

*AM*

October 20, 1937

Valentine BF-2  
Neb.  
Narrative Report

*this is not a  
CCC report*

Dr. Ward M. Sharp  
Valentine Lakes Refuge  
Valentine, Nebraska

Dear Dr. Sharp:

Your letter of October 16, together with your Narrative Report for September has been received and is being circulated through the usual channels. You will no doubt receive further comments on this report from Mr. Pedersen or Mr. Salyer's Office.

Very truly yours,

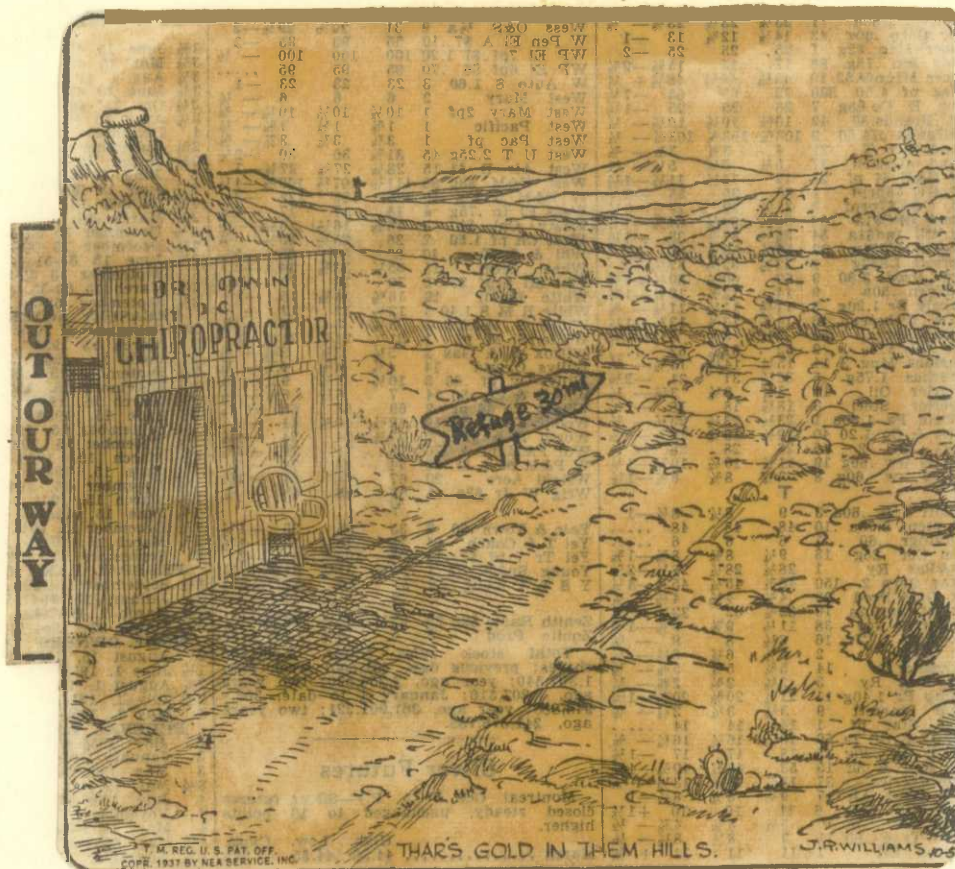
Ray Soderberg  
Jr. Administrative Assistant  
Section  
Restoration & Development  
Migratory Waterfowl Division

VAB

# VALENTINE LAKES WATERFOWL REFUGE

NEBRASKA

OUT WHERE THE WEST BEGINS



THAR'S DUCKS ON THEM LAKES

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## NARRATIVE REPORT

FOR SEPTEMBER

1937

## INTRODUCTION:

The Narrative Report for the Valentine Lakes Refuge is divided into the following parts: Weather and Water Conditions; Public Relations; Refuge Development and Maintenance Projects; Wildlife and Predator Control Report; Administration and Investigation, including The Long-Time Fire Presuppression and Control Program for the Valentine Lakes Refuge.

## WEATHER AND WATER CONDITIONS:

September turned out to be an ideal month. A total of 1.60 inches of rain fell during the first half of month, at the Refuge Headquarters. The Dads Lake and Pony Lake vicinity received much heavier rains. Roads were washed in these vicinities and formerly dry potholes had 2 to 3 inches of water raise in them. A newly excavated pothole east of Dewey Lake had a raise of eleven inches. All new excavated potholes have from one-half to three feet of water in them. All the lakes were improved by this rain. The grass on the brown sandhills and valleys greened. Grass grew profusely and by September 15, the hills and valleys were as green as of June earlier in the year.

In 1929, 2.10 inches of rain fell, 1.31 inches in 1934 and 1937 with 1.60 inches at Refuge Headquarters. Other years since 1929 had less than an inch for September according



to the Weather Bureau at Valentine, Nebraska.

**PUBLIC RELATIONS:**

The Nebraska Forest field day was held at the Nebraska National Forest on Sunday, September 19, 1937. The refuge manager attended this meeting. The nursery was inspected, a treeplanting demonstration was put on. A new piece of machinery, a tree planter, was also demonstrated. The model used is perhaps the only one of its kind in the United States. I was told by Mr. Dayharsh, Superintendent of the forest, that the machine will need more remodeling before it is perfected. A tour of the forest was made thus ending a perfect.

The refuge manager spent four days in Federal Court at Chadron, Nebraska during The Hercules Life Insurance Company versus The United States trial concerning tracts of land at Watts, Duck and Long Lakes. A fair decision was returned by the court's jury. (This is the last of the tracts to be cleared.)

DEVELOPMENT AND MAINTENANCE PROJECTS  
FOR VALENTINE LAKES REFUGE

September, 1937

CCC WORK PROJECTS:

a. Lookout Tower:

A cabin was moved from the 21 Ranch to the tower site in center of Section 21, Township 29 North, Range 27, West, so that it may be used by tower watchmen or patrolmen when working in the vicinity. This cabin has been placed on a foundation and will make a very comfortable domicile.

b. Fences:

Most of the cross fence work was in the vicinity of Mule Lake and south and east of Twin lakes. Two miles of old fence were repaired and about two miles of old fence were taken up. Three miles of new cross fences were built. All of this work was done on cross fences within the boundaries of the refuge on plots of ground which are to be leased as grazing areas.

c. Wells:

Two wells have been constructed this month, one south of Mule Lake and the other east of Middle Marsh Lake. The purpose of these wells is to furnish water to livestock running on the grazing areas by Special-Use Permit, and their depth is about seventy feet each. The

well in the Daniels grazing area had to be dug a second time at a new location. The first well being a dry hole.

The materials necessary for the construction of these wells were purchased with WPA funds allotted last year, and from regular refuge supplies of pipe and points.

d. Truck Trails:

The greater portion of our available manpower was utilized during September on the construction of new roads and in haying other trails where the sand had made them either difficult to travel or impassable. Practically all of our tractor equipment and dump trucks were used on this project.

Four hundred and fifty-two loads of clay were placed on the trail leading south from the CCC camp site to Duck Lake. About one and one-half miles of trail were graded with the heavy machinery, of which one mile was completed. The banks were sloped, drainage facilities were improved, and a surface of clay was placed on it.

What rains we had in September occurred during the first twelve days of the month, and the clay which had been placed on the road packed firmly and made a good trail. The clay which was placed on the trail during the latter part of the month, when there was no moisture in the clay or the road bed, is powder-like and will not pack until we receive moisture of some kind. This trail will not be traveled until moisture wets it down.





GCC ENROLLEES CLEANING SIDE DITCH AND  
SLOPING BANKS OF HACKBERRY-DUCK LAKE  
TRAIL.



THE TRAILS ARE COVERED BY A SIX INCH  
BASE OF MAGNESIA. PHOTO SHOWS ENROLL-  
EES SPREADING THIS MATERIAL.



Considerable time has been spent in the repairing and haying of trails in different parts of the refuge, especially in the vicinity of the tower near Pony Lake. It pays to keep our truck trails in as good as condition as possible as breakage in equipment is less.

e. Nurseries:

Nursery work has continued all during September, and most of the work was done on the south side of Dewy Lake and on Whitewater Lake. These nurseries are in fine shape.

We are contemplating increasing the size of the Whitewater nursery from about three and three-quarters acres to ten acres. It is better to make the nurseries we have a little larger rather than have several small plots about the refuge. The total acreage will not be increased, but these areas will be centrally located at Whitewater Lake, a factor of importance in operation and administering.

In the way of improvement, the centrifugal pump will be placed on a permanent foundation and a building has been moved in from Dewy Lake which will serve as a pump house and protect it against the inclemencies of the weather. We hope to have this house completed before cold weather comes.

We are going to experiment by planting stock in a few of the permanent plots during the fall. Planting will be done in cultivated soil only, and we believe, this will result in a saving of man-power in the spring and an increase in our planting plots. Our survival of trees is greatest

in cultivated ground.

A comparison of the average heights of plants at the end of August with the heights at the end of September reveals that the American Elms showed an average growth of ten inches for the month of September, the Chinese Elms grew eight inches, the Black Locust twenty inches, the Honey Locust twelve inches, the Russian Olives eight inches, and the Mulberry eight inches.

f. Fire Hazard Reduction:

Notwithstanding the fact that no fires of major significance have occurred in the sand hill region this summer, CCC foremen have made it a practice to caution the men regularly about the dangers incident to the careless disposal of matches and cigarettes.

Cutting hay as a means of reducing the fire hazard was a project carried on in the vicinity of Dewey, Pelican, Whitewater, Middle Marsh and Pony Lakes. It is in these areas that the hay growth is heavy and through which the main channels of traffic are routed. A swatch of hay has been cut along both sides of refuge trails for an approximate distance of eighty miles, and we expect to have sufficient hay on hand for surfacing trails this winter.

g. Parking Areas and Overlooks:

Most of the work on this job was done during August, but the finishing work was completed during the early part of September. The entire court area around the headquarters buildings has been covered with a three-inch layer

of bituminous mat. It is elevated so as to provide proper drainage in rainy weather or in times of melting snow.

This oiled surface on the headquarters driveway makes a good solid road for travel and provides a great improvement in the general appearance of the headquarters site. Traffic over this mat has not affect it in any way. A general sluffing is noted but not to a great extent. A seal of asphaltic oil will be necessary as soon as warm weather comes again.

One of the most appreciable benefits provided by this surfacing, aside from the convenience to travel, is that it minimizes the amount of sand which formerly blew into the headquarters buildings, on the lawn, and around small elevations such as curbs, walks, etc.

#### h. Seed Collection:

Almost twelve hundred pounds of seeds were gathered on the Valentine Lakes Refuge this season.

Chokecherries were found at all the thickets on the hills south of the lakes. About four hundred pounds were collected. The recurrent drought has had a noticeable affect on seed producing trees and shrubs, but at that those berries that were grown were in fair condition.

On the south side of Dewey Lake, CCC crews picked about one hundred and sixty pounds of wild plums, which were in good condition. Approximately three hundred pounds of wild rice were gathered at Long Lake, near the western



Boundary of the refuge. One hundred and eighty pounds of wild millet was picked at Long Lake, and also about twenty pounds of smartweed.

A part of the man days which were charged to this job was assigned to the cleaning, processing, and storing of the seeds so that when we are ready to plant them they will be in good condition for fall or spring planting.

i. Telephone Lines:

Although the construction work on the telephone line was delayed by the loss of some of our materials in the fire at the storage shed on July 27th and by illness in the family of our electrician, we now have telephones installed at the headquarters buildings, at the Newman Ranch, the Sawyer ranch, at Pony Lake, and in both lookout towers. These will be connected up as soon as the line 'tying in' is completed.

j. Preparation and Transportation of Materials:

A number of the small buildings at "21" Ranch were razed and the materials were transported to the LaCreek Migratory Waterfowl Refuge at Martin, South Dakota. This salvaged lumber will be used there in the construction of storage sheds, garages, etc., required in the administration of that refuge. About 12 thousand board feet of lumber was taken to the LaCreek Refuge. This clears up all surplus buildings on this refuge.

k. Reconnaissance and Investigation:

During the summer, we had students and enrollees

engaged in collecting data necessary for the preparation and completion of a vegetative map of the Valentine Lakes Refuge. The field maps, which were drawn on a fairly large scale, are now being reduced and worked up on a smaller scale.

Twice weekly a survey of waterfowl, shorebirds, and upland game was conducted on all lakes of the area.

One of the enrollees on the reconnaissance crew is engaged in collecting seeds of various plants found on the refuge. These will be used in building up a sample collection.

A duck potato patch was located and an area of ground twenty feet square was dug up to determine the abundance of tubers. The results indicate that the yield was low, and is not profitable to dig them.

## WILDLIFE AND PREDATOR CONTROL REPORT

## VALENTINE LAKES REFUGE

September, 1937

## A. A BEAVER GOES MODERN:

A flowing well, man made of course, located at the base of the north sloping hills of South Marsh Lake flows and one and one-quarter inch pipe volume the year round. The clear, cold, sparkling water pours into a 12-foot steel tank. The overflow is carried into a wood tank of similar dimensions and then overflows and seeps away into a dense willow thicket of the marshy border of South Marsh Lake, now almost dry.

A beaver recently has dug a hole into the sidehill near the wooden tank. Twenty-five feet beyond, further up the hill, the top of his lodge appears, the living quarters of which are underground. This master of hydraulics has cut a broad, shallow "U" shaped notch in the top of the tank. An iron bar three inches from the top limited him to a definite area. This notch facilitates ingress and egress at this side which has an easy approach by a mound of earth piled at the outside of the tank at this point.

The tank now contains numerous willow switches. These were cut in the nearby willow thicket and carried to the tank by the beaver. Conditions are ideal for a beaver's home; food and open water for winter and ample protection





A BEAVER GOES MODERN. Photo taken from over wooden water tank. Note beaver's cutting of tank. His den entrance opposite tank. Lodge in background indicated by the arrow.



A BEAVER GOES MODERN. photo showing trail from lodge leading to den entrance. Note lodge at arrow in background. Note water tanks at right.





YOUNG SNAPPING TURTLE TWO WEEKS OLD. ITS  
PARENTS WEIGHED APPROXIMATELY FIFTY POUNDS.  
(All snakes from little acorns grow)



in his underground retreat. Mr. Beaver, the Biological Survey wishes you success and a wealth of happiness in your new domicile.

## B. DUCKS AND GEESE:

### 1. White-fronted Geese:

These birds showed up at the refuge September 20, 1937 on their southward trek for the winter. Approximately fifty of these birds were present on the refuge on September 24th. Records to date show that this part of Nebraska is off the goose flight. Only a small number of Canadian and white-fronted geese stop at the refuge during their north and south flights.

### 2. Ducks:

Blue-winged teal were the dominant species during August, but by September 20, they had dwindled into fourth place. Shovelers, Mallards, and Baldpates claimed first, second, and third place, respectively. Gadwalls, Pintails, Ruddy Ducks, Canvasbacks, Redheads, and Green-winged Teal were other species of wildfowl occurring on the refuge during the month. The Shoveler-Mallard-Baldpate wave caused the total number of ducks to reach the 20 thousand mark on September 24th. A sharp decline in the numbers followed, however, by the close of the month the number had increased <sup>doing</sup> showing that the ducks are/quite a lot of moving about the country. The accompanying graph on the duck flight curve illustrates this movement. The red line shows the Blue-winged teal flight and the blue line represents the Shoveler-

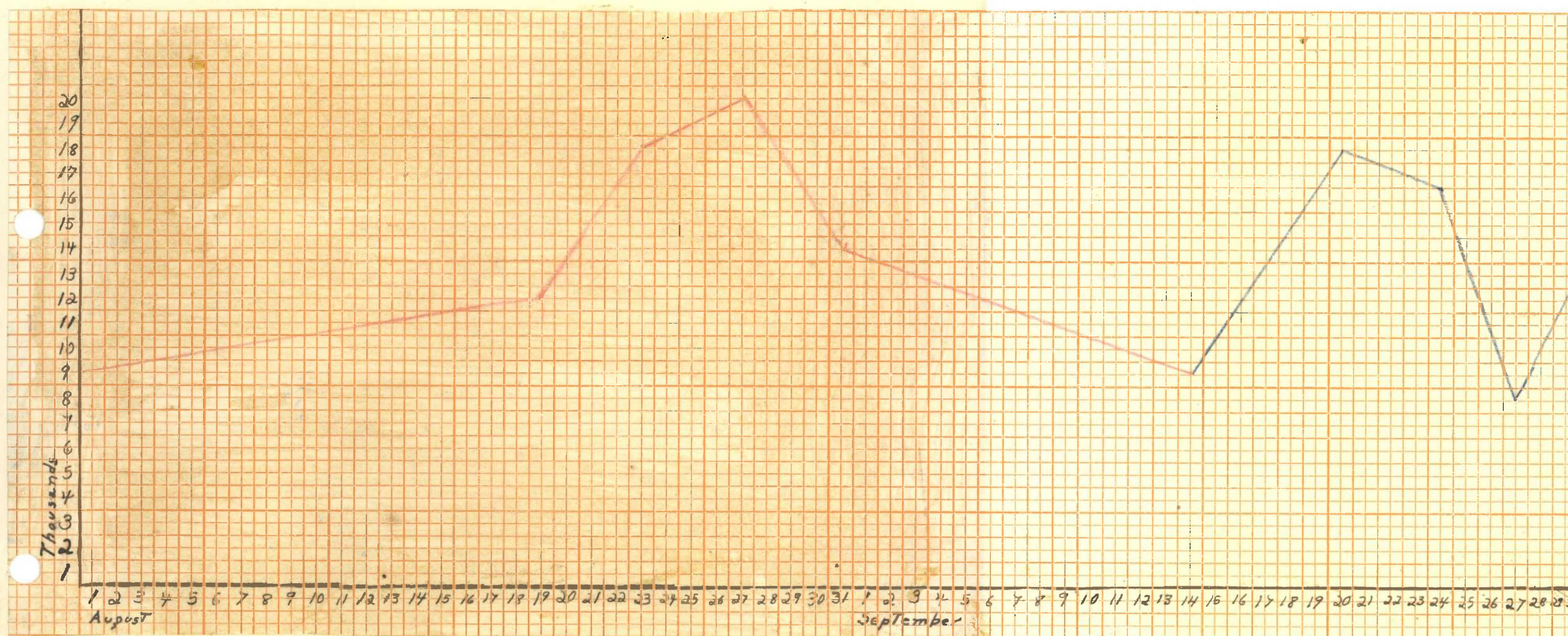
cook

cook  
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Mallard-Baldpate flight curves.

GRAPHC. SHOREBIRDS AND GULLS:

Franklins, Ringbilled, and Herring Gulls were the gull species occurring on the area during September.

Franklin's gulls were the more abundant this month than of the same month in 1935 and 1936. Approximately 800 birds were present at one time. Ringbilled and Herring gulls were less common.

Shorebirds were less common in September than in August. Yellow legs, Baird's Sandpipers, and Killdeer



were common but not abundant as in August. Avocets were rare, only a few hangovers of the summer residents from the states north.

#### D. SANDHILL CRANES:

The first call of the sandhill cranes came to the refuge on September 23rd. The birds were flying high and were not sighted. Twenty-one were seen the following day. Other flocks of similar number were seen during the last days of the month. The birds fly high and are not known to alight in the sandhills during their flight south.

carried  
3/16/95 - Burn

#### E. SONGBIRDS:

Red-shafted flickers and downy woodpeckers appeared this month. Blackbirds by the hundreds of thousands appeared. They alighted in the millet, corn, and sorghum patches, and cleaned out all of the grain left for upland game. The red-winged blackbird is a real menace in this region during their fall migration. Wildrice patches and small grain patches are cleaned out. It is a case where a protected species becomes a real menace by over population.

#### F. MUSKRAT ACTIVITIES:

About 15 rat houses are being built on Hackberry Lake. The water conditions are so poor that winter freezing may do much damage to them. Lone rats have been seen in migration as far as four miles from water. A study of their migration habits is underway. Information to date shows that migration is not always due to a shortage of water.

#### G. SNAPPING TURTLES:

Six ducks have been picked up on the lakes which had been partially eaten by snapping turtles. The birds apparently had also been caught and killed by these predators.

Young snappers hatched out about September 10-15th and began crawling towards water. One little fellow has been caught and is kept in the laboratory to observe his rate of growth. It eats beef steak readily. At two weeks of age it weighed 124 grains.

#### H. PREDATOR CONTROL:

Nine coyotes were killed on the refuge during the month. These animals were taken in the east portion of the refuge. Five ~~one~~ crows were shot early in the month. Later the crow migration reached this area. Control then was not undertaken, as our policy is to kill only the resident individuals. Four skunks were taken out of coyote traps.

Carbide  
in  
traps



## ADMINISTRATION AND INVESTIGATION

## VALENTINE LAKES REFUGE

September, 1937

REPORT OF OBSERVATIONS ON SPOTTED LIZARDS:-By Roald Amundson,  
Student Assistant Technician

Two female specimen for observation were kept in a jar in the laboratory for four days before first attempts at feeding and watering were made. Both were given water with a medicine dropper at this time. Grasshoppers thrown into the jar were siezed and devoured at once. On the sixth day one of the females laid five eggs on the surface of the sand in the jar instead of burying them as the natural habit dictates. A male and female were added to the collection and all of them put out in a specially constructed pen for observation. Daily examination of the pregnant to determine the day of laying showed that the eggs were laid on July 2nd. Numerous grasshoppers and other insects find their way into the pen making it unnecessary to feed the specimen more than every other day. Water is provided from a 1-gallon jug with a tube extending down into the pen emptying into a small dish. Each morning the Yucca plant that is transplanted into the pen is sprinkled with water to simulate dew. The lizards were seen to take water from this, but as yet haven't been seen taking water from the dish provided.

Six females were dissected during the gestation period to get an idea of the number of eggs contained in the embryo. The average number was five.





RUSSIAN OLIVE NURSERY STOCK ABOUT THIRTY  
INCHES TALL. OUR NURSERIES, WE THINK, ARE  
UNEXCELLED.



MULBERRY NURSERY STOCK IN NURSERY ROWS.  
DYCARD, SENIOR GARDENER, IN BACKGROUND.





PHOTO SHOWING A DENSE GROWTH OF SMARTWEED.  
(POLYGONUM LAPATHIFOLIUM) AT POWDER LAKE,  
SWEETWATER VALLEY.



### 1. Feeding Habits:

To date, July 8, 1937, twelve specimens have been dissected to determine stomach contents. They are:

1. Grasshoppers, caterpillar
2. Grasshoppers, caterpillar moth
3. Grasshoppers
4. Grasshoppers and beetle
5. Grasshoppers
- 6-11 Contained nothing but grasshoppers
12. Caterpillars 2, large ants 2, several small ants.

More specimens will be dissected from day to day and the stomach contents recorded. I have reasons to believe at present that lizards are an important factor in control of grasshopper, and further examination of stomach should substantiate this belie.

### 2. Shedding Skins:

On July 6th all of the lizards in the pen showed evidence of shedding or recently shedding their skins. In the females the characteristic orange markings became much more pronounced, all the spots and lines more distinct and brilliant. In the males the previous blue-green tinge turned a more pale olive hue with a faint tinge of orange color along the sides of the abdomen.

### 3. Nocturnal Activity:

Several observations made at different times of the night showed that there is no activity during the hours of darkness. As soon as the sun sets during warm weather, the lizards bury themselves to a depth of about

one-half inch in the sand. The interesting manner in which this act is performed may well be noted. In all cases observed, the lizard proceeded slowly forward, reversed for three or four steps, thrust its head suddenly into the sand and with lightning motion of all four limbs literally plunged beneath the surface until all but the tail was covered. The lizard continues to burrow until the tail, waving in a snake-like manner, wriggles out of sight. During two small thunder showers it was observed that the saurians bury themselves in the sand and remain buried until the sun warms the sand again after the shower. It is quite possible that the increased temperature of the sand in the morning informs them that daylight has returned. Two specimens were kept in a tin container for several days. It was found that covering the cage with a thick cloth caused the lizards to bury themselves in the sand as though it were night.

#### 4. Reactions to Heat and Cold:

A specimen newly captured during hot weather was held under the cold water tap; he struggled vigorously for a few seconds, then became loggy and almost inert. The temperature of the water was increased to about 110 degrees F. whereupon the lizard became active again and struggled as furiously as before.

#### 5. Feeding Habits:

The lizard kept in the pen for observation were enabled to catch enough food to keep them alive and healthy. I watched them dart at deer flies, grasshoppers, ants, and any

other insect that happened to come into the pen. Their agility is astounding. A fly lighting on the side of the pen was observed by a lizard at the opposite end of the pen a distance of four feet. He came toward the fly quickly at first, then slowed down as if he were stalking his prey. Coming to within 7 inches of the fly, the lizard made a lightning leap and snapped up the fly in a blur of motion. I threw several pupa of papilionidae into the pen early in the morning. By noon all but four were eaten, and the abdomen of the lizards were so stuffed and distended they appeared to be bloated. The mid-afternoon all of the lizards were actively catching flies, and had apparently resumed their characteristic guant appearance.





TYPE OF FIRE LANE CONSTRUCTED ON THE  
VALENTINE LAKES REFUGE  
during 1936 and early 1937



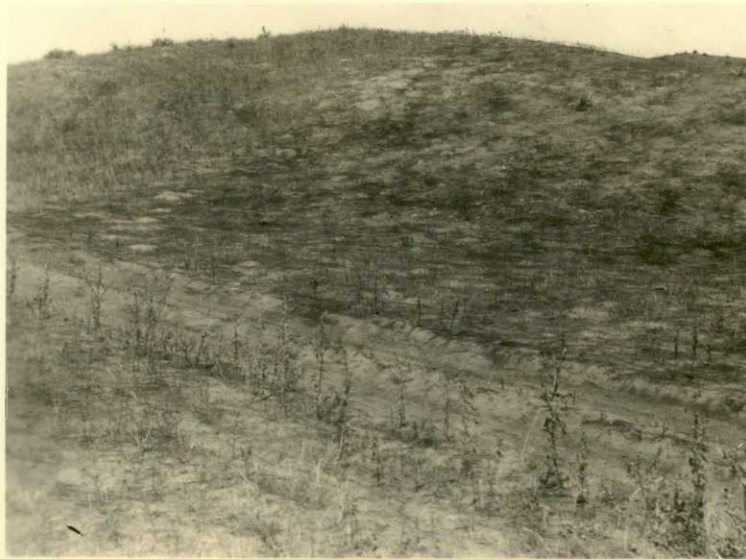


photo showing origin of grass fire at a sandy trail among the sandhills. Road had been previously hayed in order to be passable for traffic.



Refuge fire lane showing its efficiency in stopping a prairie fire. The arrow indicated a burned strip in between the two lanes. The fire jumped the lane at this point to the center strip but did not go beyond.

LONG-TIME FIRE PRESUPPRESSION AND CONTROL  
PROGRAM  
for the  
VALENTINE LAKES REFUGE

FOREWORD:

This report attempts to outline in as condensed a form as possible the long-time fire presuppression and control program for the Valentine Lakes Refuge. The geographical and climatical location of this unit confines its fire control problem to grass fires exclusively. The lakes and valleys are surrounded on all sides by sandhills. These obstructions make travel to fires difficult as well as slowing up the progress of fire fighting equipment reporting to fires on the area. Therefore, presuppression and preventive methods are strongly stressed. Located in a remote ranching community, as this is, we have found that the local people fear grass fires and exercise due caution in their prevention.

THE FIRE SEASON:

The season for grass fires is that period at which dry grasses are readily ignited, resulting from a period of dry, hot, windy weather, or after freezes have killed all green vegetation. This season, in the sandhills country, begins about July 15 and continues to about October 15, varying of course, from season to season. After this period, cool to cold weather causes grass to burn less readily. The second season for fires runs from April 15 to May 15. Prior to this spring period, it is too cold for fires and after the middle of May, the vegetation is too green to burn readily.



### KINDS OF FIRES:

GREEN GRASS FIRES and DRY GRASS FIRES are those types occurring in the sandhills. Green grass fires occur during hot, dry spells in July, August, or early September. At this time of the year, most of the vegetation is green and mixed with enough dead, standing, dry material to kindle the conflagration. When such a fire gets under way the dry grass serves as kindling and the green grass burns readily making a very, very hot fire. Dry grass fires occur most commonly in the fall or spring during warm, windy weather. They occur in the fall after the first frosts have killed all the green material, or they may occur earlier in the summer during severe drought years. Grass fires are less apt to occur when the temperature is 40 degrees or lower. The kindling point of standing grass at these temperatures is lowered beyond ready combustion unless set by man in dense clumps of dead grasses. The spread then to the lighter grasses would be very slow, however. Exhaust sparks are ineffective at low temperatures, and in fact start fires only on very hot days.

### GENERAL ORIGIN:

1. Man, carelessness on the area; 2. Exhaust sparks from cars and trucks, especially on the roads in the sandhills which are hayed to permit auto travel; 3. Outside invasions, and, 4. Lightning.

The first cause, carelessness by man, is the source of the greatest percentage of fires. The careless tossing of cigarette or cigar butts, and glowing match tips on hot, windy

days could be a real menace. Escape of fires from camp grounds at recreational resorts on the area will also be a source of some concern. Constant warning of CCC enrollees and carefulness of refuge personnel and local ranchers have prevented fires so far. Two seasons have almost passed and no "fire maniacs" have come to our territory. Lets hope they have all burned. Hunters in the past, prior to the purchase of the refuge, have set many fires so far as evidence goes.

Second, the exhaust flames from cracked manifolds or loose connections thereof are a frequent cause of fires on hayed trails during hot, windy days. Two fires occurring on the area, one of August 1936 and the last during August 1937 were traced to this cause. Both of these originated on hayed trails on the hills. The weather, when both fires occurred, was hot and very windy. The surfacing of our trails on the sandy hills with magnesia clay will eliminate this hazard.

Third, fires entering the areas from outside sources. Heavy grazing of adjacent lands has reduced this hazard to a minimum. Fire lanes around the boundary will check invasions from this source.

Fourth, lightning is a source of grass fires in some regions, but in the Nebraska sandhills it is a cause of less concern. Up to and including the present time all electrical storms are followed by sufficient rain to drown any fires started in grass from this source. A fire set by lightning, smoldering in debris of dead trees or buildings, if undiscovered may possibly

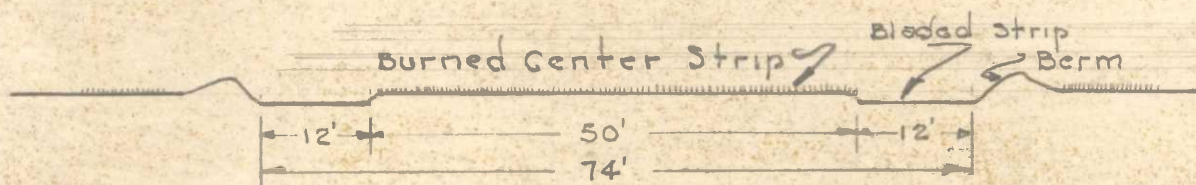


result in a grass fire.

**PRESUPPRESSION METHODS RECOMMENDED:**

**1. Fire Lanes:**

Approximately one hundred and fifty miles of double fire lanes have been constructed on this refuge at strategic points. The marshy areas are now guarded by fire lanes to prevent fires from invading them. Double lanes with a grassy strip intervening which is ten to thirty feet wide were constructed during 1936 and early 1937. The practice of leaving a fifty-foot burned strip between the two lanes will be followed in the future in compliance with our regional policy.



Typical Section of Fire Lanes  
Valentine Lakes Refuge

A blade grader was used in constructing these lanes. It is superior to a disc in that the top six inches of earth is cut and pushed aside into a windrow, leaving a 12-foot lane cleaned of all grass roots. After the lanes are once constructed a disc is used thereafter to keep the weeds down. A diagram of our fire lane is illustrated in Figure 1.

## 2. Mowing of Tall Grass and Weeds along Trails:

This season a 12-foot strip was cut on each side of the grassy trails. The refuge "Farmall" with a 6-foot power mower was used. A 6-foot trail mower attachment is desired for additional mowing equipment. By having such, one can accomplish in one day what we accomplished this season in two days of mowing. This method of mowing will prevent fires starting from the trails and also act as a fire break in case of advancing fires. Refuge fires in the past have originated on or beside trails.

## 3. Surfacing Sandy Trails with Magnesite:

Trails crossing the sandhills become very sandy during dry weather, and as a result, travel by auto is difficult. The practice in the past has been to hay these roads twice each year. Fires on the refuge to day have first had their flames kindled in this dry material. Plans at present are to grade a road through these areas and surface with magnesite clay. Approximately three miles of such trail are completed. Such work is fourfold, namely, reduces the now existing fire hazard; reduces future road maintenance; serves as a fire break in case of advancing fires; and last but not least a smooth road is available.

## 4. Range Management and Mowing:

Areas located in a half mile or more from the lakes and lying among the sandhills have been or will be fenced off for fall and winter grazing areas. This method of management will not only bring revenue to the refuge, but it will eliminate the



grass fire hazard by preventing an accumulation of dead grasses over a period of years. Light grazing at 20 acres per head is followed, however, sufficient cover will be left after each season to provide shelter for upland game birds. Nesting areas for waterfowl remain unmowed and ungrazed. Hay meadows not in the nesting areas are mowed on Special-Use Permits by local ranchers.

#### 5. Confining the Public to Certain Roads:

Picnickers, campers, and fisherman traveling to and from recreational areas on Dads Lake will be confined to specific routes. This method will not only eliminate the possibilities of fire, but the inducement for poaching will be lessened. The same applies to the Brownlee public trail crossing the east part of the refuge as well as the public road leading from Valentine to the Beaver Lake community, which crosses southward along the west side of the refuge.

#### MACHINERY AND EQUIPMENT NEEDED FOR FIRE PRESUPPRESSION:

##### Refuge Equipment on hand:

Aside from CCC owned property for fire presuppression, the permanent refuge property consists of the following: an 8-foot disc-harrow, a 6-foot fire lane disc, a three-bottom plow, and a "Farmall" tractor with a six-foot mowing blade.

##### Refuge Equipment Need:

1. A "40" Caterpillar tractor for fire lane work.
2. One, "22" Caterpillar is also desirable for use especially in plowing around fires. Other uses for which it will be used are in discing fire lanes, and plowing and discing prior to planting.

3. A ten or twelve foot disc is desired. An eight-foot disc consumes too much time doubling back. If this purchase is made then our 8-foot disc can be transferred to one of the smaller refuge units.

4. Lastly, but not least, a 6-foot trailer mower attachment is desired. Such a piece of machinery will cut our mowing time 50%.

#### FIRE DETECTION AND CONTROL:

##### Fire detection:

**Towers:** Two observation towers have been constructed on the refuge. One located at Hackberry Lake, the other east of Pony Lake at the east end of the refuge; a distance of 16 miles apart. Observers are maintained in these during the fire season. Fires originating are at once detected, located, and reported to headquarters.

Two watchmen will be necessary two to three months out of each year. CCC labor now performs this duty; in future years two unskilled laborers must be employed for this work during the fire season.

**Telephones:** A refuge telephone line has been constructed. It extends from the headquarters at Hackberry Lake to the tower south of Hackberry lake, thence by the Newman and Sawyer residences, east to the secondary headquarters at Pony Lake, then east to the second observation tower located in the center of Section 21 southwest of 21 lake. Each tower is equipped with a table on which a map of the refuge is attached properly orientated to the north. By means of an alidade, the fire is



sighted and the degree of location ascertained. The readings are compared by the two towers and as a result the location of the fire can be accurately determined to the quarter section. Results would then be reported to the field men who would report to the area of the fire. Crews will report to the exact location of the fire without the greatest possible delay. Without such a method of location much guess work is involved.

#### Fire Control:

##### Back Firing on Head Fires:

A Grass fire advances rapidly by a head column leaving lateral fires to spread at right angles at a slower rate of speed. Prompt action must be concentrated on checking the advancing head fire. The safest and most practical method recommended if the cover is heavy and a strong wind is prevalent is to backfire from a strategic point at a trail or better yet at a firelane. The head fire is then checked and the task remaining is to eradicate the lateral blazes. Conditions of the country and number of men available will determine the method of attack. The Flame Thrower now in use by the Forest Service is recommended for back firing. By its use one can work rapidly and efficiently.

##### Checking Laterals and Down Hill Advancing Fires:

1. **Sand Throwing:** A man with a long-handled shovel can eradicate a long line of lateral fire in a short time. The firefighter walks rapidly along the line throwing sand on the burning vegetation. By practice, a three or four foot strip of burning grass can be dashed out by one stroke of

the shovel. The sand is thrown so that it covers along several feet of the line rather than all falling on the space of one foot of burning grass.

2. **Fire Pumps:** Water throwing fire pumps are less practical on grass than on forest fires. They are, however, valuable in extinguishing smoldering fires in cow chips which, if remained afire, are apt to be blown by the wind into the unburned area. The limited water supply which they hold makes them less practical on burning grass than "Sand Throwing" with the shovel which is practical as long as the man holds out.

3. **Plowing:** A "22" Caterpillar and a three-bottom plow may be used in plowing around a fire. The tractor and plow are loaded into a truck and hauled to the scene of the fire. Such an outfit can be held in readiness on a loading platform during the fire season. A single plow drawn by a truck may also be used where turfy sod is present in meadows.



