947.

The major defects cited for the 1946 census, of course, apply also to this census. Although final estimates are in harmony with random field observations, the low per cent of area covered and lack of a standard computation factor to suffice for all units, relieves the census of a purely mathematical significance acquired by approved census techniques. Restricted time for census work and non-availability of a canoe

to facilitate lengthening census strips prevented rectification of the census defects.

The census does, however, emphasize a number of population trends. These trends may be grouped into two categories; namely, apparent trends and implied trends.

Apparent trends are grouped to be the least polemic. Each trend is verified by all three aids used in the formulation of population estimates. The three aids comprise the two censuses and random field observations. A list of these trends follow:

- (1) The total duck population shows a decided decrease.
- (2) Similar to the 1946 census Mallards were the most abundant duck species on the refuge, with Blue-winged Teal second in abundance.
- (3) Duck species revealing the greatest decrease in numbers are Blue-winged Teal, Shoveller, and Ruddy duck.
- (4) The high in brood production came the first week in August this year compared with mid-July for last year.
- (5) There has been an increase in the Baldpate population.
- (6) Black Duck, Green-winged Teal, Wood Duck, Redhead, Ring-necked Duck, Lesser Scaup, and Ruddy Duck are extremely low in numbers.
- (7) The Coot population dropped from an estimated 3,350 birds in the 1946 census to a point of rare observation. With little doubt there has been more than a 90 per cent decrease in this species.
- (8) No geese are present on the refuge area.
- (9) Cormorants, Mergansers, Bitterns, Black-crowned Night herons, and shore birds are low in numbers.

Implied trends include those trends selected by a literal but limited interpretation of compiled census data. A list follows:

- (1) The average number of young per duck brood is 6.5 compared with 6.7 for 1947 ¹⁹⁴⁶
- (2) Per unit of population the decrease in Blue-winged Teal production was less than in Mallard production.

- (3) The total duck population is down 31 per cent.
- (4) Total other waterfowl population is down 74 per cent.
- (5) Total production of young ducks is down 73 per cent. ✓

| | WATERFOWL CENSUS JULY 1947 | | | | | | | |
|---------------------------|--|-----------|-------------------|-------------------|--|------------|---|------------|
| | Total Population Observed (in strip census) | | | | Total Population computed (based on strip census) | | Total population Estimated (strip census & random observ.) | |
| | July 1946 | July 1947 | Per Cent Increase | Per Cent Decrease | July, 1946 | July, 1947 | July, 1946 | July, 1947 |
| | | | | | | | | |
| Common Mallard | 384 | 329 | | .14 | 22,946 | 19,734 | 22,900 | 14,900 *1 |
| Common Black Duck | 1 | | | | 3 | | 50 | 20 |
| Gadwall | 18 | 18 | | | 2,519 | 2,619 | 2,500 | 1,500 *2 |
| Baldpate | 17 | 19 | .12 | | 1,046 | 1,172 | 1,050 | 1,500 |
| Green-winged teal | | | | | | | 50 | 50 |
| Blue-winged teal | 144 | 37 | | .74 | 6,197 | 1,611 | 6,200 | 1,600 |
| Shoveller | 29 | | | | 5,229 | 911 | 3,000 | 50 *3 |
| American Pintail | 20 | 11 | | .45 | 1,656 | 911 | 1,650 | 900 |
| Wood Duck | 1 | | | | 62 | | 60 | 10 *4 |
| Redhead | | 4 | | | | 190 | 70 | 200 *5 |
| Ring-necked duck | | 7 | | | | 925 | | 500 *5 |
| Lesser Scaup duck | | | | | | | 30 | 50 *6 |
| Ruddy duck | 3 | 5 | .67 | | 73 | 122 | 120 | 100 |
| Unidentified | 88 | 40 | | .55 | 6,200 | 2,790 | 6,200 | 2,800 |
| TOTAL | 705 | 470 | | .35 | 45,931 | 29,974 | 43,880 | 24,180 |
| Horned Grebe | 5 | 5 | | | 239 | 239 | 100 | 100 |
| Pied billed Grebe | 23 | 1 | | .96 | 411 | 16 | 400 | 20 |
| Franklin's Gull | | | | | | | 10,000 | 100 |
| Black Tern | | | | | | | 2,000 | 3,000 |
| Double-crested Cormorant | 2 | 2 | | | 350 | 350 | 50 | 50 |
| Red-breasted Merganser | 2 | | | | 125 | | 20 | |
| American Bittern | 5 | | | | 149 | | 200 | 10 |
| Great blue heron | 5 | 1 | | .80 | 448 | 90 | 450 | 100 |
| Black-crowned night heron | 1 | | | | 62 | | 150 | 10 |
| American Coot | 128 | 8 | | .94 | 3,356 | 201 | 3,350 | 200 |
| Spotted Sandpiper | 1 | | | | 48 | | 250 | 10 |
| Lesser Yellowlegs | 24 | | | | 2,036 | | 1,000 | 10 |
| TOTAL | 196 | 17 | | .91 | 7,224 | 896 | 17,970 | 3,610 |
| TOTAL DUCKS | 705 | 470 | | | 45,931 | 29,974 | 43,880 | 24,130 |
| GRAND TOTAL | 901 | 487 | | .42 | 53,155 | 30,870 | 61,850 | 24,740 |

*1. Population reduced due to an abnormal high aggregation of mallards on the Mud Lake Pool Census strip.

*2. Population reduced based upon random field observations

*3. Included on basis of random field observations

*4. Included on basis of random field observations

*5. Population reduced based upon random field observations

*6. Included on basis of random field observations

WATERFOWL CENSUS AUGUST 1947

| SPECIES | Total Population Observed (In strip census) | | | | Total Population Computed (Based on Strip Census) | | Total Population Estimated (Based on Strip Census & Random Observations) | |
|---------------------------|--|--------|----------|----------|--|-------------|--|-------------|
| | July | August | PER CENT | | July 1946 | August 1947 | July 1946 | August 1947 |
| | 1946 | 1947 | Increase | Decrease | | | | |
| Common Mallard | 384 | 256 | | .33 | 22,946 | 7,572 | 22,900 | 18,200 |
| Common Black Duck | 1 | 1 | | | 3 | 3 | 50 | 50 |
| Gadwall | 18 | 16 | | .11 | 2,519 | 2,242 | 2,500 | 1,500 |
| Baldpate | 17 | 78 | 359 | | 1,046 | 4,801 | 1,050 | 2,500 |
| Green-winged teal | | | | | | | 50 | 50 |
| Blue-winged teal | 144 | 75 | | .48 | 6,197 | 3,222 | 6,200 | 3,200 |
| Shoveller | 29 | 9 | | .69 | 5,229 | 1,621 | 3,000 | 200 |
| American Pintail | 20 | | | | 1,656 | | 1,650 | 1,000 |
| Wood duck | 1 | 6 | 500 | | 62 | 310 | 60 | 100 |
| Redhead | | | | | | | 70 | 100 |
| Ring-necked duck | | | | | | | | 100 |
| Lesser Scaup | | | | | | | 30 | 50 |
| Ruddy duck | 3 | 1 | | .67 | 73 | 24 | 120 | 50 |
| Unidentified | 88 | 29 | | .67 | 6,200 | 2,046 | 6,200 | 3,000 |
| TOTAL | 705 | 471 | | .52 | 45,931 | 21,841 | 43,880 | 30,100 |
| Horned Grebe | 5 | 3 | | .40 | 239 | 143 | 100 | 100 |
| Pied-billed Grebe | 23 | 16 | | .30 | 411 | 288 | 400 | 300 |
| Franklin's Gull | | | | | | | 10,000 | 100 |
| Black Tern | | | | | 250 | | 2,000 | 3,000 |
| Double-Crested Cormorant | 2 | | | | 350 | | 50 | 50 |
| Red-breasted Merganser | 2 | | | | 125 | | 20 | 20 |
| Hooded Merganser | | 1 | | | | 3 | | 20 |
| American Bittern | 5 | | | | 149 | | 200 | 20 |
| Great Blue-Heron | 5 | 4 | | .20 | 448 | 358 | 450 | 300 |
| Black-crowned Night Heron | 1 | | | | 62 | | 150 | 10 |
| American Coot | 128 | 4 | | .97 | 3,356 | 101 | 3,350 | 100 |
| Sandpiper | 1 | | | | 48 | | 250 | 200 |
| Yellowlegs | 24 | 10 | | .58 | 2,036 | 855 | 1,000 | 100 |
| Unidentified Shore Birds | | 6 | | | | 288 | | 300 |
| TOTAL | 196 | 44 | | .72 | 7,224 | 2,036 | 17,970 | 4,620 |
| TOTAL DUCKS | 705 | 491 | | .52 | 45,931 | 21,841 | 43,880 | 30,100 |
| GRAND TOTAL | 901 | 515 | | .55 | 53,155 | 23,877 | 61,850 | 34,720 |

WATERFOWL CENSUS JULY, 1947
Number of Broods by Age Class

| | Observed | | | | | | | | Percent Decrease | Computed | | | | | | | |
|-------------------|------------|----|-----|-------|------------|----|-----|-------|---------------------|------------|-----|------|-------|------------|----|-----|-------|
| | July, 1946 | | | | July, 1947 | | | | | July, 1946 | | | | July, 1947 | | | |
| | Age Class | | | Total | Age Class | | | Total | | Age Class | | | Total | Age Class | | | Total |
| | I | II | III | | I | II | III | | | I | II | III | | I | II | III | |
| Common Mallard | 2 | 9 | 12 | 23 | 4 | | | 4 | .83 | 51 | 642 | 731 | 1424 | | | 242 | |
| Common Black Duck | | | | | | | | | | | | | | | | | |
| Gadwall | | | | | | | | | | | | | | | | | |
| Baldpate | | | 1 | 1 | | | | | | | | 45 | 45 | | | | |
| Blue-winged teal | 6 | 2 | 1 | 9 | | | | | | 195 | 50 | 48 | 293 | | | | |
| Shoveller | 2 | | 1 | 3 | | | | | .50 | 597 | | 3 | 600 | | | | |
| American Pintail | | 1 | 1 | 2 | | | 1 | 1 | .50 | 175 | | 2 | 177 | | | 88 | |
| Wood duck | | | | | | | | | | | | | | | | | |
| Ruddy Duck | | | | | | | | | | | | | | | | | |
| Unidentified | 3 | 1 | 3 | 7 | | | | | | 121 | 48 | 245 | 414 | | | | |
| TOTAL | 13 | 13 | 19 | 45 | 4 | | 1 | 5 | .89 | 1139 | 740 | 1074 | 2953 | | | 330 | |

WATERFOWL CENSUS AUGUST 1947
Number of Broods by Age Class

| | Observed | | | | | | | | Computed | | | | | | | |
|-------------------|------------|----|-----|-------|--------------|----|-----|-------|------------|------|-----|-------|--------------|-----|-----|-------|
| | July, 1946 | | | | August, 1947 | | | | July, 1946 | | | | August, 1947 | | | |
| | Age Class | | | Total | Age Class | | | Total | Age Class | | | Total | Age Class | | | Total |
| | I | II | III | | I | II | III | | I | II | III | | I | II | III | |
| Common Mallard | 2 | 9 | 12 | 23 | 2 | | 5 | 7 | | | | | 51 | 642 | 731 | 1424 |
| Common Black Duck | | | | | | | | | | | | | | | | |
| Gadwall | | | | | | | | | | | | | | | | |
| Baldpate | | | 1 | 1 | | | | | | | | 45 | 45 | | | |
| Blue-winged teal | 6 | 2 | 1 | 9 | 2 | 1 | 5 | 8 | .11 | 195 | 50 | 48 | 293 | | | 261 |
| Shoveller | 2 | | 1 | 3 | | | 1 | 1 | .67 | 597 | | 3 | 600 | | | *198 |
| American Pintail | | 1 | 1 | 2 | | | | | | 175 | | 2 | 177 | | | |
| Wood duck | | | | | | | | | | | | | | | | |
| Ruddy Duck | | | | | | | | | | | | | | | | |
| Unidentified | 3 | 1 | 3 | 7 | 1 | | | 1 | .86 | 121 | 48 | 245 | 414 | | | 58 |
| TOTAL | 13 | 13 | 19 | 45 | 5 | 1 | 11 | 17 | .68 | 1139 | 740 | 1074 | 2953 | | | 944 |

*Random field observations indicated number of broods of Shoveller was considerable less than the computed 198

| WATERFOWL CENSUS JULY, 1947 | | | | | | | | | | | | | |
|------------------------------|------------|----|-----|-------|------------|----|-----|----------------------|------------|-----------|------|-------|------------|
| Number of Young by Age Class | | | | | | | | | | | | | |
| | Observed | | | | | | | Per Cent Decrease | Computed | | | | |
| | July, 1946 | | | | July, 1947 | | | | July, 1946 | | | | July, 1947 |
| | Age Class | | | Total | Age Class | | | | Total | Age Class | | | Total |
| | I | II | III | | I | II | III | | | I | II | III | |
| | | | | | | | | | | | | | |
| Common Mallard | 18 | 56 | 76 | 150 | 27 | | 27 | .82 | 319 | 4000 | 5055 | 9374 | 1,687 |
| Common Black Duck | | | | | | | | | | | | | |
| Gadwall | | | | | | | | | | | | | |
| Baldpate | | | 7 | 7 | | | | | | 315 | 315 | | |
| Blue-winged teal | 43 | 14 | 4 | 61 | | | | | 1428 | 391 | 192 | 2011 | |
| Shoveller | 15 | | 11 | 26 | | | | | 4600 | | 29 | 4629 | |
| American Pintail | | 7 | 7 | 14 | | 6 | 6 | .57 | 1225 | | 18 | 1243 | 534 |
| Wood duck | | | | | | | | | | | | | |
| Ruddy duck | | | | | | | | | | | | | |
| Unidentified | 23 | 8 | 16 | 47 | | | | | 804 | 383 | 1830 | 3017 | |
| TO TAL | 99 | 85 | 121 | 305 | | 33 | | .89 | 8376 | 4774 | 7439 | 20589 | 2221 |

| SPECIES | WATERFOWL CENSUS AUGUST 1947 | | | | | | | | | | | |
|-------------------|------------------------------|----|--------------|-----|-----------|----|-------|-----|------------|-------|--------------|------|
| | Number of Young by Age Class | | | | | | | | | | | |
| | Observed | | | | | | | | Computed | | | |
| | July, 1946 | | August, 1947 | | | | | | July, 1946 | | August, 1947 | |
| | Age Class | | Total | | Age Class | | Total | | Age Class | | Total | |
| | I | II | III | | I | II | III | | I | II | III | |
| Common Mallard | 18 | 56 | 76 | 150 | 16 | | 37 | 53 | | | | |
| Common Black Duck | | | | | | | | | | | | |
| Gadwall | | | | | | | | | | | | |
| Baldpate | | | 7 | 7 | | | | | | | 315 | 315 |
| Blue-winged teal | 43 | 14 | 4 | 61 | 13 | 7 | 28 | 48 | .21 | 1428 | 391 | 192 |
| Shoveller | 15 | | 11 | 26 | | | 8 | 8 | .69 | 4600 | | 29 |
| American Pintail | | 7 | 7 | 14 | | | | | | 1225 | | 18 |
| Wood Duck | | | | | | | | | | | | |
| Ruddy duck | | | | | | | | | | | | |
| Unidentified | 23 | 8 | 16 | 47 | 1 | | | 1 | .98 | 804 | 383 | 1830 |
| TOTAL | 99 | 85 | 121 | 305 | 30 | 7 | 73 | 110 | .69 | 8376 | 4774 | 7439 |
| | | | | | | | | | | 20589 | | 6365 |

*Random field observations indicated production of young Shovellers was considerably less than the computed 1435



SUMMER RESIDENT WATERFOWL ESTIMATED FOR 1947

(Based on July & August Waterfowl Censuses plus Random Observations)

| SPECIES | TOTAL POPULATION | Per Cent | | TOTAL NUMBER OF BROODS PRODUCED | TOTAL NUMBER OF YOUNG PRODUCED | Per Cent | |
|---------------------------|------------------|----------|----------|---------------------------------|--------------------------------|----------|----------|
| | | Increase | Decrease | | | Increase | Decrease |
| Common Mallard | 18,200 | | 21 | 427 | 3,300 | | 65 |
| Common Black duck | 50 | | | | | | |
| Gadwall | 1,500 | | 40 | 17 | 1 | | |
| Baldpate | 2,500 | 138 | | 17 | 100 | | |
| Green-winged teal | 50 | | | | | | |
| Blue-winged teal | 3,200 | | 48 | 260 | 1,600 | | 20 |
| Shoveller | 200 | | 93 | 17 | 100 | | 98 |
| American Pintail | 1,000 | | 39 | 30 | 200 | | 84 |
| Wood duck | 100 | | | | | | |
| Redhead | 100 | | | 17 | 100 | | |
| Ring-necked duck | 100 | | | 17 | 100 | | |
| Lesser Scaup | 50 | | | | | | |
| Ruddy Duck | 50 | | 58 | 17 | 100 | | 97 |
| Unidentified | 3,000 | | 52 | 17 | 100 | | 97 |
| TOTAL | 30,100 | | 31 | 802 | 5,600 | | 73 |
| Horned Grebes | 100 | | | 10-20 | | | |
| Pied billed Grebes | 300 | | 25 | 20-30 | | | |
| Franklin's Gull | 100 | | 99 | | | | |
| Black Tern | 3,000 | 50 | | | | | |
| Double-crested Cormorant | 50 | | | | | | |
| Red-breasted Merganser | 20 | | | 2-4 | | | |
| Hooded Merganser | 20 | | | 2-4 | | | |
| American Bittern | 20 | | 90 | 2-4 | | | |
| Great Blue-Heron | 300 | | 33 | 100 | | | |
| Black-crowned Night Heron | 10 | | 93 | | | | |
| American Coot | 100 | | 97 | 15-20 (17.5X3.5) | | | |
| Sandpiper | 200 | | 20 | | | | |
| Yellowlegs | 100 | | 90 | | | | |
| Unidentified Shorebirds | 300 | | | | | | |
| TOTAL | 4,620 | | 74 | | | | |
| TOTAL DUCKS | 30,100 | | 31 | | | | |
| GRAND TOTAL | 34,720 | | 44 | | | | |

| | | | |
|----------------------------|--------|----|------------------|
| SHVED LOVIT | 24'130 | 44 | |
| LOVIT DACKS | 20'100 | 21 | |
| LOVIT | 4'850 | 47 | |
| untentitied spoleridg | 200 | | |
| lejtomjega | 100 | 80 | |
| gungbubel | 300 | 30 | |
| shelton coor | 100 | 81 | 12-50 (1A'2X3'2) |
| black-shelton wltit Nelson | 10 | 82 | |
| shelton wltit Nelson | 300 | 32 | 100 |
| shelton wltit Nelson | 30 | 80 | S-4 |
| shelton wltit Nelson | 30 | | S-4 |
| shelton wltit Nelson | 30 | | S-4 |
| shelton wltit Nelson | 20 | | |
| black wltit | 2'000 | 20 | |
| shelton wltit Nelson | 100 | 38 | |
| shelton wltit Nelson | 300 | 32 | 50-30 |
| shelton wltit Nelson | 100 | | 10-50 |

| | | | | | |
|----------------------------|--------|-----|-----|-------|----|
| LOVIT | 20'100 | 21 | 805 | 2'800 | 12 |
| untentitied | 2'000 | 25 | 1A | 100 | 81 |
| black wltit | 20 | 28 | 1A | 100 | 81 |
| shelton wltit Nelson | 20 | | | | |
| black-shelton wltit Nelson | 100 | | 1A | 100 | |
| shelton wltit Nelson | 100 | | 1A | 100 | |
| shelton wltit Nelson | 100 | | | | |
| shelton wltit Nelson | 1'000 | 28 | 20 | 500 | 84 |
| shelton wltit Nelson | 300 | 82 | 1A | 100 | 88 |
| shelton wltit Nelson | 2'500 | 48 | 520 | 1'800 | 50 |
| shelton wltit Nelson | 20 | | | | |
| shelton wltit Nelson | 2'800 | 128 | 1A | 100 | |
| shelton wltit Nelson | 1'800 | 40 | | | |
| shelton wltit Nelson | 20 | | | | |
| shelton wltit Nelson | 18'500 | 51 | 451 | 2'300 | 82 |

| INCREASE DECREASE | INCREASE DECREASE | INCREASE DECREASE | INCREASE DECREASE |
|-------------------|-------------------|-------------------|-------------------|
| EXCISES | EXCISES | EXCISES | EXCISES |
| EXCISES | EXCISES | EXCISES | EXCISES |



Department No. 1