

LIST OF WILDLIFE REPOSITARY NARRATIVE REPORTS

MR. SALYER _____

MISS BAUM _____

MR. CRAWFORD _____

Operations

~~MR. DEWAN~~ _____

WJTC 6/19

MR. DUMONT _____

Land Management

MR. ACKERKNECHT _____

DR. MORLEY _____

Habitat Improvement

MR. BANKO _____

MR. STILES _____

MR. KUBICHEK _____

Stenographers

REFUGE CRAB ORCHARD

PERIOD Jan - Apr 1959

CRAB ORCHARD NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

January thru April, 1959.

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF SPORT FISHERIES & WILDLIFE
Fish and Wildlife Service
Route #2
Carterville, Illinois

CRAB ORCHARD NATIONAL WILDLIFE REFUGE

REFUGEE STAFF

H. E. STILES PROJECT MANAGER
W. D. CARTER REFUGE MANAGER
G. H. HUNTER ADMINISTRATIVE ASSISTANT
A. O. MANKE SOIL CONSERVATIONIST
L. B. SHEFFIELD PARK RANGER
C. C. WINGARD ENGINEER TECHNICIAN
K. N. OLSON ASSISTANT REFUGE MANAGER
ADMINISTRATIVE & TECHNICAL STAFF 7 Employees
J. J. PICKAR FOREMAN, MIXED GANG
CRAFTS, TRADES & MAINTENANCE 8 Employees
LABORER (WAE) 5 Employees
W. E. ELLIOTT FOREMAN, REFUGE SHOP
OPERATORS & MECHANICS 5 Employees
W. T. CAMPBELL FOREMAN, LABORER
LABORERS 7 Employees
F. L. NORTON FOREMAN, LABORER
RAILROAD SECTION (WAE) 8 Employees
A. BOLES FOREMAN, WATER & SEWER
WATER & SEWER PLANTS. 5 Employees
E. C. HUNTER FOREMAN, HEAT & STEAM
HEAT & STEAM PLANT 4 Employees
G. MELTON FOREMAN, PROTECTION & SECURITY
PROTECTION & SECURITY 9 Employees

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I. GENERAL

Weather Conditions

January and February were characterized by temperatures low enough to completely freeze Crab Orchard Lake. Snowfall during these two months amounted to only 1.25 inches; somewhat below the amount expected for this period.

March rains were few and April showers were not to be had. Precipitation for April was 2.33 inches below normal and 7.30 inches below the wettest recorded April (1957).

Table I below summarizes weather statistics. These data were collected by the official weather station at the Marion Veterans Hospital, Marion, Illinois.

Table No. I - Weather Statistics for Report Period

Month	Snowfall	Precipitation		Temperature	
		This Month	Normal	Maximum	Minimum
January	1.25	3.61	4.80	63	- 1
February	--	2.91	2.66	68	10
March	--	3.26	4.03	78	24
April	--	1.78	4.11	86	32
Total	1.25	11.56	15.60	Extremes 86	- 1

Habitat Conditions

Water.

Crab Orchard Lake. During the middle of January, the lake level rose 1' above the spillway crest and then dropped 1' by the 31st of January. For the remainder of the period, the lake level never varied more than 0.5' above or below the spillway crest.

Little Grassy Lake. During January the water rose from 2' below to the spillway crest and never varied more than 0.1' for the remaining months. There was no manipulation of the valves at either Crab Orchard or Little Grassy Lakes during this period.

Devils Kitchen Lake. The valve was closed during January to permit work on the downstream side of the dam. By mid-February, water had filled the basin to a depth of 48'. The valve was opened 12" on February 27, and 48" on March 3. Drainage of the basin was completed by the middle of March. The Devils Kitchen water control valve will not be closed until the watershed fish poisoning project is completed.

Streams and ponds contained a "low average" amount of water during the first three-quarters of the period. In March and April, paddlers and lesser scaup used these ponds during their northbound journey. A dry April resulted in lowered, sluggish streams and receding potholes.

Food and Cover.

"Slim pickings" summarizes the amount of food available to Canada geese in the inviolate area at the start of the period. Fields of corn and winter grain had been depleted by the geese during late 1958. Some forage was provided by the refuge pastures. Harvested corn and bean fields off the refuge furnished most of the food. Goose trapping activities required 250 bushels of corn during the period. An additional 500 bushels were fed out in March.

Five thousand Canada geese were seen (at the post!) grazing on the infield of the Hambletonian race track near Du Quoin, Illinois.

Some of our best "bunny" habitat was destroyed when the land clearance brush piles were burned. However, food and cover during the period was adequate to maintain a high population of Bob-white Quail and cottontail rabbits.

II. WILDLIFE

Migratory Birds

Canada goose day use for the period showed a 38% increase compared to 1958. Honker use in 1957 was about the same as this year. The goose population build up occurred earlier this year. The 43,500 peak was about 12,000 more than was recorded in 1958.

Actually, the goose population used the refuge as an area headquarters. Weekly census flights occasionally showed there were two or three sub-headquarters. The birds used the refuge for loafing and grazing, but all grain feeding was on private land.

The major exodus of geese occurred during the first week in March. Last year it was the 25th before the main flock departed.

The final census of the period showed 97 Canadas on the refuge. We expect most of these will remain as summer residents.

Our annual survey of goose nesting was conducted on April 22. Ten nests were found on islands in Crab Orchard Lake. Six of these had either been destroyed or all evidence of successful hatching was absent. Two nests contained two eggs each with incubating birds present. One nest contained 5 eggs with incubating bird present. One nest had recently hatched with 3 goslings present.

Table II below shows a comparison of goose nesting during the past 5 years.

Table No. 11 - Goose Nest Comparison - 5-Year Period

Year	No. of Nests	Date of Census
1954	9	4-30
1955	11	4-26
1956	11	4-19
1957	8	4-15
1958	7	5-1
1959	10	4-22

The number of Snow and Blue geese using Crab Orchard this period was not significant. A slight increase over the 1958 population was recorded.

There was a 154% increase in dabbling duck use this period. This is an impressive increase percentage-wise but does not involve an impressive population.

The only species showing a population decrease was the Black Duck. Baldpate and Pintails remained about the same. Other shallow water ducks showed considerable increases.

Our small diving duck population showed a slight increase for the period. Ringnecks, Ruddies and Common Mergansers were responsible for the increase. All other divers showed a decrease. The spring waterfowl migration was a week or ten days earlier than last year. Several species lingered longer than usual; however, we have attributed the increase in waterfowl use to the scarcity of surface water outside the refuge.

Other Waterbirds

The ice-bound condition of Crab Orchard Lake during January and February restricted early use by our usual waterbirds. A few Common Loons, Horned and Pied-billed Grebes moved in after the ice disappeared in late February. Double-crested Cormorants appeared in early April and Common Egrets arrived in mid-April.

Great Blue Herons were seen during March but did not become common until late April. Little Blue Herons are usually late arrivals but Lee Bush recorded one on April 10 this year. A few Green Herons, Black-crowned Night Herons and American Bitterns appeared in their usual limited numbers.

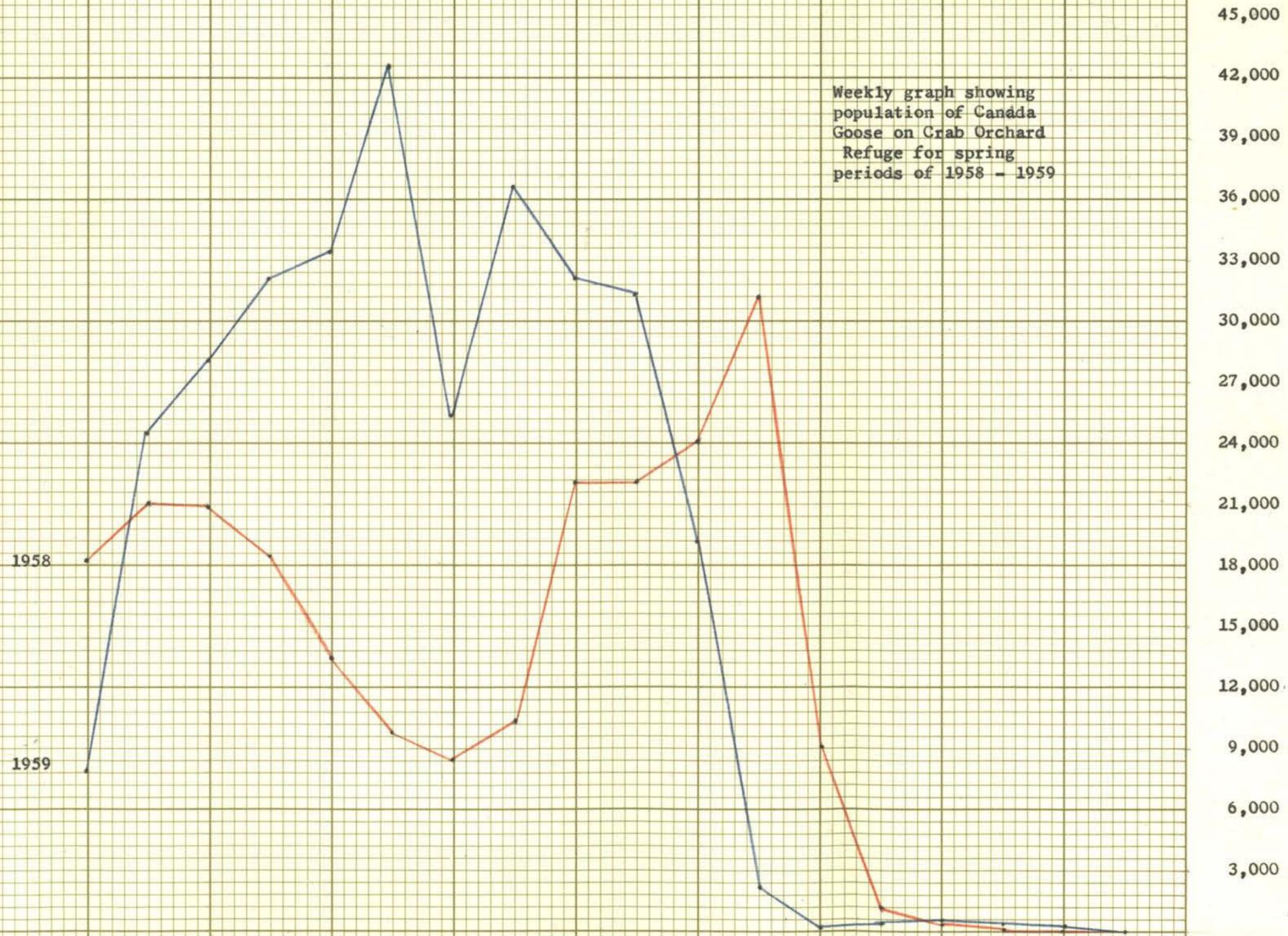
Shorebirds

There were three unusual shorebird visitors this period. A flock of 28 Golden Plover was observed on April 5. Eight Northern Phalarope were seen April 23, and one Franklins Gull was identified on three different occasions in April.

Table No. 111 - Comparison of Waterfowl Useage Days Between 1958-1959
Spring Season.

Species	1958	1959	1959 Popula- tion Trend.
<u>GEESE</u>			
Canada Goose	1,606,304	2,219,350	+ 38%
Hutchin's Goose	---	91	+
Snow Goose	35	21	- 40%
Blue Goose	28	98	+250%
Goose Totals	1,606,367	2,219,560	+ 38%
<u>DABBLING DUCKS</u>			
Mallard	206,955	695,023	+236%
Black Duck	70,700	14,441	- 80%
Gadwall	280	574	+105%
Baldpate	1,687	1,673	- .0008%
Pintail	3,325	3,157	- .005 %
Green-winged Teal	154	378	+145%
Blue-winged Teal	2,947	9,863	+235%
Shoveler	1,113	4,970	+347%
Wood Duck	126	224	+ 78%
Dabblers Totals	287,287	730,303	+154%
<u>DIVING DUCKS</u>			
Redhead	1,862	1,225	- 34%
Ring-necked Duck	5,229	5,943	+ 14%
Canvasback	13,160	3,381	- 74%
Lesser Scaup	30,492	14,882	- 51%
Goldeneye	30,639	14,693	- 52%
Bufflehead	252	42	- 83%
Ruddy Duck	175	1,869	+968%
Hooded Merganser	16,870	4,298	- 75%
Common Merganser	442,259	612,675	+ 39%
Red-breasted Merganser	---	238	+
Divers Totals	540,938	659,246	+ 22%
TOTAL DUCKS	828,225	1,389,549	= + 68%
Coots	39,011	30,877	- 21%

JANUARY FEBRUARY MARCH APRIL
 1 8 15 22 29 5 12 19 26 5 12 19 26 2 9 16 23 30



Killdeer arrived later than usual this year. The first nest was found March 27, and young were seen April 10. A few Woodcock, Wilson Snipe and the two yellowlegs were recorded during the period. The Upland Plover population continued its decline of the past few years. The sandpipers, terns and gulls appeared in nearly normal numbers.

Mourning Doves

No attempt was made to record dove census data this period. The first dove cooing was heard on February 14, and nest building began March 25. Most of us have the impression there were more doves this spring. Our annual coo count routes will be run in May.

Upland Game Birds

It's easy to get an exaggerated impression of the spring population of Bob-White Quail. When the covies start to break up in April the "spring shuffle" seems to put quail under every blade of grass. The dry, warm weather of April stimulated a majority of the birds into nesting activities. With favorable weather we should have a bumper bird crop next fall.

The success of the Wild Turkey release last spring and summer is still undetermined. Single birds have been observed on eight different occasions this period. Courting activities were observed on one other occasion.

Big Game Animals

Our growing white-tail deer herd was very much in evidence this period. Traffic through the refuge, on State route 148, was interrupted several times as 20 to 30 deer grazed on the new R.O.W. rye seeding.

Last period's population estimate of nearly 700 deer seemed too low when we were seeing 20 to 30 deer during a normal days travel.

Fur Animals, Predators, Rodents and Other Mammals

Muskrat.

Little muskrat activity has been recorded and the population in general is low. Many of the ponds do not support enough aquatic growth to maintain a muskrat population. Outside of several protected bays, Crab Orchard Lake falls into the same category.

Some pond dikes have been undercut by bank dens and these animals are being controlled by trapping and gas bombing.

Mink.

Two observations were made during this period and few signs were noted along the waterways.

Raccoon.

The "coon" population is at a high level. Many observations of this "bandit" have been made even during daylight hours.

Skunk.

The population is apparently down as few observations (by eye or nose) have been made.

Opossum.

This "old timer" competes very well on the refuge. Road kill has been high and as many as four dead possums per mile have been counted.

Red and Gray Fox.

Numerous observations of red fox have been made during the period, and several sightings of his retiring gray cousin have been reported. A gray was seen hunting mice in the ear corn used as bait in the goose trapping program.

Coyote.

Coyotes have been seen a half-dozen times this spring and appear to be on the increase. If the westerners persist with their 1080 programs perhaps this Country will be the last stronghold of the coyote. We prefer the coyote to the raccoon.

Fox and Gray Squirrel.

No significant changes in the population have occurred, and numbers of both species appears at or near carrying capacity.

Cottontail Rabbit.

Numerous field observations and high road kill indicates that the population has remained at a high level. Rabbit cover is abundant. Pre-refuge farms and fields were small. Many of these old fence rows and farm sites still remain. It is here that the honeysuckle, sawtooth and blackberry briars, woodchucks and cottontails abound.

Woodchuck.

As mentioned previously, the chucks have plenty of cover. Add to this adjacent fields of clover and the sum is woodchuck -- many woodchuck. High populations also occur in the old Ordill War Plant Igloo Areas. Every igloo is honeycombed with burrows.

In April the Predator and Rodent Control branch initiated a woodchuck control experiment with the assistance of refuge personnel. Dieldrin (a chlorinated hydrocarbon -- related to DDT) has been used with success on

rats as a "contact" poison. Rats pick up the Dieldrin powder on their fur from their runways, and the powder is ingested during cleaning. Powdered Dieldrin was heaped or blown into ten active chuck dens. Results showed some possible repellent effects, but no definite kills.

Woodchuck control on the refuge will again be directed toward those animals that are damaging soybean fields.

Hawks, Eagles, Owls, etc.

Every summer since 1954 a pair of Osprey have maintained a nest on Crab Orchard Lake. They arrived in late March again this year.

The number of Marsh Hawks seems to have decreased this year. Otherwise, the species common to this area (indicated on NR-1A) are present in normal numbers.

Fish

The Cooperative Fisheries Management Research Laboratory at Southern Illinois University carried out two sampling studies in March. The results of these samplings are discussed in the Field Investigation and Applied Research section.

Cane pole fishing from the bank is the favorite of most fishermen at Crab Orchard Lake. The catch is divided among white crappies, yellow bass, largemouth bass, bluegill, bullheads and carp. Little Grassy Lake has again produced some fine catches of largemouth bass.

III. REFUGE DEVELOPMENT AND MAINTENANCE

Physical Development

General Wildlife and Biological Development

- Peeled 2400 pine posts.
- Cleared 2 miles of boundary fence
- Brushed and sprayed woody vegetation on 4 pond dikes
- Brushed and sprayed 1/2 mile fire trail.
- Planted 42,500 pine seedlings.
- Planted 8,000 multiflora rose seedlings.
- Made 100% cruise of 180 acres of timber.
- Removed and burned 1/4 mile of old fence row.
- H--Made rough fish survey of Devils Kitchen Lake watershed.
- Began preliminary land preparation on 180 acres refuge farm land.

Recreational Development and Maintenance

- 225 tons broken concrete hauled from Route 13 construction to Lookout Point and Public Boat Dock as rip rap.
- 175 tons rock salvaged from old parking lots and used for road road repairs and new parking area at Hogan Beach.
- 18 large general informational signs renovated.
- 65 traffic sign posts and barrel hangers painted aluminum.
- Renovated and reroofed Hogan Shelter.
- 150 picnic tables legs painted aluminum.
- 1200 feet of guard rail painted aluminum.
- 8 septic type toilets - exterior woodwork painted.
- 24 trash barrel hangers constructed.
- 10 iron fireplaces constructed.
- 2 movable toilets constructed.
- 1 double stall toilet constructed and installed at Hogan Beach.
- 1300 board feet lumber cut and pressure creosote treated for replacement of pier at Crab Orchard Beach.
- 150 pine posts salvaged during thinning at Camping Area.
- 1 acre brushed and pruned at Camping Area.
- 2 miles of roads graded in public areas.
- 1 hand pump installed on old well at Hogan Beach.

Soil and Moisture Conservation

- Established permanent contour guides for 240 acres.
- Cleaned 4300 lbs. grass and legume seed.
- Seeded legumes on 200 acres in pasture renovation.
- Seeded 15 acres in pasture with grassland drill.
- Installed 800 feet breakwaters for bank protection.
- Contributed to 20 acres brush removal for pasture renovation.
- With aid of cooperators, constructed 4.5 miles of fence.
- Completed conservation plans for 5000 acres.
- Attended 5 meetings re soil and moisture conservation.

Plantings

Aquatics and Marsh Plants. None this period. Bulrushes planted in 1957 in several farm ponds have become established and are spreading.

Trees and Shrubs. Class 5 and 6 land in Agricultural unit B-2 was planted with most of the 18,000 loblolly pine, 18,000 shortleaf, 2000 Scotch and 500 White pine purchase from the State nursery at Jonesboro.

34,500 Trees

About 12,000 Multiflora rose seedlings were planted. Some of these were used to interplant gaps in older fence plantings. Others were used as borders on upland game habitat areas on the public hunting grounds.

This year weather conditions made it possible to use the tree planter for most of the season. The planting crew was a hard working bunch and did a commendable job.

4,000

Two rough areas in Agricultural Unit A-36 were planted with 4000 black locust.

Cultivated Crops. About 275 acres of wheat and rye can be harvested out of about 900 acres planted. Except for 10 acres of rye, all grain fields fit to be harvested are, as usual, outside of the inviolate portion of the refuge. The rest of the winter grain was "for-the-birds", destroyed by the geese.

An unusually dry, warm April permitted farmers to plant over 300 acres of spring oats. It also permitted plowing of almost all the fields scheduled for corn and soybeans prior to May 1. In fact a few corn and soybean fields were planted just about May 1. This is a vast difference from the past two years when cooperators were still plowing corn and soybean fields to almost July 1.

We will watch a number of corn fields with keen interest because of unusual fertilization. Starting next year a fertility maintenance program financed largely by the cooperators will be mandatory. Several cooperators believe it to be good enough to start this year on a voluntary basis. The program could be termed the "200-plan." Approximately 200 pounds each of ammonium nitrate, triple-super-phosphate, and 60% muriate of potash per acre, or their equivalents, are plowed or disced in ahead of corn. This is just about enough to replace the nutrients removed through a five-year crop-rotation. Although this may not sound unusual or startling in many areas, it is a revelation at Crab Orchard. We anticipate, and hope, hope, hope for a marked increase in yields to help sell the program. At least this plan will curtail further depletion of soil fertility.

The early spring has also provided a shot-in-the-arm to the cooperators. All of them got their tractors in high gear and were happy and content watching the clods roll over. Except for a very few, farmer morale and energy are high. As Mr. Claude Turner said, "Nothin' like feeling your oats in the clover."

Olin Mathieson Chemical Corporation again contracted to do some development in an area leased to it. The 18 acres limed and planted to grain sorghum last year was seeded to a fescue-ladino mixture. Another 12 acres are plowed, will be limed, and planted to sorghums this year. In this manner we hope that the igloo area leased to the company will be developed into a good goose pasture.

Permanent contour guide lines of Sericea lespedeza were established and seeded on about 240 acres. This is the first spring in three years that soil conditions permitted seeding sericea.

Refuge personnel are again farming Unit A-41. As soon as a satisfactory drainage system is completed this area will again be turned over to a cooperator. A-41 will be planted mainly to corn. A hybrid dwarf corn (stalks about 36" - 40" tall) will be used in place of grain sorghum. A few rows of dwarf corn tried last year showed much promise. It yielded better than the average normal corn and, of course, was 100% available to the geese. Our grain sorghum became badly infested with army worms last year, and we were afraid of even greater damage this year because of a possible large carry-over.

Collections and Receipts

Seed or Other Propagules. - None this Period.

Specimens. No specimens were collected this period.

Fires

Field fire danger during late March and most of April was high. The refuge fire tower was manned 11 days and refuge personnel suppressed 5 fires. Three fires occurred adjacent to the refuge and burned over 122 acres of private and U. S. Forest Service land. Two small fires on the refuge burned .6 acres.

An estimated \$215.00 was the suppression cost for this period. For the second time in refuge history a party responsible for starting a field fire was charged with the cost of suppressing the fire. Mr. James Nanney of Carbondale paid the refuge suppression cost for a fire which burned over 120 acres of U.S.F.S. and private land.

IV. RESOURCE MANAGEMENT

Grazing

Pastures are scheduled to support 927 cattle and 8 horses for six months which amounts to 5610 A.U.M.'s. A possibility exists that this will be increased if satisfactory growth occurs on about 200 acres of renovated pasture.

Pastures were in good to excellent condition at the beginning of the grazing season, May 1. Although several ponds showed signs of seepage for the first time, the water supply is deemed adequate in all pastures. Our strategy has been planned for removal of a few pest muskrats and groundhogs that have taken residence in pond dikes.

As an experiment, a 30 acre pasture was topped with liquid nitrogen, Uran 32. It was applied at the rate of 150 lbs. per acre. This amounts to about 50 lbs. nitrogen per acre. Even in the cool damp weather of March the effects were almost immediate and evident. As the temperature warms the effects are expected to become increasingly evident. The grasses are much deeper colored and about six inches taller where applied. It, no doubt, increases the amount of forage. It was applied slightly late and some of the early lespedeza leaves were burned. No serious or permanent damage occurred.

No conclusions have been drawn, but several opinions can be ventured. First, early top dressing of nitrogen on pastures may be valuable to the refuge in delaying the need of pasture renovation by a year or more. Small unthrifty grass plants could be stimulated to get the jump on weeds. Second, unless used as above, top dressing is of much more value to the cattlemen than the refuge. Therefore, it should be left optional and at the expense of the permittee. He could benefit by the refuge allowing more cattle on a given acreage.

Haying

A few red clover fields and an alfalfa field outside the inviolate portion of the refuge show excellent growth and prospects. Inside the inviolate portion, red clover fields were heavily damaged by the geese and prospects of good hay are poor.

It is too early to determine the value of lespedeza hayfields. A normal crop is anticipated. No hay was permitted to be cut after September 1 last year. This should be some insurance that lespedeza fields reseeded normally.

Fur Harvest. None for this refuge.

Timber Removal

Five special use permits were issued for the harvest of 1502 black locust posts. Total revenue derived from these sales was \$135.18.

Refuge personnel made a 100% cruise of 180 acres of bottomland timber in farm units A-12 and A-13. Timber sale bid invitations will be distributed next period.

Commercial Fishing

Two special use permits were issued for commercial fishing on Crab Orchard Lake. One permittee is operating only 2 hoop nets for fun. The other has ambitious plans of baiting rough fish with corn and catching them with trammel nets.

Other Uses

The payment from Concessionaire Schwartz and Davis is calculated at 3% of their gross receipts and is tabulated in the following table.

Table No. IV - Schwartz & Davis Concession					
Item	Jan.	Feb.	March	April	Total for 1959
Refreshments					
Boat Dock	\$	\$	\$	\$ 8.71	\$ 8.71
Gas & Oil		.36	6.40	15.96	22.72
Boat & Dock Rental		.22	1.80	6.23	8.25
Storage	12.15	6.15	47.70	76.16	142.16
Merchandise	16.48	25.77	127.70	376.06	546.01
Labor	1.00	.38	.65	1.21	3.24
Totals	\$ 29.63	\$ 32.88	\$184.25	\$484.33	\$731.09
Plus annual payment					250.00
Total payments, 1959					\$981.09

Revenues realized from all phases of the recreational operations are listed in the following table:

Table No. V - Recreational Revenues

Item	Jan. through April, 1959
Camp lease, Educational Council of 100	\$ 300.00
Camp permit, Boy Scouts of America	1.00
Camp permit, Girl Scouts of America	1.00
Camp permit, Future Farmers of America	1.00
Concession, Julius Swayne, Little Grassy	30.00
Concession, Schwartz & Davis	981.09
Total Revenues	\$ 1314.09

V. FIELD INVESTIGATION OR APPLIED RESEARCH

An analysis of two samplings of Crab Orchards' fish population by Mr. Edward Lyles, S. I. U. Fish Research Laboratory revealed some interesting data. These data appear in the tables below.

It is evident the fish population is in poor condition. Less than 20 percent of the total population is of catchable species and only a portion of this 20 percent is of catchable size.

FISH POPULATION OF A 1.7 ACRE COVE OF CRAB ORCHARD LAKE 1/

Species	Total Weight (lbs.)	Percent of Weight
<u>Game Fish</u>		
Largemouth Bass	15.2	8.4
White Crappie	17.0	9.4
Black Crappie	2.0	1.1
Bluegill	10.8	5.9
Green Sunfish	1.5	0.8
Longear Sunfish	3.0	1.6
Warmouth	.8	.4
Yellow Bullhead Cat		
Black Bullhead Cat		
Total Game Fish	50.3	27.6
<u>Weed Species and Misc. Species</u>		
Gizzard Shad	20.0	11.0
Carp <u>3/</u>	13.5	7.4
Drum <u>3/</u>	14.5	8.0
Yellow Bass <u>2/</u>	77.5	42.6

1/ Sample taken by Mr. Edward Lyles March 20, 1959 by closing off the cove with a plastic divider and poisoning with 2 ppm sodium cyanide. Cove considered lies south of Southern Acres on Sneed Road. First cove on left after crossing bridge.

- 2/ The yellow bass does not reach catchable size in Crab Orchard and hence cannot be considered of any value.
- 3/ The carp and drum might afford some recreational fishing but they are not normally sought after and hence must be considered undesirable.

FISH POPULATION OF A 1.7 ACRE COVE OF CRAB ORCHARD LAKE

Species	Total Weight (lbs.)	Percent of Weight	
<u>Weed Species and Misc. Species Cont.</u>			
Golden Shiner	.2	.1	
Madtom	.2	.1	
Bullhead Minnow	.2	.1	
Blackstripe Topminnow			1 fish
Orangespot Sunfish	5.0	2.8	
Swamp Darter			
Johnny Darter			
Common Shiner			
Gambusia			
Total Weed Species	131.2	72.1	

FISH POPULATION OF A 1.57ACRE COVE OF CRAB ORCHARD LAKE 1/

Species	Total Weight (lbs.)	Percent of Weight	
<u>Game Fish</u>			
Largemouth Bass	24.5	2.4	
White Crappie	13.8	1.4	
Black Crappie	0.8	0.1	
Bluegill	64.0	6.4	
Green Sunfish	2.8	0.3	
Longear Sunfish	8.5	0.9	
Warmouth	5.8	0.6	
Yellow Bullhead	0.5	0.1	
Total Game Fish		12.2	

Weed Species and Misc. Species

Gizzard Shad	536.0	54.0	
Carp <u>3/</u>	241.5	24.3	
Drum <u>3/</u>	63.5	6.4	
Yellow Bass <u>2/</u>	28.0	2.9	
Golden Shiner	3.2	0.3	
Madtom			29 fish
Bullhead Minnow			7 fish
Blackstripe Topminnow			28 fish
Orangespot Sunfish	0.5	0.1	
Total Weed Species		88.0	

- 1/ Sample taken by Mr. Edward Lyles May 1, 1959 by closing off the cove with a plastic divider and poisoning with 2 ppm sodium cyanide. Cove considered lies east of Hogan Point and south of old Highway 13.
- 2/ The yellow bass does not reach catchable size in Crab Orchard and hence cannot be considered of any value.
- 3/ The carp and drum might afford some recreational fishing but they are not normally sought after and hence must be considered undesirable.

Canada Goose Banding Data January 1 - April 30, 1959

<u>Classification</u>	<u>Male</u>		<u>Female</u>		<u>Total</u>
	Ad.	I.	Ad.	I.	
New Birds	53	21	23	32	129
Returns	1	0	0	0	1
Recoveries	* 3	0	** 2	0	5
Repeats	2	0	1	0	3

Banding operations continued through March 15, at which time most of the Canada Geese had left for the "far north". Highest success was achieved in January, two weeks after the close of the goose hunting season, before the birds had developed a strong feeding pattern outside the refuge.

During January - February birds were trapped in corn and bean fields, however as the ground thawed out, the "mud" fouled up trapping operations. The cannon net trap was then set up to fire across a gravel road. 25% of the Canaga geese were caught in this manner.

Geese entered the trapping area most willingly at sunset, however the white tailed deer also entered the trapping area most willingly at sunset. Deer continually plagued operations, and during late February the baiting strip (ear corn) became a "graveyard" for deer antlers knocked off at night by jousting bucks. Corn fed out to the deer in several adjacent areas proved rather successful in keeping the deer out before sunset.

* Horseshoe Lake Refuge, Cairo, Illinois

** Jack Miner Bird Sanctuary, Kingsville, Ont.

VI. PUBLIC RELATIONS

Recreational Uses.

The relatively quiet and pleasant months of January, February and March were shattered in April by the roar of 50 + hp. motors on Crab Orchard Lake.

Spring was on us before we realized and there was a mad rush to prepare refuge recreation areas for the anticipated record breaking crowds.

Requests from various organizations (boat clubs, etc.) for leases on the shores of Crab Orchard continue. Our refusals, with the support of the Regional and Central offices continue. We feel quite strongly and justified with our policy of maintaining the refuge public use area for the public.

The following dog trials were held on the area during this period:-

Feb. 8 - Sangamon Beagle Club - Derby
 Feb. 14 - Crab Orchard Beagle Club - Western Derby
 Feb. 15 - Egyptian Beagle Club - Western Derby
 Feb. 20 - Regional Brittany Trial
 Feb. 28 - Egyptian Beagle Club - Derby

Mar. 1 - Crab Orchard Beagle Club - MidWestern Derby
 Mar. 8 - Sangamon Beagle Club - All Age
 Mar. 15 - Crab Orchard Beagle Club - All Age
 Mar. 21 - Sangamon Beagle Club - Western Derby
 Mar. 22 - State Zone Beagle Trial

Mar. 7-8 E & N Field Trial Club
 Mar. 14-15 Crab Orchard Gun Dog Classic & Amateur All Age
 Mar. 20-21 All American Derby Championship
 All American Quail Championship

Refuge Visitors

Refuge visitors other than industrial contacts during the period were logged as follows:-

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
Jan. 9	Ben Gelman	Southern Illinoisan	Photographs
	J. Mitchell	Shawneetown High School	Tour of Refuge
27	Dr. William Barton	Springfield, Ill.	Courtesy

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
Jan.			
29	Ralph Von Dane Maurice Whittacre	F.W.S. Pilot State Fish Hatchery	Aerial census State Fish Hatchery
30	Ralph Von Dane Herb Duncan John Waters Vic Blazevic Morgan Wildon	Game Management Agent	Conference - enforcement
Feb.			
4	Martin Anderson Leonard Harris Carl Parsons A. Howell Les Kahler	Ill Forest Service Ill. Forest Service Crab Orchard F. T. C. Crab Orchard F. T. C. Ill. Forest Service	Courtesy Courtesy Field Trials Field Trials Timber Management
5	Larry Jahn	Wisconsin Cons. Dept.	Courtesy
6	Reid Troutman	Carbondale, Ill.	Quail trap.
9	Harry Crain	Crab Orchard F. T. C.	Field trials.
11	Julius Swayne & class	Herrin High School	Refuge tour
13	Robert Neilson	Forest Service	Pine Plantations
17	K. C. Baysinger Cy Brown Oscar Peters	Marion, Ill. Dept. Agriculture Dept. Agriculture	Goose depradation Ag. field drainage Ag. field drainage
Mar.			
2	Cy Brown	Dept. Agriculture	Farm Plans
4	Dr. Neil Hosley Dick Dickson Maurice Whittacre	S. I. U. Forest Service Ill. Dept. Conservation	Pine Plantation Pine Plantation Fish Hatchery
5	Van Ray	Marion Ill. Constable	Law Enforcement
9	Ralph Von Dane	U. S. F. W. S. Pilot	Aerial Census
10	Bill Jay	Carterville, Ill.	C. O. S. A.
11	Marshall Stinnett	U. S. F.W. S. G. M. A.	Law Enforcement
16	Reid Troutman Edward Lyles Kenneth Glasco	Ill. Dept. Conservation S. I. U. U. S. Dept. Agriculture	Law Enforcement Fish census Coop Farming.
25	Dr. Ed Behr Dr. Neil Hosley Dr. Harry Dubuar	S. I. U. S. I. U. S. I. U.	Timber Study Timber Study Timber Study

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
April 1	Wayman Presley	Makanda, Ill.	Fishing Permit
2	Max Lane	Ill. Forest Service	Fire Suppression
9	Paul St.Amon	U. S. Forest Service	Courtesy
22	Vic Blazevic	U. S. F.W.S. G.M.A.	Courtesy

Refuge Participation

Members of the Crab Orchard Refuge staff represented the Service at the following meetings and activities during the period:-

January

- 1 -Stiles participated in panel discussion program, "Business Outlook for Southern Illinois", over radio station WCIL, Carbondale.
- 7 -Sheffield presented slide talk to Carterville Scouts.
- 12 -Carter - guest speaker, Herrin Rotary
- 13 -Sheffield - slide talk for West Frankfort Rotary.
- 16 -Sheffield - annual meeting Williamson County Tourist and Recreation Association.
- 19-
- 23 -Stiles - Regional Office goose management conference.
- 20 -Carter and Sheffield - Meeting of Coordinating Council of Southern Illinois Tourist and Recreation Association.
- 27 -Stiles - Marion Chamber of Commerce annual meeting and banquet.
- 27 -Manke and Carter - Meeting of Southern Illinois Biology Teachers Association.
- 28 -Stiles - Annual meeting Illinois Technical Foresters Association.
- 29 -Stiles, Carter and Sheffield - Annual meeting of Southern Illinois Incorporated.
- 30 -Stiles - Management Development Program meeting at Marion Veterans Hospital.

February

- 3 -Sheffield - slide talk to Murphysboro Rotary.
- 5 -Stiles - guest speaker, Marion Jr. Chamber of Commerce "Bosses Night".
- 7 -Carter and Stiles - Annual game dinner of Crab Orchard Sportsmens Association.
- 9 -Sheffield - slide talk, Murphysboro Kiwanis.
- 10 - Carter and Stiles - Annual meeting, Williamson County Tourist and Recreation Association.
- 11 -Stiles - guest speaker of Sangamo Electric Company breakfast and plant tour - National Electric Week.
- 13 -Sheffield supervised work detail for Carterville Scouts.

- 14 -Carter, Refuge tour, Herrin High School biology class.
- 17 -Stiles, Carter, Sheffield, meeting with Southern Illinois Recreation Coordinating Council.
- 18 -Sheffield - slide talk to Carterville Presbyterian Church.
- 18 -Stiles and Olson supervised scout field day at Little Grassy Scout Camp.
- 20 -Sheffield - meeting of Williamson County Tourist and Recreation Association.
- 21 -Carter - lecture tour for S.I.U. Game Management Class.
- 22 -Carter - Organization meeting of C. O. Sailing Club.
- 23 -Stiles and Sheffield - meeting Southern Illinois Incorporated.
- 24 -Stiles, Carter and Manke - S.I.U. Wildlife Seminar.
- 25 -Sheffield, - meeting Southern Illinois Recreation Coordinating Council.

March

- 5 -Stiles, Manke, Carter - meeting Crab Orchard Sportsmens Association.
- 12 -Stiles, Manke, Carter - directors meeting, C. O. S. A.
- 16 -Stiles - guest speaker, Herrin Rotary, "Future Influence of Refuge on Local Economy".
- 23 -Stiles - meeting Southern Illinois Incorporated.
- 25 -Sheffield - meeting Southern Illinois Tourist and Recreation Coordinating Council.
- 30 -Stiles and Sheffield - annual meeting of Rend Lake Association.
- 31 -Manke - meeting of Williamson County Conservation Needs committee.
- 31 -Sheffield - slide talk Murphysboro First Baptist Church
- 31 -Stiles - meeting Southern Illinois Tourist and Recreation Coordinating Council.

April

- 2 -Manke, Stiles and Carter - meeting C.O.S.A.
- 13 -Sheffield, Carter and Stiles - meeting Williamson County Tourist and Recreation Association.
- 15 -Stiles- guest of American Society of Public Administration
- 17 -Carter and Manke - meeting Williamson County Soil Conservation Service Board of Directors.
- 27 -Stiles and Sheffield - meeting Southern Illinois Incorporated.
- 29 -Sheffield - meeting Southern Illinois Tourist and Recreation Coordinating Council.
- 30 -Carter, Sheffield, Stiles - meeting with Haven Committee.

Hunting

The cottontail rabbit season ended January 20. By that date the refuge public hunting area was well trampled. A few rabbits remained but they kept to the heaviest cover of the most isolated spots.

Violations

Recreational patrol and enforcement began early in April. This early concentrated effort seems to have improved visitor conduct.

A list of refuge violators with results is as follows:-

<u>Date</u>	<u>Violator</u>	<u>Type</u>	<u>Fine & Cost</u>
3/4	Donald Haskins - Marion	Speeding	\$ 20.00
3/10	C. L. Ramsey - DuQuoin	Littering	10.00
3/31	Michael Jennings - Murphysboro	Reckless driving	41.40
3/31	Ronald L. Walker - S.I.U.	Littering	13.20
4/4	David Thomas - Carbondale	Failure to report to J.P.	15.00
4/4	Billy Ridings - Herrin	Littering	20.00
4/7	Dale Hosto - S.I.U.	Disobeying Officer	33.20
4/7	Donald Menzel - S.I.U.	Running stop	18.20
4/7	Jerry Wallis - S.I.U.	Disorderly conduct	18.20
4/7	James Conaway - S.I.U.	Disorderly conduct	18.20
4/21	Joe B. Bryant - S.I.U.	Speeding	15.00
4/23	Timothy West - S.I.U.	Expired Auto license	15.00
4/28	Robert Rader - Carbondale	Littering	15.00
4/30	Donald Mayhue - S.I.U.	Boat in Swimming area	13.20

An additional 92 reprimands were made for the following reasons:-

19	Speeding
14	Immoral conduct
11	Cars entering at "Exit"
8	Running "Stop"
9	Disorderly conduct
7	Littering
6	Throwing rip rap into lake
3	Unauthorized firearms
3	Following too closely
2	Reckless driving
2	Trespassing in closed area
1	Illegal transportation of intoxicants
3	Miscellaneous traffic violations
4	Boating violations

Several thefts of boats and motors were reported. The largest haul of 3 practically new 35 h.p. outboards (\$1500.00) was made from boats docked at the Public Boat Dock.

Vandalism was relatively light and limited to pulling up several traffic signs and breaking bottles.

VII. INDUSTRIAL ACTIVITIES

Water Use

Industrial Consumption. Production of treated water this period, primarily for industrial consumption, averaged 1,057,500 gallons per day. This is an increase of 164,000 gallons per day over the corresponding period in 1958. Resumption of production at Olin Mathieson Chemical Corporation's Nitric Acid Plant in February accounts for the sustained demand for treated water. Minor employment gains in all refuge industries also account for increased water consumption.

Table No. VI - Quantities of Water and Sewage Treated at Refuge Operated Plants.				
Month	Jan. - April, 1958		Jan. - April, 1959	
	Gallons Treated Water	Gallons Treated Sewage	Gallons Treated Water	Gallons Treated Sewage
January	23,678,000	4,829,000	28,421,000	6,145,000
February	24,926,000	2,250,000	32,078,000	5,736,000
March	33,760,000	3,735,000	36,465,000	5,392,000
April	24,860,000	3,861,000	29,940,000	6,599,000
Total	107,224,000	14,675,000	126,904,000	23,872,000
Average Daily Pumping this Period (Water) - - - - 1,057,500 gallons				

Municipal Use. Raw water pumping from Crab Orchard Lake this period was limited to use by the City of Carbondale. Supplies in city-owned reservoirs of Marion, Herrin and Carterville were adequate to meet their needs and their raw water pumping facilities on Crab Orchard Lake remained idle throughout the period.

Facility Activity, Development and Maintenance

The battle to keep facility maintenance and rehabilitation ahead of breakdowns continued through the period. Since many of the original Army Ordnance Plant facilities here were initially constructed for a minimum life expectancy of five years--those now in service for 16 years are requiring major maintenance--if not complete replacement.

Boiler House. Following is a table of comparison of steam production at Boiler House No. 1.

Table No. VII - Comparative Steam Production, Boiler House No. 1				
Boiler No. & Type	Jan. - April, 1958		Jan. - April, 1959	
	Steam Prod.	Fuel Used	Steam Prod.	Fuel Used
No.1-Coal Fired	39,903,500#	5,017,160#	32,959,500#	4,454,300 #
No.2-Oil Fired	9,222,500#	70,360gal.	9,947,000#	87,800 gals.
Total Steam Prod.	49,126,000 pounds		42,906,500 pounds	

The quality of coal supplied under the current G.S.A. contract left much to be desired. All efforts to have the contract cancelled by G.S.A., or to get the local mine to take remedial steps were to no avail. Reduction in payment penalties assures that the Government pays for only the quantity of BTU's contained in the coal, but this procedure helps little in solving the problem of inefficient boiler operation and performance. Contract specifications for coal to be supplied this facility during next fiscal year have been completely revised. It is hoped that this action will eliminate problems encountered this past heating season. At least we are reasonably certain the new specifications will eliminate the "gopher hole" mining operations that was awarded last year's contract.

Major maintenance to the Boiler House this period included removing slag from the combustion chamber and rolling the tubes in Boiler No. 1, installing new truck unloading coal conveyor, overhauling of steam turbine, overhauling of boiler feed steam pump and general cleanup of boiler house interior and chemical storage shed.

Buildings and Grounds. Major items of construction, rehabilitation, and maintenance completed under this heading are as follows:-

- Fabricated three chemical feeders for boilers at Shop, Office and Fire Station.
- Constructed bridge from piling up over Crab Orchard Creek on Chamnesstown Road.
- Quarters maintenance and repairs - Quarters Nos. 1, 2, 3, 4, 7, 10, 13, 16 and 23.
- Extensive door repairs to storage buildings FAM 4-1 and 4-2.
- Re-arranged and painted interior of Central Shop.
- Constructed bridge over creek on east end of Ogden Road.
- Road patching and maintenance - Approximately 10 miles of bituminous roads.
- Temporary repairs to Ogden Road Bridge over Sugar Creek.
- Renovated all signs at highway-railroad intersections.
- Painted trim on office building.
- Replaced septic tank disposal fields at Quarters Nos. 1 and 2.

Equipment.

- Repairs to tandem drive on Model 12 motor grader.
- Engine repairs to No. 105 Locomotive.
- Painted No. 8 Dodge pickup truck, No. 37 White truck-tractor, 5' and 8' rotary mowers.
- Overhauled two Carver water pumps.
- Overhauled three tractor mowers.
- Rebuilt railroad hand car.
- Major and minor repairs to three dump trucks, two stake trucks and winch truck.
- Removed two radios from trade-in vehicles and installed in new vehicles.

Railroad. Rehabilitation of the refuge railroad was resumed on March 16 when an eight-man section gang was rehired. Work on track maintenance progressed through the remainder of the period under favorable weather conditions. Major accomplishments are listed as follows:-

- Unloaded five carloads of railroad ties (2238).
- Cleaned, lubricated and adjusted all railroad switches.
- Replaced 1100 cross ties.
- Cleaned and repaired all railroad grade crossings.
- Placed and graded cinders around all railroad switch stands.

Increased production at Olin Mathieson's Dynamite Plant and operation of a new ammonia nitrate fertilizer warehouse here by Monsanto Chemical Company spurred railroad switching activity. A total of 620 cars were handled this period. For the corresponding period in 1958, our railroad handled 580 cars. The Month of April set somewhat of a record when 245 cars were handled.

The railroad switching rates of \$9.44 per car, in effect since 1944, were increased to \$15.00 per car on May 1. This measure was taken to bring revenues more in line with operational costs. The \$15.00 rate is still substantially less than those approved by the Interstate Commerce Commission for similar services by commercial carriers.

Water and Sewer. Operation of the Water Plant was relatively trouble-free this period. Occasional breaks in 2", 4" and 8" service lines caused some loss of water before detection, but these were soon repaired by a crew now "old hands" at the game.

Contract construction of a 40' diameter floating cover at the sludge digester along with renovation of the sludge heating system was begun April 1. At this writing, the work is nearing completion. Undigested sludge has been pumped to a temporary lagoon throughout the winter without undue pollution of the drainage area below the lagoon.

Water and sewer rates charged refuge industries were adjusted upwards during the period to conform more closely with local municipal rates. These rates, effective May 1, will also provide a more favorable cost/return ratio for these facilities.

Other work accomplished in the Water and Sewer Departments are listed as follows:-

- Began program of sewer line repairs on 15 inch mains.
- Cleaned, serviced and repaired 42 pumps and motors at seven sewer lift stations and at water and sewer plants.
- Repaired several breaks in water service lines.
- Overhauled 10" water meter at Olin Mathieson's Explosives Plant.

Fire and Security Activities

Two minor fires involving project buildings are reported this period. Sparks from a welding torch ignited rubber oxygen and acetylene hose in the

maintenance room at Olin Mathieson's Boiler House serving their Solid Propellant Research and Development Area. A leaking oxygen valve was a contributing cause of this fire. Automatic sprinklers and quick action by fire fighting personnel of Olin and the refuge restricted damage to the welding equipment.

The second fire occurred in the Ammonia Nitrate Mix-house at Olin Mathieson Explosive Plant. This fire, caused by a light bulb igniting dust containing ammonium nitrate, was extinguished by Olin personnel with no damage resulting.

Refuge Fire Department personnel contributed the following maintenance and services this period:-

- Painted 76 fire hydrants in Areas No. 5, 7, 9, 11 and 12.
- Painted numbers on fire hydrants in Areas No. 1, 2, 7, 8, 9, 11 and 12.
- Cleared brush and weeds from around hydrants in Area 5; repaired six hydrants.

Industrial Lease Management

As of April 30th, 13 warehousing and 12 manufacturing industries were located on the refuge. These operations are currently furnishing employment to 2177 people. Industrial revenues to the Service for the period totaled \$116,005.67. Industrial occupancy of buildings totaled 1,244,525 square feet.

Industrial expansion and new lease activity this report period were as follows:-

- Knute Aronson. -Leased additional 520 square feet in Building 1-1-31.
- * Explosives Incorporated. -Leased 2138 square feet, high explosive storage magazines HE-1-11 and HE-1-12.
- Great Lakes Solvents, Inc. -Leased additional 2138 square feet, high explosive magazines HE-3-1 and HE-3-2.
- * Hanley Industries, Inc. -Leased 1069 square feet in high explosive storage magazine HE-2-12.
- Monsanto Chemical Company. -Rehabilitated and leased truck scales and scale-house.
- Olin Mathieson Chemical Corporation. -Leased an additional 26,975 square feet in Army Ordnance constructed buildings and 4783 square feet in Company constructed buildings. Expansion included rehabilitation of Buildings FAM-1-4 and FAM-1-5.
- Department of Special Education - Southern Illinois University. Leased Building S-1-3 for training center for mentally handicapped -- 3380 square feet.

* New industrial tenants.

TABLE NO. VIII INDUSTRIAL LEASING, REVENUE & EMPLOYMENT

INDUSTRY	Lease Footage				Monetary Return					Total No. Employed	
	Jan.	Feb.	Mar.	Apr.	Rent	Wat.&Sew.	Steam	Switching	Total	12-31-58	4-30-59
Allen Industries	42,000	42,000	42,000	42,000	\$ 2 373.36	\$ 16.00		\$ 56.64	\$ 2 446.00	6	8
Aronson, Knute	1,550	1,550	1,550	1,550	77.52	--		--	77.52	1	1
Diagraph-Bradley	75,410	75,410	75,410	75,410	4 688.12	123.53		37.76	4 849.41	84	88
Dura-Crates	30,692	34,721	34,721	34,721	2 178.62	68.51		179.36	2 426.49	41	41
E.Side Lumberyard	16,195	16,195	16,195	16,195	1 079.64	16.00		84.96	1 180.60	4	3
Gen. Services Adm.	63,103	63,103	63,103	63,103	3 538.44	16.00		9.44	3 563.88	10	9
Great Lakes Solvents	51,471	51,471	51,471	53,609	2 864.74	16.00		387.04	3 267.78	2	6
Grinnell Sash & Door	33,517	33,517	33,517	33,517	1 832.56	39.84		859.04	2 731.44	50	48
John Hutton	1,550	1,550	1,550	--	58.14	--		--	58.14	--	--
Ralph McBride	4,685	4,685	4,685	4,685	312.36	26.15		--	338.51	13	13
Monsanto Chem. Co.	12,750	12,750	12,750	12,750	599.20	--		1 038.40	1 637.60	--	7
Norge	76,850	76,850	76,850	76,850	4 610.88	--		453.12	5 064.00	50	50
Olin-Mathieson	333,254	335,709	345,359	358,109	13 999.71	6 544.91		2 341.12	22 885.74	318	435
Permanent Homes	20,500	20,500	20,500	20,500	1 161.68	16.00		--	1 177.68	12	12
Propellex Chem.	1,069	1,069	1,069	1,069	35.64	--		--	35.64	--	--
Sangamo Electric	204,290	204,290	204,290	204,290	10 058.28	4 630.25	34 481.20	9.44	49 179.17	816	819
Schilli Transp.	3,324	3,324	3,324	3,324	221.60	16.00		--	237.60	3	7
Sou. Metal Arts	4,685	4,685	4,685	4,685	312.36	16.00		--	328.36	4	3
Sou. Homes	82,520	82,520	82,520	82,520	4 240.12	24.00		273.76	4 537.88	12	35
Supreme Transf.	25,464	25,464	25,464	25,464	1 467.60	626.28		--	2 093.88	165	160
Triangle Const.	20,500	20,500	20,500	20,500	1 025.00	--		--	1 025.00	--	--
Universal Match	102,987	102,987	102,987	102,987	4 333.05	1 323.29		18.88	5 675.22	270	326
Ben Walker	100	100	100	100	--	--		--	--	--	--
SIU	220,792	220,792	220,792	220,792	--	894.18		--	894.18	100	100
SIU - Sp. Education	--	3,380	3,380	3,380	169.02	12.00		--	181.02	--	7
Hanley Ind.	--	--	--	1,069	8.91	--		--	8.91	--	--
Explosives, Inc.	--	--	--	2,138	8.91	--		--	8.91	--	2
James Quinlivan	--	--	--	--	5.00	--		--	5.00	--	--
Corp of Engineers	--	--	--	--	--	--		18.88	18.88	107	80
CO Field Trial Club	--	--	--	--	--	46.40		--	46.40	--	--
COSA	--	--	--	--	--	20.00		--	20.00	--	--
Am. Dist. Telg.	--	--	--	--	5.00	--		--	5.00	--	--
R.K. Mfg. Co.	--	--	--	--	--	--		--	--	20	--
Totals-Jan.-Apr. 1959	1,429,258	1,439,122	1,448,772	1,465,317	\$ 61 265.46	\$ 14 491.34	\$ 34 481.20	\$ 55 767.84	\$116 005.84		2,260
Totals - Dec. 1958				*1,185,016	\$ 60 181.70	\$ 13 720.93	\$ 30 527.60	\$ 3 417.84	\$107 848.07	2,088	

* Southern Ill. University lease foot age not included.

Universal Match Corporation. -Leased additional 17,865 square feet in various buildings within their lease area.

Lease Prospects

The dramatic upturn in the national economy was reflected by the unusual industrial lease activity this period.

Negotiations were completed with the Universal Match Corporation for lease of the last un-committed industrial area on the refuge - the former Fuze Loading Line. Forty thousand square feet of floor space in this area will be occupied on June 1, 1959, with the remaining 30,000 square feet to be occupied on or before April 30, 1961.

The General Services Administration has let bids for rehabilitation of five-10,500 square foot buildings in Area III and will sign their lease early in June. These buildings will be used for storage of cryolite - a stockpiled item considered "critical material" and used in the making of aluminum.

Building S-1-2 is being considered for lease by National Reproductions, Incorporated, for use as a printing shop.

Industrial Public Relations

The stream of industrial visitors to the refuge office flowed unabated throughout the period. Some of the more important contacts are listed below:-

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
1959			
Jan.			
5	Wayman Presley Dr. Oliver Kohlstoe	Makanda, Illinois S.I.U.	Lodge Concession Lease prospect
7	Sam Birdzell	V. A. Hospital	Blood Bank
8	Lloyd Teas Vince Ferrell Dr. Oliver Kohlstoe	St. Highway Engineer Southern Illinois University " " "	Route 148 Lease of building " "
9	Lloyd Baldwin Melvin Thompson Vince Ferrell	Monsanto Chemical Co. " " " S. I. U.	Lease premises " " Lease premises
13	Elmer Eggemeyer	Egyptian Electric	Devils Kitchen ROW
14	Carl Wiemken	Chasteen & Company	Route 4, R.O.W.
15	Arthur Robley Col. Charles Schweizer Goffrey Hughes Jack Lewis	Corps of Engineers " " " , St. Louis So. Illinois Incorporated " " "	Devils Kitchen " " Available lease space " " "

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
Jan. 16	Roy Campbell	Green Bay, Wisconsin	Courtesy
23	Ed Drinkwin Mayor K. Thurmond J. H. Moore DeLoyde Litton	Railroad Retirement Board Johnston City, Illinois Johnston City, Illinois Johnston City, Illinois	Employment ceiling Aquiring Fire Truck " " " " " "
27	Winston Walkup James Sands	I. C. Railroad I. C. Railroad	Freight Traffic Freight Traffic
29	Maurice Nelson	U.S. Forest Service	Wage Survey
Feb. 2	M. MacArdle Julius Swayne Oscar Grant	Olin Mathieson Herrin, Illinois Zeigler, Illinois	Fencing lease premises L. G. concession Topog maps
3	Bob Sanders Leon Stilley	Triangle Cons. Co. Triangle Cons. Co.	Labor disturbance Labor disturbance
4	Dr. Wilson Scott Elmer Eggemeyer Earl Powell Frank Cobin	Carbondale, Ill. Egyptian Electric Johnston City, Illinois Dowell, Illinois	Sail Boat Club D. K. ROW Bid Opening Bid Opening
5	S. E. Jorgenson Ross Hansen Gerald Pospichal	R. O. Minneapolis R. O. Minneapolis R. O. Minneapolis	Inspection Inspection Inspection
7	Dave Gulick	St. Louis Post Dispatch	Federal Prison Story
9	O. W. Norsworthy Robert Jones	Postal Inspector Trucking Firm	Post Office Sub-Station Lease space
11	J. C. Stalder C. A. Hansen Wayman Presley J. T. Anderson	Corps of Engineers Corps of Engineers Makanda, Ill. Anderson Aluminum	Devils Kitchen valves Devils Kitchen valves Lease concession Lease prospect
12	G. H. Hughes J. L. Jones Courtney Clower	Southern Ill. Inc. Labor Union Railroad Retirement Board	Courtesy Courtesy Employment Ceiling
16	James Sands Julius Swayne	I. C. Railroad Herrin, Ill.	Freight Traffic L. G. Concession
17	H. M. Parker	C.I.P.S. Division Engr.	R. O. W.
18	Lloyd Teas	Engineer, Ill. Div. Highways	R. O. W.

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
Feb. 19	Harry Goetz J. W. Klein Joe Haden	I. C. Railroad American Dst. Telegraph	Switching Schedule Additional hookups. N.F.F.E
20	H. K. Paisley Dan Jeffrey George Demko	Western Adj. Bureau " " " Student	Information " Term Paper
26	John Caynak Stewart Daniels Lew H. Kehr	S.I.U. Student Monsanto Chemical Co. Boy Scouts of America	Term Paper Courtesy Scout -o- rama
27	Tom Kelley	Federal Housing Adm.	Devils Kitchen specs.
Mar. 2	Lloyd Teas Jerry Snider Leslie Hunt Bob Lyons	Ill. Highway Engineer Pyramid Archers Ass'n. " " " " " "	Road conditions Archery Tract " " " "
3	James Micklewright N. N. Bering J. Muler Dennis O'Geary	U.S. Forest Service Fruin Conlon S. J. Groves S. J. Groves	N. F. F. E Route 4 Route 4 Route 4
4	Ray Donaldson	S. I. U.	Family Camp Show
5	R. W. Breidenbach Glen Schnaake Wm. Crawley	Commercial Solvents E. T. Simonds Ill. Dvsn. Highways	Prospective lease Lease conditions Route 13
6	Art Robley Rev. Jones	Corps of Engineers United Pentecostal Church	Dam dedication Little Grassy Camps
9	Lytle Jennings Carl Mayhew Ben Gilman James Sands	Mingo Refuge Southern Illinoisan Southern Illinoisan I. C. Railroad	Employment News Article News Article Freight Traffic
10	W. D. Fitzwater L. J. Mansaeger	FWS - Purdue University General Services Adm.	Surplus property Prospective lease
11	Blue Heatherington	Olin Mathieson Corp	Boiler problems.
12	Frank Detomasi Stanley Wilson Ben Schilli Steve Bujdoso	Industrial Chemical Wilson Asphalt Schilli Transportation Grinnell Sash & Door	Purchase orders Surplus tile Lease premises Rate increases

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
Mar.			
13	Harvey Pitt	Universal Match Corp.	Test site
	William Rose	Universal Match Corp.	Test site
	Blue Heatherington	- Olin Mathieson	Boiler problems
	Walter Baehr	Railroad Retirement Board	Labor census
	Lonnie Priest	Marion, Ill.	D. K. concession
16	Lytle Jennings	Mingo Refuge	Employment
	Shelby Wright	Carbondale, Ill.	L. G. concession
	Jim Rheuby	Olin Mathieson	Policy
18	R. E. Favreau	Public Health Dept.	Waterworks Operators
19	O. W. Norsworth	U. S. Postal Inspector	Locate sub-office
	Frances Meador	Lightening Gas Co.	Locate LP gas plant
	Bill Bond	" " "	" " " "
20)	Clair T. Rollings	R. O. Minneapolis	Inspection
21)			
22)			
23	Richard Mundinger	R. O. Branch Realty	Courtesy
	Ben Schaffer	R.O. Branch Realty	Courtesy
	Prof. Howard Fisher	Northwestern University	Courtesy
	John Caynak	S.I.U. Student	Thesis
24	James Sands	I. C. Railroad	Freight traffic
26	John Mooney	Orr Construction Co.	Route 4
	Harry Maroney	Olin Mathieson Chem. Co.	Courtesy
27	Ed Lampa	Universal Match Corp	Lease negotiation
	John Caynak	S.I.U. Student	Thesis
	Duane Norman	Chautauqua Refuge	Property pickup
30	Lloyd Teas	Ill. Dvsn. Highways	Route 4
	David Umberger	R. O. Minneapolis	Inspection D. K. dam.
31	Ed Lampa	Universal Match Corp	Lease expansion
Apr.			
1	Elmer Eggemeyer	Egyptian Electric Co.	Power Installation
	M. Meisenheimer	C. H. Boehr Co.	Digester installation
	John Schaluchter	Ill. Cons. Dept.	Courtesy
3	Lloyd Teas	Ill. Highway Dept.	Route 148
	D. Wicker	Cities Services	Gas pump for Schilli
6	Frank Geraci	Ill. Employment Svs.	Employment census
7	Spence W. Ohlinger	Hercules Powder Co	Lease prospect
	Ray Wardein	Schilli Transportation	Gas pump installation

<u>Date</u>	<u>Name</u>	<u>Title or Organization</u>	<u>Purpose of Visit</u>
Apr. 8	Spence Ohlinger Dick Alspaugh Tom Hagerman F. E. Coultas Lum Starrick	Hercules Powder Co. Explosives, Inc. Orr Cons. Co. V.A. Hospital Herrin, Ill.	Leased igloo Leased igloo Route 4 Surplus property C. O. cemetery
10	John Talbot Blue Heatherington Olin Mathieson	Sedalia, Mo.	Area information Boiler specs
13/13	Ed Lampa	Universal Match Corp	Lease expansion
17	Carl Mayhew Daniel Janzen Ross Leffler Glen Palmer Lew Martin Ray Schmidt W.A. Leucke E. A. Sogen Lew Neilson Don Hileman Augusta Millegan Dr. W. J. Tudor Carl Birkholtz Dwight Burns Rex Karnes	Southern Illinoisan C. O. Washington, D.C. C. O. Washington, D.C. Ill. Dept. Conservation Ill. Dept. Conservation Sangamo Electric Co. C. I. P. S. Diagraph Bradley General Telephone Co. S. I. U. Chamber of Commerce S. I. U. Carbondale C of C. Carbondale C of C. S. I. U.	News Article Inspection Inspection Inspection Inspection Conference Conference Conference Conference Conference Conference Conference Conference Conference Conference Conference
20	Wm. Bridges Louis Thamer	National Reproductions Chas. Boehr Co.	Lease inquiry Digester installation
21	John Clark	Olin Mathieson	Lease expansion
22	Ray Plute Pete Vansavage F. W. Boriske	Norge Norge Engineer- Ill. Dvsn.Hwys.	Lease expansion Lease expansion Route 04.
27	C. W. Gibbons Frank Makuraukas	C. I. P. S. C. I. P. S.	R. O. W. R. O. W.
28	Bill Rice Father Renschen Don Roach	Wood Pilot Plant St. Mary's, Anna, Ill. Boy Scouts - Carbondale	Switching Little Grassy camp lease Scout-o-rama
29	L. J. Mansaeger	G. S. A.	Lease Area III bldgs.
30	Father Renschen James Micklewright D. Niebe	St. Mary's - Anna, Ill. Forest Service Forest Service	Little Grassy camp lease N.F.F.E. N.F.F.E.

VIII. OTHER ITEMS

Items of Interest

Devils Kitchen Dam, begun in 1940 by the Works Progress Administration, was completed on March 4, 1959 by the U. S. Army Corps of Engineers. This dam will impound a lake having 810 acres of water surface averaging 36 feet in depth. It will serve primarily for recreation with most of the lake shore to be leased to private individuals and groups for cottage sites. Photographs of the dam and a program of the dedication ceremonies are appended.

The Fish and Wildlife Service saw fit this period to release 1200 acres in the southeast corner of the "inviolable" refuge to the Bureau of Prisons for location of a maximum security federal prison. At this writing, the appropriation bill for construction funds for this institution is before the Congress. All indications are that funds will be granted.

Personnel

Clark C. Wingard entered on duty February 12 as Engineer Technician. Clark hails from Minnesota via Thule, Greenland, Upper Michigan and Arizona - having held construction engineering positions at all four locations.

Roy D. Taylor was promoted to Operator General on April 5 filling a position vacated in February by the resignation of William F. Meneese. Charles C. Hoffard moved up from Maintenceman to Roy's old job of Automotive Mechanic. Thirteen WAE Laborers were appointed during the period - eight of which will form our railroad section crew for the balance of the summer.

Credit for preparing this report is divided as follows:

Section I	Olson
Section II	Carter, Bush and Olson
Section III	Carter, Manke and Sheffield
Section IV	Manke, Carter and Sheffield
Section V	Carter and Olson
Section VI	Carter and Sheffield
Sections VII and VIII	Stiles

Photographs

Fourteen photographs, portraying a few of the periods activities are appended.

SIGNATURE PAGE

Submitted by:

Larry E. Stiles
(Signature)

Date: June 4, 1959

Project Manager
(Title)

Approved, Regional Office:

Date: 6-16-59

H. R. Nelson
(Signature)

ACTING

Chief, Division of Wildlife



Photo No. 59-1. Manke and Olson banding Canada geese at the Wolf Creek Road set.

January 9, 1959 W.D.C.
M M M



Photo No. 59-2. Manke banding Canada geese at the Wolf Creek Road set.

January 9, 1959 W.D.C.



Photo No. 59-3. Razing of 150,000 gallon water tank on
Southern Acres Campus of Southern Illinois University.
Disposal by G.S.A. to private contractor.
January 20, 1959 G.H.H.



Photo No. 59-4. Trouble! "Fly-by-nite" contractor lost
control of leg which fell carrying standpipe with it.
January 26, 1959 G.H.H.



Photo No. 59-5. Tower leg hangs over Vocational Technical Institute Cafeteria like the Sword of Damocles. It took two motor cranes to right structure and lower to ground.
January 26, 1959 G.H.H.



Photo No. 59-6. Razing of Boiler House sold as surplus by G.S.A. Two were removed from Detonator Line by this method this period.

January 26, 1959 G.H.H.



Photo No. 59-7. Canada goose goslings in nest of base of
black walnut snag on Turkey Island, Crab Orchard Lake.
April 22, 1959 K.N.O.



Photo No. 59-8. Canada goose nest on Sawmill Island,
Crab Orchard Lake.

April 22, 1959 K.N.O.



Photo No. 59-9. Scrapping old sewage digester tank cover at Sewage Disposal Plant. Under contract, scrap becomes property of contractor.

April 14, 1959 H.E.S.



Photo No. 59-10. New digester tank cover in place and fabrication nearing completion.

April 14, 1959 H.E.S.



Photo No. 59-11. Brush disposal by burning on refuge pasture unit A-25. Brush and trees had been removed previous fall with D-7 Dozer and root rake.

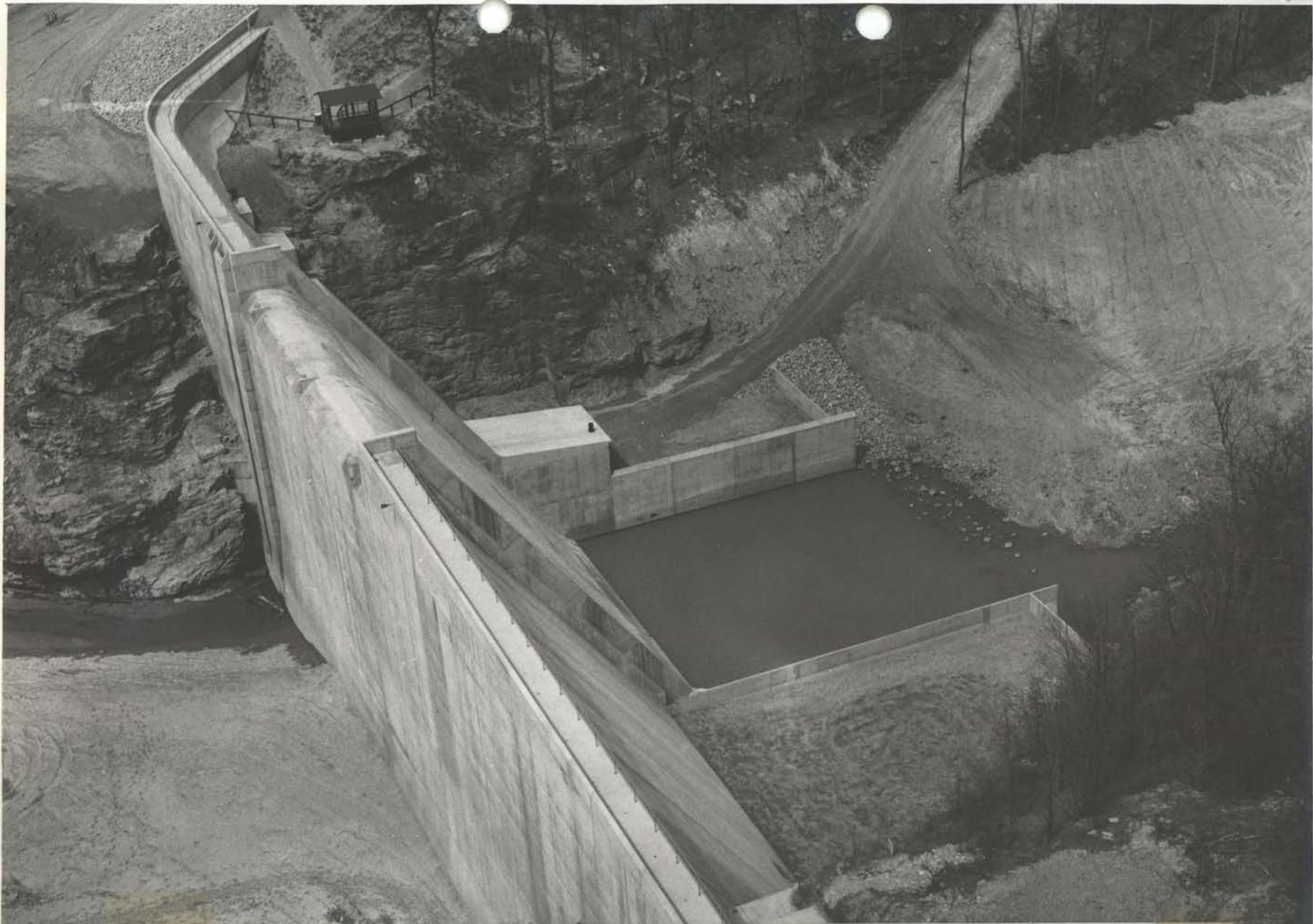
April 14, 1959 G.H.H.



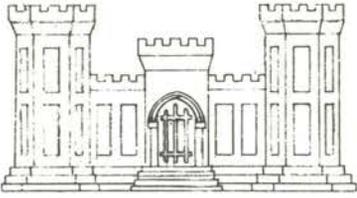
Photo No. 59-12. East boundary of above pasture unit. Ten to 20 year old trees have been removed from roadside and piled near pond in background for burning. Penta-treated shortleaf pine posts have been distributed for construction of pasture fence by permittee.



Upstream view of Devils Kitchen Dam. Structure completed on March 4, 1959. Photo - Courtesy of U. S. Army Corps of Engineers.



Unusual view of Devils Kitchen Dam from Colonel Schweizer's
(better known as "Chopper Charlie") helicopter.
Courtesy of U. S. Army Corps of Engineers.



SOUVENIR PROGRAM
Dedication Ceremonies
May 30, 1959



DEVILS KITCHEN DAM

1940 - 1943

WORKS PROGRESS ADMINISTRATION

1957 - 1959

Completed By

U. S. ARMY ENGINEER DISTRICT

St. Louis, Mo.

CORPS OF ENGINEERS

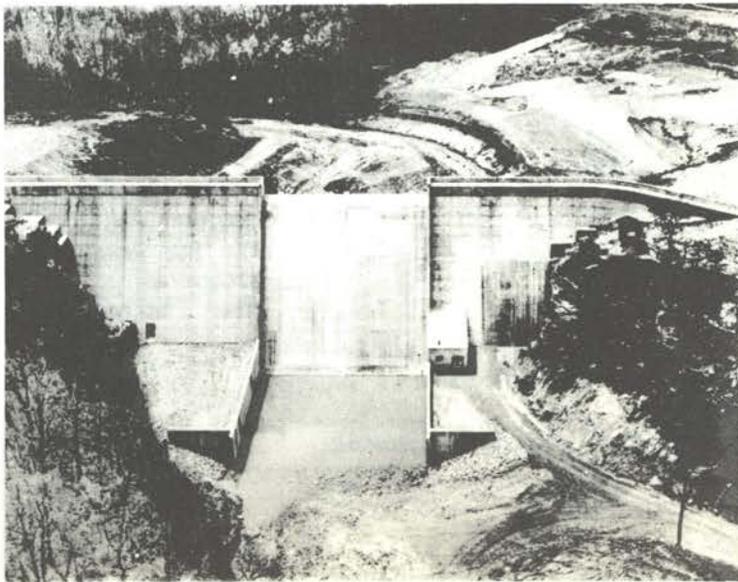
for

BUREAU OF SPORT FISHERIES

and

WILDLIFE

U. S. DEPARTMENT OF INTERIOR



DEVILS KITCHEN DAM

General Information

Devils Kitchen Dam is located in Williamson County approximately 4.0 miles east and 5.5 miles south of Carbondale, Illinois. It is a concrete gravity type structure anchored to the sandstone walls of the canyon formed by Big Grassy Creek. An auxiliary spillway located to the north of the main dam supplements overflow capacity. The completion of this dam adds a third lake to the water area of the Crab Orchard National Wildlife Refuge.

History

Construction of the dam was begun in 1940 by the Works Progress Administration. World War II halted construction early in 1943. At that time, the dam was about 50% completed. Construction was resumed in 1957 by the U. S. Army Corps of Engineers for the U. S. Fish and Wildlife Service. A bronze plaque bearing the construction history of the dam is located on a concrete monument near the north end of the structure.

TECHNICAL INFORMATION

Engineering Design

Height above foundation rock	117.5 ft.
Length along crest	670.0 ft.
Maximum width at base	168.0 ft.
Spillway width	100.0 ft.
Maximum spillway discharge	6,300 c.f.s.

Construction Data

Mass concrete in place	62,770 cu.yd.
Reinforcing steel	300,000 lbs.
Interior drainage pipe	3,000 lin. ft.
Derrick and filter stone	219 tons
Earth embankment	11,000 cu.yd.

Excavation Quantities

Earth	65,529 cu.yds.
Rock	26,312 cu.yds.

Appurtenances

Discharge pipe and valve	48 inch
Electrical & ventilating systems	

Flooded Area at Spillway Elevation - (Devils Kitchen Lake)

Maximum Length	3.75 miles
Maximum width	.6 miles
Maximum depth	90.0 feet
Average depth	36.0 feet
Volume at Spillway elevation	29,200 acre feet
Area of Lake	810.0 acres
Length of shoreline	24 miles

PROGRAM OF EVENTS

Dedication, Devils Kitchen Dam	2:00 P.M. D.S.T. May 30, 1959
Ceremony at Dam Site - Crab Orchard National Wildlife Refuge - Illinois	
Opening Remarks.....	General Chairman, Goffrey Hughes, Exec. Director, Southern Illinois Incorporated
Presentation of Colors	S.I.U. R.O.T.C. Color Guard Col. Emmett E. Cockrum
National Anthem.....	S.I.U. R.O.T.C. Band Donald G. Kennedy, Director
Invocation	Rev. Joseph Van Roekel President Elect, Marion Ministerial Alliance
Greetings	R. J. Lewis President, Southern Illinois Incorporated
Remarks and Delivery of Contract to District Engineer	R. B. Potashnick President, Mary Construction Company, Inc.
Remarks	Colonel Charles B. Schweizer District Engineer, U. S. Army Corps of Engineers, St. Louis District
Remarks	Lt. Colonel Russell J. Wilson Exec. Officer, U. S. Army Corps of Engineers St. Louis District
Verbal Acceptance of Dam from District Engineer.....	Winston A. Elkins, Chief, Division of Sport Fisheries, U. S. Fish and Wildlife Service
Unveiling of Plaque.....	Miss Shelly Ann Stiles
Remarks.....	Harry E. Stiles, Project Manager Crab Orchard National Wildlife Refuge U. S. Fish and Wildlife Service
Remarks.....	Hon. Paul H. Douglas, U. S. Senate
Remarks.....	Hon. Everett M. Dirksen, U. S. Senate
Remarks.....	Hon. Governor William G. Stratton, State of Illinois
Remarks.....	Hon. Kenneth J. Gray, 25th Cong. Dist. Ill.
Benediction.....	Rev. B. P. Mongan, Chaplain U. S. Veterans Hospital, Marion, Illinois
Closing Remarks and "Thank You"....	General Chairman, Goffrey Hughes

Future Development of Devils Kitchen Lake

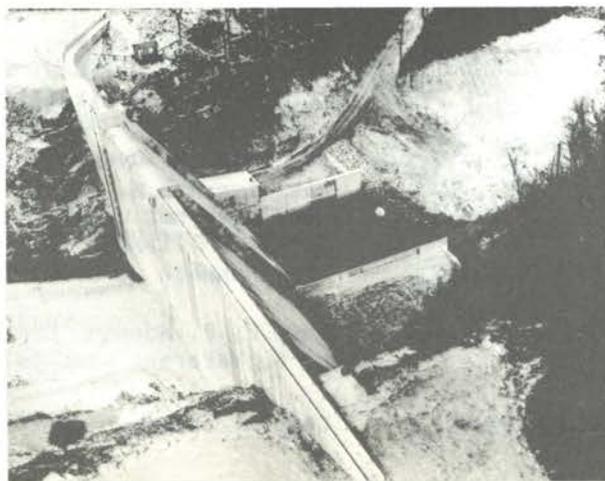
The Crab Orchard National Wildlife Refuge has a total area of 44,000 acres. Of this total 8810 acres will be water surface when Devils Kitchen Lake fills. Crab Orchard Lake has 7000 surface acres and Little Grassy Lake has 1000. Although Devils Kitchen Lake will have only 810 surface acres, it will be the deepest of the three refuge lakes, and will be second in storage capacity to Crab Orchard. A twenty-four inch conduit through Devils Kitchen Dam will permit connection of a water supply line if ever is needed to supply water to area municipalities or industries. Wildlife Conservation, Public Recreation and Industrial Development are established goals of management of the Crab Orchard National Wildlife Refuge. Devils Kitchen Lake will fill an important role in the realization of these three goals.

While the completion of Devils Kitchen Dam marks the major accomplishment toward the creation of Devils Kitchen Lake, other construction is underway which will provide for the full utilization of the project.

Public recreation facilities in the vicinity of the Dam are nearing completion. These include a swimming beach, boat dock and harbor, camping area, picnic area and a boat launching ramp. Twenty brush-type fish shelters have been constructed in the Devils Kitchen Basin. Fish poisoning of the lake drainage basin and re-stocking of the lake with desirable sport fish species will further add to public enjoyment of the area.

It is estimated that with normal rainfall it will take about one year for the lake to fill. During that time land surveys will be completed establishing cottage sites around the lake. These sites will then be available for long term lease from the United States Fish and Wildlife Service to individuals and organizations for development. Twenty-four miles of roads, now under construction, will provide access to the cottage sites, of which there will be approximately 1000. Since it is apparent there will be more applicants than cottage sites, a public drawing to determine cottage site assignment is scheduled for June 8, 1960, at the dam site. There are no sites reserved for "special" individuals or groups.

Although public use at Devils Kitchen Lake will be subordinate to private and group cottage site development, all the various forms of public recreational use, including public hunting, fishing, boating, swimming and similar activities will be permitted in accordance with State and Federal law.



WATERFOWL

REFUGE Crab Orchard

MONTHS OF January TO April, 1959

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling Trumpeter										
Geese:										
Canada	7,866	24,500	28,000	32,000	33,200	43,500	25,100	36,400	32,000	31,200
Cackling Hutchin's							12			
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	5,253	40,000	50,000	300	500	100	740	600	540	600
Black	200	400	500	35	200	50	210	200	150	50
Gadwall							1			10
Baldpate										130
Pintail	4	2					12	20	23	
Green-winged teal										
Blue-winged teal										
Cinnamon teal										8
Shoveler										
Wood										
Redhead				7				10	49	12
Ring-necked		30		33	200		84	50	2	50
Canvasback	4		30	21	50	10	41	50	56	70
Scaup Lesser		45				100	31	70	100	200
Goldeneye	25	100		77	300	500	700	300	35	60
Bufflehead										
Ruddy									7	30
Other Hooded Merganser	9	10	200	100	100	100	50	25	2	10
Am. Merganser	2,482	2,000	6,000	12,000	15,000	15,000	15,000	8,000	4,000	2,500
Red-breasted Merganser										5
Coot:	17							2	4	40

3 -1750a

Cont. NR-1
(Rev. March 1953)WATERFOWL
(Continuation Sheet)REFUGE Crab OrchardMONTHS OF January TO April, 1959

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production : Broods: Estimated : seen : total		
	11	12	13	14	15	16	17	18				
Swans:												
Whistling												
Trumpeter												
Geese:												
Canada	19,000	2,200	279	414	558	441	295	97	2,219,350	5	30	
Cackling Hutchin's								1	91			
Brant												
White-fronted												
Snow		3							21			
Blue		11		1	1			1	98			
Other												
Ducks:												
Mallard	300	180	120	20	12	14	6	4	695,023			
Black	24	44							14,441			
Gadwall		4	22	10	8	10	23	4	574			
Baldpate	17	16	114	8	12	36	24	2	1,673			
Pintail	140	95	25						3,157			
Green-winged teal	6	10	13	10	15				378			
Blue-winged teal		185	271	333	221	165	124	110	9,863			
Cinnamon teal												
Shoveler	22	66	150	126	147	124	65	2	4,970			
Wood				2	5	8	6	11	224			
Redhead	55	42							1,225			
Ring-necked	70	330							5,943			
Canvasback	60	71	20						3,381			
Scaup Lesser	200	200	300	109	131	245	88	307	14,882			
Goldeneye	2								14,693			
Bufflehead	2	4							42			
Ruddy	30	45	81	50	3	16	5		1,869			
Other Hooded Merganser	8								4,298			
Am. Merganser	4,000	1,350	150	29	8	1	3	2	612,675			
Red-breasted Merganser	4				25				238			
Coot:	300	200	650	800	1,037	800	400	161	30,877			

(over)

	(5)	(6)	(7)	SUMMARY
	Total Days Use	Peak Number	Total Production	
Swans	:	:	:	Principal feeding areas <u>Area #2</u>
Geese	<u>2,219,560</u>	:	<u>30</u>	
Ducks	<u>1,389,549</u>	:	:	Principal nesting areas <u>Islands in lake</u>
Coots	<u>30,877</u>	:	:	
				Reported by <u>Lee Bush</u>

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A
(Nov. 1945)MIGRATORY BIRDS
(other than waterfowl)Refuge Crab Orchard Months of January to April 1959

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total Estimated Number
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	
<u>I. Water and Marsh Birds:</u>										
Common Loon	1	Mar. 27	2	Apr. 3	1	Apr. 18				44
Horned Grebe	1	Feb. 12	3	Apr. 23	1	Apr. 24				142
Pied-billed Grebe	1	Feb. 12			14	Apr. 30				669
Double-crested Cormorant	12	Apr. 10			25	Apr. 30				400
Great Blue Heron	3	Jan. 13	5	Apr. 23	5	Apr. 30				700
Common Egret	2	Apr. 11	11	Apr. 30	11	Apr. 30				200
Little Blue Heron	1	Apr. 10			1	Apr. 30				20
Green Heron	1	Apr. 12	7	Apr. 23	8	Apr. 30				95
Black-crowned Night Heron	3	Apr. 21	5	Apr. 23	4	Apr. 30				40
American Bittern	1	Mar. 31			1	Apr. 30				32
<u>II. Shorebirds, Gulls and Terns:</u>										
Killdeer	1	Feb. 20	120	Apr. 16	72	Apr. 30		60	240	8280
Golden Plover	28	Apr. 5								28
Woodcock	1	Feb. 22	3	Apr. 3	1	Apr. 30		3	12	197
Wilson's Snipe	3	Mar. 19	31	Apr. 3	2	Apr. 28				1050
Upland Plover	1	Apr. 18			4	Apr. 30				52
Spotted Sandpiper	2	Apr. 21			6	Apr. 30				40
Solitary Sandpiper	1	Mar. 27	6	Apr. 10	10	Apr. 30				272
Greater Yellowlegs	2	Apr. 5			5	Apr. 30				75
Lesser Yellowlegs	1	Apr. 16			5	Apr. 30				50
Pectoral Sandpiper	22	Apr. 1	65	Apr. 3	16	Apr. 30				750
Northern Phalarope	8	Apr. 23			8	Apr. 23				8
Herring Gull	200	Jan. 7	10,000	Jan. 13	61	Apr. 30				200,952
Ring-billed Gull	25	Jan. 7	25,000	Feb. 5	2	Apr. 16				499,870
Franklin's Gull	1	Apr. 10			1	Apr. 23				20
Common Tern	20	Apr. 30								20
Caspian Tern	11	Apr. 30								11
Black Tern	8	Apr. 30								=

(over)

(1)	(2)		(3)		(4)		(5)		(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove	10	Jan. 1	1,000	Apr. 30			100	50	40,000
IV. <u>Predaceous Birds:</u>									
Bald Golden eagle	7	Jan. 1	7	Jan. 7	1	Apr. 10			161
Duck hawk Turkey vulture	1	Feb. 16	5	Apr. 10	4	Apr. 30			300
Horned owl		Permanent	Resident						600
Magpie Osprey	2	Mar. 31			2	Mar. 31			147
Raven Sparrowhawk		Permanent	Resident						1,582
Crow		"	"						25,000
Sharp-shinned hawk		"	"	(Rare)					240
Cooper's Hawk		"	"						600
Red-tailed hawk		"	"						1,988
Red-shouldered hawk		"	"						315
Broad-winged hawk	1	Mar. 2			3	Apr. 10			249
Marsh hawk	2	Jan. 1			1	Apr. 16			168

Reported by Lee Bush

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

UPLAND GAME BIRDS

Refuge Crab Orchard

Months of Jan. to May, 19 59

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total		Hunting	For Re- stocking	For Research		
Bob-white Quail	Cropland, pasture, idle upland, woodland Areas I & III 15,000 acres	38	--	--	1:1	--	--	--	400	Pertinent information not specifically requested. List introductions here.
	Area II 19,000 acres	10	--	--	1:1	--	--	--	2,500	
Ring-necked pheasant	Same as above.	--	--	--	1:1	--	--	--	4	
Wild turkey	Same as above.	1500	--	--	1:3	--	--	--	10	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

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

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

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Crab Orchard

Year ending April 30, 1959

(1) Species Common Name	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula- tion	
	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated		Furs Destroyed
								Permit Number	Trappers Share	Refuge share				
Fox & Gray Squirrel	Area II: 2,300 ac.	1.5	**											1,600
	Area I & III: 4,300 ac.	2.2	500											2,000
Cottontail Rabbit	Area II: 12,000 ac.	4.0	**											3,000
	Area I & III: 10,000 ac.	6.0	500											1,600
Muskrat	Area II: Lake shore & ponds 1,000 ac.	7.0		*										160
	Area I & III: 1,200 ac.	4.0		100										300
Mink	Area I, II, III: 30,000 ac.	300		20										100
Red & Gray Fox	All land areas of Refuge 34,000 ac.		**											300
Raccoon	30,000 ac.													600
Striped Skunk	34,000 ac.													200
Opossum	34,000 ac.													600
Woodchuck	30,000 ac.	30	**	25		15								1,000

* List removals by Predator Animal Hunter

REMARKS: * Estimate of fur harvest in public use areas.
** " " hunter kill in " " "

Reported by Kent Olson

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
- (2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
- (4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprime-ness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
- (5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.
- REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.