

**Annual Report – July 1, 1936
thru June 30, 1937**

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF BIOLOGICAL SURVEY

ANNUAL REPORT, WAUBAY MIGRATORY WATERFOWL REFUGE

For the fiscal year July 1, 1936 to June 30, 1937 incl.

Watson E. Beed
Junior Refuge Manager, In Charge.

Wildlife:

The Waubay refuge is ideally located and since it is in central United States, we have many Eastern birds that rarely are found west of this locality and also many Western birds that are not found much further east. For example, the black duck is not uncommon here and the brown phase of the screech owl is sometimes seen.

This refuge manager assumed duties on this refuge on September 4, 1936, and at that time the fall migration of waterfowl had not begun.

A few double-crested cormorants, several hundred white pelicans and countless thousands of Franklin gulls were present on this refuge during September and the greater portion of October. The cormorants and pelicans secured food in Spring Lake which contains a great many stickle-back minnows and tiger salamanders.

The most common ducks during the fall migration were blue-wing teal, pintail, shoveler, mallard, lesser scaup, gadwall and baldpate. Canvas back and redheads were seen in sizable flocks but the total numbers were never large. Ruddy duck and buffleheads were rare as were also golden eyes and mergansers. The above remarks applies to the 1937 spring migration except that the numbers of birds was much greater than in the fall. Redheads and canvasback were present in much larger numbers in the spring than in the fall.

During the fall migration, blue geese were rare and no snow geese were seen. Cackling geese and Canada geese were very numerous during the fall migration. Ruchin's geese and the white fronted goose were uncommon.

During the spring migration many snow and blue geese stopped on this refuge for food and rest. Some feeding was done and the snow and blue geese became very tame and remained on this refuge for three weeks. Canada geese were numerous in the air but few stopped on this refuge during the spring of 1937.

Few ducks were shot in this vicinity during the open season of 1936, partially because the open season failed to coincide with the migration flight and partially because all potholes were dry and few ducks stopped here except on the large lakes where they were comparatively safe.

Spring lake on this refuge was a favorite stopping place for geese during fall migration. The government owns only a narrow strip of land along the southeast side of this lake. When leaving the lake the geese almost invariably choose this direction and were unable to

gain sufficient altitude to escape hunters guns. Many geese were killed just off the refuge at this place.

Coots were very common on this refuge and large flocks would remain for several days before continuing their journey south. The spring migration of coots was large but not in such large flocks as during the fall. Many coots nested on our refuge this spring and many young were hatched. Bared grebes, Hobell's grebes and pied-billed grebes also nest on this refuge.

Of the shore birds, killdeers, solitary sandpiper, marbled godwits, western willets, avocets, upland plovers and Wilson phalarope nest here. A few black bellied and golden plovers were seen during fall migration. Least sandpipers, spotted sandpipers and northern phalarope were quite common.

The upland game birds on this refuge are European partridge, sharp-tailed grouse, prairie chicken and ring-necked pheasant. (see Research and Investigation)

The raptors on this refuge include short-eared owl, long-eared owl, burrowing owl, screech owl, great horned owl, snowy owl (during winter), rough-leg hawk, Swainson's hawk, red-tailed hawk, marsh hawk, sharp-shinned hawk, Cooper's hawk, pigeon hawk, sparrow hawk and the prairie falcon.

Song birds are very numerous here and include many eastern and western forms as this seems to be a transition area. This refuge is in part well wooded and since trees are scarce in this part of South Dakota, no doubt accounts for the concentration of song birds. During the early spring vast flocks of long spurs and red polls were seen.

The Mammals ~~are very common on this refuge.~~ ^{are common} They include ground squirrels (three species), fox squirrels, ^{gray squirrels} weasels (two sub-species), meadow mice (two sub-species), white footed mice (two sub-species), harvest mice, ^{prairie jumping mice} jackrabbits and cottontails. Mammals common here are shrews (three species), coyotes, mink, grasshopper mice, pocket mice (two sub-species). Mammals rare here are moles, jumping mice, wood chucks and raccoon.

Reptiles are uncommon here except the painted tortoise. A few garter and bull snakes are seen but they are rare. The five lined skink and the six lined lizard are found in the woods.

Amphibians are quite common, two species of toads and three species of frogs are found. Tiger salamanders are common in all lakes. Axolotal larvae of the tiger salamander are present in Spring Lake.

Franklin gulls were present on this refuge in countless thousands during the summer and fall of 1936. These birds do much of their feeding on insects, especially grasshoppers. These birds feed in large flocks and often ten thousand of these birds have spent a half day on a quarter section of pasture, few indeed are the grasshoppers that can be found there. The preservation of such waterbirds and the offering to them of protected nesting areas is one of the many arguments in favor of our waterfowl program.

The pheasant population during the fall of 1936 on this refuge was very great. During the severe winter, many pheasants died of cold and hunger. It is a significant fact that although we had a rather large population of prairie chicken and sharp-tailed grouse, that not one of these birds was found starved or frozen. A few of the European partridge, however, succumbed to the elements.

Use of Refuge:

Due to the small size of this refuge and due to the fact that in the past much of the refuge unit had been overgrazed, no special use permits were recommended for this year.

Although no portion of this refuge is open to public hunting, a group of men own a club house which is located on government property. This group of men had a lease for the land on which their club house is located from the former owner of the tract. The United States Government had honored this lease and the lease money was paid into the United States Treasury. Ten men spent about two weeks at this club house. They hunted during the day, returning to the club house at night. These men were very careful to observe all rules governing this refuge and the condition of their lease.

The public recreational area on this refuge had been well received by the public and is much used. Over one thousand people during May and twenty three hundred people during June took advantage of this area. The approximate number of recreational man days this area was used would be eleven hundred.

Plantings:

Two hundred pounds of wild rice was planted in springs and in moving water on this refuge. The accepted mud ball method was used for most of this rice. Some of the rice was broadcast in likely places. Very little of this rice is growing. Much of it was smothered out by other aquatic vegetation. The broadcast rice grew best but it seems evident that wild rice will not grow to advantage here. Fifty pounds of smart weed was sown in potholes. The results of these sowings cannot be determined as practically all of the smaller potholes have rank growths of smartweed this season. Four pounds of prairie bullrush was sown and the area where the seed was planted was carefully marked. This planting is excellent although much of the seed was eaten by ducks.

Over one hundred acres of food patch plantings were made. Yellow-dent corn, rainbow-flint corn, red amber cane, proso millet and barley were planted. The barley was very good but many of the heads have been cut off by grasshoppers. The corn, millet and cane plantings are doing very well and are seeding heavily.

There are several small fields of volunteer rye and one field contains much volunteer oats. These fields will furnish much food for ducks and upland game birds.

Preditor Control:

During the fall migration and hunting season, eighteen crippled ducks were picked up and placed in the spring pond at Spring Lake. These ducks later all disappeared and it was thought that they had recovered and continued their journey south or had moved to the main body of the lake. It was later found that most of these ducks had been killed
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by minks and stored in their borrows near the spring. Three large mink were trapped at this spring. This spring later became a favored feeding spot for a flock of about forty semi-domesticated mallards.

Nine weasel and one skunk were trapped during the winter. Weasel were quite plentiful but skunk are rare indeed. It is believed that the scarcity of skunks is due to the fact that in the past, they have been relentlessly trapped, hunted and dug out in this vicinity.

Four coyotes were shot by hunters during November just off the refuge. These were young coyotes and it is believed that they were from a litter of eight pups that were observed on this refuge early in September.

Predators, with the possible exception of coyotes, are under control on this refuge. Weasels are plentiful but meadow mice and white-footed mice are also abundant and serve as excellent buffers for game birds.

Refuge Improvements:

Waubay Lake Dyke:

A dyke 300 ft. long, 60 ft. wide at the base and 9 ft. wide at the top was constructed of dirt, clay and gravel. It is completely rip-raped. Two culverts installed with automatic flood gates.

Secondary Dykes:

Four secondary dykes for holding run off water in potholes, averaging 50 ft. long and 30 ft. wide at the base and 4 ft. high were constructed of dirt, clay and gravel and rip-raped with rock. Rip-raped spillways were constructed on two of the dykes.

Machine Shed:

One machine shed, 50'x20'x14', constructed mainly from salvaged lumber. This building has two, 20 ft. entrance doorways with four sliding doors on tracks. Graveled floor with concrete approaches and wheel guards.

Barns:

Two temporary barns constructed on the east and west side of this refuge. Built from salvaged woven wire, lumber and dead trees. Completely covered with straw. Built for the purpose of sheltering WPA horses working on this project during the winter.

Fence:

All fence acquired with the land purchase was taken down and salvaged. 26½ miles of boundry and road fences constructed. Steel posts with steel and wood corner, stretch and gate posts. Five strands barb wire with one wire stay between each of the posts. Gates constructed

of double steel posts on the ends and seven strands barb wire and stays. Fabricated iron gate locks used.

Goose Pasture:

A woven wire fence with three strands of barb wire and wood and steel posts. Encloses about 100 acres of marsh, springs and a part of Spring Lake. A salvaged building was moved in and set up for winter shelter for the geese.

Nursery:

A rabbit proof woven wire fence constructed around one acre of ground. 3900 young tree transplants; Eastern red cedar, Ponderosa pine, Black Hills spruce, Colorado blue spruce, Scotch pine and jack pine were planted within the area. An irrigation pipe layed from the tank at the CCC camp to the nursery.

Storage Cellar:

An octogonal shaped building, 10 ft. in diameter and 7 ft. high constructed of salvaged lumber and built over a former silo pit. Has first floor and the basement.

Food Patch Planting:

100 acres plowed, harrowed and planted to corn, barley, cane and millet. Wild rice was planted in the springs. Prairie bullrush and smart weed was planted along shores of potholes.

Refuge Office:

The east or shop room of the service building was converted into a modern office. The concrete and cinder block walls were covered with plyboard and varnished. A modern laboratory bench was installed in one part of the room.

Transplanting Bullrush:

Bullrush was dug from the marsh near the springs where it was very abundant and transplanted along the north shores of Spring Lake.

Stump Clearance:

About ten acres of cut over land was cleared of stumps. This land was later plowed and planted to corn and millet.

Bird Shelters:

Twenty one lean-to type bird shelters were constructed from salvaged wire and dead trees and brush. The 10'x14' top was constructed with poles made from dead trees and wire and covered with straw. A semi-

circle windbreak constructed with dead brush was built around each shelter. Many small shelters were constructed in the woods from dead trees and brush.

Snow Fences:

Approximately one mile of snow fences were constructed with salvaged wire and posts and placed along the refuge roads were drifting snow warranted it. The snow fences were constructed of a double line of woven wire with Russian thistle packed between.

Odd Jobs:

Parts of the road running through the refuge was bladed and graveled in order that it may be passable. Fire boxes made to contain fire fighting equipment were constructed and are to be placed at suitable places along fire trails. Rubbish such as rusty wire, broken boards, empty cans, etc. were cleared from the refuge. Tool boxes with locks for refuge tools were constructed and set up at the service building. Numerous cat and bird traps were constructed. Two Martin houses were built and one set up at headquarters. Constructed three flagpole bases. Also made five telephone cabinets, one gun rack and cabinet combined, one gun rack and two hall trees. Part of the furniture was for distribution to other refuges. Refuge completely posted with refuge warning and blue goose signs.

Spring Lake Dyke No. 1:

A 1700 ft. dyke constructed across the east end of Spring Lake. Composed of dirt, clay and gravel and rip-raped with rock. Complete except rip-raping service road on top of dyke and some minor work on spillway which permits surplus impounded water to flow into Spring Lake Dyke No. 2.

Spring Lake Dyke No. 2:

A 500 ft. dyke constructed from a peninsula north to the north shore of Spring Lake. Composed of dirt, clay and gravel and rip-raped with rock. Complete except rip-rap of service trail on top of dyke, repair to control gate and completion of spillway to take surplus water impounded by this dyke into Spring Lake proper.

The purpose of Spring Lake Dyke No. 1 and Spring Lake Dyke No. 2 was to stabilize the water levels and to reduce alkalinity in these impounded portions of Spring Lake. A large spring flowing into Spring Lake Dyke No. 1 makes stabilization of water levels and reduction of alkalinity possible.

Picnic Area:

An area of approximately seven acres is enclosed with woven wire fence on three sides. Two rubble stone pillars were constructed at the entrance gate and one at the southwest corner of the area. Five

ruble stone fireplaces were constructed within the area. Two ruble stone pillars and a guard rail made from native logs were constructed within the area, separating the parking area from the picnic area proper. Fourteen rustic picnic tables and benches combined were constructed from native logs and placed in the area. A portion of the fence line was gravelled for fire prevention. Two modern outdoor toilets were constructed and two toilet vaults and cesspools were dug and lined with stone and concrete. Complete except for drilling well, constructing rail fence on south side of area, painting the toilets, clearing and sawing dead timber and brush, complete graveling of area fence lines, constructing shelter with stone fireplace and leveling and graveling parking area.

Landscaping:

Stumps were cleared from the headquarters court, leveled and black dirt hauled in and placed on the top and part of it later sown to lawn grass. Retaining walls constructed of rocks were laid separating the lawn from the graveled drives at the machine shed and service building. Young tree transplants were planted in various parts of the court. A drive running through the court to the picnic area was constructed and graveled. The drives at the machine shed and service building were leveled and given a heavy surface of gravel. The driveway was graded up and rocks were hauled in for rip-raping the ditch. A 5'x5½'x2" refuge sign was constructed from native timber and set up at headquarters entrance. Numerous young willows were planted along fence lines for permanent snow fences. Complete except for planting more trees, filling and leveling the incline north of the service building and planting lawn grass and constructing a retaining wall.

Painting:

Storage cellar given one coat paint, machine shed two coats paint and two coats shingle stain, fire and tool boxes two coats paint and service building and family cabin one coat of special concrete paint. Inside of cabin painted.

Aquatic Cellar:

An old silo pit was dug down another two feet and concrete footing poured. Trenches were dug and outlet and inlet pipes laid. Left to complete; concrete floor, trays to install and construct concrete roof.

Fire and Service Trails:

Approximately twelve miles of eight foot fire and service trails are constructed through the woods and along lake shores and through the refuge in general. These trails should be remodeled and graveled and additional eight miles constructed.

Fire Lines:

A rooter plow was used to construct a five foot fire line, ten

miles long. Additional five miles are to be constructed with a tractor plow.

Islands:

Seven large islands were constructed, two were completed. They measure about 50 ft. in diameter and 5 ft. high from the base. Two are completely rip-raped to about two feet above the water line. There are some large rocks laid on the top. The other five are constructed of dirt thrown up from the lake bed in which they were constructed. These are incomplete and as they are now surrounded by water, work is at a standstill until winter.

Twelve duck resting and nesting islands were set up on the outside edge of Killebrand lake. They are composed of woven wire fastened in a four foot circle and filled with dirt and rock. These small islands are evidently unsatisfactory.

Salvaged Buildings:

All buildings acquired with land purchases are or shall be razed and lumber salvaged.

Research and Investigation:

At the suggestion of Mr. Kubichek, an investigation on the effects of coyote predation on upland game birds during extreme weather conditions was attempted. The upland game birds on this refuge are European partridge, sharp-tailed grouse, prairie chicken and ring-necked pheasant. The pheasants far outnumber all the other species combined.

The data collected would indicate that coyotes are not harmful to upland game birds during winter in this locality in South Dakota. Seventeen pheasants had been eaten or partially eaten by coyotes. It was evident that these pheasants were dead and frozen before being touched by the coyotes. It seems quite evident that cottontails and jackrabbits served as an efficient buffer between the coyote and upland game birds. Both the jackrabbit and the cottontail were very abundant during the winter of 1936-37 on this refuge and "coyote kills" of these rabbits were observed on thirty two occasions. The evidence was always plainly marked in the snow.

On four occasions evidence in the snow would indicate that a great horned owl had made a kill of a rabbit and that the game was appropriated by a coyote.

Pheasants died by hundreds on this refuge and it is surprising that so few were eaten by coyotes. It seems that the coyote prefers a warm freshly killed rabbit to a frozen pheasant. If the rabbits had been absent it is felt the results would have been different. It was evident from tracks and animals observed that six coyotes frequent this refuge.

The stomachs of one hundred twenty six pheasants found dead on this refuge were examined. One hundred four crops were entirely empty, eight contained coral berry seeds, three contained blue grass sprouts and nine contained some barley. The barley was grain that had been

placed for the birds. In all cases the gizzards contained gravel in sufficient quantity for digestion.

Duck Census and Nesting Studies:

During May, a duck census was conducted by NYA boys under the direction of the refuge manager. Only male birds were counted and the results indicated that we had one male duck per acre for the entire refuge unit. Pintails lead the list with blue-wing teal, shovelers and mallards, second, third and fourth. These four species comprised 80% of all the ducks on the refuge. Other species encountered were baldpate, gadwall, canvasback, redhead, lesser scaup, ruddy, American goldeneye, American merganser, hooded merganser and their numbers ranged in the order given.

In the duck nesting studies, one hundred seventeen nests were catalogued and rechecking would indicate that the number of successful broodings was over 95%. Stray dogs were the worst predators on duck nests. Crows ate a few eggs but in very few cases did they destroy the entire clutch.

Law Enforcement:

Practically all the farmers in the neighborhood of this refuge as well as large percentages of the people from the nearby towns worked on the WPA project on this refuge and were thus well acquainted with the regulations governing wildlife reservations. This perhaps accounts for the fact that we had no violations on this refuge during the hunting season of 1936. Pheasants were also very plentiful in the surrounding territory and their abundance on the refuge could offer no incentive for violations. Also, Mr. Ury Dahling, the State Game Warden in this territory, is very efficient and his cooperation, no doubt, contributed to our lack of violations. The people in this territory are sympathetic toward the refuge and understand the necessity of such institutions. No doubt this favorable public sentiment is a contributing factor to game law observance on this refuge.

Waterlevels:

During the summer of 1936, the water levels of the lakes on this refuge dropped alarmingly. All potholes were dry and prairie bull-rush and smartweed as well as most other aquatic and semi-aquatic waterfowl food plants failed to seed. Waterfowl migrating southward found few places to stop for rest and food. Spring Lake and Hillebrand Lake on this refuge which are fed by springs, were two of the few places where waterfowl could find food and rest. Rupia and sago pondweed were plentiful in this lake.

During the late fall of 1936, heavy rain and sleet fell. This wetted the top soil and caused the ground to freeze. During the winter of 1936-37, over seventy inches of snow fell here. In some places the drifts were fifteen to twenty feet deep. When this snow melted the

frozen top soil caused most of the water to "run off" into the lakes and potholes. Waubay Lake was nearly filled in some places the water is six feet deep. The dust was blowing in these same places last fall. All lakes on this refuge raised from three to six feet and continued rains this summer have caused these water levels to be maintained. This stabilization of water levels has been conducive to the growth of desirable aquatic plants.

The series of dykes on Spring Lake have permitted stabilization of water levels and reduced the alkalinity of the water in the impounded areas to a concentration where such desirable aquatic vegetation as prairie bullrush, roundstem bullrush and smartweed may grow. Roundstem bullrush planted during the fall of 1936 is growing nicely in these dykes.

It is estimated that fully one third of the area of this refuge is water.

General Facts Concerning this Refuge:

The Waubay Refuge is located in one of the greatest waterfowl producing areas in the United States. The people in this territory have watched the vast hords of waterfowl which formerly lived and reared their young here, dwindle to a few scattered remanents. Many of these people were guides to hunters or owned resorts on the lakes. They have seen their revenue and their businesses reduced in direct proportion to the reduction in the numbers of waterfowl. These people have given this refuge fullest cooperation and are in sympathy with and have a sincere appreciation of the Bureau of Biological Survey and especially the Migratory Waterfowl Division.

Our feeding program for upland game birds during the winter of 1936-37 and the construction of game shelters and feeding stations have met with almost universal approval and commendation.

The recreational area on this refuge has been used by thousands of people and the comments have all been expressions of appreciation and pride in our accomplishments.