

Narrative Report Routing Slip

Mr. Salyer _____

Mr. Ackerman _____ *MA*

Mr. Crawford _____ *[Signature]*

Administrative Services

Miss Baum _____

Operations

~~Mr. Formanich~~ _____ *[Signature]*

~~Mr. Regan~~ _____ *[Signature]*

Public Use

Mr. ~~Dickert~~ _____ *PD*

Mr. Kubichek _____

~~Mr. Stollberg~~ _____ *GS*

Resource Management

Dr. Morley _____

Mr. Hickok _____

Wildlife Management

Mr. Banko _____

Mr. Stiles _____

Mr. Goldman _____

Refuge CRAB ORCHARD

Period May - August 1960

Best possible image.

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Refuge CRAB ORCHARD _____

Period May - August 1960 _____

NARRATIVE REPORT

May 1, thru August 31, 1960

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Crab Orchard National Wildlife Refuge
Route 2
Carterville, Illinois

CRAB ORCHARD NATIONAL WILDLIFE REFUGE

REFUGE STAFF

Administrative, Managerial and Technical

H. E. STILES PROJECT MANAGER
W. D. CARTER REFUGE MANAGER
G. H. HUNTER MANAGEMENT ASSISTANT
J. E. TOLL REFUGE MANAGER
L. B. SHEFFIELD PARK RANGER
C. C. WINGARD ENGINEERING TECHNICIAN
K. N. OLSON REFUGE MANAGER
P. E. FERGUSON ASSISTANT PARK RANGER
H. T. GUALDONI CLERK (TYPING)
ESTHEL L. COX CLERK-STENOGRAPHER
BERNELL H. MURRAY . . . FISCAL ACCOUNTING CLERK (STENOGRAPHY)
MARY L. SHERERTZ CLERK-STENOGRAPHER
ARLIE JACK STOREKEEPER (GENERAL)
LEE BUSH WILDLIFE AID
GORDON TRIPP FIRE CONTROL AID
GEORGE SEKETA (STUDENT ASSISTANT) WILDLIFE AID

Construction, Operations and Maintenance

J. J. PICKAR FOREMAN, MIXED GANG
W. E. ELLIOTT FOREMAN, SHOP
R. L. BASLER FIRE FIGHTER, SUPERVISORY
E. C. HUNTER FOREMAN, OPERATING ENGINEER (STEAM)
A. G. BOLES . . . FOREMAN, MUNICIPAL UTILITIES (WATER & SEWER)
W. T. CAMPBELL FOREMAN, LABORER
F. L. NORTON FOREMAN, LABORER
P. E. EASTWOOD FIREFIGHTER
G. EMERY FIREFIGHTER
J. T. GIBBONS FIREFIGHTER
W. E. WEBB FIREFIGHTER
H. L. DAVIS GUARD
L. J. GASS GUARD
S. E. IRVIN GUARD
K. W. SUMMERS GUARD
(VACANT) GUARD
H. L. CARNER FIREMAN, STATIONARY BOILER
C. L. FLORA FIREMAN, STATIONARY BOILER
S. A. GLENSKI FIREMAN, STATIONARY BOILER
R. H. HOWELL FIREMAN, STATIONARY BOILER
C. B. ORANGE FIREMAN, STATIONARY BOILER
H. E. BROWNING FILTER & DISPOSAL PLANT OPERATOR
J. C. COX FILTER & DISPOSAL PLANT OPERATOR
J. C. LILLICH FILTER & DISPOSAL PLANT OPERATOR
L. R. PARKS FILTER & DISPOSAL PLANT OPERATOR
W. R. WALLIN FILTER & DISPOSAL PLANT OPERATOR

-- Continued --

REFUGEE STAFF

H. P. BUTLER BUILDING REPAIRMAN
J. C. CALCATERRA BUILDING REPAIRMAN
C. L. DAVIS BUILDING REPAIRMAN
W. C. HERRING OPERATOR GENERAL
L. MORSE OPERATOR GENERAL
R. D. TAYLOR OPERATOR GENERAL
L. R. TIPPY OPERATOR GENERAL
C. C. HOFFARD MECHANIC, AUTOMOTIVE
R. E. GOLDSMITH MECHANIC, AUTOMOTIVE
J. E. KELLY GARAGE SERVICEMAN
J. W. BOOTH MAINTENANCEMAN
E. E. DARNELL MAINTENANCEMAN
J. R. RICE MAINTENANCEMAN
J. L. VENEGONI MAINTENANCEMAN
D. P. ELLIOTT LABORER
G. J. ELLIOTT LABORER
T. GALINES LABORER
J. H. MOORE LABORER
A. SEBBEN LABORER
W. J. STACEY LABORER
R. L. VENEGONI LABORER

19 EMPLOYEES WAE - LABORER

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CRAB ORCHARD NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

I. GENERAL

A. Weather Conditions.

	<u>Precipitation</u>		<u>Max.</u>	<u>Min.</u>
	<u>This Month</u>	<u>Normal</u>	<u>Temp.</u>	<u>Temp.</u>
May	<u>4.27</u>	<u>4.09</u>	<u>88</u>	<u>36</u>
June	<u>3.36</u>	<u>4.08</u>	<u>98</u>	<u>51</u>
July	<u>1.26</u>	<u>3.33</u>	<u>94</u>	<u>56</u>
August	<u>2.24</u>	<u>3.50</u>	<u>99</u>	<u>58</u>
Total	<u>11.13</u>	<u>15.00</u>	Extremes <u>99</u>	<u>36</u>

Fine start, dry finish, sums up our summer weather. As in 1959, crops lacked rain throughout July and much of August. Fortunately, temperatures were near normal until a final blistering week in August.

The weather data above were obtained from the U. S. Weather Station at the Marion Veterans Hospital, Marion, Illinois.

B. Habitat Conditions.

1. Water

Water levels at the Crab Orchard and Little Grassy Lakes spillways ranged from 0.2' above in May down to 0.6' below in August. Devils Kitchen Lake is within 20' of the Spillway crest. No manipulation of the valves were made during this period.

Migrating waterfowl found full ponds in May, however, lack of late summer rains dropped pond levels in August. One stock watering pond will have to be deepened in September. In other pastures cattle found plenty of water.

The first Crab Orchard Lake drawdown since late 1955 is scheduled to begin in early September. The drawdown will lower the lake 2' below the spillway crest. The following should be accomplished: (1) reduce bank erosion (2) increase production of waterfowl food on newly exposed mud flats (3) improve fishing by reducing the small fish population.

2. Food and Cover

Resident game (quail, squirrel, rabbit, and deer) had ample food and cover.

One of our major management goals is to provide food for the wintering Canada goose flock. Food prospects look good. Although Spring was late in arriving, planting conditions were the best in several years. The midsummer drouth "hurt" upland corn yields but this will be more than offset by increased bottomland production.

Pastures will need more rain to produce an optimum amount of browse. Additional 1960 goose browse will be found on 230 acres of renovated pasture, newly exposed mudflats, and on pond shoreline seeded in millet.

Competition for corn gets as fierce as an Olympic finish. Farmers line up with coons, possums, mice, corn borers, deer, squirrels, crows, blackbirds, and waterfowl. A withering pace narrows the field to two, the farmer and the geese. A wet track hobbled the farmer in '59 and in several "corn and bean" races

the geese pocketed all the gold medals. Aided by a fast track (a dry August), the farmer hopes to score a comeback this year. The results will be posted in the next Narrative Report.

II. WILDLIFE

A. Migratory Birds.

Waterfowl

Resident Canada geese have been seen less frequently and in smaller number than in 1959. No more than eleven have been seen at one time, whereas the flock totaled 25 last year.

The Spring nesting census turned up approximately the same number of active eggs as last year. Apparently, nesting success is down or the birds just haven't been seen.

A brief nesting attempt was made by a pair of geese adjacent to the pond in A-6S farm unit. The remains of the goose were found on April 12, having been killed by an unknown predator. Heavy predator pressure, both human and otherwise, are indicated by refuge records. These records reveal no successful nesting has been made on the mainland. As elsewhere, the islands are the nesting haven for the Canada goose at Crab Orchard.

Mallard

The Illinois Conservation Department released 500 pen-raised Mallards in July of 1959 in an attempt to build up a resident nesting flock on the Refuge. To date, Band returns indicate 30 were killed by cars along the Sneed Road Causeway, 1 shot by a hunter 3 miles west of the point of release, and 6 were trapped, along with wild mallards, 2 miles from the point of release.

It is not known how many or if any of the birds migrated south with wild flocks. Perhaps future band returns will give us this information. By late Fall 1959, the original flock concentrated at two locations: the waterplant and the east end of the lake. Nothing more than speculation is known of the fate of the latter group. However, the waterplant flock, wintered over (fed waste grain by interested waterplant personnel) and number 18 birds in the Spring.

Ten nesting attempts were made in the immediate vicinity of the waterplant. Fifty young were successfully raised. Wildlife Aid Lee Bush reports at least 50 more young were raised on other parts of the refuge. However, as wild mallards do occasionally nest here, it was not possible to determine if these young were wild or State birds.

Wood Duck

As with resident Canada geese, Wood ducks were late in nesting. As yet, no August concentrations have been observed. Because of a low population, no trapping and banding was attempted.

Other Waterbirds

The late summer buildup of Common Egrets has been average in numbers. Fine Refuge salesmen, these birds. In the shallows of Crab Orchard Lake, adjacent to traffic laden State Route 13, these picturesque birds identify Crab Orchard as a Wildlife refuge. There are indeed times when this identification is necessary, especially to refuge personnel caught up with industrial, recreational, and even kidnapping problems.

Great Blue, Green, and to a lesser extent Little Blue Herons make up our other more commonly found waterbirds. The first Refuge recording of an immature Yellow-Crowned Night Heron was made in July.

Shorebirds

As usual, local Killdeers and Spotted Sandpipers made up the shorebird population in May and June. In August Solitary and Pectoral Sandpipers arrived during their fall migration followed by Lesser Yellowlegs and Least Sandpipers.

We expect more shorebirds will be attracted to the increased mud flat areas exposed by the September drawdown.

Mourning Doves

The annual coo count showed no significant changes over last years count. Sprouting grasses in the newly renovated pasture units, are attracting large flocks of doves. As these units are in the closed area, the early season kill on doves will probably be lessened on lands adjoining the closed area.

B. Upland Game Birds.

Bob-white Quail

For several years, conditions have been favorable for this game little bird, which resulted in a high population. However, a severe late winter, coming in March when the available food supply was low, did kill Quail. The severity of the food shortage is indicated by the number of Quail seen feeding on low preference multiflora rose berries. By mid-March, Quail, Cardinals, Mockingbirds, even possums had stripped all the berries off the rose bushes.

We are in no position to say what percentage of Quail died, certainly however the 1960 brood stock was down in numbers from the previous two years.

Conditions so far, indicate that the Bob-white is making a fine comeback. The nesting season started a good week late. Otherwise the weather has been working for the Bob-white.

Ring-necked Pheasant

No observations. Apparently all the birds released at the 1957-58 field trials have perished. The Mason-Dixon line for the "Yankee Ring-neck" lies roughly 100-150 miles north of Crab Orchard.

Wild Turkey

No observations have been made in the past year on any of the 122 Turkeys released by the Conservation Department of Illinois in 1958. Unconfirmed reports of birds off the refuge indicate the possibility that Turkeys are still in the area.

C. Big Game Animals.

The closed area deer problem is still very much with us. There has never been an open season in this area. Much of it is prime deer habitat.

The problem is one of harvest. Picture an area encompassed on the north by family homes, and laced throughout much of its better deer habitat by industrial units, including two high explosive manufacturers. Needless to say, much study has gone into our plans for a harvest. We hope to obtain more facts on the deer herd from Grant Crawford, a Pennsylvanian working on Crab Orchard deer as a partial fulfillment for his Masters Thesis in Zoology at Southern Illinois University.

Open season or not, perhaps the greatest value of these deer is an esthetic one. Wild un-penned deer are a novelty in Southern Illinois. Few children and many adults have never experienced the thrill of watching the graceful Whitetail.

As a year round attraction, they have no peers for the average visitor. In the Fall, deer share the spotlight with the large flocks of Canada geese.

D. Fur Animals, Predators, Rodents, and Other Mammals.

Muskrat

Sheltered bays and some ponds (especially non-stock watering ponds) carry our 'rat' population. Little aquatic food probably is one factor that keeps the population down. Homes are made in banks and dikes. Trapping is carried on by refuge personnel to keep the dikes reasonably free of muskrats.

Mink

No significant changes have been recorded in our mink population.

Raccoon and Opossum

At Crab Orchard, one of the first signs of approaching spring is the appearance of the burrowing Crayfish. Many of these "turret builders" are heartily welcomed by Raccoons, especially after 1960's Alaskan March. Coons destroyed 3 of 10 Mallard nests around the close confines of the Water Plant.

Striped Skunk

Few observations have been made during this past summer.

Fox and Gray Squirrel

Both species in abundance. The season opened August 1 with above average success. Some of our better squirrel habitat has been converted into a super highway and prison site.

Red and Gray Foxes

This refuge supports a large Red Fox population. A large percentage are mangy and in poor condition. Grays are present but less frequently seen.

Cottontail Rabbit

This Spring's high rabbit browse line is indicative of last winter's deep snows. Apparently, the severe winter did not have much effect on the breeding stock, as this season's population is again at a high level.

Overall, plant succession at this date will support a high population of rabbits. However, as our non-cropped land passes out of the brome sedge, then Winged Elm, Persimmon stages, into the Oak - Hickory climax, bunny production will be lowered as will be that of the Bob-White Quail.

This will be prime squirrel habitat. Deer will benefit from the increased mast crop, but will have less browse through the "low food" months of January and February.

Woodchuck

The "chuck" burrows homes in briar patches and honeysuckle thickets growing along miles of fence row, on hundreds of old house sites and World War II High Explosive bunkers. Food is plentiful in nearby bean and clover fields. This is Woodchuck habitat.

The second successful cross-channel swimming of Crab Orchard Lake in the Wolf Creek Causeway area by a "chuck" was reported by Guard Lewis Gass. According to Mr. Gass the completely exhausted animal appeared to be a young of the year.

Why would such a born landlubber attempt such a swim? Food at this time is plentiful. Perhaps other Woodchucks forced him out of his home range.

Coyote

Although Coyotes last year were seen during this period, no observations were reported in 1960.

E. Hawks, Eagles, Owls, Crows, Ravens, and Magpies.

Crows are abundant. The other most commonly seen species are Red-tailed, Red-shouldered, and Sparrow Hawks. Our large rodent, small game, snake, etc. populations support large populations of these birds.

F. Other Birds

As previously mentioned, the first refuge recording of an immature Yellow-Crowned Night Heron was made during this summer. Last Winter, thousands of wintering Starlings, Cowbirds, and Grackles used several stands of Shortleaf Pine in Agricultural Units B-4 and 5 as roosting sites. Many of these heavily fertilized trees have been severely damaged. These birds will have to be "encouraged" to find a new home.

Notes
DAD

G. Fish

Following last Falls stocking of Devils Kitchen Lake with Bluegill, 150,000 Bass were added to the lake in June. Special regulations include: (1) the use of live bait is prohibited (2), no fishing will be allowed until January 1962, (3) the use of power-craft is prohibited.

Service and Southern Illinois University studies have shown that Crab Orchard Lake is overbalanced with small fish. They have not been kept in check by the larger predatory species. Resulting competition for food is keen between these smaller fish, (Yellow Bass, Bluegill, Crappie). The result is that many do not attain pan size.

Thousands of Carp keep the shallows muddied, thus lowering food production by reducing photosynthetic activity, and spoiling Bass spawning grounds.

It is hoped that the proposed drawdown will help reduce the vast numbers of small fish by stranding them in the shallows and by reducing the amount of escape habitat. The result: more food per small fish or more pan-sized fish in the creel.

One bright spot has been the large numbers of fair sized Channel Cats that have been caught this year. Many large (fifteen pound) Sheepsheads have also been taken.

Robert Sharp, Fishery Management Biologist, assisted by Wildlife Aid Lee Bush, spent several days taking gill net samples out of Crab Orchard Lake.

H. Reptiles

No significant observations were recorded.

I. Disease.

See Section II Wildlife, Red and Gray Foxes.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development.

General Wildlife and Biological Development:

- Plowed, disked, fertilized, planted and cultivated 25 acres of grain Sorghum and 210 acres of corn.
- Graded one-half mile of farm access road in A-41 agricultural unit.
- Repaired two washouts on A-32 road, also replaced two culverts on A-11 access road.
- Sprayed with 2,4-D, 2,4,5-T mixture both Crab Orchard and Little Grassy dikes and 9 miles of trail right-of-ways.
- Planted food patches totaling 3 acres.
- Constructed and erected 15 refuge regulation boxes.
- Constructed and erected 4 fishing regulation signs at Devils Kitchen Lake.
- Installed safety flags on necessary farm equipment.
- Constructed one permanent goose trapping site for the cannon-net trap.
- Repainted 8 Refuge entrance signs.
- Re-sacked and transferred 10,000 pounds of seed to the new seed house.
- Penta treated and re-piled 400 pine fence posts.
- Seeded 20 pond shorelines to millet.
- Constructed and installed three farm gates.
- Began hauling from woods, peeling, and stacking in drying piles 1500 pine fence posts.
- Constructed and erected two "Help Keep Your Refuge Clean" Signs.

Recreational Development and Maintenance:

- 276 man days spent on routine cleanup of public areas.
- 116 man days spent in mowing and trimming public areas.
- 100 tons of salvaged rock used in roads and parking area improvements.
- 2 miles of roads bituminous surfaced by contract.
- 70 salvaged 55 gallon drums placed in areas as trash cans.

- 12 informational signs renovated and placed in public areas.
- 6 tons of bituminous mix used in road repairs.
- 13 public toilets maintained in reasonably good condition.
- Corp of Engineers office building at Devils Kitchen converted to living quarters for Assistant Ranger - completed with fence.
- Sailboat dock constructed by the Crab Orchard Sailboat Club after we drove the pilings.
- Removal of the old Crab Orchard Beach House completed and area cleaned up.

Soil and Moisture Physical Development and Maintenance:

- Erosion checks in 150 acres of pasture.
- 200 acres of land clearing.
- Combined 50 acres of rye.
- Combined 30 acres of fescue.
- 100% pasture checks.
- 120 acres of rye planted for cover crops.
- Brush controlled 150 acres.

B. Plantings.

Aquatics and Marsh Plants

No plantings were made during this period.

Trees and shrubs

No plantings were made during this period. 85% survival was reported on the Shortleaf, Loblolly, and Black Locust trees set out in the Spring of 1959.

Cultivated Crops

The planting season this year was normal. Soybeans and corn were planted in plenty of time and looked good until late summer. During August we had some very hot days which were hard on early beans and late corn. Crop prospects for corn is average or better but soybeans yields will be below average.

Refuge personnel planted 160 acres of corn and 30 acres of sorghum. Most of the corn is on bottomland and will yield far above average for the refuge.

Olin has again contracted 12 acres of sorghum planted in Area 13 storage area. In addition they have about 30 acres of ladino that should provide some excellent goose browse.

The 50 acres of ladino sown by the refuge staff last winter looks excellent. We are curious to see how much it will be used by the geese.

On the average, crops on the refuge look about as good as last year. The amount that will be available to waterfowl will probably be down because there was so much unharvested last year due to wet weather.

C. Collections and Receipts.

Seed or Other Propagules

No collections were made.

D. Control of Vegetation.

Railroad and many gravel road right-of-ways were sprayed with a water borne mixture of 2, 4-D and 2,4,5-T. The goals of the above Spray Program are to improve drainage and visibility along these roads.

Clear skies and average temperatures aided in giving us a good apparent kill on Sweet Clover, Trumpet Creeper, Persimmon, Sassafras, Sumac, and American Elm. Maple as usual was resistant. Undoubtedly, a stronger mixture would kill it.

Summer checks revealed that the kill was 90% complete when refuge personnel sprayed sodium chlorate (atlacide) on Johnson Grass late last summer. This grass, growing on State of Illinois roadside, was sprayed this summer by State Highway employees with Dalapon to control new seedings.

Continued vigilance must be maintained if Johnson Grass is to be kept out of Refuge bottomlands.

E. Planned Burning.

No planned burnings were attempted.

F. Fires.

Dry field conditions during the early weeks of May increased the field fire hazard. At this time the tower was manned by Fire Aid, Gordon Tripp. No field fires were reported on Refuge lands for this period.

IV. RESOURCE MANAGEMENT

A. Grazing.

The number of acres in pasture land is about the same as last year. A total of 120 acres was taken out of production to be renovated but about the same amount was in the new pasture A-25.

Pastures held up well. If we do not get rain soon some of the cattle may have to be taken off.

Clipping of pastures was on schedule this year. Refuge pastures are in demand so we can get things done such as clipping, fence repair, etc. It's too bad we don't have the same luck with our farmers and farming program. If the demand for farm land on the refuge continues to fall, we may have to convert several of our units to pasture to prevent them from growing up.

B. Haying.

The only hay that was cut this year was on farm units by permittees. The demand was normal and yield was average. Several hayfields that were not cut for hay are being clipped by the refuge staff to provide additional goose browse.

C. Fur Harvest.

No fur harvest during this period.

D. Timber Removal.

A permittee harvested one-hundred, 3" - 6" x 7' Black Locust posts, per Special Use Permit, and a local lumber company completed its harvest of an estimated 293,000

board feet of Elm, Hickory, Soft-maple, Honey-locust, Ash, Pin-oak and other hardwoods. The fourth and last installment, for \$426.16, was made in July.

E. Commercial Fishing.

Two Special Use Permittees harvested 5 pounds of Buffalo fish and 400 pounds of Carp during this period.

F. Other Uses.

Following is a tabulation of revenues received from all phases of the recreational operation:

Table No. 11 - Recreational Revenues

Item	May	June	July	August	Total
Concession - Crab Orchard	\$ 289.02	\$265.10	\$261.71	\$234.47	\$1050.30
Sale of Bath House	106.00				106.00
Impoundment fees		10.00	10.00	10.00	30.00
Rent - Quarters			33.58	57.41	90.99
Totals -	\$ 395.02	\$275.10	\$305.29	\$301.88	\$1277.29

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Waterfowl Trapping and Banding.

Fifteen Class 2 Mallards were banded in July. Last year 13 resident Canada Geese, including 9 goslings, were trapped and banded. Few young or moulting birds were seen this summer, consequently no trapping was attempted. It was hoped that the flock could be trapped again this year to determine if any of the crop of 1959 remained at Crab Orchard. Unfortunately, few birds were seen this summer and none were trapped.

Two field investigations were carried on by Southern Illinois University students. Grant Crawford is studying refuge deer to obtain material for his Masters Thesis as is a Botany student, who is working on plant survival under flooding conditions.

VI. PUBLIC RELATIONS

A. Recreational Uses.

The Crab Orchard Refuge public use area continued to be the major outdoor recreation attraction in this part of the state. Total visitor use days for the period have not been computed, but most weekends recorded 25 to 30 thousand visitors.

There seems to be no end to the popular activities of boating, swimming, camping and picnicking. The only factors which seem to limit visitor use are weather and space. There are times when space seems unimportant.

This was the first recreational season for the State of Illinois Boat Registration and Safety Act. This new state legislation has been a big help in regulating boating activity on the refuge. State Department of Conservation personnel took an active part in checking boat registrations and equipment early in the season. Their cooperative efforts dwindled somewhat, but we expect renewed efforts next season.

We wish it were possible to report no problems concerning recreational use; however, this is not the case. We take care of one problem and three more appear in its place. It seems a pity ducks can't scream as loud as people.

Recreational maintenance required 276 man days. This may be compared with 196 man days in 1959 and 118 in 1958. The new garbage truck, acquired from a surplus property list, was a valuable addition to recreational cleanup equipment. The 12 toilets on the public use area are about half the number needed. The intense use of those present pose a serious maintenance problem. The scarcity of potable drinking water remains a problem. An overcrowded camping area will require additional planning and considerable money before anything approaching quality is possible.

Those of us who have wrestled with the recreational problems of Crab Orchard have wished many times that three important words had been used during early negotiations for the area. These important words are "day use only". If this had been the case we would have half as many recreational problems.

Perhaps our most important recreational problem is one which is not immediately evident to the casual observer. This problem is one of more significance to the future than for the present. It is the problem of managing and developing an unnatural area in a natural condition, free of unnecessary commercialism and the resort atmosphere common to so many "outdoor" recreation areas today.

We know our "natural area" policy is right. We know this policy will pay big dividends in the future. We do not know if this policy will withstand tremendous pressures from local "economic recreationists".

B. Refuge Visitors.

Refuge visitors during the period were logged as follows:-

<u>Date</u>	<u>Name</u>	<u>Title</u>	<u>Purpose of Visit</u>
May. 2	Larry Kladiva	U. S. F. S.	Fire School
	Max Lane	U. S. F. S.	Fire School
5	A. Holtz	Union Homes	Lease prospect
6	Dr. H. Stains	S.I.U.	Tour
	Maurice Whitacre	Ill. Dept. Consv.	Minnow ponds

12	Wm. Giles Wm. Shirley Wm. Sparling Rex Karnes Dr. L. Taylor C. Melsen F.E.Graper Claude Grace	Herrin, Ill. Horner & Shifrin Blue Cross S.I.U S.I.U. Horner & Shifrin F.B.I. F.B.I.	Boat Dock Prison construction Health Insurance Family Living show Family Living show Prison construction Employee indictment Employee indictment
16	J.W.Kimrey	C.I.P.S.	Tree trim
18	Mark Davis	G.S.A.	Prison construction
<u>June</u>			
2	Chet Lund D. L. Lampman Frank Jennings Steve Moro Paul St.Amant	Regional Office S. Dakota U.S.F.S.	Audit Tenant lease Tenant lease Property pickup Courtesy
3	Chet Lund	Regional Office	Audit
6	Chet Lund L. W. Teas	Regional Office Highway Dept.	Audit Rt. 57
7	Pat Rooney Chet Lund Eldon Gosnell	Golden Rule Regional Office Paul Hall Assoc.	Health insurance Audit Carbondale water plan.
8	Chet Lund Sgt. Gates	Regional Office National Guard	Audit Bivouac site
9	R.J. Harris Cy Brown Oscar Peters Martin Anderson Chet Lund	Marion, Ill. Dept. Ag. Dept. Ag. Ill. Dept. Consv. Regional Office	Tie bid & sale Little Grassy dam. Little Grassy dam. I.T.F.A. meeting Audit
10	Paul Lamendola Chet Lund	Ill. Dept. Consv. Regional Office	I.T.F.A. meeting Audit
13	Guy Gossett Paul Ferguson	C.O.S.A. Willow Springs, Mo.	facilities Interview
15	Harry Maroney	Olin Mathieson	Lease facilities
20	Frank Kuykendall	Marion, Ill.	Concessions

21	Charles A. Kelley Edward W. Fennell Thomas Bear Vance Lischer Wm. Shirley Cleve Melson	Bureau Prisons Bureau Prisons Hellmuth Obata Horner & Shifrin Horner & Shifrin Horner & Shifrin	Inspection - prison Inspection - prison Inspection - prison Inspection - prison Inspection - prison Inspection - prison
22	Maurice Whitacre	Ill.Dept. Consv.	Fill kill
23	James McSherry	Olin Mathieson	Ball Diamond
30	Joe Morrison Maurice Whitacre	R. O. Hatche ³ res Ill.Dept. Consv.	Courtesy Courtesy

July

5	Cleve Melsen Lawrence Sexton Charles Shoot Cy Brown Lawrence Cralley Tom Mofield Eugene Hickey	Horner & Shifrin Herrin, Ill. Marion, Ill. Dept. Ag. Dept. Highways C.O.F.T.C. Engnr. McCann	Prison construction Beach house bid. Lease building. Coop farming Route 57 Quail population Devils Kitchen
6	Cleve Melsen	Horner & Shifrin	Prison construction
7	F.E.Kassberger	G.S.A.	Prison construction
8	Gene Wells J.W.Travelstead Karl Malzahn Carl Mayhew Dr. W.Scott Robert Merz J. Micklewright	P.O.Hall Assoc. General Telephone S.I.U. Southern Illinoisan C.O.Sailboat club U.S.F.S. U.S.F.S.	Carbondale water Pay booth. Surplus property News Articles Boat dock. Timber Management Timber Management
11	Art Hamilton Robert Sharp Walter Bates Cleve Melsen	Herrin C. C. R. O. Fisheries G.S.A. Horner & Shifrin	Courtesy Fish management Property Prison boundary
13	Tom Madra Peter Gentile	Monsanto Chemical Monsanto Chemical	Lease expansion Lease expansion
14	Newt Williams	Boy Scouts	Camp-o-ree
18	Mae Gualdoni Karl Malzahn	Girl Scouts S.I.U.	Security Lease property
19	Ray Richardson	Herrin, Ill.	Security

25	Larry Miller Marshall Stinnett Ray Plute	U.S.G.M.A. Norge	Civil Defense Courtesy Lease property
28	Art Hamilton Goffrey Hughes R.W. McElwee	Herrin C.C. S.I.I. General Electric	Tour - D. K. Tour - D.K. Courtesy

August

3	Mark Davis Cleve Melsen	G.S.A. Horner & Shifrin	Prison construction Prison construction
4	Morgan Sweeney	Olin Mathieson	Water line break
10	R. E. Favreau R. J. Van Derwerker A. O. Manke	Ill. Dept. Health U. S. Public Health Mingo Refuge	Inspection prison Inspection prison Property transfer
11	Cleve Melsen Reid Troutman	Horner & Shifrin Ill. Dept. Conv.	Prison construction Game laws.
23	G. Siegelman V.H. Hartmann	Olin Mathieson Olin Mathieson	Lease contract Lease contract
24	Wm. Sinks	Marion, Ill.	Boat dock
26	Art Hamilton	Herrin C.C.	Refuge development
31	Julius Swayne	Little Grassy	Concession

C. Refuge Participation.

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

May

- 1 --Stiles served as Forestry Merit Badge Instructor - Egyptian Council Scouts & Explorers, Boy Scouts of America, Shawnee National Forest.
--Sheffield met with Little Grassy Lake Group Camp Association.
- 3 --Carter spent day with S.I.U. Forestry Camp Class on tour and discussion of refuge recreational areas.
- 5 --Carter attended C.O.S.A. meeting.
- 6 --Carter spent P.M. with S.I.U. game management class on field trip of refuge.
--Toll conducted 30 students from Illinois Normal University on tour of refuge.

- 14 --Toll conducted field trip for Indiana University Conservation Extension class from Evansville, Indiana.
- 16 --Carter gave talk at Murdale Toastmasters meeting.
- 17 --Sheffield gave conservation talk for Marion sixth graders at S.I.U. Little Grassy Lake Camp.
- 18 --Toll gave conservation talk for Marion graders at S.I.U. Little Grassy Lake Camp.
--Carter discussed conservation practices of Crab Orchard for Carterville High Science and Biology class on tour of refuge.
- 20 --Carter met with Educational Council of 100.
- 25 --Sheffield attended Southern Illinois Recreation Council meeting.
- 26 --Sheffield attended Williamson County Tourist and Recreation Association meeting.

June

- 6 --Sheffield attended meeting of Williamson County Tourist and Recreation Association.
- 11 --Stiles attended monthly meeting of C.O.S.A.
--Sheffield attended Illinois Park District Association meeting.
- 15 --Stiles gave welcome address to Region 9 (F.S.) Fire Equipment meeting.
- 16 --Stiles guest speaker at Region 9 Fire Equipment group.
- 17 --Stiles made field tour with Region 9 Fire Equipment group.
- 20 --Sheffield attended Williamson County Tourist and Recreation Association meeting.
- 27 --Stiles attended conference on Rend Lake wildlife potential, S.I.U. camp.
--Stiles and Sheffield attended S.I.I. meeting.

July

- 11 --Sheffield attended Williamson County Tourist and Recreation Association meeting.
- 15 --Carter presented program on refuge recreational program for Carbondale Lions.
- 25 --Stiles attended S.I.I. board meeting.
--Sheffield presented slide program for Anna, Illinois Rotary.

August

- 3 --Carter attended meeting of Technical Section of Mississippi Flyway Council in St. Louis.
- 8 --Carter attended wildlife seminar at S.I.U.
- 10 --Sheffield attended meeting of Southern Illinois Recreational Council in Anna.
- 11 --Carter presented slide show for 59 4-H boys attending 4-H Forestry Camp near West Frankfort.
- 23 --Carter presented slide show "Our National Wildlife Refuges", for Extension Service Conservation Workshop at Dixon Springs Experiment Station.
- In addition, Carter attended weekly meetings of Carbondale Lions Club and Murdale Toastmasters Club, and Stiles attended weekly meetings of Carterville Lions Club.

D. Hunting.

Squirrel were the only game in season this period. Local nimrods tell us the extremely dry weather conditions are making hunting difficult.

E. Violations.

Violations during the period were confined to those peculiar to our summer recreational activities. The tabulation below summarizes apprehensions and prosecutions.

<u>No.</u>	<u>Violation</u>	<u>Total Fine</u>
4	Improper parking	\$ 34.00
2	Speeding	33.00
2	Illegal transportation of intoxicants	35.00
2	Reckless driving	60.00
2	Boating violations	30.00
1	Littering	15.00
<u>13</u>	Totals - - - -	<u>\$207.00</u>

In general, there was an increase in the number of complaints of undesirable activities and vandalism. The following tabulation summarizes these complaints. Local civil authorities have made apprehensions or are investigating some of these.

- 1 Attempted murder plus kidnapping and murder
- 1 Disturbance of the peace
- 2 Complaints of immoral conduct in public
- 5 Car break-ins
- 1 Boat stripped of equipment
- 1 Boat stolen
- 1 Car stolen
- 1 Complaint of stolen hub caps
- 1 Break-in (Veterans Haven)
- 5 Refuge signs damaged
- 1 Regulation box destroyed

The above list represents a considerable increase in the number of undesirable activities reported. The cause of this increase may be due to several factors. Perhaps limited night patrol is an important consideration.

VII. INDUSTRIAL ACTIVITIES

A. Water Use.

1. Industrial Consumption

Average production of treated water by the refuge water plant was 1,002,000 gallons per day this period. This is an increase of 25,000 gallons per day over the corresponding period in 1959.

An unusually severe "musty" odor and taste appeared in the treated water early in the period. This was allegedly due to the spring turnover of the lake water, though some claimed goose "scats" were responsible. Addition of powdered charcoal in the treating process soon corrected the problem, although the taste persisted for several weeks at some low consumption points in our water distribution system.

Month	May - August, 1959		May - August, 1960	
	Gallons Treated Water	Gallons Treated Sewage	Gallons Treated Water	Gallons Treated Sewage
May	33,348,000	6,679,000	32,546,000	11,292,000
June	29,588,000	8,931,000	29,916,000	9,910,000
July	26,217,000	8,794,000	28,428,000	9,307,000
August	31,056,000	8,562,000	32,484,000	9,802,000
Total	120,209,000	32,966,000	123,374,000	40,311,000

2. Municipal Use

The City of Carbondale pumped 131,050,000 gallons of raw water from Crab Orchard Lake this period. At \$0.02 per M gallons, the refuge collected \$2621.00 for this use.

An accumulated rainfall deficiency totaling nine inches below normal the first eight months of the calendar year has lowered the water reservoirs of all area cities. Carterville resorted to emergency pumping from Crab Orchard Lake in July and have continued pumping through August. Herrin and Marion, the other two area Cities having emergency pumping facilities on Crab Orchard Lake, are still pumping from municipal reservoir supplies.

A 10-year water agreement, between Carbondale and the Service, for use of limited quantities of raw water from Crab Orchard Lake was consummated this period.

B. Facility Activity, Development and Maintenance.

Several pages were torn from the backlog of major industrial facility maintenance and rehabilitation this period. Our railroad, sewerage system and boiler house received the most attention.

1. Boiler House

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

TABLE NO. IV - Comparative Steam Production, Boiler House #1

Boiler No. & Type	May - Aug., 1959		May - Aug., 1960	
	Steam Prod.	Fuel Used	Steam Prod.	Fuel Used
No. 1 - Coal Fired	15,432,000 #	2,142,250 #	12,806,500 #	1,888,000 #
No. 2 - Oil Fired	4,332,500 #	44,710 gals.	8,883,000 #	83,349 gals.
Total Steam Produced -	19,764,500 lbs.		21,689,500 lbs.	

Forty-one percent of steam generated this period was produced in oil-fired Boiler No. 2. The reason for this was to allow extensive repairs (see below) to coal-fired Boiler No. 1.

Major repairs and maintenance (all force account) at Boiler House No. 1 are listed as follows.

-- Rebuilt south wall and inside of north fire wall of Boiler No. 1. (approximately 10,000 refractory brick)

- Installed new top and igniter arch in Boiler No. 1.
- Complete cleaning of Boiler No. 1.
- Replaced three tubes, cleaned and replaced top, Boiler No. 2.
- Installed new 3/4" service steam line to oil burner, Boiler No. 2.
- Installed new drag-chain and center-plate, inside coal conveyor.
- Installed new augers and bearings in inside coal conveyor.
- Repaired and cleaned all steam valves and service lines.
- Replaced one 1" steam service line.
- Replaced master control with master control salvaged from inactive Boiler House No. 4.

Rebuilding the south wall of Boiler No. 1 posed a real challenge to our maintenance and operation crews. The project was accomplished in good time, however, and now stands as a good example of the ingenuity of our work force. For the most part, refractory brick salvaged from the old wall and from defunct Boiler House No. 3 was used in this rehabilitation.

2. Buildings and Grounds

Major items completed under this heading are listed as follows:

- Major repairs to Quarters Nos. 3, 23, 6 and 17.
- Minor repairs to Quarters Nos. 5, 17, 7 and 10.
- Mowed roadsides, grounds, etc. in Area 11 - one tractor mower continuous throughout period.
- Improved drainage along 1/2 mile A-5 road.
- Electrical and plumbing repairs to Sewer Lift Stations Nos. 1, 2, 3, 4, 5 and 7.
- Installed 36" ventilation fan at office.
- Cleaned and re-arranged materials in three 200' x 50' warehouses.
- Cleaned and re-sealed cistern - Qtrs. No. 8.
- Finish-bladed 3 1/2 miles of gravel roads preparatory to surfacing.
- Patched 7 1/2 miles of bituminous road preparatory to surfacing.
- Contract surfaced 11 miles of bituminous roads.
- Applied hot asphalt roofing to dormers of 15 staff residences.
- Sprayed 23 miles of railroad with herbicide.
- Converted Devils Kitchen Construction Office building to living quarters.
- Installed 120' of new 2" water line to Building 1-1-26.

- Contract painted 13 staff residences.
- Replaced 200' of underground water line at Fire Station.
- Repaired three water main breaks and two sewer line breaks.

3. Equipment

- Minor repairs to automotive equipment numbers 2, 3, 6, 7, 8, 9, 10, 11, 12, 15, 17, 18, 19, 21, 22, 24, 25, 27, 28, 30, 32 and 33.
- Minor repairs to farm tractors Nos. 101, 102, 103, 108, 109 and 126.
- Minor repairs to heavy equipment Nos. 112, 114, 115, 120 and 127.
- Minor repairs to Locomotives Nos. 104 and 105.
- Major repairs to Automotive Equipment Nos. 15, and GMA's sedan.
- Overhauled Model 35 chain saw motor.
- Installed pinion gears, and general check of No. 122 Locomotive.

4. Railroad

Rehabilitation of the refuge railroad was favored by good weather conditions throughout the period. Three wooden trestles on the mainline were repaired by replacement of lateral and longitudinal cross-bracing. A total of 2787 cross ties were pulled and replaced with new ties. The old ties were disposed of by sale to the highest bidder. The successful bidder paid 10 cents per tie and removed all ties regardless of condition.

Operation records for the period show 558 freight cars handled by our train crews -- a considerable drop from the 950 cars handled the previous period. Freight car handlings have always been a barometer of business conditions, generally. The present downturn is not as great as the above figures would indicate, however. Our heaviest shippers -- Olin Mathieson and Monsanto deal primarily in ammonium nitrate fertilizers and spring shipments would be expected heavy.

The surplus 65 ton locomotive acquired from the Navy was delivered to us this period. It is now in service and seems to be in good condition. It will be used primarily to handle trains exceeding twelve cars in length.

5. Water and Sewer

The usual number of water and sewer line breaks were encountered this period, but the Water Treatment and Sewage Disposal Plants ran relatively trouble free. The seven sewage lift stations continue to require considerable electrical and plumbing maintenance, but we are gradually getting on top of the problem.

Cleaning of gravity flow sewer mains was begun at the end of the period. Two cable-bucket sewer cleaning machines and assorted tackle was purchased to accomplish this work. At this writing, nearly 5000 feet of 12 inch line, to which the new 10 inch line to the Federal Prison connects, has been cleaned and the breaks repaired. In all, we have 11 miles of lines to clean and repair before we can stamp "finished" on this item of maintenance.

6. Fire and Security

On July 9, an overheated drying oven at the Solid Propellant Research and Development pilot plant of Olin Mathieson exploded resulting in a fire at the west end of Building 11-1-17. The fire was quickly brought under control by Olin personnel, but not until damages in the amount of \$4500 had resulted. Olin continues to be rough on government real estate, although their record this period is much improved over the last two.

Engineer Technician Clark Wingard and Fire Chief Rolla Basler made the quarterly fire inspection of all industrial lease holdings this period. Each tenant received a report of this inspection with recommendations for corrective measures wherever hazards were noted.

Intra-department maintenance accomplished by the Fire and Security Department this period included:

- Repaired and painted 11 pairs of road barricades.
- Made five cross bars for five pairs of metal barricade "horses".
- Painted and striped 20 barricades.
- Helped install storm drain at Fire Station.
- Painted interior of Fire Station office, hall and toilet.

C. Industrial Lease Management.

For the first time in the 13 year history of this refuge, industrial revenues in a fiscal year surpassed industrial operations costs. In the Fiscal Year ending

TABLE NO. V - INDUSTRIAL LEASING, REVENUE & EMPLOYMENT

Industry	Lease Footage				Monetary Return					Total No. employed	
	May	June	July	Aug.	Rent	Wat.&Sew.	Steam	Switching	Total	4-30-60	8-31-60
Allen Industries	42,000	42,000	42,000	42,000	\$ 2 373.36	\$ 16.00		\$ 300.78	\$ 2 690.14	8	8
Aronson, Knute	2,021	2,021	2,021	2,021	101.04	--		--	101.04	1	1
Diagraph-Bradley	75,410	75,410	75,410	75,410	4 688.12	292.63		75.00	5 055.75	87	89
Dura-Crates	35,258	35,258	35,258	10,250	1 739.02	38.00		255.00	2 032.02	45	--
E.Side Lumberyard	16,195	16,195	16,195	16,195	1 079.64	22.00		135.00	1 236.64	3	3
Explosives, Inc.	2,138	2,138	2,138	2,138	71.28	--		--	71.28	2	2
GSA - OCDM	63,103	63,103	63,103	63,103	3 538.44	16.00		225.00	3 779.44	10	10
Gr. Lakes Solvents	43,359	43,359	43,359	43,359	2 405.68	16.00		240.00	2 661.68	3	3
Grinnell Sash & Door	35,517	35,517	35,517	35,517	1 832.56	30.87		1 095.00	2 958.43	55	54
Hanley, Inds.	1,069	1,069	1,069	1,069	35.64	--		--	35.64	--	--
McBride, Ralph	4,685	4,685	4,685	4,685	312.36	16.00		--	328.36	17	45
Monsanto Chemical	33,250	33,250	33,250	33,250	1 639.24	--		1 605.00	3 244.24	9	8
Nat'l Reprofections	3,891	3,891	3,891	3,891	259.40	22.00		--	281.40	2	2
Norge	76,850	76,830	76,850	76,850	4 610.88	10 488.79		3 420.00	18 519.67	50	50
Olin-Mathieson	453,217	453,217	453,217	453,217	20 030.50	--		--	20 030.50	397	361
Permanent Homes	20,500	20,500	20,500	20,500	1 161.68	16.00		--	1 177.68	--	--
Propellex Chemicals	1,069	1,069	1,069	1,069	35.64	--		--	35.64	--	--
Sangamo Electric	213,490	213,490	213,490	213,490	10 708.28	7 675.90	\$17 523.60	--	35 907.78	1128	785
Schilli Transp.	3,324	3,324	3,324	3,324	221.60	16.00		--	237.60	9	9
Sou. Homes	82,520	82,520	82,520	82,520	4 240.12	24.00		900.00	5 164.12	43	43
Sou. Metal Art	4,685	4,685	4,685	4,685	312.36	16.00		--	328.36	5	5
Oxford Elec.	33,214	33,214	33,214	33,214	1 906.80	785.15		--	2 691.95	108	170
Triangle Const.	20,500	20,500	20,500	20,500	1 025.00	--		--	1 025.00	--	--
Universal Match	151,140	159,291	159,291	159,291	7 526.19	2 275.20		--	9 801.39	508	390
SIU - VTI	220,693	220,693	220,693	220,693	--	748.75		--	748.75	146	140
SIU - ETP	3,380	3,380	3,380	3,380	225.36	22.00		--	247.36	8	8
SIU - OT	7,072	7,072	7,072	7,072	471.48	31.00		--	502.48	--	--
Good Luck Glove Co.	10,250	10,250	10,250	10,250	512.52	--		--	512.52	2	2
Orr Const. Co.	--	--	--	--	40.00	--		--	40.00	--	--
E. T. Simonds	--	--	--	--	149.00	--		--	149.00	--	--
Am. Dist. Telg.	--	--	--	--	5.00	--		--	5.00	--	--
COSA	--	--	--	--	25.00	38.50		--	63.50	--	--
CO Field Trial Club	--	--	--	--	25.00	27.50		--	52.50	--	--
Totals-May/Aug. 1960	1,659,800	1,667,951	1,667,951	1,642,943	\$73 308.19	\$22 634.29	\$17 523.60	\$ 8 250.78	\$121 716.86		2188
Totals - Apr. 1960				1,653,592	\$73 591.38	\$25 173.38	\$35 424.80	\$11 165.72	\$149 355.28	2646	

June 30, 1960, industrial operation costs totalled 419,789.57. Industrial revenues in the same period totalled ~~425,038.66~~ for a return of revenue over cost of 101%.

The attainment of this long-sought goal is due to several factors. We would include among these; near 100% occupancy of industrial floor space, operation of facilities at a rate nearer design capacity, revision of rates for services, and a generally more realistic approach to industrial management. But chiefly responsible, we believe, is a group of about 60 dedicated government employees who are determined that we can operate a program unique to the Service at no cost to the taxpayer.

There were no new industrial tenants added this report period, nor did we lose any. Dura-Crates, Inc. vacated 22,008 square feet of space on July 31, when they moved to new quarters in the nearby City of Herrin. Universal Match Corporation added 8151 square feet on June 1.

D. Lease Prospects.

Ben Schilli Warehousing has optioned one 10,250 square foot building in Finished Ammunition Magazine, Area III, for storage and warehousing of ammonium nitrate fertilizer.

VIII. OTHER ITEMS

A. Items of Interest.

Crab Orchard Refuge made local and National headlines in its usual ignominious manner following an assault-kidnap-murder at the Crab Orchard Lake spillway during the early morning hours of August 25. A 17 year old waitress was the kidnap-murder victim. Her 20 year old boy friend was shot in the face with a .32 calibre pistol, but survived the ordeal. A local ex-convict is held on a Federal charge of assault with intent to murder and a State charge of murder. Crab Orchard spillway is one of a hundred "lovers lanes" on the refuge.

Two drownings occurred on the refuge this period -- both in Crab Orchard Lake. On May 22, an 18 year old Southern Illinois University student drowned near the refuge water plant while attempting to swim across a 100 yard-wide bay. On July 7, a 17 year old girl suffered an epileptic seizure while wading in two feet of water near the Camp Ground and drowned.

A squirrel hunter was accidentally shot by a hunting companion on the public hunting area near Little Grassy Lake in August. His wounds were painful, but not serious.

B. Personnel.

Several personnel changes were made during the period. Paul Ferguson joined the Management Staff on July 6, as Assistant Park Ranger. Paul is a wildlife graduate of the University of Missouri and has had considerable experience with the U. S. Forest Service.

George Seketa was hired as a Student Assistant in Recreation on July 7. George is a Wildlife Management major at Southern Illinois University.

Samuel E. Irvin e.o.d. June 25, filling a vacancy created earlier by the promotion of Rolla Basler to Firefighter (Supervisory) and William E. Webb to Fireman. Joseph L. Jines resigned his position of Guard on August 20.

James H. Moore e.o.d. June 13, as Laborer, filling the vacancy which occurred when John E. Kelly was promoted to Garage Serviceman on May 8. The Garage Serviceman position required a replacement when John W. Johnson left this post to accept another position outside the Service on March 23, 1960.

Paul and Betty Ferguson were the proud parents of a baby girl on August 1. Raymond and Jewell Goldsmith were equally proud parents of a sweet little bundle -- a girl on June 14, via adoption. The Ferguson table now seats two girls and one boy -- the Goldsmiths' one and one.

C. Photographs.

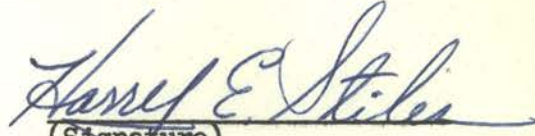
Thirteen photographs pictorializing activity highlights of the period are appended.

Credit for writing this report is divided as follows:-

Section I - Olson
Section II - Bush and Olson
Section III - Olson, Toll, Sheffield
Section IV - Olson, Toll, Sheffield
Section V - Olson
Section VI - Sheffield, Carter, Cox
Section VII - Stiles
Section VIII - Stiles

SIGNATURE PAGE

Submitted by:


(Signature)

Harry E. Stiles

Project Manager
Title

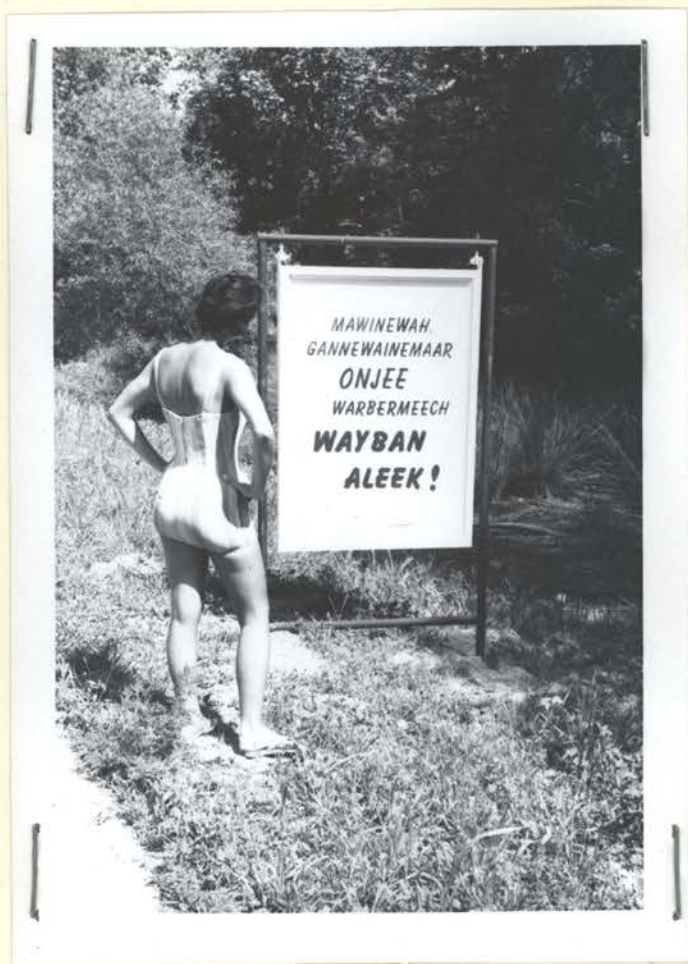
Date: October 3, 1960

Approved, Regional Office:

Date: 10-7-60


(Signature)

Regional Refuge Supervisor



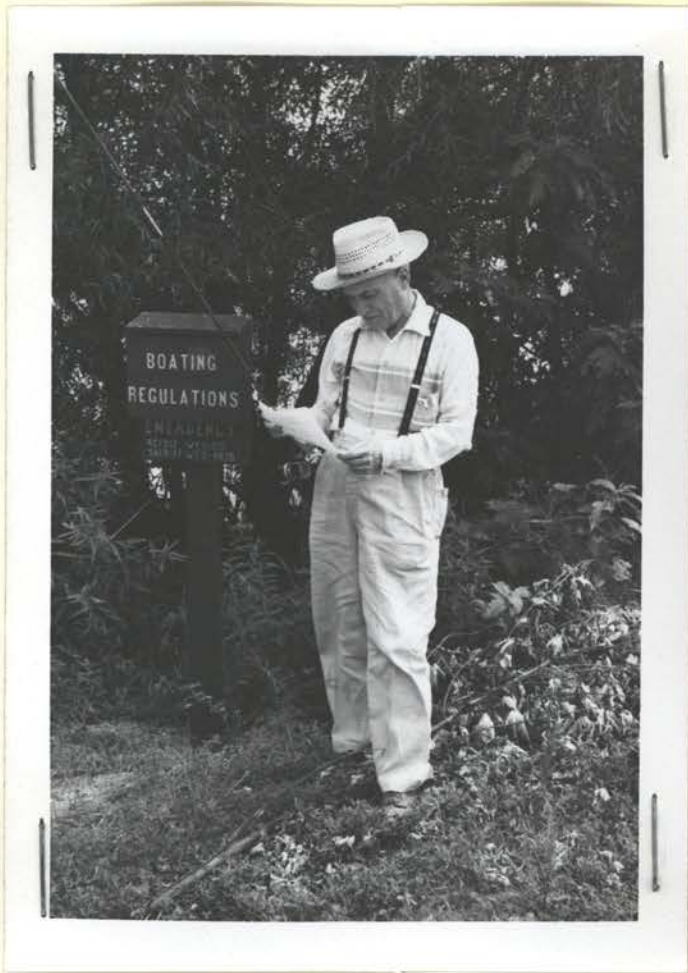
This was a "gimmick" developed by Assistant Refuge Manager Olson as an effort to solicitate better visitor co-operation. This sign and the one on the following page were placed 50 yards apart on a major public use area.

R-8-6. 7-60, Olson.



These unusual signs attracted considerable comment. The first sign in Chippewa (or as near as we could get it) caused some startled expressions. This sign, just down the road, changed the expression to a smile.

R-8-7. 7-60, Olson.



All boat launching sites were provided with boxes for boat regulations.

R-9-7. 7-60, Olson.



That part of Crab Orchard Lake east of Wolf Creek Road was zoned for fishing. This area is about $\frac{1}{4}$ of the lake area.

R-9-5. 6-60, Carter.



The new Devils Kitchen Lake filled to an elevation 20 feet
below spillway. R-6-7 & R-6-8. 6-60, Stiles.





Sailing is a growing activity on Crab Orchard Lake. The Crab Orchard Sailing Club sponsored a regatta which attracted 45 boats. R-5-2 & R-5-3. 6-60, Olson.





A severe wind storm in late June caused considerable damage in public use areas. This unfortunate visitor was in the right place at the wrong time. R-7-7. ——— 6-60, Stiles.



Over 200 acres of brush and timberland were cleared for pasture development. The D-8, in action here, can handle most of the big stuff. The D-7 and TD-14 take care of the rest. A large root rake would make this combination perfect. R-9-1. 7-60, Carter.



The refuge acted as Co-host to the Region 9 fire control organization. All types of fire suppression equipment was exhibited and panel discussions of fire control problems were presented.

R-6-1 & R-6-2. 6-60, Stiles.





We acquired this switch engine from surplus property sources. It is capable of handling more cars than the two engines on hand. It is now possible for one engine with crew to do the work formerly requiring two engines with crews.

R-9-3. 6-60, Stiles.

WATERFOWL

REFUGE Crab Orchard

MONTHS OF May TO September, 1960

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
<u>Swans:</u>										
Whistling Trumpeter										
<u>Geese:</u>										
Canada	72	30	30	30	60	60	60	60	60	60
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
<u>Ducks:</u>										
Mallard	100	100	100	200	200	200	200	200	200	200
Black										
Gadwall										
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood	60	100	100	100	100	100	100	100	100	200
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
<u>Coot:</u>										

3 -1750a

Cont. NR-1

(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Crab OrchardMONTHS OF May TO September, 1960

(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	60	60	60	60	60	60	60	60	60	7 014	9	30
Cackling												
Brant												
White-fronted												
Snow												
Blue												
Other												
Ducks:												
Mallard	200	200	200	200	200	200	200	200	200	23 100	11	100
Black												
Gadwall												
Baldpate												
Pintail												
Green-winged teal												
Blue-winged teal						12	9	20				40
Cinnamon teal												
Shoveler												
Wood	200	200	200	200	200	200	200	200	200	18 620	25	100
Redhead												
Ring-necked												
Canvasback												
Scaup												
Goldeneye												
Bufflehead												
Ruddy												
Other												
Coot:												

(over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans			
Geese	1 002	72	30
Ducks	5 960	100	200
Coots			

SUMMARY

Principal feeding areas Crab Orchard Lake

Principal nesting areas Islands and wooded areas along tributaries to Crab Orchard Lake.

Reported by Lee Bush

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 OrchardMonths of May to September 1956

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
<u>I. Water and Marsh Birds:</u>										
Pied-billed Grebe	Present	at start	10	5-1	2	5-20				20
Double-crested Cormorant	"	"	5	5-1						5
Great Blue Heron	9	5-1	50	8-31	Still present					100
Common Egret	1	5-1	200	8-31	"	"				300
Little Blue Heron	1	6-1	20	8-15	"	"				30
Black-crowned Night Heron	2	5-10	25	8-1	"	"				30
Yellow-crowned Night Heron			2	7-29	"	"				2
Green Heron	12	5-1	100	8-15	Still present					200
<u>II. Shorebirds, Gulls and Terns:</u>										
Killdeer	Present		2,000	8-31	Still present		200	400		3,000
Upland Plover	"		10	6-30	1	7-30		5	10	30
Spotted Sandpiper	"		10	7-20	Still present		10	40		100
Solitary Sandpiper	1	7-30	10	8-20	"	"				40
Lesser Yellowlegs	1	8-12	3	8-30	"	"				5
Pectoral Sandpiper	2	8-12	50	8-30	"	"				100
Least Sandpiper	3	8-15	2	8-15	"	"				2
Black Tern	5	8-10	30	8-25	"	"				100
Greater Yellowlegs	11	8-19	11	8-26	"	"				25
Semi-palmated Sandpiper	2	8-19								2

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons</u> :					
Mourning dove		PERMANENT	RESIDENT	5,000	10,000
White-winged dove					
IV. <u>Predaceous Birds</u> :					
Golden eagle		PERMANENT	RESIDENT		10
Duck hawk Screech Owl		"	"		20
Horned owl		"	"		15
Magpie Barred Owl					
Raven		PERMANENT	RESIDENT		5,000
Crow		SUMMER	RESIDENT		50
Turkey Vulture		PERMANENT	RESIDENT	8	16
Red-tailed hawk		"	"	1	2
Red-shouldered hawk		SUMMER	RESIDENT	2	4
Broad-winged hawk		PERMANENT	RESIDENT	2	4
Cooper's hawk		SUMMER	RESIDENT	1	2
Osprey		PERMANENT	RESIDENT	6	24
Sparrowhawk					200

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.

3-1750
Form NR-1B
(December 1956)

UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Crab Orchard For 12-month period ending August 31, 1960

Reported by Lee Bush Title Wildlife Aid

(1) Area or Unit Designation	(2) Habitat Type	(3) Acreage	(4) Use-days	(5) Breeding Population	(6) Production	
#1	Crops	259	Ducks	186,025	10	25
	Upland	45	Geese	1,140,930		
	Marsh	10	Swans			
	Water	326	Coots	2,275		
	Total	640	Total	1,329,230	10	5
#2	Crops	212	Ducks	101,920	10	25
	Upland	150	Geese	783,195		
	Marsh	143	Swans			
	Water	105	Coots	1,260		
	Total	610	Total	886,375	10	25
#3	Crops	398	Ducks	24,780		
	Upland	125	Geese	359,100		
	Marsh	56	Swans			
	Water	306	Coots	889		
	Total	885	Total	384,769		
#4	Crops	297	Ducks	36,190	4	6
	Upland	410	Geese	9,800		
	Marsh	9	Swans			
	Water	684	Coots	350		
	Total	1,400	Total	46,340	4	6
#5	Crops	185	Ducks	95,095		
	Upland	280	Geese	14,350		
	Marsh	19	Swans			
	Water	236	Coots	3,955		
	Total	720	Total	113,400		
#6	Crops	40	Ducks	199,185		
	Upland	559	Geese	45,290		
	Marsh	1	Swans			
	Water	600	Coots	4,830		
	Total	1,200	Total	249,305		
#7	Crops	377	Ducks	162,505	6	36
	Upland	284	Geese	613,900		
	Marsh	116	Swans			
	Water	200	Coots	8,785		
	Total	1,007	Total	785,190	6	36

(over)

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August narrative report.

INSTRUCTIONS

- (1) **Area or Unit:** A geographical unit that, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. Estimated acreage of each unit should be indicated.
- (2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland consists of all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type including wet meadow and deep marsh; and the water category includes all other water areas inundated most or all of the growing season and extends from the deeper edge of the marsh zone to strictly open-water areas, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for each type should be kept as accurate as possible through reference to available maps supplemented by periodic field observations and should agree with unit acreage.
- (3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven.
- (4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.
- (5) **Production:** Estimated total number of young raised to flight age.

3-1750
Form NR-1B
(December 1956)

UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Crab Orchard For 12-month period ending August 31, 1960

Reported by Lee Bush Title Wildlife Aid

(1) Area or Unit Designation	(2) Habitat Type Acreage	(3) Use-days	(4) Breeding Population	(5) Production		
#8	Crops	35	Ducks	126,070	2	12
	Upland	719	Geese	235,900		
	Marsh	277	Swans			
	Water	619	Coots	210		
	Total	1,680	Total	362,180	2	12
#9	Crops	758	Ducks	143,260		
	Upland	199	Geese	207,500	2	5
	Marsh	2	Swans			
	Water	161	Coots	110		
	Total	1,120	Total	250,950	2	5
#10	Crops	565	Ducks	9,835		
	Upland	119	Geese	304,115		
	Marsh	1	Swans			
	Water	5	Coots			
	Total	690	Total	313,950		
#11	Crops	315	Ducks	2,100		
	Upland	345	Geese	17,610		
	Marsh	23	Swans			
	Water	5	Coots			
	Total	638	Total	19,710		
TOTALS FOR ALL UNITS	Crops	3,471	Ducks	986,965	32	104
	Upland	3,235	Geese	3,731,770	2	5
	Marsh	687	Swans			
	Water	3,277	Coots	22,694		
	Total	10,670	Total	4,741,429	34	109
XXXXXXXXXX	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

UNITED STATES
3-1750
Form 100 (December 1955)
Refuge
Reported by

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August narrative report.

INSTRUCTIONS

- (2) (1) (3) (1)
- (1) **Area or Unit:** A geographical unit that, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. Estimated acreage of each unit should be indicated.
- (2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland consists of all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type including wet meadow and deep marsh; and the water category includes all other water areas inundated most or all of the growing season and extends from the deeper edge of the marsh zone to strictly open-water areas, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for each type should be kept as accurate as possible through reference to available maps supplemented by periodic field observations and should agree with unit acreage.
- (3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven.
- (4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.
- (5) **Production:** Estimated total number of young raised to flight age.
- TOTALS FOR ALL UNITS

UPLAND GAME BIRDS

Refuge Crab Orchard Months of May to September, 19 60

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
						Hunting	For Re- stocking	For Research		
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bob-white Quail	Cultivated fields, upland meadow, brush land and forest edges									
	Area I & III - 15,000 Ac.	15			50:50				1000	Have estimated a 30% decrease in the spring breeding popula- tion on Areas I and III.
	Area II - 19,000 Ac.	10			50:50				1900	Have estimated a 75% decrease in spring breeding population in Area II.
										Crab Orchard Field Trial Club introduced 100 adult birds 5-60. Results unknown.

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.