

HAMDEN SLOUGH NATIONAL WILDLIFE
REFUGE
Detroit Lakes, Minnesota

ANNUAL NARRATIVE REPORT
Calendar Year 1990

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

REVIEW AND APPROVALS

HAMDEN SLOUGH NATIONAL WILDLIFE REFUGE

Detroit Lakes, Minnesota 56501

ANNUAL NARRATIVE REPORT

Calendar Year 1990

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INTRODUCTION

On September 19, 1989, the Migratory Bird Conservation Commission approved Hamden Slough National Wildlife Refuge as the 452nd refuge. The establishment of the refuge ended four separate efforts by two agencies over a 50 year period to protect the area. The last effort by the Service spanned almost six years. (C.1) The purpose of the refuge is to increase duck production by restoring and protecting prairie pothole habitat. The refuge will produce nearly 10,000 waterfowl annually. (G.3)

The refuge is located in northwestern Minnesota, in Becker County, north of Audubon, MN. The area is a transition zone between the flat, tall grass prairie on the west and north, and a rolling hardwood forest - lake region on the east and south. The primary economic base for the area around the refuge is agriculture, with a strong tourism industry just to the south and east. The prairie upland, almost all of the prairie wetlands, and some of the timberland have been converted to cropland. During the last 30 years, almost 100% of the Type I, III, and IV wetlands have been drained in Becker County.

Hamden Slough NWR was one of the first refuges designed with the Mallard Management Model to predict duck production potential. Land use models were incorporated into management alternatives which varied amounts and combinations of wetland and cover types. After the alternatives were considered, a non-traditional acquisition with a mix of leased property was recommended. As planned, the refuge will include the following:

Inside Refuge

- 5944 acres in fee title on 35 tracts, with:
 - 215 restored or enhanced wetlands totalling 3000 acres.
 - 2250 acres of restored upland for nesting.
 - 500 acres of cropland for wildlife depredation alternatives.

Adjacent to Refuge

- 2600 acres of leased private property, with:
 - 400 acres of restored or protected wetland.
 - 2200 acres of alternative farming practices or seeded cropland.

Total funding to acquire and fully develop the refuge, buildings, impoundments, water control structures, facilities, and all equipment is expected to be near \$10,000,000. Approximately 15-20 years of work is anticipated to have the refuge near completion.

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A. HIGHLIGHTS

Runoff from average snow depths and normal warming, quickly drained away in the many ditches and drains on and around the Hamden Slough area. (B)

Six tracts totalling 1501 acres were acquired in fee title. (C.1)

The Hamden Slough public affairs program was de-emphasized to allow a cooling down period for local residents, after a barrage of meetings and news articles in 1989. (D.3,H.1)

Fox populations are increasing and coyotes decreasing in the area. (G.8)

Waterfowl hunting continues to decline in terms of hunters, birds available and birds harvested. (H.8)

B. CLIMATIC CONDITIONS

Weather conditions for 1990 were moderate, particularly when compared to the drought of 1988 and 1989. A total of 20.1 inches of precipitation occurred, which is only 2.9 inches below normal. The average temperature for the year was 40.8°F or 2.1°F below normal.

Quarterly summaries are as follows:

January-March. Above normal temperatures and average precipitation prevailed. Record-breaking or near record highs were set in all three months. January was the warmest January ever recorded. Sustained highs and limited low temperatures, boosted January's temperatures to 15.4°F above normal. February and March were 5°F and 7°F above normal, respectively. Limited snow fell in January and February, but 5.5" of extra snow in March left the quarter only 0.5" short. The first waterfowl of the season, Canada geese, were seen in mid-March.

April-June. Normal temperatures and below average precipitation were the norm for the second quarter. Ice went out on local lakes during the week of April 15-21. Occasionally, ice blockage and rapid runoff will temporarily restore the Hamden Slough wetlands for a short period. This did not occur in 1990. May was 1.2" short of average rain. With little soil moisture carried over from 1989, drought like conditions again began to affect grass and crop production.

July-September. Drought conditions prevailed. Below average rain continued until the end of August, when 2.3" were received in the last week. Temperatures were below normal in July and above normal in September.

October-December. Warmer than normal temperatures continued until mid-December. Precipitation was about normal, but October received an extra 1.75 inches of rain. Ice formed on the edge of area lakes during mid-November, but was usually broken up by high winds. A drop to 4°F on November 25th began a hard freeze on most lakes. Detroit Lake was frozen over on the 27th, and had it's first ice house on the 28th. The first snow for the season was received on October 18, but quickly melted away. Conditions were relatively warm and dry until December 18, when four days of snow and below 0°F temperatures unofficially brought in winter. A wind chill of -64°F was noted on December 20 and 21. A record low temperature of -38°F was recorded on December 30.

CLIMATOLOGICAL DATA - 1990

Month	(Temperature - °F)			(Precipitation - Inches)		
	Max.	Min.	Ave.	Departure from Normal	Precip.	Departure from Normal
January	44	-15	18.2	+15.4	0.20	-0.47
February	49	-21	14.5	+5.0	0.25	-0.33
March	61	-16	29.2	+7.0	1.25	+0.38
April	84	9	40.9	+0.4	2.30	+0.04
May	83	23	51.6	-2.0	1.41	-1.18
June	89	33	63.7	+1.0	4.17	+0.04
July	91	40	65.5	-2.0	1.52	-2.30
August	89	34	66.5	+0.7	3.64	-0.18
September	87	25	58.5	+3.1	1.54	+0.05
October	76	15	41.7	-3.2	3.24	+1.75
November	68	2	30.4	+3.1	0.09	-0.71
December	51	-38	9.0	+2.1	0.76	-0.04
Total				+2.1	20.1	-2.87

C. LAND ACQUISITION

1. Fee Title

The Hamden Slough Study was initiated late in 1983 and headed by Detroit Lakes Wetland Management District Manager Howard Lipke. The original study proposal included 13,754 acres. After planning with the Mallard Model process, nearly 5,200 acres were excluded. A 1988 Environmental Assessment evaluated the impacts of seven Mallard Model alternatives; and included the Service's preferred combination of alternatives (Alternative #8), which combines fee title acquisitions, wetland easements, leases, and cooperative farming agreements. The six year study was successfully completed, when the Migratory Bird Conservation Commission (MBC) approved the refuge on September 19, 1989. The approved proposal includes 8,565 acres: 5,944 acres in the core refuge area and 2,621 acres in the bordering lease-easement area.

After approval of the MBC in 1989, the first acquisition for Hamden Slough National Wildlife Refuge (NWR) was completed on February 20, 1990. Appropriately, the first purchase was with long-time supporters of the refuge, the Claris Greenland's. Other 1990 acquisitions are shown below.

FEE ACQUISITION - 1990				
Township	Former Landowner	Acres	Tract No.	Cost
Previously-owned (WPA's)		321.02		
Hamden	Claris Greenland	330.00	30	\$122,000
Audubon	Jerome Engebretson, et al	71.09	13	20,600
Audubon	Dale Marvel	402.57	10	222,600
Hamden	Lester Hass	320.00	32	131,250
Riceville	James Matter	222.56	41	151,350
Riceville	Robert Scherzer	155.20	45	141,500
Total		1822.44		\$789,300

OTHER ACQUISITION - STATUS				
Landowner	Acres	Tract No.	Appraisal	Status
Becker Co. Sport. Club	38.24	38	\$ 2,900	option secured
Dahring	100.00	35	39,360	offer declined
Olund	346.01	39	143,000	offer declined
Olson	273.60	27	70,000	offer declined
Hass	120.50	11	63,600	negotiating
Ellenson	153.93	12	68,200	negotiating
Brown	153.10	17	81,100	negotiating
Mollick	131.50	18	73,750	negotiating
Grieser	70.00	33	28,500	negotiating
Anderson	160.00	29		needs appraisal
Ackerson *	160.00	34	49,200	inside refuge
	400.00			whole farm
Amundson *	120.00	43	101,500	inside refuge
	245.25		194,000	whole farm
Nelson *	40.00	15		inside refuge
	191.89		115,134	whole farm
Gandrud *	40.00	16		inside refuge
	136.90		85,000	whole farm

* Service to purchase whole farm; portion outside refuge boundary will be exchanged. Owner will not sell part of farm.

Pressure continues on county and townships boards to conduct local government business with dwindling tax bases. Seven successive years of less than 100% entitlement in Revenue Sharing payments has left the Service open to criticism; especially when the boards are asked to certify private, tax producing, property for federal acquisition. With the high priority assigned Hamden Slough acquisitions and prior non-certification by the county of four WPA tracts over the issue of "taxes", the Service decided not to pursue WPA acquisition in Becker County. The last WPA tract approved for acquisition in Becker County was the Hass Tract in 1987, until this year.

To alleviate the negative influence of the "tax loss", Safari Club International of Minnesota (SCI) certified in May, 1989, their willingness to make up the revenue shortfall with 10 years of growth bonds, after the refuge was established. Based on a 71% base average for Refuge Revenue Sharing payments since 1981, the refuge was expected to pay only \$102,500 of the approximately \$145,500 in county entitlements. With the refuge revenue payments complimented by the SCI's maturing bonds for 10 years, a major public objection was removed. Safari Club purchased \$43,000 in zero based coupons and presented them to the Service on October 19, 1990. The bonds will mature on May 15 of each year, through 2000. With refuge revenues now up to 85%, Becker County will receive an unknown amount above their 100% entitlement.

Another objection to the refuge proposal was the use and maintenance of major drainage ditches. The Minnesota Land Exchange Board (LEB) was reluctant to approve the refuge acquisition, until the Service and Buffalo-Red River Watershed District formalized an agreement which would ensure continued maintenance of the Becker County Ditch 15 system, which passes through the refuge. At the meeting of the LEB, June 7, 1989, their decision was postponed until an agreement between the Service and the Watershed District was completed. A cooperative agreement was signed on July 13 and on July 19, 1989, the three-member LEB unanimously approved the refuge.

D. PLANNING

1. Master Plan

Following approval of the Hamden Slough National Wildlife Refuge in September, 1989, the Region decided a Concept Plan (mini-master) was needed. The plan's purpose is to facilitate Service budgeting decisions and inform/involve Congressional staffs, cooperating agencies, and organizations. In addition, it should provide for long-term development direction of the refuge. The Concept Plan could precede a Refuge Master Plan. An organizational process was initiated late in 1989, with primary assistance from Mike Marxen, Landscape Architect (Regional Office - Special Services). Assignments in plan format, drafting and illustration were completed during 1990. The first draft was reviewed, edited, and returned to the Region by the end of year. It should be printed in 1991. Planning and management strategies are built around the refuge objectives detailed in the Concept Plan.

Refuge objectives are:

1. Provide Migratory Bird Production, Resting, and Feeding Habitat
2. Restore and Enhance Indigenous Plants and Animals of the Prairie Wetland Ecosystems
3. Become an Educational Model for Land and Watershed Stewardship
4. Provide Wildlife Oriented Recreation

2. Management Plan

Management plans outlining specific upland development, wetland restoration, reclamation needs, facility developments, and management strategies for each unit of the refuge will need to be completed. Current planning has 3000 restored/enhanced acres of wetlands and 2250 acres of upland proposed for restoration on the refuge. Another 500 acres will be farmed by cooperators to provide supplemental wildlife foods and control local depredation. One of the significant components of these plans is the collection of resource inventory data and completion of Resource Inventory and Planning (RIP) cards. History, resource inventories, and objectives for each tract will be incorporated in the management planning process.

Agricultural Best Management Practices (BMP's) will be encouraged by lease of 2200 acres of privately owned agricultural land adjacent to the refuge. Four hundred acres of wetland will also be restored or protected by lease of adjacent private land.

3. Public Participation

A Citizens Advisory Committee is being developed for the refuge, by the Service. The committee of 8-10 members will have 3 major functions. First, it will represent the local community, citizens, clubs, and other interests in the development of refuge plans and management strategies. Secondly, it will observe the planning process for biological management incorporating federal, state, and local governing policies, in addition to public demands. Third, it can act as a communication link with the public and the organizations represented. The first two members of the

committee were chosen in December by their clubs, after refuge presentations. The rest of the committee should be in place by the spring of 1991.

Public participation was very active from January, 1985 with the public announcement of the Hamden Slough Refuge Study, until its approval by the Minnesota Land Exchange Board in July, 1989. As expected there were opponents and proponents. During that period, numerous public hearings, county board meetings, petitions, letters to the editor, congressional inquiries, and group and individual concerns had to be addressed and attended. To handle the overwhelming volume of inquiries in a positive, professional manner, a video on Hamden Slough development was produced early in 1989. Imagery was developed by the University of Minnesota, St. Paul Campus, working with Mike Marxen, R.O. Special Services and Scott Bates, Mark Twain NWR. The video was used in meetings with organizations, individual Becker County Commissioners, the Buffalo-Red River Watershed District, the Minnesota Land Exchange Board, and the Migratory Bird Conservation Commission leading to the 1989 approval of the refuge.

4. Compliance with Environmental and Cultural Resource Mandates

Contaminants work was completed on the Dale Marvel tract (#10). The tract (402.57 acres) was not accepted for purchase in 1989 because of the undetermined extent of contamination from oil/grease in an equipment maintenance area at the building site. Hydrocarbons were eight to ten times higher than state standards. Soil samples were taken in February, 1990 and analyzed by Bay West, INC. The results were submitted to the Minnesota Pollution Control Agency (MPCA), which determined there was no danger of ground water contamination and that no corrective action was needed. Purchase of the property was then completed.

Prior to MPCA's determination and in anticipation of site cleanup of buildings and structures on the Marvel tract (#10), a contract was established with BRW, INC. for archeological clearance of the area. The area was surveyed by Teresa Halloran, archaeologist, and Curtis Hudak, geomorphologist, in October. No historical evidence was found. BRW's final report will be available in 1991 recommending no additional survey or preservation work.

Future water development project plans will be submitted for review to the Buffalo-Red River Watershed District. A Cooperative Agreement was signed with the Watershed District in July 1989 to clarify any future mis-understandings and get their support for the refuge, prior to the Minnesota Land Exchange Board vote. (C.1 & J.1)

Both the Draft and Final Environmental Assessments for Hamden Slough NWR were reviewed and commented upon in accordance with the National Environmental Policy Act of 1969. Copies of the Draft Environmental Assessment were distributed for review during the 30 day comment period in April, 1988. Combining all respondents (1022), 94 percent were supportive of the refuge as proposed. Following minor revisions, the Final Environmental Assessment was distributed July 15, 1988. The final document was the basis for refuge approval by the Minnesota (LEB) on July 19, 1989 and by the Migratory Bird Conservation Commission on September 19, 1989.

E. ADMINISTRATION

1. Personnel

Mike Murphy was selected as the new Refuge Manager, GS-11, and entered on duty on October 7. A staff of five is eventually planned for the refuge. Positions may not be filled for awhile as only 1 FTE is authorized for FY91.

DISTRICT STAFF - 1990

Year	Full Time	Permanent		Temporary	Total FTE
		Part Time			
1990	1.0	0		0	1.0

With no offices or equipment yet for the refuge, Detroit Lakes WMD staff has and continues to provide their time, expertise, office space, and equipment for Hamden Slough NWR. (Sec.K)

5. Funding

First funding for the refuge was allocated in FY90. Funding levels for FY91 represent increases for salaries and a vehicle.

WMD FUNDING - FY 1990-1994

(Thousands of Dollars)

Activity	90	91	92	93	94
1260	19.7	74.6			
Total	19.7	74.6			

7. Technical Assistance

The Swampbuster provision of the Food Security Act prohibits the conversion of wetlands to crop production, should the landowner elect to participate in any of the USDA farm programs. One potential swampbuster was observed while taking pictures of future acquisitions for the Migratory Bird Conservation Commission. A check of Becker County SCS slides indicated a ditch may have been dug in the past and that no wetland had been designated for that area. SCS re-classified the area as farmed wetlands (FW). ASCS notified the refuge that the dirtwork was maintenance ditching, thus determining landowner's compliance with the Act.

F. HABITAT MANAGEMENT

2. Wetlands

Generally, wetlands in this part of Minnesota experience a gradual water loss throughout the ice-free period. Spring snow-melt was "less" than adequate for wetland recharge and the summer too dry to maintain soil moisture, much less water levels. Late summer rainfall was very "spotty" (Sec.B). On the refuge, all wetlands were dry, except a beaver impoundment. In the local area, dry weather enhanced field conditions for wetland development construction. Unfortunately, the same conditions enhanced wetland destruction by drainage. For a second year, significant wetland destruction was noted. An estimate of 50,000 wetlands are now drained in Becker County. That is virtually every type I - IV prairie wetland not owned or protected by the Service or the Minnesota Department of Natural Resources. It appears that the "Swampbuster" provision of the Farm Bill has had less than a desirable effect on wetland losses in this area.

4. Croplands

Farming was authorized on 318 acres on 3 tracts through the cash rent program. Special Use Permits for cash rent were issued to prepare crop land for grass seedings in 1993. Another 190 acres was farmed by a tenant via an agricultural land use reservation which was part of the purchase agreement. Approximately 10 acres of that cropland will be seeded to grass in 1991.

The cash rent program provides a method of preparing a seedbed for native grass seedings. This allows the establishment of permanent cover on newly acquired farmland. It also allows the conversion of problem weed areas and/or poor quality, non-native grassland to native grass cover. Areas are typically farmed for three years by a local farmer to control weeds and prepare a seedbed. Soybean stubble normally provides the best seedbed, in this area. Use of Treflan herbicide is also required the last year of farming to control annual foxtails. No tillage is permitted after soybean harvest. After farming, areas are treated with Roundup herbicide (1 1/2 qt./ac.) primarily to control quackgrass (*Agropyron repens*). Roundup is usually spring applied. However, late fall application has proven effective in also controlling thistle species. Truax brand native seed drills can be used to seed a mix of predominately locally harvested native grass seed, supplemented with purchased northern origin cool season grass.

Cash rent rates are determined by information provided by USDA Soil Conservation Service, Agricultural Stabilization and Conservation Service offices, and county extension agents. Rental rates are typically well toward the low end of the local private rental scale. Rent is adjusted on an increasing sliding scale. Third year rates vary between \$15-35 per acre, depending on soil, fertility, slope, moisture, etc.

7. Grazing

One permit was issued for grazing to enhance native grass on the Marvel tract. The permit allows the Service to demonstrate to local landowners that many management tools can be used within the refuge boundary. The cooperator owns land within and adjacent to the refuge and is interested in working with us.

8. Haying

Three permits were issued to hay 181 acres of bottomland on the Greenland and Marvel tracts. Until flooded, the bottomland has limited nesting value, and provides an excellent method of working with our neighbors.

10. Pest Control

a. Weed Control for Establishing Native Grasses

Selective herbicide applications can be used to enhance the success of native grass seedings and varied according to the stage of grass establishment. Glyphosate can be applied prior to seeding to reduce competition especially from introduced cool season grasses such as quackgrass. Later in the season as broadleaf competition develop, 2,4D can be applied. Fields seeded to natives during the previous three years can be treated with 2,4D for broadleaf competition. A total of 110 acres of native grass, planted in 1988 and 1989, was sprayed with 2,4D on the Spring Marsh WPA, which is now inside the refuge boundary.

b. Noxious Weed Control

In 1990, very few weed complaints were received from neighbors around the refuge, as compared with 13 received in 1989. Previously, Service programs were under a microscope, due to the interest and controversy the Hamden Slough NWR proposal had generated. One small patch of leafy spurge on the Neitzke WPA (inside refuge boundary) was sprayed with picloram by adjacent neighbor Duane Hanson. Mr. Hanson had agreed with the Service the previous year, to alternate spraying responsibility on a co-owned leafy spurge patch. Later in the season, when thistle complaints are normally received, neighbors directed their attention to grasshoppers. A 2 acre patch of plumeless thistle on the Marvel tract building site was treated with 2,4D.

c. Grasshoppers

Four acres in the south-east corner of the Spring Marsh WPA was treated with Sevin-XLR for grasshopper control, after an adjacent neighbor complained about depredation to his spring wheat. This portion of the WPA is now within the refuge boundary.

G. WILDLIFE

1. Wildlife Diversity

Upland cover and wetland restoration and enhancement in the Hamden Slough watershed is critically important for the protection and nesting of waterfowl, shorebirds, prairie chickens, pheasants, and other upland species. Refuge development should improve breeding habitat for an estimated 142 nongame migratory bird species whose range includes the refuge area. Most of these species have experienced population declines as a result of habitat degradation, now a limiting factor adversely impacting these species. Habitat should improve for several species included on the USFWS "Migratory Nongame Birds of Management Concern in the U.S." list. Nesting has been documented in this county for common loon, least bittern, northern harrier, American bittern and the black tern.

2. Endangered and/or Threatened Species

As the refuge develops and migrating waterfowl numbers increase, federally listed endangered and threatened bald eagles and peregrine falcons will be attracted. Bald eagles, peregrine falcons and gray wolves are regularly sighted in Becker County. During migration periods, eagles are seen on the refuge. A bald eagle was observed on Engebretson tract on October 14. The eagle was observing waterfowl on a beaver dam impoundment. The bald eagle and gray wolf are listed as a federally threatened species in Minnesota.

Trumpeter swans are being re-introduced in this area and should be released on the refuge as water control structures and impoundments are developed.

The Minnesota Natural History Program maintains the most comprehensive database of state-designated endangered, threatened and special-concern species. The database was searched to identify the presence of significant species in the vicinity of the refuge. The following species have been identified as occurring in Becker County:

Animals

Greater prairie-chicken (Typanuchus cupido)
 Upland Sandpiper (Bartramia longicauda)
 Red-shouldered Hawk (Buteo lineatus)
 Yellow Rail (Coturnicops noveboracensis)
 Bald Eagle (Haliaeetus leucocephalus)
 Marbled Godwit (Limosa fedoa)
 Wilson's Phalarope (Phalaropus tricolor)
 Forster's Tern (Sterna forsteri)
 Common Tern (Sterna hirundo)
 Northern Myotis (Myotis septentrionalis)
 Mule Deer (Odocoileus hemionus)
 Eastern Spotted Skunk (Spilogale putorius)
 Snapping Turtle (Chelydra serpentina)
 Frigga Fritillary (Clossiana frigga saga)
 Poweshiek Skipper (Oarisma poweshiek)

Plants

Cooper's Milk-vetch (Astragalus neglectus)
 Goblin Fern (Botrychium mormo)
 Carex scirpiformis (no common name)
 Sterile Sedge (Carex sterilis)
 Twig-rush (Cladium mariscoides)
 Ram's-head Lady's-slipper (Cypripedium arietinum)
 Small White Lady's-slipper (Cypripedium candidum)
 Beaked Spike-rush (Eleocharis rostellata)
 Felwort (Gentianella amarella)
 Hair-like Beak-rush (Rhynchospora capillacea)
 Whorled Nut-rush (Scleria verticillata)
 False Asphodel (Tofieldia glutinosa)
 Marsh Arrow-grass (Triglochin palustris)

3. Waterfowl

Twenty four waterfowl species will benefit from enhanced breeding and/or migratory habitat on the refuge. Fifteen species, including Canada geese, mallards, wood duck, northern pintail, blue-winged teal, American wigeon, canvasback, redhead, ring-necked duck, lesser scaup, green-winged teal, northern shoveler, ruddy duck, common goldeneye and hooded merganser will benefit from increased or enhanced breeding habitat. Nine species will benefit from improved migratory habitat, including greater scaup, gadwall, black duck, bufflehead, common merganser, red-breasted merganser, snow geese, and tundra and Trumpeter swans. The Mallard Management Model projects a five fold (5x) increase in waterfowl production on Hamden Slough National Wildlife Refuge. Other model alternatives suggest a three-fold (3x) increase for the surrounding leased land.

Trumpeter swans have been reintroduced in Minnesota, and are reproducing in the wild. Based on recent reports of their distribution, the refuge will increase or enhance migration and potential breeding habitat for this population.

4. Marsh and Waterbirds

Greater sandhill cranes, American and least bitterns, great blue and green-backed herons, red-necked grebes, greater egrets, horned and eared grebes, black-crowned night herons and white pelicans are commonly observed during migrations and breeding seasons. A rare sighting of a cattle egret was made 2 miles from the refuge, on the Lee Marshes WPA.

5. Shorebirds, Gulls, Terns and Allied Species

Shorebirds common to the area include killdeer, marbled godwit, upland plover (sandpiper), spotted and pectoral sandpiper, Wilson's phalarope, greater and lesser yellowlegs, and common snipe. These species and others were observed during migrations and breeding seasons.

Herring gulls, ring-billed gulls, Franklin and Bonepart's gulls, were frequently observed during migration. Black terns are summer residents of adjacent WPA's.

6. Raptors

At least 20 species of raptors are observed on or around the refuge. Marsh hawks, sharp shinned hawks, red-tailed hawks, rough legged hawks, American kestrels, broad-winged hawks, goshawks and great horned owls are among the most common.

8. Game Mammals

Muskrat and beaver populations suffered because of poor water conditions on the refuge. This is the fourth year of decline for these species in the area.

Based upon general observations, trapper reports, and autumn scent post surveys, coyote and mink populations declined, while fox and raccoon numbers increased. Fox numbers were previously in decline, but due to the reduced coyote numbers, the fox appears to be making a comeback. Area coyotes have been infected with the biting mite (Trichodectes canis), which results in hair loss. Without the hair, coyotes eventual die due to cold weather exposure.

Moose have been observed within the refuge boundary; the latest was the winter of 1988-89. Deer populations in the area have increased significantly, since the harsh winter conditions of 1988-89. Very few 1988 fawns survived until the spring of 1989. Fawning rates were 1.8 fawns per doe in 1989 and 1.7 fawns in 1990. The refuge overlays Minnesota DNR Prairie Deer Management Unit from which the statistics are taken.

10. Other Resident Wildlife

Local scent post surveys and general observations indicate a slight decline in the skunk population.

Pheasant and gray partridge do appear on the refuge and their populations will be estimated at a later time.

A prairie chicken booming ground does occur on the north end of the refuge. The population is estimated at 10-20 birds by the Prairie Chicken Society.

H. PUBLIC USE

1. General

After the extensive media coverage generated by the Hamden Slough (NWR) proposal in 1989, no coverage was given the refuge until October 1990. Only three topics were covered in the local papers: refuge closure to hunting, a donation by a local sportsmen's club, and an appearance before the Watershed District.

RM Mike Murphy presented 2 programs on refuge development to local conservation clubs in December. Only one other program was given by Detroit Lakes WMD Wildlife Biologist Les Peterson in January.

8. Hunting

All refuge property was closed to hunting in 1990. Two WPA's which are within the designated boundary were open to hunting and received minimal pressure. Duck numbers were generally very low, and there was no concentration of water, waterfowl, or hunters. In 1991, the WPA's will be incorporated in the refuge and closed to hunting.

10. Trapping

Refuge property was closed to trapping in 1990. A number of phone calls were received by trappers who traditionally trapped the area, including some from southern Minnesota. One trapper, with traps just inside the refuge boundary, was contacted. He apologized and thanked us for "... not sicking the game warden on me". With this being the first year of closed areas, public contact and information appeared to be a better management tool than prosecution. Area trapping pressure was light due to low fur prices.

11. Wildlife Observation

Use of the refuge for wildlife observation and photography is difficult to determine. Public contacts indicate that the refuge is utilized quite extensively during certain times of the year. Peak wildlife observation periods occur during spring waterfowl migration, when broods are visible, and prior to the waterfowl and deer seasons.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

Progress was made equipping the refuge. A 4x4, 3/4 ton pickup was requisitioned for Hamden Slough.

8. Other

Four of the refuge tracts were posted with refuge boundary signs just prior to the fall. The backlog of boundary marking, building site reclamation, wetland restorations, etc. continues to grow as acquisitions are completed.

J. OTHER ITEMS

1. Cooperative Programs

a. Watershed Districts

In early refuge proposals, considerable landowner opposition surfaced because of expanded and increased drainage assessments. A re-determination of benefits by "viewers" went through review and readjustment by the Buffalo-Red River Watershed District. New assessment maps were completed in 1990. The District is receptive to the refuge and its potential benefits for water retention and watershed protection. However, they had not been openly supportive because of the opposition of a few. Approval of the refuge was delayed by the Minnesota Land Exchange Board until a Service/Watershed District cooperative agreement was finalized, insuring maintenance of the County Ditch 15 system for agricultural purposes. An agreement (FWS 14-16-0003-89-975) was signed July 13, 1989; and subsequently added Addendum 1 with the Service agreeing to fund "a detailed survey of the original profile and width of the entire Ditch 15 system and its laterals", at a cost of \$29,600. The Watershed District contracted with Houston Engineering, Inc. to complete the survey. Ground survey work was completed in the fall of 1990 and preliminary blueprints of the system were submitted to the Regional Office in December, for review. The survey will provide baseline data for all future refuge wetland restoration work.

A fourth Watershed District, Pelican River (PRWD) will now involve the Service because of the Hamden Slough NWR. A local consultant working for the City of Detroit Lakes is considering an option of rerouting treated wastewater from the PRWD into Becker County Ditch 15 which is in the Buffalo-Red River Watershed District.

b. Ducks Unlimited, Inc.

Ducks Unlimited (DU) maintains a strong interest in major development on Hamden Slough. After initially supporting a \$4.2 million development on the refuge in 1986, DU's involvement in other habitat work for the North American Waterfowl Management Plan has drawn their contributions to many other worthwhile developments.

4. Credits

Murphy: All sections

Christen & Hendrickson: Typing and Assembly

K. Feedback

A very special thanks to all the Detroit Lakes WMD staff for their exceptionally supportive help, while trying to maintain their district responsibilities. Over a six year period, they struggled with numerous meetings, public surveys, an Environmental Assessment, acquisition headaches, contaminated soil, congressional inquiries, management plans and models, etc. and still completed their district responsibilities. One would think, they would be delighted to "dump" the refuge assignments on a new manager and get on with their own jobs. To the contrary, I was constantly offered help by the entire district staff. Even more impressive, the staff would immediately assist in tackling refuge questions and problems at the expense of their own valuable time. Their energy, spirit, and enthusiasm was infectious. I take a great deal of personal pride in being associated with so fine a group of people.