LOUISA-KEITHSBURG

NARRATIVE REPORT

MARK TWAIN NATIONAL WILDLIFE REFUGE
LOUISA-KEITHSBURG DIVISIONS

1971

DEPARTMENT OF THE INTERIOR
BUREAU OF SPORT FISHERIES AND WILDLIFE
MARK TWAIN NATIONAL WILDLIFE REFUGE
WAPELLO, IOWA

I. GENERAL

A. WEATHER CONDITIONS

	PRECIPITATION				MAX.	MIN.
	MONTH	NORMAL	SNOWFALL		TEMP.	TEMP.
January	1.84	1.51	9.60		46	-10
February	1.50	1.30	1.70		61	-10
March	0.88	2.44	3.90		75	15
April	1.85	3.12	----		85	23
May	3.54	3.98	----		85	35
June	3.03	4.40	----		97	55
July	4.55	3.45	----		90	49
August	0.53	3.34	----		94	47
September	3.77	4.28	----		95	35
October	2.06	2.54	----		86	33
November	1.54	2.10	2.19		72	15
December	4.29	1.40	Trace		49	11
ANNUAL TOTALS	29.38	33.86	17.39	EXTREMES	97	-10

Weather data obtained from observations made at the U. S. Army Corps of Engineers, Lock and Dam 17.

Snowfall data obtained from the U. S. Weather Bureau Observer - Wapello, Iowa.

January temperatures in southeast Iowa averaged about 7 degrees below the normal monthly average (Iowa Climatological Data). Cold temperatures caused the ice covering on refuge pool areas to range in thickness from 14 inches in early January to 24 inches by the end of the month. January snowfall was also noteworthy; a January 3rd storm dropped approximately ten inches in the Wapello area and covered the ground throughout the month. February was somewhat milder on the average with considerable melting of ice and snow beginning mid-month. The snow had completely disappeared by the end of February but it was not until March 20, that all water areas were ice-free. Spring weather was rather on the dry side but temperatures were near normal.

According to climatological data for southeast Iowa, June 1971, had the highest average temperature for that month on record since 1939 and July 1971, was the coolest July on record since 1958. Relatively mild conditions prevailed throughout the remainder of the year. Snowfall received in November soon melted and none carried over into December. The first killing frost occurred on November 4th, with ice forming on the edges of shallow water areas; however, freeze-up was still incomplete on December 31st.

Total annual precipitation was below normal with only four months (January, February, July and December) providing above normal amounts. August was the driest month receiving less than one-sixth its normal precipitation. The Quad-Cities area, approximately 50 miles north of Wapello received only 0.35 inches of rain in August; a record low.

B. HABITAT CONDITIONS

1. WATER

For a second consecutive year the Mississippi River crested before breaching local levees. Early forecasts predicted a repeat of the 1965 flood but were modified by a comparatively slower northern runoff.

LOUISA DIVISION

Average water levels ranged near the proposed winter drawdown level (533.7 MSL) until late February. As the Mississippi River

rose, seepage into the Louisa Division-Lake Odessa complex raised pool levels. By the end of April an estimated 80 per cent of Louisa bottomlands were inundated with varying depths of water. Fox Pond and Prairie Pocket were not drained to their proposed summer levels (533.7 MSL or below) until mid-July. Fox Pond-Prairie Pocket water control, especially drawdown, has been largely influenced by Lake Odessa water levels since the Fox Pond pump structure collapsed in September, 1970. Such being the case, Lake Odessa levels correlated closely with those of Fox Pond and Prairie Pocket as one would expect.

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Utilizing gravity flow from the refuge pool into the Mississippi River, winter drawdown was not completed until the second week in February. Shortly after, a flooding Edwards River and rising Mississippi influenced slowly rising pool levels on the refuge. After the river waters began receding, gravity flow was again used to dewater the unit. Reverting the farm ground to moist soil units precluded the urgency of an early drawdown necessary for cultivation. On this basis, gravity flow was utilized in lieu of pumping to circumvent pumping expenses. Fall flooding was restricted to precipitation runoff to accommodate planned brush clearing on the division. Water levels were maintained below 531.00 MSL for that purpose.

A second spillway was constructed in the levee near the south end of the refuge. During the 1969 flood the levee had been cut at this site to reduce the interior water pressure. We now have two spillways at Keithsburg; one at the north end to let water into the area and one at the south end to void water.

2. FOOD AND COVER

Production of natural food and cover on all three divisions was excellent. Good stands of American lotus (Nelumbo Lutea) and broad-leafed Arrowhead (Sagittaria Latifolia) afforded abundant wood duck brood cover. Mast producing trees, the dominant ones being oak (Quercus sp.) and hickory (Carya sp.), provided an abundant natural food supply.

LOUISA DIVISION

Cultivated crops, in contrast to 1970, produced comparably to many of the better past production seasons. Detailed information is presented in Cultivated Crops, Section III.

Volunteer smartweed was considerably more productive than in 1970. Swamp smartweed (Polygonum Coccineum) dominated the lower, moist sites but developed few seedheads. Pennsylvania smartweed (Polygonum Pennsylvanicum) occupied drier sites, and a majority of the plants produced seed. Fields 12b and 12c lay idle and supported dense patches of Pennsylvania smartweed primarily on ridges and other high spots.

The first Canada geese arriving in the fall concentrated their feeding on buckwheat, millet and wheat at the south end of the refuge. Feeding patterns became more varied in November with a large influx of mostly mallards. Corn and other crops adjacent to Fox and Little Goose Ponds received the greatest use. By the year's end, a guesstimated 80 to 85 per cent of the cultivated grains had been consumed. One field of buckwheat (Field 5) was untouched by waterfowl, apparently because it is a small field completely isolated by timber. The milo was killed by frost before producing any seed to speak of. Smartweed in Fields 12b and 12c was not flooded, which may have contributed to its being unused.

Canada geese browsed wheat in Field 7b throughout the fall just as they had done in 1970. They also devoured new growth of Kentucky fescue seeded to the shoulders of the auto tour route. Where the route parallels Little Goose Pond all fescue was completely consumed. Another favored site for Canada geese and blue and snow geese was Field 8a, a permanent goose pasture adjacent to Fox Pond.

Two incidents of wood ducks feeding on small fish were observed. The fish in the first case was dropped when the duck flew and was identified as a Gizzard Shad (Dorosoma cepedianum); in the second case the fish could not be retrieved for identification.

KEITHSBURG DIVISION

Since farm fields on this division have not been farmed since 1965, woody vegetation has slowly encroached on all of them. Attempting

to exterminate the brush and convert the fields to moist soil units, refuge personnel disked all accessible fields at least once. Disking was not sufficient since most of the woody plants survived. Plowing is probably necessary to adequately root out the brush and attain the desired results. To further diminish the value of these efforts, anticipated stands of smartweed did not appear. The project has not been given enough time to justify scrapping it; instead the objectives will be better defined and the methods better planned.

Waterfowl use on the division in 1970 was largely in the open marsh and slough areas of the northern half of the unit. While many ducks used the same area in 1971, a large number of mallards were observed in flooded timber on the south end of the refuge. Assumptions are that they were retrieving the produce of an excellent mast crop.

II. WILDLIFE

A. MIGRATORY BIRDS

LOUISA DIVISION

1. GEESE

Indications of spring migration were noted on February 19, with the arrival of 400 Canada geese, 7 snow geese and about 500 ducks. Apparently weather and habitat conditions were not quite to the liking of most, since all but 170 Canada geese and 30 mallards had departed after two days. At that time some snow cover remained and most water areas were still frozen but thawing rapidly. As habitat conditions improved locally, spring migrants again made an appearance on the area. Canada goose numbers reached 700 which was about 61 per cent lower than the highest spring population in 1970. Blues and snows appeared in groups of 25 to 50 with a recorded 150 appearing the last week in March. Blue and snow geese, for the most part, appear to by-pass the refuge during spring migration. White-fronted geese were first observed the last week in March. A group of 50 blues and snows and 15 white-fronts were observed during the last two weeks of April browsing on green vegetation in Fields 11c and 14b. They departed when seepage water inundated most of their feeding area.

The arrival of 35 Canada geese on August 24, heralded the beginning of fall migration. Their numbers increased to peak at 3,000 the first week in December. The first fall arrival of blue and snow geese was recorded on September 16, when 8 blues and 4 snows were observed. Peak concentration was recorded at 4,500 birds on November 24, and by December 22, all the blues and snows had vacated the refuge. The peak white-front population coincided with the first fall sighting of this species on December 3. They remained for about two weeks before continuing south. At the end of the year approximately 1,000 Canada geese remained on the refuge.

Figures 1 and 2 graphically illustrate eleven years of data on goose use days and peak concentrations. Tables I and II categorizes the data in terms of species of geese.

GEESE -- USE DAYS

FIGURE 1.
LOUISA DIVISION
GEESE - USE DAYS

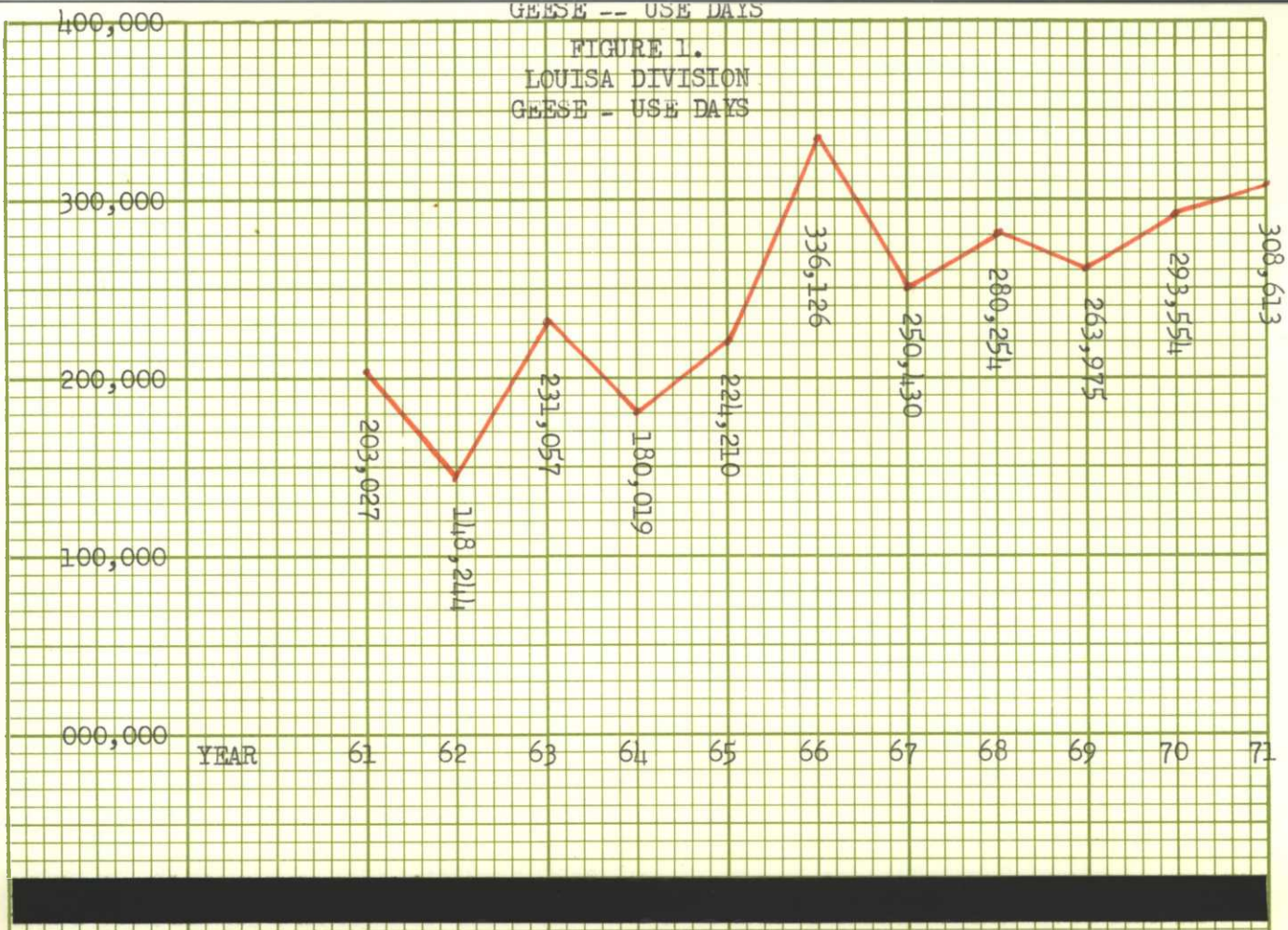

FIGURE 2.
LOUISA DIVISION
GEESE - PEAK CONCENTRATIONS

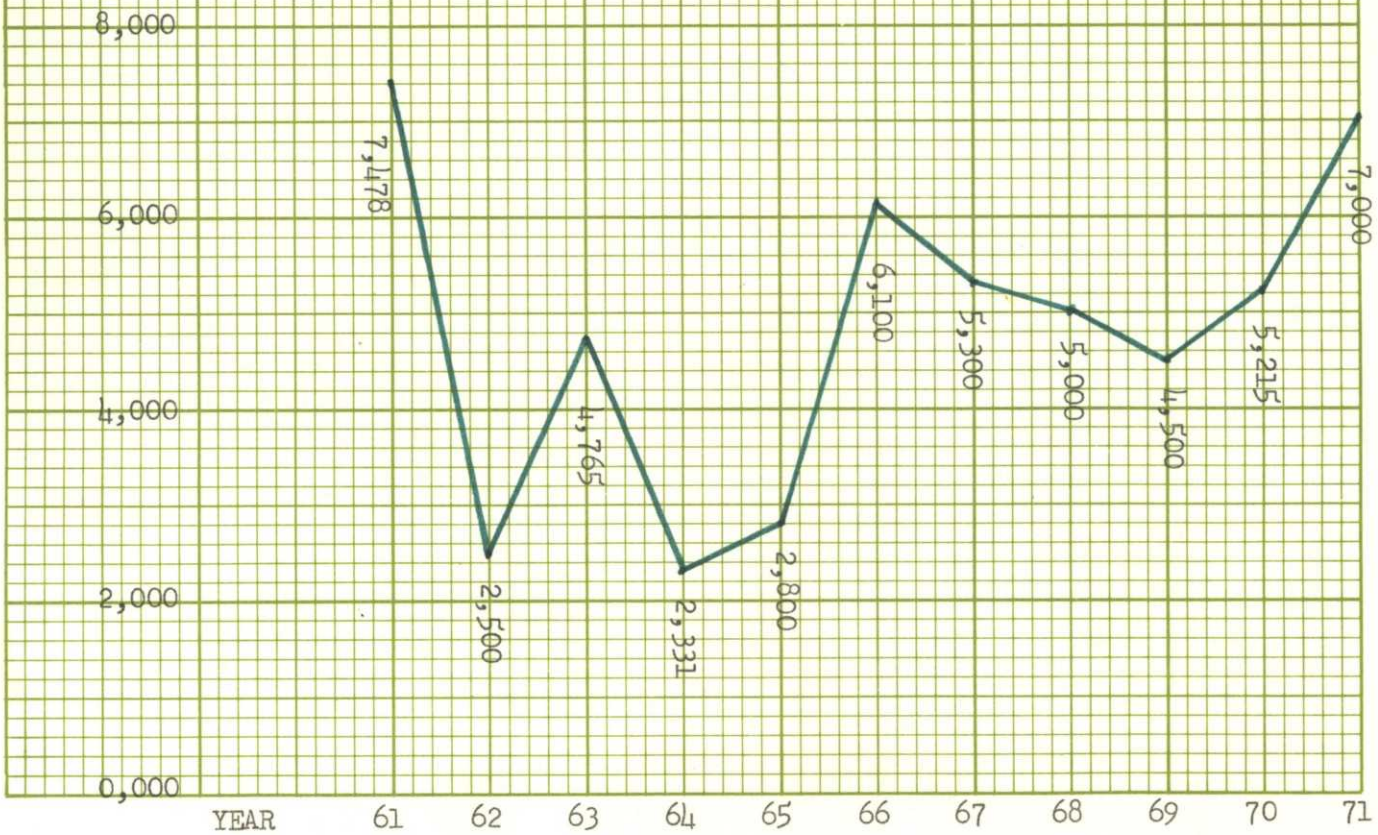

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TABLE I.

MARK TWAIN NATIONAL WILDLIFE REFUGE
LOUISA DIVISION
USE DAYS BY SPECIES OF GEESE
1961 - 1971

YEAR	CANADA	BLUE-SNOW	WHITE-FRONT	CACKLING
1971	156,104	123,410	399	28,700
1970	168,373	91,462	1,519	32,200
1969	172,947	85,533	105	5,390
1968	166,819	112,770	665	-----
1967	139,312	110,446	672	-----
1966	141,848	193,088	840	350
1965	142,555	78,505	---	3,150
1964	129,535	45,612	462	4,410
1963	81,376	140,000	1,435	8,246
1962	72,994	74,942	168	140
1961	59,430	142,363	233	1,001

TABLE II.

MARK TWAIN NATIONAL WILDLIFE REFUGE
LOUISA DIVISION
PEAK CONCENTRATION BY SPECIES OF GEESE
1961 - 1971

YEAR	CANADA	BLUE-SNOW	WHITE-FRONT	CACKLING
1971	2,500	4,500	15	500
1970	3,000	3,500	120	600
1969	2,000	2,500	15	200
1968	2,000	3,000	70	---
1967	1,800	3,500	75	---
1966	1,600	4,500	120	50
1965	1,500	2,100	---	200
1964	1,200	1,000	25	125
1963	800	4,000	25	250
1962	900	1,600	11	20
1961	900	6,500	30	80

TABLE III.

MARK TWAIN NATIONAL WILDLIFE REFUGE
LOUISA DIVISION

COMPARISON OF PEAK NUMBERS AND
PERIODS OF CONCENTRATION BETWEEN
MALLARD AND OTHER DUCK SPECIES
1965 - 1971

	MALLARD		OTHER DUCK SPECIES	
YEAR	NUMBER	DATE	NUMBER	DATE
1971	200,000	11-24	6,010	11-3
1970	150,000	12-11	20,800	11-18
1969	40,000	11-12	5,865	10-15
1968	60,000	12-7	11,670	11-16
1967	100,000	11-8	6,910	10-28
1966	200,000	12-3	6,850	11-5
1965	250,000	12-25	6,344	11-6

2. DUCKS

The first ducks arriving in the spring were 400 mallards and 100 pintails; however, within two days all but 30 mallards had departed. Spring populations increased to 6,120 in late March with lesser scaup comprising 70 per cent of the total and diving ducks accounting for 80 per cent.

During mid-April when the numbers of diving ducks, mallards and pintails were declining, gadwalls, shovelers and blue-winged teal were building in numbers. Blue-winged teal remained in substantial numbers until about the second week in May.

One brood survey was conducted at Louisa Division on July 12. Ten wood duck broods were recorded with 73 young. Later, two other wood duck broods with 16 young were reported. Until other data on nesting can be collected, brood surveys can be used only for production trends rather than as production estimates.

The last to depart in the spring, blue-winged teal were the earliest arrivals during fall migration; 140 were recorded on Fox Pond, August 16. Duck numbers jumped to 62,000 in early November with a large influx of mallards. Most duck species, excepting mallards, peaked in early November. Mallards peaked during Thanksgiving week at 200,000 which coincided with the refuge peak duck population. The coincidence of the mallard and refuge duck peaks occurring simultaneously is characteristic of past fall populations. Figures 3 and 4 illustrate duck use days and peak concentrations for an eleven year period. Table III presents a comparison of mallard and other duck species concentration for 1965 to 1971.

An interesting phenomenon occurred the week following Thanksgiving when the refuge duck population dropped to an estimated 5,000 birds. The population was up to 150,000 the second week after Thanksgiving. Apparently the birds took advantage of the termination of the hunting season and spread out to the state managed Lake Odessa Unit and other local areas. Evidence of this occurrence came when large flights of ducks were observed entering the refuge from the south on December 7. Why this abrupt spread for such a short duration remains a question. At the end of the year approximately 25,000 ducks remained on the unit.

DUCKS -- USE DAYS

FIGURE 3.
LOUISA DIVISION
DUCKS - USE DAYS

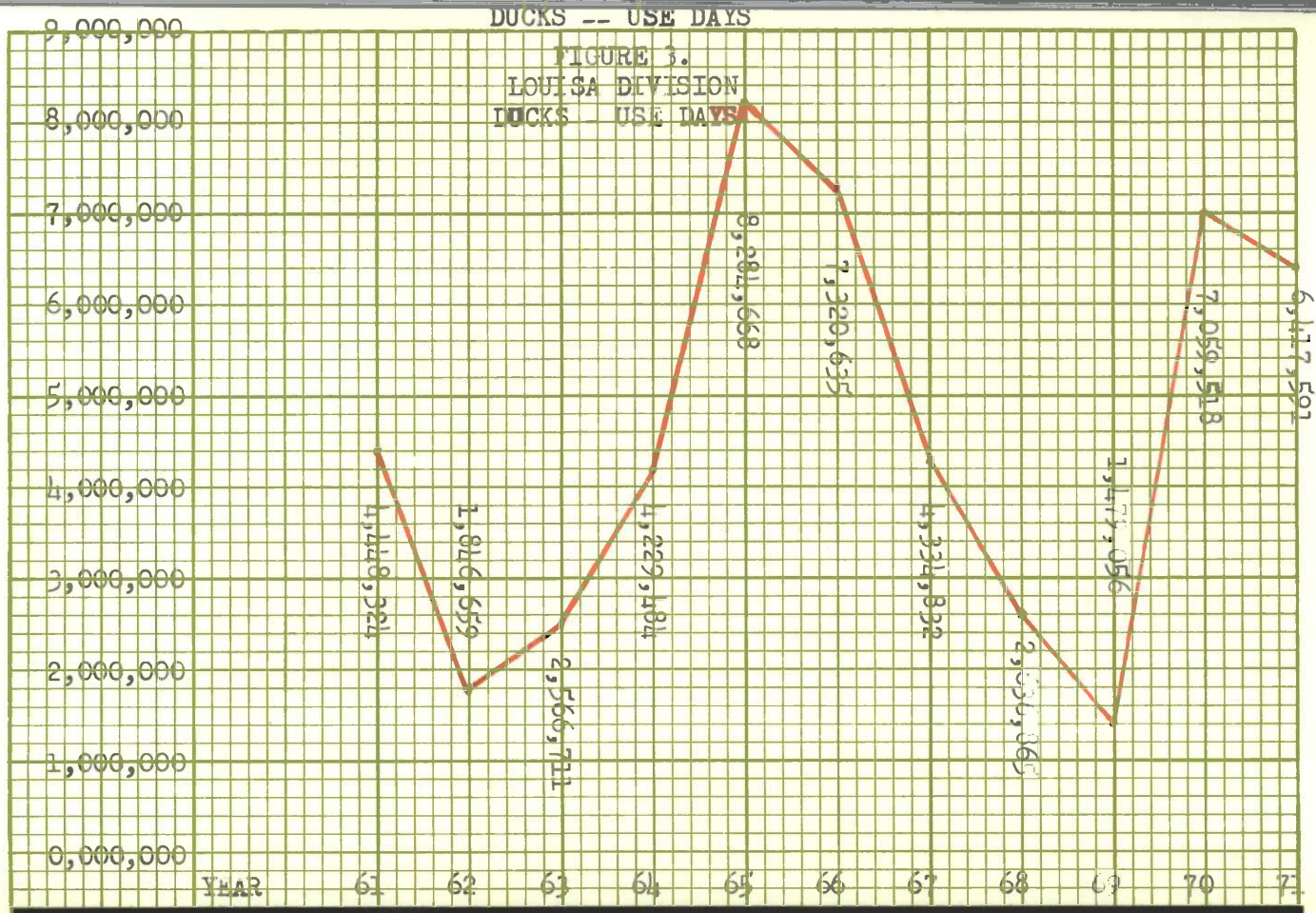
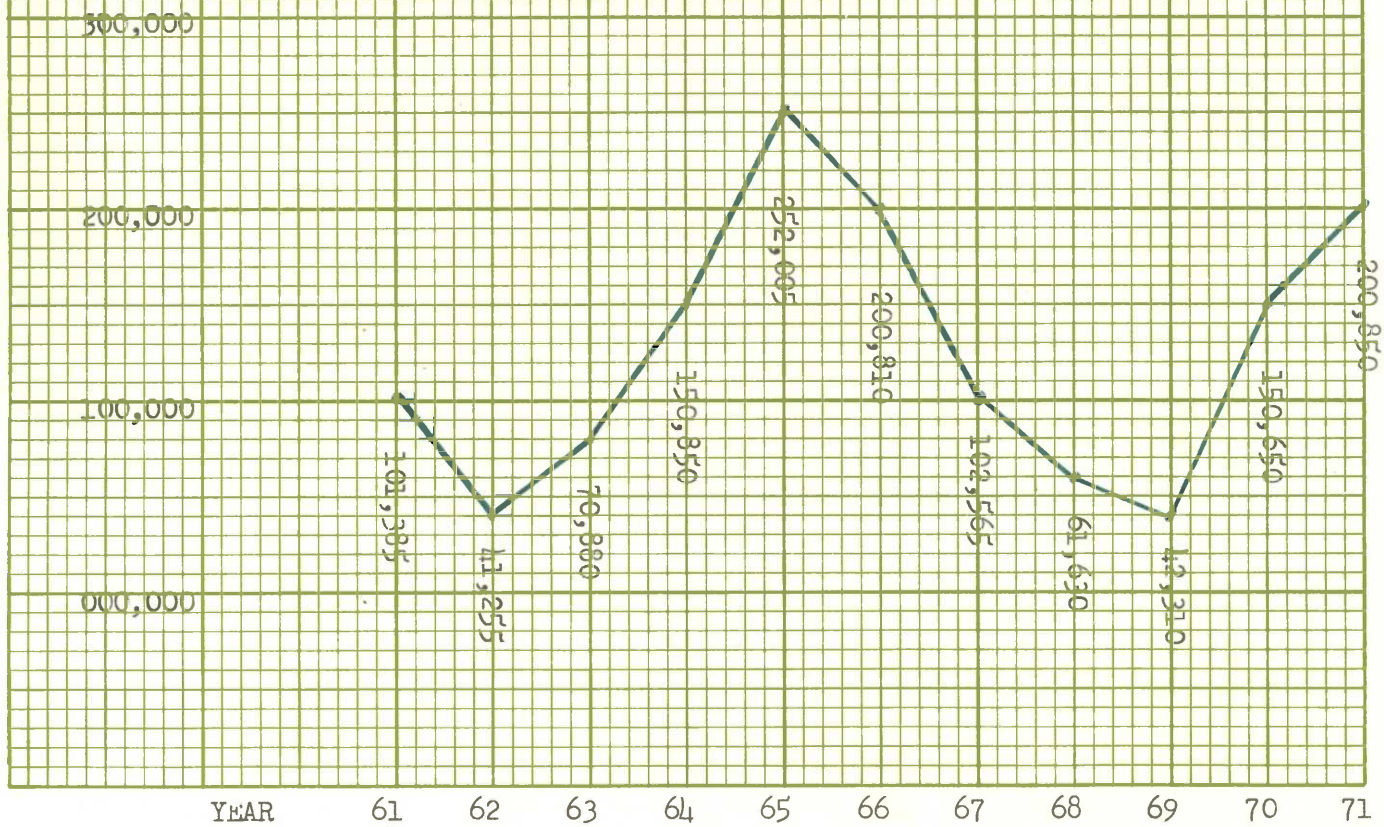


FIGURE 4.
LOUISA DIVISION
DUCKS - PEAK CONCENTRATIONS



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KEITHSBURG DIVISION

Unfortunately the refuge manager's trips to Keithsburg Division were limited in 1971 in order to meet objectives deadlines and comply with normal administrative obligations. As a result, census guesstimates were applied more frequently than desirable.

1. GEESE

Goose utilization of the Keithsburg Division is quite limited. Twenty Canada geese were observed March 24, on the open, marsh area in the northern part of the division. On the same date, 100 blue and snow geese flew over the refuge headed north. During fall migration only one Canada goose was observed using the refuge on October 7.

2. DUCKS

Spring migration chronology coincided with that occurring on Louisa Division. Concentrations were highest in late March when an estimated 3,140 ducks were using the refuge. Spring duck populations peaked about the same time on Keithsburg and Louisa Divisions, but an estimated five times as many m allards were on Keithsburg as on Louisa.

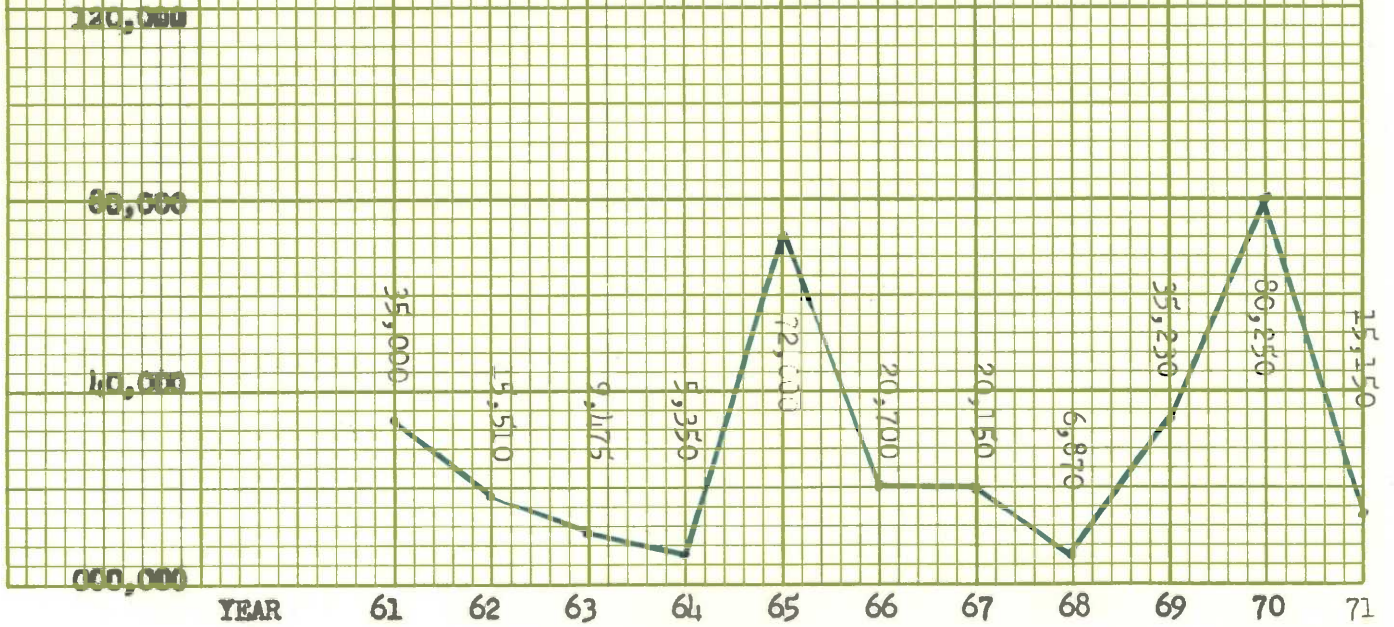
A brood survey conducted on July 16, resulted in two wood duck broods with 12 young. Six wood duck broods with 35 young were observed in conjunction with other duties prior to the survey.

Peak concentration during fall migration was estimated at 15,000 on November 19. This figure constitutes approximately an 80 per cent decline from the high in 1970. The year ended with a guesstimated 200 mallards still using Keithsburg Division.

Figures 5 and 6 illustrate duck use days and peak concentrations covering an eleven-year period.

FIGURE 5.
KEITHSBURG DIVISION
DUCKS - USE DAYS

FIGURE 6.
KEITHSBURG DIVISION
DUCKS -- PEAK CONCENTRATIONS



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BIG TIMBER DIVISION

1. GEESE

Geese have not been recorded in this unit, very probably due to Big Timber being almost entirely timber with little in the way of goose habitat.

2. DUCKS

As with Keithsburg Division, Big Timber was unintentionally neglected this year and waterfowl figures are little more than guesstimates. Based on waterfowl chronology at Louisa Division it was estimated that spring use on Big Timber began about the first week in March. Concentrations coincided generally with that at Louisa during the last week of March and was guessed at 950 birds.

A brood survey was conducted by boat on July 7. Eight wood duck broods were recorded totalling 66 young. Prior to the formal survey, two broods were observed with 10 young wood ducks. Total broods observed were ten with 76 young wood ducks.

Fall migration was again relative to Louisa Division and partly based on observations in conjunction with limited hunter checks on the unit. Migrant ducks appeared during the last week in September. Peak concentration occurred during the second week in December with 6,200 birds.

Figures 7 and 8 illustrate duck use days and peak concentrations on Big Timber for the past six years.

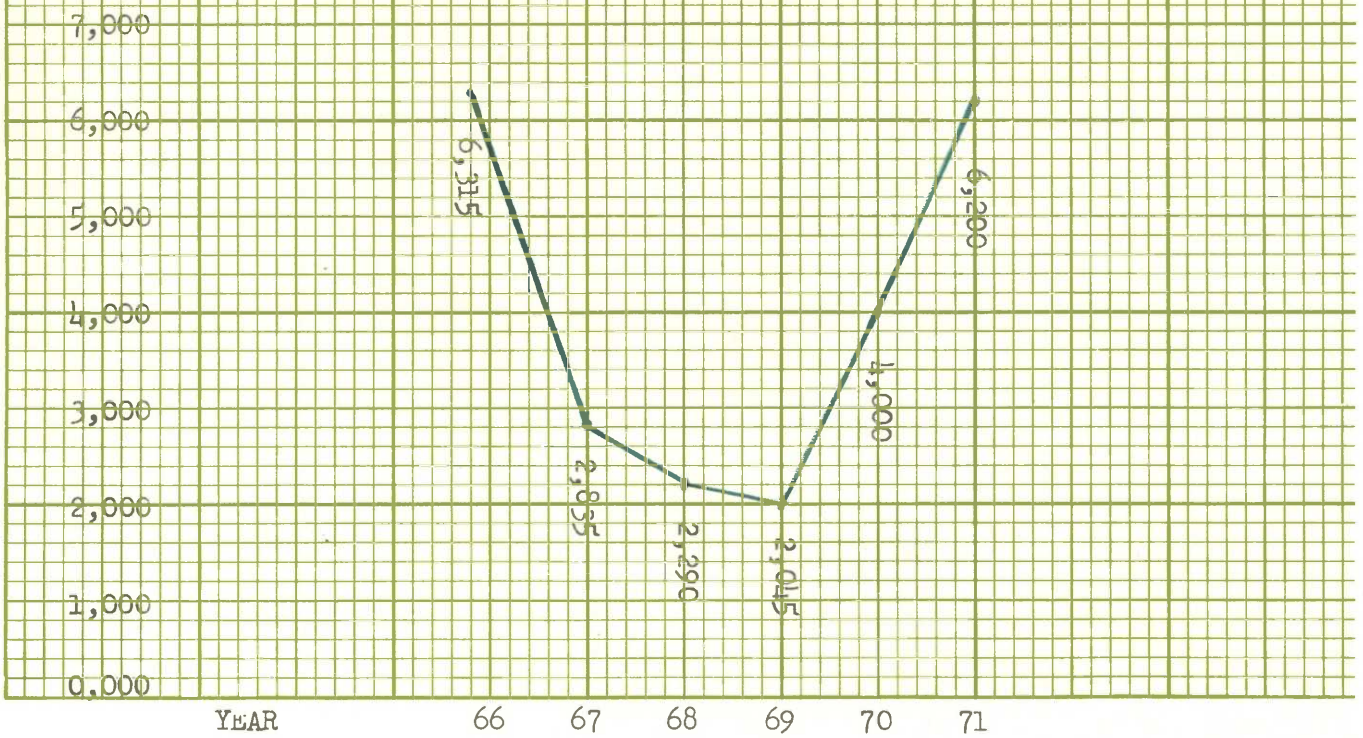
LOUISA, BIG TIMBER AND KEITHSBURG DIVISIONS

3. WATER AND MARSH BIRDS

Great blue herons were present on all divisions by the end of March. By mid-April pied-billed grebes were present on Louisa

FIGURE 7.
BIG TIMBER DIVISION
DUCKS - USE DAYS

FIGURE 8.
BIG TIMBER DIVISION
DUCKS - PEAK CONCENTRATIONS



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and Keithsburg Divisions and American egrets had appeared on Louisa and Big Timber. Green herons were first observed on Louisa Division in the first week of May. Summer populations of green and great blue herons and American egrets remained on all three divisions. On July 26, great blue herons and American egrets jumped to 45 and 115 birds, respectively, on Louisa. Fox Pond, normally drained in the summer, retained some water all year. It is believed the high numbers of herons and egrets were attracted by fish that had concentrated in the deeper, cooler pool areas of Fox Pond.

Sora rails use the Louisa Division during the spring and fall. Other noteworthy Louisa observations included a black-crowned night heron and American bittern. Summer student, Ron Hoffman reported 15 cattle egrets on Fox Pond, July 24, which was the only sighting of these birds.

4. SHOREBIRDS, GULLS AND TERNS

Killdeer were the earliest spring arrivals in this group with 25 appearing at Louisa Division on March 17. Other birds using the three divisions during the year were: greater and lesser yellowlegs, herring and ring-billed gulls, spotted and Baird's sandpipers, Wilson's snipe, willet and golden plovers. An American avocet sighted at Louisa Division on April 25, remained about one week and departed. This observation was noteworthy as avocets are rarely seen; and past observations have been during the fall period.

5. MOURNING DOVES

Some doves remain year around, although the migrational influx became evident about mid-March. Peak concentration occurred about the second week in March when 400 were recorded on Louisa Division. Although protected in Iowa, many hunters in the state would like to test their shooting skill on this fast-flying little bird and are beginning to pressure the state for a dove season.

Trapping and banding was successful again this year and will be discussed further in Section V.

B. UPLAND GAME BIRDS

1. BOB-WHITE QUAIL

Quail are more commonly heard than seen on the Louisa Division. Population estimates for 1971 were comparable to those in 1970; although production was thought to be better in 1971 since flooding had occurred in 1969 and probably influenced a slow return of local nesting birds.

The apparent scarceness of quail during the fall and winter prompts one to wonder about the post-nesting movements and distribution of this species. Pairs were sighted at Keithsburg in May, June, and July but no coveys.

Hunting pressure adjacent to Louisa Division was not intense probably because local populations were not sufficiently abundant to stimulate more interest.

2. RING-NECKED PHEASANT

Corn stored in a screen bin at Louisa Division headquarters attracted pheasants throughout February. At times as many as five pheasants were seen feeding on the stored corn.

In late July two young pheasants (one male and one female) were observed on Louisa. Sex determination was possible as the cock's plummage was acquiring its male coloration. Sightings of birds-of-the-year are considered worth noting since local pheasant populations are not abundant.

C. BIG GAME ANIMALS

White-tailed deer is the only big game species found on the three divisions. Winter abundance is usually indicated by tracks and other signs. Deer immigrate onto Louisa Division during mid-fall and most depart during spring thaw.

Animals wintering on Louisa Division appeared higher than in 1970 suggesting an increasing local population. Groups of 10 to 20 deer were commonly seen on Louisa bottom during the evenings. On February 16, a local resident who lives on the bluff in a location that commands a superb view of Louisa Division and Lake Odessa sighted 52 deer on the refuge. On February 17, James Ripple, Manager of Lake Odessa State Game Management Unit, counted 44 on the refuge.

Sightings of does with fawns were somewhat less than in 1970. A doe with one fawn was observed by the summer student, a doe with two fawns and one with three fawns were sighted by one of the cooperative farmers.

Winter feeding on Louisa Division appears to be primarily on current annual growth of willow (Salik sp.) and corn. All the willow stands observed had 80 to 90 per cent utilization on stems from ground level to five or six feet above the ground. Use of winter wheat was noted on two occasions during the fall.

D. FUR ANIMALS, PREDATORS, RODENTS, AND OTHER MAMMALS

1. MUSKRATS

Muskrats are common on all divisions although not abundant to the point of being a problem. Eighteen houses were counted during the winter on Louisa and six on Keithsburg. This does not constitute a total house count on either area, especially on Keithsburg where only about one-fourth of the suitable muskrat habitat was inventoried. Bank dens, which may be of more importance on Keithsburg than Louisa, were not accounted for. Never-the-less, house counts may provide a trend in population census especially at Louisa Division which has more open marsh than the other divisions.

Muskrat trapping on Louisa was fruitless although four were harvested on the Turkey-Otter Islands complex. Trapping on Keithsburg was more successful with fifteen taken there.

2. MINK

Although mink are rarely seen, two were observed this year. One was seen on Louisa Division by maintenanceman McNeil; the other was reported on Turkey Island by a trapper.

3. BEAVER

Beaver are known to inhabit Louisa and Keithsburg Divisions and assumed to be present on all three divisions. Three different caches were discovered on Louisa. One colony of beaver had constructed a lodge at the north end of Fox Pond (one food cache observed at this site) and had dammed a drain ditch at the same location. The other two caches were associated with bank dens.

Beaver were more of a problem at Keithsburg. All of the observed activity was in the southwest one-fourth of the refuge. Four lodges were found in association with a heavily used stand of young willow. Beaver interference came in early August when the refuge pool, which had raised due to July rains, was being lowered. On August 5, the beaver decided the water level was low enough and plugged the outlets.

Trapping on the two divisions resulted in harvests of four beaver from Louisa, four from Turkey-Otter Islands complex and 33 from Keithsburg.

4. RACCOON

Raccoons were plentiful on all three divisions as evidenced by the numerous tracks observed. Five were trapped from Louisa, five from Turkey-Otter Island complex and two from Keithsburg.

5. RED FOX

Louisa Division had an abundance of foxes in 1971. Tracks in the snow were plentiful and sightings were common (8 total). Three

active dens were located, and four pups were observed in one of them. Numerous tracks and one active den were noted at Keithsburg.

Grapevine information reported at least 20 foxes were taken during the hunting season from areas near Louisa. Trapping efforts on the refuge resulted in harvesting 10 foxes. Of interest to note were the reports of at least two coyotes killed local to Louisa Division.

6. SQUIRRELS AND RABBITS

Fox and grey squirrels were plentiful on all three divisions with fox squirrels predominating. Squirrel numbers were comparable to 1970 populations. Excellent mast production and corn where available were the major food sources.

Cottontails were occasionally seen during the late spring and early summer; however, they do not appear to be high in numbers. The headquarters bluff area at Louisa Division which is in the early seral stages of succession provided winter food supplies for cottontails. Young seedlings were clipped above the snow level and several larger saplings were girdled.

E. HAWKS AND OWLS

Red-tailed hawks are common year around residents. Marsh hawks, kestrels and Cooper's hawk are observed during migration periods.

Great-horned owls, barred owls and screech owls are common to all three divisions. Barred owls are occasionally seen but more frequently heard. Great-horned and screech owls are less frequently heard and rarely seen.

F. RARE AND ENDANGERED SPECIES

Most bald eagles moving into the areas are migrants; a few hardy ones may spend the winter. One adult was observed on Louisa Division the

first week in January; two weeks later an immature was sighted. However, the actual spring movement was not noticed until the last of February when two bald eagles (1 adult and 1 immature) were observed on Louisa Division and eleven (8 adults and 3 immatures) on Keithsburg. The peak concentration on Louisa occurred March 17, with 18 immatures and 7 adults recorded. It seemed as though young eagles were everywhere. The peak population at Keithsburg was estimated at 20 eagles.

The first eagle sighting of the fall was an adult observed at Louisa Division on September 6. Following this observation it was interesting, but not surprising to note that immatures were the early arrivals, and they predominated until the first of December when adults began to outnumber them.

More than 20 ducks and 2 blue geese, 2 Canada geese and 1 snow goose crippled during the hunting season managed to reach the sanctuary of Louisa. All but a few ducks disappeared and piles of feathers discovered during late winter indicated the eagles and foxes ate well.

Only one osprey was sighted this year compared to the record high of seven birds observed last year. The single observation was made on April 11, and the osprey remained until April 24.

F. FISH

Carp, buffalo and gizzard shad are the main rough fish in the refuge waters. During the spring when seepage flooded low fields and depressions on Louisa, gigging for carp provided recreation opportunities for many.

Rod and reel fishermen are afforded the opportunities to catch crappie, bluegill, channel catfish and bass on all divisions. Some small northern pike have been seen in Fox Pond on Louisa Division. Sport fishing accounts for the primary recreation use on all three divisions.

The Muscatine Bass Club, Muscatine, Iowa, held their annual bass fishing contest at Big Timber Division on June 6. Total bass caught was twenty with five taken by Don Birkholz. The largest bass weighed 4 pounds and 14 ounces and was also taken by Mr. Birkholz.

G. REPTILES

Nothing unusual to report. The Louisa Division herpetological collection begun in 1970 was not expanded this year, but other specimens will be collected when they are available.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. DEVELOPMENT

LOUISA DIVISION

Contracts were let this year for rehabilitation of flood-damaged portions of the road system in Louisa bottoms and construction of a new pump unit at Fox Pond.

CONTRACT 14-16-0003-13,359

This contract was awarded to Kemp and Son, Conservation Contractors, Letts, Iowa, for road and dike rehabilitation. During the 1969 flood a low level dike-access road, constructed in 1967, was badly washed. This structure served as part of a route used for auto tours in 1968. The contract called for construction and rock surfacing of 0.75 miles of new road, machine grading and rock surfacing 1.50 miles of existing road and cutting, machine grading and resurfacing 2.00 miles of dike-access road. Also included were a new crossing in the Prairie Pocket - Fox Pond drain ditch, and two spillways in the low dike to prevent flood waters from building up sufficient head to rewash the dike. Work was begun in late June and completed September 16.

Road shoulders were seeded to a mixture of Kentucky 31 fescue, bromegrass and oats to check erosion. Seeding was funded through force account.

CONTRACT 14-16-0003-13,461

This contract was awarded to O. W. Morehead, Des Moines, Iowa, for construction of a new pump structure to replace the 1967 model that collapsed in September, 1970.

The new structure was relocated in line with an old channel that runs the length of Fox Pond. Construction of the structure was of 20 foot lengths of interlocking steel piling.

Work was begun the second week in July, and though the structure was completed September 2, late delivery of the new pump delayed completion of the whole unit.

CONTRACT 14-16-0003-13,434

The above contract was awarded to Northland Supply Company, Minneapolis, Minnesota, to supply the pump for a new pumping unit at Fox Pond. Problems with matching the pump to the existing right-angle drive assembly delayed delivery of the pump until the first part of November. The pumping unit was finally completed on November 12.

Using refuge funds and personnel, an observation platform and parking area were constructed at the south end of Fox Pond. Both were well received by visitors participating in the fall auto tours.

KEITHSBURG DIVISION

During the 1969 flood, water poured into the refuge through a spillway in the levee at the north end of the division. However, as the outlets at the south end were not able to pass water as fast as it came in, the water began topping the levee near the pump structure. Ultimately, the levee had to be cut about 100 yards above the pump to save the structure and much of the south levee.

CONTRACT 14-16-0003-13,361

This year, the above contract was awarded to William Robertson, Muscatine, Iowa, to construct a second spillway at the same site the levee was cut. Eight foot lengths of interlocking steel piling were driven into sand approximately 15 feet in depth. The top and slopes of the spillway were to be riprapped with 12-inch rock with a cap of 3-inch rock placed on the top to provide a smoother driving surface.

Work was begun the latter part of May and a final inspection requested on June 30. The work was not accepted until August 6, as the contractor had failed to comply with the riprap specifications. The rock ranged from 6 inches to 4 feet and the larger ones had to be broken to at least 12 inches.

B. MAINTENANCE

LOUISA DIVISION

Equipment servicing and repairs accounted for a considerable proportion of the maintenance efforts. The refuge stake truck was decommissioned when the engine kept blowing out the headpan and lifter cover gaskets. Its replacement requisitioned through surplus property received a new bed floor, dump hoist and paint job. A surplus 3/4 yard crawler crane was transferred from Scott Air Force Base. Track adjustments and adjustments of cable and swing clutches were necessary. Other repairs are needed, but will not be accomplished until funds are available. New floors were installed in the beds of the Chevrolet and Dodge pickup trucks.

New overhead doors were installed on the metal storage building at headquarters. In addition, a 16 X 28 feet concrete slab was poured abutting the east end of the building to provide additional outside storage space for lumber.

During February and early March sand was strate stockpiled for sandbags in view of the potential flood threat.

A concrete extension was poured on the Port Louisa boat ramp.

Preparations for fall auto tours occupied much of August and September. In addition to construction of the observation platform and parking area, portions of the roadsides were cleared of brush, directional and informational signs were installed and gates and barricades were constructed to keep traffic off roads other than the tour route.

KEITHSBURG DIVISION

Snow runoff badly washed the boat ramp which had to be re-bladed and re-rocked.

The most time-consuming project on the unit was disking the farm ground with refuge personnel and equipment. The operation was an experimental attempt to establish a seed bed for volunteer moist soil foods.

C. PLANTINGS

1. AQUATIC AND MARSH PLANTS

Nothing to report.

2. TREES AND SHRUBS

Approximately 220 honeysuckle plants donated by the Lake Odessa State Game Management Unit were set out at Louisa headquarters. The purpose is to establish a shrub screen between the visitor overlook and two grain storage bins. To date, dry conditions during the spring and again in August and accidental clipping with a lawn mower has limited survival to about 50 per cent.

3. UPLAND HERBACEOUS PLANTS

Nothing to report.

4. CULTIVATED CROPS

On Louisa Division 602 acres were cultivated in 1971. Approximately 400 acres remained fallow due primarily to excessive soil moisture.

Corn production in southeast Iowa yielded bumper crops and refuge production, generally, was no exception. Yields ran from moderate to high with Field 9 producing as much as 155 bushels per acre, dry weight basis. Southern corn leaf blight was not apparent this year but was largely responsible for poor yields in 1970. Buckwheat and millet, for the most part produced excellent stands. One field of buckwheat (Field 11c), planted in early July, apparently drowned out in an early stage of germination due to a generous storm. The same phenomenon occurred about the same period in 1970; however, all of the buckwheat and millet had been planted before the gulley-washer hit. Milo planted on an experimental basis sprouted and headed well, but due to a combination of late planting and a dry August, less than 5 per cent of the heads produced seed before frost. Wheat planted in August produced only fair stands influenced largely by low precipitation during the month. In Field 28 volunteer forbs outcompeted the wheat and probably had a bearing on the reduced goose utilization compared to 1970.

Big Timber Division has only 26 acres of farmground, which when planted, is usually seeded to corn. Production was good considering this land is not top farmground since it usually floods.

D. COLLECTIONS AND RECEIPTS

1. SEED OR OTHER PROPAGULES

Approximately eight bushels of proso millet was received from DeSoto National Wildlife Refuge for mourning dove trapping and banding.

2. SPECIMENS

Summer student, Ron Hoffman, expanded the herbarium collection by adding 20 new specimens.

E. CONTROL OF VEGETATION

Corn ground was sprayed with Atrazine prior to planting by the farming cooperator.

Approximately 0.5 acres of Louisa roadsides were cleared of brush and sprayed with a mixture of Silvex and water.

The Corps of Engineers cleared brush from approximately 17 acres of levee (refuge side) at Louisa Division. Tordon pellets were applied around the base of the stumps to prevent resprouting.

F. PLANNED BURNING

Approximately 200 acres of farmgrounnd and levee were burned at the Keithsburg Division.

G. FIRES

Nothing to report.

IV. RESOURCE MANAGEMENT

A. GRAZING

Nothing to report.

B. HAYING

Nothing to report.

C. FUR HARVEST

The three divisions were open to trapping on a permit basis. Permits were requested and granted on Louisa and Keithsburg Divisions.

Trapping efforts on Louisa Division and the Turkey-Otter Islands complex resulted in harvests of: 8 beaver, 10 raccoons, 4 muskrats and 10 red fox. Keithsburg harvests consisted of: 33 beaver, 15 muskrats and 2 raccoons.

D. OTHER USES

Special use permits were granted to John Compas and Keith Garret for turtle trapping on Keithsburg Division. Mr. Compas harvested approximately 50 snapping turtles totaling 700 pounds during 30 days trapping. Mr. Garret was unable to trap since work demands involved the bulk of his time.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. WOOD DUCK BANDING

Seven floating traps and one swim-in trap were set for local wood ducks in chutes and sloughs of Turkey, Otter and Bogus Islands. After a pre-baiting period of five days, trapping was conducted from July 20 to August 8. Trapping and banding was terminated for two reasons; the boat trailer suffered a broken axle, and word was received that wood duck banding on the Mark Twain would be discontinued indefinitely. Table 7 presents an age and sex breakdown of the trapping results.

TABLE VII.

WOOD DUCK BANDING
1970 - 1971

	AGE AND SEX						
YEAR	L-M	L-F	HY-M	HY-F	TOTAL	BIRDS BANDED/ TRAP-DAY	COST PER BIRD BANDED
1971	27	18	1	2	48	0.300	$ 3.68
1970	53	36	2	4	95	0.529	$ 1.95

Compared to the 1970 results approximately one-half as many birds were banded per trap-day in 1971 at almost twice the cost per bird banded. Even more interesting, the results of each age and sex category in 1971 were one-half the 1970 results. Since traps were located at approximately the same sites both years, the data suggest significantly reduced production in 1971. Only one trap-loss was sustained in 1971 apparently to raccoon predation.

It might be of interest to mention other species captured during the trapping and banding program. Two young raccoons, one fox squirrel and one mourning dove were released from the floating traps. Carp and gar had to be removed from the swim-in trap.

B. MOURNING DOVE BANDING

Although the banding quota of 300 doves was surpassed in both 1970 and 1971, the success per trap day was greater and the cost per bird less in 1970. Banding results are categorized for 1970 and 1971 in Table 8.

TABLE VIII.

MOURNING DOVE BANDING
1970 - 1971

	AGE AND SEX						
YEAR	AHY-M	AHY-F	AHY-U	HY-U	TOTAL	BIRDS BANDED TRAP DAY	COST PER BIRD BANDED
1971	128	70	4	120	322	0.235	$ 0.82
1970	163	45	-	95	303	0.461	$ 0.68

It is interesting to compare trapping success relative to climatic conditions for both years. In 1970, summer student Terry Fears trapped 67 per cent of the doves banded on rainy days, 14 per cent on cool days and 19 per cent on hot, dry days. Ron Hoffman's success in 1971 was also improved on rainy days and days immediately following rain with 56 per cent of the banded doves trapped on such days. Hoffman (Summer Report - 1971) goes on to suggest, "...prolonged or heavy rain diminished trapping success which leads to the theory that the conditions accompanying rainy weather, cloudy, overcast skies and the resulting lowered temperatures, are responsible for the increased numbers of doves attracted to the traps." Perhaps a light, prolonged drizzle is more conducive to trapping doves as suggested by the correlation between trapping success and rainy days in both years.

C. WOOD DUCK NESTING BOX SURVEY

Comparable to 1970 results, use of artificial nesting boxes by wood ducks was negligible on all three divisions. Of 43 boxes on the

Keithsburg Division, only 22 were checked due to obstructions rendering several sloughs impassable. Of these, three or 13.6 per cent were used by nesting wood ducks. Two of the nests were abandoned in the early stages of incubation; the third produced a successful hatch. Twenty of the 46 boxes at Big Timber were checked but had not been used by wood ducks. Most of the boxes at Louisa Division are wood structures and were in such dilapidated condition as to be unattractive to wood ducks. Many of the boxes were inhabited by wasps which made checking them a potentially painful venture (luckily no one was stung).

Poor utilization of artificial structures in 1970 and 1971 suggest natural cavities are sufficiently abundant and distributed for nesting wood ducks and preferred by them. Consequently, artificial nesting programs will be discontinued until manpower becomes less of a limiting factor and time can be devoted to adequately improving the program.

VI. PUBLIC RELATIONS

A. RECREATIONAL USES

Fishing accounts for the bulk of recreation use on each division when comparing individual activities. It accounts for 30.1 per cent of the visits to Louisa Division, 91.7 per cent of the visits to Keithsburg and 70.3 per cent of the visits to Big Timber. The comparatively lower percentage figure for Louisa Division is clarified when comparing the diversity of activities with that of the other two divisions.

Fall auto tours were offered for the second time on Louisa Division. The first tours were available to the public during October and November on Sunday afternoons in 1968; at that time 6,750 visits were logged. Several sections of the tour route were badly washed during the 1969 flood. Road repairs in 1971 (See Section III) made fall tours once again possible. The tours were very well received and appreciated by visitors participating in them. The self-guiding tours were again offered on Sunday afternoons from October through November, with 6,683 visitors expending 7,242 hours. While accurate statistics were not kept on the area influenced by the tours, periodic notations indicated most visitors were from Iowa followed by Illinois. Three cars were from California and one car each from New York, Massachusetts, Arkansas and Tennessee. Except for Illinois visitors most of the out-of-state visitors were in southeast Iowa to visit relatives or friends.

The nature trail near refuge headquarters at Louisa Division continued to gain popularity. Almost all comments were favorable and expressed appreciation for what the trail had to offer. Auto tours probably influenced trail use with about one-third (35 per cent) of the trail visits coinciding with the two months that auto tours were available.

B. REFUGE VISITORS

Regular visitors to refuge headquarters were Iowa Conservation Commission personnel, farming cooperators and neighbors interested in the refuge program.

Several contractors inspected the Louisa Division road rehabilitation and pump sites. Also in conjunction with contract work, Engineer Eliason made periodic trips to Louisa and Keithsburg Divisions for pre-construction conferences and job inspections. Engineer Richie made two inspection trips to Louisa Division.

Other visitors worth noting are:

DATE	VISITOR	AFFILIATION	PURPOSE
9/3	John Chaplain	Iowa Chamber of Commerce	Photos for Illiamo, Chamber of Commerce publication.
9/20	Les Peck	Burlington Hawkeye (Newspaper)	Photos to publicize auto tours.
10/13	Ron Gonder	WMT Radio & TV	Tape radio and TV programs.
10/13	Orland Hanland	Iowa Cons. Comm.	Assisted with taping.
11/27	Lee Simons	Iowa State Univ. (Student)	Take movies for presentation on WOI Educational TV. (Class project).
12/7	Audrey Walk	BSF&W, Mingo Ref.	Salvage parts from scrap D-7.

C. REFUGE PARTICIPATION

DATE	PARTICIPANT	ACTIVITY
2/15	Gill	Spoke on water pollution to Jefferson Highlanders 4-H Club.
5/12	Gill	Talk and tour of Louisa Division for 61 pupils and 8 adults from Washington, Iowa 6th Grade Science Class.
7/21	Gill & McNeil	Attended Annual Cub Scouts "Dads and Lads" Day.
9/20	Gill	Conducted tour of nature trail for 7 Cub Scouts and 2 leaders.
10/13	Gill	Taped radio program and TV program for WMT radio and TV, Cedar Rapids, Iowa.
10/28	Gill	Conducted tour of Louisa Division for 65 pupils and their chaperones from Stewart Elementary School, Washington, Iowa.
10/30	Gill	Showed movie "So Little Time" to Wapello Cub Scouts.
11/5	Gill	Tour of Louisa Division with 30 pupils and their chaperones from a Burlington, Iowa Elementary School.
11/8-11/12	Gill	Attended PPBE Workshop in Marion, Illinois.
12/8	Gill	Showed movie "The Bald Eagle" to Wapello Cub Scouts.

Gill and McNeil continued as Awards Co-Chairmen for the Wapello, Iowa Cub Scouts, Pack 16.

Gill managed a little league baseball club.

D. HUNTING

Turkey-Otter Islands complex and Big Timber Division were open to all public hunting and Keithsburg Division was open to squirrel hunting. Louisa Division was closed to public hunting.

During waterfowl season, the refuge manager developed a hunter check system. As the season got underway other duties began to supercede hunter checks and finally hunting patrols were dropped. As a result insufficient data was collected to even attempt a prediction of kill on Bureau managed lands. Data presented on NR-1C are derived partly from grapevine information on local hunting success and are to some degree guesstimates. About the only definite statement that can be made about the 1971 waterfowl season in southeast Iowa is that hunters were generally dissatisfied which is not unique for the 1971 season. Many hunters felt the duck season was too early and too short relative to the periods of highest duck (mallard) concentrations. They also felt the one bird bag and possession limits on Canada geese were too restrictive along the Mississippi River, especially when Illinois hunters across the river were allowed 2 bag and 2 possession.

No checks were made on squirrel hunters due to lack of manpower and time. Squirrel hunting data are, therefore, little more than guesstimates.

E. VIOLATIONS

Only one violator was apprehended this year. He probably would not have been caught if he had not run off the road and stuck his vehicle while watching a group of ducks.

DATE	VIOLATOR	CHARGE	FINE
11/30	Dan Lee Ohl	Refuge Trespass *	$25.00 and Costs in Magistrate Court.

* Mr. Ohl also had several boxes of unexpended shotgun shells in his vehicle at the time of his apprehension but no shotgun was found.

For the second time in six months the shop-office building at Louisa headquarters was burglarized. The first robbery occurred August 12, 1970. On January 24, 1971, the building was again entered when the violators broke the bottom glass panes out of both the shop and office doors. Approximately $1,800.00 worth of equipment was stolen. Both the F.B.I. in Davenport, Iowa and the Louisa County Sheriff were notified and an investigation was conducted by Deputy Sheriff Jerry Andries. Nothing has been seen of the equipment stolen in August and probably will be the case with items taken in this recent robbery.

F. SAFETY

Regular safety meetings were held in conjunction with monthly staff meetings at Mark Twain headquarters in Quincy, Illinois.

A. B. "Beanie" McNeil was involved in a motor vehicle accident January 21, in Quincy, Illinois while on official duty enroute to Calhoun Division of the Mark Twain Refuge. There were no injuries to the occupants of either vehicle. No damage was sustained by the Government vehicle while damages to the private vehicle were estimated at approximately $180.00. Mr. McNeil was charged with carless driving.

VII. OTHER ITEMS

A. ITEMS OF INTEREST

Ron Hoffman contributed his time and talents as summer student in 1971. Mr. Hoffman hails from Columbus Grove, Ohio and has been attending Ohio State University, majoring in wildlife biology. He lacks one quarter of completing his B.S. Mr. Hoffman was undecided about the future other than professing hopes of permanent employment with the Bureau's Division of Refuges. While with us Mr. Hoffman contributed greatly to our program and was a pleasant asset to our staff.

Kenneth L. Whitham was employed as a temporary laborer from May 17, through November 12. Mr. Whitham fit right into our program; possessing good initiative, understanding and enthusiasm and a pleasing personality. Mr. Whitham would make an excellent permanent employee; his termination was begrudgingly executed by the refuge manager.

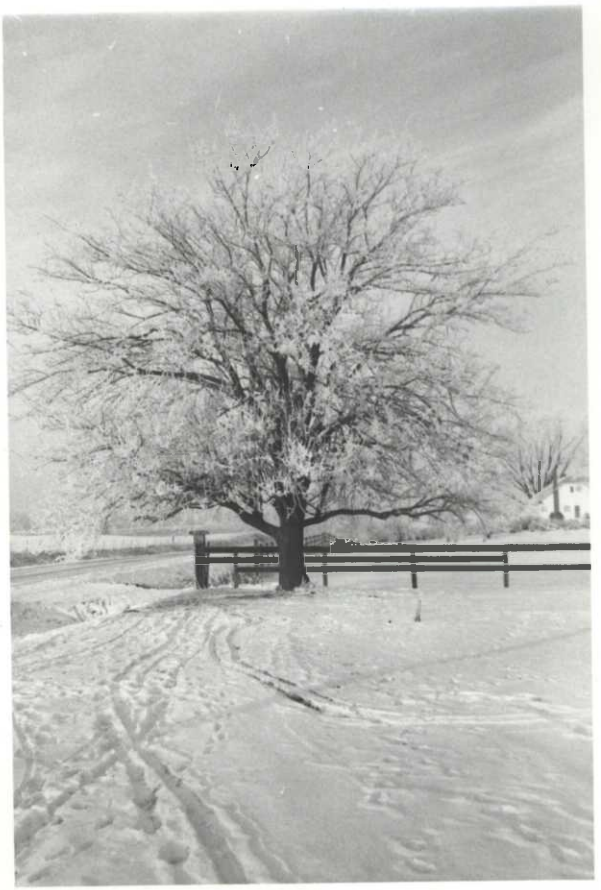
B. PHOTOGRAPHS

Photographs are appended.

Winter snows may be difficult to endure at times, but.....

R-222, P-17 GBG

January 1971



.....natural beauty can be enjoyed in any season.

R-231, P-1 GBG

January 1972

A contract was let in 1971 to construct a second spillway in the Keithsburg Levee.

R-223, P-14A GBG February 1971

Eight foot lengths of sheet piling were driven into 10-15 feet of sand to prevent washing the outlet side of the spillway.

R-223, P-15A GBG March 1971

The structure was riprapped with 12-inch rock and...

R-224, P-10 GBG June 1971

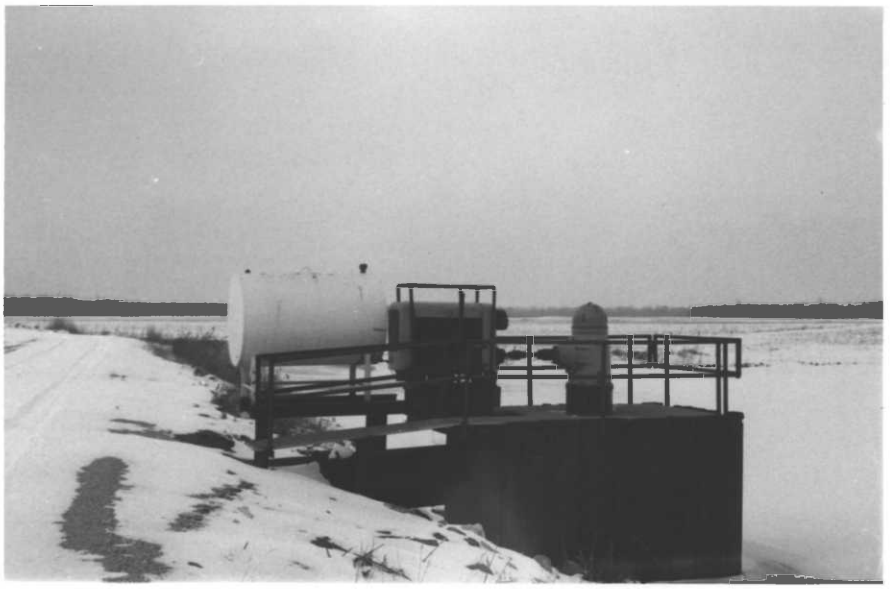
.....capped with 3-inch rock to provide a smoother driving surface.

R-226, P-4 GBG August 1971

Another contract was let for construction of a sheet piling pump structure at Fox Pond to replace a concrete structure built in 1967 that went defunct in 1970.

R-226, P-20 GBG

January 1972



I think we have a more substantial unit this time (knock on wood); at least the location of the structure is more feasible.

R-231, P-17A GBG January 1972

Refuge personnel constructed an observation stand at the south end of Fox Pond on Louisa Division.

R-226, P-10 GBG August 1971

The crew did an excellent job on this endeavor and had the stand ready for use during the fall auto tours.

R-229, P-1 GBG October 1971

All three units produced excellent natural stands of American Lotus (Nelumbo Lutea).

R-224, P-19 GBG June 1971

Cultivated crops were also excellent. The row crop is milo and the light vegetation is buck-wheat in bloom.

R-227, P-6A GBG August 1971

Tracks and.....

R-231, P-10A GBG January 1972

...beds indicated considerable deer use of Louisa Division.

R-231, P-14A GBG

January 1972

Now we come to our wildlife section. During the fall migration period, a group of Canada geese allowed us to photograph them.

R-228, P-20 GBG September 1971

However, if the animal itself cannot be captured on film, perhaps its signs can be. Beaver are active on all units; sometimes to the manager's misfortune.

R-228, P-7 GBG September 1971

Fall auto tours on Louisa Division were highly praised by visitors taking advantage of the opportunity to drive the refuge.

R-230, P-3 GBG November 1971

Almost 6,000 visitors enjoyed the refuge and the waterfowl and other wildlife species to be seen.

R-229, P-13A GBG October 1971