DESOTO NATIONAL WILDLIFE REFUGE
Missouri Valley, Iowa

NARRATIVE REPORT
Calendar Year 1990

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

REVIEW AND APPROVALS

DESOTO NATIONAL WILDLIFE REFUGE

Missouri Valley, Iowa

ANNUAL NARRATIVE REPORT

Calendar Year 1990

George E. Cogz — Project Leader — Date

Matthew E. Vandeberg — Wildlife Associate Mgr. — Date 4.10.91

Richard D. Schultz 4-11-91

Regional Office Approval — Date

INTRODUCTION

DeSoto National Wildlife Refuge is located midway between the farming communities of Blair, Nebraska, and Missouri Valley, Iowa, on U. S. Highway 30. The refuge is situated astride the Missouri River, located approximately 20 miles north of Omaha, Nebraska. It lies in Harrison and Pottawattamie Counties, Iowa, and Washington County, Nebraska.

The refuge was established in 1959 to preserve habitat for migratory waterfowl. Acquisition was authorized by the Migratory Bird Conservation Act and Migratory Bird Stamp Act. It serves as a seasonal resting area for up to one-half million waterfowl, primarily lesser snow geese and mallards. It has also become an important wintering area for up to 120 endangered bald eagles.

The 7,823 acre refuge lies in the wide, fertile plain of the Missouri Valley Basin on the former meanders of the Missouri River. Portions of the refuge are characterized by cottonwood bottomlands. Approximately 2,600 acres are biologically managed as croplands and grasslands under 12 cooperative farming agreements. Warm season native grasses have been reestablished on over 350 acres to provide additional diversity.

The focal point for both man and wildlife is a former oxbow of the Missouri - the 788 acre DeSoto Lake. Recreational demand for its use has remained high since refuge establishment. The refuge provided active recreation throughout its early history, including fishing, picnicking, boating, waterskiing and swimming. Approximately 16 million dollars worth of facilities have been developed to accommodate public demand by up to 500,000 visitors annually. More recently, management emphasis has been redirected toward a more balanced program between man and wildlife, emphasizing wildlife-oriented recreation.

The 1968 excavation of the steamboat Bertrand, which sank in 1865, adds a major historical emphasis to the refuge program. The 200,000 artifacts in the Bertrand Collection provide one of the most significant assemblages of Civil-War era artifacts from the Missouri River region. As such, it constitutes a national time capsule and a regional attraction.

In 1981, the DeSoto Visitor Center was opened. The visitor center is the permanent home of the Bertrand Collection. The five-million dollar, 26,000 square foot building contains exhibits interpreting the importance of the Bertrand as part of the historical development and ecological change that occurred within the Missouri River Basin. In addition to environmentally controlled artifact storage and museum exhibit areas, the building houses a laboratory for artifact treatment, a collection records area, and a reference library.

The visitor center also provides exhibits depicting the natural history of the area and its wildlife. Viewing galleries overlooking DeSoto Lake provide excellent opportunities to observe waterfowl and bald eagles during the spring and fall migration periods. A variety of complex audio and audio-visual equipment provide effective interpretations to an average of 185,000 visitors who pass through the center each year.

DE SOTO NATIONAL WILDLIFE REFUGE

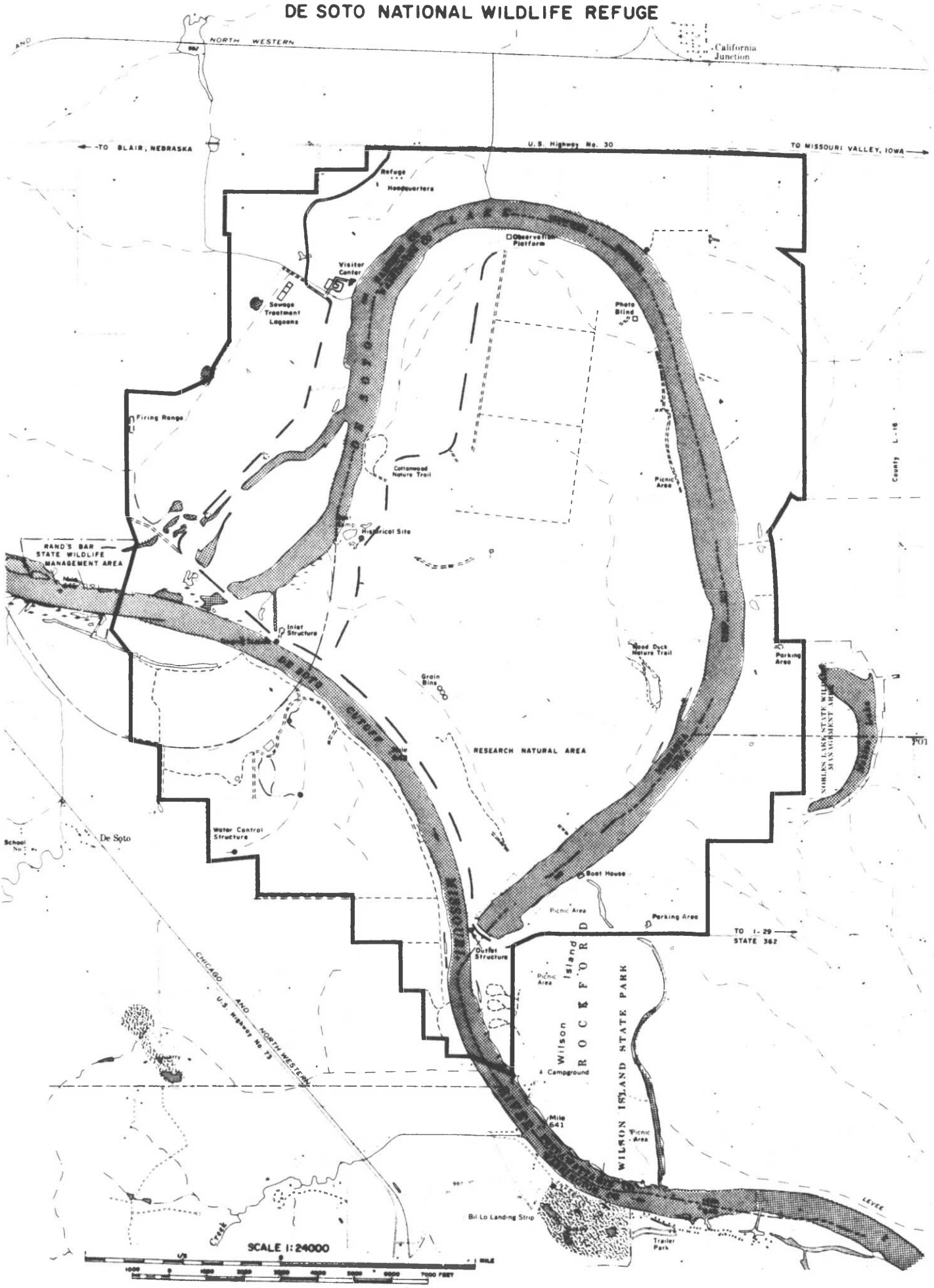

TABLE OF CONTENTS

G. WILDLIFE

H. PUBLIC USE

A. HIGHLIGHTS

The refuge finally experienced some drought relief during mid-summer. Section B.

Two of the refuge's long-term field investigations are drawing to a close. Sections D.5 and F.4.

Several familiar faces were missing at year's end, leaving the station understaffed. Section E.1.

Cooperative farmer Tietz discontinued refuge farming after a quarter century of refuge operations, leaving portions of over 700 acres of cropland fallow. Section F.4.

The refuge's first recorded broods of Canada geese hatched in May. And, while not a record, snow goose peaks remained above 400,000 this fall. Section G.3.

The DeSoto Visitor Center staff continues to provide a high level of quality public services. Section H, 1-7.

An Interior-wide OIG audit was critical of Bertrand Collection management. Section H.6.

Ice fishing was short-lived, but anglers were highly successful, taking an estimated 3,700 pounds of northern pike. Section H.9.

The refuge became a focal point for two anti-hunting protests, sponsored by the Fund for Animals. Imagine, even in Nebraska! Section H.17.

Everyone looked forward to replacing the old underground fuel storage tanks, until it was found that the ground was contaminated. Section I.2.

B. CLIMATIC CONDITIONS

The severely dry weather that has been plaguing this area for the past several years was only sporadically felt this year.

The year started out with mild temperatures and only eight inches of snow during January. Locally, it was the third mildest January on record. The mild temperatures allowed close to 10,000 waterfowl to keep a large hole open in the ice on DeSoto Lake throughout the month. Then, February was as mild as January. Only one storm passed through early in the month, which delivered two inches of snow. The temperatures never dropped below

two degrees F. March followed suit, with warm temperatures. And, much-needed moisture arrived in several rainstorms, delivering a total of 4.45 inches of precipitation.

Hopes of a wet spring were denied. April brought mild temperatures, but only 0.22 inches of precipitation. May provided some relief with 3.90 inches of rain. This brought the area to less than two inches below normal, but overall groundwater levels had depleted appreciably during the past three years.

The summer started in earnest with temperatures climbing above 100 degrees F. in June. Along with the heat came many rainstorms, contributing a total of 5.66 inches. Heavy rains north of the refuge caused the Missouri River to rise high enough to cause some flooding.

July copied June, with hot, wet weather. One storm at mid-month brought nine inches of rain alone. The resulting flood was only two feet below the 1984 flood stage. One of the refuge parking lots and a field along the river flooded. Inflow farm drainage ditches ran some water, the first in three summers. 27-091-90 JO

Precipitation for August totaled 9.76 inches, the most moisture since July, 1977. By the end of the month, the refuge had received 6.04 inches above normal. Even August brought 2.22 inches of rain.

September's temperatures jumped all over the place, from almost freezing to all the way up above 100 degrees F. The fall started off dry, with only 0.84 inches of rain. Locally, marshes started to dry up, and October brought them no relief. The rainfall in October only amounted to 1.80 inches. Most of the marshlands in the area completely dried up during the month. Thus, the refuge spent a considerable amount of time in pumping wetlands for migratory habitat.

Winter temperatures began fairly mild. November brought only 1.05 inches of precipitation. The Army Corps of Engineers lowered the flow on the Missouri River by November 1 for reservoir retention upstream, which dropped the river seven feet in three weeks. The Corps overall releases from Gavins Point Dam for the year were only 69 percent of normal. By December, flows along this section of the Missouri were as low as 12,000 cfs. December brought lots of cold weather. There was snow cover from mid-month on. Temperatures dropped to minus-17 degrees, with windchills down in the minus-50-degree area by the third week. The cold weather

quickly froze DeSoto Lake over. The waterfowl were not able to keep an area open, and all had left the refuge by December 24th. Ice thickness averaged seven inches by Christmas and the lake was opened to ice fishing on the 26th.

Total precipitation for the year was 33.38 inches, which was 0.86 inches above the 30-year average. A welcome change from the past few years.

1990 WEATHER DATA
DESOTO NATIONAL WILDLIFE REFUGE

	Precipitation (inches)			1990 Temperatures*	
Month	1990	Normal*	Snowfall	Max.	Min.
Jan.	1.55	1.03	8	65	9
Febr.	0.20	1.14	2	75	2
March	4.45	2.53		79	20
April	0.22	2.92		87	16
May	3.90	4.40		82	36
June	5.66	4.34		102	46
July	9.76	3.35		108	54
August	2.22	3.75		105	51
Sept.	0.84	3.99		104	35
Oct.	1.80	2.49		87	23
Nov.	1.05	1.29	3	76	20
Dec.	1.73	1.27	8	59	-17
TOTALS	33.38	32.52	21		

* 30-year average, 1959-1989.

C. LAND ACQUISITION

4. Farmer's Home Administration Conservation Easements

DeSoto's FmHA District consists of 28 counties in western and southwestern portions of Iowa. We also have assumed a minor role in northeastern Nebraska, since we are the nearest field station. The station's responsibility in this area is to screen properties for important resources, and to propose conservation easements on the properties, or portions thereof, as these resources are identified. As these easement proposals are accepted by both FmHA and the Service, the tracts will then be managed as part of the National Wildlife Refuge System.

During the year, some 37 FmHA properties in 13 different counties were reviewed. Of these, only two were proposed for easement. The Orr property, in Monona County, consists of two fields that appear at one time to have been under the waters of Blue Lake. The property is immediately adjacent to Iowa Department of Natural Resources (IDNR) land. The easement proposed requests that IDNR be

allowed to apply for transfer of easement title, to be managed in conjunction with their other holdings in the Blue Lake area.

A second easement was proposed in Adams County in March. Upon inspection, the county SCS office made a determination that the Peter's property had an "artificially created wetland", because of the placement of a county road pipe. FmHA denied our proposed easement as a result. As documented on video-tape, this would have been the best looking wetland easement in the entire District! And, so it goes.

The following shows the status of the FmHA easement program for DeSoto's District as of the end of December.

FmHA Easements

Former Owner	County	Date Proposed	Date Accepted	Date Recorded	Posting Status	Acres
Anderson	Boone, IA	06/88	11/88		Yes	61.0
Showers	Decatur, IA	07/88	02/89	03/90	Yes	15.6
Buckingham	Decatur, IA	07/88	02/89	12/89	1/2	41.8
Bolen	Decatur, IA	07/88	02/89	03/90	1/2	9.5
Peirson	Decatur, IA	07/88	02/89		No	10.5
Thompson	Dodge, NE	11/88	06/89		Yes	47.5
Bruck	Harrison, IA	01/91			No	****
Hildring	Lyon, IA	07/89			No	157.7
Lauer	Madison, IA	09/89	09/90		Yes	4.1
Hughes	Madison, IA	09/89			No	****
Orr	Monona, IA	08/90			No	27.5
Riherd	Plymouth, IA	12/89			No	115.0
Hunt	Pott., IA	06/89	02/90		Yes	29.0
Cooper	Ringgold, IA	11/89			No	****
Klommhaus	Ringgold, IA	11/89			No	****
Langstraat	Sioux, IA	07/89	04/90	07/24/90	No	6.3
McAlpin	Taylor, IA	08/88	02/89		Yes	3.8

**** Acreage to be determined by future survey.

Considerable easement posting was accomplished during the year. Lots of dumps were found.

The Anderson easement in Boone County is a hilltop tract which has 31 corners, surveyed during the year and posted. However, the FmHA offices refused to survey our narrow, 66 to 100 foot easements along riparian corridors, so three remain without legal posting in Decatur County, Iowa. The 6.28 acre Langstraat easement along the Big Sioux River in Sioux County, Iowa is the only other recorded easement not posted at this time.

The worst dumps are located on the 61-acre Anderson property in Boone County. Here, there are three large farm dumps which cascade down steep woodland slopes and cover deep gullies. More environmental damage would occur in trying to clean them up, than in leaving them alone.

34-163-90 HM

D. PLANNING

2. Management Planning

The station's Moist-Soil and Water Management Plan and the revised Safety Plan were approved during the year. The Law Enforcement Plan was updated during the summer, reviewed, and approved by October. Biologist Root drafted the station's first Forest Management Plan which was finalized, submitted, and approved as well. Work continued on revising the overall Management Plan document for this station. Also, the staff is finalizing the Public Use Management Plan. Public use objective levels were revised and five-year averages were recalculated in the update. We've been dragging our feet in hopes that the entrance fee system would either be discontinued, or funded as a staffed collection system. Refuge administration, enforcement, and even the level of public use here are impacted by the entrance fee system. So far, we've had to muddle along with our self-registration system, which is not paying for itself.

4. Compliance with Environmental and Cultural Resource Mandates

Refuge Manager Gage was called into the regional office in mid-February for a refuge compatibility interview. The refuge no longer has any uses which can be considered truly incompatible.

Due to open weather, no attempt was made to place the 500 tons of rip-rap materials in DeSoto Lake for fish habitat piles as per our Section 404 permit. The plan is to place the rock piles on the ice in winter, and there just wasn't sufficient ice to accomplish the task.

The new regulations for curation of federally-owned archeological collections (36 CFR 79) requires periodic inspections of materials housed in approved repositories. The staff conducted an annual, random spot-check of museum objects located in the Cargo Storage Area, and a 100 percent inventory of those artifacts housed in exhibit areas outside the Cargo Storage Area. The inventory was completed in September. National Park Service guidelines were adapted to accommodate this cataloguing system. Rather than random sampling of the recommended percent of objects in the collection, a random sample of catalog entries were inventoried. Many catalog entries contain numerous objects (e.g. a case of bitters). The location, condition, and records of all objects associated with the number were checked. The inventory report is on file.

A Comprehensive Conservation Plan for the Bertrand Collection was completed two years ago. The National Advisory Council on Historic Preservation is drafting a related Programmatic Memorandum of Agreement. This will simplify procedures and reduce time requirements normally associated with required Section 106 review processes for future artifact conservation activities.

5. Research and Investigations

The station's funded IPM study is included in Section F.4, as a part of the croplands discussion.

DeSoto NR-84 - "A Field Investigation to Evaluate the Impact of Various Sewage Sludge, Compost, and Commercial Fertilizer Land Applications on Refuge Wildlife, Soils, and Crop Production".

This was the sixth and final crop year of this study, designed as a cooperative venture between the City of Omaha, the Service, and a refuge farming cooperator. However, this cooperator resigned his farming rights on refuge in early 1990, so this last year's crop was temporarily assigned to a cooperative farmer who farms adjacent refuge lands.

Soybeans were grown on the conventional-rotation plots, and clover on the biological-rotation plots. Soybean yields ranged from 35.5 bushels per acre to 48.9 bushels per acre.

During 1990, both soil and sludge samples were collected and analyzed for composition. In addition, livers from 5 pheasants, 12 deer, and composite samples of rodents from each plot were collected and analyzed for the potential presence of heavy metals. Results from these collections have not been returned at this time. A final report will be written in 1991 to discuss all aspects of the project.

The year began with 551 cubic yards of refuge hay being delivered to the site in August, 1989, for compost to be used on the 1990 crop. This hay was mixed with 249.2 tons of sludge delivered in November, 1989.....

...and an additional 156.8 tons of sludge were delivered by an Omaha city contractor in early April for the "sludge-only" plots. 33-170-90 TR

Both the compost and sludge were applied in April by the cooperative farmer, using a conventional manure spreader. 33-168-90 TR

DeSoto NR-86 - "Monitoring DeSoto Lake Ecosystem"

Monitoring of the DeSoto Lake ecosystem continued as planned with periodic collection of data, including light penetration, water depths, dissolved oxygen, species and density of algae, as well as random determination of growth, spawning, and survival of fish species. Some of the results of this periodic monitoring are discussed in Section G.11.

6. Other

Mindy Sheets completed her Refuge Manager Training Plan as scheduled.

Several "Action items" identified in the 1989 Operations Inspection were completed during the period and reported accordingly. Several remain to be accomplished.

E. ADMINISTRATION

1. Personnel

Name	Title	Grade	Status
George E. Gage	Refuge Manager	GS-13	PFT
E. H. McCollum (Retired 10/31/90)	Sup. Refuge Operations Spec.	GS-12	PFT
Karen L. Drews	Outdoor Rec. Plnr.	GS-11	PFT
Leslie A. Peterson (LWOP 11/2/90 - 12/31/90)	Museum Curator	GS- 9	PFT
Terry A. Root	Wildlife Biologist	GS-11	PFT
Melinda Sheets	Refuge Operations Spec.	GS- 7	PFT
Kenneth Jones (EOD 2/11/90)	Law Enforcement Officer	GS- 6	PFT
Jerry Olmsted	Fishery Biologist (LE)	GS- 7	PFT
Randy A. Porter	Admin. Officer	GS- 9	PFT
Wanda Harbottle	Admin. Technician	GS- 5	PFT
Nellie Weldon	Clerk-Typist	GS- 4	PFT
Lenora Lundeen (Retired 12/28/90)	Clerk-Typist	GS- 4	PFT
Joan Martin	Information Recep.	GS- 3	PPT
Barbara Nielsen	Information Recep.	GS- 3	PPT
Monty J. Storm	Automotive Worker	WG- 8	PFT
Harlan Lightwine	Eng. Equip. Operator	WG-10	PFT
Kenneth E. Marquardt	Maintenance Worker	WG- 8	PFT
Robert Kraushaar	Maintenance Mechanic	WG- 9	PFT
Steve Gleason (Resigned 8/17/90)	Custodial Worker	WG- 2	PFT
Loren Hinkel (EOD 10/24/90)	Custodial Worker	WG- 2	PFT
Mark Cunard	Heavy Equipment Operator	WG- 8	PFT
Susan Cooper	Tractor Operator	WG- 6	PS
Temporary			
Kirk Coleman	Student Trainee	GS- 4	PPT
Sheryl Metz	Student Aid	GS- 2	TI
Sharna M. Davis (Terminated 5/13/89)	Fishery Biologist	GS- 5	TI

From left to right; front to rear: Ken Jones, Sheryl Metz, Joan Martin, Nellie Weldon, K. L. Drews, Mindy Sheets, Randy Porter, Wanda Harbottle, George Gage, Loren Hinkel, Ken Marquardt, Bob Kraushaar, Monty Storm, Terry Root, Mark Cunard and Jerry Olmsted. Missing: Kirk Coleman, Susan Cooper, Harlan Lightwine, Lenora Lundeen, Homer McCollum, Barbara Nielsen and Leslie Peterson.

Personnel Actions

Among some changes this year were titles. We now have Supervisory Refuge Operations Specialists, instead of Refuge Managers... but, it pays the same.

Susan Cooper, a permanent-seasonal Tractor Operator, was placed on furlough as of January 1 and returned to duty May 14 after attending Basic Army Reserves Training in Georgia. Susan also was put in a leave-without-pay status once again on December 30, when she was called to active duty in Saudi Arabia.

Ken Jones arrived from Wichita Mountain NWR to fill our long vacant position as Refuge Law Enforcement Officer on February 17.

Harlan Lightwine was on extended sick leave for the full year, fighting a long battle with cancer. See Feedback section, "Thanks".

Refuge Law Enforcement Officer Jones was promoted to a GS-6 on April 22.

Sheryl Metz, President's Stay-In-School enrollee, was promoted to a GS-2 on April 22.

Kirk Coleman began work as a temporary Recreation Aide on May 14, which ended on September 30. Kirk was rehired as a Coop Student on October 24, while continuing his curriculum at the University of Nebraska - Omaha.

Custodial Worker Gleason resigned as of August 17. This position was fairly quickly filled by Loren Hinkel, a past employee.

Fishery Biologist Olmsted received a promotion to a GS-7 position on October 21.

Museum Curator Leslie Perry Peterson went on LWOP status, effective November 2, to join her husband for a move to his promotion with the Bureau of Reclamation in Nevada.

Two temporary employees were terminated as we entered the new fiscal year. They were reinstated on October 24.

Supervisory Refuge Operations Specialist McCollum retired on October 31. After nearly thirty years with the Fish and Wildlife Service, Homer returned to his homeland, someplace called Missouri.

Wildlife Biologist Root received a promotion to a GS-11 position on November 4.

Tractor Operator Cunard was promoted as a WG-8, Heavy Equipment Operator, on December 16, in line with accrued duties.

Clerk-Typist Lenora Lundeen retired on December 28 after nearly ten years of service at DeSoto.

So, as the year ended, several positions were either absent or vacant.

Awards

Performance awards were presented to Clerk-Typist Lundeen, Information Receptionist Nielsen, and Maintenance Mechanic Kraushaar this fall.

Museum Curator Peterson was presented a special achievement award during this period.

Travel/Training

Station personnel completed all training as annual work planned, but special details reached a record high, and we remain uncertain as to how much was paid by other stations, the regional office, or the Washington office.

Four refuge officers traveled to Squaw Creek Refuge to assist with their primitive weapon hunts on the weekends of January 6 and 20.

Refuge Operations Specialist Sheets attended the Wildlife Disease Workshop in Madison, Wisconsin, on January 9 and 10.

Manager Gage participated in the WAM-JAM at Pere Marquette State Park, Illinois, on January 17-18.

Administrative Officer Porter traveled to the Washington office to participate on an Alternative Internal Control Review Team on January 22-23.

Administrative Officer Porter attended an OPM supervisory training course in San Francisco the week of January 29 through February 2.

Manager Gage attended an advanced supervisory training course (OPM) in Denver during the week of February 5.

Refuge Biologist Root attended the Biologist's Workshop in Brainard, Minnesota during the week of February 5.

Manager Gage and Fishery Biologist Olmsted attended the Nebraska Federal/State Coordination Meeting in Lincoln on February 14.

Manager Gage also participated in the compatibility review process in the Regional Office on February 15.

Over Manager Gage's "dead body", Administrative Officer Porter traveled to Region's 1 and 7 on an Alternating Internal Control Review Team during the first week in March, and certainly enjoyed the experience.

Manager Gage was in the Minneapolis Regional Office as Acting WAM-2 from March 12 through 14, and didn't especially enjoy the experience.

Six refuge officers attended the Law Enforcement Refresher at Fort Dodge in Des Moines as scheduled on March 19-23 and March 26-30.

Outdoor Recreation Planner Drews participated in an Operations Inspection at Union Slough NWR on April 23-25.

Refuge Officer Jones and Museum Curator Peterson traveled to Minneapolis to attend and instruct, respectively, the Archeological Resources Training during April 30-May 3.

Refuge Manager Gage and Supervisory Refuge Operations Specialist McCullom attended a Farm Bill meeting at Union Slough NWR on May 9.

Outdoor Recreation Planner Drews, Museum Curator Peterson, Administrative Tech Harbottle, Clerk-Typist Weldon and Clerk-Typist Lundeen attended a two-day WordPerfect computer training session held in Omaha on May 22-23.

Wildlife Biologist Root attended an Urban Wetlands Symposium in Elgin, Illinois, on May 22-23.

Refuge Operations Specialist Sheets completed the Basic Refuge Management Academy held at Dana College in Blair from April 29 through May 18.

Manager Gage traveled to Denver to participate in a Missouri River Natural Resources Enhancement Program planning meeting on May 30-31, along with a number of Region 3 and Region 6 personnel.

Kirk Coleman, the station's temporary GS-4 Recreational Aide, attended the Career Awareness Institute at Tennessee Tech during June 2-23.

Museum Curator Peterson traveled to Washington, D.C., where she presented a paper at the National Park Service's "Preservation Challenges in the 90's" Conference on June 5-7.

Administrative Officer Porter attended another OPM supervisory course in Indianapolis the week of June 11, completing his 80 hours of required training.

Project Leader Gage attended the Regional "ARW Attack" (the opposite of a retreat) in Two Harbors, Minnesota, on June 25-28, with interesting group exercises lead by Outward Bound strategists.

Tractor Operator Cooper was on military leave attending a two-week Army Reserves training course in July.

Manager Gage toured several Missouri River enhancement proposal sites with Region 6 refuge personnel and Papio-Missouri River Natural Resource District's Environmental Coordinator on July 17.

Biologist Root was detailed to the Chicago area during the majority of July and August to work on-site on an urban wetland initiative.

Refuge Manager Gage attended the WAM-JAM II in Northfield, Minnesota, during August 20-23.

Museum Curator Peterson and Refuge Operations Specialist Sheets attended 40 hours of "Supervision and Group Performance" in Minneapolis during the week of August 20.

Refuge Manager Gage attended the joint Iowa/Illinois Wildlife Society Meeting in Dubuque, Iowa, during the week of September 24.

Tractor Operator Cunard traveled to Esterville, Iowa, to work on Farm Bill wetland restorations during October 15-26.

Fishery Biologist Olmsted was detailed to Lake of the Woods on a law enforcement sting operation during October 9-13.

Refuge Officer Jones was on detail to the Upper Mississippi to assist with waterfowl law enforcement during November 26-28.

Fishery Biologist Olmsted traveled to the regional office for a fishery task force meeting on November 29.

Station supervisors attended required equal opportunity training from Human Resource's Milne at the DeSoto Visitor Center on November 29.

Refuge Officer Jones attended the Firearm's Instructor Training Course at the Federal Law Enforcement Training Center. The two-week training course ran from December 3 through the 14.

Maintenance Mechanic Kraushaar and Tractor Operator Cunard attended a one-day pesticide applicator's course in Ames, Iowa, on December 7.

2. Youth Programs

The 1990 Youth Conservation Corps (YCC) program started on June 11. A total of 25 applications were received from the local area. Four names were randomly drawn, two males and two females, one each from Nebraska and Iowa.

The summer started out typically, but the personalities of the group soon turned the summer into a unique one. The four youths hit it off from the start. The crew meshed extremely well together. They had a lot of fun working on the refuge and playing jokes on the maintenance staff.

Safety was a major concern of the program. Every Monday morning started out with a safety film. The potential problems of each new project were discussed before they began. During the course of working on a project, if an unsafe incident occurred, the work was stopped, and the enrollees discussed the situation. All of this did pay off; not one accident occurred.

The positive way the enrollees dove into every project and the friendship they shared made the summer enjoyable for all. Our YCC program provides the station and the government with a very inexpensive labor force and a means to get numerous projects completed. The enrollees also learn a lot about the environmental problems threatening the planet, which will ultimately benefit everyone.

The YCC enrollees spent the majority of the summer on three work projects: nature trail maintenance, litter control, and boundary fence repair.
30-127-90 MS

Other work projects included visitor center maintenance, thistle removal, refuge quarter's maintenance, road culvert marking, picnic table painting, and headquarter's maintenance.

As soon as possible after the program started, the enrollees were given first aid and CPR training by the Red Cross. Environmental education programs included a hunter education course.
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3. Other Manpower Programs

Harrison County's Summer Youth Employment and Training Program placed two Iowa youths at the refuge for the summer. This program is designed for economically disadvantaged youths, ages 14-21, to provide career exploration and practical work experiences. Bob Wagner was assigned to the visitor center, where he helped with general maintenance, both inside and outside. The other youth, Greg Moore, worked around the headquarters on a variety of projects. These temporaries are provided at no cost to the refuge and, of course, there are no FTEs associated with the program.

4. Volunteer Program

DeSoto continued to operate a high-quality volunteer program in 1990. Our staff does not have time to recruit, supervise, and train a large volunteer force, so we seek a few individuals willing and able to make major contributions to the refuge. Nine regular volunteers, 30 Audubon (Adopt-A-Refuge) volunteers, one intern, one graduate student, and 28 limited-project volunteers donated 2,149 hours of valuable assistance.

Synopsis of 1990 Volunteer Services

Volunteer Activities	Hours
Habitat survey (includes IPM crop scouting)	720
Environmental education activities	426
Waterfowl and other wildlife counts	235
Annual spring bird count	142
Clerical work	106
Environmental monitoring	96
Visitor information and assistance	95
Writing/editing	46
Artwork for exhibits and publications	46
General maintenance	42
Training	42
Special exhibits (set-up)	39
Exhibits (including monitoring)	31
Trail work	20
Habitat maintenance	16
Data analysis/compilation	15
Conducting tours	13
Off-site programs	12
Volunteer program coordination	5
Bioexams	2

The Omaha Audubon Society provided assistance through their Adopt-A-Refuge program. This year, they assisted in the annual Spring bird count and weekly waterfowl counts in the fall (The annual Christmas Bird Count was canceled due to inclement weather). Refuge volunteers often came to the refuge in early morning and during nighttime to complete various wildlife counts during the spring and summer.

Marian Ingwersen of the University of Nebraska-Omaha completed a small mammals survey using overnight trap sets. John and Brandon Winter, a father and son team, worked at the refuge for five days completing a variety of work assignments in preparation for the public use season, and assisting with biological duties. Brandon used the work experience toward qualifying for a Boy Scout wildlife badge.

Refuge volunteers were toasted at a special Christmas Party held in their honor. The efforts and projects of each volunteer were recognized, and appropriate Service recognition pins were awarded. Bob Starr was presented with a snow goose carving in recognition of his over 2,000 hours of service to the refuge. He also was featured on KETV (Channel 7) in Omaha, on the "Heartland Heroes" segment on October 17, for his many volunteer contributions.

Take Pride in America Projects

Many people have been involved in a community Take Pride in America habitat enhancement project for DeSoto Lake since the 1985 lake renovation. Approximately 100 Christmas trees were again donated to the refuge by the people of Blair, Nebraska, to create off-shore fishery habitat.

Prior to placing new litter dumpsters at public use sites, each dumpster was stenciled with "Take Pride in America, Pitch in!"

5. Funding

Funding Targets, Fiscal Year's 86-90

	FY91	FY90	FY89	FY88	FY87
O&M	782,700	669,187	739,200	686,700[1]	644,200
YCC	0	6,800	6,800	6,800	7,090
ARMM	0	0	0	35,000	37,000
Flex Funds	0	2,000	44,000	0	0
RPRP	0	0	0	0	0
Quarters	?	?	8,619	15,450[2]	9,500
Other	33,988[3]	30,700[4]	25,000[5]	40,000[5]	0
Fee Receipts	?	?	24,114	0	0
Maint. Mgmt.	40,000	75,000	5,000	0	0
Total	$856,668	783,687	852,733	783,950	697,790

?Fund target not received as of 2/23/90.

[1]This figure does not include the $23,000 job-ordered through the regional office.

[2]Carryover quarters funding, part of which was used to rehabilitate the water system supplying these houses.

[3]Funding for coop. ed. student - $6,100; Farm Bill - $5,000; fire management - $12,500; volunteers - $1,700; FmHA easements - $1,988; law enforcement - $6,700.

[4]1120 purchase semi truck - $5,000; 1241 purchase of fire truck - $15,400; 1230 wetland restoration - $8,000; 1261 FmHA easements - $2,300.

[5]Funds programmed from Fisheries Resources for fish habitat.

This is the second year that we have not received fund targets for refuge fee receipts or quarters maintenance. In FY90, this refuge

expended $16,334 in 4960 (fee money) and $13,582 in 8610 (quarter's maintenance).

The refuge presented checks totaling $33,336 to local counties under the Refuge Revenue Sharing Act. Harrison and Pottawattamie counties in Iowa received $13,413 and $1,980, respectively. Washington County in Nebraska received $17,943 in lieu of taxes. This amounts to 78 percent of their entitlement under this program.

6. Safety

Safety topics are assigned to individual staff members who are responsible for providing programs for monthly safety meetings. Topics this year included health and fitness, first aid, heat disorders, tornado and thunderstorm alert, defensive driving, job safety, boating safety, and winter safety. Three-person teams also conduct quarterly safety inspections of facilities and report unsafe items or practices.

Cooperation with the State of Nebraska continued in nuclear emergency preparedness due to the close proximity of the Fort Calhoun Nuclear Power Plant.

The station's Safety Plan was revised and approved during the period. Two eye washes were installed in work areas at the headquarters and the center as directed by an "action item" during the latest Operations Inspection.

Staff members received training in standard first aid, cardiopulmonary resuscitation, and boating safety. Additional first aid supplies were purchased and added to refuge first aid kits, including pocket masks for artificial respiration.

There was only one accident involving refuge employees during the year. On August 5, while moving tables which were leaning against a wall in a visitor center storage area,, Outdoor Recreation Planner Drews had a number of tables fall forward, striking her on the head and left forearm, and pinning her beneath the front table. She was taken to the hospital for x-rays, which proved negative.

Only one accident involving the public was recorded. The accident occurred on October 19th, but was not reported to the refuge until December 3, when the individual requested payment for injuries sustained. Apparently, Ms. Lois Ream fell on the Missouri Meander Trail after tripping over a tree stump which was exposed on the wood-chipped trail. Her knee injury resulted in substantial medical bills and she has subsequently submitted a tort claim.

Iowa boating accidents recorded during 1990 were 51, resulting in 10 fatalities, double the previous year's. Firearm accidents also increased during 1990, to a total of 61, of which seven were fatal.

7. Technical Assistance

There is always someone requesting special assistance or technical information from this facility. Technical assistance was provided to 57 sources in the following general topic categories: Bertrand artifacts, museum management, Service archeological needs, exhibitry, wetland restoration, public use management and planning, tourism and economic development, public relations, environmental education programming, refuge and habitat management, and water control structures.

Information regarding staffing, security measures, and other safety items was provided to the Federal Management Emergency Agency (FEMA) for inclusion in a civil defense management plan.

We have had a large number of requests for more information on our biological cropland program and the integrated pest management program, so we developed two formats for brochures, both a general and a technical one, which were printed by the Iowa Cooperative Extension Service as part of our funded IPM program. Copies are appended on the back cover.

A public information meeting on Missouri River mitigation projects was held at the DeSoto Visitor Center on February 24. It was cosponsored by the Iowa Department of Natural Resources, Iowa State Senator Hester, and Representative Hester.

Two representatives from the Kansas Fish and Game Department toured the refuge in April to glean both our farming and water management practices.

Then, the refuge hosted a visit by the Indiana Dunes National Lakeshore Management Team on June 22. The team reviewed refuge operations and facilities, and were impressed by the diversity of our programs.

Most notable among the farm tours was the bus tour given to 110 participants as part of the National Sustainable and Natural Resources Conference held by the University of Nebraska - Lincoln.

Finally, Manager Gage served on a local committee that is developing an 18-acre arboretum at the new Arbor Park Middle School in Blair, Nebraska, through a challenge grant with the Nebraska State Arboretum Society.

Assistance was provided to other Service units by a number of members of the refuge staff. Porter participated in the Alternative Internal Control Review Team in Regions 1 and 7, after some training in the Washington, D.C. offices, and also assisted in setting up the office for Walnut Creek NWR. Drews participated in a regional Operations Inspection of Union Slough NWR, and provided technical planning assistance in public use management and facility siting for

Squaw Creek NWR. Root was detailed to Enhancement/Private Lands to assist in urban wetland evaluations in the Chicago area. And, Olmsted was assigned to chair a regional refuge fishery management task force.

Various materials were provided to new refuges, or those planners expanding their public use facilities. Slides, photographs, and information were provided to the Patoka River NWR support group, PRIDE (Patoka River/Individuals Defending Environment), to assist in soliciting support and money for a visitor center. Similar information was provided to Bear River, Cypress Creek and Malheur Refuges for responses on planned centers, and also to the Walnut Creek NWR planning team and Winona Visitor Center (Upper Mississippi NWR) planners. Similar information, as well as conceptual development methodology, was provided to the University of Nebraska State Museum.

8. Other Items/Donations

The Basic Refuge Management Academy was held again at Dana College in Blair, Nebraska. The three-week program in April-May was well attended by professional expertise from throughout the Service's realm. The program was given administrative support by this station, providing clerical duties, supplies, and support services, as necessary. We got to keep the new fax machine which was purchased for their use. Our staff hosted a refuge picnic, and enjoyed the interaction with both trainees and cadre.

Administrative support also was provided to the newly established Walnut Creek NWR near Des Moines, Iowa. This refuge acted as a temporary repository for their office equipment and a variety of newly purchased light and heavy equipment. We also assisted in setting up their new office in November.

The station's Savin 770 copier finally failed us in the fall, requiring an emergency purchase. A new Savin 9250 now adorns the administrative area at headquarters, a much more versatile copier.

A collection of 147 endangered species items, originally confiscated by Service law enforcement personnel and housed at the DeSoto Visitor Center since 1982, were transferred October 18, 1990, on a long-term loan agreement, to the Henry Doorly Zoo in Omaha, Nebraska. Loan of the exhibit will enhance their educational efforts regarding endangered species. The items will be used in conjunction with a display on the subject. An additional 21 endangered species items were permanently transferred to the Service's Law Enforcement office in Denver, Colorado, for use in future educational programs.

F. HABITAT MANAGEMENT

1. General

While average precipitation for the year was about normal, the rains and snow came in a feast and famine fashion, as outlined in Section B. Dry conditions in January, February, and April resulted in lower than average recharge of wetlands and lake levels. However, wet summer conditions presented better than average recharge conditions. A dry fall beginning in late August, again created dry wetlands conditions, along with low lake levels.

During the last two years, the dry weather was advantageous to farmers during harvest, but this late summer's drought reduced soybean pod production.

Once again, the dry fall weather locally reduced amounts of waste grain available for migratory waterfowl, due to extensive off-refuge tillage following harvest.

2. Wetlands

a. DeSoto Lake - The management of DeSoto Lake is largely dependent upon Gavin's Point Dam releases and their corresponding Missouri River flows. During spring and summer, little opportunity usually exists to lower DeSoto Lake due to the high river levels required for navigational purposes; this being a gravity-fed lake. In contrast, good opportunities exist for water level management during the river's winter drawdown and periods of low release within the Missouri River basin.

The management strategy for DeSoto Lake is a compromising effort between waterfowl management, fishery management, and public recreation objectives. In general, optimum summer elevations of 989.5 msl are desired to make the best use of the various boat ramps and docks that have been constructed around the lake for fishing access. To accommodate normal spring runoff, and limit summer elevations to 989.5 msl, late winter and early spring drawdowns are usually attempted.

Ideally, water levels are reduced through mid-summer evaporation to 987.0 msl by mid-September. This level helps concentrate predator and prey fish species, as well as promote the growth of aquatic vegetation. The exposed shoreline during the fall also provides loafing and gritting areas for waterfowl. Then, near-full pool levels of 989.0 to 989.5 msl are desired through most of the winter to reduce the possibility of a fish winterkill.

Warm temperatures in late 1989 resulted in ice-free conditions until a severe cold snap in mid-December. This severe cold created ice conditions which allowed ice fishing to begin in late December. However, extremely mild temperatures prevailed in January which ended ice fishing by mid-month, and most of the lake opened up in February.

Late winter drawdown was not necessary this year due to residual lake levels two feet below desired elevations for January and February. In addition, lake levels didn't achieve desired levels at any point during the year, with a six-week exception in mid-summer, which resulted from above-average summer rains in June and July.

The aforementioned warm temperatures and reduced lake levels resulted in extensive green algae blooms which showed up early, persisted, and which kept water clarity to a minimum throughout the summer. This, in turn, resulted in less macrophyte growth due to reduced light penetration. These shallow lake levels also aided the spread of American lotus, which has become a concern in recent years. The lotus beds doubled in acreage this year, to about 10 acres.

b. Managed Marshes and Potholes

As previously mentioned, the dry spring and fall weather had a detrimental impact on wetlands. Consequently, a total of 176.0 and 267.5 hours of Crisafulli pumping were required to bring managed wetlands and the moist-soil unit to desired levels during these respective seasons.

34-160-90 JO

Response by both spring and fall migrating ducks was excellent, despite low migration numbers, resulting in over 100,000 use days on these wetlands.

Within the last four years, numerous small ditch plugs have been constructed in various locations to restore once-drained

wetlands. All have some capacity to be recharged by runoff, and eleven are considered "managed" wetlands, since they also can be pumped, if necessary. Management of these areas is primarily for spring waterfowl breeding pair use and to provide fall migratory habitat.

Spring rains were insufficient to adequately fill Wood Duck Pond. Consequently, 24 hours of pumping was required to raise this pond to the desired level. In addition, the late summer dry weather resulted in an additional 14.5, 19, and 16 hours of pumping in August, September, and October, respectively. Both spring and fall use in this unit was very good by wood ducks and mallards.

Buchardt Pond was pumped for 28.5 hours during the months of March through May and for 40 hours from Late August to early October. Waterfowl use was good in spring, but marginal in fall.

The three visitor center ponds, comprising approximately eighteen surface acres, are located west and north of the visitor center. The southern-most pond, referred to as Osprey Pond, can be recharged via a feeder pipe connected to the visitor center's water cooling system or by Crisafulli pumping from DeSoto Lake.

During 1990, these ponds were pumped for 48.5, 14, 34, and 38 hours in early March, late August, early September and early October, respectively.
32-183-90 TR

In addition, considerable scavenged cooling-system water from the visitor center was supplied, also. They received very active mallard use, both in spring and fall.

Willow Pond also was dramatically impacted by low water levels. Consequently, eight hours and 16.5 hours of Crisafulli pumping were required in mid-March and mid-September, respectively, to attain desired water levels.

Moist-soil plant growth was excellent due to spring and early summer shallow water levels. Fall use of these plants by migratory waterfowl was exceptional.

Young's Pond remained essentially dry all year. No pumping was undertaken as the pumping station in Young' ditch had an inadequate water supply to keep up with the Crisafulli pump due to low lake levels.

The Botos' Ponds held water all winter from the previous fall's pumping. Consequently, no pumping was required in early spring. However, ten hours of fall pumping was required for a mid-September recharge. Use by spring migratory waterfowl was good, but fall use was nearly non-existent, despite good plant growth. We don't know why.

Some enhancement work was accomplished on vegetation-clogged refuge wetlands in January. Approximately two acres along the upper Bullhead Pond drainage were deepened and opened up.

c. Moist-Soil Unit - This unit was pumped intermittently for 24.5 and 22.0 hours in early April and May, respectively, and for 61 hours in mid to late September. Only the lower four units were pumped for waterfowl use as it was determined in 1989 that the upper two units lost water too rapidly to warrant pumping.

Response by moist-soil plants, and subsequently by waterfowl, was excellent. Smartweed was abundant and produced considerable seed for waterfowl use.
34-161-90 TR

The area received about 10,000 use days in the spring and over 20,000 use days in the fall. Fall use would have been greater, but it was noted that waterfowl hunting on private land adjacent to the unit prevented use by ducks during the hunting season.

3. Forests

For many years, the refuge has experienced a die-off of mature cottonwoods, with essentially no regeneration to replace existing stands. This problem was addressed in a 1990 Forest Management Plan. Proposed forest management strategies included protection of existing mature cottonwoods for bald eagle perching and roosting habitat, development of a forest management program to ensure a sustained source of roosting and perching trees for bald eagles, promotion of designated cottonwood regeneration in grasslands targeted for this management, and systematic flooding of identified converted croplands to promote cottonwood regeneration. Some experimental flooding was attempted along the East dike in June. Water retention and response varied considerably.

4. Croplands

a. Cooperative Farming - In 1989, the refuge converted to a one-third/two-thirds crop-share farming system. Using this system, ten cooperators farmed 1955.3 acres to provide food and loafing areas for migratory waterfowl; and food, cover, and edge for other species.

The year began with eleven cooperators farming 2691.6 acres, but in early March we were notified by primary cooperator Tietz (736.3 acres) that he didn't plan on farming refuge ground any more, due to financial problems. At that late date, we chose not to give the acreage to another cooperator, but to rewrite the Cropland Management Plan, incorporating changes in ground farmed by each cooperator and retiring numerous acres. Consequently, the entire acreage, with the exception of the sludge demonstration fields, was planted to clover, carried over to second year clover, or retained in alfalfa for 1990. This gave us the option to convert to whatever crops we desire in the future.

Some excellent stands of clover were grown. We have documented that such stands can supply up to 170 pounds of available nitrogen to the following year's crops.
32-184-90 MS

Normally, cropland rotations are approximately 85 percent biological and 15 percent conventional. The refuge tries to maintain a minimum of fifteen percent in conventional rotation as a control for yield comparisons between the two types of rotations. However, the aforementioned acres which were not farmed on Center Island, resulted in a ratio of 77.7 percent biological to 22.3 percent conventional rotation for the year.

The following table summarizes refuge farming activities for 1990:

	Corn	Soy-beans	Wheat	Clover & Oats	Milo	Al-falfa	Other*
Biological	362.6	415.8	47.2	412.6	80.8	107.0	92.8
Conventional	218.3	218.2					
Total Acres	580.9	634.0	47.2	412.6	80.8	107.0	92.8

*Includes alfalfa/oats and clover seeded into wheat.

Corn production was very good due to adequate rainfalls throughout most of the summer. However, moisture was still somewhat lacking in biological-rotation fields due to depletions caused by clover growth the preceding year, which resulted in yield averages of 7.7 bushels/acre less for biological-rotation corn than conventional-rotation corn.

Soybeans were negatively impacted by the late August and September drought, which reduced pod production significantly. However, as opposed to corn, the biological rotations were benefitted by this rotation as increased organic matter resulted in average yields of 5.1 bushels per acre higher than conventional-rotation fields. Incorporating 1990 yields, the 12-year average for conventional-rotation corn is 98.1 bushels per acre, versus 95.3 bushels per acre for the biological-rotation; and conventional-rotation beans averaged 33.3 bushels per acre, versus 35.2 bushels per acre for the biological-rotation beans.

Average Yield in Bushels/Acre

Crop	1986	1987	1988	1989	1990	1979-90 Average
Conv. Corn	100.8	107.5	88.7	88.6	125.5	98.1
Biol. Corn	101.3	120.2	72.2	68.0	117.8	95.3
Conv. Beans	36.2	35.3	26.1	35.5	35.4	33.3
Biol. Beans	44.2	35.9	24.1	34.1	40.5	35.2

In addition to the previously stated cooperative farming activities, the refuge reimbursed a cooperator to fall-sow wheat on approximately 100 acres of the former Tietz ground in Center Island which had not been farmed in 1990.

The refuge also reimbursed two cooperator's to have wheat aerially sown on 77.6 acres of standing soybeans in early September. All stands grew well and were used extensively by snow geese, during the fall migration. 33-169-90 TR

A 61.8 acre alfalfa field also was hayed on Center Island in late August under a competitive bid contract. This resulted in some excellent fall green browse for migratory waterfowl and receipt of $747.78 for the U. S. Treasury.

b. Food Plots - Fifteen food plots, each generally containing three cover types, and totaling 152.2 acres, were grown and left unharvested for wildlife use. Of these, a total of 54.8 acres were in milo, 47.2 acres were in fall-planted wheat, and 50.2 acres were in wheat and clover (fall-planted wheat from 1989, with clover interseeded in the spring of 1990). The primary objective of food plot management is to provide food for resident and migratory non-game wildlife. This objective continues to be accomplished, with 100 percent utilization year after year.

In addition, the refuge's share of several corn fields was left standing or chopped for use by migratory waterfowl and resident game. Milo was grown and left standing on 26.0 acres as the refuge's share on three corn fields for the same purpose, and 6.5 acres of corn strips were left standing for concealment of hunting blinds in our Iowa controlled waterfowl hunting program. These strips also are used extensively by waterfowl and resident game.

c. Excess Grain - Each year, the refuge stores 1,200-plus bushels of corn for potential depredation or disease management problems per existing management plans. Any additional grain stored in refuge bins is used to initially attract snow geese to the vicinity of the visitor center during the fall

migration and for the center's bird feeders. When spring arrives, the held-over grain is transferred to other stations, as available.

Under the current crop-share system, the refuge's entire share of soybeans and some corn is harvested and the monies used to reimburse cooperators (per the Iowa Custom Rate Survey) for refuge farming activities, such as food plots, or for inter-elevator transfers to other refuges. In 1990, the cooperators were reimbursed a total of $23,479.16. The remaining monies resulted in the following inter-elevator transfers to other refuges for their wildlife management needs, on a first-come, first-served basis:

Refuge	Dollar Value
Mingo	$ 971.42
Long Lake	6,375.10
Red Rocks	11,220.93
Agassiz	1,820.70
Des Lacs	5,000.00
Blackwater	5,000.00
Fort Niobrara	2,000.00
Tamarac	1,903.13
Lee Metcalf	4,000.00
Erie	2,000.00
Montezuma	3,000.00
LaCreek	735.00
Swan Lake	16,840.30
	$60,866.58

d. Integrated Pest Management - During 1988, the refuge entered into an integrated pest management project with the Iowa State University Extension Service. This three-year project has been funded through a grant by the Leopold Center for Sustainable Agriculture. The Center was founded by the Iowa Legislature as part of the Groundwater Protection Act. Its program goals were stated in a previous narrative report.

The objectives of the refuge project fall into the following categories: (1) to demonstrate current integrated pest management technology, and, specifically, crop scouting through application to refuge and adjacent private cropland; (2) to demonstrate optimum nutrient management technology; (3) to determine nitrate, orthophosphate, and pesticide levels entering DeSoto Lake via agricultural drainageways, and nitrate levels in groundwater located under biological and conventional crop rotations; (4) to compare productivity and profitability of conventional versus biological farming rotations; (5) to establish an alfalfa weevil parasite insectary on the refuge, with potential to serve as a distribution center for inoculation releases of parasites in

Iowa and Nebraska; and (6) to provide public information on integrated pest management techniques.

The DeSoto project was one of 19 selected for funding in 1988. An initial grant of $13,470 was administered through the Iowa Cooperative Extension Service. In 1989, the project was one of 25 funded, and a grant of $22,296 again was designated by the Leopold Center, administered by the Iowa Extension Service. For 1990, the project was one of 40 funded, and, a similar grant of $27,250 was received.

Becky Latka, a Master's Degree graduate from the University of Nebraska-Omaha, was hired in April by the Iowa Cooperative Extension Service to conduct the crop scouting portion of the IPM project.
33-167-90 TR

Becky scouted 30 selected demonstration fields weekly, totaling 1,097.4 acres. Eighteen fields, totaling 416.4 acres, were scouted on-refuge and 12 fields, totaling 681 acres, were scouted off-refuge. All major insect pests of alfalfa, corn, and soybeans were observed. However, unlike the last two years, no pests reached economically threatening levels, and no extended diapause was observed for northern corn rootworm.

Grasshoppers damaged some fields, with numbers averaging up to 6/ square meter. IPM crop scout Latka discovered grasshoppers were dying from a fungal disease (Entomomphaga grylli).
33-171-90 TR

As in the preceding two years, a weekly newsletter, the "DeSoto Crop Report" was written by the crop scout and distributed to local farmers (copy appended).

The water quality monitoring portion of this project is comprised of two investigative areas, ground and surface water. The objective is to monitor for the presence of nitrates and selected pesticides. Consequently, in the fall of 1988, six vacuum lysimeters and five piezometers were installed to aid in this monitoring process. During the fall of 1988 and early spring of 1989, baseline samples were taken from each well (lysimeter and piezometer), from DeSoto Lake, and from each of three agricultural drainageways entering DeSoto Lake.

After baseline samples were taken, refuge and/or Cooperative Extension Service personnel collected samples from DeSoto Lake, agricultural drainageways entering DeSoto Lake, and wells (lysimeters and piezometers) each time a rainfall event of one-plus inches occurred during the growing season.

Samples taken during 1989 produced the following results: (1) nitrates were not found in 18 groundwater samples (with one exception of 2 ppm); (2) nitrates were more abundant in the soil profile, averaging 59 ppm for conventional crop rotations versus 30 ppm for the biological crop rotations; (3) nitrates were detected three times out of six in drainageway samples, averaging 10 ppm; (4) Atrazine, Bladex, Dual, Lasso, Treflan, Eradicane, and Basagran were all detected in drainageways entering DeSoto Lake following rainfall events. Concentrations ranged from .14 ppb for Basagran to 66 ppb for Atrazine; (5) Atrazine, Bladex, Dual, and Lasso were found in all groundwater samples, including control samples. Concentrations ranged from .25 ppb to .64 ppb; and (6) Atrazine, Bladex, and Eradicane were detected in DeSoto Lake samples at less than 1 ppb. Atrazine, and Bladex were detected in all samples, including controls, and Eradicane was detected in one sample following a rainfall event.

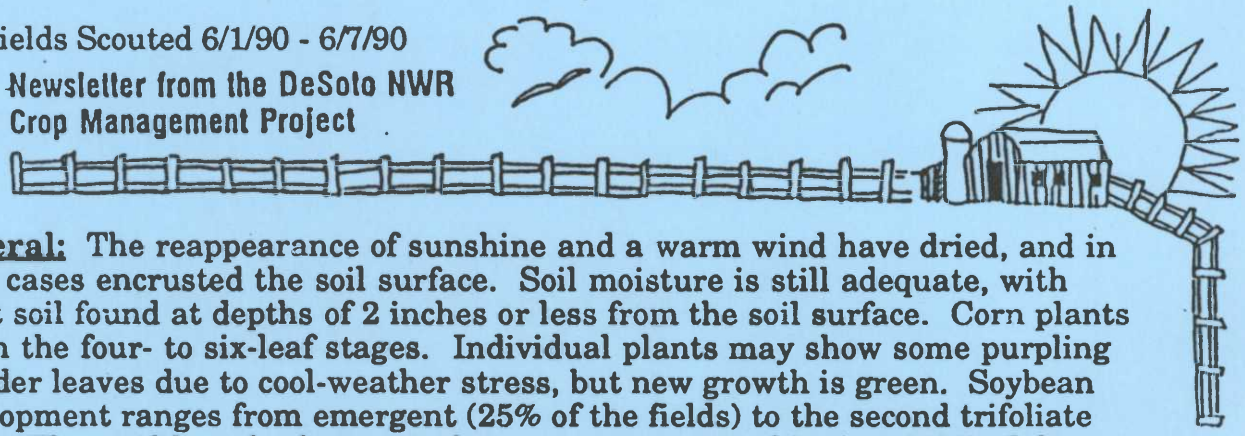
Testing continued in 1990 with the following data collected: (1) nitrates were not found in 20 groundwater samples, but were present at 1 ppm in two samples; (2) nitrates were present in soil profiles, averaging 45 ppm for the conventional rotation, versus 23 ppm for the biological crop rotation; (3) nitrates were detected in agricultural drainageways and averaged 11 ppm; (4) Atrazine, Bladex, Dual, Lasso, Eptam, and Treflan were detected in drainageways entering DeSoto Lake following rainfall events. Concentrations ranged from .15 ppb for Lasso and Bladex (though higher concentrations also were detected) to 37 ppb for Atrazine; (5) Atrazine, Basagran, Bladex, Dual, Eptam, Lasso, and Sencor were found in groundwater samples.

IOWA STATE UNIVERSITY EXTENSION

DESOTO CROP REPORT

For Fields Scouted 6/1/90 - 6/7/90

Newsletter from the DeSoto NWR
Crop Management Project



General: The reappearance of sunshine and a warm wind have dried, and in some cases encrusted the soil surface. Soil moisture is still adequate, with moist soil found at depths of 2 inches or less from the soil surface. Corn plants are in the four- to six-leaf stages. Individual plants may show some purpling on older leaves due to cool-weather stress, but new growth is green. Soybean development ranges from emergent (25% of the fields) to the second trifoliate stage. The unifoliate leaf stage is the most common at this time (40% of the fields).

Insects: Dingy cutworm activity in corn has almost subsided (< 5%) and no other insects have become a problem yet. Average leaf defoliation by bean leaf beetles in soybeans is 5%, ranging from 1 % to 14%. Once true leaves have developed, beans can tolerate up to 40% defoliation without significant yield loss.

Weeds: Sunflower (up to 6" tall), velvetleaf (up to 4" tall), and foxtail (up to 4" tall) are the most common annual weeds that I've been finding. Many farmers have already cultivated and/or sprayed, so any remaining problem plants are confined to the spaces in the row between plants. Perennial weeds (those with rhizomes connecting plants underground) are a more stubborn problem. Energy stored underground in the rhizomes will allow the plant to survive a herbicide application, even though the leaves may curl and yellow. These weeds include smartweed (tan weed), common milkweed, elderberry, volunteer clover, and Canada thistle. To get the best results when spraying, wait until the weed is in the bud-to-bloom stage. Because of the added energy required for reproduction, plants are more vulnerable at this time.

Becky Latka
IPM Scout

DeSoto NWR crop management project is conducted jointly by Iowa State University Extension and the U.S. Fish & Wildlife Service. Funding for the project is through Iowa State University's Leopold Center for Sustainable Agriculture.

Concentrations ranged from .12 ppb to 2.2 ppb; and (6) Atrazine, Basagran, Eptam, Bladex, Dual, and Lasso were detected in DeSoto Lake samples at 1.5 ppb or less. Atrazine was detected in all samples.

What does all this mean? Simply put, it means that low levels of Atrazine, Bladex, Dual and Lasso exist in groundwaters below DeSoto. In addition, DeSoto Lake has consistent low levels of Atrazine and Bladex present, and numerous herbicides are entering DeSoto Lake as a result of local agricultural processes following rainfall events. The cumulative effect is not known at this time.

Another of the objectives of this project was to establish an alfalfa weevil parasite insectary on refuge. This process began in 1988, with two releases of the alfalfa weevil parasite, Bathyplectes anurus, which is the larval parasitoid. In 1989, the adult parasitoid, Microtonus aethiopoides was released on two sites. Survival and propagation of these parasites coincides well with the existing refuge haying program, which incorporates delayed cutting.

In May, Iowa state entomologists, U.S. Fish and Wildlife Service, and Cooperative Extension Service personnel collected alfalfa weevils in the larval stage to determine the presence or absence of the larval parasitoid. 33-166-90 TR

The parasitoid was present in the weevil larva, which indicated a successful introduction of this species. Future sampling of the weevil adults will determine the success of the adult parasitoid.

To partially meet the public information objective, two leaflets were developed describing refuge farming and integrated pest management. One leaflet was designed for distribution to professional resource managers, while the other was written for the general public.

5. Grasslands

The station's comprehensive Grassland Management Plan calls for the eventual establishment of 1,000 acres of introduced cool-season grasses and 500 acres of native warm-season grasses.

32-185-90 TR

Since the plan's completion, an additional 389.9 acres of cool-season grasses have been planted. However, no plantings occurred in 1990 because the dry April weather was not conducive to planting in early spring, and the dry late August and September conditions were again unacceptable for planting cool-season grasses.

6. Other Habitat

Ten acres of the former North Beach shoreline were disked three times for vegetation control to promote potential nesting by least terns and/or piping plovers.

In addition, the three-acre peninsula north of the Sandbar area was disked to meet the same objective. Also, this point is a favorite loafing spot for mallards and Canada geese when maintained in an open condition, free of heavy vegetation.

No least terns or piping plovers were observed this year.

8. Haying

The refuge currently maintains 107 acres of alfalfa hay, and 42.6 acres of alfalfa and oats were planted to establish additional alfalfa fields. Management of alfalfa hay changed in 1987, with the annual first cutting date being delayed from June 20 to July 15, to promote completion of nesting by ground nesters, particularly waterfowl. To compensate cooperators for this inconvenience and the loss of a viable first cutting, cash rent on alfalfa was reduced to $5 per acre. This fee, which is based on a three-year average market value, was increased to $10 per acre for 1990. In addition, the three-year market value average was increased to 5 years as the

recent drought years would have increased 1990 fees to $20/acre, four times last year's price. Increasing the refuge assessment to 5 years helps reduce extreme fluctuations in cash-rental rates.

Even with the change in 1989 to crop-share farming, alfalfa was retained as a cash-rent crop because the refuge has no use for alfalfa hay. The amount of rent owed by cooperators for hay is simply subtracted from the amount owed to that cooperator for food plots and farming services provided to the refuge. Consequently, the cooperator does not have to pay out-of-pocket expenses for alfalfa. The system works well, and apparently meets management objectives because mallards have been observed nesting in refuge alfalfa since 1987.

9. Fire Management

One cool-season grassland and five warm-season native grasslands, totaling 150.0 acres and 46.1 acres, respectively, were burned in 1990.
32-182-90 JO

Other grasslands were scheduled for burning, but either moisture or drought conditions prevented planned burning.

Response by grasses was good for most species and excellent by big bluestem, tall, and intermediate wheatgrass. Control of woody vegetation appeared quite good.
32-186-90 TR

An attempt was made to fall burn the Center Island goose pasture, with only limited success.

10. Pest Control

Regional herbicide management changed in 1988 with a list of accepted herbicides being supplied by the regional environmental contaminants office. This list now includes 26 non-restricted-use herbicides which can be used on station upon approval by the Project Leader. This list was retained for 1989 and 1990, but was further reduced by three herbicides which are not feasible or acceptable for use in this area. Cooperators applied nine of these herbicides for control of sunflower, cocklebur, buttonweed, foxtail, and other weeds in agricultural fields.

Roundup was applied twice on the gravel along entrance road's edge to control invading vegetation. In addition, Roundup was spot-applied to control vegetation (primarily cool-season grasses) invading the buffalograss lawn at the visitor center. Other weed control included chopping of musk thistle by YCC enrollees and some thistle mowing in extremely dense stands.

Musk thistle has recently become a problem in a few of our cool-season grasslands. Since spraying is not a desirable choice, releases of a parasite, Dinoyllus conicus, were planned for 1990, but availability of this weevil was limited. Hopefully, the release can occur in 1991 and this biological control will become part of our integrated pest management program.

Until recently, phragmites had shown no tendency to spread. However, in the last few dry years, it has enlarged its territory along the DeSoto Lake shoreline and at the edge of the moist-soil unit. Consequently, the phragmites in the moist-soil was wiped with Roundup and the phragmites along the lakeshore was sprayed with Rodeo. While these treatments were quite successful, future treatments will probably be necessary because phragmites is present along two of the drainage ditches which flow into the refuge. It also has spread along the U. S. Highway 30 right-of-way in the vicinity of Rand's Ditch.

No insecticides are used afield. Baygon bait was applied around the visitor center to rid the area of roaches, crickets, millipedes, and spiders. As part of the IPM program within the museum storage area and work areas, Baygon bait was replaced during 1989-90 with boric acid and monitored for effectiveness. It has not been as effective. Baygon will be used for future control.

Live traps and glue traps are used to control mice within the visitor center. It's a constant battle. This year, mice damaged a Fuzitsu printer, a computer's disc drive, a refrigerator's compressor, books, entrance fee envelopes, and even MIA's t-shirts.

14. Farmer's Home Administration Conservation Easements

Only one wetland enhancement appeared feasible among the riparian easements acquired by Ecological Services personnel, and that one isn't within DeSoto's designated District. It is located in Dodge County, Nebraska, a Region 6 easement, which we inherited due to its close proximity.

The 47.5-acre Thompson tract was posted and the riverside dumps along the north side of Maple Creek were cleaned up. FmHA has tentatively agreed to clean up some of the debris that lines the steep banks on the south side of the stream. 5-7-90-15 HM

However, such trash was placed there to hold the high banks. As a result of heavy July precipitation, Maple Creek flooded and meandered, undercutting a bend within the easement so badly that the creek bank moved outside the easement area 60 feet into adjoining croplands. Surprisingly, the landowner hasn't complained.....yet.

The soils appeared hydric, the vegetation was right, and the runoff above a wet depression looked adequate, so a 150-foot gut plug, with tube and overflow-spillway, was installed by force-account on the Thompson FmHA easement.

5-7-90-8A HM

And, while the silty clay loam looked good, and no soil lens appeared penetrated, the 3-4 acre wetland lies perched several feet above the Maple Creek, which is roughly 80 yards away. It won't hold water over a couple days. So, we aren't too happy about this easement.

All FmHA conservation easements were videotaped for future reference.

Weed control had to be arranged on two tracts during this period.

15. Private Lands

The only significant wetland project completed in the District by station personnel was a cooperative cost-sharing enhancement on Iowa Department of Natural Resource lands at Winnebago Bend, an old oxbow of the Missouri near Sloan, Iowa. 34-159-90

Iowa DNR engineered a 400-foot dike, with a 54-inch-bay Wisconsin structure. It was protected with filter fabric and 500 tons of rip rap. The $30,000 project has the potential of impounding approximately 150 acres. 34-158-90 GG

Both state and refuge personnel worked side by side on this late-winter project, coordinating purchases and contracts. While a scraper had to be contracted for some of the earthen work, both state and federal dozers pushed a lot of material.

The overflow structure utilizes a 1,000-foot section of natural vegetation. It also has a rather ingenious blowout area, in case of a major flood on the Missouri. Thus, flooding would hopefully bypass the main structure, saving it. Time will tell. If it works, there's potential for doing a lot more of this sort of work along the river.

By fall, only 30 acres of water had pooled behind the Winnebago Bend structure due to the overall drought, but there were 1,600 mallards using it when visited in October.
34-162-90 GG

While we looked at a number of properties and did some wishful thinking with landowners, we did not see one restorable wetland within this Refuge Management District, and almost all the enhancement projects were cost prohibitive. There are plenty of opportunities for deep-gully fish ponds and stock ponds, but little in the way of restorable wetlands along the Loess Hills of western Iowa.

So, the station's dozer spent the summer and early fall working on wetland projects in north-central Iowa, under the watchful eye of Union Slough's personnel. Heavy Equipment Operator Cunard was detailed to assist in restoration work up there for a couple weeks as the season ended.

Station personnel were involved in reporting two swampbuster violations and, also, two minimal effect determinations were denied. Our most gratifying action was saving a five-acre marsh in Lyon County from being channelized. The owner called the refuge only a couple hours before the equipment was scheduled to move in. He had heard some sort of permit was required.

G. WILDLIFE

1. Wildlife Diversity

DeSoto sits amidst thousands of acres of cultivated croplands that now alternately cover or denude the Missouri River bottomland. Some of the diversity that was once a part of the area still exits on the refuge. The refuge's biodiversity is maintained today through many management practices, including development and expansion of breeding pair and brood marshes; placement of wood duck boxes and nesting habitat; shrub and tree plantings; native grass seedings;

intensive grassland, cropland and water management; development of moist-soil units; and other routine habitat manipulations which maximize edge and habitat diversity.

2. Endangered and/or Threatened Species

Due to mild weather from January through March, between 15-25 bald eagles stayed on the refuge all winter, feeding primarily on waterfowl. The first eagle to return in the fall was an immature which arrived on October 26. The eagle numbers increased from then on, following the large build-up of snow geese. Still, the eagles peaked at only 30 birds this year, substantially below normal. Whether the fishing along on the Missouri River was better due to its extreme drawdown or just what caused a migrational shift or dispersal, we are not sure.

Northern harriers (endangered in Iowa), eared grebes, and long-eared owls (threatened in Iowa) were seen on the refuge during the year. Osprey were seen over the lake in late March and a single bird was observed in August.

Roughly, 1,800 linear feet of the former North Beach shoreline, 35 acres of the Sandbar area, and 3 acres on Sandbar Point are managed for potential nesting sites for interior least tern and piping plover. Vegetation is controlled and tern decoys are placed on the area. No nesting has occurred on the refuge since the early 1970's. The areas are maintained primarily as alternate relocation sites should catastrophic events occur on their more tenuous, but preferred, nesting sites along the Missouri River. See Section K, Feedback.

3. Waterfowl

Winter Period (January - February)

The mild weather allowed close to 10,000 mallards and 250 Canada geese to keep a large hole open in the lake near Prairie Lane throughout the winter. This was fairly unusual. Normally, the lake freezes over in December or early January, except at the aeration site.

Spring Period (March - May)

Significant numbers of snow geese were observed pushing north as early as March 10. The waterfowl that had spent the winter on the refuge joined the early migrants and left the refuge by the second week of March. The vacancy was quickly filled by ducks coming up from the south. A total of 14 different species of ducks were seen using the refuge.

Wind sheer is blamed for the death of minimally 10,000 snow geese in the northwest corner of Nebraska's Rainwater Basins, near York. The cutting edge of a severe March 13 thunderstorm drove the migrants into the ground over a fairly widespread area. This same storm spawned several small tornadoes.

May brought a nice surprise. Two broods of giant Canada geese were seen on the lake. These were the first Canada geese hatched on the refuge since it was established. One of the nests was found on top of a muskrat mound on the west arm of the lake. 03-064-90 MS

Two goose broods were reported on adjoining Noble's Lake, and a third nesting structure was abandoned after disturbance. In all, Iowa DNR recorded over 30 broods in the valley, so the state's restoration attempts along the Missouri are "taking off" after just three years of restocking.

Numerous breeding pairs of mallards were observed around the lake and one nest, which was later destroyed by predators, was found, but no broods were seen this season. 04-119-90 TR

The primary nesting species here is the wood duck. Nesting boxes have been on the refuge since the 1960's. Due to high dump-nesting and severely low hatching success, the nest boxes were relocated last year. Single compartment boxes were relocated back into the trees. This year, the percentage of eggs hatched increased over last year's success, with a 63.6 hatch rate. Only 14.3 percent were dump-nests. With the positive results of the past two years, more boxes will hopefully be put out before the next nesting season.

Summer Period (June - August)

This summer was pretty quiet. The broods of Canada geese and wood ducks did well on the lake, but hopes of other duck broods did not materialize. The lake level was fairly low and because of an exposed shoreline and very limited emergent growth, broods were quite visible.

Fall Period (September - December)

September usually brings a few migrants down the corridor. The first arrivals usually are small flocks of blue-winged teal. We also start seeing flocks of pelicans and cormorants about the same time. Personal, JO

The fall migration started with a bang. Close to 10,000 ducks appeared almost overnight on October 19. Snow goose numbers jumped from 1,000 to 102,000 in a matter of days. Waterfowl numbers continued to climb over the next couple of weeks. The ducks, (almost exclusively mallards), peaked on November 14 with 50,000 birds. Although this is higher than last year's peak of 10,000 birds, it is drastically below the refuge's historic average of 158,000 ducks. Total duck use days was 2,775,727; nearly double last year's use.

On the other hand, snow goose numbers, climbed to a peak of 420,000 on November 29, well above the historic average of 209,000. Personal, JO

The Canada geese peaked early, on October 31, with 1,000 birds present. This fell in line with the average of 835 birds. Ross' geese and white-fronted geese also were observed on the refuge. An

odd goose was seen for several weeks, a Canada/white-fronted cross. Few neck collars were seen during the fall migration period.

An extended cold period moved in beginning in mid-December and all the birds had moved south by December 24, as both the lake and the river iced over. Total goose use for the year was 11,289,488 use days, 3,250,000 use days lower than last year.

4. Marsh and Water Birds

Great blue herons, green-backed herons, great egrets, double-crested cormorants, eared grebes, pied-billed grebes, and a common loon all enjoyed the peaceful lake to do some serious fishing.

A storm in late November blew two unusual guests into the refuge, a tundra swan and a sandhill crane. Both looked very out of place and lonely here.

Large flocks of pelicans, up to 500 or more, use the refuge each spring and fall. Although our fisheries biologist was not too pleased to see them gobbling up the game fish, the visiting public really enjoys the large birds as they soar by. Personal, JO

Some pelicans have discerning tastes. This 22-inch carp was dropped out of a pelican's pouch while in flight over the lake. 18-216-90 JO

5. Shorebirds, Gulls, Terns and Allied Species

Several muddy shallows, and sandbars attracted willets, American avocets, killdeer, spotted sandpipers, and common snipes.

A large flock of black terns was observed on the refuge for several days in May. However, no nesting attempts were observed. Several species of gulls also were seen on the refuge.

6. Raptors

Numerous red-tailed hawks used the area during the spring and fall, and many nest on the refuge. Other hawks included northern harriers, rough-legged, Swainson's, Cooper's, and sharp-shinned hawks. Several other raptors observed were American kestrels, turkey vultures, ospreys, merlins, and, of course, bald eagles.

Great horned and eastern screech owls nest on the refuge. Barred owls are probable nesters, also. Two other species of owls were seen during the year: long-eared and two snowy owls. It appeared that rodent populations were on an upswing, which probably accounted for increased observations of screech and barred owls this summer and fall.

7. Other Migratory Birds

The DeSoto Spring Audubon Bird Count was held on April 27. A total of 86 species were observed.

Bluebirds were observed throughout most of the year. The refuge had maintained 22 nest boxes for them for many years. However, the only tenants had been wrens, sparrows, snakes, and mice. Due to the lack of use and the declining condition of the boxes, they were all taken down in December.

The refuge's mourning dove population needs no help when it comes to nesting. Well over 200 doves nest in the headquarter's shelterbelt alone. Personal, JO

Woodcock, common crows, belted kingfishers, tree swallows, and northern rough-winged swallows were frequently observed during their

respective nesting seasons. Some unusual sightings included house finches, olive-sided flycatchers, and a lazuli bunting.

8. Game Mammals

The only big game animals that reside on the refuge are the white-tailed deer. A very minor die-off occurred this summer from blue-tongue or EHD. An aerial count on January 22 produced a count of only 112 deer. A ground transect count just prior to the muzzleloader hunt showed 200 deer, a little higher than average for this trend count.

However, our overall observations throughout the year would indicate the population may be lower than in recent years. And, the coy-ote may be one reason why. The refuge cur-rently has a very healthy population, estimated at about 50 animals. Personal, JO

10. Other Resident Wildlife

Turkeys were reintro-duced in 1986. Since that time, they have adapted well to the refuge and are rapidly growing in numbers. They are often seen in groups up to 21, and occasionally as high as 32 individuals.

Personal, KM

Since there is little natural mast, the turkeys must depend pretty heavily on poison ivy berries and the refuge's food plots during the winter bottleneck.

The pheasant and bobwhite quail population survived the mild winter well and had good nesting success. Numerous broods were spotted during the spring and summer. Manager Gage counted over 200 quail in just one milo food plot during the fall. Large flocks of pheasants, 200 or more, are a common sight in the soybean fields during the winter months.

11. Fisheries Resources

The annual DeSoto Fishery Coordination Committee meeting was held on March 22. Representatives from the Service, Nebraska Game and Parks Commission, and Iowa Department of Natural Resources were present. Some of the topics discussed were the cooperative agreement, sport fish stocking, habitat improvement, management objectives, mark-and-recapture studies, and fish population surveys. A new cooperative agreement was prepared and signed by respective parties.

Approximately 5,458,000 sport fish were stocked in DeSoto Lake this year, bringing the total sport fish stocked since renovation to over 20.5 million. Stocking for the year was as follows:

Month	Species	Number	Size
March	Northern Pike	3,000,000	Fry
April	Walleye	2,400,000	Fry
June	Walleye	8,000	1 - 2 inches
August	Largemouth Bass	40,000	2 - 3 inches
October	Walleye	10,000	4 inches

Largemouth bass and walleye fingerlings were stocked to help improve the survival rate of the current age class and to increase the predator base in the lake. Population surveys were showing a void in the survival level of these species. 18-214-90 JO

Due to the increase in the number of roughfish (carp and buffalo fish), two commercial fishermen were issued special permits to harvest them. One of the fishermen removed approximately 250 pounds of carp, but then quit.

The second commercial fisherman removed 21,104 pounds of carp and 31,221 pounds of buffalofish. This represents an increased harvest of 12 percent and 79 percent, respectively. The permittee was allowed to fish six weeks prior to the opening of the public use season and an additional three weeks after closure of the season on October 13. He was restricted to areas of the lake not being utilized by migratory waterfowl. 40-145-90 JO

Here's a nice ten-pound flathead! Any sport fish caught by the commercial fishermen were released, if uninjured. Only 12 northern pike were lost due to injuries sustained by the trammel nets - a small sacrifice compared to the 52,325 pounds of roughfish that Willard James removed.

40-146-90 JO

Lake monitoring was conducted throughout the year to monitor changes in water clarity, water temperature, and dissolved oxygen at specific depths and locations. There has been a continual decline in the water clarity over the last three years. The water clarity is measured with the use of a Secchi disk. The maximum reading (depth) for each year is as follows: 1986 - 5 meters, 1987 - 3 meters, 1988 - 2.5 meters, 1989 - 1.1 meters, and 1990 - 1.1 meters. The 1.1 meter readings were taken in January and May, and the clarity steadily declined until late summer, reaching a maximum reading of 0.15 meter.

The maximum pH level of the lake was only 9.7, which is quite a decline from the maximum pH reading of 10.4 recorded in 1989.

The electrical aeration system was activated during three periods. The first use was from January 12 to February 8, costing approximately $954. The ice was approximately ten inches thick when the system was activated to decrease the possibility of a winter fishkill. 28-085-91 KJ

The second operational period was from June 15 to June 17 to check the system for leaks and clear all sediment from the lines. The third activation period was September 30 to October 3, again to check the system and clear sediment from the lines.

Water temperature did not cause any problems until early July. With extremely warm sunny days, the surface temperature soon reached levels over 95 degrees. Another small fishkill occurred this July, similar to the fishkill the previous year. There were not as many dead adult northern pike (10-12 northern pike) observed during this year's kill. The small die-off is believed to have been caused by the extremely high surface water temperature, along with a dissolved oxygen stratification at 2 meters from the surface. Northern pike can not tolerate such conditions.

A minor modification of the fish aeration system occurred by replacing three rubber flex-hose sections with stainless steel flex hose. The modification was necessary due to the continual need to replace the rubber hose sections because of rubber cracking and air leaks developing in that area.

The electrical fish barrier on the lake's outlet tube was not operated this winter due to low lake levels. The lake was below operational level throughout the year. Two modifications to the fish barrier were necessary. The building housing the controls with the back-up generator was insulated on the inside with two-inch thick styrofoam. Also, a small electric heater was wired in and positioned near the generator, which will be used when the electric fish barrier is on-line.

On June 17, it was discovered that the outer gate (river gate) on the lake's outlet tube had been tampered with, and opened approximately six inches.

Due to the Missouri River flood stages at the time, the fish barrier building had approximately four inches of water on the floor. The building's four-inch dewatering discharge pipe was running a full tube of river water into DeSoto Lake, something it's not suppose to do! 18-215-90 JO

There was one small orange-spotted sunfish found in the area of discharge. Only time will tell if any new fish species were introduced into the lake. Steps have been taken to further secure control gates.

Due to the fact that the lake lacks adequate fishery habitat, there has been an on-going effort to improve conditions. Again this year, Christmas trees were placed in the lake to provide additional cover. Approximately 100 trees were tied together in bundles of five-to-six each, with cement blocks attached, and placed in the lake from a boat.

Growth of desirable submergent vegetation declined from last year. Crispy pondweed, along with some sago pondweed, were present during a shorter growing season, due to the poor water clarity. The algal bloom, which was obvious in May, was absolutely suffocating by June.

The undesirable American lotus continues to expand its boundaries in DeSoto Lake. A distribution survey was made to record the location and the size of each bed of lotus on a lake map for future comparison. The survey estimation was ten acres of lotus. 18-218-90 JO

Fishery surveys, accomplished by electrofishing, were conducted in August and September. August sampling indicated a decrease in the carp population. A mark-and-recapture study to determine the number of carp was also conducted in August to compare to the results of the mark-and-recapture study conducted in July, 1989. A 130-acre section of the lake was surveyed. Two days of fin-clipping (marking and release) were followed by a recapture check to determine a calculation factor.

Carp Population Estimates

Year	Estimated Number	Estimated Weight	Average Weight	Average Length	Pounds/ Acre	Catch Rate/ Minute
1989	132,403	174,773	1.32	11.9"	221.85	2.43
1990	28,959	52,416	1.81	13.8"	66.51	1.01

A largemouth bass mark-and-recapture study was conducted in September. Four electrofishing teams were utilized during this operation. One team was provided from both the Service and Nebraska Game and Parks, while the Iowa Department of Natural Resources provided two teams. The entire shoreline was electrofished three times; only largemouth bass were collected. The fish were fin-clipped (marked), released, and recaptured. The two age classes, from 1987 and 1988 reproduction, are not being represented in the numbers expected. The young-of-the-year bass are present in high numbers in initial surveys, but are practically nonexistent in subsequent surveys. At the time of the study, water quality was so poor that many of the fish stunned by the electric current were not visible for collection. The lake level also was at a height that hindered the effectiveness of the electrofishing boats. The boats were unable to sample the majority of the shoreline due to these shallow conditions. So, there may be some bias in the following data:

Largemouth Bass Population Estimates

Year	Estimated Number	Estimated Weight	Average Weight	Average Weight	Pounds/ Acre	Catch Rate/ Minute
1989	3,361	7,629	2.27	14.1	9.68	1.00
1990	1,586	1,538	0.97	10.9	1.95	0.52

The largemouth population surveys are showing a continual decline in percentage of total biomass, as shown in the table on the next page.

Estimated percentile of total biomass for each species by electrofishing

Date	Largemouth Bass	Carp	Bigmouth Buffalo	Northern Pike
October, 1987	80	13	0	3
September, 1988	69	26	1	1
July, 1989	13	79	6	0
September, 1990	9	70	12	1

Bullheads play a major part of the total biomass but electrofishing is not effective in sampling bullheads, so the true percentage of all species can not be represented in the above table. Unfortunately, the surveys do indicate an increase in bigmouth buffalo. Buffalofish feed on zooplankton, which, in turn, control algal growth. They are believed to be the primary reason for the lake's poor water clarity.

17. Disease Prevention and Control

Only a couple deer were found in the early fall which might be suspected of having had blue-tongue or epizootic hemorrhagic disease.

While avian cholera became a real threat in the 100,000 snow goose population remaining at Riverton Wetland Management Area in southwestern Iowa by mid-December, it was hardly noticeable at DeSoto. Iowa Department of Natural Resources personnel had picked up and incinerated over 500 birds by December 18, whereas less than a dozen birds are suspected to have died of the disease at DeSoto before freezing temperatures drove the birds southward just before Christmas.

H. PUBLIC USE

1. General

Public use trends have changed dramatically over the past decade, with a major increase in wildlife-oriented recreational uses. The refuge was closed to high-speed powerboating and waterskiing in 1984; swimming ended the previous year. These uses had accounted for an average annual visitation of 41,000 and 25,000 people, respectively.

In reviewing use trends over the past five years, visitation in 1990 was 5 percent higher than that experienced in 1986. Interpretive visits have remained about constant, although shifts have occurred in specific uses. Educational uses have increased dramatically and, in fact, have reached the saturation level during certain periods. Hunting use has remained constant, while fishing visits have gradually increased since the 1985 lake renovation and subsequent

restocking with game fish. Non-consumptive wildlife recreation has increased 37 percent. Whereas, non-wildlife recreational uses have decreased. The following chart compares 1990 use with that of the five-year average.

Comparative Visitation Data (Activity Hours)

	1986-90 Average	1990
Interpretation	328,923	*287,402
Environmental Education	25,426	25,986
Consumptive Wildlife Recreation	161,744	228,361
Non-consumptive Wildlife Rec.	205,991	234,253
Non-Wildlife Recreation	2,194	2,609
Total (Hours) Public Use	724,278	778,611
Total Refuge Visits	391,727	388,345

*The decrease indicated is primarily a result of formally dropping the Spring Auto Tour in 1989 and the addition of two non-interpreted nature trails which immediately became very popular.

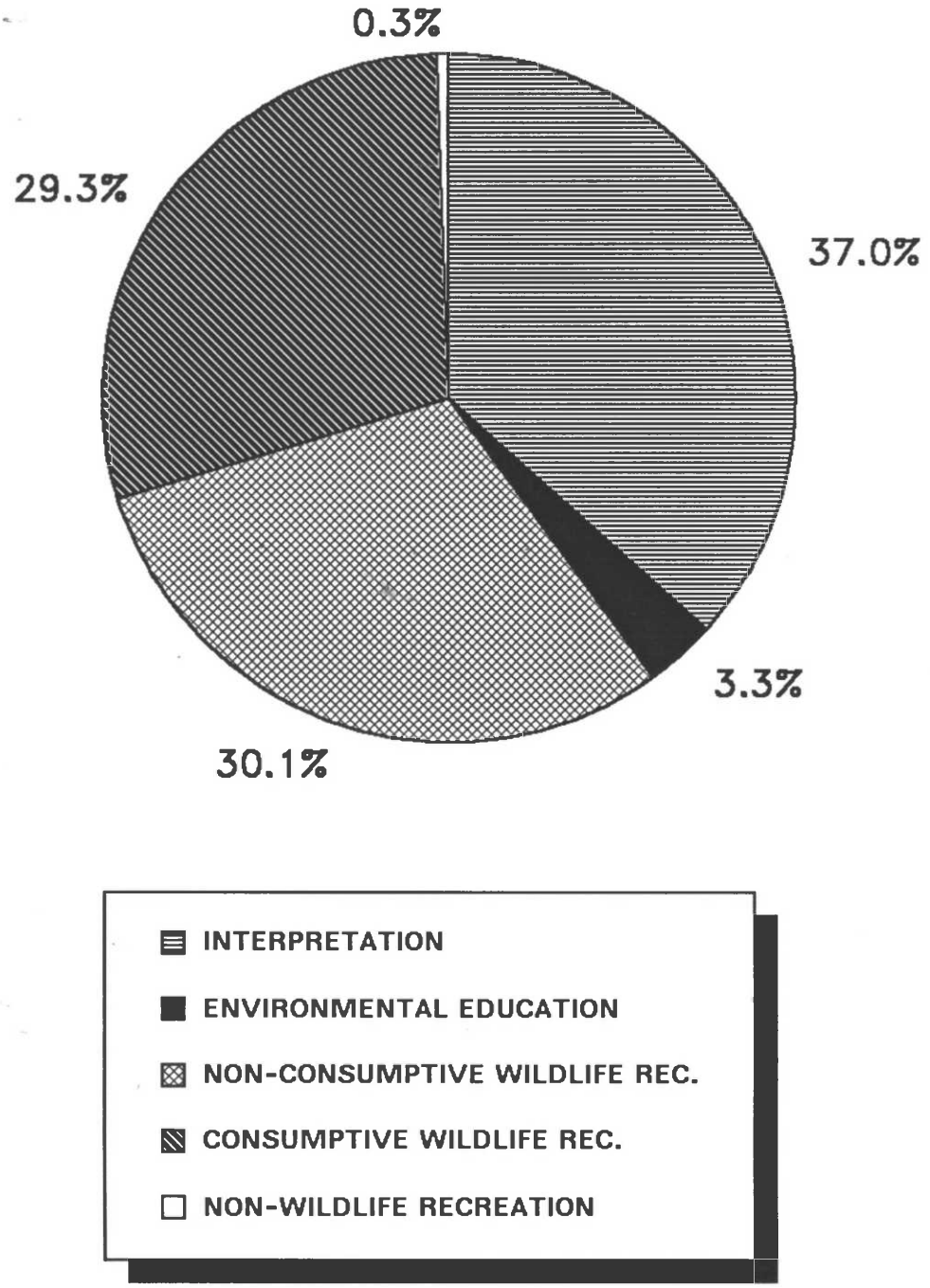
Total visitation has remained fairly constant, though the former high level of use in the non-wildlife category has virtually disappeared. The refuge's highest visitation occurred in 1982, with 473,000 visits, when non-wildlife, water recreation was the rule.

The graph on the following page shows the present use distribution.

Consumptive uses vary. Two hunting programs are controlled, so use is constant. Fishing visits have still not reached the peak pre-renovation level. Picnicking has decreased due to the closure of the lake to swimming and waterskiing. However, picnic grounds remain fairly busy during the summer, accommodating anglers and other summer recreationists. Non-wildlife use is limited to the occasional business picnic, charity runs and walkathons.

The most gratifying change in the public use program has been the increase in wildlife observation and related uses. Trail use has increased in recent years, with the addition of two trails, one adjacent to the DeSoto Visitor Center, and one at the Bertrand Excavation Site. Wildlife observation visits via vehicle (not including the fall auto tour route period) have doubled, as more local folks drive through the refuge, particularly on spring and summer evenings, to view resident wildlife species. This was not possible a few years ago because of all the noise and disturbance associated with the former active recreational programs.

PUBLIC USE CATEGORIES AS PERCENTAGE OF TOTAL USE
1990



Use patterns have changed greatly since the refuge's 1972 public use survey. A new survey is needed. Visitation data is extrapolated from traffic counter figures; in addition, actual counts are made for interpretive programs, tours, and for students participating in educational activities. Law enforcement personnel monitor fishing and archery hunting use and calculate monthly use figures. Other hunts are controlled, so specific tallies are made.

Summer visitation from Memorial Day weekend through Labor Day totaled 134,488, with over 12,500 on Memorial Weekend, 2,020 on the Fourth of July (single day), and only 5,600 on Labor Day Weekend. Overall, use was down during this period. While summer visitation is sizeable due to vacation traffic and some angler visits, the overall percentage is decreasing as more people "discover" wildlife observation is better during the spring and fall.

The summer public use season was extended from September 30 to October 14 in order to provide fall fishing opportunities. However, the refuge was closed from late afternoon on October 6 through October 8, due to the federal budget emergency. An estimated 7,500 visitors were turned away during the 2.3 days of closure.

a. Entrance Fee System

The refuge completed its third year of entrance fee collection. Collection is made from self-registration stations near both entrances. Visitors also may buy the daily permit, as well as other entry instruments, at the DeSoto Visitor Center. Compliance has been generally poor, though the level of non-compliance varies depending on time of day and the season. For instance, on the first full weekend of our public use season, over 9,000 persons visited the refuge, paying more than $3,000.00 in entrance fees. However, minimal effort was made this year to enforce payment of fees, in hopes of a proactive public use decision to drop the fee system. This contributed to a 13 percent decrease in recreational fees, compared to 1989 monies. A total of $67,351 was collected, including the sale of Duck Stamps and other fee instruments.

Cost-effectiveness of the program still remains poor, with costs exceeding returned revenues by approximately 11 percent. In addition, the staff spends an inordinate amount of time explaining the confusing system and issuing Golden Age Passports. A further complication is traffic congestion that occurs on weekends in November, as cars line up to obtain "self-service" permits. The booths had to be shut down on several occasions due to traffic back-ups, extending onto U. S. Highway 30. Repeated recommendations to drop the entrance fee program at DeSoto have been made, apparently to no avail.

A total of 668 Federal Duck Stamps and 71 Golden Eagle Passports were sold. Golden Passes, issued without charge under the Federal Recreation Fee Program, were distributed as follows: 2,337 Golden Age and 93 Golden Access Passports. These issuances take time and detract from normal public services at the reception desk.

b. Public Information - Response was made to 9,283 inquiries, almost triple that of last year. That number includes 7,822 telephone responses. A total of 1,461 written responses were provided, including those to queries related to wildlife and wildlands resources (113), the Bertrand Collection (58, including technical requests), waterfowl hunting (215), special programs and exhibits (521), educational (232) and group (54) visit schedules, and general or specific public informational requests (268).

A total of 32 news releases and 5 public service announcements were sent to appropriate sectors of the news media throughout Iowa and Nebraska, as well as major South Dakota, Kansas, and Missouri media. This included up to 166 television, radio, and press outlets, and 43 other sources. This effort includes quarterly (seasonal) Calendars of Events, which also are provided to tourism outlets, chambers of commerce, and other public information sources.

Information was frequently provided to journalists from Home and Away Magazine and the Omaha World-Herald, Blair Enterprise, Des Moines Register, Council Bluffs Nonpareil, and Lincoln Journal-Star newspapers for special articles and coverage of the anti-hunting protests (see also Sections H.17 & K.). A total of 46 interviews were provided to newspaper and magazine representatives.

Frequent radio and television interviews also were provided by various members of the staff. Topics for the 22 radio and television news interviews and feature spots were the snow goose migration and attendant viewing opportunities, opening of the public use season, bald eagles, fishing, and the anti-hunting protests held at DeSoto.

Background materials and photographs were provided for several magazine feature articles. The subject of migration was the topic of a special radio forum, and fall viewing opportunities were featured in a "Spot A Bird" article in the Fall, 1990 issue of Friendly Exchange magazine. Articles on the refuge were included in Iowa and Home and Away magazines. An article on revenue stamps found on the bitters and matches aboard the Bertrand was published in the May issue of The American Revenuer. America West Airlines Magazine included a short entry on the Bertrand Collection in their monthly "People and Places" column in August. KDFM-TV, the Fox Network affiliate

station in Des Moines, aired a feature during the summer. Two public television programs featuring the refuge were "re-run" this year; an "Off the Beaten Path" segment on Nebraska wildlife and natural areas re-aired several times on Nebraska ETV in April, and Iowa PTV repeated a segment on the Bertrand on "Iowa This Weekend", a summer travelogue show.

c. Public Relations - Off-refuge programs, exhibits, and assistance with public relations matters were provided to other Service entities, outside agencies, and public forums.

Information and photographs were provided for the Iowa Historical Tour Guide, a new tourism guide book on Iowa, and for the 1991 Iowa Visitor's Guide, published by their state tourism department. Information and an audiotape were provided to the firm producing travelogue cassette tapes for the Iowa Department of Tourism. These will be distributed to the public at state tourism wayside areas and information outlets. Design assistance and photos were provided to the Blair Chamber of Commerce for a new color tourism brochure promoting the area.

Artifact descriptions and pictures were provided to Tig Productions of South Dakota for planning use for the Kevin Costner film, "Dances With Wolves". A film crew shot a substantial amount of footage for use in an educational program and a new general series, entitled "NEBRASKAland", both of which are being produced by the Nebraska Public (Educational) Television. Information was provided for an upcoming revision of the Riley's book, Guide to National Wildlife Refuges, as well as Karen Hollingsworth's upcoming book on refuges. A two-column insert on visitor opportunities was developed and provided to Telecom USA Publishing for the "Community Information" section of the Omaha Primary Telephone Directory.

A booth featuring a DeSoto exhibit was placed at the Travel and Tourism Expo at the Des Moines State Fairground. The event included a special legislative night for honored delegates. Over 500 persons viewed the display. Exhibits were displayed at three other off-site events. A Duck Stamp exhibit was displayed at the Ducks Unlimited banquet in Blair. A refuge exhibit also was displayed at the Western Iowa Tourism conference in Sioux City, and at the Eastern Iowa Tourism Conference.

Slides were loaned to numerous individuals, magazines, free-lance journalists, and also to several organizations for planning purposes. In addition, numerous slides and negatives were provided to the Iowa Department of Economic Development and the Western Iowa Tourism Committee for duplicating for use in programs and exhibits. Others were provided to the Iowa

Film Office for "Take One" brochures promoting film locations in the state. Some were even provided to Defenders of Wildlife for use in a leaflet promoting legislation on compatible uses on refuges.

Finally, with information gleaned from the staff, Genevieve Morrison won first place in the Missouri Valley Social Studies Fair with her presentation of "History of the Bertrand".

d. Off-refuge programs dealing with public programs and opportunities, refuge and fishery management, the Bertrand, wildflowers, and Earth Day were provided to conservation organizations, museum groups, schools, social and civic groups, scout troops, and the Oregon-California Trails Association Conference. Deborah Meyer made a presentation on her graduate intern study entitled "Consumerism and the American Frontier" to 135 persons at an Iowa State University Alumni meeting. In all, a total of 46 off-refuge programs were given to 2,902 persons, mostly by refuge volunteers.

Films were loaned to the National Park Service, several school districts and universities, historical societies, scout troops, senior citizen centers, other national wildlife refuges, and local Iowa conservation officers. In addition, videorecorder and slide and film projector loans were made to the Basic Refuge Management Academy and the Iowa Department of Natural Resources. Forty-two films and equipment loans were made in 1990, some for multiple presentations. These were reportedly viewed by 3,210 persons.

e. Signs and Publications - A total of 102 signs and 115 decals were produced by the Regional Sign Center (worth $6,529). An additional order of 41 standardized signs were purchased from UNICOR.

Reprints of two refuge leaflets were received through GPO: 10,375 fishing and 50,000 general leaflets.

Two new brochures, co-produced by the Service and Iowa Cooperative Extension Service, were received; "Discover Alternative Farming at Work" (2,700 copies) and "Farming DeSoto" (500 copies). They were produced in support of the cooperative integrated pest management project.

Iowa and Nebraska Archery Hunting Information sheets were revised to reflect new refuge regulations. An interpretive guide detailing a number of artifacts in the Bertrand Collection is being developed. It will be published by the Midwest Interpretive Association as a sales item in 1991.

A total of 4,000 refuge leaflets were distributed to the City of Omaha, Iowa and Nebraska state tourism offices, departments of natural resources, the National Park Service's Midwest Regional Office, local visitor bureaus and chambers of commerce, motor clubs, and select interstate information centers. Demand continues to far exceed supply capabilities.

2. Outdoor Classrooms - Students

Structured environmental educational activities continued to be a major emphasis this year, with 7,947 visits (404 classes) and 25,616 activity hours documented.

44-083-90 KLD

Use is confined primarily to three months of the late spring and fall school semesters. During May, use averaged 122 students per day. The majority of use comes from Omaha school districts, which are finding it difficult to schedule buses for small groups. More and more teachers are finding that they must bring over 120 students (two busloads) in order to secure transportation. Obviously, this makes it difficult for teachers to use the refuge for curricular-based investigations, which is the criteria of the Service educational program. At best, such groups can only handle a trail hike or questionnaire-type activity, or other very simplistic tasks. There are simply too many children to supervise for investigative activities, unless the teachers are very organized. However, those teachers that do use study sites and attend an orientation or training session have been very pleased with the educational opportunities the refuge can provide.

Refuge-specific educational activities are available, as well as Service habitat and issue pacs and guides. In addition, the resource library includes a multitude of other excellent educational materials which are used to plan outdoor classroom activities. Educational films, slide shows, and videos are available for loan to teachers, as is equipment for environmental investigations.

Since the staff does not include an educational assistant, trained volunteers, available on a limited basis, assist teachers in conducting educational activities. Normally, they are available to

facilitate first-time class visits only. Less structured groups are provided minimal staff attention.

National Wildlife Week/Earth Day presentations were provided to local school systems in Iowa and Nebraska. Programs were given to a total of 580 students (22 classes), including a high-school wildlife conservation class. A total of 58 educational packets were distributed to Iowa and Nebraska schools. In addition, a resource book, entitled Recovering our Heritage -- Peregrine Falcons, was sent to all local Iowa schools.

Special Prairie Appreciation Week programs, each with two sessions - an indoor activity and field work - were participated in by 528 upper-elementary students (23 classes). Such use is increasing each year: up 45 percent in 1989, and another 7 percent in 1990. Space is limited, due to the three-hour length of the two-part program. Staffing is a problem, since the two sessions run simultaneously. When volunteers cancel, our public use person must be in two places at one time. Therefore, it is doubtful that the program can be expanded to meet the demand.

Use by colleges increased. Twenty-three classes, totaling 340 students used the area. Included were ornithology, population biology, life sciences, environmental biology, botany, American studies, archaeology, geology, museum studies, and agronomy classes from fourteen colleges and universities.

Several special educational programs were hosted during the year. A day-long engineering seminar for eighth graders was held, with emphasis on solar energy. The American Institute of Architects utilized refuge resources for a full day of activities for students in grades 5-8. Many innovative approaches to environmental education were used, including sessions on environmental conservation, and design and siting of structures to reduce impacts on wildlife and the environment. Finally, activities were developed for several Elderhostels that visited.

Summer use of the refuge increased dramatically due to work with non-traditional educational institutions which offer summer courses. These included a curriculum called Project WISE (Women Investigating Science in the Environment) administered by Wayne State College, in conjunction with the University of Nebraska. Another group, T.E.K., held courses for junior high students at Dana College, with concentration on computers and science. These types of educational uses of the refuge are specific and, therefore, much more effective from the Service's educational perspective than more casual school trips.

Outdoor Education - Fishing Clinics - In preparation for National Fishing Week, two fishing clinics were held in May.

A total of 40 Iowa Boy Scouts participated in the first clinic held in cooperation with Iowa DNR. Their activities included water safety, wildlife management topics, and fishing on DeSoto Lake.

40-142-90 KLD

Another fishing clinic was provided in cooperation with the Blair Extension Office 4-H for 19 youths. It included two hours of instruction and four hours of fishing techniques along the lakeshore.

Lastly, a successful fishing clinic was held in August for 42 Omaha boys, most of whom came from under-privileged home situations. They learned many things, including the fact that sharks aren't the only fish with big teeth.

40-147-90 KLD

This third clinic was another cooperative effort. Refuge staff, Special Agent Cleveland Vaughn, and volunteers from several Omaha Baptist churches provided instruction and support services; Nebraska Game and Parks provided fishing tackle through their Aquatic Education program; and our Midwest Interpretive Association donated prizes. The refuge also provided Master Chef McCollum and enough fish for a cookout.

3. Outdoor Classrooms - Teachers

Teachers are encouraged to attend environmental education workshops and in-service training to obtain further skills in order to better use the area. However, there is no requirement to do so, since regularly scheduled workshops and training sessions are not held.

Some special focus, in-service training sessions were provided. Moreover, about 35 persons participated in refuge sessions which were part of a workshop for middle school science and math teachers, provided by Dana College in June. Finally, a teacher workshop, entitled "Discipline-based Art Education", was held in cooperation with the Prairie Visions Consortium of the Nebraska Department of Education. Twenty elementary and secondary teachers from districts throughout Nebraska attended. Activities included traditional, multi-curricular environmental education activities, as well as new instructional techniques for teaching art.

4. Interpretive Foot Trails

The refuge nature trails were enjoyed by over 93,000 visitors, a 12.6 percent increase over use in 1989. Of that, 30,250 is use on Wood Duck and Cottonwood Trails, which have interpretive leaflets. Guided interpretive walks were taken by 683 persons, led primarily by volunteer naturalists.

The appearance and safety of refuge trails has greatly improved through the Adopt-A-Trail program. Volunteers Dorothy and Frank Hardy performed litter patrol and minor maintenance throughout the public use season.

5. Interpretive Tour Routes

Fall Auto Tour visitation decreased 33 percent from that of the previous year. Only 32,200 persons visited DeSoto during the 28-day period from October 15 through November 11.

42-143-90 GG

This is due to a redistribution of use because of the change in public access during the fall migration season. Use dramatically decreased during the auto tour period because the public could still access the North Lake Observation Area (goose loafing site) after closure of the Auto Tour. Most people wish to see large concentrations of snow geese, and that rarely occurs now until latter November. (See also Section H. 11. for non-interpretive tour route use).

Guided tours of the refuge were provided for 44 groups, totaling 1,098 persons. Most of the guided tours were provided to conservation and tour groups which called ahead for reservations,

and had sufficient time to spend exploring the many uses and management practices of DeSoto. These tours were provided primarily by refuge volunteers.

6. Interpretive Exhibits/Demonstrations

a. Self-guided Exhibits - These exhibits include interpretive wayside displays at the Bertrand Excavation Site and the farm sludge demonstration plots.

An active schedule of special exhibits was featured at the DeSoto Visitor Center:

March - In conjunction with Student Art month and the traditional Wildlife Week period, the refuge hosted the seventh annual Student Wildlife Art Exhibit, which was displayed throughout the month.
03-09-90-23 KLD

Of 519 entries allowed in K-12, the artworks of over 365 students were selected from 47 participating Iowa and Nebraska schools for entry in the exhibit. Ribbons were awarded by judges, who are local artists, to the winning entries; and all participants received a special personalized certificate. Over 3,800 enjoyed the display. "Thank you" letters were sent to all of the teachers whose 284 classes entered the exhibit.

June - The Seventh Annual Wildlife Photography Exhibit and Sale was held May 26 through June 23, which featured 287 works by 10 Iowa and Nebraska photographers. Entries decreased dramatically due to administrative changes, necessitated by cost-cutting measures. Many photographers were no longer interested in entering because the show is no longer judged. Despite less participation, 36 photographic works were sold for a total of $877.50 -- more than double that of last year's receipts. Over 5,550 visitors viewed this exhibit.

July - The Outdoor Writers Association of America Photography Exhibit featured 37 color and black-and-white photographs that had been selected as winning entries in five categories for the annual competition among hundreds of professional outdoor photographers. This traveling exhibit, funded by the Nikon Sport Optics Company, was viewed by over 4,200 visitors.

September - A special Prairie Appreciation Week display was open during September 8-19. These exhibits, which included various species of native grasses and a new prairie wetlands display, were viewed by over 1,500 visitors. They also were used in conjunction with special prairie educational efforts (See Section H.2.).

September - November - The Service's "Diversity Endangered" exhibit was displayed during the fall and provided excellent coverage of the global decrease in biodiversity.

October - The Eighth Annual Wildlife Art Exhibit and Sale, held October 6-27, was fairly successful. A total of 268, two and three-dimensional works by 24 Iowa and Nebraska artists were displayed. In order to reduce the show's cost, no judging was done, nor awards (monetary or ribbons/plaques) presented. Sales totaled $1,669 for 35 items; substantially lower than that of last year. Unfortunately, the announced opening, scheduled for the first weekend of the show, had to be canceled due to the unexpected closure of the visitor center during the budget emergency. Individual artists were featured on weekends during the show. Approximately 4,220 persons attended the fall Wildlife Art Show. This is a 45 percent decrease from that of 1989, which is primarily attributable to the refuge closure on the opening weekend of the exhibit.

November - The regional Stewardship 2000 exhibit was featured in the visitor center lobby during this peak visitation period.

b. Visitor Center - Visitation approached 165,000, a slight decrease from 1989. While a large amount of summer vacationing use is experienced, use is more evenly distributed throughout the year than it was five, or more, years ago.

This year, over 45,000 visitors came to the center during November, which is nearly triple the use of any other month. During peak periods of use, traffic control is coordinated by an officer on the center's roof.48-108-90 GG

This is a 21 percent increase over 1989 visitation. It also should be noted that, with the exception of school groups, most of the use was experienced on three weekends. The highest visitation was on Friday, November 23, with over 4,400 persons. The building use count approximated 480 when the parking lot reached capacity. The lakeside viewing gallery looked like a curb at the New York Macy's Thanksgiving Day parade, with people twelve, or more, deep. One could not freely walk through any of the rest of the building, either; visitors were literally "packed in"!

An orientation film, "Seeds of Change", is shown hourly during the week, and on the half-hour on weekends and during heavy use periods. A total of 36,264 visitors viewed this introductory film, in addition to all school groups.

Two exhibit galleries feature displays on the steamboat Bertrand, and the effects of westward expansion on the habitat and wildlife of the Missouri River Basin.

In addition to wildlife, conservation, and Service-oriented displays, two wildlife-viewing areas are found in the Refuge Today Gallery. Some folks spend hours watching the waterfowl from these vantage points.

42-147-90 GG

Several Bertrand artifact items on display were removed from exhibition for conservation treatment. Included were the snatch block and rope on the wall in the Cargo Gallery and the walking plow and hand cart that are part of exhibits in the Theme Gallery. Each of these items is subject to being touched by the visiting public. Small artifacts on exhibit in a plexiglas display case were damaged again when a visitor accidentally pushed in the top of the cube, breaking a string of beads and a small toy cart. Since these were the personal effects/toys of Bertrand passengers, no duplicates exist in the collection. Repairs were made and documented.

The Federal Duck Stamp display was revised for 1990-91 in July. A wildflower information guide is placed at the Information Desk, spring through early fall. It is updated

periodically to include photographs of flowers currently in bloom. A new waterfowl art display, featuring 43 species, was completed by volunteer Cheryl Elswick. It will be used in conjunction with taxidermy mounts in educational activities, and also enjoyed by the general public.

Replacement of audio-visual equipment began with the purchase of a Sony video projector and attendant video equipment, replacing the original theater 16mm film projection system. It will be used for showing the refuge orientation film up to 13 times daily. This video system will provide much more flexibility of use. Moreover, the system is tied into the visitor interactive computer for future use. Acquisition of other new video equipment was made to replace the self-activated, Bertrand Excavation film equipment. Work has begun on production of a videotape replacement. However, difficulty has been experienced in securing "master" copies of both the aforementioned films from the original production company.

Numerous problems with existing equipment and exhibitry remain. Most have been in place for nine years. Audio devices used in the various exhibit areas require constant maintenance. The audio playback equipment is outmoded and in need of replacement. In addition to normal wear and tear caused by visitors, the exhibits are experiencing fading caused by ultraviolet light from windows with no filtering. Patching and repair of exhibits is being done in a piecemeal fashion. It is difficult to find an exhibit contractor to undertake small jobs; on the other hand, it is difficult to get funding for exhibit repairs for large, expensive jobs. Without cyclic funding, exhibits will grow shabbier with little chance of timely replacement.

New locks were installed on all exterior and interior doors. A total of 145 locks were replaced, and the entire key administration system for the building was revamped. This was considered a precautionary measure, dictated by the numerous refuge staff changes that have occurred since the building opened in 1981. Other security modifications include adding dead-bolt locks to several rear access areas, providing for safer entry by refuge officers in case they are summoned to the building after business hours by a security alert. It also should be noted that modifications made to the security system have greatly decreased after-hour alarm notifications.

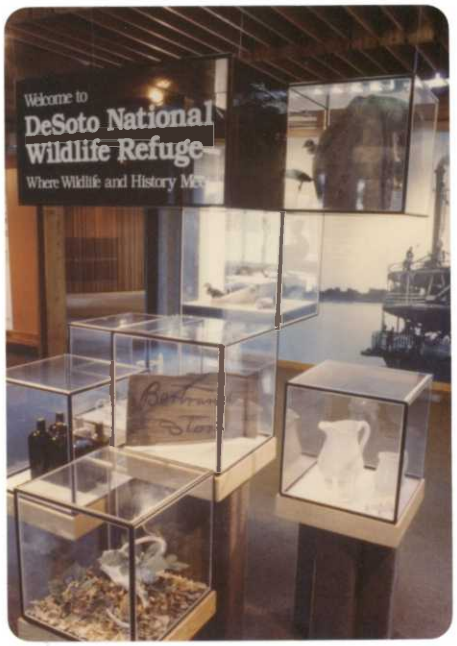
The public use computer recorded 3,886 starts, or users, during the year. However, the old Zenith computer was out-of-service for six months. In addition, constant resetting of the machine erases the tally; no tallies are recorded for 33 days, and only partial tallies (due to resetting) are recorded on an additional 29 days during the period of use. Therefore, actual use is known to be higher than recorded. A much faster

Apple IIe is being loaded with an updated program by the Midwest Interpretive Association's business manager as time permits.

Binoculars were loaned to approximately 1,000 individuals or families, with an average use of 42 minutes each. This service is very popular with waterfowl and eagle observers. The center's wheelchair was borrowed for use by 50 persons, averaging 51 minutes use each.

Finally, a spotting scope was provided during the popular viewing period in November. Refuge volunteers assisted over 23,300 visitors in viewing waterfowl and bald eagles.

c. Bertrand Collection - The revised Scope of Collection Statement received regional approval in February. One recommendation of this document is to recall artifact loans of long duration. In order to accomplish this in the least intrusive manner, the staff is trying to locate suitable facsimiles that could be substituted for the loaned artifacts, such as interpretive exhibits at the National Bison Range.



Artifacts on display in exhibits outside of the environmentally-controlled Cargo Storage Area were rotated with similar items from that stable environment periodically. M729 MW

A blanket purchase arrangement was developed for treatment of metals by Jensen Conservation Service in Omaha. Items completed include the walking plow, cargo truck, snatch block, cast iron pot, and letter clip, all from display areas; and several cinches from the Cargo Storage Area.

The annual inspection of foodstuffs, and treatment of contaminated items, was completed under contract with Dr. Larrie Stone, a microbiologist from nearby Dana College. A

new, long-term sampling procedure was instituted. Half of the contents of each of 10 bottles of bitters will be filter-sterilized and put into sterile, prescription bottles. The remaining half will be transferred, unsterilized, into a second prescription bottle. The samples will be visually inspected on an annual basis for the next five years to determine comparative levels of stability.

Periodic condensation problems continued to occur in the high-humidity chamber of the Cargo Storage Area, even when winter temperatures were relatively mild. Cardboard (artifact) storage boxes began to display the effects of dampness. During the high- humidity periods of the summer, both chambers exhibited increased humidity levels. The climate-control machinery (HVAC) continues to have difficulty keeping up with ambient conditions. Service engineers recommended insulating only the interior "star columns" on the exterior wall of the Cargo Storage Area. This may not prove sufficient in solving the overall problem. The refuge had originally requested that the building's north exterior wall be insulated. This would stop condensation and lower energy-operating costs, reducing overuse of the HVACs. However, our engineers considered it economically and aesthetically infeasible. A contract for adding insulation to the star columns was awarded to Arnold Thompson of Missouri Valley, Iowa. Work will begin in January, 1991.

In 1989, the Office of Inspector General conducted an "Accountability and Control Over Artwork and Artifacts" audit. The audit was part of a Department of Interior-wide inspection intended to identify problems in curation of federally-owned objects and collections. The report was finalized in July, 1990. Overall, the audit concluded that Interior's accountability procedures were inadequate and that guidelines for handling these types of materials should be developed. However, these criticisms were targeted mainly at artworks and natural history items, e.g., taxidermy mounts, displayed in offices or in study collections.

The audit noted specific problems at DeSoto involving the Bertrand Collection. Essentially, these included: (1) 120 "objects" which are not included in property records (mounts, Duck Stamp collection, etc.); (2) disposition of 174 lost artifacts; (3) access to the Cargo Storage Area, which has been corrected; and (4) insufficient climate control and insulation in the Cargo Storage Area. The loss of artifacts is a legitimate accountability concern. During the 1986-87 inventory, a total of 174 objects were noted as missing. The majority also had been missing during inventories in the 1970s. Others are probably recordskeeping errors, some resulting from the moving of artifacts between facilities in 1981, when the center opened. Verifying the presence of the

remaining objects will require a physical inspection of artifacts according to their shelf locations. To do this efficiently, the current collection inventory needs to be converted to a computer database. This will be completed as soon as practicable, following Service selection on an appropriate database, for nationwide and, possibly, interagency use.

As early as March 23, Larry Kopaz, U. S. Attorney General's Office, called regarding the current status of funding of the Bertrand Collection's Comprehensive Conservation Plan. So we knew something was going on. The refuge received a number of press contacts and one Congressional inquiry following release of the final report in July, but before we had seen it. One headline read, "Federal Report Criticizes DeSoto Wildlife Refuge". While most reporters were referred to the Washington office, our local responses to these inquiries included the fact that the Bertrand Collection has received some of the best conservation care and is housed under near state-of-the-art conditions. However, deterioration of objects over time can only be slowed down through such measures, not completely stopped. The efforts being made to correct problems also were explained. Finally, it was tactfully pointed out that conditions were not as bad as might be assumed by reading the report; the auditors from the OIG's were non-museum people who may not have completely understood all of the technical requirements of museum management. Regardless, the refuge is now committed to reporting progress in correcting the identified problems to the OIG's office on a monthly basis, until completed.

A number of individual researchers utilized the collection in 1990. John Maki, who fabricates accurate reproductions, studied packing cases. He donated a replica pepper sauce case, which may be used in interpretive programs. Deborah Meyer analyzed coats that were shipped on the Bertrand for her graduate thesis. Paul Wiedhaas researched nineteenth-century revenue stamps for a journal article. In appreciation for our assistance, Mr. Wiedhaas donated a Hostetter's revenue stamp, ca. 1863-1875, to the refuge.

7. Other Interpretive Programs

The staff presented talks and programs to a variety of groups. Other than educational groups, 145 organized groups and bus tours, containing 4,403 persons, visited the refuge. Orientation talks regarding the Service and refuge are provided, as staff is available. A total of 2,364 received this orientation.

Forty-two other interpretive programs were provided for 976 persons. These included several slide presentations and talks on endangered species, refuge and wildlife management, and the Bertrand. A tour

and program related to refuge operations and opportunities was provided for Iowa Welcome Center employees and Nebraska Tour Guides participating in their respective state's tourism division training program. The Oregon-California Trails Association conference was held in Omaha. A film and slide presentation were provided at a conference session, and 160 of the participants visited the refuge on a field trip that included presentations at both the visitor center (artifacts) and the Bertrand Excavation Site.

Numerous educational and interpretive programs were provided for special populations groups, including School for the Deaf, Plains Area Mental Health Center, classes for children with learning and behavioral disorders, and also groups with mobility disabilities. Such requests underscore the need for special programs for these groups, not just access to facilities for the mobility impaired.

Films and videos were provided for the public throughout Earth Day Weekend, April 21-22. In addition, special Earth Day slide programs and discussions were held twice each afternoon. Approximately 100 persons attended. In addition, project ideas and planning assistance were developed for a number of groups that wanted to undertake more than the simple Earth Day recycling projects. Most were habitat enhancement projects.

As per the Service's 1988 Memorandum of Understanding with Girl Scouts of America, special programs were developed for a full-day session for the Great Plains Girl Scout Council. Nearly 100 girls participated in an array of activities designed to meet the requirements for the Wildlife and Foot Traveler Badge.

Films for campfire programs were provided at the Wilson Island State Recreation Area, which adjoins the refuge. They were used in eight programs, provided to 205 persons.

Weekend wildlife films were enjoyed by 4,885 center visitors throughout the year. Many of the same local folks come each Saturday and Sunday to enjoy a film. The feature is shown twice each weekend afternoon. The series includes a special program shown during Prairie Appreciation Week. Films are discontinued from mid-October through November due to the high visitation levels during the waterfowl migration, so that the center experiences rapid-turnover and maximum utilization.

8. Hunting

a. Waterfowl - This year represented the seventeenth consecutive controlled waterfowl hunt. The 38-day hunt (November 1 - December 8) was limited to the Iowa portion of the refuge. Ten blinds, with a limit of three hunters per blind, were available, by advanced reservation only. The advanced reservation drawing was held on October 3rd, while remaining reservations were made available on a first-come, first-serve

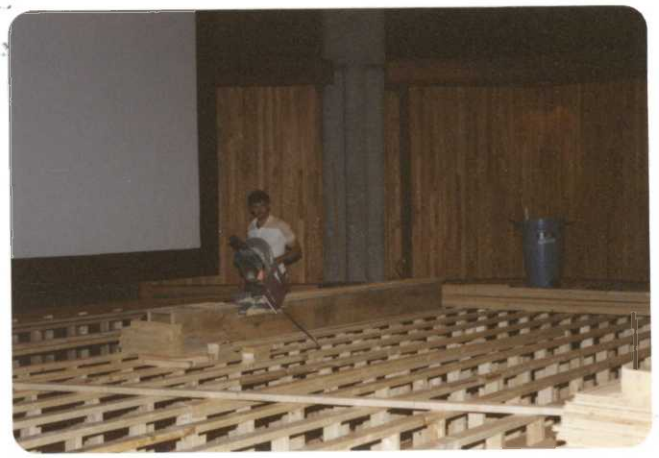
I. EQUIPMENT AND FACILITIES

2. Rehabilitation

The visitor center theater was originally designed to use carpeted steps as seating. Over the years, several accidental falls and a tort claim raised our concern about the safety of the design.

Under a $4,200 contract with Porter Construction, the sunken-style theater was replaced with a flat floor. New carpet was installed at a cost of $1,315, and 80 theater-style seats were installed for $4,172.

6-12-90-36A KLD



Two of the audiovisual systems at the visitor center were rehabilitated during the year. The 16mm projection system used in the center's theater was replaced with a state-of-the-art videotape projection unit. The Sony VPH 1270Q system will provide us with greater versatility in public programming for the theater, and it projects a far brighter image than the system previously in use. The unit is set up to interact with a computer for future programming. It cost $14,420, the first major purchase made with the refuge's share of entrance fee monies collected during the past three years.

The second system replaced was the shipping crate projector used in the Cargo Viewing Gallery to show the steamboat excavation film. The rear-screen 8mm projection unit had deteriorated and was unreliable. This unit was replaced with a 20-inch video monitor and VHS tape player. The new unit should be much more maintenance-free. This replacement unit cost $1,357, including the conversion of the film to videotape.

The stained wallboard above the theater entrance was replaced with cedar by the maintenance staff. The wallboard had become water-stained from roof leaks. The cedar blends with the visitor center woodwork and will resist water damage. A number of roof leaks occur on major rainfall events. Maintenance Management funds are scheduled for roof repairs this next year.

As discussed in Section H, in an effort to provide greater environmental control in the Cargo Storage Area, a contract was awarded to Thompson Construction of Missouri Valley, Iowa, for $4,500. Work on this insulation project is scheduled to begin in January, 1991.

One large and four small panes of glass in the Refuge Today Gallery had began to fog, which indicated a failed seal in the insulated glass. After close inspection of these windows, it was noticed that the caulking around the window had failed, causing the glass seal to fail. While the insulated glass was replaced under it's ten-year warranty, it cost $850 for labor and new caulking. The additional areas of glass in the center that require new caulking have a projected cost of $10,000. Sounds like a great candidate for Maintenance Management.

Two underground storage tanks at headquarters were removed by Evans Engineering for the contracted amount of $3,820. One served as the refuge "gas station"; the other tank had been abandoned when the headquarters building switched from fuel oil to propane as a heating source several years ago.9-4-90-12 RP

Unfortunately, the soil underneath the gasoline tank was contaminated and the new above-ground Convault tanks, purchased for $12,930, can not be placed until the soil contamination problem is solved.

36-122-90 RP

At years-end, the refuge was operating with a temporary gravity-flow system, waiting for a decision on what to do about the contamination.

This year, a lot of much-needed work was performed on the three refuge quarters. First, new high-efficiency propane furnaces were installed, and, then, all roofing, facia, gutters and downspouts were replaced on the 25-year-old residences. The total costs of the furnaces were $5,680, and the total contract for the roofing, facia, and guttering amounted to $13,128.

In July, a $12,388 contract was awarded to H. Gene McKeown and Associates (an A&E firm) to perform a structural evaluation of the deteriorating headquarter's building. The interior of the building is sinking, both floors and walls, leaving cracked concrete walls, joint gaps, stressed plumbing and electrical lines, etc. After on-site evaluation and soil sampling, this firm provided the refuge with a list of options for quick fixes of the problem. Price estimates provided by this firm ranged from $40,000 to $106,000. An A&E firm will be awarded design work during the coming year.

3. Major Maintenance

Evaluation of changing public use patterns and activity areas allowed us to remove five old pit toilets, thus reducing some of our summer, pit-toilet maintenance. The maintenance staff really appreciate this change.

Cracks in the entrance road, headquarter's courtyard, and refuge quarters road were filled with an asphaltic sealant to prevent further deterioration of the asphalt. To completely seal all cracks in the asphalt roads would take a phenomenal amount of money. A chip-and-seal coating is required on several miles of refuge asphalt roads in the near future.

Considerable time was spent in mowing roadsides and boundaries. Sixteen miles of interior roadsides were mown for the first time in four years under our planned minimal maintenance program.

Some carpeting at the visitor center is starting to show its age. A local contract for $1,315 replaced worn and faded carpeting in the administrative corridor.

Artifacts displayed in one of the Theme Gallery's plastic cubes were damaged when a visitor leaned on the cube. This was the second occurrence within five months. The artifacts required professional curatorial repairs. New solid cubes were fabricated locally and will be placed in the gallery to prevent future artifact damage.

Our heavy equipment also is starting to show its age as repair costs begin to increase. The John Deere 2440 tractor required a new

clutch and water pump; the IHC-456 tractor required a clutch replacement; and the John Deere 750 dozer required a new fuel pump.

Due to the long drought, the headquarter's lawn had gone to weeds. Considerable bed preparation and reseeding was required. 31-145-90 TR

4. Equipment Utilization and Replacement

Aahhh! Stuck Time! In the last hour of the last day he worked at DeSoto, January 12th, Heavy Equipment Operator Lightwine buried the dozer in a wetland... well, almost.
31-146-90 RK

But the maintenance crew was able to salvage the JD-750 by jamming a couple of old refuge managers under the tracks for floatation. 30-129-90 RK

A 1974 Mack, twin-screw, dual-axle semi was picked up from the Bureau of Land Management in Carson City, Nevada, for use in transporting heavy equipment, both on and off-refuge. In conjunction with this acquisition, one of two former military 40-foot flatbed trailers was hauled to Mingo JCCC for shortening and conversion to a low-boy type trailer. Upon completion, DeSoto will have a serviceable, road-worthy tractor/trailer unit.

The station's old F-600 Ford truck was fitted with a 600-gallon diesel fuel tank for improved field servicing of heavy equipment. Previously, a towed tank-trailer had been used.

A large marine diesel engine, previously used by the Navy, was modified and mounted on a trailer for use as our primary power source for wetland pumping.

In June, the refuge received two replacement trucks: a full-sized pickup for the enforcement program and a compact four-wheel-drive truck for use in our Private Lands operations.

5. Communications Systems

The station continued to have problems with the OKI, Discovery III telephone system. The system is old and outdated, repair parts are hard to find, and this system has become basically unreliable. In December, a new AT&T System 25 and Merlin II system was ordered for $27,624 to replace the old telephone system, with installation to be completed in early 1991. We hope our telephone problems will be eliminated.

The station's hand-held portable radios are 5-watt units of YACC vintage. These old low-band units just don't perform adequately for safe refuge coverage. An additional low-band unit was transferred from Union Slough refuge during the period. In 1991, we hope to replace most of our radios with high-band radios to improve area coverage and, thus, employee safety.

6. Computer Systems

Two additional Hewlett-Packard Laser Jet printers were purchased this year to replace the dot-matrix printers. These printers will enable us to have letter-quality capabilities at both the headquarters and visitor center, eliminating the disk swapping, hand-carrying between administrative offices, and other inconveniences that we had been experiencing.

The Midwest Interpretive Association's Business Manager, Bruce Barkley, continued to work on conversion of the interactive software for the Apple IIe computer to be used by refuge visitors in place of

the old Zenith computer. Bruce has donated a lot of hours on the project. The results will be a much faster and efficient system for public use.

J. OTHER ITEMS

1. Cooperative Programs

Many of the station's cooperative services are covered elsewhere in this report.

It has been interesting working with other agencies on Farm Bill activities during the last couple of years. Our working relationship is slowly improving as they come to know our respective responsibilities and begin to realize that we are professionally serious about wetland preservation/restoration. The Iowa Department of Natural Resources is especially happy with the Service now that our minds, muscles, machinery, and monies are pouring into Iowa wetlands. This partnership should result in a variety of other cooperative spinoffs.

The DeSoto Visitor Center has served a number of conservation agencies as a meeting place. The Iowa Department of Natural Resources law enforcement officers use the conference room and the refuge's pistol range on a regular basis. The local ASCS offices attended a one-day meeting here. The center is occasionally used by the National Park Service, Soil Conservation Service, and even the Corps of Engineers. In July, Colonel Don Hazen, Omaha District Corps Office, visited with a group of French and German engineers. The center also hosted two Missouri River mitigation meetings which brought together representatives of the Corps, the Service, Iowa Department of Natural Resources, Nebraska Game and Parks Commission, and the Papio-Missouri River Natural Resource District. A second meeting was co-hosted by Iowa State Senators and Iowa Department of Natural Resources as a public meeting on Missouri River mitigation issues. Seventy people attended.

At mid-year, Refuge Manager Gage began serving on one of the Service's newest initiatives, the Missouri River Natural Resources Enhancement Program, participating in coordination meetings, exchanging information, and serving as a local coordinator as the conceptual plan has evolved. There's more on this initiative in Section K, Feedback.

In conjunction with the above program, Region 6 became involved with the Papio-Missouri River Natural Resource District on their Missouri River Corridor Project. This District includes the six northernmost counties along the Missouri River, from Sioux City, Iowa to the mouth of the Platte River...certainly the most degraded 137 miles of the river. The District had developed an inventory of remnant bottonland habitats in conjunction with the Corps and the National

Park Service, both headquartered in Omaha. This District has a strong political base and sound funding. They are moving forward with habitat acquisition and development. Their priorities exclude sites which lie within the probable realm of future mitigation funding, with one exception. The exception is Boyer Chute, halfway between Omaha and DeSoto on the Nebraska side of the river. Up to 1,800 acres of Boyer Chute will be acquired, opened up by the Corps as a demonstration project, and fully developed by the Natural Resource District for passive public use. The Service has tentatively accepted operational responsibility for this area as a part of the National Wildlife Refuge System. More sites could follow, including some in Region 3. Refuge Manager Gage became a member of a working group to inventory and prioritize other potential restoration/enhancement sites along this river section. Similar inventories are commencing on the lower river by the Columbia ES office. The working group includes three other Service representatives, representation by both states, and the Omaha Tribe. The concept is to save and restore remnant habitats for both fish and wildlife, linking former oxbows and chutes on both sides of the river through acquisition round-outs and conservation easements. It's possible that a Missouri River Fish and Wildlife Refuge may eventually evolve, similar in function to the Upper Mississippi.

Manager Gage represented the Service in a media-covered presentation in Sioux City, Iowa, on December 11. Cargill Seeds and the National Fish and Wildlife Foundation each contributed a matching $10,000 donation to the Great Lakes Joint Venture program in northern Iowa. Bill Ashe represented the Foundation in this ceremony.

2. Other Economic Uses

A special use permit has been issued to Valdemars Deklaus from Blair for years to keep 25-50 bee hives on the refuge in three apiaries. The annual fee of fifteen dollars takes care of the administration and the bees provide a valuable service.

3. Items of Interest

Only two Congressional responses were required this year. Response was made to a Congressional inquiry from Representative Peter Hogland's Nebraska office regarding restrictions on boating use on DeSoto Lake. An inquiry also was fielded from Jim Barr in Congressman Doug Bereuter's office in September regarding the OIG's audit on artworks and artifacts.

To the best of our knowledge, only Senators Exon and Kerry visited the refuge this year. Both accompanied family and friends to view the snow goose migration. It appeared that actress Debra Wingert was with the Kerry clan.

And, speaking of stars, Sean Penn cruised through the refuge in late summer, looking for a likely scene for his new movie, "Indian Runner", while filming a segment at the Blair Bridge.

And, speaking of the Blair Bridge, the new concrete span is taking shape quickly, expected to be completed by the summer of 1991. The narrow, old bridge has been a major bottleneck on the otherwise popular U. S. Highway 30 "bypass" to the interstate system.

4. Credits

The only Manager escaping some responsibility for this report was Homer McCollum, and that sneaky devil had to retire in order to get out of it! The report was calculated and computerized by Administrative Technician Harbottle, and suffered the heavy editing pen of the Refuge Manager. Credits for photos can be deciphered from individual captions.

K. FEEDBACK

Life and Death in the Anti-Hunting War

I just got off the telephone...not literally, of course! I was talking with a local reporter who wanted me to refute something an animal-right's activist had said. This activist had just laid some deer "facts" on him about "crippling loss". Who am I to refute the professionalism of this overwrought matron from Maryland. But, I'm often obliged to try.

Maybe, we do it to ourselves. Maybe, we should not produce annual narrative reports and publish wildlife studies, etc. Then, their scientific "do-gooders" wouldn't have our ammunition to fire back at us. There wouldn't be these fragmentation bombs either. Because, as sure as we give numbers and percentiles, the figures will be used against us in the anti-hunting war. These sorry souls are not above taking statements out of context, bursting biological figures into mere fragments of the truth, and using smooth-tongued conjecture to "prove" their point. Who was the wise person who said, "Liars figure, and figures lie"?

I was warned against the use of the term "crippling loss" long ago by the past Legislative Representative for the National Rifle Association, Tink Nathan (He's into the more lucrative deer-scent business today). Anyway, Tink warned that just because a hunter shoots at a deer and the deer appears hit, that the deer shot at shouldn't be considered a "crippling loss", because it won't necessarily die. Aside from killing shots, there are misses (although what hunter ever admits to one), there are superficial wounds, there are serious wounds that heal, and, lastly, there are "crippling losses". Remember that the next time you write up a hunt report. If you don't have biological facts, don't use conjecture to derive figures and percentiles. Simply don't report it.

Then you, I, and the hunting public may survive a "crippling loss" from one of those activist's fragmentation bombs.

An Endangered Species Catch 22

The last remnants of interior least tern nesting colonies along the Iowa section of the Missouri River have occupied slag heaps at two fossil-fuel power plants, one at Sioux City and the other in Council Bluffs.

Then, a consortium of organizations and agencies began sponsoring a perequine falcon recovery project across the river on the Woodman Towers in downtown Omaha. This year, instead of feeding on the thousands of pigeons, sparrows, and starlings around the downtown area, guess where they ventured? That's right! They harassed the few remaining terns across the river in Council Bluffs so much that they left their nesting site. And, that's the nature of this story.

A Thanks!

A year ago, Heavy Equipment Operator Harlan Lightwine was diagnosed as having cancer. A fist-sized tumor on one lung was found initially, along with a couple small tumors in his brain. Radiation treatments were followed by chemotherapy, and his sick leave was soon depleted. We submitted a leave-sharing request in his behalf and the response by Service personnel was phenomenal.

Anyone who ever knew our Harlan will remember both his smile and his style. He was a good-looking cowboy, with a strong farming background, and close family commitments. He loved horses. And, lucky for us, he excelled in equipment operation. The twelve years that he worked out of DeSoto Refuge were some of his happiest and most productive years. He dearly loved refuge work, and he had assisted on projects at four other refuges and on Private Lands wetland restorations in recent years.

Harlan fought long and hard, but he died on January 23, 1991. He was escorted out by three refuge pallbearers and over 200 friends and relatives, with his government-issue Stetson on top of the casket. We are sure sorry he's gone, but there's a good feeling too. And, that is because of all the sharing and caring. Service personnel donated over 1,700 hours of leave during his sickness. Thanks!

The Mighty MO

The mighty Missouri River is no more. Upstream.....sure.....there is some pristine habitat remaining. But, the dams and the channelization downstream have taken a heavy toll. Below Sioux City, Iowa, the navigation channel is nothing more than a massive ditch, shotgunning sediment ever downriver and degrading what little wetland habitat remains in adjourning oxbows. But, there is still some hope. And, this year, Region 3 and Region 6 personnel have been discussing partnerships to

facilitate a Missouri River Natural Resources Enhancement Program, over and above any mitigation projects which may eventually be undertaken by the U. S. Army Corps of Engineers. See the following page.

In fact, within this concept, Regions 3 and 6 have begun to work on inventorying and prioritizing wetland and riparian habitats which are restorable or worthy of enhancement. In some instances, the Service may be instrumental in coordinating efforts with private landowners, other agencies, the states, and specific tribes to link habitat corridors and fragmented wetlands together into manageable units.

The day may soon arrive, when there will be a Missouri Chutes or Missouri River Fish and Wildlife Refuge rising out of those muddied waters.

A PROPOSAL TO CONSERVE A RIVER ECOSYSTEM

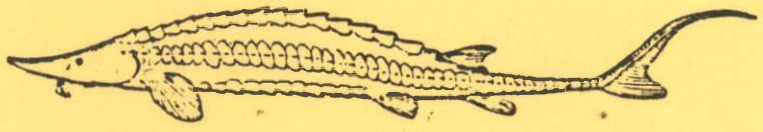
"A Missouri River Partnership"

The Missouri River (River) flows 2,300 miles through seven states with its headwaters located in the Rocky Mountains of south-central Montana. Until this century, the River, with its wooded islands, backwater areas, oxbows, sandbars, extensive floodplain forests and wetlands, and wet prairies, supported one of North America's most diverse and extensive riparian ecosystems.

Today's River is vastly different from that of even 50 years ago. In 1933 the Federal government, through the U.S. Army Corps of Engineers (Corps), set out to "tame" the unpredictable River with the construction of the first large dam on its main stem. This structure, the Fort Peck Dam, was later included in multi-purpose plans adopted in 1944, commonly termed the "Pick-Sloan Plan." Today there are seven main stem dams on the upper reaches of the River, which have transformed it from a heavily silt-laden, braided stream into a series of deep, cold-water reservoirs. Over 900 miles, or nearly 60 percent of the former upper river now lie under permanent pools.

In 1941 the Corps began to construct a system of levees along the lower Missouri River (from Sioux City, Iowa, to St. Louis, Missouri) to provide flood protection for thousands of acres of floodplain land. In 1945 the Missouri River Bank Stabilization and Navigation Project was authorized to provide bank stabilization and a nine-foot deep, and not less than 300-foot wide, channel downstream of Sioux City, Iowa. The downstream channelized portion of the River today is a rock-lined channel, with swift currents and very limited habitat diversity. Shoreline erosion and riverbed degradation are common in this reach. The lowered riverbed, in turn, contributes to the draining of adjacent backwater chutes and floodplain wetlands.

In the reach downstream of Sioux City, Iowa, approximately 95 percent of the original floodplain (1.8 million acres) has been converted to intensive agricultural, industrial and municipal uses. By the year 2003, approximately 100,200 acres of aquatic habitat, and 421,800 acres of wetland and terrestrial habitats, will have been eliminated from the natural channel and its formerly active erosion zone. Average channel widths of the lower River have been reduced from 2,440 feet to 790 feet.



Impoundment and channelization have resulted in elimination of some species and significant reduction in the numbers of others. Currently, eight species of fish, 15 birds, six mammals, four reptiles, six insects, four mollusks, and seven plants indigenous to the River System are listed by the Federal government either as threatened or endangered, or are under status review. Others are likely to follow, if the trend of habitat alteration and depletion continues. Physical alterations to the River have had an especially serious impact on many large river fish species such as the sturgeons and paddlefish.

To accomplish the needed restoration of the Missouri River, a system-wide plan of action will be required, involving Federal, State, Tribal, local, and private entities interested in the River's well-being. No attempt to manage the Missouri River as an ecosystem has yet been attempted.

The U.S. Fish and Wildlife Service's (Service) program goal is to facilitate, in cooperation with interested governmental, Tribal and private parties, the optimal recovery of the natural resource values and environmental health of the Missouri River Ecosystem, recreational benefits, consistent with existing resource uses.

To achieve the Service's program goal the following objectives are proposed:

1) To facilitate establishment of a Missouri River environmental resources management, restoration and enhancement program involving Federal, State, Tribal, and local governments and an interested public.

2) To coordinate preparation of a comprehensive action plan for the management, restoration, and enhancement of fish, wildlife, and related habitats within the Missouri River Ecosystem.

3) To develop and implement plans for providing optimal fish and wildlife resource-based recreational opportunities.

4) To establish a functional outreach program to involve and exchange information with the public concerning problems, opportunities, and resource restoration needs in the Missouri River Ecosystem.

For further information please contact the Columbia Field Office at 608 East Cherry Street, Columbia, Missouri, 65201 or by telephone at (314)876-1911.

basis. A total of 313 reservations were filled during the season. Twenty percent of the hunters making reservations failed to show up, primarily because mild, open weather reduced the potential kill.

Hunters bagged a total of 232 birds: 204 geese and 28 ducks. This represents a slight increase over 1989, but a 17 percent decrease from the five-year average. Hunters logged 591 visits, for a total of 2,763.5 activity hours. At a rate of 11.91 activity hours per bird bagged, a great deal of time was invested to take home one bird. Some hunters complained about the low number of birds bagged. Others were pleased with the chance to watch a few hundred thousand geese take wing in the early morning light. Judging the quality of the waterfowl hunt program remains a dilemma. Is it the number of birds bagged, or the aesthetic experience, that makes a hunt successful? Weather conditions definitely contributed to the low number of birds bagged. Fair weather delayed the arrival of fall migrants, and, by opening day, only 1,075 geese and 20,300 ducks were using the refuge. Populations peaked by November 29, with 420,000 geese and 50,000 ducks on the refuge. The large increase in available waterfowl did not substantially increase the number of birds bagged by refuge hunters. While the goose season continued through December 31 in the southwest zone, the DeSoto hunt closed on December 8th due to conflicts with other pending hunting programs.

Off-refuge hunting was poor, also. Most of the local Iowa DNR marshes were dry. The best duck hunting occurred during the last week of the season, when a strong movement of mallards passed through the valley.

b. Muzzleloader Deer Hunt - The Nebraska Game and Parks Commission issued 100 permits for the 1990 muzzleloader hunt which was operated from December 15 through 17. A pre-hunt scout day was held on December 9. Eighty hunters took advantage of this opportunity to scout the area and erect tree stands. A total of 94 hunters participated in the hunt, logging 1,622 activity hours. Hunters took 45 deer, a success rate of 47.8 percent.

Muzzleloader Deer Harvest Data

Age and Sex	Number Taken
Adult Male	19
Fawn Male	7
Adult Female	13
Fawn Female	6

Deer hunting at Desoto had the added attraction of anti-

hunting protests this year. Two protests were organized by the Fund For Animals, Inc. and the Greater Nebraska Animal Welfare Society. See Section H.17.

c. Archery Deer Hunt - Archery deer hunting was permitted on designated areas in both Nebraska and Iowa. License requirements and season lengths were consistent with regulations for the state in which the hunting occurred. This hunting program normally requires little administrative or enforcement effort by the staff. However, the anti-hunting protest described under Section H.17. required some additional effort. The following season results were reported for archery hunters:

Iowa	Nebraska
868 Activity Hours	2,421 Activity Hours
4 Deer Taken	14 Deer Taken

9. Fishing

Ice fishing was permitted from December 26, 1989 through January 16, 1990. Ice conditions deteriorated and safety concerns for the anglers caused an early closure. A creel survey was conducted during this period, which indicated an estimated 1,265 angler visits and 7,375 activity hours.

Northern pike was the primary fish species being harvested with an estimated 3,725 pounds of pike taken home to the skillet. Our struggle to control roughfish in the lake is hindered by all these large predators being removed.
40-144-90 TR

Open-water fishing began on April 15, with another busy opening day. An estimated 43,327 visits and 194,082 activity hours were recorded this year (includes angler visitation during ice fishing season). This indicates a 16 percent increase in fishing visits and a 13 percent increase in angler activity hours above last year. Some really nice bass were taken.

The refuge hosted eleven bass tournaments and one carp (archery) tournament, in addition to three fishing clinics for youths.

From April 15 to early June, the fishing success for northern pike and largemouth bass was the best since lake renovation in 1985. Lots of bass were taken. Northern pike were being caught on smelt, which is unusual for those predators to be hitting on that time of year. 40-143-90 JO

Once the water temperature reached 70 degrees Fahrenheit, the anglers began having a problem with keeping the bullheads off their hooks, regardless of what they used.

While carrying out some experimental carp control, the refuge was able to provide "The Catch of the Day" for an Omaha inner city fishing clinic. It takes a lot off carp to feed 100 kids!
18-217-90 CV

With the lake's over-population of bullheads, those fishing for panfish were fighting an uphill battle trying to keep a worm, or even a minnow, on their hook without having a three-inch bullhead swallow it. There were even reports of anglers catching bullheads on crank-baits!

The summer fishing season was extended an extra two weeks in October to afford anglers additional cool-weather fishing opportunities. However, fishing use during the period was lower than expected, with only about a dozen anglers present on any given weekday.

11. Wildlife Observation

Wildlife observation opportunities increased this year due to changes in the spring and fall touring schedule, and additional areas being open for public access during those periods.
Personal KM

Overall, use in this category increased 17 percent above 1989 use, and 20 percent over the five-year average. Reported wildlife observation visits, totaled almost 300,000.

Visitors enjoyed good viewing opportunities, particularly of bald eagles along the river in January, due to additional refuge areas being open to the general public during the ice fishing season.

The Spring Auto Tour is no longer held. The paved portion of the refuge tour road is now opened on March 1, providing access to the Bertrand Site, Cottonwood Trail, and North Lake Observation Area. Such access provides the public with a longer spring wildlife viewing period than was available with the previous nine-day tour. In addition, the present route prohibits access in the vicinity of the primary bald eagle roost, thereby decreasing disturbance to that species. Use is limited to wildlife observation and trail access. This provides waterfowl viewing opportunities throughout the early spring period. Access remains thus until the primary public use season opens on April 15. Likewise, the same area was opened for viewing of migratory birds on November 12, following closure of the Fall Auto Tour. Not only do these changes provide increased viewing opportunities, but they also have several benefits to refuge administration: they spread out the large number of waterfowl viewers in November, alleviating some of the overcrowding and trespassing violations near the DeSoto Visitor Center; they have eliminated the need for closed area permits for most photographers; and they have decreased the number of closed area entry violations, though enforcement patrols during the period remained about the same.

As indicated in the section on visitor center use, November is the highest visitation period. Over 72,665 persons visited the refuge during that peak waterfowl migration period, a 28 percent increase over 1989 visitation levels. This is an increase of over 4,000

vehicles for that month alone. Since most visitation is confined to three weekends, overcrowding is a real problem.

There are only two facilities from which to view the geese--the DeSoto Visitor Center and the North Lake Observation Area. This old tower reportedly "swayed" when packed with people. Plans call for its replacement with a handicapped accessible viewing platform.

42-142-90 GG

Over 142,000 visitors came to enjoy wildlife/wildlands observation and appreciation during the April 15 to October 14 public use season. In addition, another 120,000 visited the refuge for this purpose during the migration seasons. Combined with increasing environmental education activities and wildlife observation from the visitor center viewing galleries or trails during the winter, this indicates an increased appreciation of wildlife and nature, particularly by the local populace.

To that end, the refuge makes available a photoblind, binoculars for loan, and volunteers with spotting scopes to assist in migratory bird identification, and viewing of eagles.

12. Other Wildlife/Wildlands-Oriented Recreation

a. Nature Trails -

Non-interpretive nature trails received approximately 63,000 visits, a 19 percent increase over 1989 use. Use on the Missouri Meander Trail, adjacent to the DeSoto Visitor Center, remains highest due to its location. Use in November averaged 249 persons per day. Those are snow geese in the background.

42-146-90 GG

Another nature trail is located adjacent to the Bertrand Excavation Site. The 2,300-foot trail traverses several habitat areas, and has proven to be very popular for two reasons. Firstly, it is fairly short and diverse. Secondly, it is accessible most of the year and located at the most popular, year-round outdoor stop.

b. Mushroom Hunting is permitted in designated areas from April 15 through May 31, while berry picking in public areas remains open throughout the public use season. 46-097-90 KLD

Almost 8,400 persons collected morels, mulberries, elderberries, and wild grapes during their respective seasons. Morel gathering was the best in years.

c. Boating, canoeing, sailing - Less activity was recorded for pleasure boating this year, with only 365 visits. This may be attributed to continued low water levels. (Boating attendant to fishing is not recorded in this category.)

d. Bicycling and Walking - More people are touring the refuge by alternate means of transport as trends have moved away from the past crowded, noisy, non-wildlife oriented recreation. Visitors now enjoy the wildlife and wildlands in a tranquil setting. Over 800 bicyclers were counted this year, but the number is probably higher.

14. Picnicking

Designated picnic areas were available throughout the refuge from April 15 through September 30. Over 25,200 visitors came to enjoy the area and picnic.

Picnic tables at the Cottonwood Nature Trail remained available for use by school groups, involved in environment education activities,

after the public use season closed. However, use by school groups is not counted in the recreational picnicking category.

16. Non-Wildlife Oriented Recreation

Non-wildlife oriented use is practically non-existent now, representing less than a half of one percent of what it was a decade ago! Such use is in the line of reunions and business picnics, and an occasional charity bike or walkathon. Total use in this category is now less than 1,000.

17. Law Enforcement

As in year's past, refuge officers, spent most of their time on potential resource violations. Enforcement of the entrance fee system continued to remain a problem, but the use of roadblocks was reduced from the previous year. As a result of major efforts during 1989, the level of voluntary compliance increased to as high as 89 percent, at times. Visitors found without entry permits were given verbal warnings and directed to purchase a permit. This approach was used due to the uncertain future of our entry fee program. We continue to get a lot of negative feedback since the system is confusing, and further complicated by the adjoining state park's lack of a fee system.

Traffic jams continue to be a problem during the peak of the snow goose migration. Officers stayed busy directing traffic on the weekends before and after Thanksgiving. Three officers were required to safely direct traffic at the visitor center. Therefore, little time was available to handle traffic problems elsewhere on the refuge. While visitors enjoyed spectacular views of geese feeding close to the roads, officers worried about potential accidents, because of vehicles stopped everywhere imaginable. However, no accidents or major problems were reported during these busy weekends. Fee booths were closed on five separate days, to relieve traffic congestion. At times, traffic had backed up for over a mile. Visitors were diverted away from the visitor center for over 17 hours during peak traffic control periods, literally thousands of people, which resulted in angry and disappointed visitors. A few wrote letters, requiring our response.

Increased efforts in the area of fishing regulation enforcement resulted in a 109 percent rise in the number of violations prosecuted. Officers used high-visibility patrols, concentrating on license and creel checks. As a result, the number of fishermen caught fishing without a license increased appreciably.

Off-refuge enforcement efforts were increased during the waterfowl season, as violations became obvious. The number of cases prosecuted increased four-fold. Officers were frequently frustrated while attempting to develop late-shooting cases. Many times,

required elements would come together, only to have a total lack of cooperation from the birds. A number of cases are still pending. The courts continue to lack proper follow-up in bringing violators to trial and issuing arrest warrants.

Summary of 1990 Violations

Types of Violations	Warning Ticket Issued	Prosecuted Violations	Total Court Fines	Cases Pending
Entry Without Permit		1	$50	1
Careless Driving		1	50	
Trespass	4	19	950	1
Swimming	3	1	50	
Pets	2			
Parking		1	25	
Drinking/Driving		2	50	
Boating				
Unattended Boat		1	50	
Registration		1	50	
Drinking/Operating		2	100	
Speeding	1	5	250	
Life Jackets		3	100	
Navigational Lights		1	50	
Trailer Lights		1	25	
Fishing				
License		8	800	7
Closed Season	1	1	50	
More Than 2 Lines		2	100	
Undersized Fish	4	4	200	
Hunting				
Late Shooting		2	100	2
Unplugged Gun		1	50	1
State Stamp		1	125	1
Federal Stamp		1	50	1
Wanton Waste		1	50	
Lead Shot		1	75	
Total	15	61	$3,500	14

*One state stamp violation was turned over to an Iowa Conservation Officer for prosecution.

A waterfowl hunting case, which had been pending over a year, had an unfavorable outcome when finally settled in December. Officer Sheets had been detailed to assist Special Agent Diane Fries in the Rainwater Basins during the 1989 season. They watched three hunters in a blind shoot two birds over their limit. The case was heard and the judge ruled against the defendants. They then appealed, and a

higher court dismissed the case. Since the officers could not specifically determine which man or men in the blind shot the extra birds (and they weren't telling), it was ruled that none could be charged. It happens!

The refuge's greatest potential law enforcement challenge in years became known in mid-September. The Fund for Animals, Inc. put out a release that they were going to protest bowhunting at Desoto. As a result, local media contacted the Fund's Terry Torrez at their Maryland headquarters and she stated they would probably go afield harassing hunters. The media picked up on that, and even the wire services carried it. We started getting calls from the media, politicians, and angry hunters.

Pro-hunt groups wanted to counter-protest. Considerable time and energy was spent in diffusing tempers and sorting out truths. We attempted to keep the media event as low key as possible and, finally, persuaded the bowhunting groups to just send representation; cool-headed spokesmen who could respond to the media.

But, not knowing how many activists might show up for the demonstration, a possible counter-demonstration, or what tactics might be used, we planned for the worst. Four special agents, two state officers, two Washington County Sheriff's Officers, and four refuge officers were on stand-by. In the final hours before the planned event on the morning of September 29, Ms. Torrez called to ask for police protection, since threats had allegedly been received among the Fund's cosponsors, The Greater Nebraska Animal Welfare Society. They had it, although it wasn't especially visible at the site.

A week after an animal rights protest rally at the Aksarben Rodeo in Omaha, Terry Torrez from the Fund for Animals, Inc. (on left) was back at DeSoto to lead the Greater Nebraska Animal Welfare Society in the state's first anti-hunting "disruption". 48-109-90 DC

The protestors assembled off-refuge, on a county road adjoining one of our Nebraska bowhunter parking areas. The rally only lasted a couple hours. There were approximately 15 protestors and a few pro-hunt representatives from groups like the Nebraska Bowhunter's

Association. They intermingled, expressed their opinions to the media, and confined their activities to a peaceful demonstration. Along with the presence of the media (including two television stations), Iowa Conservation Officer Doug Clayton videotaped the event for future analysis. Signs and banners ran the usual gamut - "Broad minds, not broadheads", "Refuges are not killing fields", "Sanctuaries, not slaughter houses".

To the best of our knowledge, the demonstrators didn't even see a refuge bowhunter. At our suggestion, they sensibly hunted elsewhere.

Then, on the opening morning of our Nebraska muzzleloader hunt, we had them on our turf. Eleven protestors assembled, under a special use permit, at the refuge headquarters in the pre-dawn hours. However, they only got to chant at four late-arriving hunters, since the hunter orientation was already under way at the visitor center, a mile down the road. It was cold out. No media coverage was at hand. After a few half-hearted chants, they were gone. They said they would "be back earlier next year". Maybe, we should start the hunt at noon?

Refuge officers were detailed to assist with several enforcement operations, including the black-powder deer hunt at Squaw Creek National Wildlife Refuge, Lake of the Woods take-down in Minnesota and Canada, and the waterfowl hunting season at Upper Mississippi Fish and Wildlife Refuge.

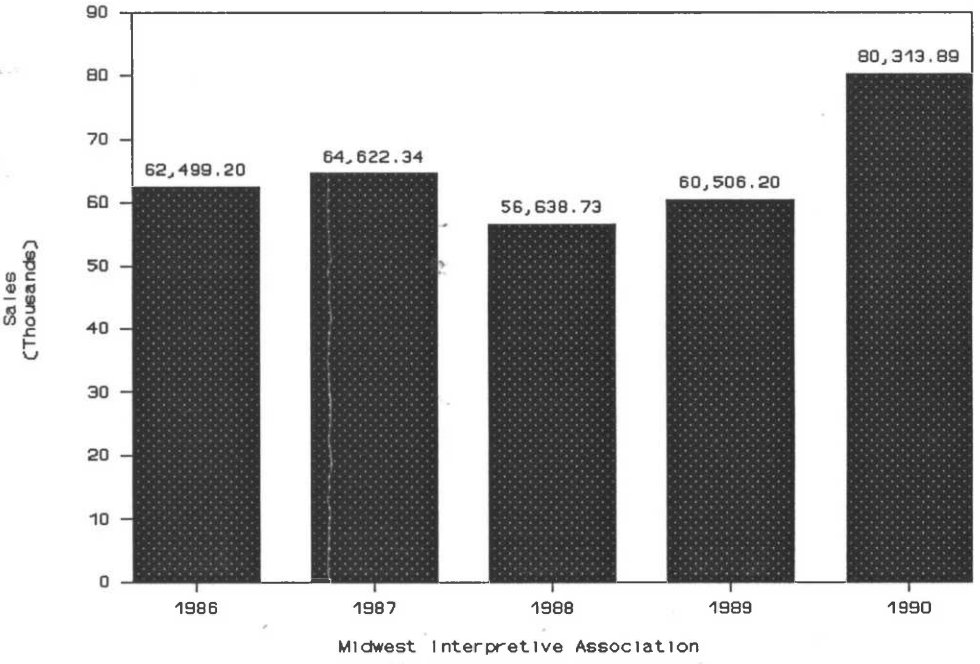
Officer Jones completed the Firearm Instructor Course at Glynco so that the station would have a qualified officer for the station's range. A couple special agents, several refuge staffs, state officers, and three other federal agencies (FBI, ATF, and FPS) have traditionally used DeSoto's range.

18. Cooperating Association

The Midwest Interpretive Association (MIA) completed its ninth year of operation. Revenue received from the sale of books, artwork, photographs, T-shirts, postcards, and posters at DeSoto totaled $58,197.42 Overall sales were up over 30 percent above last year, primarily due to the sale of brightly colored T-shirts.

Bruce Barkley serves as the MIA's full-time Business Manager. Along with DeSoto, the Association also administers outlets at Mingo, Crab Orchard, Squaw Creek, and a five-month, seasonal operation at Tamarac.

The graph on the following page shows revenue generated by all Association sales outlets during recent years.



Direct contributions to the refuge totaled $4,512.20. This included sponsoring both photography and wildlife art shows, computer programming for development of public use interactive computer, and purchasing library materials. A breakdown of MIA sales activities during 1990 follows:

Outlet	Gross Sales	Percent of Assn. Sales	Contributions Rendered
DeSoto	$58,197.42	73	$4,512.20
Mingo	8,353.80	10	1,214.53
Tamrac	4,851.17	6	668.63
Crab Orchard	935.41	1	0
Squaw Creek	7,976.09	10	600.00
Total	$80,313.89	100	$6,995.36

DeSoto's new sales items included Bertrand T-shirts, Bertrand and snow goose sweatshirts, a new postcard (featuring snow geese over the DeSoto Visitor Center), several new wildlife books and activity guides, note cards, and audio cassettes of the Peterson bird guide. The quality of the two sets of Bertrand note cards was disappointing. They were not reordered after the initial printing. Work continued on the interpretive guide for the Bertrand artifact area.