QUARTERLY NARRATIVE REPORT FOR
MAY, JUNE, JULY,
1939
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INTRODUCTION

The Narrative Report for the Valentine Migratory Waterfowl Refuge covering the quarterly period ending July 31, 1939, is divided into the following parts:

WEATHER AND WATER CONDITIONS

Weather
Water Conditions

WILDLIFE REPORT

Duck Nesting Report for the 1939 Season
General Wildlife Notes

REFUGE DEVELOPMENT AND MAINTENANCE

Physical Development
Plantings and Vegetative Outlook
Research and Investigation

PUBLIC RELATIONS

Official Visitors

ECONOMIC USES OF REFUGE

Special Use Permits

PHOTOGRAPH SECTION
PERSONNEL

*******

VALENTINE MIGRATORY WATERFOWL REFUGE

***

WARD M. SHARP
Assistant Refuge Manager

MILFORD K. THURBER
Assistant Clerk-Stenographer

EDWARD R. BULTINGHOUSE
Laborer-Patrolman

***
WEATHER AND WATER CONDITIONS

I -- WEATHER

a. May

The dry weather characteristic of March and April of this year continued throughout most of the month of May. The dry spell broke during the last week of the month when 1.45 inches of precipitation was received, making a total for the month of 1.92 inches. Temperatures during the month were quite moderate. The highest temperature was 92 degrees on May 29th, and the lowest was 38 degrees on May 13th. The dry weather during March, April, and the early part of May retarded the growth of vegetation.

b. June

Rains which began the latter part of May continued throughout the month of June, making a total of 3.60 inches of precipitation for June. This is 1.22 inches above normal. The temperatures were very moderate. The highest was 93 degrees on June 5th, and the lowest was 41 degrees on June 12th. June was a very favorable month so far as water conditions and the growth of vegetation was concerned.

c. July

Precipitation for the month of July amounted to 3.05 inches. This is .26 inches above average. During the evening of July 7, 1.75 inches of rain was received in less than an hour. No precipitation was received after the 16th. Abnormally high temperatures prevailed during the latter two weeks of July. This condition rapidly
depleted the soil moisture, and vegetation showed signs of drying and burning.

II -- WATER CONDITIONS

   a. Summary

   The absence of spring rains during April and May caused the lakes to drop in level rather than increase. The rains received in June had little effect upon the lake levels. High temperatures during the latter half of July caused the water levels to drop rapidly. Some of the smaller lakes have dried up completely. Hackberry Lake is approximately 15 inches lower than at the same time a year ago. All other lakes, likewise, were as low at the close of July, as they were at the close of September a year ago.

   Water gauges were installed on the major lakes and readings taken the first part of June. Readings were also taken again in July. The following is a tabulation of the gauge readings on the various lakes:

<table>
<thead>
<tr>
<th>Lake</th>
<th>Date Reading Taken</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6-9-39</td>
<td>1.00 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-13-39</td>
<td>.96</td>
</tr>
<tr>
<td></td>
<td>7-28-39</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>Total Drop</td>
<td>.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pelican</th>
<th>Date Reading Taken</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6-9-39</td>
<td>1.00 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-13-39</td>
<td>.88</td>
</tr>
<tr>
<td></td>
<td>7-28-39</td>
<td>.60</td>
</tr>
<tr>
<td></td>
<td>Total Drop</td>
<td>.40 Ft.</td>
</tr>
</tbody>
</table>
Water Gauge Tabulation (Continued)

<table>
<thead>
<tr>
<th>Lake</th>
<th>Date Reading Taken</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Marsh</td>
<td>6-9-39</td>
<td>1.00 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-12-39</td>
<td>.62</td>
</tr>
<tr>
<td></td>
<td>7-28-39</td>
<td>Dry</td>
</tr>
<tr>
<td>Pony</td>
<td>6-9-39</td>
<td>1.00 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-12-39</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>7-28-39</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td>Total Drop</td>
<td>.50 Ft.</td>
</tr>
<tr>
<td>South Marsh</td>
<td>6-12-39</td>
<td>1.00 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-12-39</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>7-28-39</td>
<td>.30</td>
</tr>
<tr>
<td></td>
<td>Total Drop</td>
<td>.70 Ft.</td>
</tr>
<tr>
<td>Whitewater</td>
<td>6-12-39</td>
<td>1.50 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-7-39</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td>7-31-39</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Total Drop</td>
<td>.50 Ft.</td>
</tr>
<tr>
<td>Dewey</td>
<td>6-12-39</td>
<td>2.00 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-7-39</td>
<td>1.90 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-31-39</td>
<td>1.39 Ft.</td>
</tr>
<tr>
<td></td>
<td>Total Drop</td>
<td>.01 Ft.</td>
</tr>
<tr>
<td>Hackberry</td>
<td>6-12-39</td>
<td>1.70 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-7-39</td>
<td>1.64 Ft.</td>
</tr>
<tr>
<td></td>
<td>7-31-39</td>
<td>1.11 Ft.</td>
</tr>
<tr>
<td></td>
<td>Total Drop</td>
<td>.59 Ft.</td>
</tr>
</tbody>
</table>
I. DUCK NESTING REPORT FOR THE 1939 SEASON

a. General

Nesting areas covered in 1938 were also studied again in 1939, with the following exceptions: Long Lake was not studied in 1939, while Pony Lake was added to our list of lakes for the first time. Four hundred forty-three nests were located and studied in 1938, while only 217 nests were located and studied in 1939. A decrease of 51 percent. Low water levels caused by extremely dry weather in March, April & May depleted potholes and shallow marshy areas that had an abundance of water throughout last year's nesting season.

b. Adult Populations

No census estimates were taken during May, June, or July. The populations observed at Pelican, Pony, and the Marsh Lakes indicated that there were at least two or more pairs of birds for every nest found on these areas. This held true throughout the nesting season. The percentages of males ran high on Pelican Lake. Judging by the number of females on this lake, and the number of nests found, it would indicate that 25 percent or more of the female duck population were non-nesters.

c. Nest Increases or Decreases over 1938 & 1937

(1) Puddle Ducks

Table I, "Nest Increases or Decreases of 1939 Season..."
TABLE I — NEST INCREASES OR DECREASES OF 1939 SEASON OVER 1937 AND 1938 SEASONS

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>No. of Nests Found</th>
<th>1939 Increase Over 1937</th>
<th>1939 Decrease Over 1938</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue-winged Teal</td>
<td>102</td>
<td>156</td>
<td>127</td>
</tr>
<tr>
<td>Shoveler</td>
<td>24</td>
<td>130</td>
<td>24</td>
</tr>
<tr>
<td>Pintail</td>
<td>5</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td>Redhead</td>
<td>8</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>Gadwall</td>
<td>38</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Mallard</td>
<td>10</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Canvasback</td>
<td>7</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Green-winged Teal</td>
<td>5</td>
<td>8</td>
<td>--</td>
</tr>
<tr>
<td>Baldpate</td>
<td>1</td>
<td>1</td>
<td>--</td>
</tr>
</tbody>
</table>
Over 1937 and 1938 seasons, will give a graphic picture of the nesting in 1939, as compared with other years. Now, having looked at this chart, I shall proceed with certain supplementary explanations that I feel are of interest.

The Shoveler was almost absent from the nesting areas when compared with 1938. In the latter season, 130 nests were found while in 1939, only 24 nests were found. It is interesting to note that only 24 nests were found in 1937.

Pintails decreased from 61 nests in 1938 to only 13 in 1939. Their nesting in the dry marshy areas may account for some of the decreases as we did not study these areas so closely. Eighteen nests were found in 1937.

Green-winged Teal and Baldpates nested in 1938, but no nests were located in 1939.

The Mallard with 36 nests in 1939, showed an increase over the past year of 10 nests. It was the only species that actually showed a marked increase over 1938, but was 2 nests under 1937, which had 38 nests.

The Blue-winged Teal showed a decrease of 29 nests over 1938. Their nesting in the dry marsh areas would, no doubt, account for the shortage of nests. Broods and pairs of breeding ducks would indicate no decrease in this species.

The Gadwall like the Shoveler and Pintail actually were scarce. Six nests were found in 1939, as compared with 23 in 1938. However, only 6 were found in 1937. This data is very similar for the Shoveler and Pintail.
Shovelers, Pintails, and Gadwalls, actually showed a striking decrease over 1938. Their nesting comparisons with 1937, however, were about equal. The Mallard showed an increase over 1938, but was about equal to the 1937 record. The data on the Blue-winged Teal has been fairly consistent for the past three years.

(2) Diving Ducks

All diving ducks (Redheads, Canvasbacks, and Ruddy) nesting on the area showed a sharp decline for the nests found in 1938. Since the spring migration numbers were the largest in the history of the refuge for these species, it is hardly possible to attribute the decrease to a shortage of these ducks. Extremely low water conditions in the marshy areas, we believe, is the cause of the decline.

The three marsh lakes have always been our best diving duck nesting area. These areas were more than 50 percent dried out by mid-June. Redheads and Canvasbacks, no doubt, sensed this condition and moved further in search of more suitable nesting areas.

d. Nesting Populations by Lakes

Nesting by lakes is graphically illustrated by the chart on Page 18, "Nesting Populations by Lakes." Pelican Lake holds first place with 42 nests. Last year this lake ranked first with 134 nests; a decrease of 92. Whitewater Lake is second with 37. Last year, 1938, this lake ranked sixth with 28 nests. This is an increase of 8 nests over the previous season.

The greatest decreases in nesting is noted on North, Middle,
and South Marsh Lakes and the Caif Camp Marsh. The dry spring depleted much of the choice potholes that had plenty of water last season. Last year, 176 nests were found on these four lakes, while only 65 were found in 1939, a decline of 66 percent. Poor water conditions are credited for this sharp decline. The general decrease on the refuge, however, can hardly be due to low water conditions.

e. Nest Life Histories

A total of 56 percent of all nests studied were robbed. The graph on Page 19, "Graph Showing Termination of All Nests," shows that 40 percent of all nests in 1938, were destroyed by predators. Even though our predation increased, the hatch also increased from 33 to 36 percent. This is due to a decline in nest desertions.

Desertions were high as usual among the diving ducks. Soft stemmed bulrushes when used for a nest are softened by decay so that the nest collapses before incubation is completed. This is common among Redheads and Canvasbacks.

Early nesting ducks that hatched before June 10, came off with an average hatch. Ducks nesting after June 10, suffered heavy losses from bull snakes. The greatest loss being after June 20.

f. Nest Predation

The graph on Page 19, "Graph Showing Mortality of All Nests," gives a comparison for predation in 1938 and 1939. Bull Snake predation increased from 26 percent in 1938 to 35 percent in 1939. Skunk predation increased from 10 percent in 1938 to 14 percent in 1939. There was an increase of one percent in badger predation.
Crow predation remains the same as last year. Raccoon predation shows a decrease. The raccoon is also more abundant this season than in 1938.

The coyote robbed no nests in 1939, while only one percent was recorded in 1938. This is due to Mr. Boultinghouse's efficient control program on this predator. He is able to keep the coyote population at a minimum.

Bull snake predation on 2 lakes that have had an extensive pocket gopher control program decreased ten percent. Lakes with no pocket gopher control showed an increase in bull snake predation over 1938.

**g. Boultinghouse Snake Trap**

The accompanying photograph shows one of Mr. Boultinghouse's latest inventions on a bull snake trap. It is designed to take the snake at the nest. This being the first season, he now sees where the trap can be improved upon greatly for greater efficiency. To give an example of the success of this trap the past season, 30 sets were made at duck nests and 16 bull snakes were trapped. In only one case did a duck desert the nest on account of the trap. In this case the bull snake was caught in the region 3 inches in front of the anus. Consequently, the snake was not killed. It remained in the trap from one afternoon until the next morning. The presence of the live, trapped, struggling snake and not the trap scared the duck away. Who wouldn't leave!!

**h. Nesting Cover Types**
(1) Plant Communities

The plant communities for the Valentine Refuge have been classified as follows by W. L. Tolstead, Ecologist, of the Conservation Survey Division of the University of Nebraska:

1. Meadow Communities which are divided into 2 groups:
   a. Wet meadow or lower meadow which extends from the marsh toward the uplands. This ground may be wet and swampy in wet weather. The dominant grasses are Calamagrostis, Carex, and Spartina.
   b. Tall grass meadow or upper meadow. The dominant grasses are blue stem (Andropogon furcatus), Indian grass (Sorghastrum Nutans), timothy, red top, and blue grass may occur on the lower borders of this community.

2. True Prairie Community
   a. The conspicuous dominant is switch grass (Panicum virgatum) associated with western wheat grass (Agropyron Smithii), Wild Rye (Elymus canadensis) and Balsam Sage (Artemisia grapholodes). This is the grassy zone between the high meadow and the sand or dune grasses. The true prairie is distinct and very characteristic in our vegetation.

3. Salt Grass Communities
   a. Salt grass communities comprises the vegetation located in the level, more alkaline areas, on the refuge. Common salt grass (Distichlas spicata) is the dominant. Associated species on more recently flooded grounds are squirrel tail (Hordeum), and three-square bulrush (Scirpus Americana).

4. Xerophytic Tall Grasses (Also called Sand Dune Communities)
   a. All very sandy upland soils are occupied by these grasses. This vegetative zone comprises several communities of grasses. This is the most diversified of the plant zones by having a greater abundance of grass species. Grass species making up the Xerophytic communities are sandhill reed grass (Calomovilfa longifolia), love grass (Eragrostis trichodes), drop seed (Sporobolus cryptandrus), and needle grass (Stipa commata). Many forbes or weeds occur in this plant zone, but Chenopodium is by far the most abundant.
5. Forbe or Weed Community

a. Weed communities are found in any of the preceding four groups of plant zones. They come in on areas that have had the grass removed by heavy grazing, flooding, etc. These plants are pioneers and are soon replaced by grasses in the ungrazed areas.

i. Method in nesting Cover Technique

All density was judged at the time the nest was active and not on the basis of a normal year's growth at the close of each season.

The square foot density method was employed throughout the study. The plot used was a circle of 100 square feet in area, a radius of 5.64 feet. The nest formed the center of the circle. The density of the entire area was estimated which included all species growing upon the plot.

The percentage of bulk or volume of vegetation was estimated on a basis of 100 percent. Later dead and green material was segregated on a percentage basis. Nest "A" for example, had 60% dead grass and 40% green grass by volume on the plot with an average of 8" in height. Its density or ground coverage was 40 percent or .4.

Density was estimated on ground coverage by erect or tangled vegetation. Dead grass closely flattened or matted on the ground was not considered as in these cases, it was as low or lower than the base of the nest and consequently of no value as cover for the nest, but of value in the base of the nest. A blue grass lawn would have 100 percent density.
Percentages of Upland Nesting Ducks Occupying the Five Plant Groups

The data on duck nesting is illustrated in Table II. The wet and high meadows are treated as separate zones in the table for sake of convenience. The Forbe (weedy) community is included as a community and not a distinct vegetation group ecologically speaking.

<table>
<thead>
<tr>
<th>Species</th>
<th>Wet Meadow</th>
<th>True Prairie</th>
<th>Salt Grass</th>
<th>Xero-phytic Forbs or Shrub Meadow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pintail</td>
<td>27%</td>
<td>13%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Mallard</td>
<td>55%</td>
<td>5%</td>
<td>22%</td>
<td>10%</td>
</tr>
<tr>
<td>Blue-winged Teal</td>
<td>38.27%</td>
<td>10.91%</td>
<td>16.91%</td>
<td>12.40%</td>
</tr>
<tr>
<td>Shoveler</td>
<td>33.32%</td>
<td>9.52%</td>
<td>19.04%</td>
<td>33.32%</td>
</tr>
<tr>
<td>Gadwall</td>
<td>25%</td>
<td>---</td>
<td>25%</td>
<td>---</td>
</tr>
</tbody>
</table>

TABLE II Showing percentage of duck nests by species found in six plant communities and one subcommunity

Wet meadow nesting was the most popular this year because of the very low water levels. The accumulating mat since 1935 has made these areas popular nesting grounds by cutting down the density due to carpeting of the old grasses.

The Xerophytic tall grass or dune grass communities rank second in nesting importance. The true prairie follows third and the salt grass communities fourth in preference.

Meadows unmowed since 1935 have gradually accumulated a mat of dead grass which has cut down the original density considerably. Open spaces are frequent and as a whole, nesting preferences have improved 50%. Tall erect dense areas of grasses are not preferred.
The duck prefers a lookout. Nests are located near open spaces within the area are preferred by four species of upland nesting ducks. Old mat becomes closely oppressed to the ground in unmowed meadow and marsh grasses. Such a condition gives a carpet effect so that a brood of ducklings may go over it to the water without difficulty.

Prairie and drier communities have no mat. The dead grasses usually remain erect and tangled. The coarse stout stems of these grasses prevent matting under most conditions.

Density of nesting cover ran higher in 1939 than in 1938 due to accumulated dead material. The average cover density for 5 species of dabbling ducks is as follows: Pintails 44; Mallards 41; Shoveler 41; Gadwall 36; and Blue-winged Teal 37 percent density.
GRAPH SHOWING DOMINANT NESTING DUCKS ON THE VALENTINE MIGRATORY WATERFOWL REFUGE, 1939

<table>
<thead>
<tr>
<th>Species</th>
<th>Total No. of Nests</th>
<th>No. of Nests Robbed</th>
<th>No. of Nests Hatched</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue-winged Teal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mallard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoveler</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pintail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redhead</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gadwall</td>
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<td></td>
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<tr>
<td>Canvasback</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruddy</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Black: Total No. of Nests
- Blue: No. of Nests Robbed
- Red: No. of Nests Hatched
**Graph Showing Nesting Populations by Lakes on the Valentine Migratory Waterfowl Refuge, 1938 & 1939**

<table>
<thead>
<tr>
<th>Location</th>
<th>1939 Populations</th>
<th>1938 Populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelican</td>
<td>42</td>
<td>133</td>
</tr>
<tr>
<td>Whitewater</td>
<td>37</td>
<td>26</td>
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<td>South Marsh</td>
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<td>Pony Lake</td>
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<td>Middle Marsh</td>
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<td>46</td>
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<td>West Twin</td>
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<td>25</td>
</tr>
<tr>
<td>Dewey</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>North Marsh</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Glory Hole</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Hackberry</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Calf Camp Marsh</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

*Red Figures* 1938 Populations

*1939 Populations*
GRAPH SHOWING THE TERMINATION OF THE TOTAL NUMBER OF ALL NESTS FOR THE 1938 AND 1939 SEASONS AT THE VALENTINE MIGRATORY WATERFOWL REFUGE

<table>
<thead>
<tr>
<th>%</th>
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<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
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<tbody>
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<td>Robbed</td>
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<td></td>
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<td>Hatched</td>
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<td>1938 Season</td>
</tr>
<tr>
<td>Deserted</td>
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<td></td>
<td></td>
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<td>1939 Season</td>
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GRAPH SHOWING MORTALITY OF ALL NESTS AND LIST OF PREDATORS DESTROYING THEM ON THE VALENTINE MIGRATORY WATERFOWL REFUGE, 1938 & 1939

<table>
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<tr>
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<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Snake</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>1938 Season</td>
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- 1938 Season
- 1939 Season
II — GENERAL WILDLIFE NOTES

a. Upland Game Birds

(1) Sharp-tailed Grouse

The following is a list of grouse observed on different parts of the refuge. They were observed at widely separated localities so that we feel sure they were all individual broods and not repeats:

- 6-10-39 — 15 small grouse in west end of Sweetwater Valley
- 6-12-39 — 8 grouse in Micheel Valley
- 6-27-39 — 10 grouse, Southwest side of Center Marsh
- 7-5-39 — 10 grouse, Sawyer Hay meadow
- 7-10-39 — 3 broods of 8 each, "21" Lake Valley
- 7-15-39 — 3 broods with a total of 28 young, valley around Belsky Lake in Grazing Area #13

A total of 10 broods were seen. Last year over the same period, a total of 17 broods were observed.

(2) Pinnated Grouse or Prairie Chicken

Two broods of young of 8 to 10 in each were observed during July. One at the west end of Sweetwater Valley, and one in the valley about a mile south of "21" Lake.

(3) Pheasants

Twenty-four nests were found by the duck nest survey crew. Fifteen of the 24 nests hatched; two were deserted and seven were robbed — five by skunks and two by bull snakes. The Shoveler, a duck species, for example had 24 nests on the same type of ground as occupied by the Pheasants. A 40 percent hatch was realized by the duck and 62 percent by the pheasant.

It is interesting to note that bull snakes don't care about
robbing a pheasant nest. Apparently the flailing that is administered by the pheasant hen is sufficient to induce the snake that it is bad luck to eat pheasant eggs.

The dragline operator, Mr. Farber, brought in a dead bull snake that he observed being pecked by a male pheasant. Examination showed that the head and neck were badly pecked. The snake died after it was picked up by Mr. Farber.

A brood of 10 young pheasants about 5 days old were seen on the refuge lawn July 29. This is the smallest brood we have seen so late this season.

(4) Chukar Partridge

The adults all mated and left to select breeding grounds. To date, no broods of young have been seen. In one case, 5 of the adult birds have bunched.

b. Black and Foresters Terns

(1) Black Terns

Black Terns nested most abundantly of the tern species on the refuge. The most boggy inaccessible places were chosen by these birds. A conservative estimate would place their now present numbers on the refuge at about 12,000 to 20,000.

(2) Forester's Terns

Forester's Terns were not so abundant as the former named species. Hackberry Lake was the best nesting area. They selected semi-floating hammocks of dead bulrush, rhizomes, and black muck for their nesting sites. On July 7, 17 nests with eggs and 41
young that had left the nests were counted. (See accompanying photographs).

c. Curlews, Avocets, Willets, and Upland Plovers

(1) Long-billed Curlews

Photographs included in this report give an excellent study of the young curlews a few days after they have hatched. The bill is no longer than that of a young turkey. Young curlews observed in late July can be distinguished from the adults by the shorter bill.

Four nests of the Long-billed Curlew were found on the east end of the Sawyer hay meadow. They were on ground mowed last year and were located all within a radius of 200 yards. Greater nesting may be encouraged by mowing small areas in the vicinity where these birds are known to nest.

Flocking and indications of Curlew migration were noted on July 29 and 30. Forty curlews were seen in one flock on the south part of the refuge. Another flock of 10 was seen on Sunday, July 30.

(2) Avocets

Avocets occurred on all lakes having open sandy borders. This shore bird appears to be on the increase.

(3) Upland Plovers

This upland shore bird is not showing a very encouraging increase. Approximately 10 nests were found during the season. A great percentage of these nests were destroyed by bull snakes.

(4) Western Willets

Four nests of this shore bird were located during
the nesting season. Their habitat selected is similar to that of
the curlew except that it is closer to water.

(5) Other Shore Birds

Thousands of White-rumped, Semi-palmated, Yellowlegs,
and other sandpipers migrated during May. Lesser Yellowlegs have
been seen about the refuge throughout the Months of May, June, and
July.

d. Bird Arrivals After May 1, 1939

Early spring arrivals were listed in our February-April
Narrative.

- Blackbird, Red-winged, 5-1-39
- Blackbird, Yellow-headed, 5-1-39
- Bluejay, 5-3-39
- Chipping Sparrow, 5-7-39
- Eastern Kingbird, 5-7-39
- Warbling Vireo, 5-8-39
- Arkansas Kingbird, 5-9-39

e. A Bird Bath for Orchard Orioles, Yellow Warblers,
Grackles, and Blackbirds

Orchard Orioles use the lawn sprinkler at the refuge head­
quartes daily for a shower and source of drink. On July 29, seven
of these birds were at the sprinkler at one time. They were iden­
tified as both parents and 5 immatures.

Bronzed Grackles and both Red-winged and Yellow-headed Black­
birds use the sprinkler, but apparently only for a bath. The Yellow
Warbler is a daily visitor to the sprinkler. Morning Doves and the
Kingbirds do not go near the public shower.
f. Osprey

An Osprey was seen near Duck Lake on May 7. It was perched on a fence post with an 8 to 10-inch bullhead in its talons. Our approach caused it to take flight. A marsh hawk gave hot pursuit, but the fish hawk circled and gained altitude so swiftly that the hawk was soon left far below. It carried its fish until it disappeared.

g. Green Racer (Coluber constrictor flaviventris)

A great commotion was raised by two Eastern Kingbirds early in the afternoon of June 25, in an elm tree west of the service building. I went to the tree and spied a Green Racer on the trunk about 7 feet up among the branches. I walked to the north side of the tree and saw the bird's nest on the limb on which the snake's head and forebody was now heading. Suddenly, it ran out on the limb and into the nest. The parent birds were making passes at him and popping their beaks, but perhaps my presence made them less aggressive because he grabbed an egg in his mouth and began swallowing it. I jumped up, grabbed the snake out of the nest, and killed it.

h. Duck Hawk vs. Great-Horned Owl

While checking a Great-Horned Owl's nest at the Michael place, the female flushed and flew to a tree 200 yards east, and then returned at once to the top of a dead willow near the nest. A Duck Hawk appeared and began diving at the owl. Each pass became closer so that the owl had to finally dodge quickly in order to not
be struck. This sudden ducking of the owl lost its balance and it
started for the next tree. In flight to the tree 200 yards to the
east, the hawk dove again, the owl escaping only by a sudden, but
well-timed dodge at the proper time by dropping about 1½ inches.
My presence didn't seem to scare the hawk. The second time the owl
perched so that limbs obstructed the hawk's diving. The Owl's
perfect coordination and timing in dodging the hawk's pass apparently
saved its life.

i. Herons

A heronry of about 100 nests of the Black-capped Night
Heron and 12 nests of the Great Blue-Heron were located in a Hack-
berry grove on the south side of Dads Lake.

j. Great-Horned Owl Nest Observations

Two nest observations on the Great-Horned Owl were given
in our February-April narrative report. These nests were termin­
ated during late May. A third nest was located on May 5. The young
owls were small and did not have their eyes open.

Prey brought to and left in the nest of the two previously
reported nests was less common because the young were able to con­
sume most of it during the night. Pellets were more common so
that a few were collected from each nest almost daily. Only two
birds -- a Coot and a female pheasant were brought to the nests
during May. The rest of the food consisted chiefly of young jack
and cottontail rabbits. The balance being mice of various genera.

K. Snapping Turtle Lays its Eggs

About 7 p.m., June 23, 1939, I observed a snapping turtle
on the lawn near the curb south of the pump house. It had dug down with its front feet so the body was slightly tilted. We went about mowing the lawn, and it apparently became accustomed to our presence. Finally at about 8 p.m., it reversed its rear into the depression dug out by the front feet. I crawled up behind the brute and observed. It was digging with its hind legs. Once in a while it would reach in with its right hind leg and bring out a paw full of earth. Then the left leg would repeat the going in and out with a paw full of soil. The tail was braced on the ground and served in raising the rear portion of the body each time the legs were put in and taken out of the hole which was being excavated.

When a sufficient sized hole was cleaned out, the turtle kept its right hind leg in the hole and egg laying started. The turtle, by the aid of its tail, raised its body so the right foot was pulled out of the hole then the anus was placed in due position and 2 eggs were laid. The right hind foot was thrust into the hole and moved around clawing soil over the eggs. When sufficient covering was completed, the turtle would raise its body always bracing with the tail and pull the foot out. Then it would lay two more eggs, insert the foot and cover as above. This process was repeated until the eggs were all lain. The egg-laying process was observed by use of a flashlight. Only two eggs were laid at each time followed by thrusting the right hind leg into the hole to repeat more covering.

The turtle performed so nicely that I let her have her liberty when her task was finished.
L. General Predator Control

(1) Crows

Eight crows were killed during May and June. Three of these were shot while on their nests by Bouitinghouse and 5 others were shot by him at the Pony Lake grove.

(2) Skunks

Ten skunks were taken on nesting areas at Pelican, Whitewater, Pony, and Marsh Lakes during May and June. Six of the ten were females that had litters of young judging by the teats and the milk contained in them. On one occasion, a tiny skunk was found dead in the trail about 300 feet from the place a female with young had been killed. The loss of the mothers may easily account for the fate that befell the other litters.

(3) Weasels

One weasel was taken at a set by a freshly robbed duck nest. The weasel was apparently caught by accident on account of its curiosity. I say this because the skunk was trapped a few days later.

(4) Bull Snakes

Records show that 140 bull snakes were brought in for posting. Those with any food in their stomachs and intestines were preserved for food habits studies.

(5) Snapping Turtles

Thirty snapping turtles were taken during their egg-laying period of June 1, to June 12th. Many of these were cut
open, but their stomachs were always empty indicating nonfeeding generally during the egg-laying season.

(c) Badger

One badger was taken at a trap on the nesting area at Pelican Lake. We have made no effort to control this mammal since its nest predations are not serious.

(7) Franklin Ground Squirrels

Two were taken in traps at duck nest. This was the only record we have had of these squirrels occurring on the refuge. We have no definite proof as to why they happened to get in the traps.
REFUGE DEVELOPMENT AND MAINTENANCE

I -- PHYSICAL DEVELOPMENT

The following report gives a summary of important development projects carried on at the refuge during the past three months. Fuller details of this development are given in the CCC report.

a. Other Buildings

(1) Dieffenbach Overnight Cabin

Work was completed on constructing the cabin, combination barn and garage, and well. The pump was installed at the well and the shutters replaced on the windows of the cabin. The latter was the last work towards the completion of this unit.

(2) Pony Lake

This group of buildings consisting of a residence, combination garage and shop storage shed, barn, chicken house, skinning house, grain bin, and water storage tank has been completed. The last structures to be completed in this group were the storage tank and the erecting of the windmill tower and final completion of the garage and shop. With the completion of this group of buildings, we have a very practical unit as secondary headquarters in this part of the refuge. These buildings were remodeled or constructed from salvaged materials, using new shingles. They will be long-lived and will serve an important function on the refuge.

(3) Lake 13, Warden's Cabin

This set-up consists of an overnight cabin, a well
and pump were placed near the cabin. A chimney was built on the west end of this building in order to make it practical for winter occupancy.

(4) Newman Buildings

The Newman buildings consist of the residence, combination barn and garage, chicken house, cellar, and a hide house or work shop. For some reason or another, this group of buildings is not yet completed. Construction on the Gordon Dam and work at the Dads Lake Concession have apparently taken priority and this group of buildings has been neglected somewhat towards completion.

(5) Fences

Fences in the following locations were completed during the period May to July: One mile of fence along the north side of Area No. 12 from South Marsh Lake west to East Twin Lake. Two new wires were attached to the fence along the north side of Area No. 13 which had previously been built of old salvaged wire. A fence of 1½ miles to two miles in length was built around the King Flat hay meadow, thus separating it from Grazing Area No. 14. Salvaged posts and wire were used in this construction. About 2 miles of fence were built along the south side of the Toms Valley hay meadow. This fence will serve as a boundary along the north side of a portion of Area 13a. A quarter of mile of fence was built extending from Dads Lake south to the north side of Area #6. This was constructed for the purpose of a water lane for cattle grazing in this area. A fence using mostly salvaged materials was located
around the newly located feedlot at the east side of the Mícheel valley. A board windbreak of about 200 feet in length was also constructed at this feedlot.

(6) Wells

The following wells were washed down during May and June: Pony Lake headquarters, Diefenbach overnight cabin, Mícheel feedlot and one located on Grazing Area No. 15. Towers and windmills were erected over wells at Pony Lake headquarters, Mícheel feedlot, and Area No. 15.

(7) Hackberry Diversion Ditch and Control Structure

The diversion ditch extending from Hackberry to Dewey Lake was completed during early May. The water control structure located in this ditch was completed all except installing the fish screen and splash boards. This was unfinished at the close of July.

(8) Lake and Pond Development

Twelve potholes were completed during the period. Six are located on Dewey Marsh and six are on Long Lake. Two excellent potholes with islands were constructed with the Link-Belt dragline on Dewey marsh. It is not practical to construct islands with the Bay City dragline due to its smaller size.

(9) Reconnaissance and Investigation

A crew of enrollees totaling about 10 men worked on the duck nesting surveys from the 15th of May to the 30th of June. Nesting studies were carried on at ten lakes during the period.
(10) Pocket Gophers

The area covered and treated for the poisoning of pocket gophers is located in the vicinity of Hackberry, Dewey, Whitewater, Pelican, and Long Lakes. Approximately 2,100 acres of land was covered in this spring's program. Pocket gopher poisoning was discontinued after June 20. It will be resumed again around the first of September. The mid-summer months are inactive periods for this mammal.

(11) Food & Cover Planting and Nurseries

The results of these projects will be discussed under plantings and vegetative outlook.

(12) Gordon Creek Dam

Work got underway on this project during July.

(13) Dads Lake Resort

Excavating and building forms for pouring concrete for the foundation for the concession building, boat building, and fish building was started during July.

(14) Headquarters Buildings

The drain leading from the tuber cellar was dug up and found to have been very poorly located resulting in a failure of the water to drain out of the tuber cellar. A pit was constructed and walled up by concrete blocks thus providing a permanent means of drainage. The rust spots on the headquarters buildings were picked out by chisels and the cavities refilled with white cement. Painting of the cinder walls of the barn and machine shed got underway during late July.
(15) Trails

Several man months were used in constructing and reconstructing trails of the refuge. This work consisted chiefly of haying and leveling up roads.

II -- PLANTINGS AND VEGETATIVE OUTLOOK

a. Plantings, Marsh & Aquatic

(1) Wild Millet

One thousand pounds of wild millet seed was received from Swan Lake, Missouri, and was planted during May on the refuge. Islands of six newly constructed potholes at North Marsh Lake were planted to wild millet. Several other small plots were planted in various parts of the refuge.

(2) Prairie Bulrush

One thousand pounds of prairie bulrush seed was received from North Dakota. The following areas were planted: School Lake, a plot at east end of Dewey Lake, west end of Michael Lake, at potholes 1, 2, and 3, North Marsh Lake, Lost Lake, and on the west and south sides of Mule Lake.

(3) Wild Rice

Six hundred pounds were taken to Lake Andes and planted.

(4) Pondweed Seedlings

Pondweed seedlings removed from germinators in our laboratory are planted in newly constructed potholes for observation.
(5) Buckwheat, Corn, Kaio, & Milo Sorghums

Plots of buckwheat were planted at east end of Whitewater Lake, South and Middle Marsh Lakes. The CCC narrative report for April and May, 1939, reports that Corn, Kaio, and Milo were planted in the following places: At South marsh, corn 2 acres, kaio, 2 acres; at a point south of Tony, 3/4 acre to kaio, 3/4 acre to milo; at Twin Valley near grove, corn, 3 acres; at West Twin Lake, corn 2 acres; at barrow pit, kaio, 1 acre; At Middle Marsh Valley, corn, 6 acres, kaio, 2 acres, milo 2 acres; at School Lake, 1 acre of corn, 1 acre of kaio; east of Whitewater, corn 2 acres, kaio, 7 acres; east of Sawyers, corn, 3 acres, kaio, 2 acres, milo, 2 acres; at the west end of Dads Lake, kaio, 1 1/2 acres, milo, 1 1/2 acres. A total of 20 acres of corn, 11 1/2 acres of kaio, and 7 3/4 acres of milo have been planted.

b. Tree and Shrub Plantings

(1) Soft-stemmed Bulrush (Scirpus acutus)

Two hundred pounds were collected during July. A close watch was made on the bulrush crop for ripening. The crop was ripe and ready to collect by July 15. It is going to be hard to clean the chaff from the seeds due to the lightness of the seeds. The seeds began shattering from the heads by late July.

c. Seed Distribution

(1) Wild Rice

Crescent Lake received 600 pounds
Lake Andes received 600 pounds
d. Results of Plantings

(1) Wild Celery

Wild celery purchased from Terrell's aquatic gardens in the fall of 1937 was planted in potholes at Watts Lake the same fall. This year wild celery has shown up and is making an excellent growth. Long leaves are coming to the top of the water in dense clumps.

III -- RESEARCH AND INVESTIGATION

a. Pondweed, Tule Lake Sago Seeds

Seeds sent to this refuge by Mr. Fairchild of the Tule Lake Refuge have to date given 70 percent germination. Germination tests with semi-excised embryos indicate that this lot will eventually give 85 percent germination. The above germination results were from seeds treated by the sunshine-drying-sunshine process.

b. Pondweed seedling Development

One lot of Sago pondweed seedlings were let remain in the germinator for observation on growth. Two extremely interesting observations and discoveries were the results. Photographs in the photograph division of this report show two interesting stages: (1) Tuber development on plants 60 to 70 days old and (2) Rhizome development of plants of the same age. An interesting method of budding was also observed, but this is rare, only one example being observed.

Rhizome development directly from the young seedling is the common method of growth. Tuber development is common, but tubers
develop first with no rhizomes appearing. Later rhizomes usually develop. In a few cases, the tubers developed into rhizomes. This, to me, is an interesting discovery of the life history of sago pondweeds.

c. Longevity of Pondweed seeds in Nature

The photograph in the photograph division of this report shows a pondweed seedling that was found on June 21, 1939, in a pothole excavated last October at North Marsh Lake. So far as we can ascertain, the area around this pothole was flooded last in 1929 and 1930. The seedlings developing from seed in 1939, were then probably 9 to 10 years of age. Two species of pondweed were found in this pothole growing from seed (1) a broad-leaved species probably Potamogeton americanus or P. angustifolius and (2) a narrow leaved species illustrated in the photograph which is apparently P. panormitanus.

d. Prairie Bulrush Grown from Seed

A planting of prairie bulrush (Scirpus palidosus) seedlings grown from seeds in our laboratory are giving excellent results. A fuller report will be given later.
PUBLIC RELATIONS

On May 12, and 13, Refuge Manager Sharp attended the annual meeting of the Nebraska Ornithologist's Union held at North Platte, Nebraska, and gave a talk entitled, "The Function of the Valentine Migratory Waterfowl Refuge in Conserving Nebraska's Bird Life."

The following official visitors were at the refuge during the past three months:

- Mr. A. C. Elmer -- one visit in July
- Mr. W. F. Kubichek -- one visit in May
- Mr. Burnie Maurek and Mr. F. C. Gillett of the regional office inspected the refuge during these months.
- Mr. E. R. Kalmbach of the Food Habits Division at Denver, visited the refuge with Mr. Imler to discuss nesting research problems and results.
- Mr. Imler visited the refuge also for a day in late May.
- Mr. C. J. Henry, Mr. Karl W. Craven, and their wives came to the refuge for a brief visit on Memorial Day.
Haying and grazing privileges extended to the local ranchers comprise the major special uses of the Valentine Refuge.

Sixteen special use permits have been issued for harvesting of hay on the refuge during the 1939 season. July 16, was set as the earliest date at which permittees could begin haying operations.

The hay crop this year is much lighter than a year ago due to the shortage of rainfall during the early spring months. Early reports are that the yield is approximately 50 percent less than that of a year ago.

Special use permits for grazing on the refuge have also been issued to a number of local ranchers. One thousand three hundred four head of cattle were grazing on the refuge at the close of July.

Respectfully Submitted,

[Signature]

H. M. Sharp
Mamma teal told me to swim over here and tell you that the whole teal family wants to extend our wholehearted thanks and appreciations to all of you migratory waterfowl people who are doing a wonderful job in preserving us and our lakes and marshes from exploitation and annihilation.
Nest of Forster's Terns with 3 eggs located on a boggy semi-floating island in Hackberry Lake.

Young of Forster's Terns in same colony as the above nest with eggs. The nest lining along with other things was pondweed tops plucked from the water surface over the lake.
Young of Great Horned Owls 6 days old at Dewey Lake Marsh.
Hatched April 11, 1939.

Young of Great Horned Owl 28 days old. Mother Owl's babies are frightened at the camera.
Young Long-billed Curlews 1 to 5 days old; note the short bill at this age. They resemble young turkeys somewhat at this stage of growth.
Sago Pondweed seedlings in germinator. Seeds received from Tule Lake Refuge. After Sunshine-drying-sunshine treatment, 70 percent germination was the results.

A seedling of Potamogeton taken from newly excavated pothole with dragline at North Marsh Lake. No. seeds were planted in this area. Seed probably was in soil 8 to 10 years.
Sago pondweed seedling showing rhizome development at the age of about 60 to 70 days. Note the seed still attached to the plant.

Sago pondweed seedlings showing tuber developments at the age of 60 to 70 days. This occurrence is not at all uncommon. Scale is in centimeters.
Boultinghouse Bull Snake Trap to show position when set

Boultinghouse Bull Snake Trap showing snake caught
January 8, 1940

Regional Director,
Post Office Box 1269,
Omaha, Nebraska.

Dear Mr. Naurek:

Reference is made to the May-July 1939 Quarterly Report for the Valentine Lakes Refuge, submitted to this office by Dr. Sharp.

The heading "Trees and Shrub Plantings" on page 34 of the report is followed by a discussion of Scirpus acutus and there is no discussion of the heading as listed. We are of the opinion that an omission has occurred and this belief is strengthened by the fact that the Valentine Lakes CCC Narrative Report for April-May 1939 reported the planting of 35,666 trees during May.

Please bring this matter to the attention of Dr. Sharp and request the submission of tree and shrub planting records for the period concerned.

Sincerely,

W. F. Kubihek,
In Charge,
Section of Habitat Improvement
Division of Wildlife Refuges