MEREDOSIA NATIONAL WILDLIFE REFUGE

Meredosia, Illinois

ANNUAL NARRATIVE REPORT

Calendar Year 1984

U. S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

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U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

Personnel

1.	Thomas S. Sanford	Refuge Manager, GS-11	PFT
2.	Patti A. Thomsen . .	Refuge Manager Trainee, GS-5 DOD 1-07-84	PFT
3.	Linda L. Long	Biological Technician, GS-5 EOD 8-20-84	PFT
4.	Alice L. Clanin	Secretary, GS-4	PPT
5.	Charles W. Watts	Maintenance Worker, WG-8	PFT
6.	Jeffrey A. Hines	Biological Aid, GS-4	TFT

YCC

1.	Gary W. Campbell.	6-04-84 - 8-07-84	Enrollee
2.	Mari J. Otto	6-04-84 - 7-13-84	Enrollee
3.	Daniel W. Smith	6-04-84 - 8-07-84	Enrollee
4.	Connie S. Whitley	6-04-84 - 8-15-84	Enrollee

REVIEWS AND APPROVALS

Thomas S. Sanford — 2-21-85
Submitted by — Date

John W. Ellis — 3/1/85
Regional Office Review — Date

INTRODUCTION

Early history indicated that this area was a favorite camping and hunting area for Indians. A group of Indians lived on the island in 1824 until the big flood of 1844. White families inhabited the island on an intermittent basis from 1844 to 1900. After 1900, several families moved onto the island permanently.

Ownership changed during the early 1900's and through the Depression years. Duck hunting clubs purchased most of the island. These early clubs were owned by wealthy members who spent several thousands of dollars in order to hunt a few days each year.

Mr. James Anderson, Sr., bought out the members of the Chicago-Meredosia Gun Club. The area was renamed the Anderson Gun Club and intensively managed for waterfowl.

The Meredosia National Wildlife Refuge was established by donation to the U. S. Fish and Wildlife Service through the estate of Mr. Anderson on May 9, 1973. The area is located in the Illinois River Valley, historically known for its wildlife. This valuable riverbottom habitat has changed due to the efforts of man to control the river. To date, over half of the original habitat remains in the Illinois Valley. The primary purpose of establishing this refuge is to preserve a portion of this relatively undisturbed riverbottom habitat for wildlife.

The refuge is not protected by any drainage district and is subject to erratic fluctuation of water levels of the Illinois River. The river forms the west boundary; Meredosia Lake forms the east boundary; and private land joins the south and north boundaries. The area consists of 1,850 acres of river bottomlands containing wooded ponds, 156 acres of water, 150 acres of moist soil development, and 300 acres of cropland.

TABLE OF CONTENTS

Page

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

A. HIGHLIGHTS

Annual precipitation totaled 42.13 inches, nearly 10% increase from last year. Extreme dry weather occurred in June and below normal rainfall continued through September. (Section B)

Linda L. Long, Biological Technician, EOD August 20, transferred from Veterans Administration, Portland, Oregon. (Section E. 1)

The Youth Conservation Corps program increased to four enrollees. (Section E. 2)

Additional land adjacent to the refuge was received by The Nature Conservancy and is to be transferred to the Service. (Section E. 7)

The spring flood peaked at 440.20 msl on March 30. The dry, hot summer months resulted in excellent moist soil production. (Section F. 2)

Bald eagle use days totaled 955 UD, nearly 53% increase over last year. (Section G. 2)

Waterfowl use decreased to 904,570 use days, down 18% from 1983. (Section G. 3)

Wood duck trapping on Meredosia Refuge resulted in 168 birds banded. (Section G. 16)

Refuge Manager Sanford EOD 8-15-76

Biological Technician Long EOD 8-20-84

Secretary, Alice Clanin EOD 6-20-66

Maintenance Worker, Charles "Bill" Watts EOD 9-06-60

Biological Aid Hines

EOD 6-04-84

B. CLIMATIC CONDITIONS

Climatological records are recorded at the LaGrange Lock operated by the U. S. Corps of Engineers. This facility is located four miles upstream from the Meredosia National Wildlife Refuge. Annual precipitation totaled 42.13 inches, nearly a 10% increase from last year. Normal precipitation, based on the past 20 years, is 39.80 inches.

The wettest month was May with 5.68 inches of rain, followed by 5.39 inches during March. Extremely dry weather occurred in June and below normal rainfall continued through September. Normally, during this period, 16.58 inches of rain occurs. This year, only 12.43 inches, a 25% decrease, was recorded. Fall precipitation made up for the shortage with over 12 inches of rain during the October - December period.

Precipitation - LaGrange Lock

	1984	1983	1982	1981	Norm*
January	0.10	0.30	3.63	0.26	1.66
February	1.71	1.66	1.31	2.06	1.34
March	5.39	3.17	3.70	1.94	3.46
	(7.20)	(5.13)	(8.64)	(4.26)	(6.46)
April	4.80	9.00	4.30	6.08	4.09
May	5.68	4.66	2.83	6.34	4.43
June	1.73	1.84	4.52	6.89	4.31
	(12.21)	(15.50)	(11.65)	(19.31)	(12.83)
July	4.36	0.80	5.57	10.87	4.50
August	2.59	1.61	2.68	4.39	3.64
September	3.75	2.35	3.80	1.93	4.13
	(10.70)	(4.76)	(12.05)	(17.19)	(12.27)
October	4.12	3.64	2.18	3.12	3.41
November	4.35	6.10	4.63	1.97	2.34
December	3.55	3.23	6.40	1.77	2.49
	(12.02)	(12.97)	(13.21)	(6.86)	(8.24)
TOTALS	42.13	38.36	45.55	47.62	(39.80)

*20-year average

E. ADMINISTRATION

1. Personnel

Patti A. Thomsen, Refuge Manager Trainee, returned to school early in January. Patti completed required field work under the Cooperative Education Program. She plans on returning to the Fish and Wildlife Service upon graduation from Purdue.

Tom Sanford, Refuge Manager, completed fire training in January at Brussels District of the Mark Twain NWR. Fire training included S110 Basic Fire Orientation, S130 Basic Fire Fighting, and S190 Introduction to Fire Behavior.

Alice Clanin, Secretary, attended PAY/PERS training for timekeepers held in St. Paul, Minnesota on April 9 - 10.

Bill Watts, Maintenance Worker, and Tom Sanford attended the Refuge Law Enforcement Refresher Course held April 30 - May 4 in Springfield, Illinois. Firearms re-qualification was conducted October 3 in Springfield, Illinois.

Bill Watts attended Heavy Equipment Operator Certification School June 4 - 6. This course was held at the Crab Orchard NWR.

Jeffrey A. Hines, Biological Aid, EOD June 4. Part of Jeff's summer duties included supervision of the Youth Conservation Corps program.

Staffing was increased with the hiring of Linda L. Long to fill the Biological Technician position. Linda EOD August 30, transferring from the Veterans Administration, Portland, Oregon. Linda is a graduate of Washington State University.

Refuge Staffing

	Permanent		Temporary
	Full Time	Part Time	
FY 1984	3	1	1
FY 1983	3	1	1
FY 1982	3	1	0
FY 1981	3	1	1
FY 1980	3	1	1

2. Youth Programs

The Youth Conservation Corps Program was increased this year from two to four enrollees. This is the second year for the program. A total of forty applications were received from the six county high schools. After selection of the enrollees, seven additional applications from distant counties were received due to a Washington Office news release. The major portion of the applications came from the Forman High School in Manito. Last year most of the applications came from the Havana High School.

Again, female applications were few with only four received. One of the selected enrollees cancelled at the last minute. A second female enrollee resigned after the sixth week of employment.

YCC crew filling sandbags supplied by Corps of Engineers.
(R-967, P-16, TSS) (06-28-84)

Erosion control of water control structure located in transport ditch.
(R-967, P-19, TSS) (06-28-84)

Major accomplishments included sandbagging water control structures for erosion control, painting the storage shed, and brush removal on dikes and ditches. The entire crew and biological aid all required poison ivy treatment regardless of the statement, "I never get it."

5. Funding

Funding for refuge operations decreased nearly $8,000 - even with an end-of-the-year increase of $11,000. REHAB funding of $60,000 was decreased $53,000 for funding the YCC program. Interesting note is that the eleven refuges in RF-2 contributed $110,000 for YCC funding. Construction and quarters fund was designed for use on the Chautauqua NWR. An additional $100,000 was added to the west spillway REHAB plus $100,000 under the Jobs Bill for dike REHAB at Chautauqua NWR.

Refuge Funding

FY	1260/1210	1220	1240	1520	1994	2821	Total
1983-84	$112,000	--	--	$7,530	$2,200	$200,000	$321,730
1982-83	119,200	$4,000	$ 3,000	3,500	--	100,000	229,700
1981-82	94,500	2,000	7,000	--	--	--	103,500
1980-81	88,000	2,000	15,000	--	915	--	105,915
1979-80	98,000	2,000	17,000	--	--	--	117,000

6. Safety

Another year without a lost-time accident. Staff awareness of safety and additional emphasis during the YCC program continued to maintain an accident-free record.

The refuge staff has completed eighteen years without a lost-time accident. The current safety reporting system seemingly does not acknowledge the past accomplishments.

Safety meetings were conducted during the year with emphasis on vehicle safety, working habits, personnel and home safety.

7. Technical Assistance

Refuge manager met with Corps of Engineers, Illinois Department of Conservation. Illinois Department of Transportation, Illinois Environmental Protection Agency, and Southern Illinois Field Office (USFWS) personnel to review onsite request for a permit to establish a sand and gravel operation on Meredosia Lake.

A meeting was held with Ralph Barnett of The Nature Conservancy and Dan McFall, Field Representative of the Illinois Preserve Commission, reference the Murray Johnson tract. This tract includes land south of the refuge and control of most of Meredosia Lake. The Nature Conservancy will hold the land until transferred to the U. S. Fish and Wildlife Service.

F. HABITAT MANAGEMENT

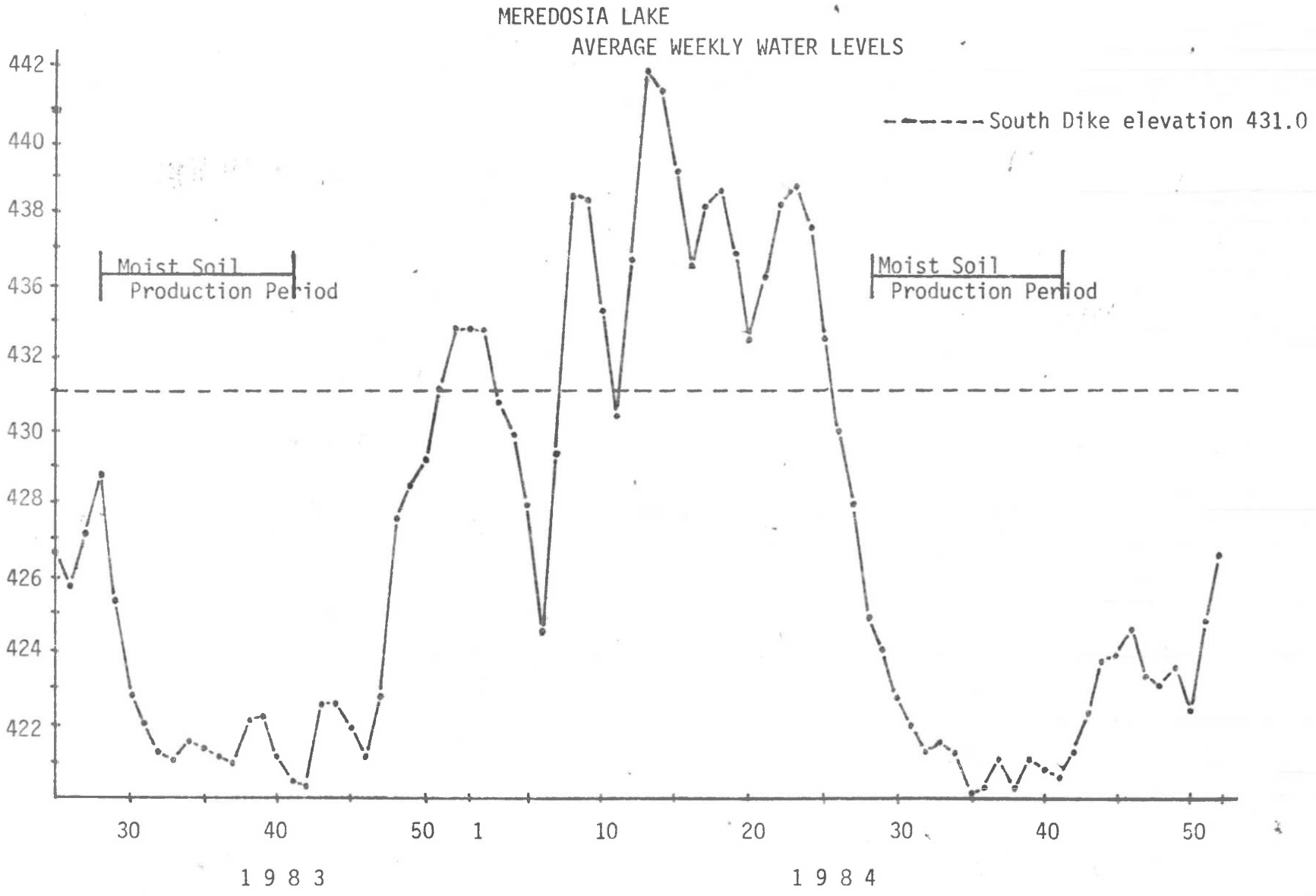
2. Wetlands

The Meredosia Refuge was under the floodwaters of the Illinois River periodically during the first six months of the year. The spring flood peaked on March 30 at 440.20 msl receding to 429.25 msl by the end of June.

The combination of continuing low water levels and a dry, hot summer produced an abundance of moist soil plants in the idle croplands. The moist soil units produced a good crop of moist soil plants. The marsh smartweed looked good until the low water levels in the Illinois River dried up the units. Water levels continued to lower to 420.10 msl during October.

Gauge Reading - Illinois River

	LaGrange Lock		Meredosia (town)	
Month	Low	High	Low	High
January	429.1	433.8	428.3	432.5
February	424.5	438.1	423.8	436.7
March	430.2	440.8	429.1	439.7
April	434.2	440.5	433.0	439.1
May	431.9	437.3	430.8	436.1
June	429.6	437.9	428.9	436.6
July	422.6	429.4	422.1	428.8
August	419.7	422.0	419.5	421.4
September	419.1	422.7	419.1	421.7
October	420.2	422.9	420.0	422.2
November	422.1	428.7	421.9	427.7
December	422.1	429.1	421.5	427.9


MEREDOSIA LAKE
AVERAGE WEEKLY WATER LEVELS
South Dike elevation 431.0
Moist Soil
Production Period
Moist Soil
Production Period
442
440
438
436
432
430
428
426
424
422
30
40
50
1
10
20
30
40
50
1 9 8 3
1 9 8 4

Using diesel Ford tractor with 16" Crisafulli pump reduced fuel consumption by 50 percent compared to operation of Waukesha power unit.
(R-970, P-17, TSS) (10-29-84)

The combination of a hot, dry summer resulted in extreme low water levels. Nearly 60 percent of the impoundments were dry.
(R-971, P-5, TSS) (11-06-84)

Increased rainfall during the fall restored water levels. Aerial view shows lower section of 150-acre moist soil unit located right of center of photo. Larger body of water is Meredosia Lake.
(INHS-S. Havera) (09-05-84)

Meredosia NWR

Month	Low	High	Month	Low	High
January	428.95	433.00	July	422.35	429.10
February	424.20	437.30	August	419.60	421.60
March	429.65	440.20	September	419.10	422.20
April	433.60	439.80	October	420.10	422.55
May	431.35	436.70	November	422.00	428.20
June	429.25	437.25	December	421.85	428.50

Pumping operations started on October 15 and continued until October 18. Pumping resumed on October 29 and terminated on November 1, due to weather conditions. A total of 136.5 hours of pumping moved 77.8 million gallons of water into the moist soil units. Moss and Brier gained 1.02 feet while Lower and Middle Twin gained 1.6 feet. Alice's Pond was nearly dry at the beginning of operations and received 2 feet of water.

Breakdown of Water Use
and Meredosia Lake Effects

Rate of pumping (GPM)		9,500
Gallons per hour		570,000
Total hours pumping	136.5	
Millions of gallons pumped		77.8
Cubic feet (millions)		10.4
Effect on lake (acre-feet)		238.75
Effect on lake (inches)		2.09

3. Forests

A field survey of timber was conducted by Grant Haley, Illinois Department of Conservation Forester. Transect lines were established along the river ridge. Linda Long, Biological Technician, provided assistance during the survey. A total of three days was spent on the timber inventory. The forester will write up a timber management plan when computer printouts are returned from the Springfield Office.

An experimental planting of pin oaks was initiated during the year. The Shawnee National Forest provided 300 pin oak seedlings free of charge from a surplus on hand. The plants were two and four-year old seedlings. The planting was delayed due to high water. Personnel from the Illinois Natural History Survey assisted in planting the pin oaks on May 24. The trees were planted in two

Timber inventory conducted by Illinois Department of Conservation Forester, Grant Haley. Survey required three days of field work.
(R-971, P-8, TSS) (11-06-84)

Michelle Georgi and Kathy Belcher, Illinois Natural History Survey, assisted in planting pin oak seedlings. Two and four-year old seedlings supplied by U. S. Forest Service.
(R-967, P-7, TSS) (05-24-84)

Survival rate was 80%, surprisingly good for a hot, dry summer. Seedlings in the heaviest vegetation responded best due to the shading effect.
(R-967, P-14, TSS) (06-28-84)

Ah! The plans of mice and men...Summer student disregarded instructions and mowed nearly half of the pin oak seedlings. The area had been staked and student was informed to mow only east of the stakes.
(R-970, P-32, TSS) (10-29-84)

rows adjacent to a moist soil unit in Field 4. Shortly after planting, the seedlings were flooded with two feet of water. Survival checks indicated 80 percent survival. The plants in the heavy vegetation responded best during the hot, dry summer months. The survival rate dropped due to misjudgment by the summer student. The second row was mowed while controlling woody vegetation. Future planting will be restricted to underplantings in timber.

4. Croplands

Last year terminated the cooperative farming agreement, due to the cooperator's past performance and management changes. The wet spring provided excellent conditions for moist soil growth. Biological Technician Long conducted a survey of the idle cropfields. The area was surveyed in early September when the mature plants were most readily identifiable. Fields were sketched for variations in the dominant vegetation. There were fourteen dominant types. The three most abundant types were a large-seeded smartweed/wild millet association, cocklebur and pigweed. See Appendix for report on idle field production.

12. Wilderness and Special Areas

A 275-acre tract of woodland proposal was submitted in 1979 for designation as a Research Natural Area. The area under consideration is a silver maple forest on a natural levee of the Illinois River Valley with associated meander scars and backwater sloughs. Current action involves interest by the State of Illinois of registering the area on the State Natural Area List.

G. WILDLIFE

1. Wildlife Diversity

Wildlife diversity on the Meredosia Refuge has been accomplished by development of moist soil units, ponds and sloughs, idle land, and woodland. The results benefit migratory birds, resident birds, and mammals.

2. Endangered and/or Threatened Species

The northern bald eagle is the only federally listed endangered bird to utilize Meredosia NWR at present. The wintering population of 1983-84 peaked in February and March with 5 adults and 3 immatures. This is down from last year's high of 12 eagles, continuing the downward trend in numbers from 1980's 25 eagles.

Bald eagle use days increased over 50% compared to last year. Peak population occurred during December with 15 birds observed.
(R-971, P-9, TSS) (11-06-84)

Extensive mudflats attracted shorebirds. Total use days recorded were down with only 45,285 use days. Major shorebirds were yellowlegs and sandpipers.
(R-970, P-30, TSS) (10-29-84)

However, use during the first quarter increased from 350 use days to 550 use days. The last eagles observed during the spring were 1 adult and 3 immatures seen March 27. Fall populations began with 1 adult on October 29, gradually increasing to 5 eagles on December 3 and peaking December 10 with 6 adults and 9 immatures, reversing last winter's downward trend. Total use for the 1984 calendar year increased by 52.8% to 955 use days over 1983's 625 use days.

TABLE G-1 Northern Bald Eagles Peak Population by Month (Adults/Immatures

	1984-85	1983-84	1982-83	1981-82	1980-81
September				1/0	
October	1/0	1/0	1/1	2/1	1/2
November	6/2	3/1	2/1	4/3	5/3
December	6/9	3/1	9/3	4/2	3/4
January	6/3	3/1	2/2	3/2	2/2
February		5/3	3/0	4/1	6/4
March		5/3	4/3	9/5	4/3

TABLE G-2 Northern Bald Eagle Use Days

	1984	1983	1982	1981	1980	1979
January-March	550	350	560	498	600	135
October-December	405	275	412	399	380	560
Total	955	625	972	897	980	695

Wintering bald eagles utilize the refuge as a roosting area and to feed on vulnerable waterfowl. Their relationship to migrating ducks is seen when winter use days for eagles and ducks are plotted together (Figure G-1). Peak use of the refuge by ducks was followed by increased eagle use during the late 1970's, with a gradual decline in both groups. Since eagles are not solely dependent on waterfowl as a food source, the eagles also reflect other influences.

The Illinois Endangered Species Board has listed 33 species of birds as being in danger as a breeding population in Illinois. Fourteen of these have been sighted at Meredosia National Wildlife Refuge, twelve this year. The great egret has increased its use by 409.9% over last year, with 4,130 use days and a peak of 52 birds. The bald eagle ranked second with 955 use days, followed by the American bittern with 575 use days, northern harrier with 405 use days, Cooper's hawk with 300 use days, black tern with 225 use days, and black-crowned night heron with 225 use days. Not seen this year were the osprey and Forster's tern, both infrequent visitors.

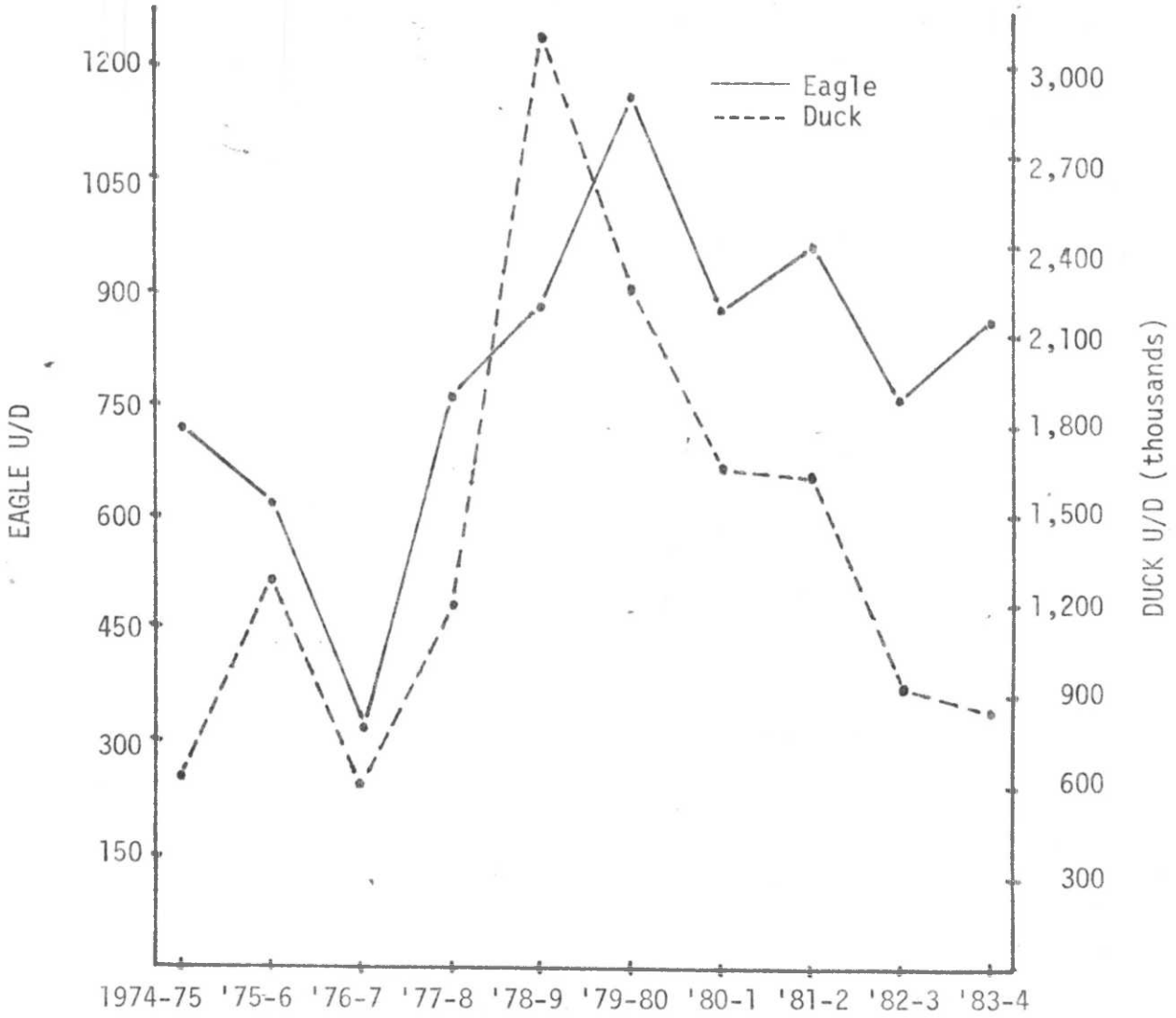


FIGURE G-1. Wintering bald eagle U/D and duck U/D October - March.

TABLE G-3 Endangered Species Use - 1984

Species	Use Days	Peak Population	Current 5-year Average
Great egret	4,130	52	2,522
Bald eagle	955	15	830
American bittern	575	10	708
Northern harrier	405	5	442
Cooper's hawk	300	4	268
Black tern	225	6	630
Black-crowned night heron	225	3	348
Double-crested cormorant	215	12	799
Red-shouldered hawk	170	5	143
Common tern	90	5	179
Wilson's phalarope	15	2	49
Short-eared owl	8	1	95
TOTALS	7,313		7,013

TABLE G-4 Endangered Species Use Days

	1983	1982	1981	1980	1979
Double-crested cormorant	1,750	355	480	1,090	310
Black tern	1,125	325	350	525	825
Great egret	810	925	6,175	2,655	2,045
Bald eagle	625	972	879	980	695
American bittern	570	610	745	905	710
Black-crowned night heron	350	250	145	585	410
Marsh hawk	335	280	425	665	505
Cooper's hawk	205	110	260	165	600
Common tern	140	135	215	215	190
Red-shouldered hawk	115	130	50	275	145
Wilson's phalarope	90	35	10	80	30
Short-eared owl	50	30	25	270	100
Osprey	-	25	10	35	-
Forster's tern	-	-	-	-	55
TOTALS	6,165	4,182	9,769	8,445	6,620

3. Waterfowl

Six aerial surveys were made by Illinois Natural History Survey personnel between February 20 and April 11. Two flights, the last week of March and the first week in April, were incomplete for Meredosia due to weather conditions. Duck numbers started at 2,425 birds to peak on March 21 at 17,690 birds. This is almost twice last year's peak of 8,930, but is low compared to the peak of 42,000 ducks in 1979. Mallards made up 49.1% of the duck population; lesser scaup were next at 14.8%; American wigeon 9.6%; canvasback 5.3%; common goldeneye 4.1%; shovelers 3.3%; and pintail 3.2%.

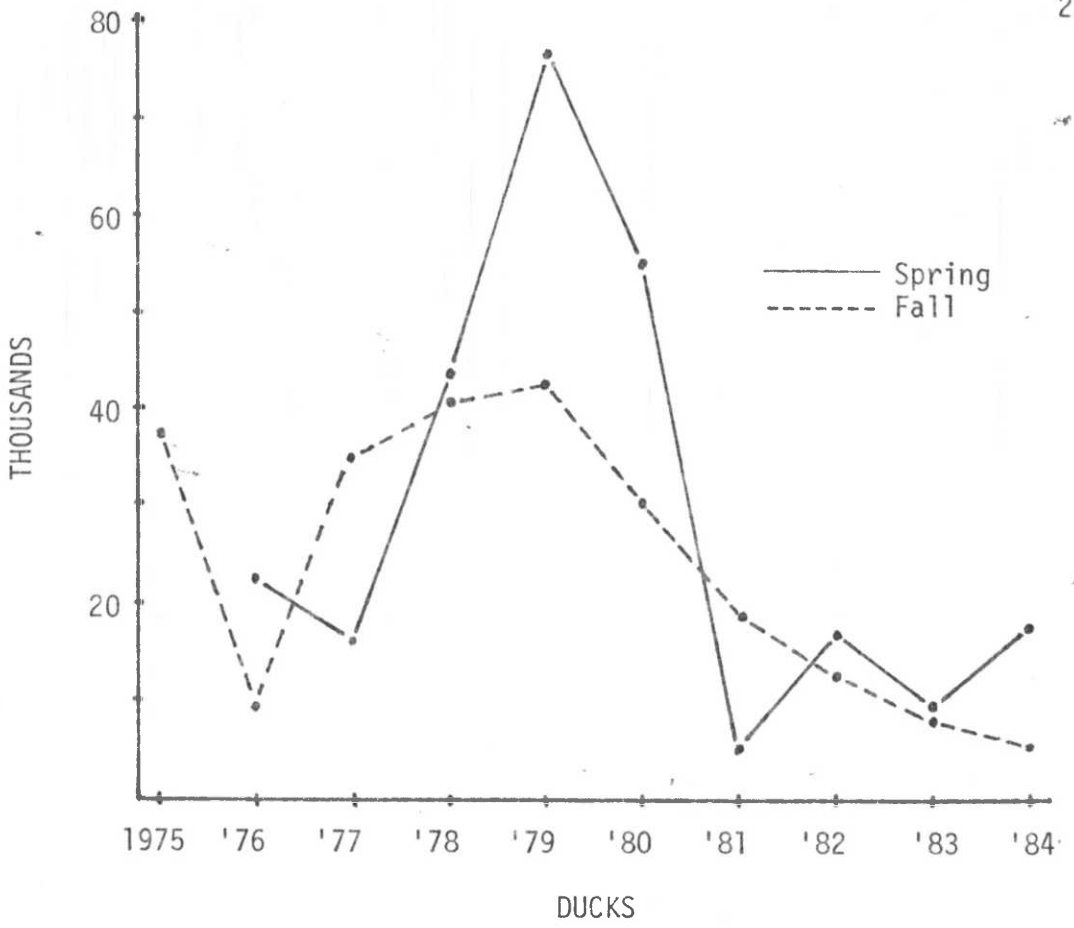
Geese started at their peak of 525 birds on February 20 though snows increased from 25 to 40 on March 21. Spring peaks have fluctuated for goose populations perhaps due to early peaks that have been missed.

TABLE G-5 Spring Surveys - Illinois Valley

Year	Total Ducks	Dates	Flights
1977	1,429,600	3/09 - 4/12	6
1978	1,326,132	3/27 - 4/20	4
1979	2,441,716	3/19 - 4/13	4
1980	3,393,105	3/08 - 4/17	4
1981	891,375	2/24 - 4/07	7
1982	739,030	3/08 - 4/12	4
1983	1,751,053	2/23* - 4/25	8
1984	943,080	2/20 - 4/11	6

*Upper Illinois Valley only
Current 5-year average 1,843,256 ducks

Fall surveys began on September 4, with a large gap from mid-September to the end of October. The last flight was December 10, for a total of 9 flights. Waterfowl populations increased from 900 ducks to 5,425 ducks and 285 geese on October 29. Though fall goose populations seem fairly stable over the past few years at Meredosia, ducks have experienced a steady decline since the 1979 peak of nearly 77,000 ducks. Mallards make up the largest portion of the fall duck population at 56.0%, followed by three other dabblers - American wigeon 9.3%, green-winged teal 8.6%, and blue-winged teal at 8.0%, with scaup trailing at 5.1%. Mallard use of Meredosia dropped from an average 3.8% of the Lower Illinois River Valley population to 1.7%, the highest rate for this year coming in September with 3.8%. Peak fall mallard population on the refuge also dropped, down 59.7% from the 1983 level of 6,700 to 2,700 ducks. In all, seven duck species decreased including the shoveler which dropped 62.5%. The



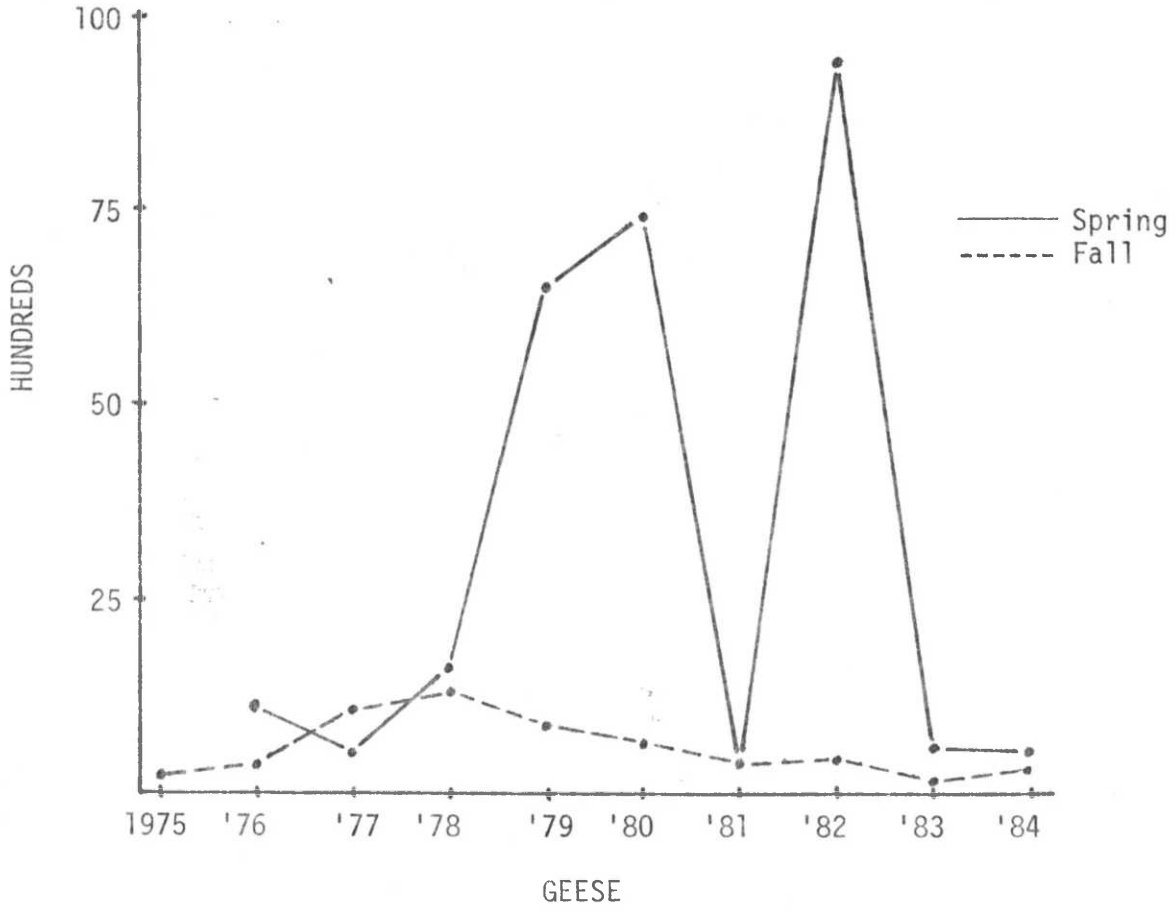


Figure G-2. Spring and fall population peaks of ducks and geese at Meredosia NWR.

most dramatic increases were canvasbacks with a 275% increase and green-winged teal with a 233.3% increase. All the mergansers increased but the red-breasted merganser, not seen since 1979, was once again on the refuge with a peak of 20 birds. Geese also increased with a combined 130.7%.

Waterfowl use for 1984 decreased. Duck use dropped 18.1% to 904,570 use days, less than half the 5-year average of 1,908,015 use days, despite a promising increase in the first quarter. This continues a downward trend since 1979, except for last year's slight increase. Geese went from 38,060 use days in 1983 to 15,440 use days in 1984, a 10-year low. Use is only 18.4% of the current 5-year average of 83,920 use days.

TABLE G-6 Fall Mallard Population

Date	Lower Illinois Valley	Meredosia (%)	% 1983
09/04	5,550	115 (2.1)	6.3
09/11	11,885	450 (3.8)	6.0
10/29	154,675	2,700 (1.8)	2.5
11/05	140,405	2,400 (1.7)	1.9
11/12	158,330	1,800 (1.1)	2.3
11/20	146,730	1,400 (1.0)	3.7
11/26	123,980	1,200 (1.0)	4.1
12/03	99,830	1,200 (1.2)	
12/10	39,015	700 (1.8)	
		1.7	3.8

WOOD DUCK PRODUCTION

Maintenance

Boxes were checked for sawdust and any needed repairs on March 1 and 27. A total of 26 boxes were available for nesting this year. Four boxes at Brier Pond were removed for winter repairs on August 29, to be reinstalled next spring at Billings Lake, since they have seen almost no use at their present location.

Production

The first wood ducks were sighted March 27, when 31 pair were seen. Broods were first sighted on June 28, when a total of 68 ducklings were sighted, ranging from class Ic to IIIa in eleven broods.

TABLE G-7 Waterfowl Use Days - Meredosia NWR

Ducks

	January-March	April-June	July-September	October-December	Total	△ %
1975	286,605	54,318	52,750	826,720	1,220,393	
1976	491,365	169,940	59,645	272,460	993,410	- 18.6%
1977	360,737	92,130	72,400	1,054,365	1,579,632	+ 59.0%
1978	148,280	479,640	68,725	1,680,025	2,376,670	+ 50.5%
1979	1,455,795	240,620	117,065	1,347,780	3,161,260	+ 33.0%
1980	933,925	117,053	88,075	1,439,360	2,578,413	- 18.4%
1981	243,000	63,115	118,955	1,206,370	1,631,440	- 36.7%
1982	442,054	78,735	36,255	507,680	1,064,724	- 34.7%
1983	430,490	235,050	69,690	369,005	1,104,235	+ 3.7%
1984	476,650	138,140	75,625	214,155	904,570	- 18.1%
Average*	701,053	146,915	86,008	974,039	1,908,015	
Percent	36.7%	7.7%	4/5%	51.1%		

Geese

1975	32,313	900	450	12,355	46,018	
1976	13,700	2,400	600	6,605	23,305	- 49.4%
1977	7,800	300	900	17,900	26,900	+ 15.5%
1978	11,625	3,600	1,500	56,375	73,100	+171.5%
1979	75,465	3,300	1,500	21,650	101,915	+ 39.4%
1980	77,300	2,370	1,572	24,555	105,797	+ 2.8%
1981	14,280	360	750	19,385	34,775	- 67.1%
1982	120,365	1,950	900	15,840	139,055	+299.9%
1983	30,745	600	600	6,115	38,060	- 72.6%
1984	8,920	1,200	150	5,170	15,440	- 59.4%
Average*	63,631	1,716	1,064	17,509	83,920	
Percent	75.7%	2.0%	1.3%	20.9%		

*Current 5-year average

TABLE G-8 Peak Spring Waterfowl Population by Species

Meredosia NWR

	1979	1980	1981	1982	1983	1984	5-Year Average 1979-1983
MALLARD	29,000	17,000	3,400	7,800	3,200	8,025	1,280
BLACK DUCK	600	300	80	150	75	165	241
GADWALL	400	800	75	450	700	390	485
PINTAIL	1,600	5,200	175	1,600	550	600	1,825
GREEN-WINGED TEAL	400	1,900	350	125	800	100	715
BLUE-WINGED TEAL	850	3,600	450	350	850	650	1,220
AMERICAN WIGEON	11,000	9,400	600	1,700	1,400	1,600	4,820
SHOVELER	1,100	1,200	300	250	900	800	750
WOOD DUCK	130	270	220	135	250	165	201
REDHEAD	600	700	-	250	275	215	365
RING-NECKED DUCK	16,000	3,600	350	800	600	575	4,270
CANVASBACK	2,800	5,300	350	1,300	750	1,100	2,100
LESSER SCAUP	24,000	10,800	700	2,900	1,500	4,000	7,980
BUFFLEHEAD	50	225	-	50	150	150	95
RUDDY DUCK	125	250	20	75	250	400	144
COMMON MERGANSER	2,300	550	250	275	80	325	691
HOODED MERGANSER	-	65	-	60	40	75	33
COMMON GOLDENEYE	3,800	1,600	800	650	350	1,000	1,440
SNOW GOOSE	1,300	1,200	60	400	150	40	622
CANADA GOOSE	5,200	6,200	350	9,000	450	500	4,240

TABLE G-9 Peak Fall Waterfowl Population by Species

Meredosia NWR

	1979	1980	1981	1982	1983	1984	5-Year Average 1979-1983
MALLARD	35,000	24,500	17,000	9,750	6,700	2,700	18,590
BLACK DUCK	600	450	500	225	75	30	370
GADWALL	400	400	275	75	80	150	246
PINTAIL	1,500	1,300	625	415	400	450	848
GREEN-WINGED TEAL	1,000	1,300	1,000	825	300	1,000	885
BLUE-WINGED TEAL	2,100	750	1,600	550	700	750	1,140
AMERICAN WIGEON	7,500	4,700	2,900	1,300	650	650	3,410
SHOVELER	150	150	300	90	80	30	154
WOOD DUCK	550	450	750	350	495	480	519
REDHEAD	25	50	65	-	60	50	40
RING-NECKED DUCK	325	275	350	85	175	125	242
CANVASBACK	350	125	350	100	40	150	193
LESSER SCAUP	1,100	650	700	225	375	350	610
BUFFLEHEAD	40	50	50	15	30	40	37
RUDDY DUCK	50	80	100	50	80	100	72
COMMON MERGANSER	275	345	250	40	25	35	187
HOODED MERGANSER	40	125	75	20	20	50	56
RED-BREASTED MERGANSER	40	-	-	-	-	20	8
COMMON GOLDENEYE	900	350	800	125	60	75	447
CANADA GOOSE	600	500	615	350	100	225	433
SNOW GOOSE	250	375	300	125	30	75	216

Average hatch sizes over the season were 7.8 ducklings in Class Ic; 5.7 for IIa; 8 in IIb; and 3.3 in Class IIIa.

Nine of the 26 nest boxes were used by wood ducks this year for 34.6% use, recovering from last year's decrease after steady increases since installation. Seven of the nine boxes used produced young for a total of 55 young. Average hatch size ranged from 7.6 ducklings at Billings Lake to 9.0 along the south ditch, averaging 7.9 young per successful nest. Brier Pond boxes received no use this year. Total production for the refuge, including natural cavities, is estimated at 379 woodies, compared to 311 in 1983 and 302 in 1982.

Wood Duck Box Production

Area	No. Boxes	No. Used by Wood Ducks	No. Producing Young	Production of Young	Average Hatch Size
Moss Pond	8	1	1	8	8.0
Brier Pond	4	0	0	0	0
South Ditch	6	2	1	9	9.0
Billings Lake	8	6	5	38	7.6
TOTAL	26	9 (34.6%)	7 (26.9%)	55	7.9

Starling use continues to decrease, from a high of nine boxes in 1981 to only two boxes this year. Great crested flycatchers used three boxes. Flickers, which had caused some damage in nests last year, were apparently not a problem this year. The only damage in a nest was after hatching, when one unhatched egg had been broken.

Wood Duck Box Use

Use	1980	1981	1982	1983	1984
Wood Duck	5	7	9	7	9
Flycatcher	3	3	6	3	3
Starling	2	9	4	5	2
Empty	16	7	5	7	12
Unavailable			2	4	
Wood Duck Use (%)	19.2	26.9	37.5	31.8	34.6

4. Marsh and Water Birds

Spring migration of coots began March 21 with 200 birds to peak April 11 with 6,000 coots, down from last year's peak of 6,800 coots, which had been a promising increase.

Spring Coot Population Peaks

Month	1979	1980	1981	1982	1983	1984
March	19,000	29,000	1,400	2,300	1,900	650
April	3,400	10,000	1,100	800	6,800	6,000

Fall populations began with 1,800 coots on October 29, a peak they held the following week, to be gone by the end of November. This is 69.2% of the previous year's high of 2,600 birds, showing a continuing decrease since the 1978 peak of 19,000 birds. Total use decreased 48.6% to 111,420 use days, with no use during the period from July to September.

Fall Coot Population Peaks

Month	1979	1980	1981	1982	1983	1984
September	450	800	550	75	175	0
October	16,000	7,000	7,700	1,700	1,200	1,800
November	8,500	1,400	3,400	8,000	2,600	1,800
December		75	50			

Marsh and water birds, excluding coots, increased use by 9.5% to 10,895 use days, just short of the current 5-year average by 10,897 use days. Decreases during three quarters of the year were offset by a third quarter increase of 71.9%, the heaviest use period during fall migration.

The great blue heron (5,185 U/D) and the great egret (4,130 U/D) totaled 85.5% of the year's use. They were followed by the green-backed heron (350 U/D), pied-billed grebe (310 U/D), and black-crowned night heron (225 (U/D). The double-crested cormorant plunged from last year's record high of 2,170 use days to a record low of 215 use days. Cormorant populations were low during the spring and arrived late in the fall, contributing to the low use.

Double-crested Cormorant Use Days/Peak

Year	Spring	Fall	Total
1984	125/ 6	90/12	215
1983	1,520/60	650/25	2,170
1982	150/25	205/ 8	355
1981	10/01	470/16	480
1980	700/25	390/20	1,090
1979	265/25	308/14	573

TABLE G-10 Coot Use Days

Meredosia

	January-March	April-June	July-September	October-December	Total	△ %
1975	10,800	7,350	1,290	28,800	48,240	
1976	12,450	64,800	5,100	23,700	106,050	+119.8%
1977	10,350	20,700	3,810	118,500	153,360	+ 44.6%
1978	12,600	187,350	5,600	334,500	540,050	+252.1%
1979	382,385	55,985	5,012	326,670	770,052	+ 42.6%
1980	203,700	119,000	12,180	155,225	490,105	- 36.4%
1981	4,185	22,385	6,000	162,100	194,670	- 60.3%
1982	43,400	21,000	1,350	91,565	157,315	- 19.2%
1983	25,380	139,050	2,700	49,550	216,680	+ 37.7%
1984	6,665	68,405	--	36,350	111,420	- 48.6%
Average*	131,810	71,484	5,448	157,022	365,764	
Percent	36.0%	19.5%	1.5%	43.0%		

TABLE G-11 Marsh and Water Bird Use Days (Excluding Coots

	January-March	April-June	July-September	October-December	Total	△ %
1975	480	540	3,655	5,085	9,760	
1976	135	1,355	5,700	1,090	8,280	- 15.2%
1977	400	1,210	4,555	870	7,035	- 15.0%
1978	490	3,420	6,805	1,160	11,875	+ 68.8%
1979	340	1,315	7,870	1,780	11,305	- 4.8%
1980	530	3,065	6,080	1,400	11,075	- 2.0%
1981	60	1,485	10,725	3,105	15,375	+ 38.8%
1982	160	1,225	4,400	995	6,780	- 58.5%
1983	465	1,930	4,280	3,275	9,950	+ 46.8%
1984	160	1,195	7,360	2,180	10,895	+ 9.5%
Average*	311	1,804	6,671	2,111	10,897	
Percent	2.8%	16.6%	61.2%	19.4%		

*Current 5-year average

5. Shorebirds, Gulls, Terns and Allied Species

Total use days were the second lowest in ten years, decreasing 54.4% from 1983 to 45,285 use days. Herring gulls and ring-billed gulls constituted 79.8% of the use with 36,155 use days. The major shorebirds were the lesser yellowlegs (6,020 U/D), semi-palmated sandpiper (2,525 U/D), spotted sandpiper (1,810 U/D), greater yellowlegs (1,760 U/D), common snipe (1,520 U/D), and killdeer (1,415 U/D). In all, twenty species were observed - 14 shorebirds, 3 gulls and 3 terns. Last year, twenty-five species were observed and gulls and terns combined were only one-third of the total use.

6. Raptors

Fourteen species were observed this year for a slight increase of 4.3% to 9,768 use days: 4 owls, 8 hawks, bald eagles and turkey vultures. This continues last year's increase, hopefully an up-swing after three years' decline. The major species are the barred owl (2,040 U/D), eastern screech owl (1,735 U/D), great horned owl (1,480 U/D), bald eagle (955 U/D), red-tailed hawk (925 U/D) and turkey vulture (790 U/D). The 3 owls also nest on the area. A merlin was sighted November 1, an uncommon visitor.

7. Other Migratory Birds

Mourning dove use decreased to 6,750 use days, just over half last year's use, and well below the current 5-year average of 14,150 use days. The peak population was the lowest in eight years, with only 35 doves using the refuge. Halting the cooperative farming program may have contributed to the decrease in use, as the native plants may be less palatable to the doves compared to the nearby crops on other land. Cold, wet weather during the nesting season resulted in poor production this year.

TABLE G-14 Mourning Dove Populations

Year	Use Days	Peak Number	Production
1984	6,750	35	10
1983	12,250	85	20
1982	10,250	75	25
1981	4,250	45	10
1980	20,000	125	25
1979	24,000	150	35
1978	16,000	100	20
1977	4,250	50	10

TABLE G-12 Shorebirds, Gulls, Terns and Applied Species Use Days
Meredosia

	January-March	April-June	July-September	October-December	Total	△ %
1975	8,950	350	107,285	12,955	129,540	
1976	5,500	1,350	97,575	9,450	113,857	- 12.2%
1977	10,050	980	29,820	6,215	45,065	- 58.7%
1978	18,740	6,685	107,980	14,700	148,105	+214.7%
1979	5,626	575	30,856	72,375	109,432	- 26.1%
1980	10,705	3,020	61,960	12,730	88,415	- 19.2%
1981	10,550	2,585	14,265	26,210	53,610	- 39.4%
1982	9,595	4,075	33,385	22,735	69,790	+ 30.2%
1983	5,400	2,860	58,195	32,820	99,275	+ 42.2%
1984	5,090	1,785	16,410	22,000	45,285	- 54.4%
Average*	8,375	2,623	39,732	33,374	84,104	
Percent	10.0%	3.1%	47.2%	39.7%		

TABLE G-13 Raptor Use Days

	January-March	April-June	July-September	October-December	Total	△ %
1975	1,090	225	490	835	2,640	
1976	870	325	1,645	910	3,750	+ 42.0%
1977	1,430	850	1,200	2,620	6,100	+ 62.7%
1978	3,060	1,395	2,520	2,420	9,395	+ 54.0%
1979	4,625	1,130	4,600	2,490	12,845	+ 36.7%
1980	2,830	1,440	4,345	2,260	10,875	- 15.3%
1981	2,725	1,380	2,570	2,489	9,164	- 15.7%
1982	1,515	1,360	2,260	2,822	7,957	- 13.2%
1983	2,770	1,065	2,780	2,753	9,368	+ 17.7%
1984	2,655	1,135	3,005	2,973	9,768	+ 4.3%
Average*	2,893	1,275	3,311	2,563	10,042	
Percent	28.8%	12.7%	33.0%	25.5%		

*Current 5-year average

8. Game Mammals

White-tailed deer can be found in the bottomland timber and edge habitats. Deer use increased this year, from 4,275 to 4,400 use days, but the numbers decreased, with the peak dropping to 16 from last year's 23 deer. They share the habitat with fox squirrels, red fox, southern flying squirrels and raccoons. Mink, beaver, and muskrat can be found in the water areas. No hunting or trapping is allowed on the refuge due to legal restraints.

10. Other Resident Wildlife

Bobwhite quail and ring-necked pheasants both decreased in use this year with 1,250 and 750 use days respectively. Their numbers have fluctuated over the years with available habitat and available food. Both have been known to nest on the refuge. This year the quail have produced an estimated 8 young. These are the only game birds on the refuge. Other resident wildlife includes a variety of songbirds, reptiles and amphibians.

TABLE G-15 Game Bird Populations

Year	Bobwhite Quail	Ring-necked Pheasant
1984	1,250 U/D	750 U/D
1983	2,750 U/D	1,525 U/D
1982	2,750 U/D	425 U/D
1981	1,250 U/D	725 U/D
1980	2,626 U/D	525 U/D
1979	6,525 U/D	1,225 U/D
1978	6,750 U/D	2,475 U/D
1977	2,625 U/D	425 U/D

16. Marking and Banding

No hens were banded on the nest this year due to restricted personnel time. Traps were set out on Moss Pond, the south dike, and Van's Dike in September. A total of 168 wood ducks were banded, including 5 adult males which was unusual. These bands were included in the Chautauqua NWR quota.

TABLE G-16 Wood Duck Banding

Age	Total Banded
AHYM	5
AHYF	11
HYM	53
HYF	99
	168

Somewhere under that pile of material is the south dike water control structure. Water management by beaver standards is maximum water level.
(R-971, P-15, TSS) (11-26-84)

Ron Ogden, Wildlife Assistance Office, Springfield, treated beaver lodge, located in vicinity of south dike water control structure, with Phostoxin.
(R-971, P-22, TSS) (12-03-84)

H. PUBLIC USE

1. General

Public use is not permitted on the Meredosia National Wildlife Refuge due to legal restraints. The land was deeded to the federal government by the James Anderson estate. Management of the refuge was limited to waterfowl and wildlife management. The deed specifically states that no public use would be permitted. This was the main reason the State's proposal listing public use was turned down in favor of federal ownership.

17. Law Enforcement

Past enforcement on public trespass, commercial fishing, and illegal hunting continues to reduce problems in this area. The refuge boundary was posted prior to the waterfowl season. The problem of blinds located on the refuge boundary has been resolved in the northern half of Meredosia Lake. The hunting clubs along the north end of the lake contacted the State concerning blind locations that affected their hunting. The Cass County section of the lake has been classified as a controlled hunt area. Only six blinds are permitted and their locations are designated by the Illinois Department of Conservation. A waterfowl rest area now exists in the northern end of the lake. Posting of the Cass County section restricts other public use during the fall and provides additional benefits for waterfowl.

Information on baiting at one of the clubs was turned over to the special agents on two different occasions. Seemingly, some people never learn. The agents closed the club down twice plus fined the club members involved.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

Brush control in the idle fields was not possible with the existing Rhino lift disk, Model R-50. This unit was not heavy enough to cut up the brush and root systems. Purchase of a Rhino Model 127, offset disk, weighing over 4,000 pounds, resolved this problem. The cost of the unit was $5,250.

The new diesel Ford tractor, Model 7610, was modified for the pumping operation. Rather than the frequent refueling during pumping, the unit was fitted for directly receiving fuel from a bulk tank.

Waterfowl blinds in the northern portion of Meredosia Lake. Normally, waterfowl hunters constructed blinds close to the refuge boundary. State restricted number of blinds and selected sites by staking prior to season. (R-970, P-25, TSS) (10-29-84)

Safety shutoff equipment was installed to protect the power unit when operating through the night. The use of the diesel Ford tractor rather than the Waukesha diesel unit resulted in quicker setup of the pumping unit, plus greater ease of removal after pumping. The consumption of fuel was reduced 50% from 8 gallons to 4 gallons per hour.

Ed Pennington, a certified welder from Waukomis, Oklahoma, re-designed the ROPS supports on the D-7 dozer. Costly, heavy steel was purchased and numerous days were spent working on the machine. After all this expense, effort and overtime, the D-7 did not pass the stress test. Payment for $3,245.00 is pending until Mr. Pennington returns to complete the job.

J. OTHER ITEMS

1. Cooperative Programs

Two bald eagle surveys were conducted this year. The mid-winter eagle survey was conducted in January for Elton Fawks, Midwest Regional Coordinator for bald eagle research. Additional information on bald eagles present during the year was forwarded to Mr. Fawks.

Terrance Ingram, Executive Director, Eagle Valley Environmentalists, requested information on bald eagle populations during the first weekend of February.

Wood duck information on production and brood observations was forwarded to Frank Bellrose, Illinois Natural History Survey. Frank's studies on wood ducks continues after his retirement. Hopefully, a wood duck book may materialize after so many years of research.

2. Items of Interest

Revenue-sharing checks totaling $2,130 were delivered to the Cass and Morgan County treasurers. Funding for these payments is derived from revenues received from the sale of products from refuge lands plus a supplemental Congressional appropriation. Revenues and the supplemental appropriation provided only 77% of the full entitled amount, due to budget restrictions and overall cutbacks in federal funding.

ROPS reinforced by Pennington Welding, Waukomis, Oklahoma. Total cost for the job was $3,245 and no certification. Welder misunderstood a portion of the static load testing required by OSHA.
(R-970, P-20, TSS) (10-29-84)

Closeup of ROPS support designed by welder. This section moved two inches while testing. Correspondence with Pennington stated the D-7 met the test at the point of bending. He will return to straighten support and certify the machine.
(R-970, P-19, TSS) (10-29-84)

Revenue-sharing Payments (percentage)

Fiscal Year	Cass County	Morgan County
1972	$ 964.14	$425.74
1973	964.14	425.74
1974	964.14	425.74
1975	1,315.23	580.77
1976	1,068.38 (75)*	471.77 (75)*
1977	749.37 (53)	330.91 (53)
1978	713.00 (50)	315.00 (75)
1979	1,097.00 (75)	485.00 (75)
1980	1,446.00 (100)	639.00 (100)
1981	1,267.00 (88)	560.00 (88)
1982	1,311.00 (91)	579.00 (91)
1983	1,415.00 (77)	716.00 (77)

*15-month period

Refuge manager attended the following meetings and training sessions:

Fire training	Brussels, IL	01/09-01/11
IDOC/FWS Coordinating Meeting	Springfield, IL	3/07
Midwest Bald Eagle Meeting	Rock Island, IL	4/02
Law Enforcement Refresher Course	Springfield, IL	04/30-05/04
Project Leaders' Meeting	Mingo NWR, MO	08/26-08/30
Professional Development Short Course	Hannibal, MO	09/24-09/27
Firearms Re-qualifications	Springfield, IL	10/03
CPR Course	Pekin, IL	10/30
Big Bluestem Advisory Committee	Canton, IL	12/12

Bill Watts, Maintenance Worker, attended the following training sessions:

Law Enforcement Refresher Course	Springfield, IL	04/30-05/04
Heavy Equipment Certification Course	Crab Orchard NWR IL	06/02-06/05
Firearms Re-qualification	Springfield, IL	10/03

Alice Clanin, Secretary, attended the following training session:

PAY/PERS	St. Paul, MN	03/09-03/10

3. Credits

Linda Long, Biological Technician, wrote the section on wildlife. The remainder of the Narrative was done by the refuge manager. The 1984 Narrative was typed by Alice Clanin, Secretary.

Idle Field Production

at

Meredosia NWR, Illinois

Introduction

The purpose of this study was to gain general information about the production of native plants in the idle croplands on the Meredosia National Wildlife Refuge.

Of the 1,850 acres comprising the refuge, 300 are in croplands. These have been farmed under a cooperative program until the program was halted with the harvest of 1983. This year, the fields have been idle and a few were disked to maintain the open fields and moist soil plants.

It is hoped that these fields will produce food favored by waterfowl for their spring migration, when the fields are flooded by the Illinois River.

The following report presents information on which plants are dominant as well as a general overview of which species have invaded the fields and their status as food plants.

Study Area

The Meredosia National Wildlife Refuge is located along the Illinois River on a peninsula formed by the river and Meredosia Bay. Indians used the site for hunting and camping until the pioneers came west and settled in the area. It was used for farmlands until the duck hunting clubs bought the land and began intensively managing the area for waterfowl production. Many ducks and geese use the refuge for resting and feeding during migration as well, since the area is located on the Mississippi Flyway.

The refuge was formed in 1973 when the land was donated to the government. There is a total of 1,850 acres, consisting of bottomland timber, natural ponds supplemented by a dike system installed by the duck clubs, and 300 acres of cropland. The cropland was farmed until the decision was made to let the farmer go in the fall of 1983. Native plants have re-invaded the fields, including both herbs and woody vegetation. The areas of heaviest production of woody plants are being mowed and disked to help maintain open fields for production of the desired moist soil plants.

The peninsula is flooded each year by the Illinois River in late winter and early spring. The water is usually off the fields by May, but may be reflooded in the early summer, as it did in June of 1982, since the area is not protected by dikes. With the land flooded during the spring migratory flight, this area has proven to be an area favored by the waterfowl. The presence of preferred foods should enhance their use of the refuge.

Methods

The area was surveyed in early September when the mature plants were most readily identifiable. Using an operator's field map, each field was sketched for variations in the dominant vegetation. The field was then walked through to determine which species or species dominated each area and a list compiled of the incidental species. A composite map was drawn up and frequency of each species was determined based on the number of fields in which it occurred.

Results

Dominant Vegetation

There was a wide variety of dominant vegetative types, ranging from about an acre to a whole field (Figure 1). In all, there were fourteen dominant types with two other categories: dense concentrations of Wild Millet (Echinochloa crusgali) and areas that had already been mowed or disked prior to the survey.

The three most abundant types were a Large-seeded Smartweed/Wild Millet association (Polygonum pensylvanicum/E. crusgalli), Cocklebur (Xanthium strumarium), and Pigweed (Amaranthus sp.). Where Large-seeded Smartweed occurred, there was usually an equal amount of Wild Millet mixed in, though the balance was not always equal. Areas where Wild Millet tended to be the major dominant of the union are shown in cross hatching, Field 4A being notable in its large share of millet. All other areas contained nearly balanced populations. This field type tended to crowd out many incidental species due to its growth pattern of tightly packed stems of four feet or more tall and the shady leaves of the smartweed. Where the stand was more open, several species of grass, Red-rooted Nutgrass (Cyperus erythrorhizos), and Pigweed could be found. Beggar-ticks (Bidens sp.) were also widely scattered in these fields.

Where Cocklebur appeared as a dominant, few other species were found except Pigweed. Cocklebur tends to grow in very dense patches, the wide leaves allowing little light to reach the ground. In sparser stands, Teal Grass (Eragrostis hypnoides) grew well in association with this plant, as did Prickly Mallow (Sida spinosa) and sometimes Red-rooted Nutgrass.

Pigweed was usually accompanied by Cocklebur, making it difficult to determine where the two dominant types differed. In general, where Pigweed was a dominant over Cocklebur, the major specie was Water Hemp (Amaranthus hybridus), a tall and overbearing plant which could often form very dense stands. Large-seeded Smartweed was sometimes found as an incidental with Pigweed, as was Wild Millet, depending on the nearness of fields dominated by them. Red-rooted Nutgrass was often in this area, sometimes Teal Grass and Prickly Mallow.

A common dominant in the southern fields was Heath Aster (Aster ericoides). It totally dominated Field 9 and most of 7A. Field 9 is surrounded by woods and is isolated from the other fields, which may have influenced which species were most likely to invade. Incidentals there were mainly Halbert-leaved Rose-Mallow (Hibiscus militaris) and Catchfly Grass (Leersia lenticularis). Field 7A, being close to other fields perhaps influencing what seeded into the field, has a more favorable complement of species, including Large-seeded Smartweed and Wild Millet. Trumpet Creeper (Campsis radicans) was abundant here. Fog-fruit (Lippia lanceolata) formed dense patches and could almost be classified as a subdominant in this one field.

There were four areas where ponds had remained past the drain-off of the majority of the fields, as evidenced by the species and patterns of dominants. The largest area, Fields 6A and 6B, form a unit previously set aside for moist soil production. During sampling in September, there was a small pond with sparse Arrowleaf (Saggitaria latifolia) in 6B. Bands of vegetation types can be seen, following shrinking of the pond. Though two of the bands were Cocklebur dominated, there was a small band of Wild Millet and Long-leaved Ammania (Ammania coccinea) with a thick understory of Teal Grass and Yellow Nutgrass (Cyperus esculentus). The band of aster included a moderate amount of Red-rooted Nutgrass. Another smaller area was dominated by the nutgrass interspersed with Cocklebur. The two smaller pond areas in Fields 7A and 5A were dry by sampling time and contained small patches of Marsh Smartweed (Polygonum coccineum), which, though very dense, produced no seed.

Other minor dominants were the Horseweed/Partridge Pea association (Erigeron canadensis/Cassia fasciculata), Green Foxtail (Setaria viridis), Fog-fruit, Swamp Milkweed (Asclepias incarnata) and Late-flowering Throughwort (Eupatroium serotinum), a tall weed with a tendency to form an association with the aster and block out most other species. There were also areas dominated by sapling and seedling trees, mainly Cottonwood (Polulus deltoides) and Black Willow (Salix nigra).

Large-seeded smartweed and wild millet growing in Field 4D. The cooperative farming agreement for this unit was discontinued this year.
(R-968, P-14, TSS) (08-21-84)

Weather conditions resulted in an abundant production of moist soil plants in the idle farm fields. Closeup of large-seeded smartweed in Field 1B.
(R-969, P-5, TSS) (09-13-84)

Frequency

Wild Millet (Echinochloa crusgali)

Wild Millet formed large areas of concentration as well as combining with other species in dominant associations, making it one of the most commonly found plants in our study at 77% frequency (Table 1). This grass has been rated as an excellent food source by Bellrose and Anderson (1943). Knauer (1977) found that in Missouri, ducks had selected seeds of Wild Millet in greater proportion than its availability. It will produce 60 bu/acre according to Korschgen (1969), who recognized it as an excellent food for ducks, though he rates it as food only for geese. In a study on the viability of the seeds, Crail (1951) found that if the field was undisked and free of water by early June, a rank growth of millet would occur.

Large-seeded Smartweed (Polygonum pensylvanicus)

Ranked just below Wild Millet as an excellent food source (Bellrose and Anderson, 1943), it was equal in frequency and often found in association with millet. It was selected for by ducks in Missouri (Knauer, 1977). It produces less food than millet at 14 bu/acre (Korscghen, 1969). It has been found to easily reinvade old fields after disking, but will not be favored if left undisked where millet is more likely to invade (Crail, 1951). Smartweed will be favored in disked fields, however, if the fields are dry by late May.

Nutgrasses (Cyperus sp.)

There are three nutgrasses found in the fields of Meredosia. Red-rooted Nutgrass is the most common at 50% frequency. Yellow Nutgrass (C. esculentus) and Shining Nutgrass (S. aristatus) were at 5.6% frequency each. As a group, the sedges, of which these are a subgroup, are excellent duck foods (Bellrose and Anderson, 1943). In the Missouri study, Knauer (1977) found Yellow Nutgrass to be the most abundant vegetation in the mallards he studied, including both nutlets and seeds, though found in only half of the ducks. Taylor (1977) studying plants use by blue-winged teal, found 61.9% of his ducks used nutgrasses, but only a trace compared to the total volume. However, nutgrasses were not abundant in the study area and these figures may show a preference for it. Yellow Nutgrass is likely to dominate an area where the water is kept on until mid to late June, as the viability of the domineering smartweed and wild millet goes down with time spent underwater (Crail, 1951).

Teal Grass (Eragotis hypnoides)

This grass was not very frequent (at 50%) nor as lush as is commonly found on mudflats in areas managed for moist soil plants. The most dense stand was found in the moist soil unit, Field 6B, under the Wild Millet/Long-leaved Ammannia association. It is rated a good food source by Bellrose and Anderson (1943).

Spikerush (Eleocharis sp.)

Though a very infrequent species in the study area, spikerushes were used with 100% frequency by blue-winged teals in trace amounts (Taylor, 1977) and 59% frequency by mallards with 2.6% volume (Knauer, 1977). Bellrose and Anderson (1943) recognize spikerushes as fair duck foods, the ducks consuming both the seeds and the vegetative portions. In these fields, it was found only in the two moist soil fields, 6A and 6B.

Pigweeds (Amaranthus sp.)

Frequency of all pigweeds was 100% for the study area. The most common species, Water Hemp (A. hybridus), has been rated as a fair food source by Bellrose, et al. (1943), but it is not mentioned in any of the literature herein mentioned except by Knauer (1977) who found traces of Amaranthus species in the mallards he studied. His Missouri study area, Mingo National Wildlife Area, produces very little of this genus according to his analysis of the moist soil units, which may influence the selection of this food. Bellrose speculated that the low usage in his study compared to its high seed productivity could be due to its lack of availability.

Beggar-ticks (Bidens sp.)

This genus was found in half of the fields and was a scattered incidental species, though very obvious as most species here stood between three and five feet tall, topped with large yellow flowers. The most common species was the Common Beggar-ticks, (B. frondosa) at 50%, next to Tall Beggar-ticks (B. vulgata) at 27.5% frequency.

Beggar-ticks are considered a poor food source (Bellrose, 1943). Knauer (1977) found a very high frequency of Beggar-ticks in the mallards' diet (82%) even though they were apparantly not selected according to their abundance. This suggests that, if there is a high enough frequency in the area, the waterfowl will utilize the seeds for food. In Taylor's study of blue-winged teal, he found a frequency of 28.6% of the birds had these seeds in their digestive tracts.

Others with Potential Food Value

Catchfly Grass (Leersia lenticularis) is found in almost one fourth of the fields, though only as an incidental species. Korschgen (1969) described this grass as an excellent food for ducks and geese. Its close relative, Rice Cutgrass (Leersia oryzoides) is rated among the top foods by Bellrose in an area where Catchfly Grass is not found. Taylor (1977) found 52.4% of the blue-winged teal he studied had eaten Leersia seeds, forming slightly more than a trace of the aggregate foods.

Arrowleaf (Saggitaria latifolia), Long-leaved Ammannia (Ammannia coccinea) and Halberd-leaved Rose Mallow (Hibiscus militaris) have been rated by Bellrose as fair to poor foods. None of these are of any great frequency to influence feeding habits during migration, but may become supplements for those who use the area, especially the first two which are found in the moist soil unit. These may be used more readily by fall migrants and resident ducks when that area is flooded through the dike system in the fall.

Prickly Mallow (Sida spinosa) was found in almost three-fourths of the fields and was a noticeable weed on the roads. It is not rated as a food source, but is mentioned by both Taylor (1977) and Knauer (1977) as being utilized by waterfowl. Though there were only traces in their digestive tracts, with less than 25% frequency, this could be another potential food source.

Cocklebur (Xanthium strumarium)

Considered by most to be a nuisance species where ducks are concerned, Cocklebur was the second most abundant plan on the site. Although it was not a dominant in all the fields, in many places it would form a very dense stand 4 - 5 feet high where it was dominant. This was especially true around the edges of the fields that bordered Moss Lake as well as patches in the moist soil unit. These areas will prove to be the least useful areas for waterfowl as they tend to stay away from excessive Cocklebur growth. The only usage of such an area was seen in Taylor's study where undergrowth decay formed high populations of invertebrates.

Discussion

Managing areas for natural foods rather than monoculture farming can have both positive and negative factors (McEwan, 1979). Though farming can provide high pounds of food per acre with high protein content, those plants grown in a moist soil unit can be of higher nutritional value and is produced without need of fertilizers, other chemicals or seed cost. Energy cost is lower for maintaining the area since only

periodic disking may be required. The diversity of plants in the moist soil unit as well as long-term cover attracts a greater diversity of wildlife (Fredrickson, 1979).

Our study area has produced high frequencies of excellent duck foods. There are large areas dominated by Large-seeded Smartweed and Wild Millet, two of the highest rated foods. Pigweed dominated fields should also prove to be valuable for food, since the abundance of Pigweed seems to favor its use.

However, there are many areas dominated by unfavorable plants. Woody vegetation is a problem in Field 4 and is being disked as a control measure. The other problem plant, Cocklebur, is not so easy to control. The areas could be disked in late July, as suggested by McEwan (1979), but water control is an essential part of the program necessary for ridding the area of the pest since Cocklebur seems to be an invader of the earliest dry land. Water should be kept on the fields to discourage Cocklebur growth and our fields remain open to the fluctuations of the Illinois River, so Cocklebur is likely to reinvade those areas.

Interestingly, the two fields dominated by Aster were idle last year. The only other idle fields, with the exception of the moist soil units, were either disked or were ready to be disked for woody vegetation (Fields 2B and 3A). This may be an indication for next year's problems.

Table 1. Frequency of plants found in idle fields

	% Frequency
Pigweed *Amaranthus* sp.	100.0
Cocklebur *Xanthium strumarium*	88.9
Large-seeded Smartweed *Polygonum pensylvanicum*	77.8
Wild Millet *Echinochloa crusgalli*	77.8
Small White-flowering Morning-glory *Impomoea lacunosa*	77.8
Prickly Mallow *Sida spinosa*	72.2
Spreading Witch Grass *Panicum dichotomiflorum*	66.7
Green Foxtail *Setaria viridis*	50.0
Teal Grass *Eragrostis hypnoides*	50.0
Swamp Milkweed *Asclepias incarnata*	50.0
Red-rooted Nutgrass *Cyperus erythrorhizos*	50.0
Beggar-ticks *Bidens frondosa*	50.0
Spurge *Euphorbia* sp.	50.0
Fog-fruit *Lippia lanceolata*	44.4
Trumpet Creeper *Campsis radicans*	38.8
Heath Aster *Aster ericoides*	38.8
Cottonwood seedlings & saplings *Populus deltoides*	33.3
Tall Beggar-ticks *Bidens vulgata*	27.8
Witch Grass *Panicum cappillare*	27.8
Patridge Pea *Cassia fasciculata*	27.8
Common Morning-glory *Impomoea purpurea*	27.8
Sugar Maple seedlings *Acer saccharinum*	27.8
Late-flowering Throughwort *Eupatorium serotinum*	27.8
Catchfly Grass *Leersia lenticularis*	22.2
Common milkweed *Asclepias syriaca*	16.7
Black willow seedlings and saplings *Salix nigra*	16.7
Common Evening Primrose *Oenothera biennis*	16.7
Sullivant's Milkweed *Asclepias sullivanti*	16.7
Unidentified Asters *Aster* sp.	16.7
Marsh Smartweed *Polygonum coccineum*	16.7
Horseweed *Erigeron canadensis*	11.1
Common Ragweed *Ambrosia artemesiifolia*	11.1
Trailing Wild Bean *Strophostyles helvola*	11.1
Jimson Weed *Datura stramonium*	11.1
Riverbank Grape *Vitis riparia*	11.1
Long-leaved Ammannia *Ammannia coccinea*	11.1
Small Spikerush *Eleocharis smallii*	11.1
Asiatic Day Flower *Commelina communis*	5.6
Yellow Nutgrass *Cyperus esculentus*	5.6
Arrowleaf *Saggitaria latifolia*	5.6
Shining Nutgrass *Cyperus aristatus*	5.6
Halberd-leaved Rose Mallow *Hibiscus militaris*	5.6
Bur Cucumber *Sicyos angulatus*	5.6
Unidentified Forbes	11.1

$$\text{Frequency} = \frac{\text{\# fields for the plant}}{\text{total \# fields (18)}} \times 100\%$$

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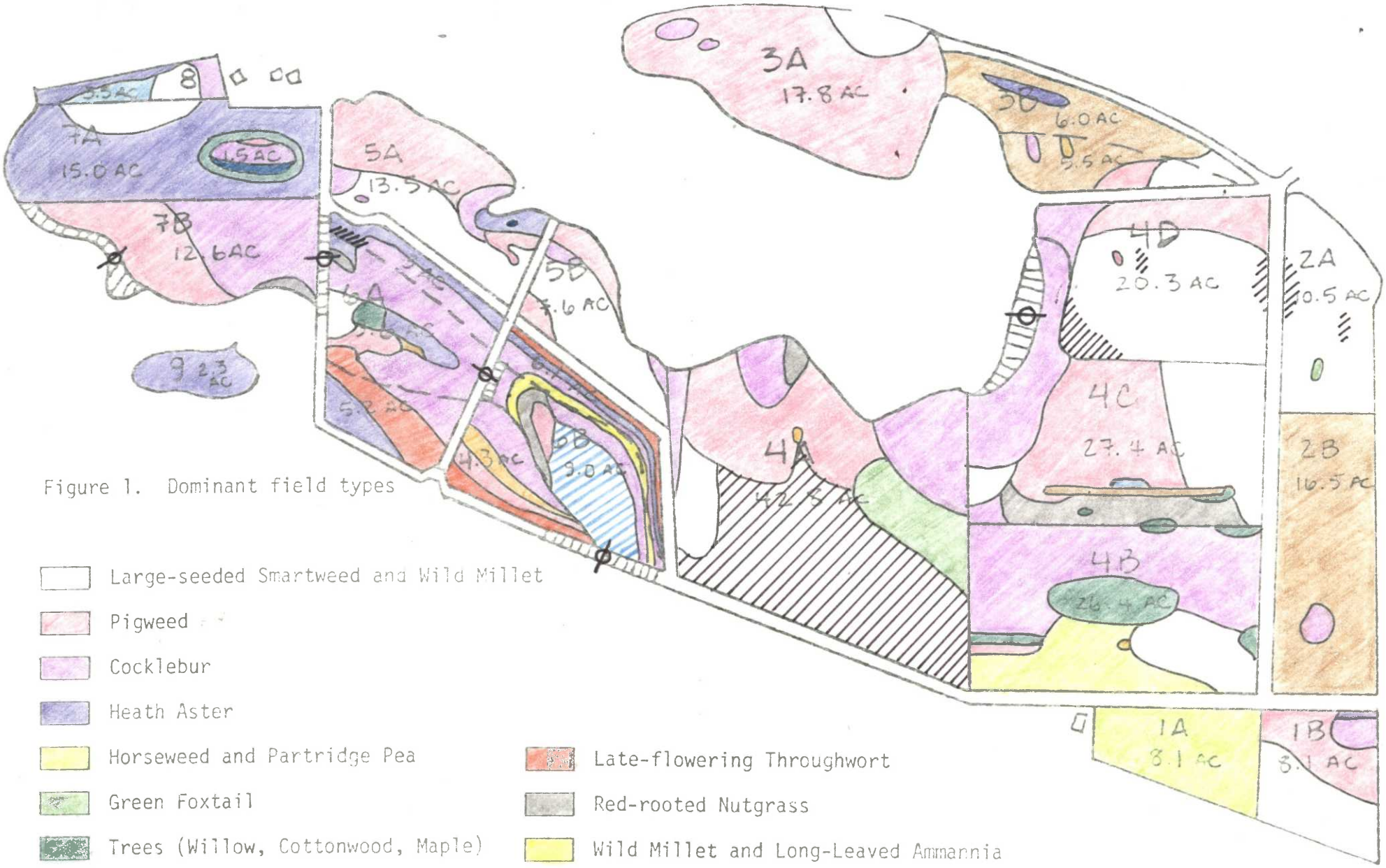


Figure 1. Dominant field types

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

ILLINOIS AND DES PLAINES RIVERS
FROM MOUTH OF THE ILLINOIS RIVER TO LOCKPORT, ILLINOIS

IN 52 SHEETS — SHEET NO. 12 — SCALE AS SHOWN

MILES 0 1/8 1/4 1/2 3/4 1

FEET 0 1000 2000 3000 4000 5000

U.S. Engineer Office, Chicago, Illinois, November 1, 1932

Submitted	Approved:
CAPTAIN, CORPS OF ENGINEERS, U.S.A. DISTRICT ENGINEER, ST. LOUIS, MO.	LT. COLONEL, CORPS OF ENGINEERS, U.S.A. DISTRICT ENGINEER, CHICAGO, ILL.
Drawn by: T.H.H. Checked by: E.R.S.	File No. I-51-25

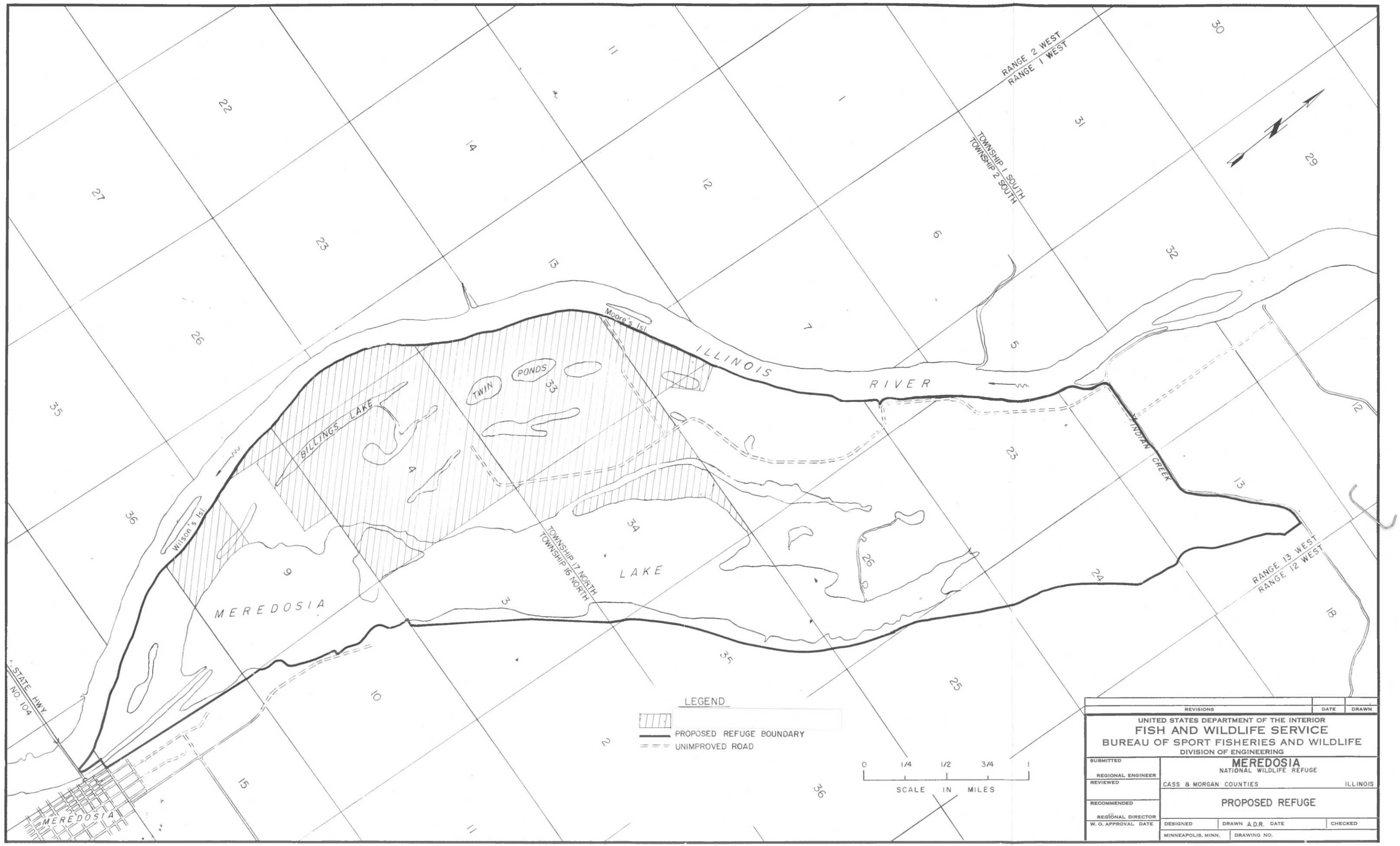
Note:
Vertical Datum Plane referred to 1929 General Adjustment U.S.C. & G.S. (Mean Sea Level).
River miles are shown thus: ⊙, with origin opposite U.S. Weather Bureau Gauge, Grafton, Ill..
Borings are shown thus: ● 233.
See additional notes on Index Map.

12 — 39°50′ — 90°39′ — 39°51 — WEST — 39°52′ — 90°38′ — 39°53′ — 39°54′ 90°37′ — 12

90°39′ — 39°49′ — 90°38′ — SOUTH — 90°37′ — 90°36′ — 39°48′ — 90°35′ — NORTH — 90°36′ — 39°54′ — 90°34′ — 90°33′ — 90°32′

Hambaugh Sch.
Perry Springs Sta.
Vondeventer Sch
Sand Ridge Sch.
LITTLE CREEK DRAINAGE AND LEVEE DISTRICT
McGEES CREEK DRAINAGE AND LEVEE DISTRICT
MEREDOSIA DRAINAGE AND LEVEE DISTRICT
HAMBAUGH LAKE
LONG LAKE
EAGLE ISLAND
BILLINGS LAKE
MEREDOSIA ISLAND
MEREDOSIA LAKE
SUMMIE LAKE (OLD BED)
COTTONWOOD LAKE (OLD BED)
SCOTT LAKE
CHEEK LAKE
TWIN PONDS
CHICAGO MEREDOSIA GUN CLUB
PUMP HOUSE
Blacksnake Bayou
Bayou Creek
Hancock Slough
Township 2 South
Township 3 South
Township 16 North
Township 17 North
Range 2 West
Range 1 West
SHEET NO. 11
SHEET NO. 11A
SHEET NO. 12A
SHEET NO. 13

12 — 39°48′ — 39°49′ 90°34′ — 39°50′ — 90°33′ 39°51′ — EAST — 39°52′ — 90°32′ — 39°53′ — 12



REVISIONS	DATE	DRAWN

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
DIVISION OF ENGINEERING

SUBMITTED REGIONAL ENGINEER	MEREDOSIA NATIONAL WILDLIFE REFUGE
REVIEWED	CASS & MORGAN COUNTIES — ILLINOIS
RECOMMENDED REGIONAL DIRECTOR	PROPOSED REFUGE
W. O. APPROVAL DATE	DESIGNED — DRAWN A.D.R. DATE — CHECKED
	MINNEAPOLIS, MINN. — DRAWING NO.

SHEET 1 OF 1

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

ILLINOIS AND DES PLAINES RIVERS
FROM MOUTH OF THE ILLINOIS RIVER TO LOCKPORT, ILLINOIS

IN 52 SHEETS | SHEET NO. 12 | SCALE AS SHOWN

MILES 0 1/8 1/4 1/2 3/4 1

FEET 0 1000 2000 3000 4000 5000

U.S. Engineer Office, Chicago, Illinois, November 1, 1932

Submitted: H. M. Harlee, Captain, Corps of Engineers, U.S.A., District Engineer, St. Louis, Mo.

Approved: Lamb Sullivan, Lt. Colonel, Corps of Engineers, U.S.A., District Engineer, Chicago, Ill.

Drawn by: H.K.H. Checked by: E.R.S. File No. I-51-22

Note:
Vertical Datum Plane referred to 1929 General Adjustment U.S.C.&G.S. (Mean Sea Level).
River miles are shown thus: ⊙, with origin opposite U.S. Weather Bureau Gauge, Grafton, Ill..
Borings are shown thus: • 233.
See additional notes on Index Map.

12 39°50′ 90°39′ 39°51 WEST 39°52′ 90°38′ 39°53′ 39°54′ 90°37′ 12

90°39′ 39°49′ 90°38′ 90°36′ SOUTH 90°37′ 90°35′ 39°48′ 90°36′ NORTH 90°35′ 90°34′ 39°54′ 90°33′ 90°32′

Hambaugh Sch.
Perry Springs Sta.
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Sand Ridge Sch.
MEREDOSIA
MEREDOSIA ISLAND
MEREDOSIA LAKE
LITTLE CREEK DRAINAGE AND LEVEE DISTRICT
McGEES CREEK DRAINAGE AND LEVEE DISTRICT
MEREDOSIA DRAINAGE AND LEVEE DISTRICT
HAMBAUGH LAKE
LONG LAKE
EAGLE ISLAND
BILLINGS LAKE
SUMMIE LAKE (OLD BED)
COTTONWOOD LAKE (OLD BED)
SCOTTY LAKE
CARTER LAKE
WILSON'S ISLAND
TWIN PONDS
CHICAGO MEREDOSIA GUN CLUB
GERBOLDT LAKE
Blacksnake
Stough
Hancock
Willow Cr.
Township 2 South
Township 3 South
Township 16 North
Township 17 North
Range 2 West
Range 1 West
Pump House
Levee
Ditch
Pond
Lake
Mile 75
SHEET NO. 11
SHEET NO. 11A
SHEET NO. 12A
SHEET NO. 13

12 39°48′ 39°49′ 90°34′ 39°50′ 90°33′ 39°51′ EAST 39°52′ 90°32′ 39°53′ 12

MEREDOSIA

NATIONAL WILDLIFE REFUGE
CASS & MORGAN COUNTIES, ILLINOIS

LOCATION MAP