CHAUTAUQUA NATIONAL WILDLIFE REFUGE
Cameron-Billsbach Unit
Havana, Illinois

MEREDOSIA NATIONAL WILDLIFE REFUGE
Meredosia, Illinois

ANNUAL NARRATIVE REPORT

Calendar Year 1988

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

REVIEWS AND APPROVALS

CHAUTAUQUA NATIONAL WILDLIFE REFUGE
Havana, Illinois

ANNUAL NARRATIVE REPORT

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Glenn E. Miller — Refuge Manager — 3/30/89 — Date

[signature] — Refuge Supervisor Review — 4-5-89 — Date

John R. Eadie — Regional Office Approval — 4/05/89 — Date

INTRODUCTION

Chautauqua National Wildlife Refuge was established on December 23, 1936, by Executive Order 7524 which authorized purchase of lands owned by the defunct Chautauqua Drainage and Levee District. The refuge is located in Mason County in central Illinois, approximately 200 miles southwest of Chicago.

Under pristine conditions, the area consisted of a series of interconnected lakes along the floodplain of the Illinois River above Havana, Illinois and was a haven for wildlife, particularly waterfowl. In the early 1900's, the area was diked, drained and converted to agriculture. However, flooding by the Illinois River proved disastrous and the drainage district ceased operations in 1926, leading to eventual Federal acquisition of the area.

In the 1930's, navigation dams were built on the Illinois River for barge traffic. The new nine foot waterway channel carried silt along with the barge traffic. Deposition of silt during flood conditions further reduced the productivity of the backwater areas.

After establishment of the refuge, the levees were restored and water control structures installed to control the effects of the Illinois River. The refuge contains a total of 4,488 acres of which Lake Chautauqua makes up 3,405 acres. There are approximately 900 acres of bottomland hardwoods and 150 acres of forested uplands. The refuge has become an important link in the chain of resting, feeding and wintering areas for migratory waterfowl in the Mississippi Flyway. The importance of the refuge for waterfowl will continue to increase as additional wetlands in the Illinois River Valley disappear each year.

Some of the greatest concentrations of waterfowl along the Illinois River can be observed during the fall and winter months. Peak concentrations of over 1,500,000 ducks (1944) and 40,000 geese have been recorded on the refuge. However, siltation and pollutants from the river have eliminated the once abundant aquatic plants and animals resulting in a dramatic decline of waterfowl use. Duck use has declined to less than 2 million birds annually in recent years. Inability to completely drain the lake for use as a moist soil unit is also a factor. Up to 57 bald eagles have also been observed on the refuge.

Fishing is the main form of public use followed by wildlife observation. Waterfowl hunting is permitted on 745 acres. Public use facilities include an interpretive nature trail, a 100' observation tower, a boat ramp, picnic tables and several comfort stations.

Chautauqua also manages the 1,709 acre Cameron Unit in Marshall County and the Meredosia National Wildlife Refuge containing 1,850 acres in Morgan and Cass Counties, Illinois.

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Severe drought hit this area. Extremely hot summer and precipitation was the second lowest on record. (Section B)

Successful in obtaining flowage easements for construction of new weir in Quiver Creek. (Section C. 2)

No restorable natural wetlands were found on CRP lands in five county area. (Section C. 3)

Changes to the Fishery Management Plan were approved. (Section D.2)

Refuge Assistant Clanin and Maintenance Worker Watts received Special Achievement Awards. (Section E. 1)

Another accident-free year. (Section E. 6)

Waterfowl use days were the lowest on record for Chautauqua Refuge and the Lower Illinois River Valley. (Section G. 3)

New weir installed in Quiver Creek. (Section I. 1)

Repairs completed on 3' x 3' water control structure, radial gate water control structure, observation tower, and 720 feet on the west levee. (Section I. 2)

Computer installed and operating. (Section I. 6)

B. CLIMATIC CONDITIONS

Climatological data for the refuge is obtained from an NOAA approved weather station located two miles south of the refuge headquarters. Mr. Glen Oest has been keeping the data since 1977 at this location. Records have been kept at the refuge since 1941.

The year started off with average precipitation for the first quarter. Then the drought of '88 started. In the next three months, the area received only 3.27 inches of rain, compared to a normal 10.66 inches. Things did not look good for the local farmers. In an attempt to try to flood out some of the willow encroachment which resulted from recent years dewatering, a decision was made to maintain high water levels in Lake Chautauqua. The west levee spillway elevation is also too high to adequately drain the lake. This leaves a large number of fish in the lake, and a drawdown would almost guarantee a major fish kill.

The drought worsened in July, August and September as a scant 4.47 inches of rain came, while an average period would have brought 10.39 inches. This was accompanied with average monthly high temperatures of over 90 degrees F. for July and August and over 82 degrees for June and September.

Although moist soil plant production was excellent throughout the Illinois River Valley, flooding the parched ground for the migration period proved to be difficult. One state area pumped their moist soil acreage for weeks, while the water simply drained into the sand.

October finally brought relief from the heat, though little rain fell. Both November and December were above average in precipitation, but it was too little too late. The year 1988 was the second driest on record at Chautauqua, and the driest since 1950.

During the better part of January, the lake was frozen completely, except for the occasional ground spring openings. By January 2, the lake was 15% open. With temperatures near 60 degrees, the lake continued thawing into February and was 40% open on February 1.

Another cold stretch hit for 11 days, with a low reading of -14 degrees F. on February 13. The lake began freezing over again and was 85% ice covered on February 17. Warm weather arrived for good after that and the lake was completely free of ice by March 7. A 1/4" layer of ice formed over 60% of

the lake on March 17 after temperatures dipped into the teen's for a couple days.

Temperatures did not get cold enough again to put any ice on until early December when low's hit single digits. The lake was completely iced over on December 12. Then the temperatures soared up to 60 degrees on December 19, accompanied by rain, and the next day the north pool was 50% open and the south pool 25%. Daytime temperatures remained above freezing most of the remaining days, while nighttime temps dropped as far as 0 degrees. Ice conditions stayed about the same.

Monthly weather data is summarized below:

		Precipitation		
Month	1988	Average*	Deviation	Snow
January	2.27	1.67	.60	1.5
February	1.36	1.65	- .29	14.0
March	2.47	3.06	- .59	2.5
April	1.17	3.63	- 2.46	
May	1.28	3.97	- 2.69	
June	0.72	4.06	- 3.34	
July	1.05	3.61	- 2.56	
August	2.70	3.30	- .60	
September	1.15	3.48	- 2.33	
October	1.64	2.94	- 1.30	
November	4.89	2.63	2.26	
December	2.81	2.32	.49	7.4
TOTALS	23.51	36.32	-12.81	25.4

*Refuge records 1941-1988

Temperatures (1988)

Month	Average High	Maximum	Average Low	Minimum
January	31.7	59	14-0	- 9
February	34.3	62	14.6	- 14
March	50.7	75	29.5	18
April	64.6	83	38.2	29
May	79.8	92	50.1	35
June	88.8	104	59.8	45
July	92.0	101	64.5	52
August	91.9	104	66.2	51
September	82.6	93	52.6	38
October	62.3	80	36.8	20
November	50.5	71	31.6	21
December	39.7	60	19.3	0
Average	64.2		39.9	

C. LAND ACQUISITION

1. Fee Title

Nothing to report.

2. Easements

Flowage

A public meeting was held in June to discuss upstream effects of the proposed Quiver Creek weir structure. The spillway of the proposed new weir was higher than the existing structure thus new flowage easements were necessary. Six of the seven upstream owners affected by the proposal attended the meeting. There was no opposition to the project voiced at the meeting. Some members of private hunting clubs wanted the structure at a higher elevation; however, elevations higher would place 100 year flood levels into cropland. The one remaining landowner was contacted by telephone. He also was not opposed to the project.

Dick Johnson, Realty, Regional Office, wrote up flowage easements to be signed by affected landowners for the predicted 100 year flood levels from a weir structure with a 739' MSL spillway. Signed flowage easements were obtained for $1 from Dr. J. W. McHarry,

John Meyer, Kenneth McHarry, Eugene McHarry, Jack Hills, et al, Donald Patterson and Dr. Albert Martens. Dr. Martens at first refused to sign the agreement once he obtained it in hand as he wanted a written guarantee that water levels would be held up to 439' MSL during the hunting season. It was explained to him that the main purpose for the structure was to provide water to the refuge first if needed. He held out until after the new weir was completed and in operation. He was told we couldn't legally hold water levels higher than 437.5' MSL (the level under the old easement) until he signed the easement. Since he needed additional water in his hunting area, he finally signed the agreement in mid-November.

The flood level information was obtained by Warzyn Engineering, Inc. from studies and survey information at a cost of $36,767.49.

Access

A construction access easement was also obtained from Dr. J. W. McHarry for $1. Most of the work on the weir was completed from the south access across Dr. McHarry's land.

FMHA Conservation Easements

Chautauqua Refuge was assigned to handle Farm Bill activities in Marshall, Mason, Scott, Cass and Morgan counties. FMHA inventory lands in Fulton County were also handled out of this office since the county is just across the river and the coordinator assigned to the county was 200 miles to the south.

The Voorhees FMHA inventory land in Fulton County is a farm mostly on strip mined land prior to reclamation laws. There are eight wetlands created by mining activities. Although artificially created, the wetlands have the nature of natural wetlands with good interspersion of cattails. Water quality is good in the area. Because of the value of these areas to wildlife and the directive to protect all wetlands, conservation easements were proposed. Also proposed were the wetland restoration of two of the wetlands and enhancement of another. State FMHA officials have balked at the proposals saying since they are manmade they are not included in the Farm Bill provisions. It had not been resolved by year's end.

3. Other

Conservation Reserve Program Wetland Restoration

Letters were sent to all CRP participants in the counties assigned to Chautauqua Refuge providing information on the Service's program of restoring drained wetlands on CRP land. No drained wetlands were identified to be restored. Soils and topography within the CRP lands in this area are such that no natural wetlands existed. There was considerable response for improving dammed farm ponds. Most of them have silted in to the extent they no longer support fish. They appear to be good wetlands for waterfowl in their present state.

D. PLANNING

1. Master Plan

Nothing to report.

2. Management Plan

The Marsh and Water Management Plan was revised and approved.

The Fishery Management Plan was also revised and approved. Major changes were the opening of Lake Chautauqua to outboard motors up to 25 HP and the opening of the area to bank fishing and commercial fishing except during the fall waterfowl migration period. Increasing the horsepower limits from 10 to 25 HP was needed for safety reasons. The lake can get treacherous when accompanied with high winds. The larger motors will help chances of returning safely to shore.

Management Plan Part 3 was completed and approved.

The annual Water Management Plan was submitted and approved by the Regional Office.

3. Public Participation

A public meeting was held in conjunction with the proposed Quiver Creek weir project. (Section C.2). Public comments were solicited on the Quiver Creek Environmental Assessment. No comments were received.

Help was solicited and received for ideas and comments on deficiencies and suggested improvements for handicap accessibility to the refuge public facilities.

4. Compliance with Environmental and Cultural Resource Mandates

An Endangered Species Consultation Request, Environmental Assessment, Finding of No Significant Impact and an Environmental Action Memorandum were completed on the Quiver Creek weir project.

Permits were obtained from the U. S. Army Corps of Engineers, Illinois Environmental Protection Agency, and the Illinois Department of Transportation - Division of Water Resources - for the Quiver Creek weir replacement and West Levee Rehabilitation projects.

Categorical Exclusions were submitted for the West Levee Rehabilitation and Observation Tower Repair projects.

4/19/88 R984-17 GRM

Archeologists conducted a shovel probe investigation on the refuge and turned up...what else, a beer bottle at Goofy Ridge. Shovel testing at 25 foot intervals on the upland above the cutbank was used for the survey. Plowed fields adjacent to the refuge were visibly searched for evidence of archeological materials. Twenty-three historic and twenty-six prehistoric items were identified; however, the final report has not yet been received. The historic material recovered reflects the intensive early 20th century residential occupation of the area.

The archeological survey for the refuge funded last year was completed this summer.

5. Research and Investigations

Warzyn Engineering, Inc., Minneapolis, Minnesota, was hired to perform a hydrologic and hydraulic analysis for the proposed new water control structure on Quiver Creek. The primary objective of the analysis was to determine the backwater effects caused by the proposed structure. The crest elevation of the proposed spillway

was 439.0' MSL which is 1.5 feet higher than the old structure. The information was needed to obtain Corps of Engineers and Illinois Division of Waters permits as well as 100 year flood predictions for the necessary flowage easements. (Section C.2).

In December 1987, Dick Ruelle with the Service's Division of Contaminant Evaluation at Rock Island, Illinois, collected sediment samples from Lake Chautauqua. Larvae fathead minnows (Pimephales promelas and Daphnia marna were exposed to water that had set 24 hours after having been mixed 3 parts water to 1 part sediment sample. There was no Daphnia mortality; however 25 percent of the minnows died when exposed to water from the sediments taken at the 12 - 18 inch depth and 15 percent of the minnows died after exposure to water from sediments at the 0 - 6 inch depth. In bioassays where fish mortality occurred, total ammonia and unionized ammonia concentrations were elevated in the bioassay waters and were suspected as the main cause of mortality. The ammonia probably was discharged in sewage effluents or reached high concentrations in the sediments when nitrogen wastes were reduced under anaerobic conditions. Total ammonia at the 0 - 6 inch depth was 1.8 mg/l while unionized ammonia was .11 mg/l. At the 12 - 18 inch depth the readings were 4.3 mg/l and .27 mg/l, respectively.

In 1985, Chautauqua was selected as one site to test reinforced fiberglass boundary signs over a three year period. After the final inspection this year, overall the signs appeared to weather little.

9/9/88 Slide GRM

Test fiberglass boundary signs weathered little over a three year period. The rust stains came from the nongalvanized washers that were used.

6. Other

Environmental Management Program

Created through enactment of the Water Resources Development Act of 1986, the Environmental Management Program (EMP) is designed to provide a balance between navigation and environmental uses of the Upper Mississippi River System. The Illinois River is included in that system. The construction estimate for the Second Lock at Lock and Dam 26 near Alton, Illinois

is $213.0 million. EMP expenditures through the Corps of Engineers are proposed to be $191.45 million over a 10 year period ending in FY 1997.

Two projects on Chautauqua Refuge were proposed as EMP projects and submitted to the Fish and Wildlife Interagency Committee (FWIC) for ranking.

Chautauqua Phase I EMP project as proposed consisted of filling the hole in the cross dike, dredging 3 - 4 feet deep channels in the upper pool, construction of a water control structure on the cross dike, and the construction of a 2-way pumping station located on the upper pool. The FWIC ranked this project in Category A, the highest category although its numerical rating was at the low end of Category A. Later the Illinois Department of Conservation asked to have the Liverpool sidechannel cleanout added to the project to benefit fisheries. This was done and accepted by COE without further review. The COE planners have begun preplanning work on the project which includes preliminary design work so they can obtain a cost analysis.

Chautauqua Phase II EMP project was proposed for the lower pool. The plan called for removal of 3 - 5 feet of soil within the pool creating channels and deep areas. The excavated material would be placed on the perimeter levee. Islands would also be constructed to reduce wave action. Construction of a water control structure was also called for to obtain maximum drawdown of the pool. The FWIC ranked this project in Category C which in effect killed the project as there are enough projects ranked in Category A to use up EMP monies even if the program is fully funded.

E. ADMINISTRATION

1. Personnel

5 2 4 3

1. Eric Sipco, Refuge Manager, GS-485-11
   8/17/86-1/30/88..... PFT
2. Glen R. Miller, Refuge Manager, GS-485-11
   EOD 1/31/88..... PFT
3. Kevin Sittauer, Refuge Manager, GS-485-7
   EOD 11/8/87..... PFT
4. Alice Clanin, Refuge Assistant (Typing), GS-0303-5
   EOD 6/20/66..... PPT
5. Charles W. (Bill) Watts, Maintenance Worker
   WG-4749-8, EOD 9/60..... PFT

Eric Sipco transferred to Catahoula NWR in Louisiana as project leader effective January 31, 1988. Glen Miller transferred in as project leader from the Litchfield Wetland Management District in Minnesota also effective January 31.

Refuge staffing patterns have remained constant as shown in the table below:

	Permanent			Total
	Full Time	Part Time	Temporary	FTE
FY 1988	3	1	-	3.6
FY 1987	3	1	-	3.6
FY 1986	3	1	-	3.2
FY 1985	3	1	-	3.6
FY 1984	3	1	1	3.3

R-985-7

Awards

Alice Clanin received a Special Achievement Award for her outstanding performance in 1987 and her efforts in making the Thompson Lake Workshop a success. She again received a Special Achievement Award late in the year awarding her performance in FY 1988.

R-984-12

Bill Watts received a Special Achievement Award in January for the dozer work he did in restoring wetlands on CRP lands in Minnesota in 1987.

Training Workshops

Public Applicator's Pesticide Licensing	2/18-19	Springfield, IL	Sittauer Watts
North American Wood Duck Symposium	2/20-22	St. Louis, MO	Sittauer
Law Enforcement Refresher Training	2/22-26	Fort McCoy, WI	Miller Watts
Water Quality Workshop	3/8	Peoria, IL	Miller
Basic Refuge Manager Training	4/18-5/13	Blair, NE	Sittauer
Rail Population Censusing Seminar	4/13	Peoria, IL	Miller
WordPerfect Tutorial	April	Office	Clanin

How to Operate the IBM PS/2 PC DOS Version Tutorial	April	Office	Clanin Sittauer
Regional Office/Illinois DOC Coordination Meeting	5/18	Jake Wolf Fish Hatchery, Manito, Il	Miller
EEO - Its Place in the Federal Government	May	Correspondence Course	Miller
CPR Refresher Training	5/21	Havana, IL	Sittauer
Red Cross/Multimedia First Aid Course	5/26	Peoria, IL	Sittauer
R:Base System V and R:Base for DOS Tutorials	July	Office	Clanin Sittauer Miller
Dragging for Drowning Victims	8/20	Havana, IL	Sittauer
NonGame Bird Workshop	8/10-11	Minneapolis, MN	Miller Sittauer
Division II Project Leaders Meeting	8/22-25	Excelsior Springs, MO	Miller Sittauer
Revolver Requalification	9/7	Crab Orchard NWR	Miller Watts
WordPerfect Use and Applications	9/8-12/17	Spoon River College Havana, IL	Clanin

2. Youth Programs

Youth Conservation Corps

Left: Shannon Horner Right: James Terrell

For the sixth year in a row a YCC program was held at Chautauqua National Wildlife Refuge. It began on June 6 and ran through July 29. A total of 32 applications, including 28 from males and 4 from females, were received. One female and one male were selected from a random drawing. Due to financial shortfalls, the crew leader was the assistant manager for seven weeks and the maintenance worker for one.

Seventeen different projects were completed, the most time consuming of which was the painting of all the refuge signs. These six signs were taken down and brought into the shop for the work. Although more time was planned for other jobs, this project came in handy on the numerous days that extremely high temperatures made outdoor physical labor dangerous.

Other tasks completed included the release of 57 pin oaks at Meredosia NWR, litter pickup, fence repair, wood duck box checks, wood duck banding, installation of a pipe gate and other general maintenance and cleanup. The required amount of environmental education was often provided by staff during the course of work, explaining the goals and biological justification of the tasks. Eight films were also checked out from the Regional Film Library.

Overall, the two employees were good workers who were usually worth more than the minimum wage we paid them. We did have an extremely hot, dry summer that oftentimes precluded the completion of field projects for safety reasons. There were really no negative aspects to the projects, other than the typical whining about safety precautions by enrollees the first week. Once they were better educated about the benefits of a safe work environment, they initiated the necessary precautions themselves.

The Youth Conservation Corps continues to be a valuable tool for refuge managers. One suggestion to managers who had their enrollees reduced to a fraction of the former programs may be to consolidate. An example would be for two refuges with two enrollees each to combine the programs and place them at either station on alternating years. In that way, the transfer and combining of funds associated with the enrollees could better offset the salary of a crew leader, and free the assistant manager for summer field work.

4. Volunteer Program

Audubon members from Peoria provided bird observations during the year. The data is valuable for compiling quarterly reports, updating the bird list, and providing information on species to the public. The group also sponsored the spring breeding bird survey and Christmas bird count on the refuge.

The public was encouraged to participate in a roadside cleanup on Federal Lands Day, September 10. Only two people showed up but in four hours had filled the back of a pickup with debris and garbage along a one mile stretch of road bordering the refuge.

9/10/88 Slide GRM

While not many people participated in litter pickup on Federal Lands Day, it was rewarding for those who came out. This young lady not only had the satisfaction of providing worthwhile labor but also found a $5 bill among the litter.

No. Volunteers	Job	Total Hours Contributed
4	Wood Duck Banding	20
2	Litter pickup	8
4*		28

*Number of individuals, 2 contributed in both tasks.

5. Funding

Refuge funding for FY 88 totaled $511,394. The total included $145,100 O&M core funding, $39,300 construction projects, $148,777 RP funds, $58,700 contaminant funds, $101,117 supplemental flood damage appropriations and

$3,400 for the YCC program. The refuge also received $15,000 from the Regional Office late in the year to cover moving costs. Of the O&M core funding, $7,100 was used for Farm Bill activities.

A five-year comparison of funding is shown in the following table:

Fiscal Year	Funding (000) 1260	1210	1510	2821	8610	Total
1988	$ 406.9	$ 3.4	$	$ 101.1	$ 3.2	$ 514.6
1987	229.7	3.5			3.2	236.4
1986	245.0	3.9	.6	43.8	1.0	294.3
1985	141.8	3.9			2.0	147.7
1984	112.0	7.5		200.0	2.2	321.7

6. Safety

Monthly safety meetings were held throughout the year on a variety of topics. Due to the refuge's small staff size, there was no standing safety committee. Instead, one staff member was responsible for conducting the monthly safety meeting, reviewing any safety related correspondence received during the month, evaluating safety practices, and identifying any new hazards since the last meeting. Assignments were rotated monthly.

The following were topics for safety meetings this year: accident prevention, job safety, teamwork safety, heavy equipment, clinical rabies, preventable accidents, hunting, chainsaws, and drugs.

4/22/88 R-984-22 GRM

Maintenance Worker Watts used his expertise in fishing to catch this broken limb hanging over the county road at the Rountree Area.

4/22/88 R-984-23 GRM

Road safe once more from potential identified flying objects.

9/88 Slide GRM

A local electrician, Joe Griffin & Sons, completed replacement of 66 fluorescent light ballasts at a cost of $1,772.05. The old ballasts did not have wording that they contained no PCB's. The contractor took the old ballasts for disposal.

The 4' x 8' recognition sign at Goofy Ridge was removed. This sign was too close to the road and blocked the view from a nearby side road.

A Type 3 storage magazine with inside dimensions of 20" x 14" x 26" was purchased for $483.40 from Dooley Brothers, Peoria, to store the refuge supply of scare devices with explosive charges.

A 1,000 gallon underground fuel tank near the office was disposed of. The tank was once used for fuel oil in heating the office building and was abandoned in 1980 when a gas furnace was installed. The State of Illinois requires an annual fee of $100 for each underground fuel tank with the money to be used to clean up areas contaminated by leaking tanks. This, plus the Environmental Protection Agency's new regulations on underground storage tank systems, made it necessary to eliminate the tank by mid-December. Approximately 550 gallons of old fuel oil sludge remained in the tank.

Contents of the tank were pumped out and taken by Lenz Oil Peoria, Inc. Judy Wallace, Division of Fire Protection, Office of State Fire Marshall, inspected the tank prior to removal and ok'd its removal. The old tank was lifted out by Forrest Davis, Davis Construction, using a frontend loader and was taken by Lenz Oil Peoria, Inc.

A safety inspection was conducted by Tom Worthington during the Operations Inspection in April. No serious deficiencies were noted.

7. Technical Assistance

The Service was asked to participate in two Commenced Determinations with ASCS County Committees. In the Lakamp determination in Scott County, it was found that the proposed work did not affect wetlands. The Golden determination in Tazewell County was proven to be commenced.

Corps of Engineers workshops were attended in St. Louis and Peoria on the Economic Impact of Recreation on the Upper Mississippi River System. Input was provided by refuge staff on public use facilities and current use figures along the Mississippi and Illinois Rivers.

F. HABITAT MANAGEMENT

2. Wetlands

Lake Chautauqua was in flood stage and completely frozen over at the beginning of the year. Mild temperatures in Mid-January started a thaw and by January 21, the lake was 15% ice free. By March 7, the lake was completely ice free.

The river flooded onto the refuge off and on until April 12 and did not flood again after that date. Two of the radial gates were opened May 16 to drop water levels in the lake low enough to get water off the trees in Melz Slough. Water level at that time was 435.72' MSL. By May 26, levels had dropped to 434.58' MSL. The radial gates were closed at that time.

In order to slow the advance of willow into the lake from recent summer drawdowns, the decision was made to hold water levels high enough to try to drown them out. The higher water levels were hoped would also encourage

the growth of sago and lotus which had been noticed in the upper pool in recent years.

Some mortality of the willow was noted; however, the extent will not be known until the pools are dewatered in 1989. One bed of sago was located in early summer but later disappeared. The lotus beds in the upper pool increased in size this year to approximately 142 acres.

The higher-than-normal temperatures coupled with little precipitation kept the evaporation rate higher than output of the springs. Lake levels reached 433.94' MSL on July 11. Stoplogs were then put into the old Quiver Creek weir structure. The structure leaked so badly that the flow into the lake was just sufficient to keep up with the evaporation loss. Some rain was received which brought the lake level up to 434.45' MSL on August 30. The stoplogs in the weir were pulled August 31 to facilitate repair work to the 3' x 3' screw gate structure.

Water levels again dropped until work was completed on the 3' x 3' structure and water again diverted into the lake October 21 with the water level at 434.22' MSL. The structure was closed October 26 to keep water in the lake as the creek levels were going to be lowered with the removal of the old weir structure. The new Quiver Creek weir structure was operational October 31 and the 3' x 3' structure was again opened to allow water into the lake.

The dry year reduced the flow into the creek to a point that by opening the 3' x 3' structure, the entire flow of the creek was diverted into the lake. To keep some water in the creek below the weir for existing aquatic animals, the 3' x 3' structure was only opened 14 inches.

By December 12, the lake was completely frozen over. Warm temperatures and rain on December 19 and 20 began opening areas of the lake again. The lake opened about 90% and remained that size until the 28th when it froze over completely. It remained in that state through year's end.

Lake Chautauqua Elevations (ft. MSL)

Month	Average Elevation	High	(Date)	Low	(Date)	Differential (feet)
January	438.60	439.80	(01)	437.14	(15)	2.66
February	438.00	438.80	(08)	436.97	(17)	1.83
March	436.54	437.40	(01)	436.26	(24)	1.14
April	439.16	441.52	(12)	436.44	(01)	5.08
May	435.51	436.75	(01)	434.50	(31)	2.25
June	434.28	434.50	(01)	434.07	(30)	.43
July	434.02	434.07	(31)	433.94	(13)	.13
August	434.24	434.46	(31)	434.07	(03)	.39
September	434.37	434.45	(01)	434.29	(30)	.16
October	434.27	434.32	(02)	434.22	(14)	.10
November	434.64	435.02	(30)	434.26	(01)	.76
December	434.35	435.93	(31)	435.03	(01)	.90

G. WILDLIFE

2. Endangered Species

Chautauqua Refuge is host to two federally endangered species. One is the peregrine falcon, seen occasionally during migration. It was seen in 1983, and last in 1986.

The northern bald eagle is a winter resident at the refuge, and populations fluctuate with waterfowl populations and ice conditions. Total use this year declined, despite a peak of 53 birds in February, the second highest on record. Use days were 1,653, down from 2,530 in 1987. The last eagle seen, a lone adult, was sighted on March 30.

The first eagle of the fall migration was seen on October 24. Numbers increased through the end of the year with a high of 23 (11A/12I) on December 23. Fall use days through December 31 totaled 720, down significantly from last year's 1,180. Decreased use is attributed to low numbers of waterfowl utilizing Chautauqua Lake and a later than average fall migration. Lake ice conditions also play a big part in eagle use on the refuge.

Quiver Creek, which is the water source of the lake and runs through part of the refuge and Quiver Lake adjacent to the south end of the refuge, also receive use from bald eagles. The peak on Quiver Creek was

12 (7A/5I) on December 5. The peak on Quiver Lake was one week earlier on November 28 with one adult and two immatures.

Northern Bald Eagle Peak Population
by Month (Adults/Immatures

Chautauqua NWR

	1988-89	1987-88	1986-87	1985-86	1984-85
September				1/ 0	
October	1/ 0	2/ 1	1/ 2	3/ 2	1/1
November	13/ 4	7/ 5	13/ 6	6/ 5	10/ 7
December	11/12	14/11	21/27	13/10	10/12
January		13/ 6	31/23	11/ 4	15/ 6
February		34/19	10/10	19/10	8/ 6
March		8/ 4	14/ 8	10/ 8	11/ 6
Peak Numbers		53	54	29	22

Quiver Creek

	1988-89	1987-88	1986-87	1985-86	1984-85
October		1/ 0	1/ 0	1/ 0	
November	4/ 1	3/ 1	4/ 1	2/ 1	2/ 1
December	7/ 5	8/ 3	5/ 3	6/ 4	2/ 3
January		7/ 2	4/ 3	9/ 5	5/ 4
February					6/ 1
March			3/ 1		4/ 2
Peak Numbers		11	8	14	9

Northern Bald Eagle Use Days

	1988	1987	1986	1985	1984
January-March	933	1,350	1,153	1,425	1,265
April-September			7		
October-December	720	1,180	1,220	1,260	735
	1,653	2,530	2,380	2,685	2,000

Chautauqua has, in the past, supported 18 of the 33 bird species listed as endangered by the State of Illinois. The four most common species are listed in the following tables.

State/Federal Endangered Use Days

Species	1988 Use Days	Peak Population	Current 5-Year Average
Great Egret	10,202	150	15,720
Double-crested cormorant	35,504	510	10,646
Northern bald eagle	1,653	53	2,176
Black-crowned night heron	2,360	55	2,126
Northern harrier	100	2	357
Osprey	40	2	47
	49,859	772	31,072

State/Federal Endangered Use Days

Species	1987	1986	1985	1984
Great egret	9,960	16,985	16,995	24,460
Double-crested cormorant	3,125	6,375	6,690	1,535
Northern bald eagle	2,160	2,380	2,685	2,000
Black-crowned night heron	1,680	2,019	3,095	1,475
Northern harrier	58	-	775	870
Osprey	76	74	30	15
	17,059	27,833	30,270	30,355

Of due notice is the great increase in the number of cormorants using the refuge this year. The figures for the increase in use days are a bit misleading. In the past, use days figures were garnered from the aerial census taken by the Illinois Natural History Survey. The cormorants use an area that is not always easily visible to aircraft, and the time of the flight often falls when the birds use another area to the north of the refuge. However, it is believed cormorants are making a general comeback in the region, and Chautauqua's figures attest to it. There have also been cormorants nests observed at Clear Lake, just north of the refuge. Although none were successful, this again points to an increase in the population in this area.

Other species will be more thoroughly covered in their respective categories.

3. Waterfowl

Waterfowl populations and related use days are taken from the weekly aerial census figures gathered by the Illinois Natural History Survey. Our Wildlife Inventory Plan was amended this year to double the figures of the Survey for actual populations. This was based on recommendations from Division Biologist Gerald Cummings after discussions with Frank Bellrose who is yet with the INHS part time. However, refuge personnel coordinated their census by boat with the Survey's aerial census and found that this doubling factor was not necessary.

The first flight of the calendar year is the midwinter count during the first week in January. Spring surveys were not flown again this year due to lack of funds so all figures were from ground or boat censuses. Flights resume in the fall, with two in early September. During the months of October and November, aerial surveys are conducted each week. Two additional flights are made in December.

The spring peak was 12,010 ducks on March 17, which was well over last year's mark of 3,800. The mallards peaked at 5,625 on the same day. Total spring duck use days was the highest in five years, and over three times that of 1987.

Spring goose use also increased over last year, showing a 127% gain over 1987, with 38,065 use days. Canada geese peaked at 2,500 on February 29. This was an increase of 900 over last year, but still below the 5-year average of 25%. Snow geese peaked at 100.

Water levels were kept up this year in an attempt to contain willow encroachment, and because the west spillway elevation is not low enough to allow complete drainage of the lake.

As could be expected then, second and third quarter use days were higher than last year, due to the available water. The raised water level also minimized moist soil plant production, however, and fall use by waterfowl declined correspondingly.

Aerial surveys began September 6, with a total of twelve flights through December 12. Ducks peaked at 23,445 on November 7, two weeks before the Lower Illinois Valley peak of 221,540. This is the lowest peak on record for Chautauqua and the Lower Illinois River Valley.

Many state and privately-owned waterfowl areas in the vicinity chose to draw down this year. Moist soil plant production was excellent but the drought made reflooding of these areas very difficult. Parched soils soaked up the water, and it took more than two weeks of pumping in some spots before the soil was even saturated. If enough water was available for waterfowl, these areas were used heavily during migration, but at a very high cost.

The following charts and graphs display waterfowl use over the last several years.

Peak Spring Waterfowl Population by Species
Chautauqua NWR

	1983	1984	1985	1986	1987	1988	5-Year Average 1983-1987
MALLARD	7,750	12,280	2,030	5,675	2,075	7,000	5,962
BLACK DUCK	180	220	45	310	400	330	231
GADWALL	900	175	60	185	40	50	272
PINTAIL	975	775	175	925	450	200	660
GREEN-WINGED TEAL	850	125	275	75	75	50	279
BLUE-WINGED TEAL	1,700	980	700	75	450	125	781
AMERICAN WIGEON	3,200	1,450	400	1,000	200	100	1,250
NORTHERN SHOVELER	1,200	1,350	400	10	600	250	712
WOOD DUCK	135	175	155	175	200	200	168
REDHEAD	700	150	175	235	250	350	232
RING-NECKED DUCK	1,480	1,960	640	1,500	500	250	1,216
CANVASBACK	900	4,025	900	555	250	2,000	1,026
LESSER SCAUP	3,425	7,400	2,400	1,465	500	2,700	3,038
BUFFLEHEAD	265	100	115	25	200	20	141
RUDDY DUCK	250	300	585	1,370	80	350	517
COMMON MERGANSER	310	510	325	1,050	500	800	539
RED-BREASTED MERGANSER	--	50	10	275	10	50	69
HOODED MERGANSER	90	140	70	75	75	15	90
COMMON GOLDENEYE	1,040	990	615	875	1,100	250	924
SNOW GOOSE	350	180	135	25	5	100	139
CANADA GOOSE	2,130	3,680	1,250	8,000	1,600	2,500	3,332
TUNDRA SWAN	--	10	--	2	--	--	2
MUTE SWAN	--	--	--	--	1	--	--

Peak Fall Waterfowl Population by Species

Chautauqua NWR

	1983	1984	1985	1986	1987	1988	5-Year Average 1983-1987
MALLARD	68,425	71,830	45,450	35,000	38,000	19,000	51,737
BLACK DUCK	915	1,210	215	500	400	300	648
GADWALL	640	1,580	1,435	1,050	1,500	125	1,241
PINTAIL	2,675	3,750	13,850	6,500	6,900	2,800	6,735
GREEN-WINGED TEAL	1,950	3,575	6,700	1,250	1,900	800	3,075
BLUE-WINGED TEAL	3,190	4,150	12,525	1,235	300	1,400	4,280
AMERICAN WIGEON	2,200	6,400	19,900	8,000	7,200	1,700	8,740
NORTHERN SHOVELER	180	290	1,350	350	800	60	202
WOOD DUCK	2,000	300	1,030	2,000	5,000		2,066
REDHEAD	150	100	300	75	300	80	185
RING-NECKED DUCK	500	1,500	1,180	3,600	900	350	1,536
CANVASBACK	350	600	650	350	600	450	510
LESSER SCAUP	930	2,865	3,130	3,500	2,300	2,200	2,545
BUFFLEHEAD	100	250	1,000	600	400	450	470
RUDDY DUCK	250	1,350	1,100	1,300	1,000	400	900
COMMON MERGANSER	75	85	465	450	250	1,400	265
RED-BREASTED MERGANSER	30	40	80	60	15	20	45
HOODED MERGANSER	30	50	85	125	140	20	62
COMMON GOLDENEYE	225	375	1,700	1,300	675	700	855
CANADA GOOSE	820	2,610	10,895	1,800	3,100	2,200	3,845
SNOW GOOSE	2,040	4,500	6,125	2,000	2,500	2,000	3,433
WHITE-FRONTED GOOSE	50	16	5	--	--	--	14
ROSS' GOOSE	--	--	15	--	--	--	3
TUNDRA SWAN	--	10	2	--	--	--	3

WATERFOWL USE DAYS

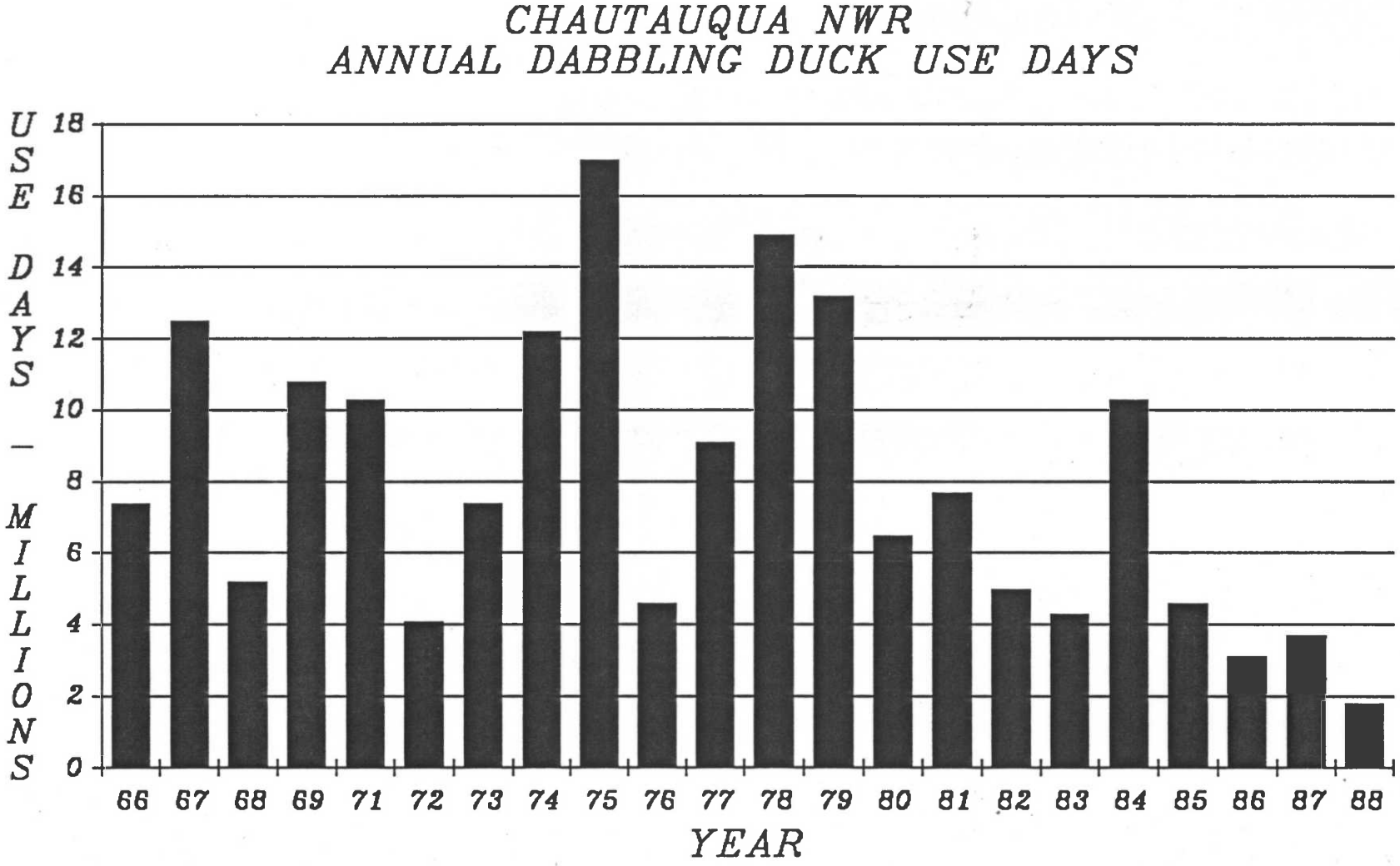
Ducks

	January-March	April-June	July-September	October-December	Total	△ %
1979	864,490	139,942	282,000	7,592,515	8,878,947	- 7.6
1980	3,425,188	435,418	351,130	3,368,550	7,580,286	- 14.6
1981	1,198,815	299,330	157,260	4,541,475	6,196,880	- 18.2
1982	705,941	111,675	143,820	3,765,785	4,727,221	- 24.0
1983	983,163	356,995	216,617	2,451,902	4,008,677	- 15.2
1984	201,325	228,800	262,793	3,399,290	4,092,208	+ 2.1
1985	204,946	78,742	209,852	3,008,800	3,502,340	- 14.4
1986	270,270	27,755	49,959	946,491	1,294,475	- 63.0
1987	103,181	21,370	56,478	1,779,960	1,960,989	+ 51.5
1988	314,991	27,690	74,945	824,115	1,241,751	- 36.7
Average*	352,577	142,732	159,140	2,317,289	2,971,738	
Percent	11.9%	4.8%	5.4%	78.0%		

*Previous 5-year average

Geese

1979	132,250	7,350	4,690	412,985	557,275	- 36.4
1980	403,240	16,210	8,465	320,295	748,210	+ 34.3
1981	63,420	545	7,660	345,720	417,345	- 44.2
1982	342,861	3,190	9,035	261,565	616,651	+ 47.8
1983	176,290	5,570	12,787	102,870	297,517	- 51.8
1984	63,860	3,910	15,475	197,740	280,985	- 5.6
1985	38,615	2,425	7,110	636,705	684,855	+ 143.7
1986	122,941	1,456	2,457	40,222	167,076	- 75.6
1987	16,788	700	2,430	131,525	151,443	- 9.4
1988	38,065	1,690	2,620	131,175	173,550	+ 14.6
Average*	83,699	2,812	8,052	221,812	316,375	
Percent	26.5%	0.9%	2.5%	70.1%		


CHAUTAUQUA NWR
ANNUAL DABBLING DUCK USE DAYS
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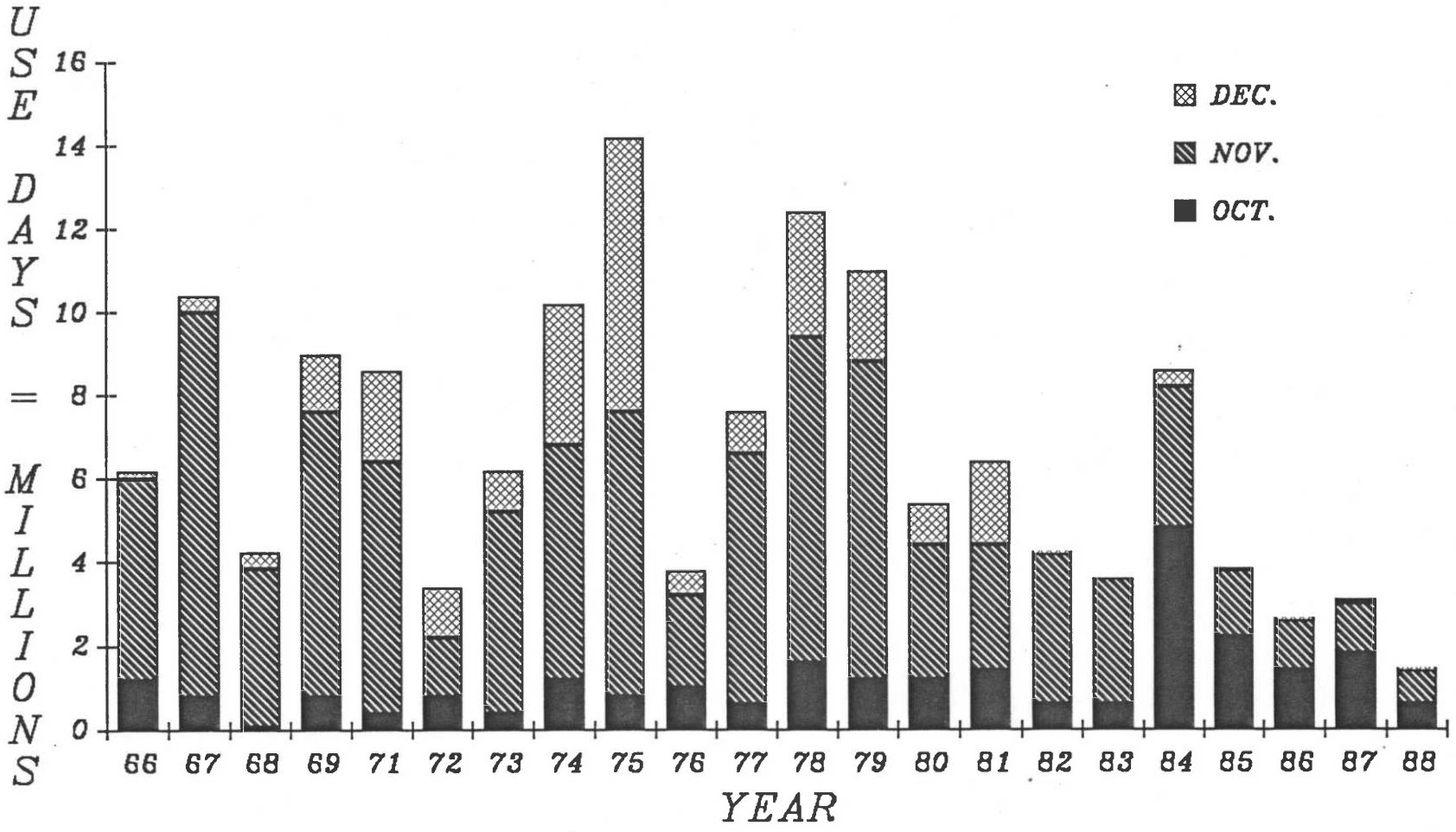
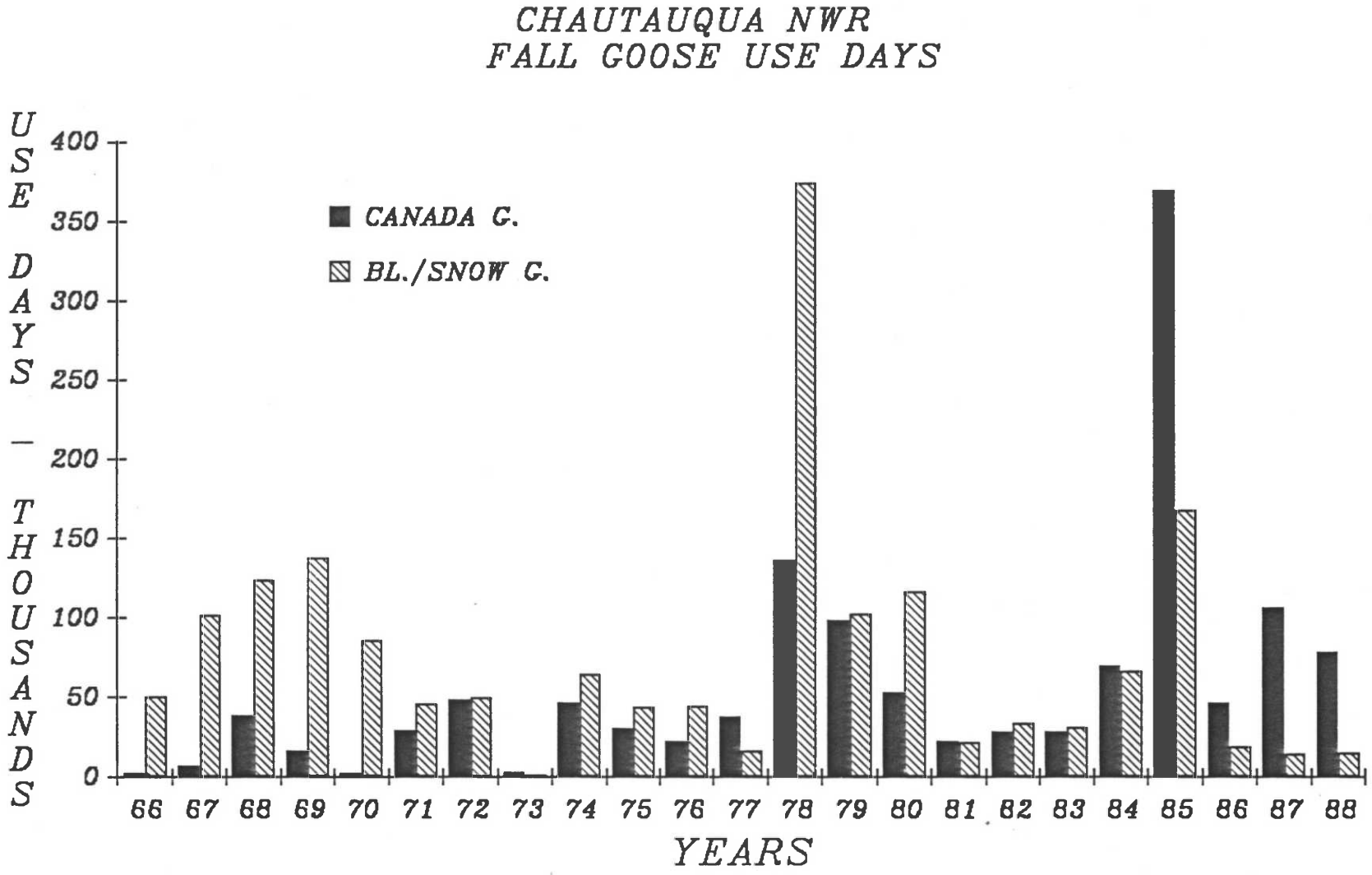
YEAR

CHAUTAUQUA NWR
FALL DABBLING DUCK USE DAYS




CHAUTAUQUA NWR
FALL GOOSE USE DAYS
USE DAYS - THOUSANDS
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CANADA C.
BL./SNOW G.
66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88
YEARS

1988 Fall Waterfowl Population
(Illinois Natural History Survey Flights)

	MALLARDS			ALL DUCKS		
Date	Lower Illinois Valley	Chautauqua 1988	(%)	Lower Illinois Valley	Chautauqua	%
09/06	7,230	800	(11.1)	20,100	2,395	11.92
09/13	6,910	650	(9.4)	18,025	1,265	7.02
10/10	29,180	3,800	(13.0)	50,270	6,065	12.06
10/17	55,225	6,400	(11.6)	106,945	10,140	9.48
10/24	85,910	9,000	(10.5)	138,760	14,585	10.51
10/31	138,330	11,000	(8.0)	201,710	15,680	7.77
11/07	178,805	19,000	(10.6)	219,505	23,445	10.68
11/14	166,570	9,000	(5.4)	192,355	12,145	6.31
11/21	189,430	11,000	(5.8)	221,540	13,945	6.29
11/28	174,270	5,500	(3.2)	198,175	7,610	3.84
12/05	126,460	2,800	(2.2)	140,340	4,360	3.11
12/12	54,240	650	(1.2)	62,530	960	1.54
Average			6.6			7.17

WOOD DUCK PRODUCTION

Maintenance

The box program this year was the same size as last year, 11 along the south dike, 7 upland, 49 at Melz Slough, and 50 at South Melz Slough.

All wood duck boxes requiring wood shavings were serviced on March 21 and 22. Branches were trimmed as needed. Another random check of 30 of the boxes at Melz Slough was performed on May 3. Nineteen contained starling nests which were removed, 9 contained wood duck nests, and two had both.

Final checks were made on June 23 at North Melz Slough, July 6 at South Melz Slough, and June 7 for the remainder. YCC enrollees enjoyed helping on this, until the inevitable starling nest encounter and subsequent disposition of the young.

Production

The number of boxes used by wood ducks this year remained the same as last, which is approximately 40% of the boxes available. Of those used, 57% were successful, and production increased 18% over 1987 to 200 hatched eggs. The hatch rate was nearly the same, around 60%.

The upland boxes produced no young this year, while North and South Melz Slough shared the success evenly.

Of the 30 boxes checked in early May, 15 of the 19 with starling nests removed had starling nests again at final check, and 4 were nested in by wood ducks.

Some consideration has been given to removing a number of the boxes in the Melz Slough area. The density of boxes per acre is high, and pair counts in the vicinity have decreased over the years. It has been suggested by wood ducks studies that fewer boxes may increase clutch size by relieving density stress.

Frank Bellrose believes the decrease in use of the refuge through the years is tied directly to a decrease in available quality brood habitat. Siltation problems destroyed the once lush growth of aquatic plants which correspondingly eliminated the invertebrate populations.

Also of great concern is the high use of boxes by starlings. In the mid-70's, starling use was as low as 2%. It rose steadily through 1981 when it peaked at 67%. After a four year lull, starlings have again dominated the artificial nests, using 69% of the boxes this year. Consultation with Animal Damage Control has been initiated and live traps were suggested at midday congregation sites. Once these are located, we will attempt to resolve the problem.

Wood Duck Box Production

	Melz Slough North	Melz Slough South	Melz Slough Upland	Total
No. of boxes available	49	50	18	117
No. of boxes used by wood ducks	26	19	2	47
No. of successful nests	14	13	0	27
Avg. clutch size/ successful nest	8.9	9.5	-	9.2
Total number hatched eggs	101	99	0	200
Total number unhatched eggs	36	99	20	155
Overall hatch rate - %	73.7	50.0	0.0	56.3
Approximate number ducks produced to flight stage (hatched x 0.40)	40	40	80	

Wood Duck Production
Ten Year Summary of Wood Duck Box Use

Year	# of Boxes	# Boxes Used by WD		Successful Nests		Production of Young	Average Hatch Size
1979	93	66	(71%)	45	(48%)	434	9.6
1980	130	72	(55%)	52	(40%)	580	11.2
1981	133	46	(35%)	43	(32%)	525	12.2
1982	124	26	(21%)	22	(18%)	240	10.9
1983	124	27	(22%)	23	(19%)	224	9.7
1984	117	18	(15%)	14	(12%)	128	9.1
1985	118	38	(32%)	22	(19%)	224	10.3
1986	118	22	(19%)	15	(13%)	111	7.9
1987	117	47	(40%)	31	(27%)	169	5.5
1988	117	47	(40%)	27	(23%)	200	7.4
Average	119	41	(34%)	29	(25%)	284	9.8

4. Marsh and Water Birds

The most common marsh bird at Chautauqua is the American coot. The first ones of the spring were observed February 23. The spring population peaked at 2,000 on March 30. Use days for the first two quarters were over 50% below the previous five-year average of 54,400. Summer use was above average, due to the increased water levels of the lake. However, fall use days once again sagged below average, probably due to the marginal amount of moist soil plant food and associated invertebrates.

The most common water birds include the great blue heron, great egret, black-crowned night heron, and double-crested cormorant. On occasion, a sighting of cattle egrets, snowy egrets, or loons will be reported by local birdwatchers. Overall, use days of marsh and water birds increased this year, mainly from the presence of 400 - 500 cormorants during the better part of the summer. However, there was also a noted increase in black-crowned night herons, particularly in the willow thicket just south of the west spillway.

The annual survey of the Clear Lake heronry just north of the refuge was once again conducted by Dr. Richard Bjorklund of Bradley University. This is one of only four known colonies on the Illinois River, and has been monitored for over 20 years. (See table page 40).

Dr. Bjorklund has requested assistance from the refuge staff for the breeding season census for the last few years, this year on June 28. Access to the site is by boat, and the YCC program is in progress at this time we were able to help him as well as provide a unique experience for our YCC workers. Sore necks withstanding, the enrollees enjoyed it.

The heronry is used by great blues, great egrets, and black-crowned night herons. Active nests showed significant increases this year, as the colony continually spreads out into new trees. These large increases correlate with increases in use days at Chautauqua, which is just south of Clear Lake. Also of interest at Clear Lake were 14 turkey vultures roosting in snags adjacent to the heronry.

Coot Use Days

Chautauqua NWR

	January-March	April-June	July-September	October-December	Total	△ %
1979	315,155	82,420	14,555	644,610	1,056,740	- 21.5
1980	812,000	497,000	60,725	372,225	1,741,950	+ 64.8
1981	15,735	77,275	21,080	497,890	611,980	- 64.9
1982	54,250	63,450	8,400	471,455	597,555	- 2.4
1983	74,710	281,115	11,250	514,585	881,660	+ 47.5
1984	10,230	35,685	1,500	930,030	978,445	+ 11.0
1985	48,360	26,560	1,200	2,439,000	2,515,120	+157.1
1986	54,225	19,350	1,500	910,000	985,075	- 60.8
1987	37,260	15,000	1,200	776,500	829,960	- 15.7
1988	19,530	6,310	3,750	522,000	551,590	- 33.6
Average*	33,921	20,581	1,830	115,706	1,172,038	
Percent	2.9%	1.7%	0.2%	95.2%		

*1983-1987

Heronry Nest Surveys

Species	1988	1987	1986	1985	1984	1983	1982	1981*
Great blue heron	533	315	348	241	174	152	170	130
Great egret	101	61	83	102	50	58	61	31
Black-crowned night heron	54	28	27	37	43	42	42	25
	688	404	458	380	267	252	273	186

*Partial survey due to high water

5. Shorebirds, Gulls, Terns and Allied Species

Ring-billed gulls make up the majority of use in this category; herring gulls to a lesser extent. Ring-billed outnumbered their counterpart by about 4 to 1 this year, with nearly 43,000 use days.

Shorebird use decreased relative to last year, due to the absence of the usual spring/summer drawdown. The pectoral sandpiper, yellowlegs (both species), sandpipers and common snipe typically account for 75% of the shorebird use.

6. Raptors

The bald eagle remains the most common raptor at Chautauqua. Despite a near record peak of 53 individuals in February, use days declined and were 24% below the five-year average. (See G.2). This decline is probably related to the decrease in waterfowl use days.

Northern harriers, red-tailed hawks, screech owls and turkey vultures are all common users of the refuge. American kestrels are sighted frequently adjacent to the refuge boundary, where the woodland/farmland edge exists. Screech owls usually utilize up to five wood duck boxes each year and are commonly heard calling.

Ospreys, though not abundant, do utilize the lake. This year two were sighted near the 3 x 3 ditch and the ring dike for two weeks during April. In the latter part of September and into October, one was again seen in the same areas.

7. Other Migratory Birds

Mourning doves use the very fringes of the refuge, along roadside ditches, in the foxtail along the south dike and sometimes along the river ridge. Use days increased over 1987, and are approaching the average for the previous five years. The population peaked at 125 with an estimated production of 25.

Mourning Dove Populations

Year	Use Days	Peak Number	Production
1979	36,000	225	50
1980	34,400	215	50
1981	25,850	185	45
1982	35,125	210	40
1983	33,950	195	50
1984	28,950	135	35
1985	23,475	110	30
1986	7,515	95	25
1987	14,640	130	30
1988	19,675	125	25

Another migrant, though seldom seen, is the American woodcock. Peak population estimate is 15 birds in September, and total use days were 805.

The annual Audubon Christmas Bird Count was conducted on December 26 with Miller and Sittauer assisting the local chapter on the refuge. A temperature of 50 degrees F. made the long walk a pleasant task. Total species count was lower than last year, but total birds was 67% higher.

A high concentration of mallards at Clear Lake accounted for almost half of the total count, while species and numbers of songbirds were low. An unusual sighting was an Iceland gull.

Christmas Bird Count

Year	Total Species	Observations	Waterfowl	(%)
1974	74	78,979	73,817	(93)
1975	81	190,053	176,913	(93)
1976	66	14,983	7,890	(53)
1977	66	8,524	3,000	(35)
1978	70	14,727	10,966	(74)
1979	65	15,304	7,283	(48)
1980	82	15,078	7,544	(50)
1981	73	11,966	7,378	(62)
1982	82	12,412	4,564	(37)
1983	64	8,926	3,848	(43)
1984	78	16,971	9,925	(58)
1985	75	11,678	4,314	(37)
1986	85	17,757	9,143	(52)
1987	84	21,757	12,993	(60)
1988	78	39,049	30,703	(79)

8. Game Mammals

The most common game mammals on the refuge are fox squirrels and eastern cottontail rabbits. Refuge headquarters provides a great opportunity for observation, especially when the bird feeder is put out in the winter. The squirrel population was up this year. On one trip from the headquarters to the ring dike, 22 were observed crossing the road. To see 7 would be considered average.

Other mammals making use of the 1,050 acres of forested land include red fox, white-tailed deer, coyote and raccoons. Beaver, muskrat, opossum and mink are also present.

No hunting or trapping of mammals is permitted on the refuge.

10. Other Resident Wildlife

Ringneck pheasants and bobwhite quail utilize the limited upland acreage around the refuge. Farming practices adjacent to our boundary have an impact on the number of birds using the refuge. Over the last 15 years, shelterbelts have been removed to facilitate center pivot irrigation systems and fall plowing has become an established practice.

Although the last two winters have been mild, helping the pheasant population, the summer's drought had a negative effect on chick survival.

Game Bird Use Days

Year	Bobwhite Quail	Ring-necked Pheasant
1988	28,105	2,740
1987	26,280	3,825
1986	23,725	2,920
1985	26,600	3,300
1984	24,575	3,500
1983	25,875	4,555
1982	23,000	3,460
1981	23,500	3,750
1980	25,300	5,250
1979	25,850	4,800

11. Fishery Resources

Lake Chautauqua supports up to 54 species of fish. Carp and buffalo and shad are by far the most abundant. Sport fishing for crappie, bluegill, catfish, bullheads and yellow and white bass is a popular activity. The fishery resource also supports the fish-eating birds of the refuge, such as herons, egrets, mergansers and bald eagles. Annual flooding from the Illinois River usually precludes most fishery management possibilities.

The new Fishery Management Plan was approved this year and regulations were listed in the Federal Register. Changes in regulations included the opening of the entire lake to bank fishing, increasing the motor size limit to 25 horsepower, and opening the lake to commercial fishing by permit.

Among other regulations concerning the commercial fishing program, permits will be $100, nets must be tended during the spring migration, and weekly catch reports must be filed.

Currently the elevation of the sill at the west spillway does not allow for complete dewatering of the lake. This traps many fish where summer temperatures can quickly reduce the oxygen content resulting in a major fish kill. In June 1987, 14 Special Use Permits for commercial harvest of non-game fish were issued to

salvage fish in this very circumstance. Public relations were improved and the resentment from a fish kill was reduced.

The commercial fishing program will provide economic benefits to the federal government and the local community from the underutilized renewable resource. It will also improve public relations with local commercial fishing groups.

16. Marking and Banding

With water levels maintained higher this year, conditions were favorable for preseason wood duck banding. We began baiting three trap sites on June 22 on the south dike. Traps were set out five days later and baiting continued as needed. In addition, two floating traps were placed near lotus beds near Melz Slough. They were both later moved to the willow thickets between the south and west spillways where up to 1,000 wood ducks were observed to roost every night. Banding was done in the evening and again the following the morning.

A total of 52 ducks were banded on July 28, the first day out. The traps were closed for a total of 7 evening/morning sets, the last time being October 6.

Quotas and results for preseason wood duck banding were as follows:

	Quota	Result
AHYM	100	43
AHYF	100	52
HYM	50	91
HYF	50	117

H. PUBLIC USE

1. General

Chautauqua Refuge is located in a service area of 15 counties where nearly 1 million people reside. One of the secondary objectives is to provide limited day-use recreation where and when such activities are compatible with the primary objectives of the refuge.

A total of 28,517 visits to the refuge were recorded in 1988.

4. Interpretive Foot Trails

A quarter-mile foot trail beginning near the headquarters leads the visitors through upland habitat, down to the lakeshore through bottomland hardwoods, and ends at the 100' observation tower. An illustrated brochure describes the ten numbered stops along the trail route that follow the history of the wood duck nesting box program at the refuge since the 1940's. On display are a number of boxes showing the progressive development of the boxes. Other interpretive signs describe different aspects of the local habitat and wildlife. A total of 1,091 people used the trail this year.

Visitor Use of Interpretive Foot Trail

1988	1,091	1983	852
1987	1,005	1982	735
1986	599	1981	768
1985	703	1980	742
1984	640	1979	864

A new interpretive foot trail that will be accessible to the handicapped is scheduled to be built in FY 89. It will follow the bluff and include an overlook of the lake. The old trail was routed behind refuge buildings and the residence, resulting in a disruption of privacy and unwanted traffic near equipment. The Outdoor Recreation Planner from Crab Orchard NWR will help route and design the trail.

6. Interpretive Exhibits/Demonstrations

The National Wildlife Refuge System Exhibit was set up at the Wildlife Prairie Park visitor center from January 15 - March 3, where approximately 6,000 people viewed it. Take Pride in America brochures were available also.

Refuge brochures are available at a leaflet dispenser outside the headquarters for off-duty hours. The information center also has posters and displays on current refuge and Service priorities; i. e., hunting

information, Take Pride in America, North American Waterfowl Plan, etc. A total of 530 visits were made to this board this year.

8. Hunting

Waterfowl hunting is the only hunting allowed on Chautauqua. The 745 acre Liverpool Lake Public Hunting Area is located on the west side of the refuge between the perimeter dike and the Illinois River. Regulations require blinds to be made from existing dead materials, and the area is available on a first-come first-serve basis.

An article printed in Outdoor Life magazine listed Chautauqua Refuge as an excellent spot for waterfowl hunting. Soon after, we received many requests for waterfowl population figures, hunting information, conditions, etc. However, the river was extremely low this summer and fall which resulted in rank stands of vegetation with a small area of water for ducks to come to. This, coupled with the stringent limits and shortened season, resulted in a decrease in hunter use days for 1988.

Those contacted after hunting said pressure was light, but results were better than expected. The river did rise later in the season, and ducks responded to the availability of the now flooded moist soil plants.

The season ran from November 5 through December 4. The 30-day season, a 10 day reduction from the previous three years, was a result of the second lowest fall flight forecast on record.

Populations on the refuge peaked at 23,445 ducks on November 7, and declined to 4,360 by December 5. Over 70% of these were mallards. Canada geese peaked at 2,700 on November 14 and averaged 1,750 during the hunting season. Blue and snow geese peaked at 2,000, also on November 14, and averaged 1,500 for three of the four weeks in the season. They were concentrated near the south end near the west spillway, despite construction at that time.

Total hunter visits were estimated at 205 with 115 ducks and 10 geese harvested.

9. Fishing

Fishing is the most popular activity at Chautauqua, with 15,808 visits this year. This is an increase over 1987, but still below the five-year average of 24,148 by 35%.

Although the lake was not drawn down for moist soil production this year, fishing use did not increase greatly as expected. Greatest use occurs during the summer, with 89% of the use occurring in the months of May through August, peaking in June.

March - June Percentage/Total Fishing Visits

1988	68%	1983	52%
1987	70	1982	59
1986	51	1981	48
1985	63	1980	50
1984	60	1979	47

Fishing Use Days

Year	April	May	June	July	August	September	Total (Year)
1988	2,685	2,818	4,680	2,150	1,730	425	15,808
1987	1,310	3,500	3,000	1,750	580	325	11,535
1986	2,565	4,612	5,074	4,249	4,651	1,887	24,893
1985	2,983	4,425	4,992	2,401	2,203	1,866	22,030
1984	2,892	7,780	10,514	4,008	2,893	2,210	36,238
1983	2,182	5,396	5,395	3,877	1,980	2,026	26,045
Prev. 5-yr Avg.	2,387	5,143	5,795	3,257	2,461	1,663	24,148

Trot line and jug fishing are the most popular forms of take, although pole fishing is still preferred when a bed of bluegills or crappies is located. Bank fishing was limited to designated areas until regulation changes occurred December 15.

The new boat ramp received more positive than negative comments. When water is high, launching is difficult without a tilt-bed and winch. At normal water levels, however, the design of the ramp functions well. The main problem is with vandals destroying the "No Parking" sign on the turnaround area, and throwing riprap in the water on the ramp.

New fishing regulations took effect December 15. Bank fishing is permitted anywhere on the refuge; horsepower limit was raised from 10 to 25, and commercial fishing will be allowed with a $100 permit and other specific regulations. Angler use will be more difficult to monitor and possible problems associated with these changes will have to be watched closely. Ideally, the underutilized fishery resource will provide greater recreational benefits without degrading the surrounding habitat. Realistically, a thorough public information campaign will be undertaken to encourage land ethics using the Take Pride in America theme.

11. Wildlife Observation

Spring and fall are usually the main wildlife observation periods, centering around waterfowl and non-game migrations.

Spring use declined considerably this year, while fall use increased slightly. Total visits for wildlife observation were 9,981, a decrease of 26% from 1987.

Spring/Fall Visit

Year	Spring*	(%)	Fall**	(%)	Spring/Fall Total %	Total Use Days
1988	1,915	19	2,590	26	45	9,981
1987	5,525	41	2,270	17	58	13,447
1986	6,242	39	4,473	28	67	15,990
1985	4,153	26	7,523	48	74	15,629
1984	1,771	11	6,997	45	56	15,501
1983	2,393	27	2,587	30	57	8,736

*March-May **September-November

12. Other Wildlife-oriented Recreation

Though less in numbers, other consumptive uses on the refuge are highly regarded by some. Mushroom hunting, berry picking and nut collecting are all allowed on the refuge. Most of mushroom and berry consumption takes place between April and June (but good luck trying to get the locations from the successful collectors). Gathering pecans, walnuts and hickory nuts usually peaks in September or October. The peak month this year was May with 100 activity hours. Total use for the year was 172 activity hours and 97 visits.

14. Picnicking

Picnicking is limited to the three picnic tables located near the headquarters building. Users are usually visitors or people working in the vicinity who like a pretty, quiet place to eat lunch.

16. Other Non-wildlife Oriented Recreation

Three ice boats took advantage of a calm night's freeze on December 29. Before sailing, the group checked ice thickness in a number of places. After two hours of 13 degrees and speeds of 30 mph., they packed it in to thaw out.

17. Law Enforcement

While questioning local amateur archeologists on their finds in the area, archeologist Arden Rose learned that two boys allegedly found an Indian pipe on the refuge. They sold it to a local person who sold it to persons in Michigan. When questioned, the boys claimed it was found just off refuge land. Since no proof was available, the case was not pursued.

The refuge got considerably more attention than it deserved when it was included in the nationwide news release on drug seizures on public lands. Staff members pulled a total of 181 wild growing marijuana plants on Chautauqua Refuge and reported such on the Drug Incident Report as directed by the Regional Office. This plant grows wild throughout the vicinity and is commonly found uncontrolled in the road ditches in the county.

Due to low water levels in the Illinois River, the only water in the 745 acre hunting area was in the side channels during the early part of the season. Hunter numbers were low and the duck kill lower. Officer Miller apprehended one hunter opening day after he killed a double-crested cormorant (a state protected species) he claims to have mistaken for a female wood duck. The hunter said he was going to go home and brush up on his waterfowl identification. The fine for such ignorance was $275.

Body armor was purchased from Ray O'Herron Company, Inc. for Refuge Officer Watts.

Refuge officers Miller and Watts attended 40 hours of law enforcement refresher training at Ft. McCoy, Wisconsin in February and requalified with Service revolvers.

I. EQUIPMENT AND FACILITIES

1. New Construction

Quiver Creek Weir

R-981-22

Before

After

The Quiver Creek weir was constructed in 1926-1928 and was used to divert water from the creek into Lake Chautauqua through a 3' x 3' screwgate structure. The weir was also used to flood private duck club ground upstream off the refuge. The structure has been in need of replacement for many years. Last year the metal pilings started leaning to a point it was feared the structure would collapse if water was held up behind it. Members of the duck clubs tied cable to it and it held one more season. Money finally arrived this year for a new weir.

A higher spillway elevation was proposed to increase the flow into the refuge and provide better quality hunting habitat for the duck clubs. Siltation problems had left some of the duck clubs mostly high and dry. The spillway of the old structure was 437.5' MSL. The spillway for the new structure was proposed to be 439.0' MSL. Because of the added height, new flowage easements were needed from affected upstream landowners. Warzyn Engineering, Inc. was hired in 1987 to furnish information on the effect the new height would have during the hundred-year flood prediction. Once that information was received, a public meeting was held to discuss it. Six of the seven upstream landowners affected by the new proposal and seven other men, all members of duck hunting clubs in the area, attended. No opposition to the project was voiced at the meeting.

The Corps of Engineers Section 404 permit was not received until October 13. Work on the new weir began immediately after it was received. Signed flowage easements were obtained for $1 each from the affected landowners. Dr. Martens, one of the landowners, at first refused to sign without a guarantee in writing that water would be held at 439' MSL during the hunting season. We were not about to do this and told him we would be forced to hold the water no higher than 437.5' MSL as stated in the existing easement. The structure was finished sufficiently to put the stoplogs in on October 28. Dr. Martens eventually signed the easement without a guarantee in mid-November.

Halverson Construction Company, Springfield, Illinois was awarded the contract and did an excellent job. Total cost of the project was $148,777.00. This included removal of the old structure. The new 187.5 foot long weir is located approximately 175 feet downstream from the old location.

A construction access easement was obtained from Dr. J. W. McHarry for access to the south side of the creek.

2. Rehabilitation

4/88 R984-24A GRM
Rock between the concrete sections of the boat ramp constructed in 1987 washed away due to wave action. Donated bricks were put in to help keep the underlying sand from washing out and undermining the ramp. The bricks seem to be working.

4/11/88 R984-7 GRM

Two of the four pit toilets near Goofy Ridge were destroyed by vandals in 1987. Early this spring, vandals destroyed the other two. The problem was subsequently solved...

9/9/88 Slide GRM

They can't vandalize what isn't there. The remaining structure was removed by refuge personnel.

Observation Tower

The cab of the observation tower has been closed for a number of years because the floor boards had deteriorated to a point where safety of visitors was a concern. A contract was awarded to Roat Construction, Havana for $3,900 to complete the necessary rehabilitation work. This work included a new roof, new floor and a metal railing around the floor entrance. Maintenance Worker Watts also replaced wooden landings and steps which were showing signs of deterioration.

3' x 3' Water Control Structure

This facility is used to allow water into the refuge from Quiver Creek. It is a screw gate structure that was originally constructed in 1936. The gate had been inoperable since 1985 when it slipped out of the sliding supports. The gate twisted 180 degrees and the stem was bent. The protective grating had long disappeared.

A contract was awarded to Lost Creek Contractors, Beardstown, for $3,196 to make necessary repairs. A new gate was installed, stem straightened, and new protective grating installed on both the ends of the concrete outlets. Water flow can again be regulated. Prior to the repairs, it was an all or none situation with a piece of plywood put over the ends of the outlets to either keep water out or in the lake.

Radial Gate Water Control Structure

This was another old structure that had seen better days. Originally built approximately 1936, many of the lower braces had rusted through. There were also two major holes in the face plate of two of the four gates. Logsdon Sand and Gravel, Beardstown, was awarded the contract to make the necessary repairs. Once the gates were removed for repairs, additional work needs were noted. A change work order for the extra repairs was made. Total cost of the rehabilitation on all four of the 12' x 12' gates was $32,200. All four face plates were replaced, bracing repaired, all the metal painted, and new J moulding mounted on the bottom and side edges for water seal. New galvanized cable was also installed for lifting the gates.

West Dike Repair

The levee south of the west spillway had a number of breeches and low spots. A 780 foot stretch was repaired in 1987. Another 720 feet was repaired this year, an area from the west spillway to the 1987 levee repairs. Monies for both contracts came from flood damage appropriations. Forrest Davis Construction, Manito, was awarded the work this year for $101,348.73. The levee was reshaped to a height of 439.0' MSL with a 16 foot top and 3:1 side slopes. Eighteen inches of riprap on top of filter fabric was placed on the river side and 250 feet on the lake side. The remainder on the lake side is protected from wave action by willow growth.

A number of Congressional inquiries were received while this project was ongoing. They were precipitated by members of the duck clubs on Quiver Creek adjacent to the refuge. They called themselves "concerned conservationists" and complained that the construction work was keeping waterfowl from utilizing the refuge - the very reason for existence of the refuge. They wanted the construction halted until after the migration period. Their real concern, which went unspoken to the

state and federal Congressional officials, was that the trucks hauling rock had to travel the refuge levee adjacent to the duck clubs. The club members feared the trucks would interfere with their hunting. The flock of snow geese using the refuge at the time remained near the construction site and exhibited little concern for the work.

The levee south of the 1987 work is in need of additional work. The lowest point is only at 436.35' MSL. The spillway elevation is 437.5' MSL.

Work breakdown was as follows:

	Quantity	Unit Price	Total Price
Site preparation (tree & brush removal)			$ 3,000.00
Common borrow	2,289 CY	3.40	7,782.60
Filter fabric	3,733 SY	2.71	10,116.43
Filter fabric	1,029.80 SY	2.70	2,780.46
Riprap	2,820 Ton	27.46	77,669.24
			$101,348.73

3. Major Maintenance

Facilities were inspected for the Maintenance Management System. Deficiencies totaled $31.5 million on Chautauqua Refuge alone.

Five loads of gravel were added to the parking lot at Boatyard No. 3 to reduce the risk of getting stuck in the sand.

4. Equipment Utilization and Replacement

A new Dodge Dakota pickup was received which replaced the 1981 Dodge pickup. The old pickup was transferred to James Engel, RO Division of Endangered Species, for use by the University of Minnesota Raptor Rehabilitation Center.

The D-7 dozer, which went under flood waters at Meredosia in 1986, was sold by the small scrap sale process to Logsdon Sand and Gravel, Beardstown, for $425.

Maintenance Management System inspection reports were completed for all equipment. Deficiencies totaled $8,500.

5. Communications Systems

A repeater station was installed at the LaGrange Lock and Dam with antennae on the Corps of Engineers tower in 1979. This was to enable communications from Meredosia NWR to the base station at Chautauqua. The system never worked properly. The company that installed the system and others that worked on it later simply botched the job. In desperation, we went to Supreme Radio Communications, Peoria, who, although they know their business, also charge rates that the refuge budget can ill afford. The cost to get the $12,400 system working was $1,910. There appear to be a few problems left to be solved but we have an operating system.

6. Computer Systems

On September 30, 1987 the Regional Office had ordered a microcomputer system from IBM. This system plus a serial printer and bidirectional forms tractor from Government Technology Services and a Hayes Smartmodem 2400 from P. C. Connection started Chautauqua on the road to increased efficiency through computerization.

The IBM PS/2 Model 60 microcomputer system and accessory items including among others, a streaming tape drive and Quietwriter III matrix printer with sheetfeed, were finally received by mid-January. Upon arrival of the NEC Pinwriter serial printer with bidirectional tractor feeder, the Hayes Smartmodem 2400, and installation of a new telephone line, the system was installed and ready to go on January 27. Total cost for the microcomputer system and accessories was $13,231. Charge for installation of a new telephone line for the modem was $82.

As ADP Implemention Guidelines call for computers to have dedicated electrical circuits, the necessary wiring was done by a local electrical contractor at a cost of $235.

Having been plagued with lightning strikes knocking out our Merlin telephone system, we were concerned what the prevalent lightning would do to the computer system. A representative from AT&T suggested the problem was inadequate grounding because of the sand and recommended

we install copper grounding rods to alleviate the possibility of damage from lightning. Six 3/8" x 10' copper coated steel rods were placed in a 3' circle outside the office building and connected with brass clamps to #6 copper wire. The copper wire was then run through the wall into the telephone surge suppressor. Materials cost was $122.

Software received was Wordperfect 4.2, Microsoft Multiplan 3.02, R:Base V, Microsoft Chart 3.0, and Crosstalk at a cost of $983. R:Base was upgraded in July at no cost and Wordperfect was upgraded to 5.0 at a cost of $60.

Our existing office furniture was found to be unsuitable for use with the computer as all components were placed on a single table. The height of the table contributed to considerable back and shoulder strain to anyone using the keyboard for an extended period. Appropriate furniture which included an adjustable keyboard workstation, terminal table, printer stand and chair was ordered at a cost of $774.

Maintenance agreements were secured with IBM and Intelogic Trace for maintenance of the P/S 2, color display, streaming tape drive, Quietwriter III printer and NEC Pinwriter for an annual cost of $610.

Training was accomplished through the use of video taped computer-aided instruction. Videos from the Regional Office on introduction to the computer and its use, as well as teaching yourself MS DOS and PC DOS, WordPerfect, Multiplan, and R:Base were utilized. Local Support Person Alice Clanin also enrolled in a 2-credit hour course in WordPerfect at Spoon River College in Havana. Cost of the course was $86.85. Classes were 3 hours every Thursday morning from August 22 through December 16.

Use of WordPerfect has greatly improved the production of correspondence and reports initiated by this office. This narrative is our first one produced with the aid of the computer and it's proving to be a great time saver insofar as revisions are concerned.

The Region 3 Accounting Package was installed in R:Base in November.

Correspondence is being sent and received via COMPUSERVE electronic mail. Use of electronic mail has increased our telephone bill by approximately $20 per month.

The cost figures mentioned above total $16,183.85. This does not include labor costs for initial installation by refuge employees nor does it include the cost for time spent in "training" with the videos and interpreting the software manuals.

7. Energy Conservation

The new compact Dakota 4 x 2 pickup which replaced the full-sized 1981 Dodge 4 x 2 pickup gets better gas mileage but not much more at 19 MPG vs. 16 MPG for the old vehicle.

8. Other

9/9/88 Slide GRM

A self evaluation was made of the public facilities on the refuge as required by the Department of Interior regulations for Implementation of Section 504 of the Rehabilitation Act. This handicap inaccessible front door to the office was one of many deficiencies noted.

J. OTHER ITEMS

1. Cooperative Programs

A mourning dove call count survey for Fulton County, Illinois, was conducted by Maintenance Worker Watts on May 20, 1988. A total of 93 calls were heard from 43 doves with 13 doves seen during the survey. Results from this survey for the previous five years are shown below for comparison.

Survey Date	Doves Heard	Total Calls	Doves Seen
May 26, 1987	42	101	7
May 22, 1986	40	86	10
May 21, 1985	31	63	10
May 31, 1984	47	119	3
May 24, 1983	49	159	14

The Illinois Natural History Survey maintains a research laboratory and storage building on the refuge under a 99-year Special Use Permit. The permit was issued for $1 by the U. S. Biological Survey in 1939. This facility is recognized for its outstanding research on waterfowl and other wildlife in Illinois.

On June 15, 1987, a Cooperative Agreement (FWS No. 14-16-0003-87-926) was signed with the Illinois Natural History Survey for their use of the vacant refuge residence as office space. The Survey began construction during that summer on a new addition to their office building and needed a place for storage and office personnel affected by the remodeling. They moved out of the residence September 30 of this year.

In cooperation with the North-Central Forest Experiment Station, in June two gypsy moth traps were placed on the same trees as last year. One north of the office building and one west of the Recreation Area. In September, they were taken down and no gypsy moths were caught.

The Ridge Lake Fire Protection District provided fire protection services again this year for all refuge buildings. The yearly charge for this service was $100.00. Fortunately, we did not need to utilize the agreement.

2. Other Economic Uses

A Special Use Permit for $10.00 was issued to the Chautauqua Lake Tavern authorizing a corner of the building that is located on the refuge. This permit was initiated in 1968 to resolve a trespass dispute dating from the establishment of the refuge.

One firewood permit was issued during the year for a fee of $5.00 per permit. The permit allowed the cutting of one cord of firewood from downed trees. This practice was dropped on the refuge after January. Processing is not worth the effort and some wildlife are dependent on downed wood to survive.

3. Items of Interest

In April, a revenue-sharing check for FY 1987 in the amount of $4,961 was presented to the Treasurer of Mason County for Chautauqua Refuge. The payment was for 59% of the full entitled amount. This percentage was the third lowest since the program began in 1964. A news release was mailed to the local newspapers concerning the revenue-sharing payment. Payments to the four Illinois counties in which refuge lands are located totaled $10,237. The payments to Mason County over the previous 10 years are shown below for comparison:

Fiscal Year	Payment	%	Fiscal Year	Payment	%
1986	$ 5,054	60	1981	$ 8,053	88
1985	5,416	64	1980	9,188	100
1984	6,813	74	1979	2,554	75
1983	7,080	77	1978	1,659	50
1982	8,329	91	1977	1,302	53

Seven Golden Age Passports were issued during the year.

A 3-day Operations Inspection was conducted on the refuge by a team consisting of Matthias Kerschbaum, Edith Donovan, Thomas Worthington from the Regional Office and Division Biologist Gerald Cummings stationed at Mark Twain NWR. No major problems were found.

Maintenance Worker Watts ran a dozer for two weeks with the Wetland Restoration Team on CRP lands in Indiana. He was presented a "Dozing for Ducks" T-shirt, a gift

from the Regional Directorate. Assistant Manager Sittauer spent one week in Minnesota seeding grass on ditch plugs on CRP lands.

A Congressional inquiry was received in June as to why we were dewatering Lake Chautauqua. This is also a yearly occurrence as fishing is disrupted in favor of moist soil plant production. The individual complaining this year probably thinks he won the battle this year as we did not draw the lake down this year. See Section F.2.

Chautauqua Refuge was assigned Marshall, Mason, Scott, Cass and Morgan counties for Farm Bill activities. All five counties were screened for restorable wetlands on Conservation Reserve Program lands. None were found. Topography and soils of the CRP land in this area are such that natural wetlands never existed in those areas.

4. Credits

Miller: A; C; D; E-1, 4-8; F; H-17; I 1-5, 7, 8; J; K.
Sittauer: B; I 2, 3; G; H 1-16.
Clanin: I 6; L; typing and assembling.

K. Feedback

In 1987, Chautauqua Refuge was one of three stations in this region selected for Refuge Management Development. The purpose was to make Project Leader assignments available to GS-11 Assistant Refuge Managers in this region if they are interested. I appreciate this region's willingness to make this program available. I spent 8 years at the Litchfield WMD and enjoyed the work there; however, I felt I was ready for a move after four years. I spent many an hour on SF-171's the following four years most to stations in other regions Needless to say without the Project Leader title, I didn't stack up well with someone known in the other regions. At least now I have the opportunity to succeed or fail as a project leader.

Another positive note I would like to touch on is this region's handling of moving costs. It works well at least for this station to have 2% of the operating budgets of each station set aside for the Regional Office to use in covering moving costs regionwide. We had two moves in Fiscal Year 88 which would have crippled this station's budget without some help. The total cost of the moves was $17,359.19. The region came up with $15,000 from other stations to help cover the costs.

I am extremely happy with the contractors that worked on the five rehab projects this year. They were all local contractors who took pride in their work and, as a result, we ended up with excellent finished products. The Regional Office engineers can take partial credit also for this. They were extremely helpful in getting necessary requested change orders approved. I still have memories of yesteryears when things did not turn out so well.

While I feel the Department's Third Party Relocation Services program is a step forward, I feel some changes are warranted which would help the employee in the moving crunch. I bought the house in Minnesota in 1980 at a time when it was a seller's market and housing was at a premium. The market declined steadily thereafter. I therefore expected to take a loss when sold. Because of the financial drain of owning two houses, I signed up with Coldwell Banker Relocation Management Services. The average of their two appraisals was 52% of what I had invested in the house. Feeling that this was probably all the house was worth, I sold the house to them. Hindsight is always the best, but I should have read the "Danger" sign a little more closely when I was told by one of the appraisers that he was restricted to Coldwell

Banker of showing his appraisal to me. We eventually received copies of the presumed-to-be-original appraisals. I still assumed everything was legitimate. Later I found out that they listed the house on the market at 77% more than they paid for it. I am not a professional realtor as is readily apparent, but if I wanted to sell a house, I wouldn't list it at 77% more than its worth. With the government paying them 38% commission to take the house, they easily recouped their expenses. I am all for free enterprise as long as it is all legitimate, which I can only trust it was in my case. But, I would like to see a third option open to the employee in selling a house. This would be for the government to pay the employee the 38% to sell his/own house if the house was listed for a specified time at fair market value and remained unsold! I am confident that even I could have sold the house at 38%, recouped the expenses and cut my losses substantially.

CAMERON-BILLSBACH

CHAUTAUQUA NATIONAL WILDLIFE REFUGE

Cameron-Billsbach Unit
Sparland, Illinois

ANNUAL NARRATIVE REPORT

Calendar Year 1988

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

INTRODUCTION

The late Judge Glen J. Cameron of Pekin, Illinois, donated the Cameron Unit to the Fish and Wildlife Service on May 17, 1958. The unit is located in Marshall County at river mile 192 (64 miles upriver from the Chautauqua National Wildlife Refuge). This 636.5 acre unit is located between Sparland and Henry, Illinois, on the west side of the Illinois River. The Cameron Unit consists of bottomland timber, old fields that are reverting to timber, and Weis Lake, a backwater area of the Illinois River. The Sparland Conservation Area, administered by the state, is located along the south boundary of the refuge.

The Illinois Chapter of The Nature Conservancy purchased the Armour Club and offered it to the Fish and Wildlife Service. This river bottomland unit was approved for purchase in November, 1981. The 1,072 acre unit cost only $28 per acre, totaling $30,000. This tract, designated as the Billsbach Unit, joins the center portion of Billsbach Lake which is located on the east side of the Illinois River.

Total area of this refuge is 1,708.5 acres.

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H. PUBLIC USE (Cont)

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F. FEEDBACK . Nothing to Report

L. INFORMATION PACKET - - (inside back cover)

B. CLIMATIC CONDITIONS

Precipitation data for the Cameron Unit were obtained from the Corps of Engineers' weather station at their Peoria boatyard, river mile 164.2. This is approximately 32 miles downriver from the refuge.

Precipitation for the year totaled only 21.11 inches, which was over 16 inches below the 19-year average of 37.76 inches. July was the driest month, with only 0.35 inch of rain, and June wasn't much better with only 0.55 inch. Only three months had above average rainfall.

Precipitation table compared to a 19-year average follows:

Month	Precipitation	1969-1987 Average	Difference
January	1.99	1.42	+ 0.57
February	0.44	1.38	- 0.94
March	3.04	2.96	+ 0.08
April	1.23	3.64	- 2.41
May	1.62	3.99	- 2.37
June	0.55	4.59	- 4.04
July	0.35	3.89	- 3.54
August	1.94	2.97	- 1.03
September	2.12	3.96	- 1.84
October	1.40	3.36	- 1.96
November	4.26	2.90	+ 1.36
December	2.17	2.70	- 0.53
TOTALS	21.11	37.76	16.65

D. PLANNING

4. Compliance With Environmental and Cultural Resource Mandates

An archeological investigation on the Cameron Unit was completed by the Archeological Research Laboratory of Western Illinois University.

Work was done between May 6 and May 11. Shovel testing on a 25' grid was employed along the terrace/bluff slope above Weis Lake and Merdian Lake, with cultural material being recovered in three loci (two prehistoric, one historic). All three find spots

occurred on the slope above Weis Lake, which is a more gentle slope than the steep, abrupt slope above Merdian Lake.

While the ground surface of the terrace/bluff slopes above Weis and Merdian Lakes were generally free of recently deposited sediments, the remaining areas in the Cameron Unit had experienced significant post-settlement alluviation.

Dr. Joe Alford, a geomorphologist with the Department of Geography at Western Illinois University, spent a day at the Cameron Unit examining these areas in order to determine their suitability for testing. It was decided that Upper Henry Island and the islands on the northwest shore of Billsbach Lake had experienced such heavy post-settlement alluviation that the prehistoric surface was unavailable for testing. The islands forming the southeast shores of Weis and Merdian Lakes had experienced modern alluviation to a lesser extent and it was decided to visually inspect the banks of these islands, in hopes of finding cultural material eroding from the bank.

While surveying the river channel side of the island southeast of Weis Lake, a large site was found eroding into the river. Among the material recovered were shell tempered sherds, two points, a quartzite blade, a grinding stone and chert flakes. Rusted metal pieces were also present but whether they were part of the archeological assemblage or modern refuse could not be determined. Given the material recovered, this site probably represents a late prehistoric or early historic occupation dating in the range of 1300 A.D. to 1700 A.D.

F. HABITAT MANAGEMENT

2. Wetlands

Approximately 60% of the Cameron-Billsbach Unit is backwater areas of the Illinois River. Water levels on the units are determined by the fluctuating levels of the river. The Peoria Lock and Dam, located 34 miles downstream, will cause an 18" fluctuation in levels during normal conditions.

Monthly average water levels were low from May through October leaving many of the shorelines exposed for potential moist soil plant production. There is no water control on the unit and reflooding is subject to natural rises in the river.

1988 ILLINOIS RIVER ELEVATIONS (MSL)

Old Henry Lock Gauge (River Mile 196.

Month	High (Date)	Low (Date)	Differential	Average
January	446.8 (22)	443.1 (17)	3.7	445.2
February	445.9 (03)	442.5 (29)	3.4	444.7
March	444.3 (31)	440.8 (06)	3.5	444.7
April	448.1 (10)	441.1 (30)	7.0	445.1
May	441.5 (10)	440.6 (02)	0.9	441.0
June	441.1 (16)	440.5 (07)	0.6	440.9
July	441.0 (19)	440.4 (06)	0.6	440.6
August	441.1 (14)	440.5 (31)	0.6	440.8
September	441.3 (20)	440.3 (10)	1.0	440.7
October	441.2 (21)	440.1 (01)	1.1	440.6
November	442.1 (17)	440.4 (02)	1.7	441.3
December	441.9 (30)	440.5 (04)	1.4	440.9

Cameron Division is located from mile 192 to 194. Subtract .1 ft. per mile below the gauge to determine water height at the refuge.

Spring Peaks - Henry Gauge

Year	Date	M.S.L.	Year	Date	M.S.L.
1988	4/10	448.1	1978	4/12	449.2
1987	5/23	445.6	1977	N/A	N/A
1986	2/22	445.8	1976	3/08	453.3
1985	3/07	458.1	1975	4/30	449.7
1984	3/27	451.0	1974	3/11	448.5
1983	4/16	455.1	1973	4/26	453.7
1982	4/22	456.8	1972	4/25	447.2
1981	4/17	448.6	1971	3/22	445.8
1980	4/18	446.2	1970	5/19	455.6
1979	3/22	458.2	1969	4/22	445.9

12. Wilderness and Special Areas

The Cameron Research Natural Area, established in 1972, is a 177-acre tract located between the south boundary and Crow Creek. It consists of bottomland hardwoods, primarily a silver maple-American elm association, located in the floodplain of the Illinois River. Other species in this association include red maple, slippery elm, swamp white oak, cottonwood, sycamore and ash.

G. WILDLIFE

2. Endangered and/or Threatened Species

In the spring and fall, censusing of bald eagles is done through aerial observations by the Illinois Natural History Survey. The mid-winter flight on January 4 observed 4 bald eagles (3A/I) at the Cameron Unit. Due to financial constraints, spring censuses were not flown. Use days dropped from last year's high to 140, 18% below the five-year average.

Peak Bald Eagle Population by Month

Adult/Immature

Month	1988-89	1987-88	1986-87	1985-86	1984-85	1983-84
October		0/1	1/0			
November	3/0	1/1	1/0	2/2	1/1	1/0
December	2/1	1/1	2/3	2/3	1/2	
January	4/2	3/1	6/3	0/1	1/0	
February						1/0
March			2/1	1/2	1/1	3/2

Northern Bald Eagle Use Days

	1988	1987	1986	1985	1984	1983
January-March	140	242	120	165	150	180
October-December	105	74	240	240	57	112
TOTAL	245	316	360	405	207	292

1982-1987 average 316

Of the 33 birds listed as endangered species by the Illinois Endangered Species Protection Board, 14 have been recorded for the Cameron-Billsbach Unit. The great egret, double-crested cormorant, black-crowned night heron and northern bald eagle all used the unit extensively in 1987. Due to the distance from headquarters, censuses are not conducted on a regular basis.

3. Waterfowl

Waterfowl use days are calculated, for the most part, from data obtained by the Illinois Natural History Survey on their weekly aerial census of the Illinois and Mississippi river valleys. Surveys are flown weekly in the fall, once in early January, and again weekly in the spring. Due to financial constraints, however, spring flights are not possible some years. Use is then calculated from boat surveys by refuge staff.

The midwinter count on January 4 this year tallied 205 ducks, which is about the same as last year. Spring and summer use days both increased significantly. Most summer use is from the resident wood duck population.

Fall surveys began in early September and a total of 11 flights occurred through December. Fall duck use was down from last year, but still higher than the fall of 1985. Total use was only 6% below 1987 figures, but 35% below the 1983-1987 average.

Goose use increased by almost 10% over 1987, but is also well below the five-year average. Most goose use occurs during the spring migration. On the average, the months of February and March account for over 60% of yearly totals.

Peak Spring Waterfowl Population by Species

	1983	1984	1985	1986	1987	1988	5-year Average 1983-1987
MALLARD	2,050	450	140	2,550	240	720	1,086
BLACK DUCK	65	30	10	110	20	40	47
PINTAIL	--	--	--	--	--	--	--
GREEN-WINGED TEAL	325	--	--	25	50	--	80
BLUE-WINGED TEAL	135	--	--	30	205	30	74
AMERICAN WIGEON	175	50	--	40	60	10	65
NORTHERN SHOVELER	80	--	--	--	160	250	48
WOOD DUCK	75	75	70	70	100	80	78
REDHEAD	80	--	--	--	--	50	26
RING-NECKED DUCK	525	180	140	5	75	35	185
CANVASBACK	125	135	50	30	50	40	78
LESSER SCAUP	875	750	405	250	125	400	481
BUFFLEHEAD	40	--	--	20	20	25	16
RUDDY DUCK	40	100	--	93	--	50	47
COMMON MERGANSER	60	50	45	2	60	70	43
HOODED MERGANSER	10	15	--	--	30	--	11
COMMON GOLDENEYE	200	135	130	22	195	100	136
CANADA GOOSE	4,650	15	--	1,812	150	150	1,325
SNOW GOOSE	125	275	125	--	--	--	105

Peak Fall Waterfowl Population by Species

	1983	1984	1985	1986	1987	1988	5-year Average 1983-1987
MALLARD	575	650	1,450	400	660	800	747
BLACK DUCK	35	20	20	30	40	50	29
GADWALL	--	20	80	--	--	--	20
PINTAIL	--	--	60	--	30	50	18
GREEN-WINGED TEAL	105	525	450	100	325	225	301
BLUE-WINGED TEAL	230	230	165	700	305	110	326
AMERICAN WIGEON	50	130	400	100	150	60	166
NORTHERN SHOVELER	35	5	105	--	225	40	74
WOOD DUCK	215	25	85	100	275	150	140
REDHEAD	--	--	50	--	--	--	10
RING-NECKED DUCK	30	50	440	60	60	100	128
CANVASBACK	--	20	175	--	50	25	49
LESSER SCAUP	75	60	1,100	125	175	200	307
BUFFLEHEAD	--	--	60	15	10	15	17
RUDDY DUCK	--	50	250	40	30	--	74
HOODED MERGANSER	--	10	15	20	10	10	11
COMMON MERGANSER	--	30	125	30	65	45	50
RED-BREASTED MERGANSER	--	--	25	25	--	--	10
COMMON GOLDENEYE	10	75	340	340	155	210	184
CANADA GOOSE	75	135	625	410	250	285	299
SNOW GOOSE	--	30	225	55	30	75	68

WATERFOWL USE DAYS

Ducks

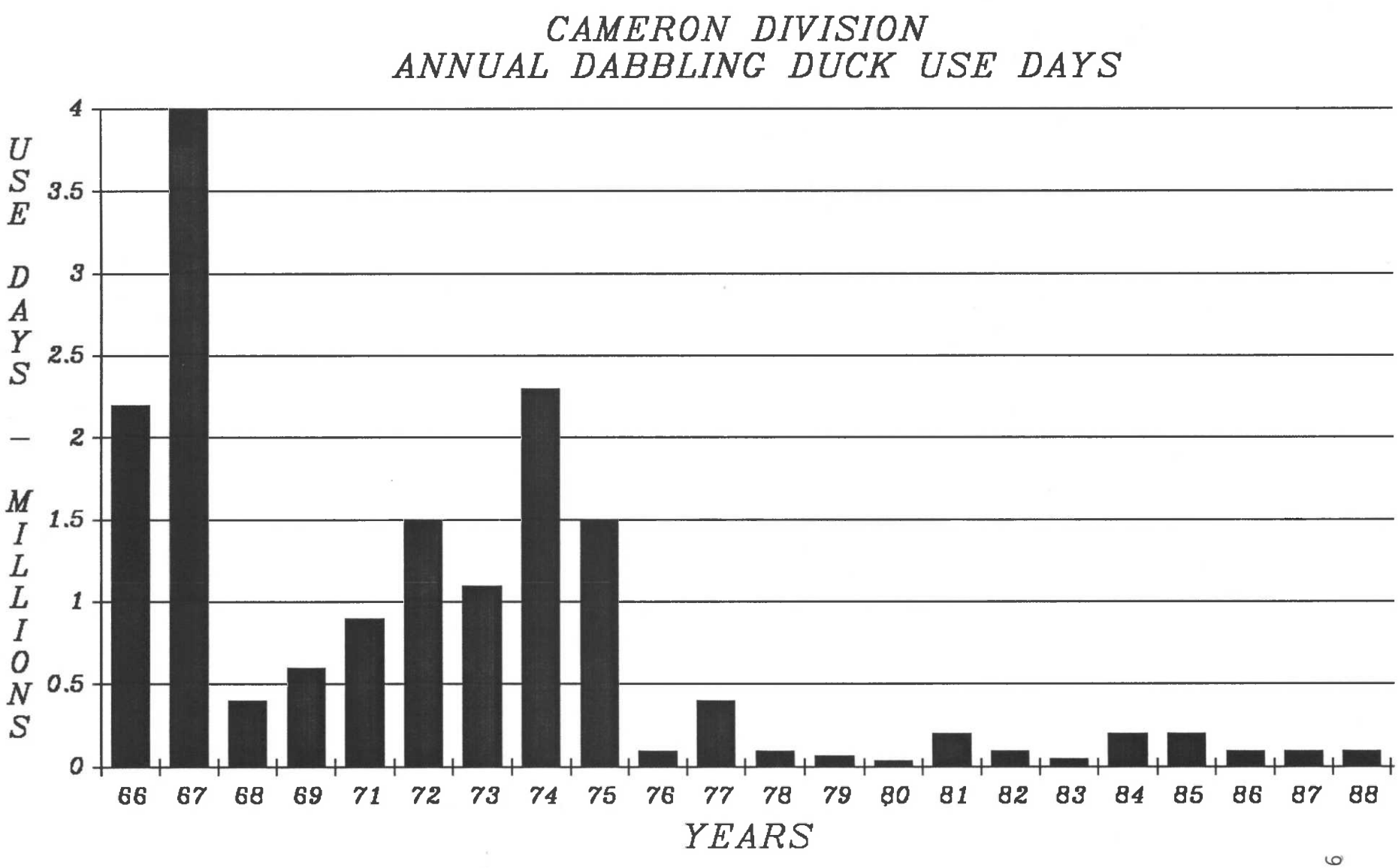
	January-March	April-June	July-September	October-December	Total	△ %
1978	40,185	100,200	58,872	374,830	574,087	- 46.1
1979	266,575	206,470	36,540	313,640	823,225	+ 43.4
1980	462,075	48,700	33,300	89,745	633,820	- 23.0
1981	66,980	11,265	22,160	93,065	193,470	- 69.4
1982	42,877	30,970	20,120	48,840	142,807	- 26.3
1983	126,111	38,460	23,400	29,065	217,036	+ 52.0
1984	37,129	27,675	21,447	50,990	137,241	- 36.8
1985	37,139	14,180	19,235	152,050	222,604	+ 62.2
1986	38,790	13,530	19,710	30,600	102,630	- 53.9
1987	19,152	6,530	16,080	68,163	109,925	+ 7.1
1988	27,365	13,120	16,980	45,655	103,120	- 6.2
Average*	51,664	20,075	19,974	66,174	157,887	
Percent	32.7%	12.7%	12.7%	41.9%		

*Previous 5-year average

Geese

1978	6,200	3,900	1,800	17,850	29,750	- 46.3
1979	33,670	3,600	900	17,185	55,355	+ 86.1
1980	27,745	1,350	1,050	18,020	48,165	- 13.0
1981	12,170	--	600	5,105	17,875	- 62.9
1982	7,365	750	900	7,185	16,200	- 9.4
1983	95,890	150	750	2,760	99,550	+ 514.5
1984	3,075	--	--	4,270	7,345	- 92.6
1985	3,010	155	30	24,035	27,230	+ 270.7
1986	19,350	4,590	--	18,150	42,090	+ 35.3
1987	855	243	3,850	8,665	13,613	- 67.7
1988	2,400	245	--	12,200	14,845	+ 9.1
Average*	24,436	1,028	926	11,576	37,966	∞
Percent	64.2%	2.7%	2.4%	30.5%		

*Previous 5-year average


CAMERON DIVISION
ANNUAL DABBLING DUCK USE DAYS
USE DAYS - MILLIONS
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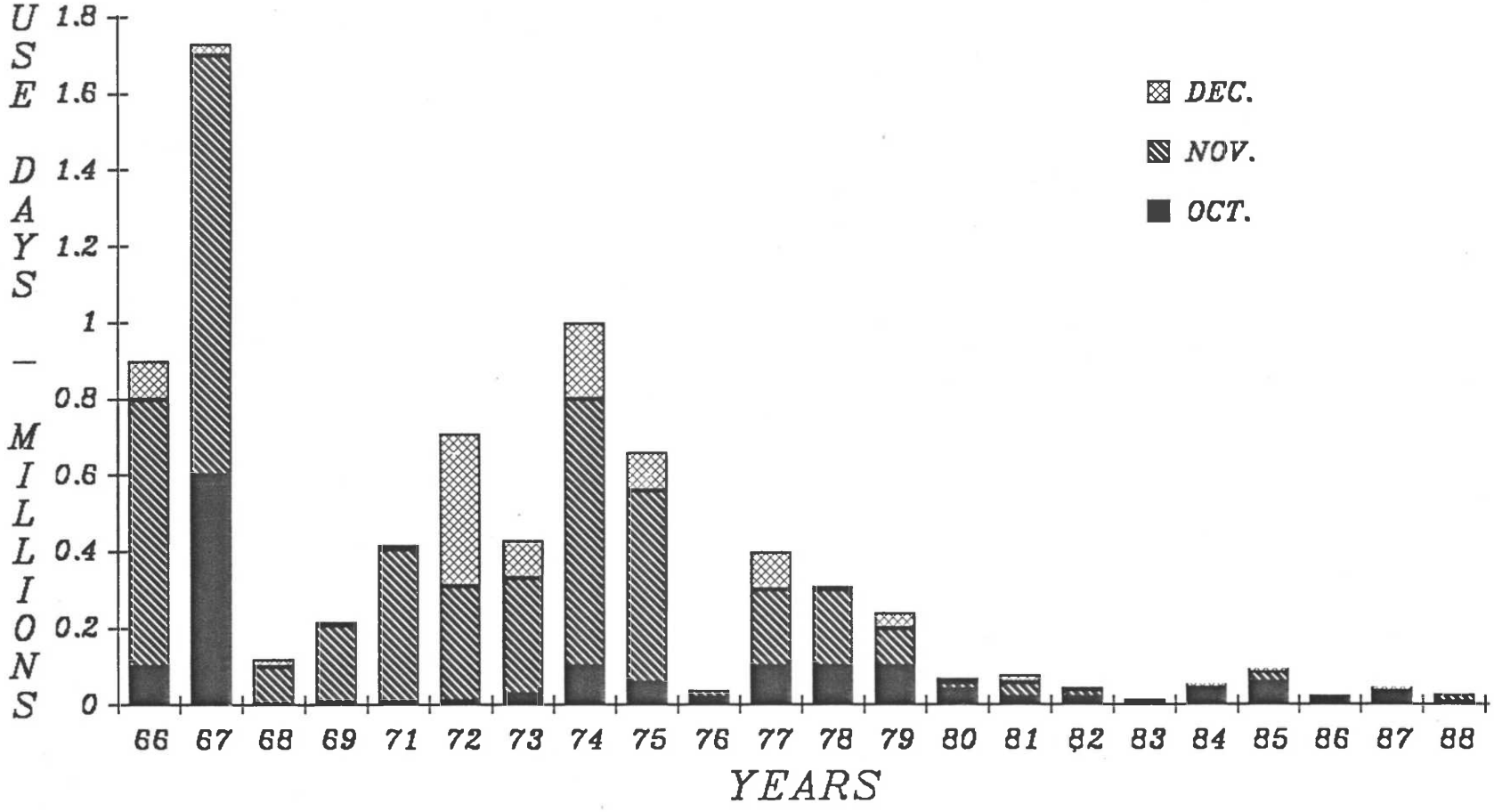
YEARS

CAMERON DIVISION
FALL DABBLING DUCK USE DAYS



WOOD DUCK PRODUCTION

The wood duck box program at Cameron-Billsbach was reviewed this year. Since moving the 15 boxes to their new location on Upper and Lower Henry Islands and the adjacent sloughs in 1984, production has not been as good as what was hoped for. In four years, 60 boxes were available; 4 were used by wood ducks and 27 by starlings. There is no really good brood rearing habitat nearby, although pairs are sighted frequently in the spring.

During the late 60's, boxes were placed around the delta of Crow Creek in Weis Lake. These boxes had about the same success as the Henry Island group. Once again, brood rearing habitat was scarce.

In the winter of 1988-89, these boxes will be moved to the old moist soil unit on the northwest side of the Cameron Unit. This unit has grown up with willows, maples and elms since it was cleared in the late 60's.

Beaver have moved in in recent years and plugged holes in the dike and culvert riser that controlled the water levels in the unit. The small permanent ponds created by a series of beaver families down the old ditch are situated adjacent to the west bluff of the river. Cattails and other emergent aquatic vegetation in these ponds may provide the missing ingredient for successful wood duck production at the Cameron-Billsbach Unit.

4. Marsh and Water Birds

The vast majority of this category consists of coot use. The first coots arrived in early March and peaked late in the month at approximately 400. They continued using the area into early May.

Although use was above average for the first quarter, limited summer and fall use accounted for a 67% decrease from 1987 for total use days. The five-year average is over double the use for 1988.

The great blue heron, great egret and double-crested cormorant typically make up 75% of the other use days in this group. Other species commonly found are the black-crowned night heron, American bittern, and pied-billed and horned grebes.

Coot Use Days

	January-March	April-June	July-September	October-December	Total	Δ %
1978	465	52,870	5,410	50,345	109,090	+ 8.4
1979	43,400	8,750	2,010	46,530	100,690	- 7.7
1980	68,045	20,620	5,700	25,390	119,755	+ 18.9
1981	1,705	5,865	1,500	13,485	22,555	- 81.2
1982	1,240	3,450	600	14,840	20,130	- 10.8
1983	4,495	11,170	750	5,660	22,075	+ 9.7
1984	5,115	5,260	---	14,100	24,475	+ 10.9
1985	6,355	4,950	---	46,275	57,580	+ 135.0
1986	3,875	5,400	---	8,425	17,700	- 69.3
1987	7,750	10,635	---	33,590	51,975	+ 193.6
1988	6,200	3,155	---	7,650	17,005	- 67.3
Average*	5,518	7,483	150	21,610	34,761	
Percent	15.9%	21.5%	0.4%	62.2%		

*Previous 5-year average

5. Shorebirds, Gulls, Terns and Allied Species

Although the herring and ring-billed gull account for the vast majority of use in this category, several other species use the Cameron-Billsbach Unit. The killdeer, spotted and common sandpiper, common and black tern, greater and lesser yellowlegs, and pectoral sandpiper are commonly observed by refuge personnel.

6. Raptors

Owls, primarily the great horned and eastern screech, along with the red-tailed hawk, dominate raptor use.

Barred owls, American kestrels, and bald eagles are other moderate users of the unit.

7. Other Migratory Birds

Mourning doves nest along the edge of the Cameron Unit, where the farmland meets the forest. Peaks normally occur in August or September where approximately 40 - 80 doves can be counted in a normal year. The woodcock also uses the Cameron Unit during its migrations. Though seldom seen, they are sometimes heard throughout the unit.

H. PUBLIC USE

1. General

Although the Cameron-Billsbach Unit is not officially open to public use, the distance from headquarters makes enforcement difficult. It has been generally accepted that fishing occurs during the summer months on Billsbach Lake. This lake is not entirely owned by the Service, and the irregular boundary through the lake is not posted, as signs would probably have to be replaced every year due to flooding and ice.

Future plans may call for opening the refuge to fishing, as there is no indication that it would conflict with refuge interests or objectives.

Wildlife observation also occurs as boaters come off the Illinois River to view the backwater lakes.

17. Law Enforcement

Special Agent Jerry Sommers, Peoria, apprehended four individuals on November 17 hunting waterfowl on the refuge.

Fines were as follows:

Hunter #1	Hunting on refuge, take one duck	$225.00
Hunter #2	Hunting on refuge	$200.00
	No Waterfowl Hunting Stamp	75.00
	Possession of lead shot	75.00
Hunter #3	Hunting on refuge, take one duck	$225.00
	No Waterfowl Hunting Stamp	75.00
Hunter #4	Hunting on refuge, take 2 ducks	$250.00
	No Waterfowl Hunting Stamp	75.00

I. EQUIPMENT AND FACILITIES

3. Major Maintenance

The Maintenance Management System inspection was made on the structures and facilities on Cameron Division. Deficiencies totaled $7,350.

J. OTHER ITEMS

3. Items of Interest

In April, a revenue-sharing check in the amount of $3,804 was delivered to the treasurer of Marshall County for 1987. As in other years, revenues and the supplemental appropriations were insufficient to make full payment. The check was 59% of the full amount. Payments to Marshall County for the past 10 years are as follows:

Year	Payment	%	Year	Payment	%
1987	$ 3,804	59	1982	$ 5,670	91
1986	3,875	60	1981	2,656	88
1985	4,153	64	1980	3,030	100
1984	4,638	74	1979	2,238	75
1983	4,820	77	1978	1,454	50

4. Credits

Miller: D, F, I, J.
Sittauer: Remainder.
Clanin: Typing and assembling.

MEREDOSIA

MEREDOSIA NATIONAL WILDLIFE REFUGE

Meredosia, Illinois

ANNUAL NARRATIVE REPORT

Calendar Year 1988

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

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, located 50 miles downriver from Chautauqua, 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 was 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 former cropland in various stages of reforestation.

INTRODUCTION

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F. HABITAT MANAGEMENT (Cont)

G. WILDLIFE

H. PUBLIC USE

H. PUBLIC USE (Cont)

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

K. FEEDBACK Nothing to Report

L. INFORMATION PACKET - - (inside back cover)

B. CLIMATIC CONDITIONS

Climatological data for the refuge are recorded by the Corps of Engineers at the LaGrange Lock and Dam, river mile 80.1, approximately four miles upriver from the refuge. Temperature readings are not kept at this station. See Chautauqua for temperature information.

Precipitation at Meredosia totaled 28.54 inches, which is 11.26 inches below the 20-year average for the station. Added to last year's shortfall of over 9 inches and the severity of the drought situation is quite evident.

The winter months provided enough moisture to get the growing season off to a good start. However, starting in April,. precipitation was well below the average, and the drought continued until August. By then it was too late to help crops, and lack of precipitation continued in September and October. November was the only month in 1988 with precipitation significantly above average.

Month	Precipitation	Normal	Difference
January	1.83	1.66	+ 0.17
February	1.53	1.34	+ 0.19
March	3.24	3.46	- 0.22
April	0.85	4.09	- 3.24
May	2.55	4.43	- 1.88
June	1.54	4.31	- 2.77
July	2.31	4.50	- 2.19
August	3.71	3.64	+ 0.07
September	1.80	4.13	- 2.33
October	1.83	3.41	- 1.58
November	5.06	2.34	+ 2.72
December	2.29	2.49	- 0.20
TOTALS	28.54	39.80	- 11.26

C. LAND ACQUISITION

1. Fee Title

Little headway was made on obtaining the Murray Johnson tract which is adjacent to the refuge. In 1984, this 1,600 acre unit was donated to The Nature Conservancy with the understanding it would later be turned over to the Fish and Wildlife Service. Trouble started when the state claimed it never gave up the portion in the

meandered lake and that, although it had been claimed by private owners for many years and they had been paying taxes on it, the state still had ownership. The Service has agreed with their claim. Presently, the project is being held up by The Nature Conservancy's attorney. There are approximately 570 acres not included as meandered waters in the tract.

Some individuals within the Illinois Department of Conservation were indicating the state should take over management of the entire refuge. A meeting with the top officials of the Department and Regional Director Gritman was held in May. The state was told that the Service planned to keep the refuge and its management would be handled by the Service.

While down for surveying the Murray Johnson tract, Regional Office surveyors also surveyed a questioned line on the refuge bordering the Lanesville-Chicago Hunting Club. The surveyors had searched courthouse records and came up with information on a 1930 survey to base the new survey on. The FWS survey put the boundary some 90 feet east of where the old line was considered to be. This resulted in a dike constructed by the hunting club a number of years ago falling on the refuge. The hunting club then came up with survey notes from the 1930 that established a line agreed upon by both Morgan and Cass county officials. This survey apparently was never registered in the courthouses. Although the hub used to mark the corner was destroyed years ago, a pecan tree used as a witness and marked with ax cuts still exists. The ax marks are readily apparently in the bark. Whether the old corner was correct or not, boundaries were determined from that corner. FWS surveyors plan to honor the earlier survey.

Private landowners within the approved refuge boundary at Meredosia were contacted for interest in selling. Only the Meredosia Farm Club expressed any interest and it was only lukewarm in that they would be interested in listening to an offer.

D. PLANNING

4. Compliance With Environmental and Cultural Resource Mandate

A contract was issued to Western Illinois University for an archeological investigation of the refuge. Sarah Studenmund, Center for American Archeology, Kampsville, did the field work. The final report has not been received.

E. ADMINISTRATION

1. Personnel

Personnel changes are discussed in the Chautauqua Refuge narrative.

1.	Eric Sipco Refuge Manager	GS-11	Trans. 1/88	PFT
2.	Glen R. Miller Refuge Manager	GS-11	EOD 1/88	PFT
3.	Kevin Sittauer Asst. Refuge Manager	GS- 7	EOD 11/87	PFT
4.	Alice Clanin Refuge Assistant	GS- 5	EOD 6/66	PPT
5.	Charles W. Watts Maintenance Worker	WG- 8	EOD 9/60	PFT

4. Youth Programs

Due to the distance from Chautauqua and the related driving time, little YCC work occurs down here. This year the crew made three trips to the refuge to release the 1984 pin oak planting. A total of 57 were found, ranging in height from less than a foot to 4 feet. The enrollees sheared all willows near the pin oaks and stacked the saplings off to the side. The stumps were treated with Tordon-RTU by the assistant manager to prevent resprouting.

YCC enrollees released 57 pin oaks by shearing willows and maples. KJS

5. Funding

Meredosia Refuge has no funding source of its own and is included in Chautauqua Refuge's budget. This makes all activities at Meredosia highly susceptible to cutbacks.

F. HABITAT MANAGEMENT

2. Wetlands

Flooding occurs at Meredosia when the water level exceeds 431.0' MSL and tops the south dike. This occurred in January and again in April. Since the ponds were not flooded the previous fall and had excellent moist soil plant production in 1987, there was a good available food supply for spring migrants. The flooded areas received heavy use by waterfowl.

With the hot, dry summer and fall, the river level stayed around 420' MSL. The interior pools completely

dried up by midsummer. Pigweed, marsh smartweed and Walter's wild millet were the predominant moist soil plants.

Again this year, the water level in Meredosia Lake was too low to enable fall pumping and flooding of the moist soil units. Fall waterfowl use on the refuge was limited to the narrow fringe along the lake.

One reason the lake levels have been low in recent years was the result of the Meredosia Lake Drainage and Levee District trespassing on private land in 1986 and tearing out the dam on the outlet to the lake. They did this on the pretext that they needed to draw the lake down to work on their outlet structure on the lake. They then refused to put it back in and threatened others with legal action if it were replaced. Fishing and other water recreational activities were eliminated during the summer because of low levels in the lake. Some concerned individuals filled in the front portion of the dam with rock hand placed. Bud Hackman, caretaker of the Sand Point Duck Club, had additional rock hauled in. The attorney for the drainage district contacted Mr. Hackman and gave him until August 1 to remove the dam. A Permit No. 971 from the Illinois Department of Transportation was issued to Linn Farms, Inc., on November 8, 1961, authorizing construction of the dam with top elevation of 423.2 ft. MSL. The Corps of Engineers informed the District that they were in violation for not obtaining a permit to remove the dam in 1986 and they were to leave the rebuilt dam alone.

Water levels in the river did not raise enough to flood the lake to the depth needed to pump into the refuge.

1988 MEREDOSIA BAY ELEVATIONS (Feet MSL)

(Interpolated for River Mile 75.6)

Month	Maximum	Minimum	Differential	Average
January	432.1	429.5	2.6	431.0
February	430.6	427.8	2.8	429.5
March	429.3	424.3	5.0	426.5
April	432.6	427.9	4.7	430.6
May	427.6	421.0	6.6	422.8
June	421.1	420.0	1.1	420.4
July	420.6	419.5	1.1	420.1.
August	420.7	419.6	1.1	420.2
September	421.2	419.7	1.5	420.2
October	421.2	419.2	2.0	420.0
November	424.2	419.7	4.5	421.8
December	423.0	419.6	3.4	421.2

3. Forests

The YCC crew cleared the willow, maple, and cottonwood encroachment from around the remaining 57 pin oak trees of the 1984 planting of 300. The stumps were then sprayed with Tordon-RTU by Certified Applicator Sittauer to stop resprouting. The trees were planted in a lower area of the former cropland thus invasion of other tree species has been more rapid than adjacent areas. The pin oaks have had a rough life thus far. Besides the competition for sunlight, one year they were flattened by ice when the river flooded, froze then receded. The work done by the YCC effectively opened the area up but also created a clearing for the deer to follow. The deer must find pin oak to their liking as this winter they have done considerable damage to the remaining trees.

4. Croplands

The Reforestation Plan for Meredosia approved in 1987 calls for re-establishment of bottomland hardwoods on the former cropland areas. The decision was made to plant 149 of the 281 acres to trees; the remaining 132 acres would be allowed to revert naturally to timber, mainly maple. The fields were last farmed in 1983 thus timber invasion has already begun to a varying degree.

The fields with smaller and fewer woody plants were targeted for future plantings which will include pin oak, sycamore, green ash, pecan and hickory.

A cooperative farming agreement was made with Ed Kloker, Beardstown, to work up the 149 acres. The extremely dry summer did not make ideal conditions for breaking the ground out. Seventy-nine acres were broke out and planted to corn. Because of the drought, the average yield was only 17 bushels/acre.

10. Pest Control

Basagran and 2,4-Damine were used on the 79 acres of corn to control weeds. Rates were as follows: Basagran - 1 pt./acre (.5 lb. AI/ac) or 39.4 lbs. AI total. 2,4-D LVamine - 1/3 pt./acre (.1666 lb. AI/ac) or 13.1 lb. AI total.

Tordon RTU was also sprayed on the stumps of small trees cut from around the 57 pin oak plantings.

12. Wilderness and Special Areas

A 275-acre tract of woodland was submitted as a proposal 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 registering the area on the State Natural Area List.

G. WILDLIFE

2. Endangered and/or Threatened Species

The northern bald eagle is the only federally endangered animal species to use Meredosia. Data on use by eagles are largely gathered from the aerial censuses flown by the Illinois Natural History Survey. Weekly flights are made every fall from September through December plus a midwinter in early January. If funding is adequate, they fly weekly censuses during the spring migration as well. Funding was not available in 1988.

Eleven eagles (8A/3I) were censused in the midwinter flight on January 4. This is the largest count ever for the early January flight, and in turn contributed to the highest use day total for the January-March period.

Fall use declined, however, probably due to the dry conditions and decrease in waterfowl populations. Total use was slightly less than last year, but there is a definite trend upward compared to ten years ago.

Northern Bald Eagle Peak Population
By Month (Adults/Immatures

	1988-89	1987-88	1986-87	1985-86	1984-85	1983-84
October	1/1	2/1	1/ 1	2/1	1/1	1/0
November	5/3	4/1	6/ 3	3/2	6/2	3/1
December	8/3	9/5	11/ 5	15/7	6/9	3/1
January	6/8	8/3	4/ 3	5/2	6/3	3/1
February		No data	12/10	3/0	No data	5/3
March		3/3	6/ 5	8/6	6/4	5/3

Northern Bald Eagle Use Days

Year	Jan-Mar	Oct-Dec	Total	Year	Jan-Mar	Oct-Dec	Total
1988	630	460	1,090	1983	350	275	625
1987	590	535	1,125	1982	560	412	972
1986	460	651	1,111	1981	480	399	889
1985	570	651	1,226	1980	600	380	980
1984	550	405	955	1979	135	560	695

Of the 33 species listed by the Illinois Endangered Species Board, 14 have been known to use the refuge. Great egrets are the most abundant, with peak populations reaching up to 75. Double-crested cormorants and black-crowned night herons are the next two most prevalent species, with peaks of up to 100 and 30 respectively not uncommon.

Due to the distance from headquarters, a limited number of surveys can be made on these species. Therefore, use day data would be unreliable, and is not calculated.

3. Waterfowl

The Illinois Natural History Survey provides the refuge with data from the weekly aerial surveys they fly in the fall. When funding is adequate, spring censuses are flown as well. This year, money was not available. Use days are then calculated from ground surveys conducted by refuge personnel.

The midwinter flight counted 1,195 ducks and 610 geese. This is a great rise in goose numbers over 1987 when there were only 50. Spring goose use increased almost three times over 1987, but is only about half the five-year average. Ducks saw a slight increase but again, it is less than half the average number of use days.

The dry summer evaporated all the water from the ponds and marshes at Meredosia this year. Billings lake was bone dry by September with monotypic stands of pigweed six feet tall in the basin. The fall rains never came to flood them however, and waterfowl use days dropped to a record low. The only available water was in Meredosia Lake and that was extremely low as well.

Fall aerial surveys resumed in early September and by December, when they were over, duck use days totaled only 198,940 for the fourth quarter, which is well below the five-year average of 544,872. Also, although spring use was up, and third quarter use increased over 50%, total use days for ducks was the lowest on record.

Consequentially, the percent of Lower Illinois Valley mallards using the Meredosia Refuge greatly decreased. The fact that there was no water in ponds (until a scant amount collected in late October) and Meredosia Bay was low, meant birds went elsewhere. Private clubs with pumping facilities concentrated great flocks in small areas. On the average this fall, Meredosia provided habitat for only 2.2% of the Lower Illinois Valley mallard population.

FALL MALLARD POPULATIONS

Date	Lower Illinois Valley	1988	%	1987 %	1986 %	1985 %
9/ 6	7,230	700	9.7	7.6	5.8	3.1
9/13	6,910	80	1.2	5.5	5.5	4.2
10/10	29,180	700	2.4	1.8	---	---
10/17	55,225	1,000	1.8	2.2	4.0	3.0
10/24	85,910	900	1.0	2.0	5.8	---
10/31	138,330	1,000	0.7	2.5	5.0	3.6
11/ 7	178,805	1,800	1.0	3.8	2.6	1.3
11/14	166,570	2,700	1.6	2.8	1.4	---
11/21	189,430	2,800	1.5	3.0	6.0	7.4
11/28	174,270	3,800	2.2	---	---	---
12/ 5	126,460	2,400	1.9	2.8	---	2.1
12/12	54,240	450	0.8	0.5	0.6	6.1
Average Percentage			2.2	3.1	4.1	3.6

Peak Spring Waterfowl Population by Species

	1983	1984	1985	1986	1987	1988	5-year Average 1983-1987
MALLARD	3,200	8,025	3,600	3,625	1,300	2,000	3,950
BLACK DUCK	75	165	50	75	30	100	79
GADWALL	700	390	200	--	75	75	273
PINTAIL	550	600	375	120	600	200	449
GREEN-WINGED TEAL	800	100	80	10	80	150	214
BLUE-WINGED TEAL	850	650	175	150	400	200	445
AMERICAN WIGEON	1,400	1,600	650	45	250	500	789
NORTHERN SHOVELER	900	800	250	55	400	140	481
WOOD DUCK	250	165	175	125	250	200	193
REDHEAD	275	215	75	--	50	80	123
RING-NECKED DUCK	600	575	500	75	250	400	400
CANVASBACK	750	1,100	500	460	150	450	592
LESSER SCAUP	1,500	4,000	2,300	320	500	800	1,724
BUFFLEHEAD	150	150	50	35	50	20	87
RUDDY DUCK	250	400	60	220	30	50	192
COMMON MERGANSER	80	325	125	125	200	130	171
HOODED MERGANSER	40	75	50	40	50	40	51
COMMON GOLDENEYE	350	1,000	700	500	800	300	670
SNOW GOOSE	150	40	250	--	25	--	93
CANADA GOOSE	450	500	1,200	125	1,400	600	735

Peak Fall Waterfowl Population by Species

	1983	1984	1985	1986	1987	1988	5-year Average 1983-1987
MALLARD	6,700	2,700	17,000	35,000	6,500	2,800	13,580
BLACK DUCK	75	30	300	250	80	70	147
GADWALL	80	150	650	350	175	75	281
PINTAIL	400	450	1,700	3,300	325	250	1,235
GREEN-WINGED TEAL	300	1,000	1,600	450	600	400	790
BLUE-WINGED TEAL	700	750	900	700	1,000	1,000	810
AMERICAN WIGEON	650	650	2,400	5,500	500	150	1,940
NORTHERN SHOVELER	80	30	500	100	450	100	232
WOOD DUCK	495	480	290	500	275	450	408
REDHEAD	60	50	125	75	175	50	97
RING-NECKED DUCK	175	125	650	400	400	150	350
CANVASBACK	40	150	650	400	450	225	338
LESSER SCAUP	375	350	1,900	2,500	750	450	1,175
BUFFLEHEAD	30	40	150	200	175	75	119
RUDDY DUCK	80	100	300	300	500	175	256
COMMON MERGANSER	25	35	375	250	150	100	167
HOODED MERGANSER	20	50	50	100	30	20	50
RED-BREASTED MERGANSER	--	20	60	20	--	--	20
COMMON GOLDENEYE	60	75	1,500	800	425	275	572
CANADA GOOSE	100	225	3,950	1,000	700	575	1,195
SNOW GOOSE	30	75	750	200	450	125	301

WATERFOWL USE DAYS - MEREDOSIA NWR

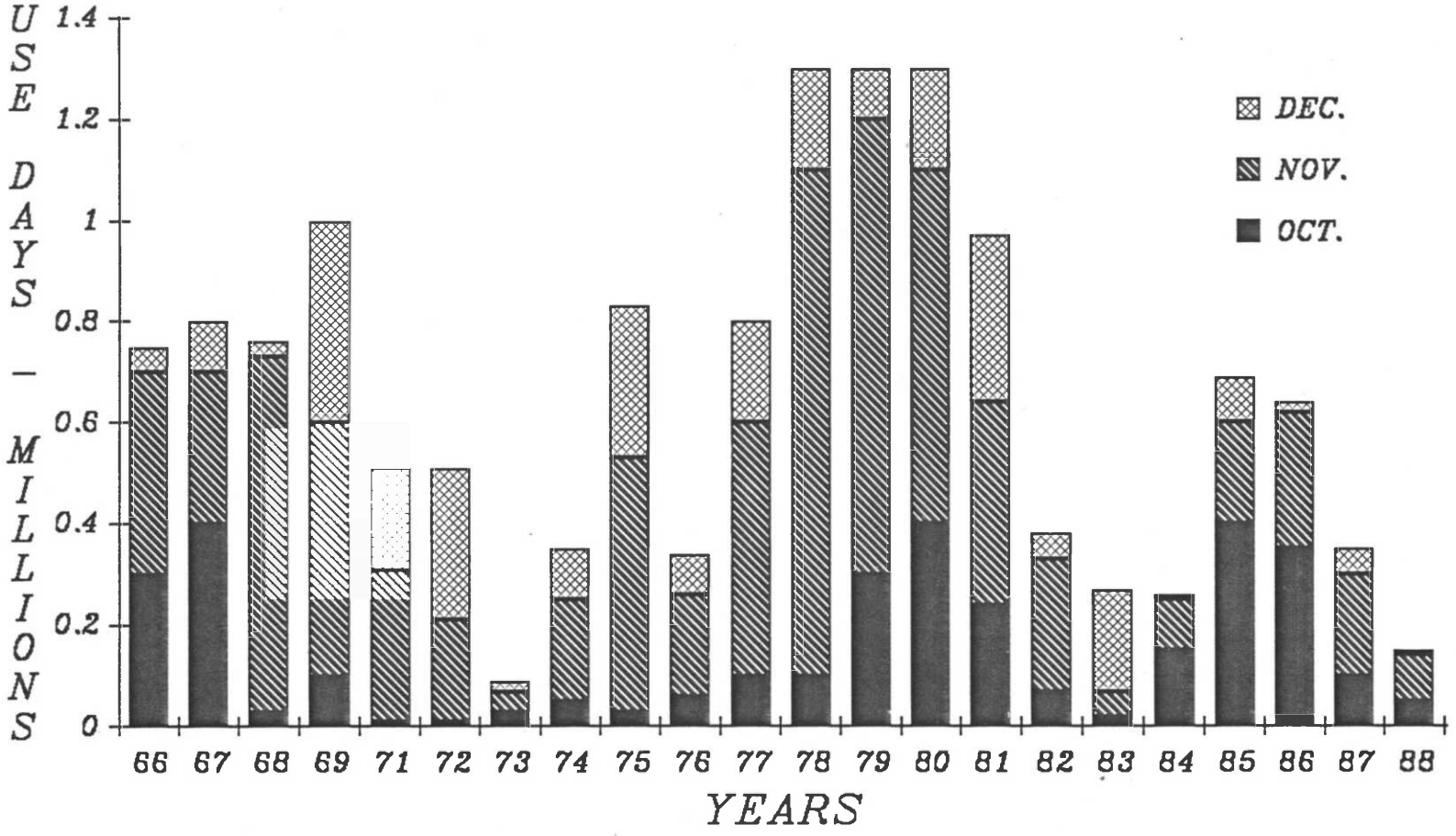
Ducks

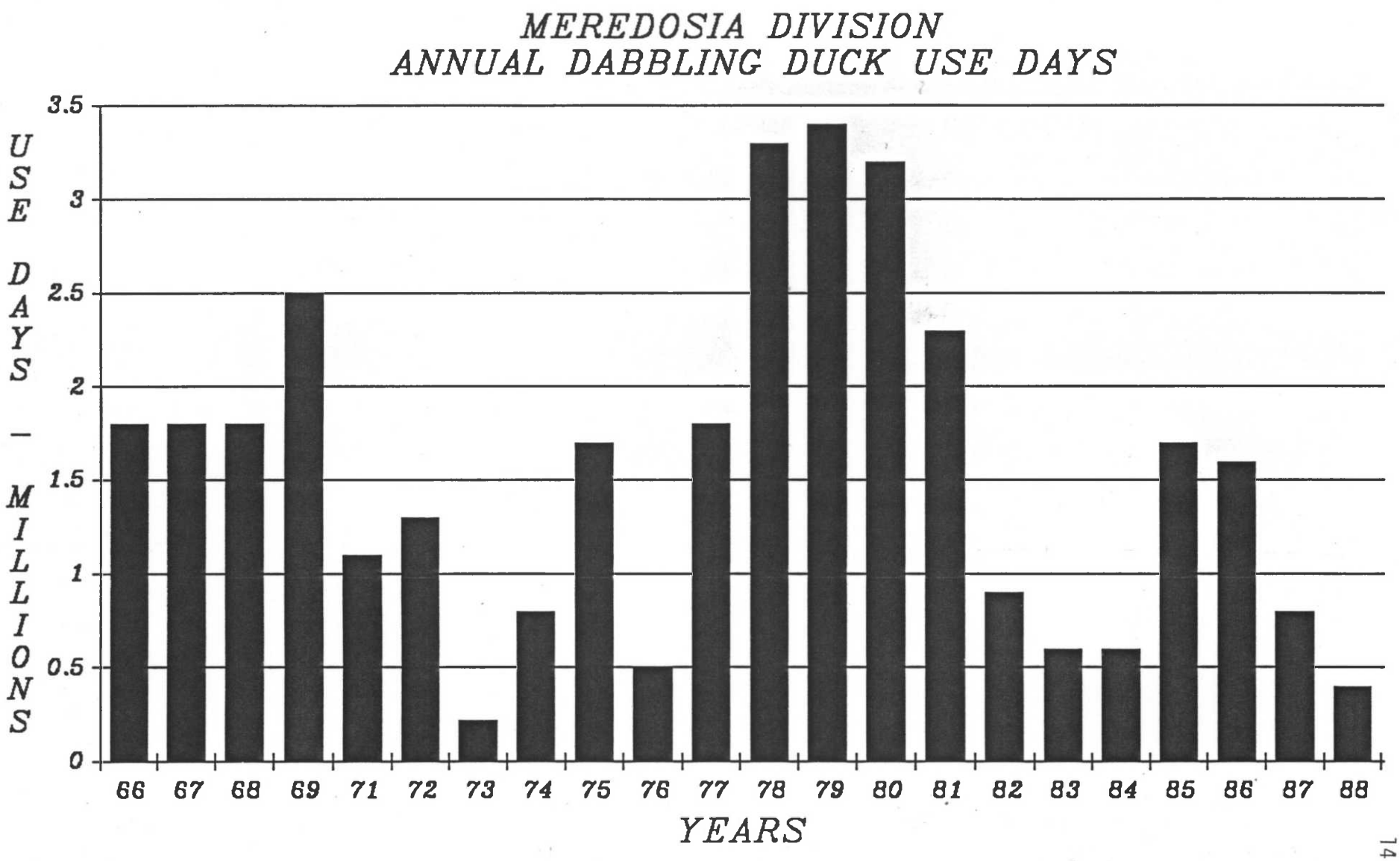
	January-March	April-June	July-September	October-December	Total	Δ %
1978	148,280	479,640	68,725	1,680,025	2,376,670	+ 50.5
1979	1,455,795	240,620	117,065	1,347,780	3,161,260	+ 33.0
1980	933,925	117,053	88,075	1,439,360	2,578,413	- 18.4
1981	243,000	63,115	118,955	1,206,370	1,631,440	- 36.7
1982	442,054	78,735	36,225	507,680	1,604,724	- 34.7
1983	430,490	235,050	69,690	369,005	1,104,235	+ 3.7
1984	476,650	138,040	75,625	214,155	904,470	- 18.1
1985	197,900	57,110	73,490	1,153,800	1,482,300	+ 63.9
1986	92,142	23,297	60,675	610,235	786,349	- 47.0
1987	91,663	26,692	41,800	377,165	538,320	- 31.5
1988	105,870	19,640	64,955	198,940	389,405	- 27.7
Average*	257,970	96,037	64,256	544,872	963,135	
Percent	26.8%	9.9%	6.7%	56.6%		

Geese

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
1985	22,030	750	0	137,740	160,520	+ 940.0
1986	2,950	150	0	29,987	33,087	- 79.4
1987	2,852	270	2,250	29,390	34,762	+ 5.1
1988	7,215	300	1,055	20,605	29,175	- 16.1
Average*	13,499	594	600	41,680	56,373	
Percent	23.9%	1.1%	1.1%	73.9%		

MEREDOSIA DIVISION
FALL DABBLING DUCK USE DAYS




MEREDOSIA DIVISION
ANNUAL DABBLING DUCK USE DAYS
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YEARS

WOOD DUCK BOX PRODUCTION

	Moss Pond	South Dike/ Billings Lake	Total
No. of boxes available	8	16	24
No. of boxes used by wood ducks	3	11	14
No. of successful nests	2	11	13
Average clutch size/ successful nest	8.5	9.5	9.4
No. hatched eggs	17	100	117
No. unhatched eggs	7	5	12
Overall hatch rate	70.8	95.2	90.7
Approximate ducks produced to flight stage (hatched x 0.35)	6	35	41

WOOD DUCK PRODUCTION

Boxes were checked in the spring for maintenance needs and to add wood shavings. Production checks were made on September 12 and January 29. For the fifth year in a row, the number of young produced increased, and the number of boxes used this year was an all time high. Starlings nested in five of the boxes, compared to two in 1987 and 0 in 1986. This is still lower than at Chautauqua, but will be monitored in coming years.

Due to the increased success, particularly on the west side of Billings Lake, we plan to add an additional nine boxes there in 1989. Two of the unsuccessful boxes at Moss Pond will be moved to the other side, and the two boxes on the east side of Billings that nested starlings will be moved if this occurs again in 1989.

Wood Duck Production

Ten-year Summary of Wood Duck Box Use

Year	# of Boxes	# Boxes Used by WD		Successful Nests		Production of Young	Average Hatch Size
1978	26	1	(4%)	1	(4%)	22	22.0
1979	20	1	(5%)	1	(5%)	10	10.0
1980	26	5	(19%)	5	(19%)	53	10.6
1981	26	7	(27%)	6	(23%)	56	9.3
1982	24	9	(38%)	6	(25%)	29	4.8
1983	23	8	(35%)	1*	(4%)	9	9.0
1984	26	9	(35%)	7	(27%)	55	7.9
1985	26	9	(35%)	8	(31%)	70	8.8
1986	26	8	(31%)	7	(27%)	94	13.4
1987	26	12	(46%)	10	(38%)	105	10.5
1988	24	14	(58%)	13	(54%)	117	9.0

*High water flooded boxes

4. Marsh and Water Birds

Coots account for the large majority of marsh and water bird use on the refuge. Data are collected from the aerial censuses and ground surveys, when possible. The fall migration period typically accounts for approximately 70% of the use days.

Coot numbers were down considerably this year. Spring flights by the Illinois Natural History Survey were cancelled in 1988 from lack of funds. Ground censuses are unable to cover Meredosia Lake, which accounts for the majority of use. Therefore, population data is an estimate in the spring. These estimates are on our occasional boat censuses and correlated with Chautauqua's known trends.

The spring population peaked near 700 in 1988. This is far below the average, but not out of line with the '85 and '86 peaks when continental populations were similar. The fall peak of 1,400 occurred in October and was also well below average. All these birds were located in Meredosia Lake.

Coot Use Days

Meredosia NWR

	January-March	April-June	July-September	October-December	Total	△ %
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
1985	22,010	19,500	--	603,950	645,460	+ 479.3
1986	8,835	10,620	900	112,150	132,505	- 79.5
1987	42,700	24,700	1,200	204,825	273,425	+ 106.3
1988	6,200	9,360	--	44,650	60,210	- 78.0
Average*	21,118	52,455	960	201,365	275,898	
Percent	7.7%	19.0%	0.3%	73.0%		

Coot Population Peaks

	1988	1987	1986	1985	1984	1983
Spring	700	3,200	665	1,200	6,000	6,800
Fall	1,400	7.700	15,000	23,000	1,800	2,600

Other marsh and water birds included the great blue heron, black-crowned night heron, great egret, double-crested cormorant, American bittern, pied-billed grebes, and the green heron.

The period from July to October usually accounts for the largest share of total use days, with anywhere between 50% to 70%.

The double-crested cormorant is listed as a State endangered species in Illinois and is counted during the aerial surveys. Likewise, we have given special attention to cormorants during our censuses. Fall use dropped 10% from 1987, but is still above the 5-year average.

Double-crested Cormorant Days/Peak

Year	Spring	Fall	Total
1988	645/20	2,002/ 50	2,647
1987	934/40	2,209/ 75	3,143
1986	525/17	1,500/ 75	2,025
1985	775/25	1,315/115	2,090
1984	125/ 6	90/ 12	215
1983	1,520/60	650/ 25	2,170

5. Shorebirds, Gulls, Terns and Allied Species

The ring-billed gull and herring gull make up between 35% and 50% of use days in this category. Other species common at Meredosia are yellowlegs, killdeer, sandpipers, and terns on a less frequent basis. Conditions were very favorable for these species this year. The lack of flooding, and gradual drydown of the moist soil units and shallow ponds provided suitable habitat over an extended period of time.

6. Raptors

Three resident species, the barred, eastern screen, and great horned owls, normally account for about half of the use days on the refuge.

The turkey vulture, bald eagle, rough-legged, sharp-shinned and red-tailed hawks are also common at Meredosia.

The State of Illinois lists four species that typically use Meredosia as endangered: northern harrier, Cooper's hawk, red-shouldered hawk, and the osprey. All four used the refuge in 1988.

Two of the fields that had reverted back to forested acres were farmed this year to prepare them for seedling planting. These open areas should have contributed to an increase in raptor use over 1987 when we had no farming program. The heavy encroachment of hardwood saplings has left a minimum of foraging area for birds of prey.

7. Other Migratory Birds

Mourning dove use increased from last year's unusual amount. The farming program ended in 1983, and use has been lower since. Last year, adjacent bumper crops were a contributing factor. This year, farming resumed to a limited extent. Crops were very poor, however, yielding only 17 bushes/acre, and didn't bring in a lot of doves.

Mourning Dove Use

Year	Use Days	Peak Number
1988	6,325	75
1987	14,075	175
1986	5,045	45
1985	7,070	45
1984	6,750	35
1983	12,250	85
1982	10,250	75
1981	4,250	45
1980	20,000	125

The woodcock population peaked at 10 and recorded 600 use days.

8. Game Mammals

Although considered a nuisance by many, the beaver is listed as a game animal. It continues to be problem on the refuge, plugging up the culvert on the south dike. White-tailed deer, fox squirrels, mink, muskrat, raccoon, cottontail rabbit, and red fox are also present throughout the year.

Hunting and trapping are not allowed other than that considered necessary for the proper management of a wildlife refuge.

10. Other Resident Wildlife

Bobwhite quail and pheasant are common in this part of the state. Considering the location of nearby fields, habitat on the refuge would provide good cover for foraging. There is a large variety of songbirds that both migrate through and nest on the refuge. Reptiles and amphibians are plentiful in the rich moist riverbottoms.

H. PUBLIC USE

1. General

Public use is not permitted on Meredosia National Wildlife Refuge. Activities are limited to management that is necessary for waterfowl and wildlife enhancement, as deemed necessary by the Fish and Wildlife Service.

Currently, the refuge is surrounded by private land or Meredosia Lake, limiting access. There is also a lack of manpower and funding to provide adequate patrol if it were open to the public.

17. Law Enforcement

No violation cases were made this year at Meredosia. Public trespass, commercial fishing during high water, and illegal hunting are the main problems on the area. Limited personnel and time make enforcement difficult.

The 1,600 acre Johnson tract, currently held by The Nature Conservancy for transfer to the Service, is wide open to fishing and hunting every year. The Conservancy is not equipped for enforcement activities. When this is finally transferred to the Service, an increased enforcement effort will be necessary.

I. EQUIPMENT AND FACILITIES

1. New Construction

Pumping Pad

The amount of $10,000 was allocated for the construction of a concrete pad for the Ford 7610 tractor to sit on while pumping with the 16" Crisafulli pump. The existing site was unsafe during pumping and rainy weather due to the slope. There was also a problem of pulling the pump out of the ditch after completion of pumping due to the sharp angle and weight of the pump. A contract was let out for bid. Bids came in considerably higher than engineers' estimates. The decision as made not to go after the additional money needed. This site would have been of short duration anyway as plans are being developed to pump water from the Illinois River. This was the setup when in private ownership and the ditches and dikes are set up for that operation. Pumping from Meredosia Lake means pushing water uphill to flood the upper units. Also, the lake is not a dependable water source. The Illinois Department of Transportation, Division of Water Resources, has stated they may limit or prevent pumping during dry periods to prevent adverse effects on public uses of Meredosia Lake.

3. Major Maintenance

The Maintenance Management System inspection of structures and facilities identified $39,000 in deficiencies.

4. Equipment Utilization and Replacement

The 7610 Ford farm tractor used at Meredosia developed mouse problems. Mice built a nest under the instrument panel and chewed insulation off the electrical wiring causing the system to short out. A new wire harness had to be installed.

J. OTHER ITEMS

3. Items of Interest

In April, revenue-sharing checks for 1987 were presented to the treasurers of Cass and Morgan counties for the amounts of $981.00 and $491.00, respectively. The payment was for 59% of the full entitled amount. Payments to these counties for the last ten years are as follows:

Year	Morgan	Cass	%	Year	Morgan	Cass	%
1986	$ 500.00	$ 999.00	60	1981	$ 560.00	$1,267.00	88
1985	536.00	1,071.00	64	1980	639.00	1,446.00	100
1984	689.00	1,316.00	74	1979	485.00	1,097.00	75
1983	716.00	1,415.00	77	1978	315.00	713.00	50
1982	579.00	1,311.00	91	1977	330.91	749.37	53

The Service was informed in October that Meredosia Refuge was included in the proposed Pruitt Military Operations Area (MOA). An Environmental Assessment and Finding of No Significant Impact were completed without Service review and were found to be inadequate. The Service requested the Federal Aviation Administration return the proposal to the Illinois Air National Guard or defer any decision on the proposal until an adequate Environmental Assessment is prepared. A consulting firm from California has been hired by the Air National Guard to review the Environmental Assessment.

4. Credits

Miller: C, D, F, I, J.
Sittauer: Remainder.
Typing and assembly by Clanin.

Other refuge units administered by Chautauqua National Wildlife Refuge

Cameron Unit of Chautauqua NWR
The Cameron Unit is a 637 acre area on the Illinois River, 70 miles north of Chautauqua Refuge. It is small, but it serves as a valuable wildlife sanctuary during the spring and fall migrations.

Public use is not permitted on the Cameron Unit because it is classified a wildlife sanctuary.

Meredosia National Wildlife Refuge
The Meredosia National Wildlife Refuge is a 1,850 acre refuge on the Illinois River, resulting from a land gift to the Fish and Wildlife Service through the Illinois Chapter of the Nature Conservancy. This refuge is 60 miles south of the Chautauqua Refuge.

Meredosia is not open to public use, because it also is classified a wildlife sanctuary.

Information
Additional information can be obtained from:

Refuge Manager
Chautauqua National Wildlife Refuge
Rural Route #2
Havana, Illinois 62644
(309) 535-2290

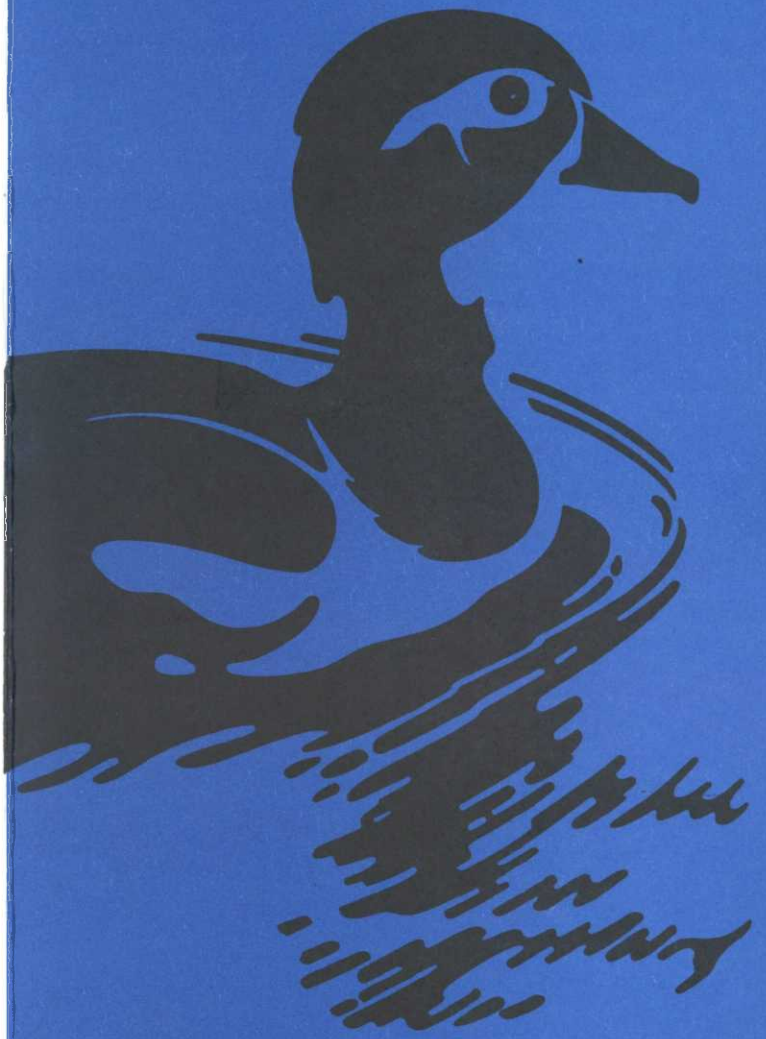
As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Department of the Interior
U.S. Fish and Wildlife Service

RF-3-33650-6/83

Chautauqua National Wildlife Refuge

Illinois



Chautauqua National Wildlife Refuge

The Chautauqua National Wildlife Refuge is a vital link in the chain of resting, feeding and wintering areas for migratory birds along the Mississippi Flyway.

Located in Mason County, this central Illinois refuge contains 4,500 acres of land and water. Lake Chautauqua impounds 3,400 acres of water. Another 900 acres of water and timbered bottomlands are located outside the impoundment area. The remaining refuge acreage is uplands and timber.

History

The lands and waters now occupied by the Chautauqua National Wildlife Refuge have experienced many changes over the years.

For thousands of years, waterfowl and other birds stopped by the millions to rest and feed in the wet Illinois River bottoms during their annual migrations from northern breeding grounds to southern winter homes. In those days, the ducks and geese were "so numerous their masses darkened the sun."

Times changed, and the rich waterfowl habitat was lost as farmers attempted to dike, drain and cultivate the floodplain that was Lake Chautauqua. For a time, Chautauqua produced harvests of grain for man's table.

In the 1920's, however, the rampaging power of a flooding Illinois River reclaimed the lands for waterfowl. The whims of the river provided the conditions of wetting and drying necessary to support the rich harvest of aquatic plants favored by migrating birds.

In the 1930's, navigation dams were built to create a channel for barge traffic on the river. In addition to carrying the products of man's labors, the river's silt load was held in suspension until it was deposited in quiet backwater areas such as Lake Chautauqua. Mud and silt discouraged vegetative growth, causing a decline in food for waterfowl.

The migratory harvest again was diminished.

On December 23, 1936, the purchase of the Chautauqua Drainage and Levee District was approved, and Lake Chautauqua became a part of our National Wildlife Refuge System.

With establishment of the refuge and repair of river levees, the effects of the Illinois River were controlled, and the table was once again set for waterfowl. The area that farmers tried to tame with dikes, pumps and plows is now occupied by wild game and fish.

Wildlife

Some of the greatest concentrations of wild ducks and geese along the Illinois River can be observed each fall and winter at Chautauqua. The average peak concentration during early winter normally exceeds 100 thousand ducks and up to 40 thousand Canada, blue and snow geese. Mallards comprise the bulk of the duck population with smaller numbers of wood ducks, pintail, wigeon, black duck, blue-winged teal, scaup, shoveler, gadwall, redhead, green-winged teal, goldeneye and mergansers.

The beautiful wood duck is the most common nesting duck on the refuge. Though they normally nest in natural cavities in the hardwood timber, they have learned to accept nesting boxes erected for them on the refuge.

Wintering concentrations of bald eagles occur along the Illinois River. Over 240 of these majestic birds have been counted on the river. A peak of 35 eagles has been reported on the refuge. Eagles usually arrive in October and stay until the ice disappears in the spring.

More than 275 other species of birds use the refuge. Great blue herons, green herons, great egrets and black-crowned night heron are common summer residents. Other marsh, water and shorebirds commonly are found during the spring and fall months. Migration of these birds are spectacular during August and early September when as many as 150,000 have concentrated on mudflats and lake shoreline.

The most frequently observed mammals found on the refuge include white-tailed deer, squirrels, raccoons, skunks, opossums and fox. Muskrat, beaver and mink are common but not as easily seen.

Land Management
Water level manipulations are often used to provide food for waterfowl. Impoundments are drained in early summer to allow natural plants such as smartweed and wild millet to grow. These moist soil plants are then flooded in the fall to provide food for migrating waterfowl. The results are the same, but the methods more predictable when plant growth varied with the ups and downs of the river.

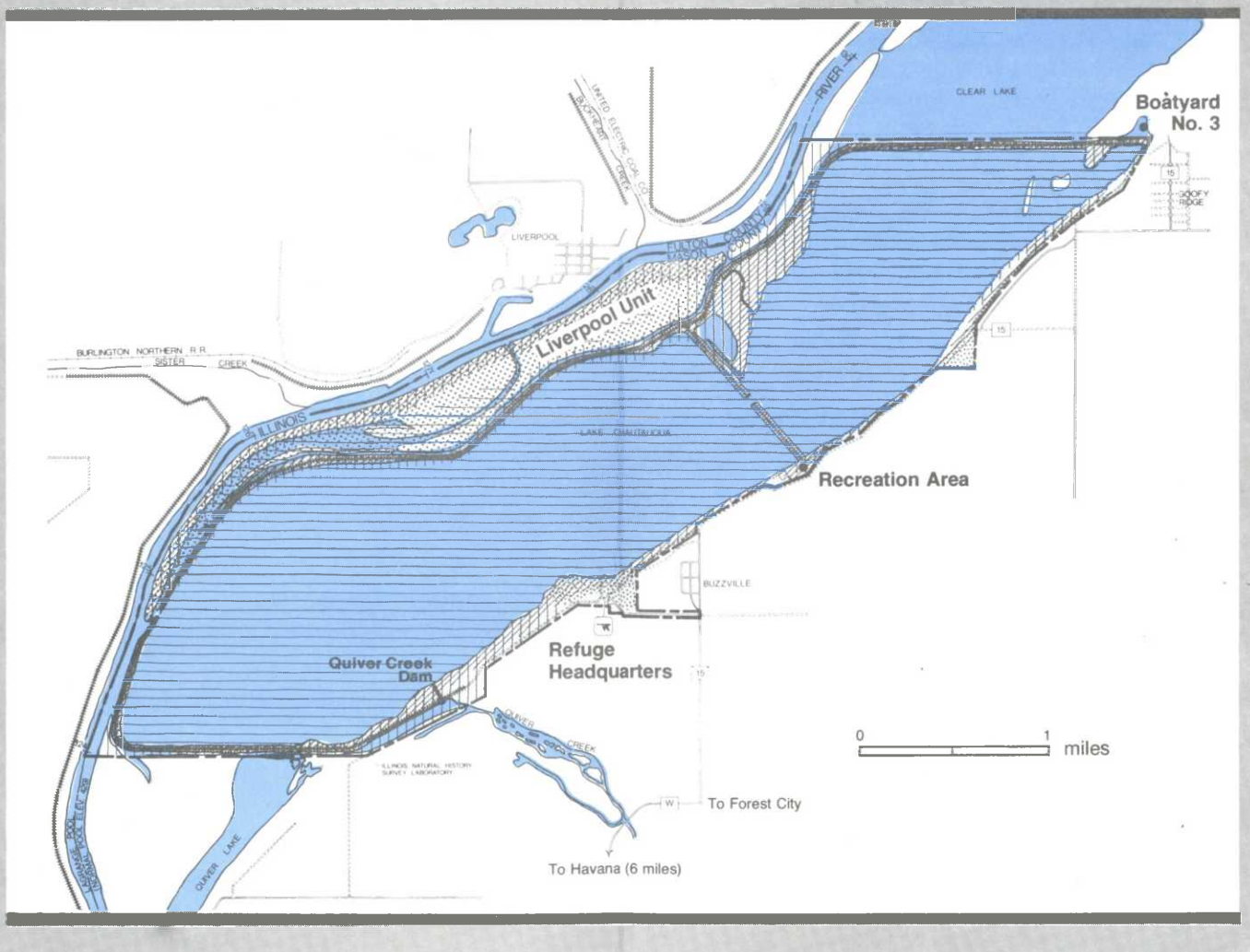
Recreation
The refuge also offers abundant recreational opportunities. The opportunity to see waterfowl, marsh and waterbirds, shorebirds, white-tailed deer, and other wildlife in their natural habitat is available to the public. An interpretive foot trail is located at the headquarters site. Roads adjacent to portions of the refuge provide an excellent opportunity to see wildlife without unduly disturbing them.

Fishing, mushroom and berry picking, hiking and related wildlife oriented activities are permitted. Boat access is available at the Recreation Area. Lake Chautauqua is widely known for its bluegill, crappie and catfish fishing especially during the productive periods of high water in April, May and early June. Be sure to check with the refuge manager for open areas, dates and types of public use permitted.

Waterfowl hunting is permitted in the Liverpool Section of the refuge, located outside Lake Chautauqua. All hunting is in accordance with State and Refuge regulations. Again, check with the refuge manager for details.

Chautauqua National Wildlife Refuge

- Refuge Headquarters
- Refuge Boundary
- Improved Road
- Dirt Road
- Drainage Ditch
- Intermittent Stream
- Major Levee
- Interior Dike
- Waterfowl Production
- Waterfowl Maintenance
- Threatened Species
- Observation/Interpretation
- Environmental Education
- Hunting



MAMMALS

CHAUTAUQUA
National Wildlife Refuge

The Chautauqua National Wildlife Refuge, established in 1936, is administered by the U.S. Fish and Wildlife Service, Department of the Interior, as a wintering waterfowl refuge within the Mississippi Flyway, which extends from Canada to the Gulf of Mexico and southward.

The refuge is comprised of 4,388 acres of land and water situated within the Illinois River floodplain. Lake Chautauqua impounds 3,200 acres of water while another 800 acres of water and timbered bottomland are located outside of the impounded area. The remaining acreage is composed of upland and timber.

A variety of wildlife habitat types are found within the refuge boundary. The refuge is bounded on the west by the Illinois River and its associated mixed bottomland hardwood forests, buttonbushwillow swamps and sedge marshes. Adjacent on the north and south ends are shallow floodplain lakes, similar to Lake Chautauqua, but without water level control. On the east side is a sandy bluff, rising 70 feet above the lake, wave-cut and nearly vertical in places. This bluff is vegetated at the top with an oak-hickory upland hardwood complex, grading downward to cottonwood, red maple, silver maple, sycamore, ash and finally black willow as it reaches the floodplain level. Several areas of old delta formation consist of marshes of sedge, button-bush and willow interspersions. Of particular interest along this east shoreline are large seepage springs which keep strips of the shoreline open, even in coldest weather. These springs border more than four miles of shoreline, with some appearing near the center of the south-central portion of the lake.

The interspersion of life zones provides habitat accommodative to a wide assortment of mammals. On quiet nights, coyotes sometimes can be heard howling along the west shoreline and in the large timber area of the Melz Slough section. Fox and coyote trails circle the marsh edge and follow the timbered edges of field. Foxes and raccoons are the most abundant predators, while cottontails and fox squirrels are the most common rodents. Whitetail deer often are seen along the refuge roads, and dike areas often are signed with their tracks. Badgers are seen rarely, but their diggings are obvious along the dike areas. Beavers, muskrats and woodchucks are common but infrequently seen. The squeaking of southern flying squirrels is commonly heard at night.

The following mammal list includes only those that have been actually observed on the refuge. Additional species can be expected, and will be added to the list with the passage of time. The 28 species listed are represented by official records and specimens preserved in the Fish and Wildlife Service collections at Washington, D.C., in the Museum of Natural History of the University of Illinois and elsewhere.

LIST OF MAMMALS OF THE CHAUTAUQUA NATIONAL WILDLIFE REFUGE

Since common names for mammals vary, scientific names are included. The order in which the species appear and the scientific names follow Miller and Kellogg (***List of North American Recent Mammals***, U.S. National Museum Bulletin 205). Common names follow Burt and Grossenheider (***A Field Guide to the Mammals***, Houghton Mifflin Co.).

Opossum (***Didelphis marsupialis***). Common in sandy-loam bluff areas, lowlands, and dike areas.

Eastern Mole (***Scalopus aquaticus***). Common in sandy-loam areas along the eastern bluff.

Little Brown Myotis (***Myotis lucifungus***). This bat is abundant during the period April-November throughout the refuge.

Big Brown Bat (***Eptesicus fuscus***). Abundant during summer months.

Hoary Bat (***Lasiurus cinereus***). Common during summer months along bottomlands and wooded uplands.

Eastern Cottontail (***Sylvilagus floridanus***). Abundant throughout the refuge in all but very wet areas. Frequent prey of foxes and owls during the winter months. Its nests are often found on the Headquarters lawn and it feeds on the spillage under the bird feeders at night.

Woodchuck (***Marmota monax***). Common along the eastern sandy-loam bluff, and wooded dike areas.

Eastern Fox Squirrel (***Sciurus niger***). Abundant throughout bottomland and upland timber areas. Competes with wood ducks for nesting cavities in large trees.

Southern Flying Squirrel (***Glaucomys volans***). Abundant throughout upland hardwoods. Can often be heard squeaking on quiet warm nights.

Plains Pocket Gopher (***Geomys bursarius***). Common in grassland areas and in the Headquarters Lawn.

Beaver (***Castor canadensis***). Common in borrow ditch areas near young cottonwood stands. Bank dens are used with brush over entrances. Winter food caches can usually be found.

Deer Mouse (***Peromyscus maniculatus***). Abundant in upland areas.

White-footed Mouse (***Peromyscus leucopus***). Abundant in upland areas and along dry areas of bottomland mixed hardwoods.

Southern Bog Lemming (***Synaptomys cooperi***). Occasionally found in marsh areas. Dead ones occasionally seen in or near owl nests.

Meadow Vole (***Microtus pennsylvanicus***). Common in fields and wooded areas.

Pine Vole (***Pitymys pinetorum***). Occasionally found in bottomland areas and along wooded east bluff.

Muskrat (***Ondatra zibethicus***). Abundant throughout marsh, shore, and dike areas. Damages dikes by tunneling. Benefits waterfowl by cutting openings in lotus, and ducks use muskrat houses for loafing areas.

Norway Rat (***Rattus norvegicus***). Occasionally found along marsh and shore areas.

House Mouse (***Mus musculus***). Common near buildings. Makes extensive tunnels in ground near grain bins and under heavy equipment.

Meadow Jumping Mouse (***Zapus hudsonius***). Occasionally seen along wooded edge and grassland areas when walking or mowing.

Coyote (***Canis latrans***). Rare, but howling frequently heard in early spring and its tracks frequently seen in winter snow.

Red Fox (***Vulpes fulva***). Common throughout the refuge, particularly in the winter months and when vegetation is low.

Gray Fox (***Urocyon cinereoargenteus***). Common throughout the refuge, particularly in the winter months and when vegetation is low.

Raccoon (***Procyon lotor***). Abundant in all areas throughout the refuge. Competes with wood ducks for nesting cavities in large trees.

Mink (***Mustela vison***). Common in lowland, shore, and dike areas.

Badger (***Taxidea taxus***). Uncommon, but its extensive diggings can usually be found along the eastern bluff and on wood dikes.

Striped Skunk (***Mephitis mephitis***). Uncommon on the refuge, but occasionally found along dikes and roads.

Whitetail Deer (***Odocoileus virginianus***). Common throughout wooded, marsh, and dike areas.

Field Notes:

Date: _____ **No. Species:** _____

Time: _____

Observers: _____

_____

Weather: _____

_____

Remarks: _____

_____

_____

_____

_____

For Additional Information Contact:

Refuge Manager
Chautauqua NWR
RR #2
Havana, IL 62644

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DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

☆U.S. GOVERNMENT PRINTING OFFICE: 1980—668-819

BIRDS OF CHAUTAUQUA

ILLINOIS

National Wildlife Refuge

SPECIES	Sp	S	F	W
____ Carolina Wren*	c	c	c	u
____ Bewick's Wren	r	r		
____ House Wren	c	c	c	
____ Winter Wren	u		u	u
____ Marsh Wren	u	o	u	
____ Golden-crowned Kinglet	c		c	u
____ Ruby-crowned Kinglet	c		c	u
____ Blue-gray Gnatcatcher	r	r	r	
____ Eastern Bluebird*	o	r	o	r
____ Veery	u		u	
____ Gray-cheeked Thrush	c		c	
____ Swainson's Thrush	c		c	
____ Hermit Thrush	c		c	
____ Wood Thrush	c	c	u	
____ American Robin*	a	a	a	u
____ Gray Catbird*	c	c	c	
____ Northern Mockingbird*	u	o	u	u
____ Brown Thrasher*	c	c	u	r
____ Water Pipit	r		u	
____ Cedar Waxwing	c	o	c	r
____ Loggerhead Shrike	r		r	
____ European Starling*	a	c	a	a
____ White-eyed Vireo	o	r	r	
____ Bell's Vireo*	u	u	o	
____ Solitary Vireo	u		u	
____ Yellow-throated Vireo	o	r	o	
____ Warbling Vireo*	c	c	u	
____ Philadelphia Vireo	u		u	
____ Red-eyed Vireo*	c	c	u	
____ Blue-winged Warbler	r		r	
____ Golden-winged Warbler	r		r	
____ Tennessee Warbler	c		a	
____ Orange-crowned Warbler	u		u	
____ Nashville Warbler	c		c	
____ Northern Parula	u	r	u	
____ Yellow Warbler*	c	c	u	
____ Chestnut-sided Warbler	c		c	
____ Magnolia Warbler	c		c	
____ Cape May Warbler	r		r	
____ Yellow-rumped Warbler	a		a	
____ Black-throated Green Warbler	c		c	
____ Blackburnian Warbler	u	u	c	
____ Yellow-throated Warbler	r	r	r	
____ Pine Warbler	r		r	
____ Bay-breasted Warbler	o		o	
____ Blackpoll Warbler	c		u	
____ Cerulean Warbler	r		r	
____ Black-and-white Warbler	c		c	
____ American Redstart*	c	a	u	
____ Prothonotary Warbler*	c	c	u	

SPECIES	Sp	S	F	W
____ Ovenbird*	c	u	c	
____ Northern Waterthrush	c		c	
____ Louisiana Waterthrush	u		r	
____ Kentucky Warbler	r	r	r	
____ Connecticut Warbler	r		r	
____ Mourning Warbler	r		r	
____ Common Yellowthroat*	c	c	u	
____ Hooded Warbler	u	r	r	
____ Wilson's Warbler	c		c	
____ Canada Warbler	u		c	
____ Yellow-breasted Chat	u	u	o	
____ Summer Tanager	u	u	u	
____ Scarlet Tanager	u	r	u	
____ Northern Cardinal*	a	a	a	a
____ Rose-breasted Grosbeak*	c	c	c	
____ Blue Grosbeak	r	r	r	
____ Indigo Bunting*	c	c	c	
____ Dickcissel*	c	a	c	
____ Rufous-sided Towhee*	c	c	u	o
____ American Tree Sparrow	c		c	a
____ Chipping Sparrow*	c	c	c	
____ Clay-colored Sparrow	r		r	
____ Field Sparrow*	c	a	c	o
____ Vesper Sparrow*	u	c	u	o
____ Lark Sparrow*	u	c	u	
____ Savannah Sparrow	u		u	
____ Grasshopper Sparrow	o	u	o	r
____ Le Conte's Sparrow	o		o	
____ Sharp-tailed Sparrow	r		o	
____ Fox Sparrow	c		c	o
____ Song Sparrow*	c	c	c	u
____ Lincoln's Sparrow	o		o	
____ Swamp Sparrow	u		u	o
____ White-throated Sparrow	c		c	o
____ White-crowned Sparrow	u		u	
____ Harris' Sparrow	o		o	r
____ Dark-eyed Junco	c		c	a
____ Lapland Longspur	r		r	
____ Snow Bunting	r		r	
____ Bobolink	o	o	o	
____ Red-winged Blackbird	a	c	a	u
____ Eastern Meadowlark*	c	c	c	o
____ Western Meadowlark	r	o	r	o
____ Rusty Blackbird	c		c	o
____ Common Grackle*	c	a	c	o
____ Brown-headed Cowbird*	u	c	u	o
____ Orchard Oriole	r	r	r	
____ Northern Oriole*	c	c	c	
____ Purple Finch	u		u	u
____ Pine Siskin	u		u	o

SPECIES	Sp	S	F	W
____ American Goldfinch*	a	a	a	u
____ Evening Grosbeak*	r		r	r
____ House Sparrow*	a	a	a	a
____ Eurasian Tree Sparrow	r	r	r	r

Accidental Birds

Eared Grebe
Trumpeter Swan
Mute Swan
Cinnamon Teal
Oldsquaw
Northern Goshawk
Sharp-tailed Sandpiper
Whimbrel
Red Phalarope
Parasitic Jaeger
Little Gull
Thayer's Gull
Iceland Gull
Glaucous Gull
Lesser Black-backed Gull
Ivory Gull
Snowy Owl
Red Crossbill
White-winged Crossbill
Common Redpoll

Sighting Notes

Time in Field _____ Date _____
Weather _____
_____
Observers _____
Species Total _____
Location _____
_____
_____
_____

Birdwatching is encouraged.
Please check at the refuge office
for times and places of entry.
PLEASE OBEY POSTED SIGNS.

For Further Information Contact:
Refuge Manager
Chautauqua National Wildlife Refuge
R.R. #2
Havana, Illinois 62644
Phone: (309) 535-2290

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
RF-3-33650-2-3/85

The Chautauqua National Wildlife Refuge was established in 1936. It is within the Mississippi Flyway that extends from Canada to the Gulf of Mexico. The refuge is a vital link in the flyway to provide rest and feed for migrating birds.

The refuge contains 4,488 acres of land and water within the flood plain of the Illinois River in Mason County, Illinois. Lake Chautauqua impounds about 3,500 acres of water. Another 800 acres of water and timbered bottomland are located outside of the impounded area. The remaining acreage is composed of upland and timber.

Peak fall waterfowl populations average nearly a quarter of a million birds. The average peak concentration during early winter normally exceeds 100 thousand ducks and up to 40 thousand geese. Mallards comprise the bulk of the duck population during migration. Shorebird concentrations during the fall migration has reached a peak of 150,000 birds.

Summer records for some shore-birds, flycatchers and swallows actually represent early fall migrants.

Legend

The following birdlist contains 254 species representing observations since 1938. Another 20 birds, listed under Accidentals have been reported but are not normally expected to be present. Those species marked with an asterisk (*) have nested on the refuge. This list, is in accordance with the current A.O.U. Check-list.

Sp—Spring . . . . . March-May
S—Summer . . . . . June-August
F—Fall . . . . . September-November
W—Winter . . . . . December-February

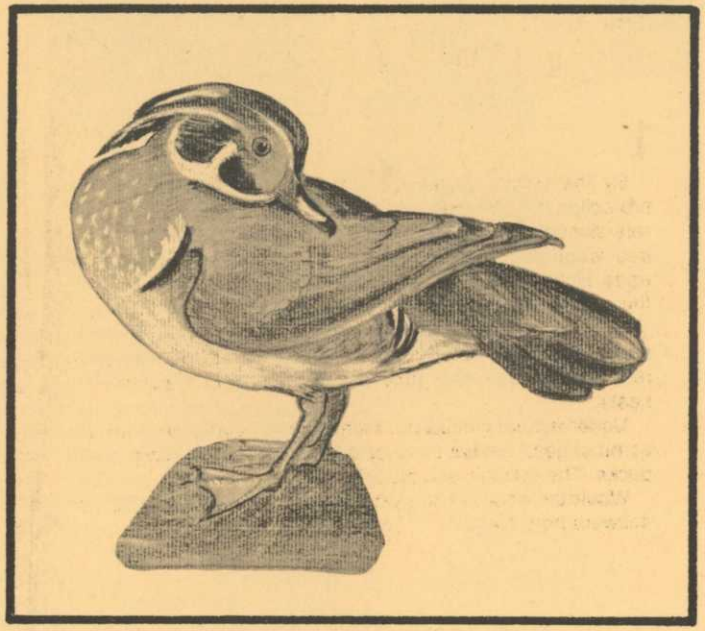
a—abundant—common species that is very numerous
c—common—almost certain to be seen in suitable habitat
u—uncommon—present but not certain to be seen
r—rare—seen at intervals of 2-5 years
o—occasional—seen only a few times during the season

	SPECIES	Sp	S	F	W
___	Common Loon	o		o	
___	Pied-billed Grebe	c	o	c	
___	Horned Grebe	u		u	
___	American White Pelican	r		o	
___	Double-crested Cormorant	o	o	c	
___	American Bittern*	c	u	u	
___	Least Bittern	r	u	r	
___	Great Blue Heron*	a	a	c	u
___	Great Egret	a	a	c	r
___	Snowy Egret	r	o	o	
___	Little Blue Heron		u	o	
___	Cattle Egret	u	u	u	
___	Green-backed Heron*	u	c	u	
___	Black-crowned Night-Heron*	o	c	o	
___	Yellow-crowned Night-Heron	r	r		
___	Tundra Swan	r		r	r
___	Greater White-fronted Goose	r		r	
___	Snow Goose	c		c	o
___	Canada Goose*	c	o	c	c
___	Wood Duck*	a	a	a	o
___	Green-winged Teal	c	u	a	o
___	American Black Duck	c	u	c	o
___	Mallard*	a	o	a	u
___	Northern Pintail	c	r	c	o
___	Blue-winged Teal*	c	u	a	r
___	Northern Shoveler	c		c	
___	Gadwall	u	r	u	r
___	American Wigeon	c	r	c	r
___	Canvasback	c	r	c	o
___	Redhead	c		c	o
___	Ring-necked Duck	c		c	o
___	Greater Scaup	r		r	
___	Lesser Scaup	a	r	c	u
___	Black Scoter	r		r	
___	Surf Scoter	r		r	r
___	White-winged Scoter	r		r	r
___	Common Goldeneye	u		u	c
___	Bufflehead	u		u	o
___	Hooded Merganser	u	r	u	o
___	Common Merganser	a		u	a
___	Red-breasted Merganser	o		o	
___	Ruddy Duck	u	o	a	o
___	Turkey Vulture*	o	o	o	
___	Osprey	u	o	o	o
___	Bald Eagle	u		u	c
___	Northern Harrier	o	r	o	c
___	Sharp-shinned Hawk	u	o	u	o
___	Cooper's Hawk	u	r	u	o
___	Red-shouldered Hawk*	o	o	o	o
___	Broad-winged Hawk	o	r	o	
___	Red-tailed Hawk*	c	u	c	c

	SPECIES	Sp	S	F	W
___	Rough-legged Hawk	u		u	c
___	American Kestrel*	c	c	c	o
___	Merlin	r		r	
___	Peregrine Falcon	o	o	o	
___	Ring-necked Pheasant	o	o	o	o
___	Northern Bobwhite*	a	a	a	a
___	King Rail	r		r	
___	Virginia Rail	u	o	u	
___	Sora*	c	r	c	
___	Common Moorhen	r	r	r	
___	American Coot	a	o	a	u
___	Sandhill Crane	r		r	
___	Black-bellied Plover	u	r	u	
___	Lesser Golden-Plover	u	r	u	
___	Semipalmated Plover	u	r	c	
___	Piping Plover	r	r	r	
___	Killdeer*	c	c	a	o
___	American Avocet		o	u	
___	Greater Yellowlegs	u	o	c	
___	Lesser Yellowlegs	c	u	a	
___	Solitary Sandpiper	c	o	c	
___	Willet	r		o	
___	Spotted Sandpiper*	c	c	c	
___	Upland Sandpiper	r	r	r	
___	Hudsonian Godwit	r	r	u	
___	Marbled Godwit		r	r	r
___	Ruddy Turnstone	r		o	
___	Red Knot			o	
___	Sanderling	r	o	o	
___	Semipalmated Sandpiper	u	o	c	
___	Western Sandpiper	r	o	u	
___	Least Sandpiper	c	u	a	
___	White-rumped Sandpiper	o		r	
___	Baird's Sandpiper	r	o	o	
___	Pectoral Sandpiper*	c	o	a	
___	Dunlin	r		u	
___	Stilt Sandpiper	r	o	c	
___	Buff-brested Sandpiper		u	u	u
___	Short-billed Dowitcher	u	o	c	
___	Long-billed Dowitcher	o	o	c	
___	Common Snipe	u	r	u	o
___	American Woodcock	o	o	r	
___	Wilson's Phalarope	r	o	u	
___	Red-necked Phalarope	r		o	
___	Laughing Gull	r	r	r	
___	Franklin's Gull	r	r	u	
___	Bonaparte's Gull	u	r	u	r
___	Ring-billed Gull	c	u	c	o
___	Herring Gull	c	r	c	c
___	Sabine's Gull			r	

	SPECIES	Sp	S	F	W
___	Caspian Tern	o		u	
___	Common Tern	c	r	c	
___	Forster's Tern	o	r	o	
___	Least Tern	o	o	o	
___	Black Tern	c	o	c	
___	Rock Dove	c	c	c	c
___	Mourning Dove*	a	a	a	c
___	Black-billed Cuckoo	u	o	u	
___	Yellow-billed Cuckoo*	u	c	u	
___	Eastern Screech Owl*	o	o	o	o
___	Great Horned Owl*	c	c	c	c
___	Barred Owl*	c	c	c	c
___	Short-eared Owl	o	o	o	o
___	Common Nighthawk*	u	c	c	
___	Whip-poor-will*	c	c	o	
___	Chimney Swift	u	c	u	
___	Ruby-throated Hummingbird	c	u	c	
___	Belted Kingfisher*	c	c	c	o
___	Red-headed Woodpecker	c	c	c	c
___	Red-bellied Woodpecker*	c	c	c	c
___	Yellow-bellied Sapsucker	c		c	o
___	Downy Woodpecker*	c	c	c	c
___	Hairy Woodpecker*	u	u	u	u
___	Northern Flicker	c	c	c	u
___	Pileated Woodpecker	c	c	c	c
___	Olive-sided Flycatcher	r	r	u	
___	Eastern Wood-Pewee	c	c	c	
___	Yellow-bellied Flycatcher	u		u	
___	Acadian Flycatcher	u	o	u	
___	Alder Flycatcher	u		u	
___	Willow Flycatcher	u	u	r	
___	Least Flycatcher	c		c	
___	Eastern Phoebe*	c	c	u	
___	Great Crested Flycatcher	c	c	u	
___	Eastern Kingbird*	c	c	u	
___	Horned Lark*	a	c	c	c
___	Purple Martin*	c	c	o	
___	Tree Swallow*	c	a	a	
___	Northern Rough-winged Swallow*	c	u	u	
___	Bank Swallow	u	c	c	
___	Cliff Swallow	u	u	c	
___	Barn Swallow	c	c	a	
___	Blue Jay*	a	c	a	c
___	American Crow*	c	c	c	c
___	Black-capped Chickadee*	c	c	c	c
___	Tufted Titmouse*	c	c	c	c
___	Red-breasted Nuthatch	r		r	o
___	White-breasted Nuthatch*	c	c	c	c
___	Brown Creeper	o	r	c	c

TRAIL GUIDE



This sand trail is about a quarter-mile long and ends at the refuge fire tower. Walking time is 20 minutes.

On this trail, you'll be told the story of one of the most beautiful of our waterfowl, the wood duck.

As the eastern United States was settled, farmers cleared the great forests to make room for food crops. Wood ducks which depend on timbered areas, lost much of their natural habitat. Loss of nesting sites and feeding grounds, combined with overshooting by market hunters, nearly eliminated this species of wild duck.

In 1918, the United States and Great Britain adopted the Migratory Bird Treaty. This treaty granted full protection to the wood duck. They responded to this protection and began to rebuild their numbers.

CHAUTAUQUA NATIONAL WILDLIFE REFUGE • ILLINOIS

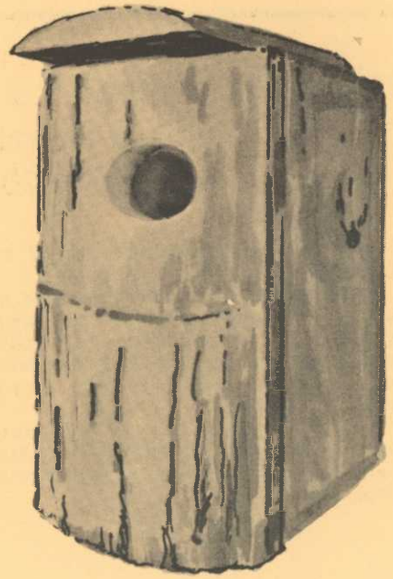
1

By the 1930's, it became apparent to many people that protection from the gun alone would not cure the wood duck's real ailment — a housing shortage! Studies showed that the best wood duck habitat was the natural cavities in black oak trees. However, only about one such natural cavity — such as the one above you — is found in every five acres of forest.

Even then, only about half these cavities are used by wood ducks and losses to predators are heavy. Raccoons, fox squirrels, snakes and other prowlers destroy more than half the nests.

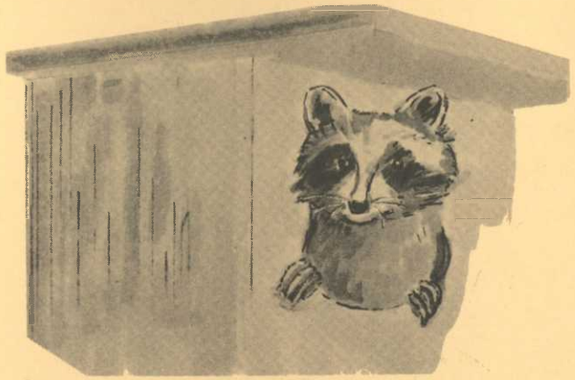
Under natural conditions, then, only about one nest per 20 acres of good habitat is successful in producing young wood ducks. The outlook was bleak.

Would the wood ducks use man-made housing? A search for answers began again.



2

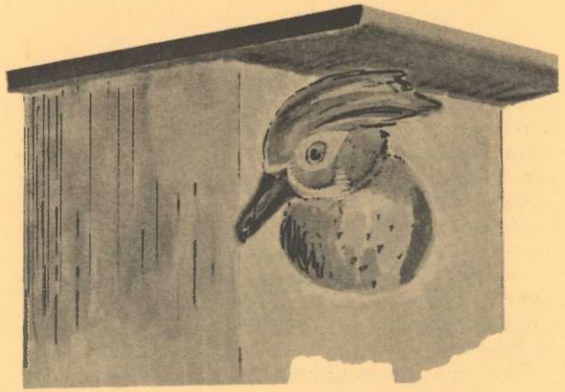
This bark slab box was the first attempt at providing artificial housing. More than 400 such boxes were erected on this refuge but results were disappointing. Few were used. Losses to predators were higher than in natural tree cavities.



3

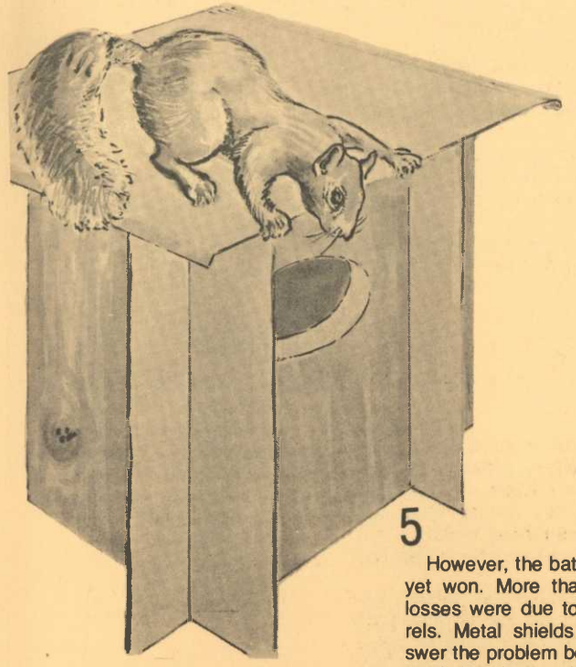
Rough-cut lumber boxes proved acceptable to wood ducks and use increased each year. Within three years, nearly all of these boxes were being used by wood ducks. However, it was discovered that raccoons found their way in and destroyed many nests, so this box was abandoned.

NOTE: The reason wire is placed over the openings of several of these boxes is to prevent wood ducks from nesting in these predator traps.



4

Further study showed that the nesting boxes could be made raccoon-proof by adjusting the size of the opening. The elliptical 3 X 4 inch opening lets the wood duck hen in but keeps raccoons out.



5

However, the battle was not yet won. More than half the losses were due to fox squirrels. Metal shields didn't answer the problem because the squirrles learned to swing down to the opening from the over-hanging roof.

6

The final answer — we thought — was a tin-covered box with a peaked roof. This model was raccoon and squirrel-proof and was popular with the female wood ducks; but it was expensive.

7

The 'stovepipe' box, now used throughout the refuge, proved successful. They are virtually predator proof, inexpensive and durable.

With this nest, wood duck nesting habitat was increased from one nest site per 20 acres to two or three nest sites per acre.

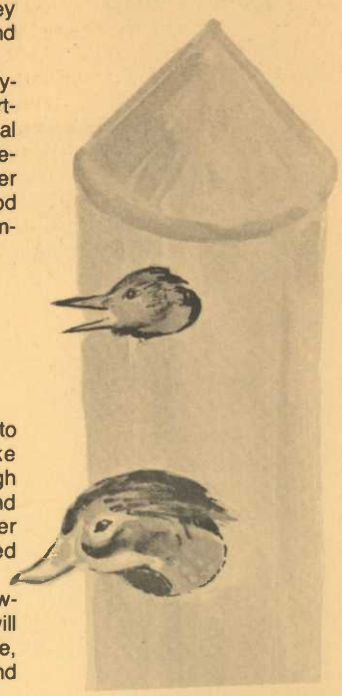
This box was installed in 1965 and has been used by wood ducks ever since.

8

One culprit remains — the starling. He's a house hunter, too, and uses about a fourth of these nest boxes on this refuge. Starlings sometimes will move in with the hen wood duck and force her to abandon her eggs.

We now know that starlings like privacy and will defend their nest sites against other starlings. They prefer smaller entrance holes and less light inside.

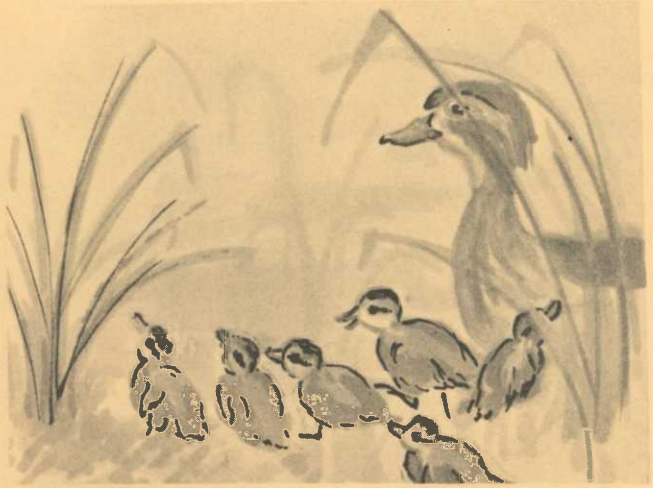
With these facts in mind, we're trying these bi-level boxes or "apartment houses" on an experimental basis. We hope the starling will defend the entire box against other starlings and will leave the wood duck alone to use the lower compartment.



9

Water levels are important, too, to wood ducks. The level of Lake Chautauqua should be high enough in early spring to flood low land woody vegetation and provide cover and protection for newly-hatched broods.

In late spring, levels must be lowered because prolonged flooding will kill woody vegetation. By this time, aquatic plants have developed and will provide the necessary cover.



10

Here you see an example of good cover for young duck broods. The small bushy shrub, commonly called buck brush or button brush, provides needed protection from predators and other natural hazards.

What has all this meant to the wood duck?

In the past, natural cavities found on the refuge produced about 80 ducklings each year. With our new artificial housing project, about 1400 ducklings are currently being produced annually on the same area. Many thousands are produced throughout Illinois along wooded streams and lakes, in wood lots and city parks.

Given the proper nest box, wood ducks might even set up house keeping in your back yard.

As you finish walking this trail, you may climb the tower for a wood duck-eye view of Lake Chautauqua and the surrounding area. Please return to your car along the designated route.

We hope you enjoyed this trail and will return again.

DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service

RF 3353161-11 MAY 1975