AGASSIZ NATIONAL WILDLIFE REFUGE

Middle River, Minnesota

ANNUAL NARRATIVE REPORT

Fiscal Year 1999

United States Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVALS

AGASSIZ NATIONAL WILDLIFE REFUGE

Middle River, Minnesota

ANNUAL NARRATIVE REPORT

Fiscal Year 1999

Refuge Manager — Date: 3.20.01

Refuge Supervisor — Date: 6/4/01

Regional Chief
National Wildlife Refuge System — Date: 4/16/01

TABLE OF CONTENTS

F. HABITAT MANAGEMENT (cont.)

G. WILDLIFE

H. PUBLIC USE

H. PUBLIC USE (cont.)

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

This Annual Narrative is Dedicated....

IN MEMORY OF.....

Eric Cox, PhD candidate working on the Moose Research Study and **Grant Coyour**, Minnesota Department of Natural Resources Conservation Officer and Pilot who gave their lives on June 11, 1999 in pursuit of moose and knowledge. Eric and Grant were dedicated individuals with a passion and deep commitment to wildlife. They were conducting the last cow/calf aerial flight of this four year study when their plane went down.

A cross with a plaque was erected on June 29, 1999, by area Conservation Officers for Eric and Grant at the site of the crash in the "Big Bog". *Photo: Greg Spaulding, MnDNR*

Eric Cox

Grant Coyour

They loved what they did and ultimately gave everything. They will be greatly missed.

See Appendix A

INTRODUCTION

Agassiz National Wildlife Refuge occupies 61,500 acres in eastern Marshall County in the northwest corner of Minnesota. The refuge is within the prairie, aspen parkland and northern forest ecotone, an area of interspersed habitat types that attract a great diversity of resident and migratory wildlife. The primary objective of the refuge is waterfowl production and maintenance.

Before settlers came, the area abounded with wildlife. The lakes and marshes teemed with waterfowl and shorebirds. In 1909, the first drainage district was organized in the area to convert the marshes to arable land. The drainage system earned the distinction of being the largest single public drainage project in the United States.

By 1933, approximately one million dollars had been expended on the drainage system without success. High tax assessments on drainage costs seriously affected landowners, and ultimately the financial conditions of Marshall County. To save the County from bankruptcy, the State legislature passed an act absorbing the drainage taxes and authorized the lands to be purchased for the development of Mud Lake Migratory Waterfowl Refuge. Mud Lake (later renamed Agassiz) was established by Executive Order 7583 on 23 March 1937 and was purchased at a cost of $6.14 an acre.

The flat terrain varies only one to two feet per mile. The watershed ultimately empties into the Red River of the North. The climate is characterized by wide variation in temperatures and late spring or early fall frosts. The average annual precipitation is about 21 inches and includes an average snowfall of 37 inches. Temperature extremes range from -47°F to 108°F. The average frost free period is 115 days.

Refuge habitat types occur as follows: wetland 40,094, grassland 4,034, shrubland 10,000, woodland 7,000, cropland 301, and administration 71. The dominant wetland vegetation is cattail. Shrubland and woodlands are primarily willow and aspen. Agassiz also contains a 4,000 acre wilderness area that is composed of black spruce-tamarack forest and two bog lakes.

A diversity of wildlife species inhabits the refuge including 280 species of birds, 49 species of mammals, 12 species of amphibians and 9 species of reptiles. Agassiz has two resident packs of eastern gray wolves and two breeding pairs of bald eagles.

With the addition of the 1985 Food Security Farm Bill and Consolidated Farm Service Agency (CFSA) responsibilities, Agassiz National Wildlife Refuge became a Refuge Management District in 1989. Included in this District are the northwestern Minnesota counties of Red Lake, Pennington, Marshall, Kittson, Roseau, Lake of the Woods and part of Beltrami County. The duties and responsibilities of the staff now include working with Natural Resources Conservation Service (NRCS) and CFSA on wetland determinations, Swampbuster responsibility and Conservation Reserve Program (CRP). The staff is also involved in private lands wetland restoration. These responsibilities broaden the influence of the refuge in protecting wetlands outside refuge boundaries.

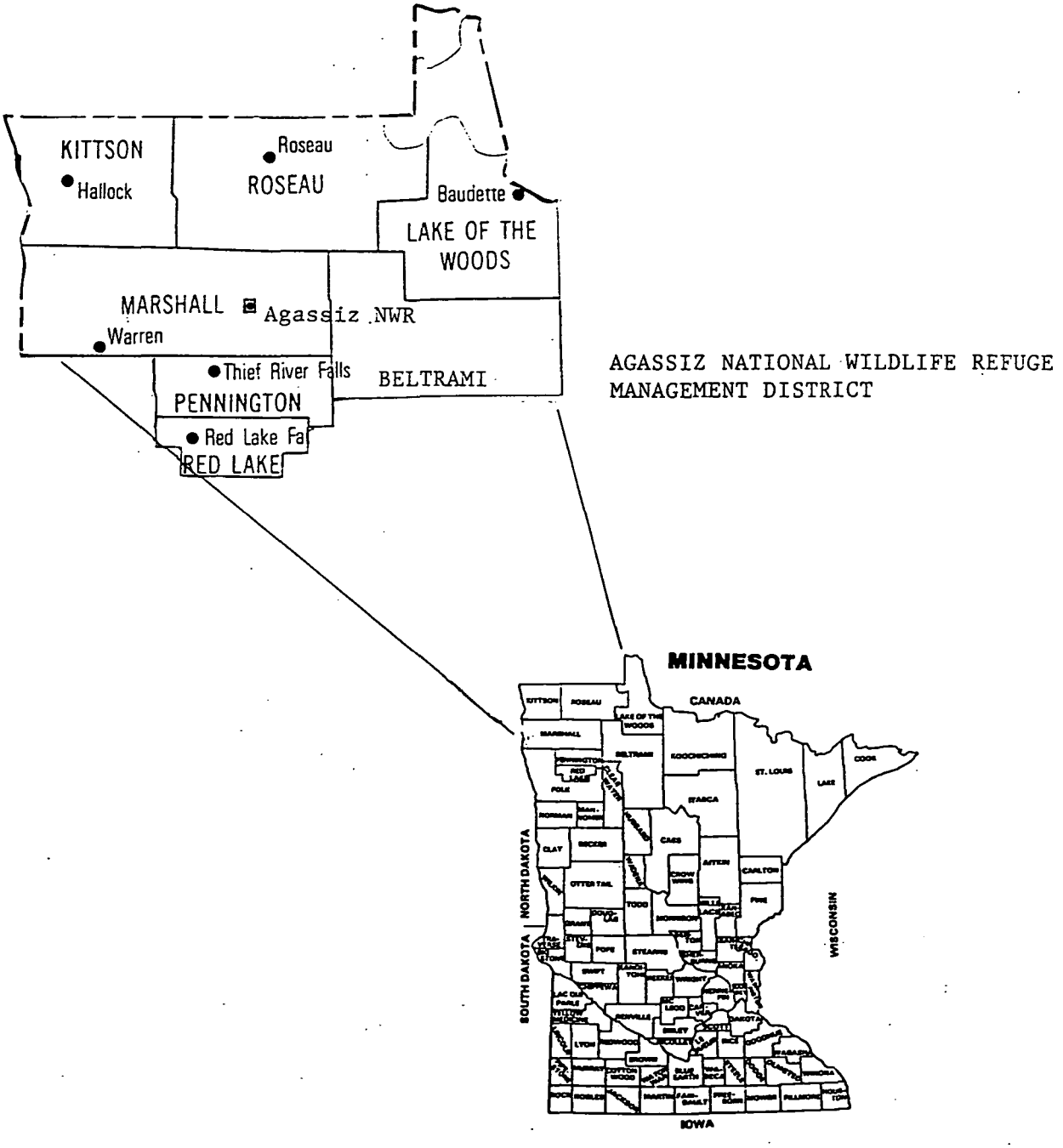

KITTSON
Hallock
Roseau
ROSEAU
Baudette
LAKE OF THE WOODS
MARSHALL
Agassiz NWR
Warren
Thief River Falls
BELTRAMI
PENNINGTON
Red Lake Fa
RED LAKE
AGASSIZ NATIONAL WILDLIFE REFUGE
MANAGEMENT DISTRICT
MINNESOTA
CANADA
NORTH DAKOTA
SOUTH DAKOTA
WISCONSIN
IOWA

Figure 1.

A. HIGHLIGHTS

Tragedy strikes the moose project with the death of Eric Cox, PhD Student, and MnDNR Pilot, Grant Coyer, June 11. ***Appendix A.***

Fire Management Plan rewritten. ***Section D.2.***

Seven studies were either on-going or completed involving moose, wolves, American bitterns, contaminants, grebes, hardstem bullrush establishment, and optimal water levels for duck brood rearing. ***Section D.5.***

Volunteer hours reached all time high of 20,330 hours by 26 volunteers. ***Section D.4.***

The northwest counties of Minnesota had the largest number of applications for the 16th and 18th CRP sign-up than any other in the Nation. Staff assisted NRCS with this effort. ***Section E.7.***

A GIS vegetative layer from 1997 IR photos was finally completed by the Environmental Management Technical Center, USGS, Onalaska, WI. ***Section F.1.***

Two biological agents were released for leafy spurge control. ***Section F.10.***

A new website, Minnesota Moose Mystery, was very popular, receiving over one million hits. An incredible number of outreach programs were given on-site and off by refuge staff, students and volunteers. ***Section H.7.***

Major rehabilitation occurred to refuge dikes, roads, public use facilities and water control structures totaling over $464,000. Work was completed by force account and contract. ***Section I.2.***

ROS Bennett spent and enormous amount of time on the Thief River Flood Reduction Work Group. A concept plan was completed after 16 meetings. ***Section J.1.***

Star attraction of the Refuge Jim Mattsson

B. CLIMATIC CONDITIONS

Agassiz National Wildlife Refuge has been recording weather for the National Weather Service for the past 42 years. Table 1, page 3, compares data for FY99 with the National Climatic Data Center 30-year period (1961-1990).

Weather conditions for FY99 were cooler and wetter than usual. Nine months had above normal temperatures and three had below normal temperatures. The greatest temperature deviations occurred in November and December 1998 and February 1999. The maximum temperature was 92°F on July 29 and the minimum temperature was -27°F on January 9.

This was the 8th consecutive year with above normal precipitation. Fire danger was low throughout the year as indicated below by the Drought Severity, or Palmer[1] Index, for northwestern Minnesota:

1998	October (4.18)	1999	January (4.70)	April (3.83)	July (4.70)
	November (4.64)		February (4.35)	May (4.56)	August (5.00)
	December (4.35)		March (4.49)	June (4.74)	September(5.99)

[1]The Drought Severity, or Palmer Index, is an index of meteorological drought (or moisture excess). The index usually ranges from about -6 to +6, with negative values denoting dry spells and positive values, wet spells of weather.

The first slight killing frost occurred October 1 with a temperature of 30°F and the first hard killing frost on October 20 with a temperature of 27°F. Permanent ice began forming on November 2. First snow fell on and started accumulating on November 10. An 8" snow pack accumulated by the end of 1998. Total snowfall for the winter of 1998-99 was 50.6; average annual snowfall is 39 inches. The maximum snow pack of 13" was measured from March 9-10. The greatest 'snow pack' water equivalency was 3.38" for 12" of snow on March 12. On April 16, the last snowflakes fell and melted. Several pools were ice free by April 13; all were ice free April 23.

C. LAND ACQUISITION

4. Rural Economic and Community Development Conservation Easements

Farm Service Agency Conservation Easements: In April, a pre-inventory easement review was completed on the Kazmierczak Farm, Marshall County. The initial request from FSA was for Endangered and Threatened species information only, but after they were given wetlands information the consideration of foreclosure was dropped.

One request for a conservation easement in Roseau County was reviewed. A 2.5 acre area on the Vatnsdal Farm, Spruce Township was field checked in October. The easement was denied as potential impacts from adjacent landowners could threaten the areas purpose.

See Table 2, page 4, for FSA Inventory Property Status, 1999.

Table 1. Temperatures and precipitation for FY99 and the 30-year average (1961-1990) and snowfall for FY99 and the 33-year average (1967-1999).

	Temperature								Precipitation			
	1999					30 Year Average[a]			Precipitation[a]		Snowfall[b]	
	Monthly		Monthly Average									
Month	Max.	Min.	Max.	Min.	Daily	Max.	Min.	Daily	1999	30-Yr @	1999	33-Yr @
October-98	73	27	57	39	48	56	33	44	5.36	1.53	0.0	1.0
November-98	50	5	34	23	28	35	17	26	1.23	0.84	17.0	7.6
December-98	43	-22	22	6	14	19	0	10	0.26	0.59	5.4	7.9
January	39	-27	14	-4	5	14	-8	3	0.91	0.58	14.0	9.8
February	45	-16	31	11	21	21	-3	9	1.21	0.39	2.1	5.6
March	55	0	40	19	29	35	12	23	0.80	0.80	8.2	5.7
April	76	25	56	35	45	53	29	41	2.05	1.54	3.9	2.2
May	85	34	67	48	58	68	42	55	5.83	2.58	0.0.	0.1
June	86	42	76	53	64	76	52	64	3.86	3.75	0.0	0.0
July	92	51	83	59	71	81	56	68	3.13	3.27	0.0	0.0
August	86	45	78	57	67	79	52	66	3.85	303	0.0	0.0
September	84	33	65	46	56	68	43	56	5.52	.65	0.0	0.0
Totals									33.01	21.55	50.6	39.9

[a]National Climatic Data Center 30-year average from 1961-1990. Agassiz has a 33-year average (1967-1999) for temperatures and precipitation but the Data Center's figures should be more accurate. Differences are minimal between the National Climatic Data Center's 30-year average and Agassiz's 33-year average.
[b]Snowfall not averaged by the National Climatic Data Center. Agassiz's 33-year average snowfall used.

County	ID # D-Dropped	Former Landowner	1st Year Reviewed	Acres Reviewed	Review Team Met	Date Recorded	Recorded Acres
Beltrami	011-C	Porch	1988	160.00	10/13/1993	11/15/94	27.60
Kittson	010-C	Klondike	1988	8,414.00	02/09/1993	12/03/93	3,714.63
	D	Webster	1988	200.00			
	011-C	Grandstrand	1997	240.00	07/07/1998	09/28/99	30.12
Lake of the Woods	010-C	S.Rinehart	1988	160	*	04/06/93	160.00
	011-C	C.Rinehart	1988	280.00	*	03/03/93	280.00
	012-C	Undahl	1988	280.00	*	01/10/90	115.18
	013-C	Lambrecht	1988	843.30	04/13/1993	12/30/96	** 459.40
	D	Forshen	1988	200.00			
	D	Jerczek	1988	160.00			
	014-C	Ranger	1992	440.00	04/13/1993	04/11/95	265.29
	015-C	Brown	1993	400.00	04/13/1993	06/28/95	111.60
Marshall	010-C	Barton	1988	440.00	*	01/25/90	8.09
	D	Dahlen	1988	200.00			
	D	Carey	1988	320.00			
	011-C	Westerlund	1988	200.00	03/11/1993	04/08/94	113.55
	012-C	Larsen	1988	200.00	03/11/1993	02/10/97	43.62
	013-C	King	1988	680.00	03/11/1993	07/25/97	60.60
	014-C (D)	Hanson	1988	420.00	03/11/1993	***	.00
	D	Leader	1989	200.00			
	D	R.Solberg	1989	160.00			
	015-C	T.Solberg	1989	160.00	*	10/16/90	32.80
	D	Johnson	1989	200.00			
	D	Loeslie	1989	160.00			
	016-C	Hendrickson	1989	532.00	05/06/1993	12/09/98	78.29
	017-C	Kaml	1989	240.00	07/14/1994	09/10/96	3.92
	D	Hoff	1990	16.00			
	018-C	Helm	1990	50.00	05/18/1993	08/26/94	18.69
	019-C	Wilkens	1990	320.00	05/06/1993	12/22/94	19.56
	020-C	Cullen	1992	240.00	06/09/1993	03/23/95	4.15
	D	Srnsky	1992	200.00			
	021-C	Bryl	1993	160.00	05/06/1993	01/02/96	** 160.00
	022-C	Grandstrand	1997	80.00	07/07/1999	09/28/99	2.42
Pennington	010-C	Peterson	1988	76.00	*	01/09/91	76.00
	011-C	Olson	1989	440.00	*	01/04/94	217.35
	012-C	Howard	1989	240.00	02/21/1995	06/23/97	6.46
	D	Anderson	1988	105.00			
	D	Troska	1988	943.00			
	D	Bartha	1989	160.00			
	013-C (D)	K.Nelson	1990	272.00	05/06/1993	***	.00
	D	Myers	1990	320.00			
	D	Iverson	1992	155.00			
	D	R&FARMS	1992	158.00			
	D	Galli more	1992	640.00			
	014-C	Paulson	1992	160.00	06/08/1993	04/08/95	59.04
	015-C	Swanson	1992	118.00	04/12/1994	07/03/97	18.50
	D	D&B Farms	1993	10.00			
	016-C (D)	Sjulestad	1993	160.00	05/25/1993	***	.00
	D	Hoffman	1994	480.00			
	017-C	Mehrkens	1998	217.00	****		
Red Lake	D	Bedker	1988	80.00			
	010-C	Seegar	1989	203.00	*	07/26/91	46.10
	011-C	Laursen	1989	242.00	03/23/1993	07/01/96	39.71
	D	Knaack	1990	160.00			
	D	Larson	1990	160.00			
	012-C	Almen	1992	360.00	10/01/1993	09/29/94	90.57
Red Lake	013-C	Fladeland	1993	319.00	12/29/1993	12/29/97	38.49
Roseau	010-C	Berry	1989	300.00	*	12/03/90	85.41
	011-C	Schadegg	1989	160.00	*	12/13/90	4.68

County	ID # D-Dropped	Former Landowner	1st Year Reviewed	Acres Reviewed	Review Team Met	Date Recorded	Recorded Acres
	D	Dieter	1988	150.00			
	D	Sutherland	1988	77.00			
	012-C	Hepner	1990	680.00	03/10/1994	06/20/97	44.43
	D	Nelson	1991	160.00			
	013-C	Lund	1992	960.00	06/28/1994	10/03/97	55.90
	014-C	Wojciechowski	1997	300.00	01/05/1998	07/02/99	63.50
	015-C	Olson	1999	240.00	01/14/2000	****	
Total	66 Properties	D=29 CE=37		26160.3			6555.65

* Not Subjected to 1990 FACTA Rule change.
**Transferred to Minnesota DNR with easement provisions.
*** Originally slated as an easement but 1995 Farm Bill Rules eliminated it from easement consideration.
**** Currently under final review.

D. PLANNING

2. Management Plan

The **Fire Management Plan** was rewritten. FMO Zellmer organized this effort with staff contributing to a product that will hopefully take us well past the millennium. Six months after submitting the plan to the RO approval is still pending, along with other FMP's, based on an archaeological technicality.

5. Research and Investigations

MOOSE REPRODUCTION AND SURVIVAL IN NORTHWESTERN MINNESOTA

Cooperators: Agassiz NWR; Red Lake WMA, Minnesota Department of Natural Resources; Dr. Dennis Murray, University of Idaho; Dr. Todd Fuller, University of Massachusetts.
Principal Investigator: Eric Cox, Ph.D. candidate, University of Idaho
Field Collaborators: Terri Barnett, Mn DNR contract biological technician; volunteers: David Grandmaison, Darrin Franco, Marci Johnson, Erin Harrington, Pat Sharkey, Eric Bergman, Hannah ter Hofstede.

Tragedy struck the moose project when University of Idaho PhD Graduate Student, Eric Cox, and Minnesota Department of Natural Resources Pilot, Grant Coyour, were killed in a plane wreck on June 11, 1999. They were over the Red Lake Bog area north of the Red Lakes checking radio-marked moose cows for calves. This was to be the last cow/calf flight of the study.

Eric Cox

The year began with 85 radio collared moose and ended with 58; 18 moose died, 4 collars dropped off yearlings as designed, and 5 batteries died. The 1999 pregnancy rates (Table 3) increased dramatically and brought hope that

the tide was turning. Subsequent cow/calf flights resulted in 31 calves, of which there were 9 sets of twins, among 44 collared cows. About 100 livers from dead collared and non-collared moose were examined for liver fluke infestation; 50 trace element plugs from livers were sent to the lab for analysis. Vegetation samples were collected in all three study sites to determine nutrition content.

Summary of information 1995 to 1999:

152 Total moose radio-marked: 101 adult cows, 51 neonates
78 of the radio-marked animals have died
22 radios have failed
47 adult cows have died:
37 disease, parasite, and or/starvation
1 accidental death, train collision
4 illegally shot
5 unknowns

15 neonates died <6 months of age:
5 disease
4 abandoned
3 capture-related deaths
3 predation

16 neonates died >6 months of age:
14 disease, parasites, and/or starvation
2 predation

Table 3: Northwest Minnesota Pregnancy Rates, 1996-1999.

	1996	1997	1998	1999
Beltrami WMA	38%	50%	33%	80%
Agassiz NWR	50%	42%	28%	64%
Viking Ag. Land	no data	75%	43%	57%

Prior to his death, PhD student Eric Cox, gave a 20 minute presentation to 140 participants at the 35th North American Moose Conference, Grand Portage, MN. Eric's presentation, *Moose Population Dynamics in Northwestern Minnesota: An Interim Report*, caused some of the greatest discussion and interest, especially among the attendees from Sweden, who were experiencing similar problems.

The project field work ended on June 30, 1999 as scheduled. Monitoring of the the remaining radio-marked animals will be continued for one more year and teeth will be removed from all mortalities located. A total of $25,000 has been dedicated by the partners ($20,000) and FWS ($5,000) to have the data summarized and analyzed. A contract for this work will be issued by Mn DNR. Mn DNR contract biological technician, Terri Barnett, worked on the project the entire year and really kept the project on track after the accident.

Eric Cox necropsied nearly 80 animals over the last three years in -20 ° F temperatures or in the midst of hordes of mosquitos. Moose always seemed to die on Friday nights or Holidays.

Terri Barnett began as a volunteer on the moose project in March 1999. She was hired by the MnDNR as a Field Technician for the project in May 1999. Her importance to the project after Eric's death can not be overstated . Photo taken 10-10-99.

Star Tribune Darlene Pfister *2001 Permission*

A STUDY OF THE LIFE HISTORY OF THE AMERICAN BITTERN

Principal Investigators: Dr. John Toepfer, Society Tympanuchus Cupido Pinnatus; Gary Huschle, Refuge Biologist.

PHASE THREE: ECOLOGY AND MANAGEMENT OF AMERICAN BITTERNS IN MARSH AND GRASSLAND HABITATS OF MINNESOTA

Cooperators: Agassiz and Big Stone NWRs; Dr. Leigh Fredrickson, University of Missouri-Columbia;Dr. John Toepfer, Society Tympanuchus Cupido Pinnatus; Dr. Jay Huseby, Red Lake Band Chippewa; *Eyes on Wildlife*, Middle School Curriculum, Perham, MN.
Principal Investigator: Socheata Lor, Ph.D. candidate, University of Missouri-Columbia.
Field Collaborators: Gary Huschle, Refuge Biologist; Dr. John Toepfer, Society Tympanuchus Cupido Pinnatus; Leigh Fredrickson, University of Missouri, Gaylord Research Station; Jay Huseby and Casey Armour, Red Lake Band of Chippewa; Tammy Laney, SCEP-Masters Degree Student, University of Missouri, Columbia, MO (assigned to Big Stone NWR for small wetlands portion of study).

Goals: 1. Assess the abundance of inconspicuous marsh birds and to establish a long-term population monitoring program for marsh birds on Agassiz NWR and Red Lake Indian Reservation.
2. Assess the response of the breeding activities of American bitterns to water level and grassland habitat management activities that are intended for waterfowl.
3. Determine migration routes and wintering areas.

Five males and three females that were radio-marked in 1998 were relocated as follows: Agassiz NWR (4 ♂), Red Lake Farm (3♀), Twin Valley (1♂). One of the Agassiz males was recaptured and radio replaced. New captures in 1999 were as follows: Agassiz NWR (10 ♂,3 ♀), Red Lake Farm (1♀), Twin Valley (2♂).

Four males were tagged with satellite transmitters in 1998. Three of these were marked at Agassiz NWR and one at Meade WMA in central Wisconsin. Two of these wintered in Louisiana and two in southern Florida. The two in Florida quit transmitting in December 1998. One of them was in the east edge of the Big Cypress National Preserve. The other one was northeast of Lake Okeechobee. One of the birds in Louisiana stayed mainly along the Intracoastal Waterway, and the other was in the Delta of the Mississippi River.

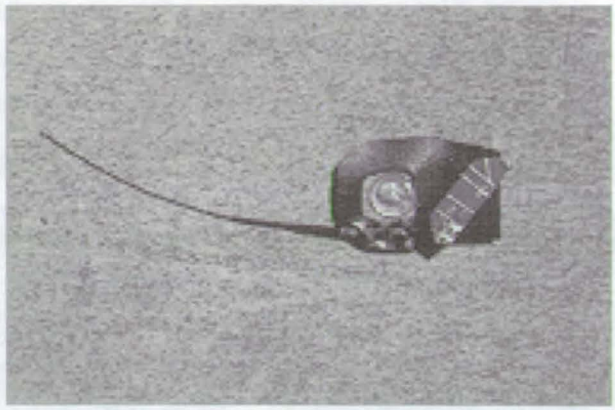
Dr. Toepfer and Gary Huschle made a 3 week reconnaissance trip in January to visit sites in Florida and Louisiana where satellite collared birds had migrated and wintered. Habitats in the area were recorded and contacts made with agency people to lay ground work for future research on winter habitat use by American bittern. One conventional radio-marked bittern was located and flushed along the Intracoastal Waterway in Louisiana. Both of the satellite transmitter birds and the conventional radio-marked bird returned to Minnesota. One satellite transmitter bird was last heard from near Grand Rapids, MN. The other satellite transmitter bird and the conventional radio-marked bird returned to Agassiz NWR and are included in the four returned birds mentioned previously.

Four males at Agassiz NWR were marked with satellite transmitters in 1999. One transmitter did not function after the bird was released. The other three were still at the refuge during September. Satellite transmitters and data time cost about $3500/bird.

Eight nests were located in Pool 8; apparent nest success was 75%. Eleven nests were found at Red Lake Farm; apparent nest success was 50%. No juveniles were marked this year.

I

rn Trap: tape recorder with male calling, mirror and cage.



ale

Satellite collars weigh 18-20 gms. At this time only adult males can support the weight.

Bitte

WOLF-LIVESTOCK RELATIONSHIPS IN NORTHWESTERN MINNESOTA

Cooperators: Agassiz NWR; Dr. Eric Gese, Utah State University, Logan; *Eyes on Wildlife*, Middle School Curriculum, Perham, MN..
Principal Investigator: Andreas Chavez, Masters Degree, Utah State University.
Field Collaborators: Dr. Eric Gese, Utah State University; Volunteers: Elizabeth Joyce, Leslie Schutte, Eric Bergman, Jeff Montifering, Saleen Richter, Scott Graham, Marci Clark, Ramana Callan, Hilary Tall, Jeff Sikich.

The project continued to conduct 24 hour tracking stints on each marked wolf on a rotational basis. One-hundred 24-hour tracking stints were performed between October-November 1998 and April-September 1999, peak livestock exposure time to wolves. Analysis of the movement data is pending and awaiting collaboration with GIS analysis.

Four wolves in the Golden Valley Pack were captured by helicopter net-gunning in February. These consisted of 3 subadult females and the alpha male, making a total of 5 wolves in the Golden Valley Pack (all radio-marked). During the summer one male puppy was trapped near Espelie WMA, but it was too small for a radio collar. This pup belonged to a different pack although it was within the area occupied by Golden Valley Pack in 1997. During trapping efforts this year, 6 non-targets were captured and released (1 red fox, 3 raccoon, 2 striped skunk).

During 1998 all members of the Elm Lake Pack that were observed or handled had signs of mange. The two radio-marked animals died the first week of December 1998. By January no tracks were observed in their territory and none were found by the helicopter. In March a subadult female from Golden Valley Pack moved into the territory. It was not until August that a second animal was observed with her, presumably a male to form a new pack.

The Golden Valley Pack produced 5 pups in April 1999 and at one point had a pack size of at least 10 animals. One juvenile radio-collared wolf was trapped and destroyed by a USDA-APHIS wolf trapper in response to a wolf depredation on livestock on the north side of the refuge. Currently the Golden Valley pack size is 9 wolves. By the end of FY99 the total number of wolves on Agassiz NWR was about 11 from two packs.

Over 600 wolf feces were examined for prey content. Preliminary results indicate deer are the primary prey item with muskrat, moose, livestock and hare as other significant items. Complete data analysis will be compiled within the next year. A questionnaire survey was designed. This will be sent out to local landowners to determine their perceptions of risk that wolves are to livestock.

Field work on this study is scheduled to conclude in mid-November 1999.

The Glamorous side to wolf research....
Tractor Operator VanEps and Andreas Chavez process and collar a captured wolf.

The not so Glamorous side...
Laundering wolf turds for future inspection!!!!
Scat are washed in nylon stocking bags.

GREBE ECOLOGY AT AGASSIZ NWR

Cooperators: Agassiz NWR; Dr. Bruce Eichhorst, University of North Dakota.
Principal Investigator: Dr. Bruce Eichhorst
Field Collaborators: Volunteers: Stacie Laducer

Dr. Eichhorst continued his work on pied-billed, red-necked and eared grebes. Three red-necked grebes were radio-marked with implanted transmitters. Artificial eggs that record temperature were placed in 5 eared, 8 pied-billed and 15 red-necked nests. Nest attentiveness is determined by the change in temperature. Red-necked grebes mysteriously leave their nest at midnight. Seven pied-billed grebe eggs, 13 eared grebe eggs and 16 red-necked grebe eggs were taken for contaminant analysis. Feathers from 12 juvenile pied-billed grebes, 24 adults and 11 juvenile eared grebes and 6 adults and 13 juvenile red-necked grebes were collected for contaminant analysis. Contaminant analysis is being done in conjunction with Dr. Joanna Burger, Rutgers University. At the end of the summer Dr. Eichhorst took a position at University of Nebraska-Kearny.

EXPOSURE AND EFFECTS OF METAL ACCUMULATION BY WILDLIFE ON AGASSIZ NATIONAL WILDLIFE REFUGE

Cooperators: Agassiz NWR;, Twin Cities Ecological Services Field Office, Upper Midwest Environmental Sciences Center, USGS/BRD.
Principal Investigator: Dr. Tom Custer and Dr. Christine Custer, UMESC, USGS/BRD
Field Collaborators: Dr. Bruce Eichhorse, University of North Dakota;Dave Warburton, Twin Cities Ecological Services Field Office;Gary Huschle, Refuge Biologist.

This 3 year study was initiated in 1998 to utilize colonial water birds and tree swallows to determine exposure and effects of metals to birds at Agassiz NWR. Sand Lake NWR and Red Lake Farm, Red Lake Indian Reservation were used as control sites. The study was proposed to look at pre, during and post drawdown conditions on Agassiz Pool. Data from the 1998 collection was summarized. Elevated levels of mercury in nestling livers appear to be a regional Midwest problem. Chromium levels in eggs were found to be extremely high in the 1998 collections. This may be because the eggs were collected just before hatching instead of fresh as in most studies. Chromium that is tied to the calcium in the egg shell may be absorbed with the calcium as it is utilized by the growing embryo. All other metals were not detected or not elevated. The extremely high levels of cadmium in eared grebe eggs found by Dr. J. Burger in 1994 were not detected.

Agassiz Pool was scheduled to be in drawdown in 1999 to allow collections from tree swallows during drawdown and from all species in 2000, post drawdown. The flooding and high flows this year prevented the drawdown. Collections from all species were made again in 1999. If drawdown occurs in 2000 only tree swallow collections will be made followed by all species collections in 2001.

THE FEASIBILITY OF USING RHIZOMES AND SEEDS TO ESTABLISH HARDSTEM BULRUSH IN A DEEP WATER MARSH

Cooperators: Agassiz NWR; Bemidji State University
Principal Investigator: Kathleen Huschle, Masters Degree, Bemidji State University
Field Collaborators: Gary Huschle, Refuge Biologist

This study was initiated in 1997 to test methods of establishing hardstem bulrush in Headquarters Pool without drawdown. Seeds and rhizomes were collected in Agassiz Pool, stored over winter under different treatments, and planted in 7 plots located in 3 macro plots in Headquarters Pool. No growth was observed at any of the sites in 1998 or 1999. Two new naturally occurring stands of hardstem bulrush in the open water area of Headquarters Pool were found during the course of this study. Propagation by rhizomes was very labor intensive, while collecting seed with the air boat was efficient and could be used as a management tool. The presence of the new stands of hardstem bulrush in Headquarters Pool which has not been in drawdown for at least 30 years, suggests that establishing hardstem bulrush without drawdown is possible. Further study is needed to evaluate other parameters, such as oxygenation and sedimentation, and their effect on the germination of hardstem bulrush in a deep water wetland.

OPTIMAL WATER LEVELS FOR DUCK BROOD REARING ON THE POOLS AT AGASSIZ

NATIONAL WILDLIFE REFUGE

Cooperators: Agassiz NWR; University of Minnesota, Morris.
Principal Investigator: Sarah Huschle, Undergraduate Senior Paper
Field Collaborators: Gary Huschle, Refuge Biologist

Duck brood occurrence as documented in the Refuge's annual brood surveys from 1986 to 1998 for nine pools was graphed with the corresponding water levels for each pool at the time of the survey. Statistical evaluation plotted the best fitting curve to the data and determined the pool level that resulted in the highest occurrence of dabbling broods, diver broods and total broods. The results are listed in the table below. Figures missing in the table are where the statistical analysis did not determine an optimum. The analysis did show a preference for deeper water by the diver broods. There are many uncontrolled variables in the analysis, but it does give managers a starting point on these nine pools to provide optimum duck brood habitat.

Table 4: Optimal Water Levels for Diving, Dabbling and Total Number of Duck Broods on Nine Pools at Agassiz National Wildlife Refuge

POOL	DIVING BROODS	DABBLER BROODS	TOTAL BROODS
Agassiz	1140.7	1139.8	1140.2
Farmes	1140.4	1139.7	1140.2
Headquarters	1141		
Madsen	1143.1	1139.1	1141.1
Northwest			
Parker	1140.1		1140.1
Pool 8		1138.5	
Pool 21	1145.4		1146.1
Tamarack	1142.9		1142.7

Water levels are mean sea level as recorded from gauges at the pool.

1. Personnel

Margaret M. Anderson	Refuge Manager	GS13	PFT
David F. Bennett	Refuge Operations Specialist (Supervisory)	GS 11	PFT
Gary L. Huschle	Refuge Biologist	GS 11	PFT
David L. Myhrer	Engineering Equipment Operator	WG10	PFT
Gary D. Tischer	Refuge Operations Specialist	GS 09	PFT
Dan VanEps	Tractor Operator	WG07	PFT
Beulah J. Wikstrom.	Administrative Technician.	GS 07	PFT
Scot C. Wockenfuss	Maintenance Mechanic	WG 10	PFT
Thomas R. Zellmer	Fire Management Officer	GS 12	PFT
Socheata K. Lor	Wildlife Biologist	GS 11	PFT
Larry R. Anderson	Biological Science Technician (Wildlife)	GS 06	PFT
Andreas S. Chavez	Student Trainee (Biology)	GS 05	SCEP
Tammy L. Laney	Student Trainee (Biology)	GS 05	SCEP
Tracie A. Koehmstedt	Maintenance Worker	WG 05	TEMP

Actions: Three employees were added to the staff. Socheata (Soch) Lor transferred May 2 from Iroquois NWR to begin her PHD work, University of Missouri, on Phase III of the American Bittern Study. SCEP-MS employee Tammy Laney, University of Missouri, arrived May 5 and started her first year on the American Bittern Study; she will be stationed at Big Stone NWR. Tracie Koehmstedt was hired for a second year as a temporary to assist with maintenance projects associated with the research studies

SCEP-MS employee Andreas Chavez, Utah State University, remained on the staff to work on the third year of the wolf research study.

Tom Zellmer, Fire Management Officer, was promoted from GS 11 to GS 12 in July. Larry Anderson, was promoted from Forestry Tech., GS-462-5, to Bio. Science Tech. (Wildlife), GS-404-6, in August.

Table 5: Five year staffing pattern, 1995-1999

FY	PFT	CSFT	SCEP	TEMPORARY	TOTAL FTE's
1999	9	2	2	1	14
1998	9	3	2	0	14
1997	9	2	1	0	12
1996	8	1	1	0	10
1995	8	1	1	0	10

3. Other Manpower Programs

3. Other Manpower Programs

Agassiz provided a work site for five enrollees hired through Inter-County Community Council, Inc. (ICCC), Oklee, Minnesota. A Worksite/Participant contract, prepared by ICCC clarifying duties and responsibilities of each party, was signed by all parties. All safety equipment was provided by the refuge except steel toed safety shoes purchased by the enrollees. Four participated through the Federal Summer Youth Employee Program (SYEP) and one through the United States AmeriCorps Program. All were paid the minimum wage of $5.15/hr. Following is a summary:

Enrollee	Program	Dates	#hrs
Shawn Lee	SYEP	June 15-August 26	207
Carl Trulson	SYEP	June 15-August 26	152
Robert Trulson	SYEP	June 15-August 24	182
Dustin Helm	SYEP	July 1-August 10	144
Teddy Perfecto	AmeriCorps	July 7-August 4	80
		Total hours	**765**

ROS Tischer supervised the youth program. Most work was labor intensive and included maintaining or repairing public use facilities, lawns, Maakstad Hiking Trail, water control structures, signs, vehicles, buildings and cutting down small trees and shrubs and grubbing out the tree and shrub roots on the new hiking trail at Headquarters.

Personal safety, good work habits and attitudes were stressed each day. One accident occurred during the summer. While enrollee Perfecto was chopping a tree root his hatchet bounced back onto his ankle and made a small cut on the skin. Because the cut was not healing and the enrollee could not wear safety boots, he was detailed back to his old work site, a day care center.

MCC: A three person crew from the Minnesota Conservation Corp girdled aspen trees from May 17-20, see section F.3 Forest for more details.

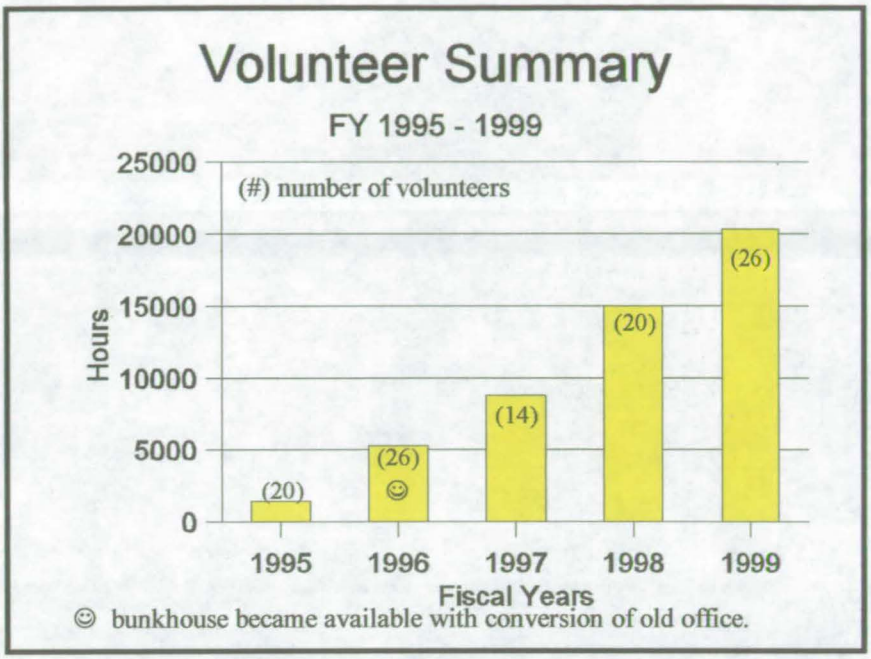
4. Volunteer Program

It was another record breaking year with 26 volunteers contributing 20,330 hours. The volunteer program continued to grow in FY99 for several reasons:

- ✦ volunteers on the moose and wolf project were onsite year-round,
- ✦ this was the last summer field season for the moose and wolf projects and, an additional volunteer was added for each, and
- ✦ Northland Community Technical College Aviation Mechanics Class, overhauled two airboat engines.

Volunteers on the wolf and moose projects were on station year round. Because of the training time involved in teaching radio telemetry, research volunteers are required to stay a minimum of three months. This year research volunteers were required to contribute one day every two weeks to refuge operations. This requirement was initiated to introduce them to all refuge operations and programs. The day spent on refuge operations hopefully provided insight and appreciation for all aspects of refuge operations. Also, refuge staff got to see some of these folks face to face, especially the ones who were on night tracking duty.

Volunteer Program Summary for the last 5 years.



Volunteer Training: Volunteers driving government vehicles are required to take the 8hr Defensive Driving correspondence course and pass the test. All volunteers go through an intensive orientation (checklist kept on record). This orientation brings them to all permanent staff to cover their area of expertise. All volunteers are provided a Lymes Screening Test. Several volunteers received certificates in ATV and snowmobile operations and four attended the S-130/190 Fire Fighter course taught by refuge staff at the UMN-Crookston, MN campus.

Volunteer Recognition: In November, all volunteers received a thank you letter describing the projects they were involved on, total number of hours they contributed, status of project they worked on, and a National Wildlife Refuge Calendar. This year the wolf crew received a framed photo of a collared wolf, and the moose crew received a hand crafted leather moose.

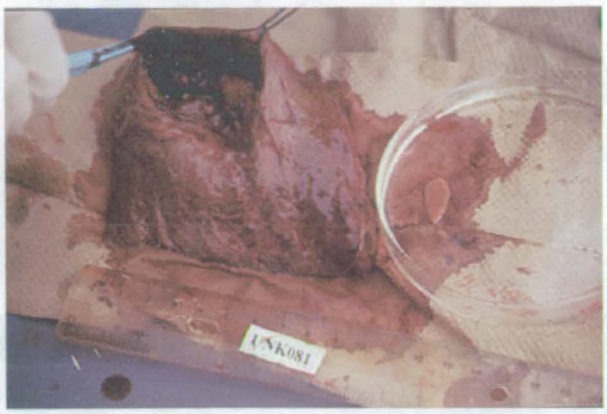
Volunteer Funding ($9,400): This covers year round expenses for running the bunkhouse, an occasional fuel tank fill-up, some maintenance, and daily per diem. The per diem was increased from $7.00 to $10.00/day, NTE $50.00/week. This rate is still well below most volunteer rates of $15.00/day, but much higher than our 1996 rate of $5.00/day, NTE $25.00/week

Table 6: 1999 VOLUNTEER ROLL CALL PROJECT & SUMMARY

Project	Name	Home State	# Hours
WOLF	**11 VOLUNTEERS**		**9,623**
	Saleen Richter	Minnesota	2705.5
	Elizabeth Joyce	Colorado	1318
	Leslie Schutte	Kentucky	1217
	Stephanie Naftal	New York	1054
	Ramana Callan	New York	899.5
	Scott Graham	Wisconsin	569.5
	Jeff Sikich	Indiana	523
	Hilary Tall	Arizona	513
	Marci Clark	New York	394.5
	Jeff Muntifering	Minnesota	343
	Eric Bergman	Iowa	86
MOOSE	**9 VOLUNTEERS**		**9,100**
	Eric Cox	Michigan	2606.5
	Terri Barnett	Minnesota	2060
	Eric Bergman	Iowa	810
	David Grandmaison	Minnesota	784.5
	Darrin Franco	Minnesota	764
	Marci Johnson	Michigan	694.5
	Erin Harrington	New York	687
	Patrick Sharkey	New Hampshire	595.5
	Hannah ter Hofstede	Canada	98.5
GREBE	**2 VOLUNTEERS**		**669**
	Bruce Eichhorst	North Dakota	348
	Stacie Laducer	North Dakota	321
AIRBOAT ENGINES-2	Northland Community Technical College(4)	Thief River Falls, MN	**416**
MISC.	**BUNKHOUSE & DAY VOLUNTEERS**		**522**
Banding/Census	Sam Kezar (30 hrs)		168
General Maint.			128
Admin./Trainin			80
GIS			54
Bittern Project	John Toepfer		46
Prescribed Fire			26
Water Mgt			20

VOLUNTEERS AT WORK

A.Chavez



E.Cox

Saleen Richter picking through wolf scats. Volunteer dissecting moose livers in search of liver flukes; you needed a tough constitution and no sense of smell! Both of these jobs were tedious.

Marci Johnson and Dave Grandmaison, moose volunteers, in the makeshift 5-stall field lab.

MMA

Hannah ter Hofstede locating radio-collared moose. Volunteers have tracked moose over hundreds of thousands of acres in the bitter cold of winter or the heat of summer garnished with the onslaught of a variety of insects.

GH

5. Funding

Over the last several years funding sources and tracking funding expenditures have become very complicated with 16 different identified funding sources. This included base 1261 and 1262, special 1261 funds (6), private lands 1121, fire 9251 and 9263, migratory non-game 1231, public lands highways 8555, flood dollars, and contributed funds 7201.

Appropriated funds were sufficient to cover all projects. Operation dollars (1261) covered permanent staff salaries, utilities, fuel, travel/training, and miscellaneous needs. The increase in the previous years volunteer hours resulted in increased funds-$9400 (1261). Maintenance Management System (MMS) funds were down from previous years. A new pickup was purchased with dedicated MMS funds. An all-terrain vehicle was funded in amount of $78,800, however, because of specification problems and timing those funds were unspent at the end of the year.

Private lands (1121) received $42,000. The technical dollars were expended, however, because of wet conditions only minimal restoration dollars were used. Fire funds **(9251/9263)** were expended for salaries, travel, repairs to fire equipment, and administrative expenses.

Research projects were funded as follows: **1261:** Research - wolf $6000 flex/RONS $25,000; American bittern $6000 flex; grebe $5000 flex; and contaminant investigative $8,000 (expended for airboat fuel, maintenance and other related expenses). **1231:** Breeding bird point counts/data entry $2500.

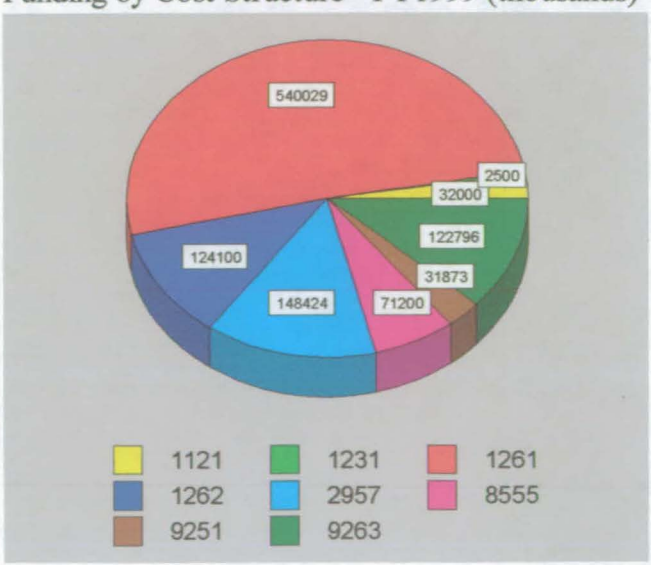
Flood funds ($148,424) were expended for salaries, and numerous repair projects where deterioration and damage resulted from the flood of 1997, and wet years 1998 and 1999. **Road funds** ($72,200) of **8555** (Public Lands Highways) was received to repair roads/structures damaged by the flood.

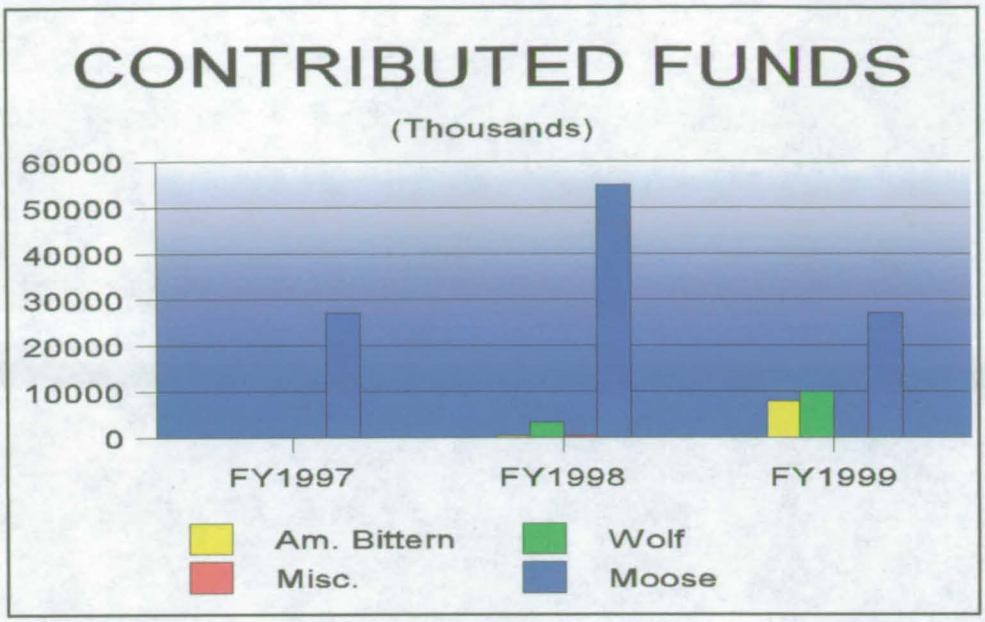
Contributed funds (7201): The following is a summary of 7201 received NOT expended. The beauty of 7201 funds are they can be carried over without fear of losing them. A total of $18,030 was received as follows:

Perham High School	
American Bittern (satellite collars)	$ 8,000
Wolf Research/LCMR Conservation Partners	10,000
Visitor Center Donation Box	30

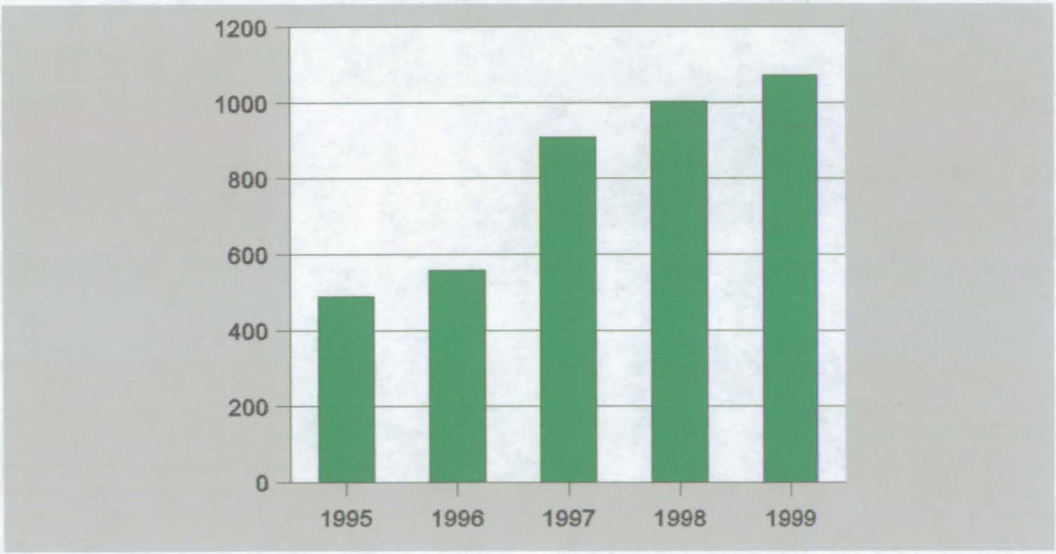
It was a busy year tracking targeted dollars, but all in all the year ended in the black.

Funding by Cost Structure - FY1999 (thousands)





Total of all Allocated Funds for the Last 5 Fiscal Years - 1995-1999 (thousands)



6. Safety

Safety Incidents: No lost time accidents occurred; 9 incidents were reported as follows:

Volunteers (4): truck slipped off road due to new snow, fender damaged wet conditions truck slipped off road due to wet conditions; finger cut on necropsie (no cost-very shallow), axel broke on wolf truck.
Staff (5): private snowmobile hit parked govt. truck ($220); boat trailer damage due to ramp disrepair ($25); power take off shield split($35); airboat propeller broken ($600); rear window on tractor broken ($300).
Vendor (1): while installing a heater in maintenance shop, the unit fell and broke a light ($250).

Airboat Operation safety was a major area of concern. The FWS is in process of developing a safety program, but it was not available this year. In April the Safety Committee developed a set of standards and training that was employed in the upcoming field season.

Table 7: Safety Committee Meetings

Date	Topics Covered
February 11	Responsibilities of committee, Safety Plan, Safety dollars to be used.
March 9	Sidewalk hazard, What is an Incident, Incident Review
April 23	Airboat Training, Life Jackets, Parker Observation Deck, Tower Inspection
May 6	Parker Observation deck steps, helmet use on 4-wheelers, Bunkhouse Use
June 6	Safety Inspection Report, Tower Repairs, North Gate Damage
October 7	Tower Use, Threshold ramps, Reporting Incidents, Smoke Alarm Testing

Table 8: Safety Training Meetings

Date	Topic	Attendance SYEP/Volunteer	Attendance Refuge staff-P &T
February 19	Snowmobile Operation Certification-5hrs	5	8
March 29	Safety Around Water Control Structures		7
May 12	First Aid and CPR refresher Cert. -4hrs		10
May 18	ATV Driving Training Certification-4hrs	6	
June 15	MSDS-Employee Right to Know-2hrs	10	11
June 16	Lyme Disease Training and Testing	9	12
July 28	Stinging and Biting Pests	6	12
July 28	Airboat Safety Video		6
August 27	Wildlife Disease & Parasites	*	9

* information added to volunteer handbook

A major effort was made by ROS Tischer to order and install over50 new safety and exit signs made by the National Sign Shop.

GT

Other Safety Items:

Debriefing Counseling Session - The MnDNR brought in 'trauma counselors' to provide an evening for all refuge staff, volunteers and MnDNR personnel in northwest Minnesota who knew Eric Cox and Grant Coyour. The session was voluntary and held at the refuge on the evening of June 14.

Annual Safety Inspection was completed June 23, all forms including Abatement Plans were submitted to Regional Safety Officer.

In August, Refuge Manager Anderson was notified by the Regional Office that there would be a team sent to conduct a **Safety Investigation** of station operations, September 14-16. A complaint had been filed with the Regional Safety Officer June 25 primarily focusing on unsafe operations relating to the research/volunteer operations and aerial survey procedures. A great deal of time was spent prior to the investigation gathering and copying records (incident reports, certificate of occupancy for bunkhouse, volunteer agreements and orientation checklists, supervisory responsibilities, volunteer training, OAS and aircraft contracts, research agreements, etc.) dating back to 1995. Rick Schultz, Refuge Manager, Minnesota Valley NWR, Lynn Lewis, Ecological Services Supervisor, and Pat McDermott, Regional Safety Officer, conducted the inspection and interviewed 16 staff, students and volunteers. A final report is due within 30 days of the visit.

7. Technical Assistance

Wetland Reserve Program - In December, three proposals in Lake of The Woods County were reviewed as requested by District Conservationist Kelly Voit. They include Peterson - 115 acres, Kramer - 175 acres and Krompton - 80 acres. Due to dollar limitations in the program none were accepted.

Swampbuster - A Good Faith Restoration Agreement was developed for a landowner in Lake of the Woods County in December 1998. The violation involved the clearing of a 3-acre willow area. The landowner agreed to replant the area with willows and white cedar.

CRP - The northwest counties of Minnesota had the largest number of applications for the 16th and 18th sign up than any other area in the United States. During the 16th sign up in early 1998 the local NRCS offices requested assistance from Agassiz NWR in processing and evaluating bids. Over 180 hours of staff time was provided to the Warren NRCS office. This assistance plus the historical recognition of FWS knowledge with restoring wetlands catapulted us into surveying and restoring the wetlands on these lands. Also the benefit of working in an area that is normally anti-government allows for a tremendous amount of public relations work, which benefits all aspects of natural resources. The 16th sign up had 180 contracts with an estimated 720 wetlands to restore and the 18th, 206 contracts with 824 wetlands to restore. However, the summer and fall of 1999 were very wet and surveying had to be suspended after June. Only 88 wetlands involving 33 landowners were surveyed, and no restorations were completed. It wasn't until November that field condition would allow dozer work in ditches. Restorations completed in November and later typically have a high rate of washout as no vegetative growth is present to hold the soil. Dennis Hall and Lori Wolf from the St. Cloud Private Lands office helped survey wetlands for the week of the 17th of May and 21st of June. Dr. Joe Artmann of the Regional Private Lands Office provided surveying assistance during the week of 21st June.

8. Other

Table 9: AGASSIZ NWR TRAINING/MEETINGS 1999

NAME	COURSE	LOCATION	DATE
Margaret Anderson, Tom Zellmer, Gary Tischer, Scot Wockenfuss, Gary Huschle, Dave Myrer	Snowmobile Safety	Agassiz NWR	2/19/99
Larry Anderson	PFPI, Prescribed Fire Planning and Implementation	NCTC	10/99
Dave Bennett	S-205, Fire in the Urban Interface	MIFC	10/99
Larry Anderson	S-217, Helicopter Crew Training	MIFC	4/6/99
Tom Zellmer, Gary Huschle	Boat Safety Training	Macon, MO	8/2-8/6/99
Gary Tischer, Dan VanEps, Dave Bennett	Boat Safety Training	LaCrosse, WI	9/7-9/10/99
Gary Tischer	Aquatic Pesticide Application	Brainard, MN	3/99
Dave Bennett, Tom Zellmer, Gary Huschle	Law Enforcement Refresher	DesMoines, IA	3/12-3/27/99
Gary Tischer, Dave Bennett	Simulated Action Firearm Education Training for Youth	Fort Snelling, MN	4/7-4/8/99
Margaret Anderson, Socheata Lor, Larry Anderson, Dave Myhrer, Dave Bennett, Gary Tischer, Andreas Chavez, Dan Vaneps, Tracie Koehmstedt, Scot Wockenfuss, Tom Zellmer	CRP Ttraining	Agassiz NWR	5/12/99
Margaret Anderson, Socheata Lor, Larry Anderson, Dave Myhrer, Dave Bennett, Gary Tischer, Andreas Chavez, Dan Vaneps, Tracie Koehmstedt, Scot Wockenfuss, Tom Zellmer, Volunteers, Youth Enrollees	Employee Right-to-Know Training	Agassiz NWR	6/15/99
Dave Myhrer	Recertification for Blaster's Certification and Wildlife Netting	Sherburne NWR	6/23-6/26/99
Dave Bennett, Volunteers: Stephanie Naftal, Saleen Richter	Introduction to ArcView	Bemidji, MN	2/99
Andreas Chavez	11th Annual Interagency Wolf Recover Conference	Pray, MT	4/19-4/23/99
Larry Anderson	Helicopter Long Line Training	MIFC	6/99
Margaret Anderson, Beulah Wikstrom, Dave Bennett, Larry Anderson, Gary Tischer, Dave Myrer, Gary Huschle, Dan VanEps, Scot Wockenfuss	Meyers- Briggs	Crookston	3/11/99
Tom Zellmer	MNICS Meeting	Duluth, MN	11/29-12/2/98
Tom Zellmer	FMO Meeting	Sherburne NWR Minneapolis, MN	12/7-12/98 9/13/-9/15/99
Beulah J. Wikstrom	Credit Card Training	Minneapolis, MN	10/27-10/29/98
Beulah J. Wikstrom	Computer Support for Field Stations training	NCTC	11/15-11/20/98
Margaret M. Anderson	Leadership White Papaer Meeting	Jacksonville, FL	12/8-12/10/98
Margarett M. Anderson	Compatibility Meeting	Fort Snelling, MN	11/12-11/20/98
Gary D. Tischer	Acquatic Pesticide Training	Minneapolis, MN	12/9-12/11/98
Gary Huschle	Tracking American Bitterns	from Plover, WI to Venice, LA	1/11-1/30/99
Gary D. Tischer	Annual Minnesota Wildlife Society Meeting	Camp Ripley, MN	2/3-2/5/99
Margaret M. Anderson, Gary Huschle, Tom Zellmer	Biologist Conference	St. Louis, Mo	2/7-2/13/99
Margaret M. Anderson	Ecosystem Meeting	Twin Cities, MN	2/21/-2/24/99 8/23-8/25/99

Tom Zellmer	FWS-FMO Meeting	Law Vegas, Navada	3/1-3/5/99
Margaret Anderson	IMPACT training	NCTC	3/12-3/21/99
Socheata K. Lor	American Bittern Research Study Meeting	Columbia, MO	5/12-5/13/99
Margaret M. Anderson	LE Retirement training	Twin Cities, MN	4/19-4/20/99
Margaret Aanderson Gary Huschle Eraic Cox	Moose conference	Grand Portage, MN	5/15-5/20/99
Beulah J. Wikstrom	25th Annual Federal Women's Day	Twin Cities, MN	6/8/99
Beulah J. Wikstrom	Pre-Retirement Seminar	Regional Office	6/28-6/30/99
Margaret Anderson	EEO training	Minneapolis, MN	8/2-8/3/99
Andreas Chavez	Site vitit to Regional Office	Fort Snelling, MN	8/16-8/19/99
Socheata K. Lor	Site visit to Regional Office	Fort Snelling, MN	8/2-8/3/99
Gary D. Tischer	Midwest Environmental Education Conference	Stillwater, MN	8/4-8/9/99
Tom Zellmer	Firebase Meeting	Elk River, MN	9/27-9/29/99
Margaret Anderson	Diversity Training	Bemidji, MN	9/30/99
Margaret Anderson Dave Bennett	National Wildlife Refuge System Conference Leadership Group	Denver, CO	10/16-0/23
Dave Bennett	Flood Reduction Watershed Workgroups	NW-MN	20 meetings
M. Anderson	Flood Reduction Watershed Workgroups	NW-MN	6 meetings

F. Habitat Management

1. General

Wet conditions due to spring flooding occurred 3 out of the past 4 years. Wet fall weather also occurred. These conditions curtailed efforts to conduct prescribed burns. These winters have also been heavy snow years cutting back on the amount of mowing with the rotary mowers and hydroaxe. These events hasten the advance of willow and aspen into open areas. There was no hydroaxe mowing completed in FY99. The flooding events and high flow years also set back plans for drawdowns. Agassiz Pool was scheduled to be in drawdown in 1999 followed in the subsequent year by other pools that drain into it. These plans have been pushed back to 2000.

Robert E. Farmes Pool: *High water in May and April along with northerly winds caused severe shoreline erosion on the south shore. In April straw bales were placed at the high water level, 1142.45. This is the second time erosion has occurred since completion of this Pool in 1991.*

6/24/99 GDT

Private lands adjacent to the southwest border of the refuge suffered from wet conditions as well. The Stacie Martin Farm surrounded by water on May 14, 1999, five days after peak flooding.

GDT 5/14/99

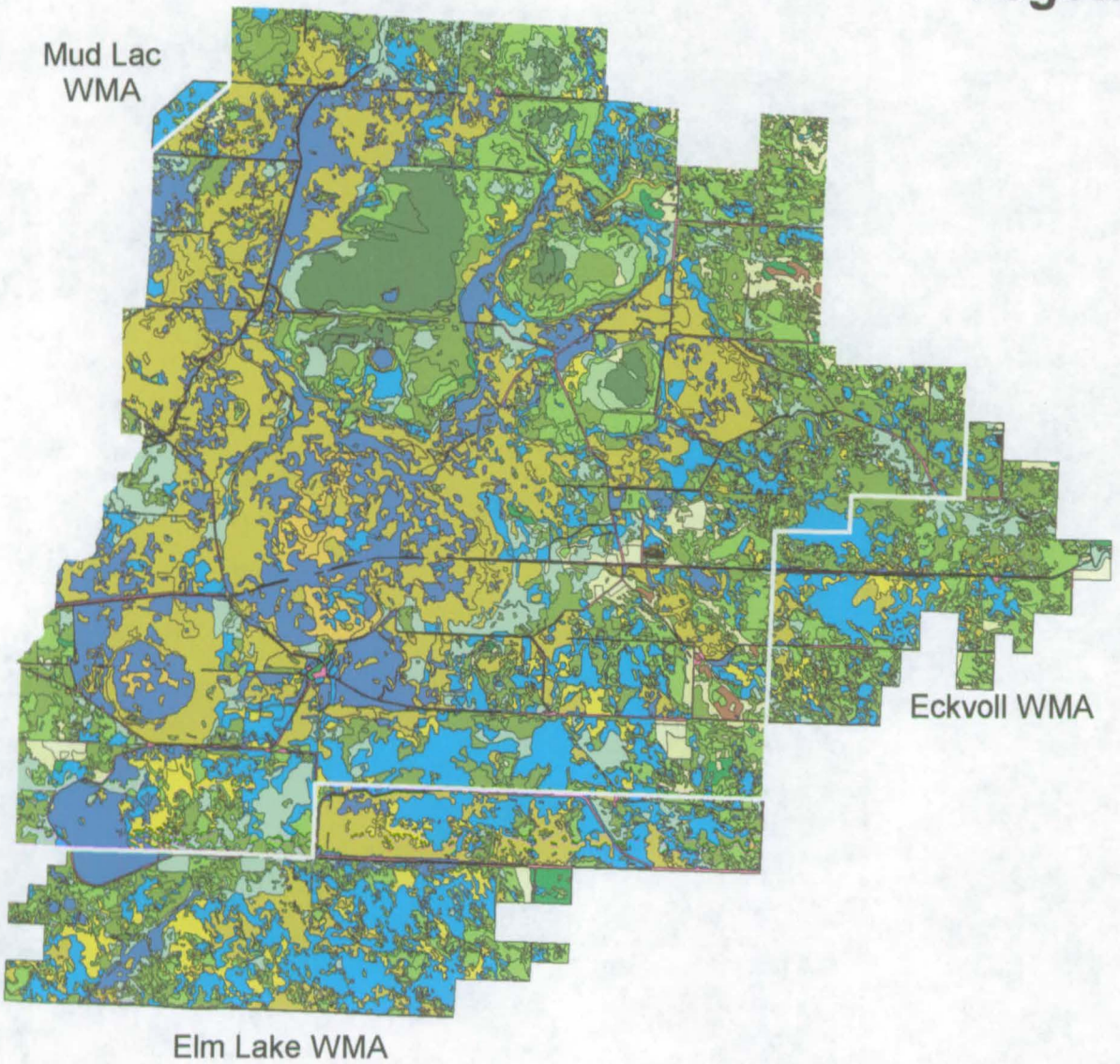
A **digitized vegetation map** of the Refuge finally became a reality. USGS Environmental Management Technical Center started digitizing the 1997 infrared photography in 1997. Funding was piece- meal over the past several years and completed in 1999. The total cost was $45,056; funds included: $5,000 (National Fish & Wildlife Foundation), $11,000 (Division of Refuges, WO), fire and 1261 funds. The vegetation classification used was tailored to Agassiz NWR but cross walked with the National Vegetation Classification. The adjoining State Wildlife Management Areas (20,400 acres) were also included and only the extreme south edge of one of these remains to be completed.

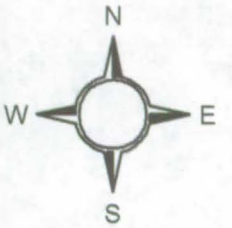
Mary Mitchell, RO-GIS coordinator, made use of the new GIS program, image analysis, to develop a tool that the Refuge staff has wanted for comparing vegetation changes due to management. The refuge has flown IR color photos almost annually since the early-80's. Vegetation types can be identified and compared between years and to the digitized vegetation map. The example used was to compare the amounts of open water and emergent vegetation changes in Pool 8 between 1993, 1997 and 1998. There was an increase of open water of 249 acres, or 23%, between 1993 and 1997. This should be a valuable tool for evaluating the effectiveness of the water and fire management programs. See next page.

2. Wetlands

Plans to put Agassiz Pool into drawdown in 1999 were shattered by another near record spring runoff and record setting outflows. Runoff started during the last week of March. The screw gate was open over winter and the radial gates thawed and opened on March 31 and April 1. The gates were gradually opened to help prevent downstream ice jams. By the end of the day, April 5, the radials had been opened to 4.5 feet each. Maximum pool was attained on April 10 at elevation 1143.22. This is the level at which the Pool starts to spread onto the road between Agassiz and Madsen pools. Parker Pool spillway is the primary spillway for Agassiz Pool. The spring flood event started this spillway flowing around April 1. Agassiz Pool remained above elevation 1141.0 until May 28. The Pool gradually decreased during the first half of June with the radial gates raised to 5.0 feet on June 8. Agassiz Pool finally reached 1140.0 on June 18. This was considered to be a reasonable summer pool elevation and was set as the summer objective level.

Agassiz NWR & Surrounding WMA
Vegetation Map





- Alder Thicket
- Aquatic Bed/Open Water
- Aspen Forest
- Bulrush Emergent
- Bur Oak Forest
- Cattail Emergent
- Coniferous Bog
- Cropland
- Developed
- Grassland
- Mixed Deciduous Hardwood Forest
- Mixed Emergent
- Phragmites Emergent
- Sedge Meadow
- Willow/Dogwood Saturated Shrubland

Vegetation based on 1997 aerial photo series.

The radials remained open at various levels the entire summer except from August 2 to 9. On August 9 drawdown was initiated to set up for a total drawdown during the fall 1999 and summer of 2000. The Pool was empty by August 31. This plan was shattered during the first half of September when daily rainfall raised the pool to 1140.1.

Outflow for 1999 from Agassiz Pool was a record setting 312,568 acre-feet. This amount of water will fill Agassiz Pool over 20 times the normal pool elevation of 1140.0. The next highest outflow was in 1985 when discharge was 259,359 acre-feet. The Refuge discharge was also record setting at 414,147 acre-feet. The next highest year was 1985 at 324,823 acre-feet. Discharge in the recent flood years of 1996 and 1997 was 305,401 and 313,518 acre-feet respectively. April and May discharge was not very different between these years but the sustained high flows through out the summer and fall contributed to making this the record year.

Kelly Pool was also scheduled for drawdown in 1999. Despite the large runoff event in the spring, the Pool was down to elevation 1143.7 by May 1. Ditch 2's direct flow from every runoff event during the summer kept the Pool bouncing. Pumping was used several times during the summer to lower water levels below Upper Mud River Pool level. Considering the position of this Pool on Ditch 2, the drawdown went better than expected. The cattail mat was dewatered during most of the year. Water was present in the perimeter ditch at all times. An attempt to burn the Pool in the fall was made. It was not very effective due to the wet fall weather. Only a small portion in the middle of the Pool and along the southeast edge burned.

A large cattail island located in the east end of Green Stump basin in Parker Pool broke loose and is now in the north west corner of the basin. This island had been in the same location since before infrared photos were started in the early 1980's.

Over the past several years outflows from Northwest Pool persist for months without inflows from Tamarack Pool. What this source of water might be is purely speculative. Possibly the old river channel that enters the Pool in the northeast corner provides some underground flow when the river is high.

ROS Tischer and Biologist Huschle walked into the 1989-90 peat burn-out area on the west side of Northwest Pool on July 13. The peat burn-outs had an abundance of milfoil, star duckweed and sago pondweed. The water depth was about 1 foot. Cattail in this area appears to be *Typha latifolia* instead of the hybrid *Typha angustifolia*.

Northwest Pool: *Ten years after the 1989-90 peat burn out, these waters have been colonized by milfoil, duckweeds and sago pond weed. Waterfowl use remains high.*

7/13/99 GDT

Headquarters Pool: *Dead cattail as a result of high water levels during the 1990s.*

GDT 6/7/99

Nelson Triangle. *Two one acre plots of willow/sedge habitat were sprayed with Krenite in August 1998. One of the plots was burned in the fall and the other was not burned. The objective was to reduce willow invasion. The krenite did kill the willow where the foliage was not dense, however, it also killed the sedge and grasses. A selective application technique would be needed to make this an effective treatment for willows.*

7/13/99 GDT

3. Forests

Oak/Savannah Restoration: Two methods were used to control aspen - wood cutting by permittes and girdling. As in the past, wood cutting permits (7) were issued (September-April)in the Dahl farmstead area. Up to 10 cords of live aspen trees/down timber can be removed per permittee. Approximately 45 cords of wood were removed from the site. There has been a noticeable increase in fern plants after removing the aspen trees. A new method, girdling of aspen, was employed. A three person Minnesota Conservation Corp crew spent 84 hours, May 17-20, girdling all trees that were not oak in a 25 acre unit east of the maintenance shop. Girdling will eventually kill the trees and prevent suckering from roots.

MnDNR Minnesota Conservation Crew girdling all aspen trees in a 25 acre unit for Oak/Savannah restoration.

LRA 6/18/99

Young willow and aspen growing in roadsides were mowed in late summer to fall. No winter rotary mowing was completed because frost was shallow preventing travel with a heavy tractor and mower.

Ten gypsy moth traps were placed on the refuge on July 7 and retrieved October 4. One trap appeared to be destroyed by bears. This was located on an oak tree at the old Dahl farmstead. No gypsy moths were found. The State Department of Agriculture also placed several traps on and around the refuge. It is unknown if any gypsy moths were found in their traps.

4. Croplands

The spring and summer were extremely wet and prevented most field work from being completed. The following table shows farming activities by field.

Table 10: 1999 Farm Activities by Field

Crop Unit/Field		Action	Acres
Dahl	- Field A	natives 1995	
	- Field B	winter wheat fall of 99	12 acres
	- Field C	natives 1995	
	- Field D	Standing winter wheat	11 acres
Rodahl	- Field A	fallow	11 acres
	- Field B	fallow	20 acres
	- Field C	standing winter wheat	17 acres
Johns	- Field A	standing winter wheat	12 acres
	- Field B	natives	
	- Field C	standing winter wheat	22 acres
E-80	- Field A	standing winter wheat barley fallow	5 acres 9 acres 8 acres
	- Field B	oats fallow	4 acres 10 acres
	- Field C	barley	10 acres
	- Field D	natives 1995	
Goose Pen	- Field A	oats	18 acres
	- Field B	natives 1995	
Golden Valley	- Field A	standing winter wheat	11 acres
	- Field B	natives 1996	
Total Active Crop Acres			179

5. Grasslands

Most of the 4,000 acres of refuge grassland was left as 'grow back' when the refuge was established. Domestic plant species established include brome, June, Kentucky blue, reed canary and quack grasses, and several species of clovers. Prescribed burning was completed on some of the grassland to rejuvenate the domestic grasses and clovers.

No mechanical mowing was completed for Canada and sow thistle control. In 1999 no herbicide spraying was completed on exotic grassland invaders. See F.10 for pesticide use.

Leafy spurge continues to sustain itself with 30 plots monitored annually. On June 30 two species of leafy spurge flea beetles (Aphthona nigriscutis - brown color and Aphthona lacertosa - black color) were obtained from the Detroit Lakes Wetland Management District and released on five plots. Most of the 1,500 beetles released were A. nigriscutis. Beetles were released on several plots south of the Maintenance Center and several plots in the Dahl Pool area.

Monitoring continued on the 130 acres of native grasses and wild flowers seeded in 1995 and 1996. This acreage was retired from croplands because the area was too wet. Although these plantings haven't been extremely successful, native wild flowers are growing in the wet areas and Indian and big bluestem grasses on the drier sites. No treatment was completed on the fields in 1999.

9. Fire Management

A great deal of staff time was spent on the fire program this year with the re-writing of the Station Fire Management Plan (FMP). Lead by FMO Zellmer, most of the staff contributed to a product that will hopefully take us well past the millennium. Six months after submitting it, we anxiously await an approved signature on the document, but as of this writing it is still held up in the regional due to an archaeological technicality.

Fall Burn Season (1998): The fall burn season was nonexistent due to extremely wet conditions.

Spring Burn Season (1999): The spring burn season was a letdown, especially after having such a good year in '98. We managed to get two burns completed on April 28 and 29, but were then hampered by conditions that kept us from getting a usable window.

The first was on the Maintenance Center unit in conjunction with the adjacent state WMA to the east using the Buck Brush Trail as the eastern boundary. The area encompassed 1200 acres, split evenly between the refuge and the state. Despite forecasts for very good conditions, actual conditions were on the high end of the prescription. A front that was supposed to pass through the area quickly hung on into the late afternoon eliminating the needed sunshine. The fire managed to carry across and through the unit where it was exposed to enough wind and sunshine. The southern sides of the area had better results with increased wind speeds from the head fire doing a better job of carrying the fire into the unit.
The second burn was implemented on the northern portion of the Diversion unit, also in conjunction with an adjacent state WMA. The area involved 1650 acres on the refuge and 320 on the state. Forecasters missed on this one too. Winds were forecast for the 10 to 12 mph range which was needed to carry the fire through the brush. The actual winds never sustained over 10 mph, although gusting reached 16 mph later in the afternoon. The backing fire along the north end of the unit did well but was unable to carry itself

through the brushy wetlands. The lack of wind kept the head fire from carrying across as well, until we reached the eastern end (state land) when occasional gusts caused the fire to make 1/4 mile runs that did quite well.

Table 11: FY1999 Prescribed/Wild Fire Summary

Unit #	Unit Name (RX)	Fire Name (WF)	Unit Acreage	Burned Acreage	Date Burned	Fire Number
15B	Maintenance Center		600 NWR 600 State	300 NWR 200 State	4/28/99	3151
9E	Diversion (north)		1650NWR 320 State	500 NWR 200 State	4/29/99	3150

Elm Lake: *18C Burn Unit on June 7, 1999 showing results of September 28, 1998 fall burn.*

6/7/99 GDT

Equipment

Bombardier: This was funded by MMS for replacement, however, after bids were let the final cost was considerably higher than the budgeted amount. The contract was canceled,. We hope the dollars will carry over and additional funds found for next year. No other major fire equipment was acquired.

FMO Travel/Training

October 15, 1998	Sponsored and represented FWS in MNICS Task Force Meeting, Agassiz NWR.
Nov. 28/Dec. 1	Attended MNICS Annual Meeting in Duluth.
Dec. 1 - 2	Attended Eastern Area Coordinating Group (Training working team), Federal Building, Fort Snelling.
Dec. 7-9	Attended regional FMO meeting at Sherburne NWR.
Jan. 20, 1999	Planning meeting with U of M, Crookston for basic fire training.
Jan. 28	Met with John Williams DNR wildlife to plan cooperative burning.
Feb. 9	Met with Mingo Job Corp and U.S. Forest Service to discuss fire crew at Mingo.
Feb. 10-11	Attended regional Biologists conference, St. Louis, MO.
Feb. 16	Attended RX burn meeting with DNR at Thief Lake.
Feb. 19	Snowmobile safety session at Agassiz NWR.
March 1 -5	Attended national FMO meeting, Las Vegas, NV.
March 11-13	Taught basic firefighter training, U of W, Crookston, 60 students.
March 21-27	Attended Law Enforcement Refresher, Des Moines, IA.
April 7	Conducted Fire Refresher Training at Detroit Lakes WMD.
May 25	Attended CPR training, Agassiz NWR.

June 10	Station visit to Tamarack to discuss FMP development.
July 29	Arranged and attended meeting to discuss new baiting laws, Agassiz NWR.
Aug. 2-6	Attended boat safety training, Macon, MO.
Aug. 30	Firearm requalification, Fergus Falls, MN.
Sept. 13-15	Attended FMO meeting, Regional office.
Sept. 27-29	Attended Firebase training, Sherburne NWR.
Sept. 30	Implemented Agassiz staff pack test, NCTC, Thief River Falls, MN

10. Pest Control

Winter wheat, barley and oat fields were sprayed with 2,4-D MCPA amine/banvel mix to control annual and perennial weeds with good results. Other herbicide use can be found in Table 12.

Monitoring of the three species of Canada thistle insects released on three plots in 1998 was completed in July. Two of the sites did have several insects of at least one species.

Approximately 1,500 leafy spurge beetles were released on May 30 on several plots of leafy spurge south of the Maintenance Center and several plots in the Dahl Pool upland area. Most of the beetles released were Aphthona lacertosa and some were Aphthona nigriscutis.

Leafy spurge beetles, Aphthona lacertosa and A. nigriscutis, released in May. 5/30/99 GDT

Table 12: Herbicide use in 1999.

PESTICIDE Used	TARGET Pests/Purposes	TREATMENT SITE	ACRES/UNIT Treated Pounds AI/AE	TOTAL Amount Used	EFFICACY Comments
Dicamba (Banvel)	**White cockle, Shepherds purse, mustard, pepper grass, C. & sow thistle. Used w/ MCPA.**	**Cropland seeded w/ barley & oats.**	**40.0 acres**	**1.25 gallons product. 2.6.lbs A.I.**	**Good control on Canada thistle, other broadleaves.**
2, 4-D Amine (MCPA)	**C. & sow thistle, white cockle. Used w/ Banvel.**	**Cropland seeded w/ barley & oats.**	**40.0 acres**	**5.00 gals. product 20.0 lbs. A.I.**	**Good results on target pests.**
Picloram (Tordon 22K)	Leafy spurge (This is one of MN's weeds).	Upland grassland	0.0 acre	0.00 gal. product. 0.00 lbs. A.I.	No pesticide used; wet conditions suppressed most plant growth. Some plants hand pulled.
Oxford 277 wetting agent	Used on cropland target pests.	Cropland seeded w/ barley & oats.	40.0 acres	1.0 gallon	Excellent wetting agent.
Fast Break antifoamer & defoamer	All target pests	All sites.	50.0 acres	2.0 pints 0.10 A.I.	Used to control foam with all pesticides.
Rodeo (Glyphosate)	Cattail; reed canary, brome, K.-blue grasses; lambs quarter, phragmites, quackgrass,smart-pig- and pineapple weed.	Wetland-waterfowl banding sites, water control structures, bridges, sewage lagoon.	3.0 acres	1.50 gallons 6.0 lbs. A.I.	Good to excellent control on all vegetation.
Roundup (Glyphosate)	Pepper grass, white cow cockle, Shepherds purse, mustard, smart- & pig-weed, quack/bluegrass, barley, Canada and sow thistle, foxtail, lambs quarter.	Flat areas around buildings, parking lots, propane/gas tanks, utility and telephone stations, boneyard, signs, banding sites.	10.0 acres	4.00 gallons 16.0 lbs A.I.	Good kill on all plant species.
Leafy Spurge Beetles *A. lacertosa & A. nigriscutis*	Leafy Spurge	Flat areas in grassland.	0.1 acre treated	1,500	Released June 1999.

14. Conservation Easements

In December, a request was received from Lake-of-The-Woods-6, owners of LOW Conservation Easement 11-C, for timber harvest. An on-site survey was completed December 17 with Minnesota DNR Area Manager Jeff Dittrich. A letter was sent to the landowners in January 1999, which indicated 4 areas, approximately 22 acres of the 120 easement which had merchantable timber, would be compatible with the purpose of the easement. The letter indicated that a special-use permit would be needed prior to proceeding. No request was received for the timber harvest.

During the year the following easements were field checked: Roseau 11-C, Lake of the Woods 11-C, Red Lake 12-C, and Pennington 10C and 11C. No problems were recorded.

15. Private Lands

In December 1998, a request for wetland restoration assistance was received from John Wahlberg in Section 6, Riene Township, Roseau County. This same land was surveyed in the early 1990's when owned by a different landowner. Restoration would only be possible with other landowners agreeing to the restored basin. It was left up to Wahlberg to contact his neighbor and get them to agree, but no response was received.

In January 1999, a request by a landowner in Red Lake for the restoration of an inactive oxbow of the Clearwater River was received. The oxbow was surveyed in August but topography and co-ownership resulted in no action.

On January 19 , an inquiry came from Kelly Knutson, a realtor from Blue Earth, for interest in selling land owned by a Milton Black in Red Lake County. Their client wanted to sell a 1600 acre farm for money to purchases land in southern Minnesota. The land had no wetlands that could be restored without effecting other landowners, and the entire acreage was under till. No action taken.

G. WILDLIFE

1. Wildlife Diversity

The MN Frog and Toad Survey Route #50271, Agassiz Refuge, was not run this year. Amphibian cover boards were not checked this fall by the Marshall County Central High School. They did set up the pit fall traps and checked them during the week of September 13-17, 1999. The data is presented in Table 13.

Table 13: Pitfall Trap Data, 1994 to 1999, Parker Road Site.

SPECIES	1994	1995	1996	1997	1998	1999
Wood frog	2	0	4	30	8	21
W. chorus frog	0	0	0	3	8	4
Tiger salamander	0	0	10	2	2	8
Leopard frog	0	0	0	0	1	0
Meadow jumping mice	0	0	2	7	18	21
Masked/pygmy shrew	1	0	1	5	8	133
Voles	8	0	4	1	4	4
Short-tailed shrews	3	0	5	1	2	1
House mouse	0	0	0	0	1	0

2. Endangered and Threatened Species

The federal government initiated procedures to down list the gray wolf in the eastern United States. In Minnesota the wolf would have been taken off of the threatened list. In 1998 the Minnesota Department of Natural Resources held a round table of interested parties to develop a management proposal. However, the Minnesota legislature failed to pass a bill to outline management for the Department of Natural Resources to follow. Consequently, the federal government could not proceed with removing the gray wolf off of the threatened list in Minnesota. The federal government did proceed with initiating the process of down listing the gray wolf from endangered to threatened in Wisconsin and Michigan.

There continues to be two wolf packs using the Refuge. The Golden Valley pack only numbered 5 during the winter of 1998-99 as compared to the 12 observed on two separate years in the early 1990's. During the winter of 1998-99 the Elm Lake pack was apparently eliminated by exposure due to mange. The two radio collared animals in this pack died during the first week of December. No tracks in this territory were evident during the helicopter net-gunning operation in February. The refuge population was estimated to be 11 at the end of 1999. Details from the wolf research are in Section D-5.

Excluding research project observations there were no wolf observations recorded . There was only one Peregrine falcon observed this year.

3. Waterfowl

On June 2, 1999 gosling production was estimated to be 840 which is above the 14 year average of 653. This year was the 5th highest year since aerial counts were discontinued in 1986. Average brood size was 4.16 which was smaller than the average of 4.3.

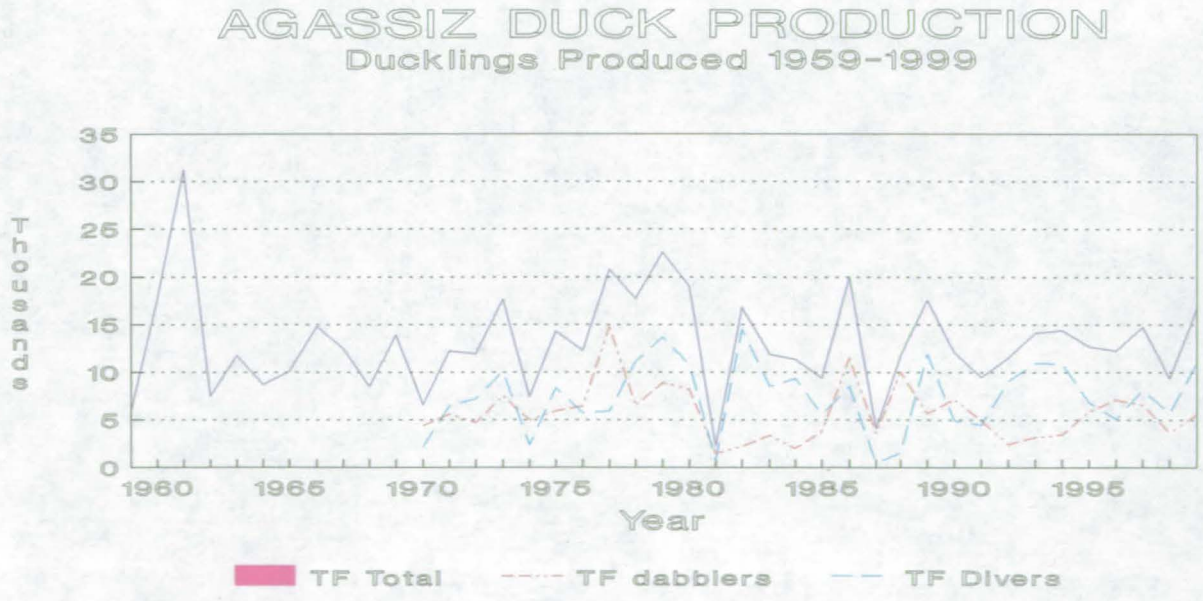
The 1999 waterfowl pair count was conducted on May 14. The estimated number of pairs was 6,666. This is only 57% of last years high count of 11,572 and below the 40 year average of 7120. The abundance of water throughout the area probably allowed ducks to be dispersed similar to 1996 and 1997 when the population estimates were 7092 and 5376. The 4 square mile pair counts were not done this year due to flood monitoring and poor survey weather.

Duck production in 1999 was estimated using the traditional brood surveys conducted on July 13 and August 24. Brood surveys have been conducted with the two observers standing in the back of the pickup bed. A railing was attached to the pickup bed at chest height for the observers to hold on to and speeds were kept to 10 to 15 mph. Safety directives have stated that no passengers will be allowed in the back of the pickups and this practice will be discontinued in the future. Observations from the back of the pickup and from two observers inside the cab were kept this year to obtain an idea of how much reduced visibility this will mean to future comparisons of brood counts. Observations from inside the cab and from the back of the pickup were kept separate. The observers in the cab were not allowed to record broods that resulted from being stopped by the observers in the back of the pickup.

During the first count the observers in the cab only saw 58% of the broods that the observers in the back of the pickup observed. During the second count the cab observers saw 86% of the broods. During the two counts combined the difference was 66% fewer broods observed by the observers in the cab. An additional year of comparison is needed to determine a correction factor to make future comparisons to old data.

Fifty-eight dabbler and 127 diver broods were sighted during the roadside surveys by the observers in the back of the pickup. The traditional model gives an estimated production of 5,652 dabblers and 11,014 divers for a total of 16,666 ducklings. This is a 178% increase over last year and above the long term average of 13,441 ducklings. This production level is still below that of the 4 year period 1977 to 1980 when production estimates were all between 19,000 and 23,000.

Fall migration started out fairly normal in September but then turned out to have very low numbers of geese and mallards during October. Canada geese peaked at only 5000 during the last week of September. Mallard numbers were less than 5000 during most of the fall with the exception of a build up of 37,000 during the first week of November. No snow geese were observed this year. Scaup were also poorly represented with only a peak of 2000 in early November. Wigeon and gadwall provided good hunting opportunities during the early part of the hunting season. Tundra swans were more abundant than in the past several years. There were up to 300 primarily on Mud River and Webster Pools.



1. TF - Traditional Formula

4. Marsh and Water Birds

American bittern surveys were not successfully completed due to weather conditions and change in students conducting the research project. The **double-crested cormorant** colony has not reestablished a nesting colony since being flooded out in 1996. The **eared grebe** colony was estimated to be 500 nests; twice as large as it has been in the past 10 years. The **great blue heron** rookery was checked without success; this site has not been active since 1994. **Black-crowned night-heron** nests were inventoried with the gull colony nest count. The number of night-heron nests was estimated to be 915.

5. Shorebirds, Gulls, Terns and Allied Species

The Roseau #8 woodcock route near Hayes Lake State Park was run on May 13. Eight woodcock were heard compared to 5 and 4 heard in the previous two years. Roseau # 6 route was also run this year. It is a route that is not run annually due to the lack of woodcock. This year two woodcock were heard!

Colonial nesting bird surveys are summarized in the following table.

Table 14: Results of Air & Ground Survey of Colonial Nesting Bird Colonies, Agassiz NWR, 1999.

SPECIES	COLONY LOCATION	HABITAT	STATUS	NO. NESTS
Great Blue Heron	Wilderness Area	Spruce-Tamarack	Inactive	0
Great Egret	Wilderness Area	Spruce-Tamarack	Inactive	0
Black-crowned night-heron	Agassiz Pool	Cattail	Active	915
Double-crested cormorant	Agassiz Pool, Ditch 11		Active	0
Franklin's Gull	Agassiz & Parker Pool	Cattail/bulrush	Active	23030
Western Grebe	Agassiz Pool		Active	2
Eared Grebe	Agassiz Pool - N. of Ditch 11	Coontail-Bladderwort	Active	500

During the years 1996,1997 and 1999 Agassiz Pool was in flood stage during nest initiation by the Franklin's gulls. The high water levels break off much of the residual emergent bulrush stalks and wash them up in large rafts. The gulls initiate nesting on these rafts of dead bulrush stalks; however, inevitably the winds come up and these nests are destroyed. In all three years the gulls reorganized the colony in the residual emergent vegetation that was exposed as water levels receded. These nests meet with the usual high success.

6. Raptors

Bald eagles nested in four nests this year. Each of the nests had one eaglet.

7. Other Migratory Birds

This was the 7th year that Breeding Bird Point Counts were done. Shelley Steva and Jeannie Joppru were contracted to conduct the surveys for passerine birds. Both had other commitments and were confounded by poor weather conditions that prevented accomplishing all of the remaining points that were laid out initially. They surveyed 44 points (out of 85 planned) in the shrub carr habitat type; most points were GPS located for future reference. No unusual sightings were made. None of the 50 points in cattail habitat were completed. Jeanie Joppru entered the data from 1998 and 1999 into the new file maker pro CENSUS data base developed by Regional Biologist Jim Mattsson.

8. Game Mammals

Cervids: The **moose** classification count was conducted on December 1,1998. The population estimate was 42. This was down from the previous year estimate of 72. The variability in the counts has increased as the number of moose observed decreases. This population estimate was backed up by a similar estimated decrease in the mid-winter big game survey conducted on February 17, 1999. The population estimate for moose was 65, down from 107 the previous winter. The moose research project was discussed in section D.5. Mortality of study animals has occurred at all times of the year, however, there is usually an increase in mortality during the first cold weather in November. In November 1998 there were 6 necropsies conducted by the research crew.

The **deer** population was estimated to be 504 from the mid-winter big game survey conducted on February 17,1999. The winters of 1995-96 and 1996-97 were severe and followed by severe flooding causing late green-up. As a result, the 1995, 1996 and 1997 year classes of deer are essentially non-existent in the population. This has been followed by two mild winters. The winter of 1997-98 was one of the mildest on record with a winter severity index of only 20. The winter of 1998-99 had a winter severity index of 91 but most of the count came in March. The 1997 and 1998 population estimates are 456 and 432 respectively. This year's estimate of 504 shows a slight increase which is expected considering the lack of three year classes and predation.

Black Bear: There were 6 observations of black bears during the fiscal year. This included an observation of 3 small cubs in May in the east end of Headquarters Pool by themselves and an observation of a sow and 3 cubs in Blue Grove eating acorns during September. These two observations were likely the same litter of cubs. The population has been increasing in northwest Minnesota. The MnDNR reported that it did not achieve the harvest in the fall of 1999 that they had hoped for.

Just one of three cubs that was surprised one morning while foraging on acorns.

8/99 GDT

Furbearers: There were only two **bobcat** observations recorded; which is below average. There was an average amount of **fisher** activity recorded with 5 sightings during the year. There were only 3 **otter** observations recorded for a total of 8 animals. This is below normal, but sightings of otter may have become too common place and the staff may be neglecting to record their sightings.

The four scent post survey routes were run in September and October, 1999. The low **red fox** population due to mange the past couple of years is still evident. **Skunk** populations are high. The results of this survey for 1992 to 1999 is shown in Table 15.

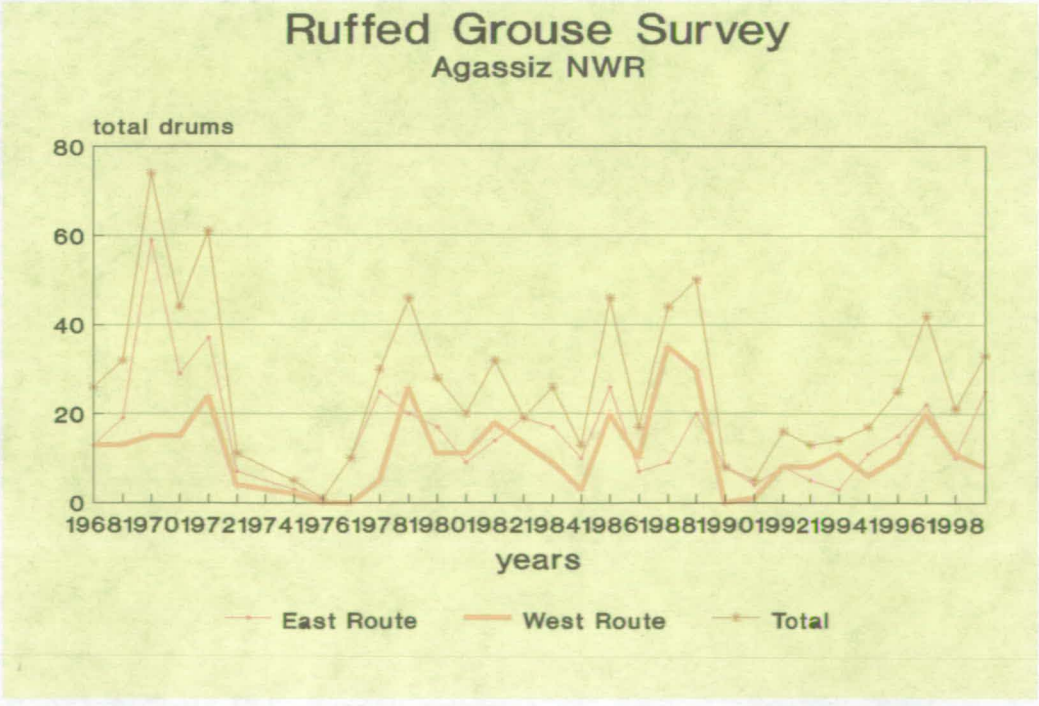
Table 15: Scent Post Survey Index 1992 to 1999

Species	1992	1993	1994	1995	1996	1997	1998	1999
Red Fox	433	270	450	300	650	125	179	77
Coyote	0	54	0	0	0	0	0	0
Wolf	67	54	0	0	50	0	179	0
Skunk	67	189	50	0	75	125	410	282
Raccoon	33	216	75	33	125	25	154	51
Bobcat	0	54	0	0	100	125	51	0
Mink	200	54	175	133		25	128	0
Fisher						75	51	

10. Other Resident Wildlife

Attempts to locate sharp-tailed grouse dancing grounds were made on three mornings without success. Three sharptails were observed at the Agassiz/Parker control structure once. One bird was flushed from the Pool 8 spillway on two mornings but not observed to dance and did not return. This is the 5th year that no dancing grounds were found.

Ruffed grouse routes were surveyed on April 28, 1999. The total number of drums was up from last year. Drumming counts for the past 32 years are shown in the figure below.



11. Fisheries Resources

MnDNR Fishery Division in Baudette conducted a fish population assessment on the Thief River downstream of the Refuge. Netting took place August 16-18, 1999 and covered the river section classified as Ditch 83. There was a flow of 500 - 700 cfs during the time period. One three-quarter inch trap net was set at six locations. One of the locations was on the Refuge at the junction of Judicial Ditch 11 and the Thief River channel. At this location they caught 15 black crappie, 1 walleye, 10 northern pike and 11 white suckers. They made note of the increased amount of black crappie that they believe results from increases in the crappie population in Red Lake. They recommended future sampling to include: spring netting to document fish moving up river to spawn; electro-fishing to sample for young of the year fish; and invertebrate sampling and additional summer population assessments to document changes due to the anticipated flood reduction projects such as Ditch 83 clean out.

15. Animal Control

Complaints about beaver activity backing water onto private land or holding water in the ditches coming into the refuge were plentiful this year. Dams were blasted 6 times and dug out with a backhoe 5 times. Major problems occurred in Ditches 1, 2, 30, 194, 201, Webster Creek, and along the east end of County Road 7. Beaver were continuously plugging Upper Middle CCC Pool water control structure and Tractor Operator VanEps was continuously unplugging the structure.

Fence panel used to keep beaver from plugging water control in northwest corner of Goose Pen. GDT

Since 1986 the Refuge has been a facilitator for the U.S. Department of Agriculture, Animal and Plant Health Inspection Services(APHIS) in loaning out propane exploders to help alleviate migratory bird crop depredation. In 1999 the exploders were unofficially (verbally..not in writing) transferred back to Agassiz NWR from the USDA state office in Missouri. This takes the USDA-APHIS out of the picture for being responsible for crop depredations.

Fourteen exploders were loaned to 4 local farmers in August to help them alleviate waterfowl depredation. Two were for geese eating timothy seeds off of swathed timothy, and two were for ducks eating seeds off of standing wheat and barley fields next to shallow wetlands. Ten exploders were loaned to The Minnesota Department of Natural Resources in Appleton, Minnesota on July 30 to discourage geese from eating crops in that area. All exploders are loaned out at no cost. Agassiz checks out each exploder and makes necessary repairs to keep them in proper working condition. USDA does not pay for any parts. Farmers must purchase propane for the exploders. We provide this service mostly to promote "goodwill" among neighbors.

16. Marking and Banding

Mallards were not cooperative for the banding operation. There wasn't much interest in the bait and their consumption and timing was not consistent. Nine rocket netting attempts were made to meet the 1200 mallard quota. The first shot did not occur until September 16, 1999, which was the public banding night.

Morning attempts were poor, and we didn't fire the rockets on two mornings. The lack of mallards at the sites did allow us to capture more blue-winged teal and pintails than usual. This year we banded 3 black ducks, 46 blue-winged teal, 157 pintail, and only 557 mallards.

Grebes and American bitterns were marked in conjunction with the research projects, see section D.5.

H. PUBLIC USE

1. General

Public use opportunities are provided by the auto drive, foot trail, Marshall County Road 7, adjacent township roads, Parker Observation Deck and the 100-foot observation tower. A total of 22,541 visits were recorded in FY99, see Table 16. A figure not in the report is the number of computer hits for the Minnesota Moose Mystery Website, see Section 7.

The refuge newsletter **"A Wild Note"** was not written in FY99. New refuge Mammal Brochures (10,000) arrived the end of October 1998.

Many newspaper reporters visited/called the refuge and wrote articles on the American bittern, wolf and moose research projects, the plane crash which took the lives of PhD student Eric Cox and MnDNR pilot Grant Coyour, and the website. Major media contacts are listed in Table 17.

Seven outdoor writers and photographers were given a tour on part of the refuge on May 19 including an airboat ride to the Franklin's gull colony, black-crowned night heron rookery and eared grebe colony in Agassiz Pool. A tour to these areas gave them a better understanding for what wildlife inhabits the largest pool on the refuge. Articles and photographs will be published in birding and outdoor magazines providing tremendous refuge exposure.

Outdoor Writers Tour. 6/19/99 GDT

Table 16: Public Use Figures for FY 1999.

Categories	# of Visits
I. Total Number of Visits Wilderness Area Visits	22,541 30
II. Interpretation and Nature Observation (On-Site)	21,780
A. Staff/Volunteer Conducted Activities	160
1. Talks	55
2. Tours	70
3. Demonstrations	35
B. Visitor Centers	0
C. Administrative Office	1,070
D. Kiosks	1,610
E. Nature Trails	2,450
1. Foot	175
2. Boat	0
3. Auto	2,275
F. Observation Towers, Platforms, & Photo Blinds	1,210
III. Environmental Education	3,553
A. Staff/Volunteer Conducted	3,488
1. Teachers participating in workshops	8
2. Students taught on-site	530
3. Students taught off-site	2,950
B. Non-Staff Conducted	65
IV. Recreation	128
A. Hunting	120
3. Big Game	120
C. Trapping	8
V. Education Outreach (Off-site)	2,650
A. Group Presentations	1,150
B. Exhibits	1,500
C. Other	0
VI. Special Events	
A. Number of News Releases	11
B. Number of Radio/TV Spots	21
C. Other Special Events	6

2. Outdoor Classroom - Students

Outdoor classroom visits totaled 530, an average for this category . Some teachers use the refuge on their own coming back year after year. Their numbers are included in the visits.

During 1999 ROS Tischer was involved with the prairie landscaping of Challenger Elementary School grounds, Thief River Falls. Three more acres were sprayed with Roundup and seeded with native prairie wildflower and grass seeds. The MnDNR supplied a tractor, operator and Truax drill to complete the seeding. Part of a walking trail six feet wide was built in 1999 which included removing soil below ground surface, filling back in with mostly Class 5 gravel and putting a 2-3" of 3/8" minus crushed granite. This made the trail wheel chair accessible. As more money becomes available the trail will be extended to wind through native prairie, wetland and forest habitats.

For the 6th consecutive year Jim Peterson's Marshall County Central High School advanced ecology class participated in the refuge amphibian monitoring program. Eight students checked the traps for a one week time period determining species and abundance of amphibians in the area.

Jim Peterson's Marshall County Central High School advanced ecology class helped two days and Becky Rennecke's Perham High School science club students helped one day with radio tracking of wolves on and off the refuge. High schools from Marshall County Central, Grand Forks Red River, East Grand Forks and Perham, and the University of Minnesota-Crookston sophomore natural resource class helped band ducks in September. Bemidji State and Rainy River Universities ornithology classes used the refuge on April 30 and May 7.

Envirothon: The 6th Annual Regional Envirothon was held on April 28. Agassiz hosts the event while local NRCS staff do the organizing. Ninety-five high school students from six schools participated. The first place team was from Lincoln High School in Thief River Falls. They went on to compete in the state competition.

Teacher Patti Johnson and her winning Lincoln High School Envirothon Team.
GDT

Before the start of the Envirothon a dedication was held for Julie Holmquist. Julie was a sophomore member of the 1998 Envirothon Team from Kittson County Central High School, Hallock, Minnesota. Julie was killed in the summer of 1998 near her rural home. She was last seen roller-blading. Her body was found by hunters the following fall. The individual(s) committing the crime has not been found.

Julie's mother, Clarice Holmquist(Red Shirt), accepting an Envirothon shirt from Stacey Lehrer, Roseau Soil and Water Conservation District Clerk(Green) and Joanne Quiner, Kittson County Assistant Manager (Blue) in the dedication ceremonies for her daughter. GDT

4. Interpretive Foot Trails

Maakstad Hiking Trail, a non-interpretive quarter mile hiking trail along the four-mile Lost Bay Habitat Drive, had 175 people using the trail.

Troop 59 Eagle Scout candidate Keith Woodruff met with ROS Tischer in the summer of 1998 to discuss clearing a path through the woods at Headquarters for a hiking trail. Keith and helpers began clearing trees and shrubs for the seven foot wide path in October 1998. In the summer of 1999 summer youth grubbed roots from the cleared path area.

Keith Woodruff standing on trail

10/98 GDT

5. Interpretive Tour Routes

The Lost Bay Habitat Drive was open from May 15 to October 31 during which 2,275 visits were recorded. A "Welcome To" sign at the beginning and eight interpretive signs along the trail describes each habitat type and several species that utilize the habitat. As part of Troop 199 Eagle Scout project, Jason Swenson washed and waxed all of these signs.

6. Interpretive Exhibits/Demonstrations

This category includes the administrative office and kiosks. Total visits were 2,680. Three new mounts and a beaver pelt were added to the refuge office display area. Wilderness Taxidermy, Thief River Falls, MN completed all the work.

7. Other Interpretive Programs

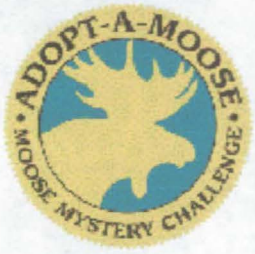
Five **open house** events were held May to September; see Table 17. International Migratory Bird Week, May 9-16, and National Wildlife Refuge Week, October 8-15, were highlighted; although the later was celebrated in September of 1998 (reported in that FY). The Waterfowl Expo held in September, was popular, in spite of bad weather. Several folks asked that this be made an annual event. The Simulated Action Firearm Education Training for Youth (S.A.F.E.T.Y.) computer-lazer shooting system was a big hit for kids and adults alike. Water fowl I.D., hunting dog /training demonstrations and a tour were also on the agenda. Attendance at open houses has been low, except Public Banding night.

Table 17:Summary of Outreach, Talks, Tours, Demonstrations, Field Trips, and Media Contacts.

Date	Speaker	On/Off Refuge	Topic	Audience (#)
FY99	Website	Off	MN Moose Mystery/Adopt-A-Moose	~ 1,230,000 hits
FY99	MA, G.Mehmel	Off	Adopt-A-Moose Updates -6	19 NWMNN Schools (93 classes/~2750 students), Sponsors (40) x 6
June	EarthSavers NWF/Target Stores	Off	MN Moose Mystery/Adopt-A-Moose	Distribution 1,000,000 copies each of paper & Activity Guide to 9000 clubs, 90000 schools, 850 Target stores
October	GT		5 News Releases: Deer hunting, Oak/Savannah restoration w/wood cutters, reward for info. illegally shot moose, website, auto-tour rte.	Distribution: All 5 sent to 32 media sources.
10/8/98	L.Longevin	On	Refuge Management	Karlstad HS (7)
10/14/98	GH/TZ	On	Refuge: Vegetation/ Fire Mgt.	Thief River Falls Envirothon Team (16)
10/21/98	GH	Off	Team Presentation on Wildlife Research/Partnerships	Interactive TV, International Group of Educators Conf.,Copenhagen,Denmark
10/30/98	J.Peterson	On/Off	Radio Tracking Wolves	Marshall County Central HS (8)
11/17/98	J.Peterson	On/Off	Radio Tracking Wolves	Marshall County Central HS (8)
12/29/98	J.Peterson	On	Radio Tracking Moose	Perham HS (9)
1/7/99	MA	Off	Adopt-A-Moose Program	Franklin Middle School (156-5classes)
1/21/99	S.Naftal-vol	Off	Wolf Project	Natl. Res. Club,UMN- Crookston (30)

2/3/99	MA	Off	FWS trip to Russia	MNTWS Annual Meeting (30)
2/5/99	MA & G.Mehmel	Off	Partnering: The Good, the Bad and the Ugly	MNTWS Annual Meeting (30)
2/10/99	MA	Off	Research on Refuges: the Rest of the Story	R3 Biologist Conference, St. Louis, MO (250)
2/8-12/99	D.Azure-SCEP B.Eichhorst	Off	Poster Sessions: American Bittern & Grebe studies	R3 Biologist Conference, St. Louis, MO (250)
2/18/99	GH		Newspaper- Wolf Study	Grand Forks Herald/Associated Press
2/22&23	MA/GH		Adopt-A-Moose Interview	EARTHSAVERS, Target Stores
2/24/99	GH		Newspaper-Wolf Study	Brainerd Paper
3/1/99	GH		Radio Interview-Wolf Study	Fosston, MN
3/5	GH		Newspaper-Wolf Study/deer survey	Grand Forks Herald-2 articles
3/8	MA		Moose Website	Hunter Magazine
3/11-13	TZ/LA	Off	S-130 & 190	UMN-Crookston (50)
3/24/99	GT	Off	FWS Careers	Goodridge 10th Grade (22)
4/17/99	MA	Off	A Land Managers Perspective on Research...The Rest of the Story.	35th North American Moose Conference, Grand Portage, MN (140)
4/17/99	GH	Off	Decline of Moose Population in NWMN.	35th No. Am. Moose Conference (140)
4/17/99	Eric Cox PhD student	Off	Moose Population Dynamics in NWMN: Interim Report	35th No. Am. Moose Conference (140)
4/26/99	GT	Off	Wildlife Mgt/conservation, I.D.	TRF Youth Firearm Safety Class (31)
4/28/99	GT	On	ENVIROTHON Competition	NWMN High School Teams (110)
4/30/99	GT	On	Bird Identification	Bemidji State U/Ornithology Class (10)
5/7/99	GT	On	Refuge Info/birding	Rainy River College, Int. Falls,MN (9)
5/8/99	GT	On	OPEN HOUSE- Birding Tours	General Public (10)
5/13/99	GH	On	Filming Moose Study	*Media Rare-Environmental Journal* TV
5/13/99	GH	On	Bittern Trapping/study update	Newfolden"Eyes on Wildlife Class"(12)
5/18/99	GT	On	4 hr tour; including airboat	MN Office Tourism Bird Writers Tour (7)
5/22/99	MA	On	Birding Tour-all day	Minnesota Chapter Audubon (25)
5/22/99	MA	Off	Research at Agassiz NWR	MN Chapter Audubon/local public (35)
5/22/27	GT	On	Refuge displays, frog tapes	Challenger 2nd Graders (150-6 classes)
5/26/99	GH	On	Bittern Trapping/study update	Warren"Eyes on Wildlife Class"(10)
5/28/99	GT	On	Office Displays,Oh Deer Game	Wannaska 1st -3rd Grades (59)
6/2/99	A.Chavez MS/SCEP	Off	Agassiz Wolf Study	MNDNR Annual.Wild. Training (60)
6/2/99	E. Cox	Off	NWMN Moose Study	MNDNR Annual.Wild. Training (60)

6/8/99	MA	Off	Outreach associated w/research	NCTC Course, Prairie Wetland Ctr. (15)
6/27/99	J. Boe	On	OPEN HOUSE-plant I.D.,tour	General Public (10)
7/14-18	GT MNDNR	Off	Pennington County Fair MNDNR/FWS Display Booth	General Public (1500)
7/18/99	B.Eichhorst	On	Newspaper; grebe study, 4 hrs	Grand Forks Herald(Sunday front page)
7/26/99	A.Chavez	Off	Agassiz Wolf Study	TRF Rotary Club (25)
8/22/99	A.Chavez	Off	Agassiz Wolf Study	Rydell NWR Open House (76)
8/22/99	GT/GH	On	OPEN HOUSE/Wintering Areas of Satellite Collared Am. Bitterns	General Public (15)
9/2/99	GT	Off	NWMN Pine to Prairie Bird Trail	Meeting to promote ecotourism
9/14/99	GH/GT	On	Band Ducks/Talk Refuge Mgt.	Marshall Co. Central HS Ecology (21)
9/16/99	GH/GT	On	Band Ducks/Track wolves	Perham HS (8)
9/16/99	GH/GT	On	Band Ducks/Talk Refuge Mgt.	UMN-Crookston, sophomores (20)
9/16/99	Staff	On	PUBLIC BANDING NIGHT	General Public (100)
9/17/99	GH/GT	On	Band Ducks/Refuge Tour	E.Grand Forks HS, Jr./Sr. Biology (40)
9/24/99	GT/Chavez	On	Band Ducks/Talk Wolf Study	Grand Forks Red River Srs. HS (26)
9/26/99	Staff	On	OPENHOUSE:WaterfowlExpo	General Public (30)
9/29/99	GH	On	Newspaper-Wolf Study Status	Minneapolis Star Tribune



After nearly 10 months of planning the **Minnesota Moose Mystery/Adopt-A-Moose** website <http://www.fws.gov/r3pao/agassiz/moose.html> went live on October 14. This site was developed to bring the local Adopt-A-Moose program to a larger audience, expand public awareness of the decline in Northwest Minnesota's Moose population, share the travels of two radio collared moose, let viewers experience as it happens research, and to promote interactive learning skills for students. MnDNR Manager Gretchen Mehmel and Refuge Manager Anderson initiated the project, secured the funds, wrote all the text and had major input in design. A contract was issued to the Environmental Management Technical Center, USGS, Onalaska, WI. Funds (FY98) were secured from a matching grant with the National Fish & Wildlife Foundation ($5,000), partners like Wildlife Forever, Hartz Foundation, and Rice Area Sportsmen, and USGS donated a great deal of labor; estimated value of setup $10000+. On this site you can hear a bull or cow moose call, see a video clip of a helicopter moose capture, track movements of a radio collared moose, view habitat, parasites, management techniques, and read interesting moose facts. We have heard from school children in Canada talking about moose in their back yard, college students from England looking for technical information on collars, and MANY people wanting to send money to help. See Appendix B for examples.

When the website first went on line the Regional Office Public Affairs Office did a massive media blitz (32 newspapers, TV, radio). During the first several weeks the site received 250,000 hits. Since that time it has averaged 75,000 to 100,000 hits/month. During the two months after Eric Cox's death, the website was not maintained in a timely manner resulting in a low of 50,000 hits. This was the most active website in Region 3. FY 99 maintenance and update costs were $2400; of which MnDNR paid $700.

National Wildlife Federation's ***EarthSavers***, Summer 1999, June newspaper and Activity Guide, both completed stories on the Northwest Minnesota Moose Mystery website and research project. These publications are a joint project between the NWF and Target Stores. NWF provides the contract writers and camera ready product and Target prints the papers. Distribution of 1,000,000 copies of each were dispersed to 9,000 EarthSavers Clubs across country (& few overseas), 90,000 schools enrolled in *Take Charge of Education Program* and 850 Target Stores.

Special Presentations: Biologist Huschle was a member of a team presentation on Wildlife Research, Partnerships and Education over Interactive TV (INTV) October 21, 1998. This session was presented to the **International Group of Educators Conference**, hosted by Frederiksborg County, Denmark, The Royal Danish School of Educational Studies, and the University of Texas, Austin, TX. This effort was initiated by Becky Rennicke, Teacher, Perham High School. Unfortunately, the satellite/telephone connection was lost part way through the presentation.

PhD student Eric Cox, Biologist Huschle and Manager Anderson all gave 20 minute presentations to 140 participants at the **35th North American Moose Conference**. The conference was held May 15 -20, Grand Portage, MN. The conference was hosted by The Grand Portage Chippewa, the first by a tribe. Anderson served on the planning committee the previous year.

Eric Cox and Andreas Chavez gave two 45 minute presentations each on the moose and wolf studies to MnDNR wildlife employees (60) at the **MnDNR Annual Training**, Itasca. Anderson gave a one hour presentation to an NCTC class titled "Education Programs for Youth: After School, Weekends and Summers" on June 8. The class was located at the Prairie Wetland Center, Fergus Falls. The presentation focused on education/outreach as a result of refuge research projects. Tom Zellmer, Larry Anderson, Larry Hanson (Detroit Lakes) and Ross Heir (MnDNR) taught S-130/190 to 50 students and 4 volunteers at UMN-Crookston Campus in March.

8. Hunting

The 1998 deer firearm hunting season was held November 6-14. For the 3rd consecutive year there were no available antlerless permits due to the low population of deer. Bucks with a three inch antler or longer were the only legal deer. Number of hunters on Agassiz was 163 and the total for Antlerless Area 203, Zone 2 was 233. Hunters harvested 40 bucks, up 100 percent from 1997 harvest of 20 bucks, and below the 10-year average of 381. Hunter success was 17 percent.

Due to continued low numbers moose hunting remained closed; the last season was in 1993.

10. Trapping

The 1998-99 trapping season went from October 24, 1998 through February 28, 1999. All eight trapping units had bids with one trapper receiving two units. Bids totaled $557.30 compared to $1,231.50 in 1997. Results are: total number of visits - 68; total number of man hours - 218; total number of trap days - (leghold) 2,081, (conibear) 751 and (muskrat colony) 73. This was the first year muskrat colony traps were permitted. Only one trapper used them. Success was very limited. The following is a summary of results:

Species	# trapped	trap days	catch rates
Mink	23	1581	0.0145
Muskrat	498	935	0.5326
Raccoon	17	1581	0.0107
Red Fox	1	1203	0.0008
Skunk	14	1203	0.0116
River Otter	4	100	0.0400
Beaver	15	289	0.0519

11. Wildlife Observation

Wildlife observation provides the most visitation to the refuge. Agassiz is known nationally for a wide variety of birds (280 species), moose and more recently wolves. There are 49 species of mammals. Although moose have been scarce over the last several years, the most frequently asked question by visitors still is, "Where can we see a moose?" Many serious birders visit during the ice free months and a few in winter looking for owls. Birders that stop in the office are asked to provide a summary of their observations. No new species were observations this year.

17. Law Enforcement

Three NOV's were written on the Refuge for dumping garbage, attempting to take an animal, and cutting firewood without a permit. Additional violations were documented including:

Vandalism to a gate	ATV trespass	2 - permanent tree stands
Illegal killing of moose	Snowmobile trespass	

A radio collared moose was illegally killed during the October 1998 waterfowl season (State Land). A news release offering a reward for information was sent to 32 media sources with no results.
Officers Bennett, Huschle and Zellmer attended the in-service at Camp Dodge in Des Moines, IA., and re-qualified with their duty weapons in Fergus Falls in September.

Discarded meat on refuge. Scott Wockenfuss was able to red license plates on suspect vehicle. Package labeling further identified the culprit.
GH

I. EQUIPMENT AND FACILITIES

1. New Construction

A patio deck was constructed along the entire south side of the office building. Maintenance Mechanic Wockenfuss and Engineering Equipment Operator Myhrer completed the project. Material cost was $4,000.00.

8/99 GDT

9/99 GDT

The deck not only provides public use opportunities but also makes the conference room emergency exit door accessible.

2. Rehabilitation

Thief River Dike Rehabilitation: **$ 322,950.30**

The last (north end) sections of the Thief River dike rehabilitation were completed in FY-99 by two contractors. Rehabilitation of this dike system began on the southern end in 1986 and includes both the Tamarack Pool and Thief Bay Pool Dikes. A summary comparison follows of work completed this year:

Dike	Contractor	Feet	Cost	Completion date
Thief Bay	Frontier Construction (8-A) Deer River, MN	7,881	$298,646.00	11/6/98
Tamarack	Ralph McKeever* Middle River, MN	3,262	$ 24,304.30	9/1/99

*Note: McKeever completed the first section, 6,600', of this project in 1986 for $50,000. Construction design was basically the same for all three contracts.

Final Section of Tamarack Dike Rehabilitation Project *8/99* GDT

South Angle Dike Rehabilitation: **$ 4,000**

Heavy Equipment Operator Myhrer reshaped 6000' of this dike in a 10 day period; completed 10/23/98.

Fire Building Painted: **$ 2,000**

The fire building, which was erected in FY98 with force-account labor, was painted in 1999. The total cost for painting and other various repairs was approximately($1,760 paint, balance-caulking, brushes, etc.).

Refuge Road Rehabilitation: **$ 123,600**

In 1999 four major projects contributed to refuge road rehabilitation as follows:

Project	Contractor	Cost	Completed
Slopes of Roads	Mark II, Fosston, MN	$53,200 (8555 Road Repair)	9/1999 75% completed
Crushed Rock/RipRap	Olson Sand & Gravel, Trail, MN	$12,800 (8555 Road Repair)	September 1999
East Olson Lakes Rd.	Ralph McKeever Middle River, MN	$7,600 (Fire)	September 1999
Class 5 Gravel	Thygeson Construction Thief River Falls, MN	$50,000(Flood Damage Funds)	September 1999

Road Slope Rehabilitation - The refuge has over 60 miles of graveled roads which have received no major repairs except gravel. Years of flood conditions and damage by beaver/muskrat activity resulted in many locations with slopes either pitted with holes or slumped into the pools. A contract was let to Mark II, Inc.on September 4 and continued through the fall construction season. An excavator was used to clean out beaver debris and other non-slope material and then rebuild the slopes with clay. The project which will resume in the spring of 2000 used $40,000 of the $53,200 contract.

Crushed rock and riprap - Olson Sand and Gravel delivered 440 cubic yards of 1 ½ inch crushed rock and 300 cubic yards of class 1 riprap for use in problem slope areas. Force account labor was used to place the rock and riprap in the needed places.

East Olson Lakes Road - In September a contract was issued to Ralph McKeever to repair this one-mile section by rehabilitating the slopes and driving surface of the road.

Class 5 Gravel - The last of the special flood damage funds were issued to Thygeson Construction for 10,000 cubic yards of gravel. This contract replaces approximately 3 inches of gravel over 40 miles of refuge roads.

Water Control Structures: Engineering Equipment Operator Myhrer with assistance from Maintenance Mechanic Wockenfuss replaced four structures at Goose Pen, Lost Bay, Golden Valley North and North Goose Pen. The structure on the ditch that comes out of the old Mud River flats was repacked to correct a leak. The new structure was purchased with FY-98 Flood Dollars.

Goose Pen structure was just one of four replaced after 30 years of use. GDT

Parker Observation Deck: The four-post ground support for the stairway was rehabilitated by placing iron I-beams between the bridge and deck post supports. An I-beam was installed between the two south 14' deck support posts to set the stairway I-beams on for support. The posts were then attached to the I-beams which were placed parallel to and three feet above the ground surface. Frost and wet conditions had caused uplifting of the four support posts attached to underground concrete pillars. This caused the stairway to lift and tipped the steps making it unsafe for use. The steps were not safe for walking.

Parker Deck rehabilitation. GDT

Other maintenance included repainting the Maintenance Center gas tanks. GDT

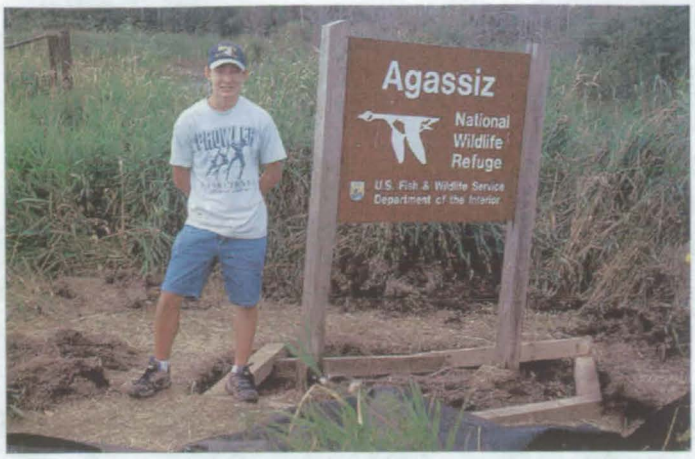
3. Major Maintenance

1978 Bombardier: This small ATV was transferred to Agassiz from Devils Lake WMD, ND in FY98. In 1999 the engine was overhauled with new lift rods by force account; cost about $300.00.

Sewage Lift Station: In April 1999, the warning light went on the Headquarters sewage lift station indicating that one of the pumps was not working. A purchase order was issued to Hughes Lift Station Services of Moorhead, MN to investigate. They found one of the pumps was worn out and needed replacing. The regional office came up with funds to replace the pump. However, after a Minnesota Pollution Control decision which stated that this type of lagoon system would now require a certified lagoon operator, it was decided to revamp the entire sewage treatment facility. Funds are supposed to be available in FY00 for this project. *In the mean time we cross our fingers that the other pump doesn't fail, then we'd have to cross our legs!!*

New Office: Since the completion of this building in January 1996, a portion of the main entrance sidewalk and the concrete platform adjacent to the door sunk about two inches. This created a tripping hazard and eliminated the accessibility of this entrance. Through force account efforts a portion of the sidewalk was remove and the concrete walk replaced. In combination with this effort a deck was designed into this rehabilitation project to address the lack of steps for the emergency exit door (off the conference room) that was not include with the original office design. A deck style system was used to make it an accessible use exit. The total cost of this project was approximately $4,000.

Entrance Signs: All entrance signs and major highway signs, 8 total, received a face lift when Eagle Scout Jason Swenson constructed and installed new wood frame bases, dug out old bases, laid new filter fabric, refilled bases with soil and topped with rock. The bases were 4' x 4' and 4' x 8' in a hexagon shape. This project was completed in August and was very hot work.



An Eagle Scout project by Jason Swenson resulted in a beautiful landscaped appearance of all entrance and highway sings. Jason (2nd from left) and Members of Troop 199 spent 250 hours on this project and cleaning interpretive signs. Ron Swenson

Quarters: ($2765) Maintenance Mechanic Wockenfuss and his wife Pam completely gutted the upstairs bathroom right down to the rotten floor boards and walls. A new sink, vanity, commode, shower stall, plumbing and electrical wiring were replaced. New floor boards and linoleum were installed and walls redone and painted.

4. Equipment Utilization and Replacement

In November 1998, the hydro mower was transferred to Tamarack NWR. Agassiz NWR declared it would never take this machine back. This machine was assigned to Agassiz but was shared by refuges in the region. More often than not when it was returned to this station for scheduled use, the maintenance crew would spend weeks repairing what was damaged at other facilities with little opportunity for direct use on the refuge. The hydro mower was not designed for use with hardwood tree species, requires constant maintenance and upkeep- maintenance log was not kept up, and unskilled operators were using the machine.

A new Dodge Dakota Pick-up, 4wd, arrived November 1998, ($19000)

Airboat Engines Overhauled: **$4,640**

Both airboats received complete engine overhauls by four students and two professors at Northland Community and Technical College. The students contributed 416 hours of labor to this effort valued at $7,904. Following is a summary:

Airboat 1 (pn#361346) **$1550**
sealant; oil and comp.rings, cyl.base o-rings rocker cover gaskets, push rod tube seals, carb.gasket, oil drain hose, cylinder overhaul

Airboat 4 (pn#355599) **$3059.74**
sealant; oil and comp.rings, cam shaft, gasket set tappet body, overhaul 4 pistons, cylinder overhaul, cracked head and lifters.

The following equipment was received during the year, most of which was used on the research studies being conducted at Agassiz:

Table 18: Equipment Transferred-In

Unit	Year	From	Date
Chev. Blazer	1986	Duluth Air Base	9/10/99
Chev. Pickup	1990	USDA/APHIS	6/15/99
Dodge Pickup	1992	Litchfield WMD	3/25/99
Chev. Pickup	1991	Litchfield WMD	2/17/99
Chev. Fleetside	1988	Morris WMD	2/17/99
Chev. Pickup	1975	Mark Twain-Annada	2/12/99
Polaris 4x2	1991	Mark Twain-Annada	2/12/99
Polaris 4x4	1988	Mark Twain-Annada	2/12/99
5 ton 6x6	1972	USFS	1/8/99

5. Communication Systems

Voice Messaging System: **$3566.18**
The Duvoice Pal 200 was purchased in February. Dave Gustafson, R3 Procurement Agent, installed the system May 17-18, 1999. The staff gradually accepted the automated system (there were initial, and periodic, system problems and caller complaints). The system has proven to be advantageous over the "old" manual system and has saved a great deal of time! In early August, US Technologies (Lucent) replaced a module in the Merlin system ($236.88).

Cellular phones were leased for private lands and field research activities. A third was obtained by the FMO for fire activities.

6. Computer Systems

The **network server** crashed in March. A Micron Millennia 350 Max MiniTower, Microsoft Windows NT unit was purchased from Micron Government Computer Systems, Inc., Chicago, Illinois, to replace the system ($2375.72). The new equipment was installed by Loyd Mitchell, Regional Computer Specialist. Backup software for the Windows NT server was purchased ($102.56) from CDW Computer Centers, Inc. Vernon Hills, Illinois.

The **Fire Weather Plus software** was updated ($745) from Forest Technology Systems, Ltd., in March. This program is used to obtain weather data for the National Weather Service as well as for planning prescribed burns on the refuge.

A Hewlett Packard 6250CXI Flatbed **Scanner** with document feeder was purchased in July from Computer Discount Warehouse, Chicago, IL, ($435.58). A Micron, 450 MHZ, InTel **Pentium III processor** was purchased ($2494.60). This computer was purchased to update the FMO's computer for GIS work.
In September, a Toshiba TLP851A computer projector with case was ordered ($6390) and an IBM Notebook Computer Thinkpad for ($2529.09).

J. OTHER ITEMS

1. Cooperative Programs

Federal Programs	Cooperator
Official weather station	NOAA-NWS
Snowpack/water content	NOAA-NWS
Gypsy moth trap monitoring	USDA-FS
Mallard Banding	USGS-BBL
Summer youth employment	SYEP-MYP
Farm Bills	NRCS, FSA
Conservation Easements	FSA
Digitized vegetation map	USGS-EMTC
Contaminant research	USGS-UMSC, FWS-ES
Wolf research	USDA-APHIS, USU, MnLCMR
Regional Lake Contamination	USGS
Loaning Exploders	USDA/APHIS

1. Cooperative Programs (continued)

State Programs	
Ruffed grouse surveys	Mn DNR
Frog and Toad Survey	MnDNR
Sharp-tailed grouse surveys	Mn DNR
Fall waterfowl observation reports	Mn DNR
Deer and moose survey	Mn DNR
Predator scent post survey	Mn DNR
Deer hunt	Mn DNR
Grebe Research	UND
Bittern Research	UMO-Columbia, Red Lake Tribe-DNR, Soc.Tym.cup.pin., NFWF, Agassiz Audubon Chapter, Perham School District-Eyes on Wildlife, Mn DNR-LCMR
Moose Research	Mn DNR, Rice Area Sportsmen, NFWF, Wildlife Forever, U-Idaho, U-Mass., Mn DNR-LCMR, Captionmax
Bulrush research	BSU
Flood Reduction Work Groups (4)	MnDNR, Watershed Districts, County, Landowners
Bird Watching Tour	Mn Office of Tourism

Private and Local Programs	
Weekly wildlife report	KTRF radio
Boy Scouts and Girl Scouts	Thief River Falls, Newfolden
Hunter safety classes	Newfolden and Thief River Falls
Envirothon	SWCD
Prairie chicken studies	Society Tym.cup.pin, Mn P.C. Society, MnLCMR
Challenger Elementary prairie	Thief River Falls School District
Karlstad prairie restoration	Karlstad, MN

Thief River/Ditch 83 Flood Reduction Work Group: On 23rd November, 1998 Minnesota DNR Regional Administrator Paul Swenson, Minnesota DNR Area Manager John Williams, JOR engineers Blake Carlson and Charlie Anderson, Audubon Area representative Cheryl Miller, HDR Engineering Consultant Nate Galleger, Board of Soil and Water Resources area representative Brian Dwight and ROS Bennett meet at the Refuge Office to brainstorm possible alternative to the Red Lake Watershed's proposal to re-dredge the Thief River (locally known as State Ditch 83). Several meetings were held to brainstorm ideas and develop those ideas to present to the Watershed Board. During this same time the Red River Watershed Management Board was finalizing its direction with a Flood Damage Reduction Work Group for organizing sub-watersheds with a method to develop projects to not only to reduce flood damage but to enhance natural resource benefits. The culmination of the Workgroup was the *mediation process* whereby sub-watersheds must comply with the process if they expected funding from the Red River Watershed Management Board.

During 1999, ROS Bennett, as a member of the Thief River Mediation process, attended 16 meetings which produced a "Concept Paper". The mediation process and the eventual production of the "Concept Paper" was influenced by the court-threatened clean out of the Thief River (locally known as Ditch 83). A 1920's declaration by a judge authorized the river to be a ditch. Straightening and cleaning occurred in the 1920's, but nothing since. Consequently, today the ditch pretty much looks like a river. However, this restored appearance was threatened when Minnesota ditch law and a local watershed board approved a landowner petition for another clean-out, which would re-annihilate this.

Thief River or Ditch 83, You Decide?

The only thing stopping the clean out was money. The State of Minnesota hasn't paid its ditch assessments since 1992. At that time, they declared there would be no more payments until assessment of benefits was redetermined. Counties, especially Marshall, refused and does so still today. A reassessment would mean less money from the State and more from local landowners. There is also the potential the re-assessment procedures would transfer the ditch authority from County to Watershed control.

The Red Lake Watershed Board decided to sue the State of Minnesota for back assessments, then they would have money to re-clean the river. The local district court sided in favor of the Watershed with the State eventually filing an appeal. The State however presented an out-of-court settlement to the Watershed, which was verbally agreed upon. In lieu of the Watershed dropping the law suite and not doing a complete clean out of the River, the State would help fund the inception of the Concept Paper. They agreed to pay the Watershed: $64,000 toward the already spent $200,000 of the proposed clean out of the Thief River, $50,000 for the engineering of a diversion ditch spelled out in the Concept Paper, and $100,000 for spot cleaning in the Thief River. The original engineer's estimate for cleaning the 14 miles of the Thief River(Ditch 83) was 3 million.

The Concept Paper is a true compromise, providing both immediate flood damage relief without total annihilation of the Thief River. As much as spot cleaning may look like a continuation of damage to the Thief River, it is believed that it provides the compromise that allows future improvements. There is anticipation that this will be the start of many ecological improvements to the ecosystem of the watershed, which includes Agassiz National Wildlife Refuge.

The Concept Paper included the need to develop alternative agricultural practices that are both family farm and ecological friendly, especially suited for the Thief River flood plain. As a result the Institute for Agriculture Trade Policy (a non-profit organization from the Twin Cites) became interested in this idea. Their representative, Steve Light, met with 5 members of the mediation team, which included ROS Bennett, and developed a $630,000 LCMR proposal partnered with University of Minnesota, Red Lake Watershed, MnDNR and FWS. The proposed is targeted at developing alternative land uses which are compatible with flood plain ecology. Six landowners (2,000 acres worth) agreed to the setup of 6 pilot demonstration areas. The proposal will go as far as to involve local business types that would financially support the most profitable and ecologically acceptable alternative uses and develop them into long range business adventures. An acceptance of this proposal by the LCMR process would mean a project start date of 2001 and possibly lasting for 6 years.

Red River Basin Board (RRB): ROS Bennett also participated on the Fish/Wildlife and Outdoor Recreation subcommittee of the RRB. The RRB involves all lands within the Red River, where as the Red River Watershed Management Board only deals with the sub-watershed on the Minnesota side of the Red River. Not to be confused with The International Coalition, which deals with issues of the Red River both in the United States and Canada. The subcommittee developed a paper which dealt with issues, concerns, priories, historical perspectives unique resources and baseline data of resources in the Red River Basin which addressed fish, wildlife and outdoor recreation. Five meetings were held during the year . The final paper is anticipated in spring of 2000. This paper will be collated with papers written by other subcommittees dealing with conservation, drainage, flood damage reduction, hydrology, institutional, water law, water quality, and water supply. All papers will not only be consolidated into a final Basin Report but will be part of a coalition of information to guide planning efforts within the basin.

2. Other Economic Uses

Table 19: Special Use Permits issued Fiscal Year 1999

Permit No:	Purpose	Fee collected
32510-9-001	Furbearer trapping	$157.00
-002	Furbearer trapping	27.00
-003	Furbearer trapping	29.30
-004	Furbearer trapping	68.00
-005	Furbearer trapping	45.00
-006	Furbearer trapping	115.00
-007	Furbearer trapping	116.00
17839	Forest products	$25.00
17840	Forest products	$25.00
17841	Forest products	$25.00
17842	Forest products	$25.00
17843	Photography	None
17844	Photography	None
17845	Photography	None
17846	Photography	None
17847	Forest products	$25.00
17848	Forest products	$25.00
17849	Forest products	$25.00

3. Items of Interest

The continued decline in revenue payments is evident in Table 20. This does not sit well, especially with a county that has strong property rights supporters.

Table 20: Revenue Sharing Payments to Marshall County for FYs 1995 to 1999.

FY	% of full entitlement	Amount of Check
1995	77.1	35,306.00
1996	65.7	30,088.00
1997	72.4	33,177.00
1998	66.2	30,288.00
1999	62.0	28,504.00

4. Credits

Anderson: Memorial; E 4; H 7; organized and edited the report
Bennett: A; C; E 2-4, 6-8; F 14-15; I 1-4, 8; J1
Huschle: D 5; G; F 1-4
Tischer: B; H; L; J 2
Wikstrom: E 1, 5; I 5-6; J 3
Zellmer: D 2; F 9

Volunteer Sue Braastad: This report would not have been possible without Sue's help. She spent 40 hours scanning in photos, coalescing sections, assembling, and keeping us on task. ***Thank you Sue!***

K. Feedback

We hope that you enjoyed this incredible narrative, like a good stew it took time to complete, so savor the flavor; it is one of five that need to be written. The other four are currently being prepared for your enjoyment. From 1995 through 2000, this refuge has endured several 100-year floods and subsequent repairs, has directly led the charge to investigate the declining moose population in northwest Minnesota, evolved from a few volunteers to over 25 in one field season, had cooperative agreements & contributing dollars from many organizations, restored 832 wetlands in one summer season, had an explosion of off refuge requirements and went space age with satellites. Add to this the constant learning curve with today's technology and a heck of a lot of energy has been spent. So, though its late, it doesn't change the fact that Agassiz is an exciting place to work.

One situation that needs to be aired is SCEP student funding. Through 1999 the Regional Office committed, funded and screened these valuable positions. In 1999, without warning, refuges were expected to dig these needed funds out of 1261 base funds. For this station it was frustrating as commitments were made to three students; one on board, one who left a job, and the other who had turned down a job. If SCEP is to truly work it needs to be funded and committed from the Region. Another issue is research funding through RONS; there has to be a better way. By the time RONS packages get funded the opportunities, issues and students may have passed. Research, studies, and students need to have base funding guaranteed for the duration of their study. Once a student and study have been approved the RO needs to ensure funds for the duration.

On a more positive note MMS funding is really beginning to make a difference in facility maintenance. RONS is also beginning to make a difference. We are thankful to the CARE group and our regional office personnel, Doug Johnson and Bill Hutchinson, who help administer these programs.

"Eric demanded a lot of himself and those who worked with him. He will be missed by many, both for his contributions to this project and because of his tremendous potential. Eric had much to offer the wildlife community."

Margaret Anderson
manager, Agassiz National Wildlife Refuge
discussing Eric Cox, a moose researcher killed last week in a plane crash

Herald file photo

◀ Eric Cox, left, and Gary Tischer, an employee at Agassiz National Wildlife Refuge, discuss moose locations in this March 1998 photo. Cox, who headed northwest Minnesota's moose research project, was killed last week while conducting an aerial moose count in the Red Lake Wildlife Management Area.

A tribute to dedication

▪Moose researcher Eric Cox died in pursuit of his passion

Brad DOKKEN

News of the plane crash again drove home the point that life — something most of us take for granted every day — is fragile and that tragedy, though not a big word, has no lay translation. That's what makes it so difficult to understand.

I didn't know Eric Cox well.

Ours was a relationship of roles: Cox a biologist looking for answers to northwest Minnesota's declining moose population; me a reporter trying to interpret his findings for others.

Before last Friday, the most challenging part of my role in the relationship was trying to translate his propensity for big words such as "immuno-incompetence" and "modulating productivity" into lay terms.

I thrive on those kinds of challenges.

But I'm at a loss to explain the tragedy that took the lives of Cox, 29, and Grant Coyour on June 11 while they were conducting an aerial moose survey in the Red Lake Wildlife Management Area.

Coyour, 43, a pilot for the Minnesota Department of Natural Resources, was piloting the DNR-owned Piper Cub when it crashed in a remote part of Lake of the Woods County. Rescuers found both men dead at the site.

News of the plane crash again drove home the point that life — something most of us take for granted every day — is fragile and that tragedy, though not a big word, has no lay translation. That's what makes it so difficult to understand.

But try to understand we must. I do that here by sharing recollections of Cox as a biologist, or as we say in the newspaper business, a source.

Since 1996, he'd been living between bunkhouses at Agassiz National Wildlife Refuge and Red Lake Wildlife Management Area, working with state and federal biologists on the northwest Minnesota moose research project.

Legacy of contributions

In remembering Cox, colleagues use words such as driven, committed, focused and determined. As a reporter, I will remember him the same way.

"Eric demanded a lot of himself and those who worked with him," said Margaret Anderson, manager of the Agassiz National Wildlife Refuge. "He will be missed by many, both for his contributions to this project and because of his tremendous potential. Eric had much to offer the wildlife community."

A graduate student at the University of Idaho, he was just days away from completing the fieldwork portion of his doctoral dissertation.

Herald file photo

▲ Eric Cox, right, and "Doc" Sutherland, a professional wildlife wrangler from New Zealand, fit a cow moose with a radio-transmitter collar in this March 1998 file photo. Cox, a graduate student at the University of Idaho, was devoted to northwest Minnesota's declining moose population before his death last week at the age of 29. Cox's ashes will be scattered in the Red Lake Wildlife Management Area, a key location in the moose study.

Parasitic vs. symbiotic

On this day, things didn't go well. Between bad weather, equipment problems and a scarcity of moose, Cox and the crew didn't fit a radio-collar until 6 p.m.

I can't begin to comprehend the frustration Cox felt in his role as a biologist on that problem-filled day, but in scientific terms, I suspect he saw my role in the reporter-source relationship as being more parasitic than symbiotic.

Lorentz and I did our best to keep out of his way. But in the end, we all got what we and Coyour had been flying over 700,000-plus-acre study area counting cow moose fitted with radio-transmitter collars.

He attributed the increase to two consecutive mild winters.

"I think a few more winters of productivity like this may well help the population a bit," Cox said. "But no one knows what will happen in the long-term."

No one certainly could have known the tragic turn of events that would occur just two days later.

Cox said he and Coyour would be making additional flights in coming days. I asked

■ Moose researcher Eric Cox died in pursuit of his passion

Brad DOKKEN

News of the plane crash again drove home the point that life — something most of us take for granted every day — is fragile and that tragedy, though not a big word, has no lay translation. That's what makes it so difficult to understand.

I didn't know Eric Cox well.

Ours was a relationship of roles: Cox a biologist looking for answers to northwest Minnesota's declining moose population; me a reporter trying to interpret his findings for others.

Before last Friday, the most challenging part of my role in the relationship was trying to translate his propensity for big words such as "immuno-incompetence" and "modulating productivity" into lay terms.

I thrive on those kinds of challenges.

But I'm at a loss to explain the tragedy that took the lives of Cox, 29, and Grant Coyour on June 11 while they were conducting an aerial moose survey in the Red Lake Wildlife Management Area.

Coyour, 43, a pilot for the Minnesota Department of Natural Resources, was piloting the DNR-owned Piper Cub when it crashed in a remote part of Lake of the Woods County. Rescuers found both men dead at the site.

News of the plane crash again drove home the point that life — something most of us take for granted every day — is fragile and that tragedy, though not a big word, has no lay translation. That's what makes it so difficult to understand.

But try to understand we must. I do that here by sharing recollections of Cox as a biologist, or as we say in the newspaper business, a source.

Since 1996, he'd been living between bunkhouses at Agassiz National Wildlife Refuge and Red Lake Wildlife Management Area, working with state and federal biologists on the northwest Minnesota moose research project.

Legacy of contributions

In remembering Cox, colleagues use words such as driven, committed, focused and determined. As a reporter, I will remember him the same way.

"Eric demanded a lot of himself and those who worked with him," said Margaret Anderson, manager of the Agassiz National Wildlife Refuge. "He will be missed by many, both for his contributions to this project and because of his tremendous potential. Eric had much to offer the wildlife community."

A graduate student at the University of Idaho, he was just days away from completing the fieldwork portion of his doctoral dissertation.

In my role as a reporter, I got a taste of that fieldwork and its challenges on a blustery morning in March 1998, when Herald photographer Jackie Lorentz and I joined Cox and others for a day in the field.

The job at hand on that nasty day was to fit cow moose with radio-transmitter collars in an effort to monitor their reproductive success. For some reason, many cow moose were either not getting pregnant or aborting them when they did.

Now moose, being the big wild animals that they are, don't typically stand still long enough to be fitted with something as cumbersome as a radio-transmitter collar. That meant a team of professional wildlife wranglers had to fly over the countryside looking for moose by helicopter, circle in close enough to shoot a net over the animal, land the chopper and then blindfold and hog-tie the moose.

Herald file photo

▲ Eric Cox, right, and "Doc" Sutherland, a professional wildlife wrangler from New Zealand, fit a cow moose with a radio-transmitter collar in this March 1998 file photo. Cox, a graduate student at the University of Idaho, was devoted to finding answers to northwest Minnesota's declining moose population before his death last week at the age of 29. Cox's ashes will be scattered in the Red Lake Wildlife Management Area, a key location in the moose study.

Parasitic vs. symbiotic

On this day, things didn't go well. Between bad weather, equipment problems and a scarcity of moose, Cox and the crew didn't fit a radio-collar until 6 p.m.

I can't begin to comprehend the frustration Cox felt in his role as a biologist on that problem-filled day, but in scientific terms, I suspect he saw my role in the reporter-source relationship as being more parasitic than symbiotic.

Lorentz and I did our best to keep out of his way. But in the end, we all got what we wanted — Cox got his moose, Lorentz got her photo and I got my story.

That was vintage Cox, Anderson told me later. He didn't know the meaning of quit.

"He was a driving force" to the moose project, she said Monday. "Without someone with Eric's total determination and focus . . . this is a huge area for one person to be looking at and he just never let up."

Since then, we kept in touch for follow-up stories, Cox giving me updates in big words, me translating those big words into small words.

Ironically, we'd spoken three times in the past two weeks, most recently just two days before he died.

The news was good, he told me last week. For the first time in several years, moose reproduction was on the upswing in northwest Minnesota. He knew that because he and Coyour had been flying over 700,000-plus-acre study area counting cow moose fitted with radio-transmitter collars.

He attributed the increase to two consecutive mild winters.

"I think a few more winters of productivity like this may well help the population a bit," Cox said. "But no one knows what will happen in the long-term."

No one certainly could have known the tragic turn of events that would occur just two days later.

Cox said he and Coyour would be making additional flights in coming days. I asked about tagging along. Not a good idea, he said; the flying often caused taggers-along to part with the contents of their stomachs. I agreed that letting him do the flying — and telling me about it later — was the best approach.

I heard about the crash before leaving the office last Friday. But not until last Sunday morning, while eating lunch in a small cafe in northern Minnesota, did I learn who was involved.

Work will continue

Cox was right when he said flying was dangerous work. That didn't keep him on the ground. Ask anyone who knew him, and they will say he died pursuing a project to

TRIBUTE: See Page 3B

June 20, 1999

Grand Forks Sunday Herald

Outdoors

Eric Cox: a tribute to dedication

Associated Press

Minnesota Department of Natural Resources conservation officers stand at attention while the Minnesota Pipes and Drums perform outside St. John's Lutheran Church in Springfield, Minn., on Wednesday before the funeral services of state conservation officer and pilot Grant Coyour. Coyour, 43, was killed along with research partner Eric Cox, 29, on June 11 when their low-flying plane crashed as the two were tracking moose in Lake of the Woods County.

TRIBUTE/

Continued from Page 2B

which he was devoted. That's why the work will continue. He'd want it that way. His family wants it that way, too; they've set up a memorial fund, the Eric Cox and Grant Coyour Memorial Fund for Moose Research, to help ensure the research continues.

"This was a very important project and we will follow through on Eric's research," Anderson said. "The data is there and we know Eric would want us to see this through."

And someday soon, a gentle stream of ashes will settle into the Red Lake WMA as Cox's remains find their final resting place, a place to which he was deeply committed in his quest for answers.

MEMORIAL FUND

To make a donation to moose research:

Eric Cox and Grant Coyour Memorial Fund for Moose Research

c/o University of Idaho Department of Fish and Wildlife Resources

Moscow, Idaho, 83844.

Somewhere not far away, I suspect, a cow moose will be standing with her twin calves.

Just the way Eric Cox would have wanted it.

Dokken is the Herald's outdoors editor. His e-mail address is bdokken@gfherald.com

Tragedy Strikes the Northwest Minnesota Moose Project

June 11 was a tragic day. Two men gave their lives in the pursuit of moose and knowledge. Eric Cox, PhD candidate, and Grant Coyour, MnDNR Conservation Officer and airplane pilot, died when their plane crashed. They were flying a moose survey to locate cows to see whether or not they had calves. This flight was part of a cooperative study by the MnDNR and Agassiz NWR. Their plane went down in the "Big Bog"on the far east end of the study area. Eric and Grant were killed on impact. The National Transportation Safety Board is investigating this disaster. This was to be Eric's last flight. His field work would have been completed on July 1. He was looking forward to taking off a few months to. visit with family before writing his dissertation. Grant was one of several pilots who flew for the moose study.

Grant and Eric spent many hours in the air together.

Grant's funeral was held June 16 in Springfield, Minnesota. Eric's funeral was held June 17 in Harbor Springs, Michigan. Refuge Manager Anderson, MnDNR Technician Terri Barnett, and Regional Pilot Bob Foster attended the funeral along with many MnDNR Biologists and Conservation Officers.

A Minnesota DNR Color Guard were present at both funerals. Richard Sprouce, MNDNR

A memorial service was held for Eric at Norris Camp, Red Lake Wildlife Management Area on June 29, 1999. Current and past moose volunteers, local people who knew him, staff from the Minnesota Department of Natural Resources and U.S. Fish and Wildlife Service came to pay their last respects. Eric's parents, DeWayne and Joan, and sister Anne and brother Jeff came from Michigan to attend the service and to spread Eric's ashes across the moose study area - an area which had become so important to him over the last three years.

Law Enforcement consisting of a cadre of Minnesota Department of Natural Resource Conservation Officers and a State Patrol officer erected a cross and memorial plaque at the crash site. Conservation Officer Jeff Birchem and Biologist Gary Huschle brought Eric's parents, DeWayne and Joan, and his sister Anne to the site

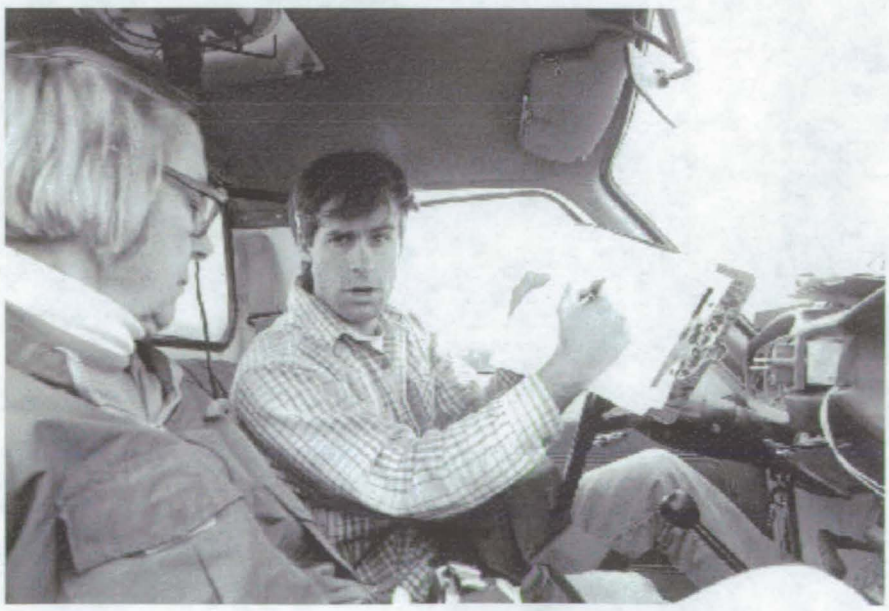
A Memorial to Eric and Grant, dedicated men with a passion and deep commitment to wildlife. They loved what they did and ultimately gave everything. MnDNR

Since Eric had lived in the bunkhouses at Agassiz NWR or Red Lake Wildlife Management Area for the last three years, the remainder of this eulogy will focus on him.

Eric Wynn Cox
1969-1999

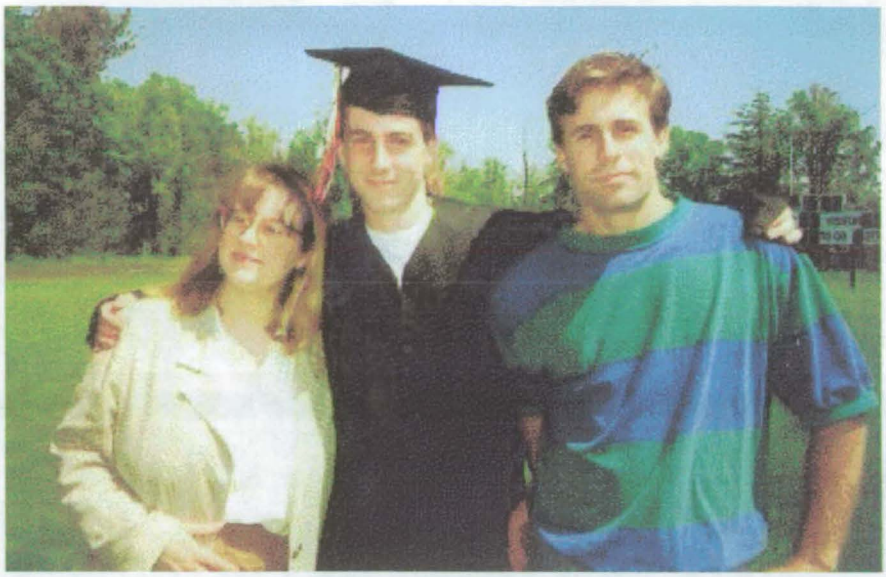
Eric began working on the moose study in May of 1996. This study was initiated when the Minnesota Department of Natural Resources and U.S. Fish and Wildlife Service recognized that the northwestern Minnesota moose population had been reduced to perilously low levels. Dr. Todd Fuller and Dr. Dennis Murray of the University of Massachusetts were selected to find a student to work on this. Dennis Murray knew immediately that Eric was the right person for the graduate position. "I felt that the independence, maturity, perseverance, and enthusiasm that Eric had demonstrated during the course of his Masters work would serve him well on the moose project."

Since that time until his death Eric spent 7,300 hours in the field! His work involved the intensive monitoring of movements, survival, and pregnancy of moose cows and calves in an area covering 700,000 acres. Over the last 3 years Eric monitored over 150 free-ranging animals and necropsied more than 70 carcasses that were retrieved post-mortem. Murray states, "This is a very large sample by most standards and is testament to Eric's indefatigable work ethic and enthusiasm." Eric found that the majority of dying moose were in a severely malnourished state, and often parasitized by liver flukes, meningeal worms, winter ticks, and various infectious diseases. Eric's necropsy work revealed that parasitism was incurring serious pathology to infected moose, and thus probably contributing to the population decline. Eric's work on moose pregnancy indicated that rates of calf production in the study population were chronically low.



Eric and Mildred Clark, Editor, ***The Refuge Reporter***. Eric explaining all of the details involved in tracking moose. Jim Clark

Eric Wynn Cox was a graduate student at the University of Idaho at the time of his death. Eric grew up in northern Michigan, where from an early age he showed a keen interest and enthusiasm for the outdoors and its wildlife inhabitants. Throughout his youth Eric participated actively in hunting fishing, and hiking excursions with his family and friends.



Eric (right) with his brother Jeff and sister Anne. Joan Cox

Eric showed an early interest in wildlife performing a number of small studies of animals around his home beginning in the 8th grade. This included a rudimentary mark-recapture study of salamanders found near his backyard. Later Eric was to relate, in a typically self-effacing manner, how he did not consider this study worthy of mention or publication because of the small sample size and lack of statistical rigor.

Upon completing high school, Eric earned a Woodbury Ransom Memorial Scholarship and attended Warren Wilson College in North Carolina. During his undergraduate years, Eric also saw brief stints at Washington State University and the University of North Carolina, and spent one fall working on a sage grouse habitat use study in Washington. It was during this experience that Eric first gained exposure to the joys and rigors of field research and wildlife biology. For his undergraduate thesis Eric worked on the effects of polluted water on a riverine benthic invertebrate community, of which he published two papers as sole author. In 1992, Eric graduated with joint degrees in Environmental Studies (Honors) and Mathematics (Honors) from Warren Wilson College.

Eric enrolled at the University of Wisconsin in 1993, as a graduate student in the Department of Wildlife Ecology. Eric had accepted a position to work on coyote scavenging behavior and habitat use. Soon after his arrival, transmitters were deployed on coyotes and data collection was initiated, support for the project fell through and all field efforts were abandoned. Eric was left without a project. Eric was resourceful and determined. He quickly designed and implemented a brand new study comparing vulnerability to predation in snowshoe hares and cottontail rabbits. This work involved providing supplemental cover to animals in the form of brushpiles, and evaluating the importance of such cover on winter predation rates. The field requirements of this project were substantial, and for an entire winter Eric conducted this study while living alone in an unheated trailer in northern Wisconsin. This research revealed that brushpiles were ineffective in reducing hare and rabbit vulnerability to predation. Upon his return from the field, Eric was an active and interactive member of the graduate student contingent and was known for his critical thinking skills and high standards. Eric completed his Masters Degree in 1996 and moved on to moose in Northwest Minnesota.

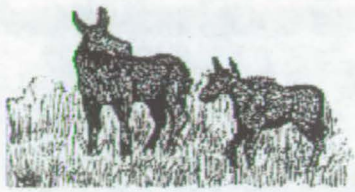
The following excerpts are from a eulogy at Eric's funeral by Dr. Dennis L. Murray, Department of Fish and Wildlife Resources, University of Idaho, Moscow, ID.

> *"Eric loved what he did. I can honestly say as his friend and advisor that I have never encountered anyone in this field who had such zeal to go the extra mile in their quest for data. Eric was a true scientist, consumed by often neglected aspects of wildlife biology such as experimental design, statistical power, and mathematical modeling. These interests clearly are reflected in both the quantity and quality of data that Eric was able to collect. Eric also loved to fly and was about 15 hours away from obtaining his own flying licence."*
>
> *"Eric was well on his way to becoming an outstanding scientist, and friends and wildlife professionals should try to remember him for his curiosity, enthusiasm, scientific rigor, and free spirit. Personally, I will miss my friend and colleague, truly one of our shining stars that simply burned out too soon." -*

Eric and his dog, Kizzy, lived at Agassiz National Wildlife Refuge and Red Lake Wildlife Management Area. He loved winter and all aspects of the outdoors. This was to be his last official flight. Because he had spent most of his time in the field, Eric was looking forward to two months off to spend time with his family before beginning to write his thesis. Eric was absolutely driven...he gave the moose project his all. We will miss seeing him on the backroads or late at night in the office. His contributions to understanding moose in this part of the world will never be forgotten.

Website: http://www.fws.gov/r3pao/agassiz/moosesite/memorial.html

Minnesota's Moose Mystery



During the last 25 years, moose numbers have declined throughout northwestern Minnesota. In 1995, state and federal wildlife managers began to take a closer look at the dynamics of these moose populations. The Moose Mystery Challenge study covers a large study area and uses a number of research methods to answer the question of northwest Minnesota's declining moose herds.

What's New:

- Final updates for B8164
- Final updates for D0982

Eric Cox and Grant Coyour Memorial page

This site best viewed on systems with 3.0 or later browsers.

Moose Home Page | Moose History | Study Area Map | Study Area | Research Design
Research Summary | Adopt-A-Moose Program | Research Cooperators | Sponsors | Media Index

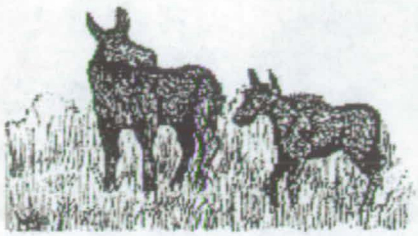
U.S. Fish and Wildlife Service

Agassiz National Wildlife Refuge

URL: http://www.fws.gov/r3pao/agassiz/moose.html

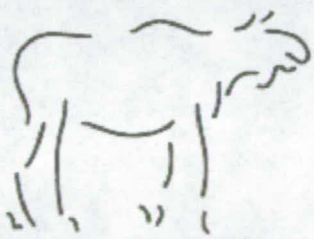
Vital Statistics - Moose B8164

- Home Page
- Adopt-A-Moose
- Moose B8164
- Moose D0982
- Media Index
- Partners



Capture Location
Agassiz National Wildlife Refuge West of Lower CCC Pool
Capture Date 12 January 1996

Ear Tag #	B8164
Sex	Female
Age	Adult



Calf history

- **1996** -Tested positive for pregnancy in January. **B8164** was never visually located until October 25, 1996; she did not have a calf with her. If she ever had a live calf, we will never know.
- **1997** -Tested positive for pregnancy in March. On May 26, she and her calf were located from an airboat; the calf was collared. On July 1 the calf's collar went on mortality mode; only the collar was found with a tooth mark. Either the calf was killed by a large predator or a predator scavenged the carcass.
- **1998** - Tested negative for pregnancy in March.
- **1999** - May 19 calf seen with **B8164** during aerial survey. The calf was laying down in a willow stand.

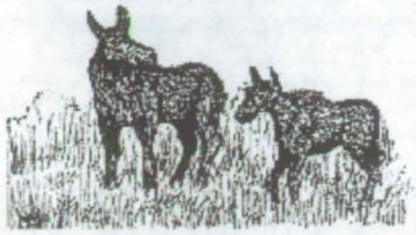
Bimonthly updates

2000	1999	1998
January - February	January - February	January - February
March - April	March - April	March - April
May - July	May - June	May - June
	July - August	July - August
	September - October	September - October
	November - December	November - December
	1997	1996
	January 1997	February
	February - March	March
	April - May	April - May
	June - July	June
	August - September	July - August
	October - December	September
		October
		November - December

Sightings - Home Range 1997-2000

All sightings

2000 - UTM data	1999 - UTM data	1998 - UTM data
2000 Sightings	1999 Sightings	1998 Sightings
January - February	January - February	January - June
March - April	March - April	July - August
May - July	May - June	September - October
	July - August	November - December
	September - October	
	November - December	
	1997 - UTM data	1996 - UTM data
	1997 Sightings	1996 Sightings
	January - June	January - September
	July - December	October - December



Moose Mystery Challenge

Adopt-A-Moose

May–July 2000 update for B8164

May - July

MOOSE MOVEMENT

Good News!!! B8164 had a calf. B8164 was located 7 times; 4 times in May, twice in June, and once in July. She and her calf were seen on June 5th and 29th. On May 25th, peak calving time, **B8164's** was in close proximity to a small island. This makes sense, since the islands usually afford some protection from predators such as bears. All of her locations are familiar (see home range map), since this moose has maintained a well defined home range. However, this spring she did find her home dramatically changed...there was a lot less water. Agassiz Pool was in drawdown (drained) to recycle nutrients and stimulate vegetation.
Note: November 14 an aerial survey indicated B8164 was alive and well. She was not seen from the air, but her collar signal was heard. Next month we will try to spot her and her calf.

RESEARCH UPDATES (May through mid-November 2000):

☹☹☹☹ **Four research moose died between May and the beginning of November.** Following are the necropsy summaries:

May 4: Viking Agricultural Area cow captured in February 1997. Her collar was heard on mortality mode on May 7. This moose was another victim to parasites and/or disease. She was very thin and appeared starved. Some of her hair was rubbed off from her shoulders and belly from scratching off winter ticks. There were many internal parasites. A tape worm cyst and a liver fluke were found on the right lung. There was a lot of scar tissue on that lung as well as on the lining of the heart. The liver was of normal size and didn't appear to have many liver fluke cysts. This cow was not pregnant.

September 23: Viking Agricultural Area cow also captured in February 1997. She was lying next to the highway between Thief River Falls and Warren. She was so sick she didn't move when the Highway Patrol tried to shoo her away.

She was shot because of her condition and the potential of her causing a vehicle accident. A necropsy was not performed because no one with training was available, but a tooth was removed for aging.

October 18: Red Lake WMA cow captured in March 1997. She had been hit by a car, and her hind leg was broken. It was evident she had been laying in one place for several days, and neighbors thought she had been hit over a week ago. She had to be shot because she could not get up. Deer can sometimes live with just three good legs, but a moose needs all four. Aside from the injured leg she appeared to be in good condition. She had produced a calf which was still with her.

November 14: Viking Agricultural Area cow captured in March 1998. She was observed by residents near Viking and had appeared sick for some time. She was so weak she could barely stand up and had to be shot. A tooth was taken. Her bone marrow was in good condition.

35 Radio Collared Moose remain on the air:
Several collars could no longer be heard, probably due to battery failure. As of November 14, moose with active collars were located as follows:

Viking Agricultural Area	(10)
Agassiz NWR/Thief Lake WMA	(15)
Red Lake WMA/Beltrami State Forest	(10)

Page 2 (For more research updates~Calf Production, Agassiz Annual Moose Survey, Moose Facts)

Moose Home Page | Moose History | Study Area Map | Study Area | Research Design
Research Summary | Adopt-A-Moose Program | Research Cooperators | Sponsors | Media Index

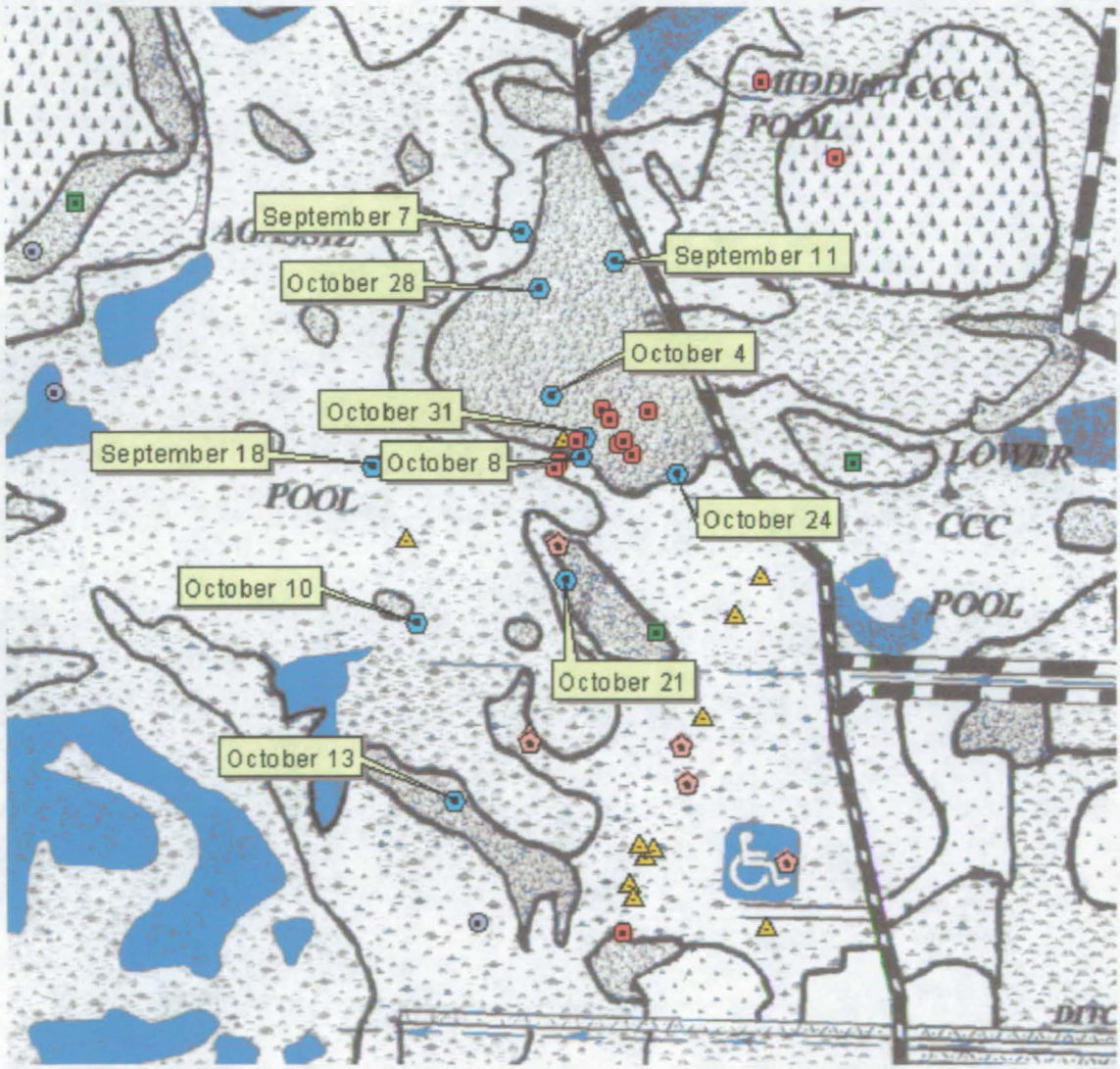
U.S. Fish and Wildlife Service

1999 Sightings - September–October

[Moose B8164]

- All 1999 sightings
- September - October update
- 1999 Universal Transverse Mercator data
- January - February update
- March - April update
- May - June update
- July - August update

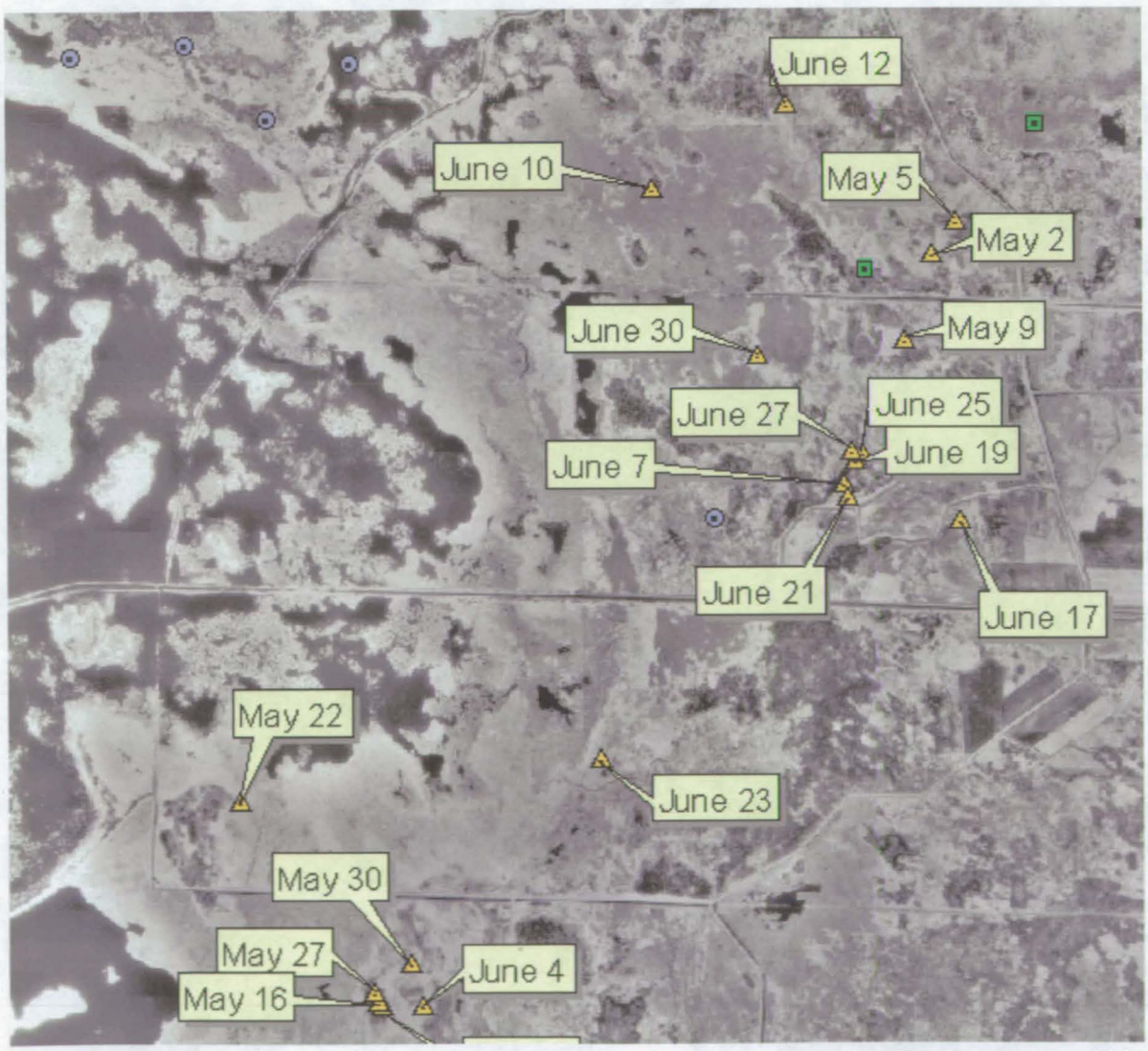
Clicking on certain dates or location points will take you to a habitat photo. The cursor will change into a hand pointing if a link is available.



Water -
Marsh with Water -
Marsh -
Upland Grass -
Deciduous Timber -
Lowland Conifer -
Shrub Swamp -
Agricultural Fields -

1999 locations

- Capture date - January 12, 19
- January - February
- March - April
- May - June
- July - August
- September - October
- November - December



In the company of Grebes

Chuck Kimmerle, staff photographer

◀ A plastic Easter egg containing a temperature sensor (center) sits with two red-necked grebe eggs in a nest at Agassiz National Wildlife Refuge.

Chuck Kimmerle, staff photographer

▲ An eared grebe chick struggles to come out of its shell in the marsh at Agassiz. Biologist Bruce Eichhorst is studying grebe nesting habits.

▪ Researcher Bruce Eichhorst seeks to unlock secrets of these largely unknown waterfowl at Agassiz National Wildlife Refuge

By Brad Dokken
Herald Staff Writer

AGASSIZ NATIONAL WILDLIFE REFUGE, Minn. — Bruce Eichhorst gets to hear the pulse of the marsh in a way few others do.

By getting right into the heart of it.

That's the way it is when you have a passion for grebes. That's the way it has to be.

Look beyond the wall of bulrushes, cattails and other vegetation and there's a whole world of wetland life that most people never experience.

"Grebes go relatively unnoticed," Eichhorst said. "Most people mistake them for ducks or loons. They build floating nests. They pretty much do everything on the water. There hasn't been a whole lot of work done on them."

Eichhorst was a part-time member of UND's biology faculty before recently accepting a job in Nebraska. For the past three summers, he has been pursuing his passion for grebes in the marshes of Agassiz.

Chuck Kimmerle, staff photographer

▲ The waterproof temperature sensor is small enough to fit into a plastic Easter egg. Recording the nest temperature at 3-minute intervals, the sensor has enough memory to store 66 days worth of data.

While his research has focused on everything from environmental contaminants to migratory patterns, Eichhorst now is learning about grebe nesting habits by tricking the birds into sitting on "dummy" eggs. Inside each egg is a tiny computer probe that records the drop in temperature when the grebes leave the nests.

A nongame waterfowl, grebes inhabit marshlands across the United States. According to Eichhorst, red-necked grebes are the most abundant species at Agassiz, followed by eared grebes, pied-billed grebes and, to a lesser extent, Western grebes. More common in North Dakota, Western grebe numbers are down at Agassiz because of this year's high water, Eichhorst says.

The birds have different nesting habits. Red-necked and pied-billed grebes, for example, are solitary nesters, while eared and Western grebes nest in large colonies. Despite their differences, Eichhorst says, none of the species appear to mind the presence of a computerized imposter in their nests.

"The birds generally accept the dummy eggs," Eichhorst said. "They'll sit on them and incubate them just like their own eggs."

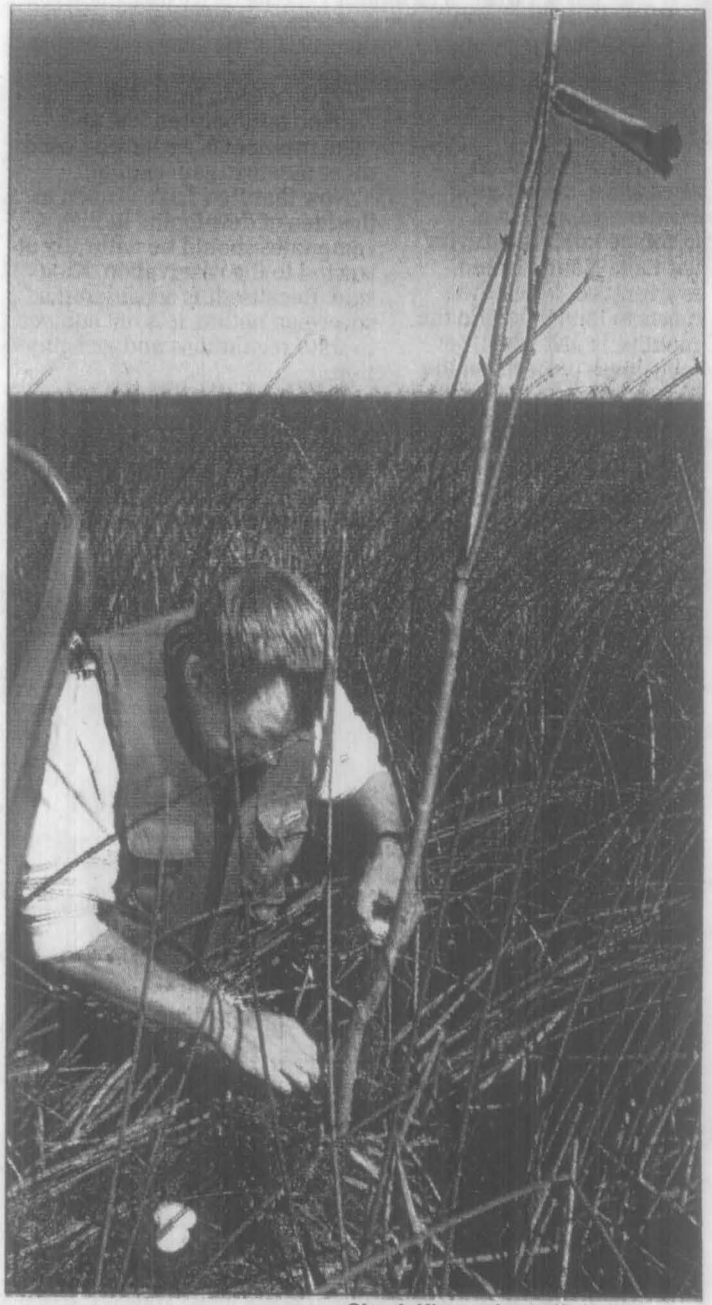
Programmed to record the temperature at three-minute intervals, each probe can capture 66 days worth of information. After the real eggs hatch, Eichhorst will retrieve the dummy eggs and download the information into a computer.

On the marsh

Last week, Eichhorst made his way through the marsh — first by airboat, then by kayak — to check on grebe eggs. Navigating his way through a floating colony of eared grebe nests — the ones with dummy eggs marked with a bright-colored flag — Eichhorst got a first-hand look at the tiny chicks pecking through the shells for their first peak at the natural world.

He picked up an egg that hadn't yet

GREBES: See Page 3B



Chuck Kimmerle, staff photographer

▲ Biologist Bruce Eichhorst checks a clutch of red-necked grebe nests. He uses the flag to mark the locations of nests containing temperature sensors.

Chuck Kimmerle, staff photographer

▲ Bruce Eichhorst uses a kayak to navigate a nesting colony of eared grebes in the marshes of Agassiz National Wildlife Refuge.

GREBES/

Continued from Page 2B

hatched. "Listen," he said, handing it off.

Inside the egg, a tiny chick chirped the news of its impending arrival.

Call it a miracle of the marsh.

"They have such a unique nest," Eichhorst said. "When they first build it, they're sitting in the water. People will see those eggs and ask, 'how do they survive?' I'm not sure, but they do."

All told, Eichhorst put 17 data loggers — the fancy name for the computer probes — in grebe nests this spring. Five were in eared grebe nests, two in pied-bill nests and the remainder were in the nests of red-necked grebes and, for a bit of variety, coots.

Patterns emerge

Although it's early in the data-crunching process, Eichhorst says he's starting to see some interesting patterns. Red-necked grebes, for example, appear to leave their nests for several hours every day about midnight.

"We're not sure why they're doing that," Eichhorst said. "Are they just taking a break? Is it to avoid predators? Nobody's ever done anything like this before."

In research circles, grebes don't carry the glamour or prestige of more popular waterfowl species such as ducks or geese. That doesn't sway Eichhorst, who says he's been hooked on grebes since the early 1980s, when he was a graduate student at the University of Wisconsin-Oshkosh.

Herald graphic

He was conducting research on coots, but he quickly concluded that while coots were OK, grebes were more interesting.

"I decided 'hey, these birds are cool, I should start working on them,' " Eichhorst said.

Everything's new

Besides the natural fascination, Eichhorst says it's rewarding to work on a species that so few people study. He says he knows of only four or five other biologists in the country doing any work on grebes.

That means almost everything he learns is new.

"Waterfowl biologists are a dime a dozen as far as I'm concerned," Eichhorst said. "But lots of these nongame species haven't had a whole lot of work done on them. There's so much that needs to be learned and anything that I come across is probably going to be new."

The reason for that, Eichhorst says, is the birds themselves; they're not hunted.

"The game species get most of the attention," Eichhorst said. "But among birdwatchers, it's a different story. They're aware of these birds."

Support from Agassiz

While Eichhorst took the initiative to launch the grebe project, Agassiz provides logistical support, including boats, vehicles and a place to stay.

"I'm doing this on my own because I want to do it," Eichhorst said. "But if it wasn't for the support of the refuge here, I wouldn't be able to do this research."

He'll be working at Agassiz through July and says he hopes to return to the refuge at least for a short time next summer. Eichhorst says he'll continue to study the ways of grebes in Nebraska, but also will set his sights on other species such as sandhill cranes.

As he leaves the marsh, Franklin's gulls and black-crowned night herons fill the sky, disturbed from their nests and resting places. This pulse of life, of miracles, is what Eichhorst says he most enjoys about working in a marsh.

"Just being out here with the birds," he said. "My own curiosity. Learning more about these unique birds. I've been working on marshes since the early '80s. I just love it."

Wolves—mange & more

ANDREA LEE LAMBRECHT
Outdoors Columnist

Mange. Not a word that conjures up a pretty picture. And as expected the sight is not easy on the eyes—in fact wolves in northwestern Minnesota are dying of the affliction. Recent reports from the Agassiz National Wildlife Refuge near Middle River indicate mange has killed at least two animals from the Elm Lake pack, which consisted of five or six wolves.

On December 10 a sub-adult female and a pup of the year were found dead, both were radio-collared. Gary Huschle, Agassiz biologist, said fur loss on the two was uniformly severe on both bodies, especially around the hocks and elbows. The skin was also crusted and patchy with sores. Necropsies performed at the University of Minnesota show the wolves died from starvation and exposure. There were no other notations of underlying disease in either body.

Since December only the tracks of one gray wolf have been spotted in the area traditionally inhabited by the Elm Lake pack. It is unknown if the other wolves in that pack have died or if the tracks of the wolf are those of the last animal in the pack or if a lone wolf has wandered into the territory historically held by the Elm Lake pack. There is no documentation substantiating other pack members died from mange, but the possibility certainly exists.

Backtracking, Huschle stated four other members of this pack appeared from distant observations to have mange to some degree as early as last summer. The sub-adult wolf and the pup that was captured and collared last summer both had a little mange at that time.

At this point, it is believed the other pack that inhabits the Refuge, the Golden Valley pack, is not plagued by mange. In fact, five pack members are radio-collared and four of those were recaptured in early February and found to be healthy.

This discovery of perhaps a pack being wiped out by the resultant complications of mange is noteworthy. No such documentation exists and as a result, wolf researchers will be watchful.

So what do we know about mange in general? There are two main types—demodectic and sarcoptic, both caused by microscopic mites. Most canines have demodex mites on their skin in small numbers, including puppies who get the mites from their mothers.

In demodectic mange, mites living in the pores of the skin multiply out of control. It is not contagious, but seemingly appears in animals having a compromised immune system or a hereditary predisposition, with makes pups unable to keep the mites under control.

There are two forms of demodectic mange, localized and generalized. The first most often appears in younger animals and manifests itself with signs of thinning hair around the eyelids, lips, mouth and front legs. Patches of hair loss may progress into one-inch circles and occasionally be confused with ringworm.

Not all juveniles with demodicosis are immunologically impaired for life and a significant percentage will "self cure" as their immune system matures. In canines, this maturity takes place between eight months and three years of age.

Localized mange may progress into the generalized form, although this second type may also have a sudden onset. Numerous small patches of fur loss develop into larger areas and may become so significant animals actually freeze to death during severe weather.

In addition, hair follicles become congested with mites and debris and the breakdown of the skin leads to skin lesions with crusting, draining sinus tracts and secondary infections. Offensive odors are often present with the supplemental infections. Irritation of the skin leads to redness and for this reason, demodectic mange was once referred to as "red mange". Amazingly, it appears to cause little or no itching.

In many cases older canines with this form of mange have underlying conditions that have weakened their immune systems. Some animals are not able to recover from the mange or die from complications.

Sarcoptic mange, also called scabies, is caused by a parasitic mite that burrows deep into the skin. It is contagious to other animals and occurs in many different species, including humans.

Intense itching, especially around the face, elbows and margins of the ear, is the most common symptom. Some animals shake their ears excessively. Hair loss is likely. Scratching inflames the skin and may cause secondary bacterial infections.

Veterinary diagnosis of all mange is arrived at through microscopic inspection of skin scrapings taken from affected areas. Multiple-injection treatments alleviate the itching and take care of sarcoptic mange. Some animals, however, do not tolerate the medication and may be prescribed lime-sulfur dips.*

Treatment of demodectic mange is more difficult, prolonged and if the case is significant may be ineffective.

Sarcoptic mange is contagious to humans, usually causing a rash around the waistband area, wrists and ankles. Mites can't reproduce or live well in human skin so they die is a few days to a few weeks, the rash clears up and the itching stops.

While much of what is known about mange has come from treatment of mange-infected domestic pets, the data may easily be transferred to animals in the wild. Outbreaks of mange have decimated fox and coyote populations in some geographic areas. Mange does affect wolves as well, but there is little documentation as to how it plays out in the numbers. Like many things in nature, just when we think we have most of the answers, there's oh so much yet to be discovered.

Never treat animals without a proper diagnosis and guidance from a veterinarian. Toxicity from certain drugs may result in blindness, coma or even death.

front page. **OUTDOORS** 2/10/99

Mange apparently ravaged wolf pack

■ Skin disease blamed in deaths

By Brad Dokken
Herald Staff Writer

MIDDLE RIVER, Minn. — A small pack of timber wolves that roamed the Agassiz National Wildlife Refuge apparently has been wiped out by mange, marking Minnesota's first documented incident of the disease wiping out an entire pack.

"Mange can hit a pack and it maybe can do a pack in, but this is the first we've ever heard," said Bill Berg, a research biologist for the Minnesota Department of Natural Resources in Grand Rap-

Researchers at Agassiz made the discovery in December while

WOLF: See Page 7A

Herald graphic

WOLF/

Continued from Page 1A

monitoring wolves fitted with radio-transmitter collars as part of a research project that dates back to 1997.

Fox, coyote, too

A skin disease that's caused by a mite, mange in recent years has drastically reduced fox and coyote populations in North Dakota and Minnesota.

According to Agassiz biologist Gary Huschle, wolves in the affected pack first began dying off after the severe winters of 1995-96 and 1996-97. At one point before deer numbers declined, the pack had at least 12 animals, he said. Coupled with another pack, up to 20 wolves roamed the refuge.

Now, the one pack essentially is nonexistent. Researchers have sighted the tracks of one wolf, but haven't been able to capture it, Huschle said.

Meanwhile, the other pack of five wolves appears to be healthy, Huschle said.

Working with a Wyoming helicopter crew, Agassiz researchers captured four of those wolves in late January. One of the wolves, the Alpha — or dominant — male, had shed the radio collar it received in 1998. By recapturing the wolf, researchers were able to fit it with a new collar, Huschle said.

Also receiving transmitter collars during the latest capture were two female pups. The fourth wolf captured, also a female pup, already had a radio collar, Huschle said.

Rarely spreads

Berg, the DNR research biologist, says mange rarely spreads between packs. As a result, he says, he's not surprised the other pack appears to be healthy.

"They're seldom in contact with other packs, so you don't see a wide rate of spread," he said.

The disease remains rare among timber wolves in Minnesota. Besides the Agassiz pack, Berg said he knows only of a wolf in the Park Rapids area and a couple of others in the Ely area with mange.

"It's not the kind of thing you'd look at as wiping out a (timber wolf) population," he said.

Led by Andreas Chavez, a graduate student from Utah State University, the Agassiz wolf project was launched in an effort to learn more about wolves that live near agricultural areas and to help researchers measure the extent of livestock depredation.

The information will help guide future management as the timber wolf moves toward being delisted as an endangered species under the Federal Endangered Species Act.

Previous studies, Huschle said, have concentrated on wolves that live in a wilderness setting.

No more collars

With the fieldwork portion of the study now complete, researchers have no plans to fit additional wolves with radio collars, Huschle said.

Instead, future work will focus on monitoring the movement of the collared animals and seeing whether other wolves move in to recolonize the territory left vacant by the ravaged pack, Huschle said.

A final report on the Agassiz wolf study is scheduled to be completed in the summer of 2000.

Minneapolis Star Tribune

2/21/99

Skin disease decimates wolf pack in northwestern Minnesota, scientists say

MIDDLE RIVER, MINN. — Mange has wiped out all but one animal from a timber wolf pack that roamed the Agassiz National Wildlife Refuge in northwestern Minnesota, wildlife officials said.

They said it is the first documented case of the disease nearly wiping out an entire pack.

"Mange can hit a pack and it maybe can do a pack in, but this is the first we've ever heard," said Bill Berg, a research biologist for the Minnesota Department of Natural Resources (DNR) in Grand Rapids.

Researchers made the discovery in December while monitoring wolves fitted with radio-transmitter collars as part of a research project that dates to 1997.

Mange, a skin disease caused by a mite, has drastically reduced fox and coyote populations in North Dakota and Minnesota in recent years.

According to Agassiz biologist Gary Huschle, wolves in the pack first began dying after the severe winters of 1995-96 and 1996-97. At one point, before deer numbers declined, the pack had at least 12 animals, he said. Another pack brought the refuge's total to 20 wolves.

Researchers have sighted the tracks of one wolf from the decimated pack but have been unable to capture it, Huschle said. He said the other pack of five wolves appears to be healthy.

Berg said mange rarely spreads between packs.

The disease remains rare among timber wolves in Minnesota. Besides the Agassiz pack, Berg said, he knows of one wolf in the Park Rapids area and a couple of others in the Ely area with mange.

The information will help guide future management as the timber wolf moves toward being taken off the endangered species list under the federal Endangered Species Act.

— Associated Press

Brad DOKKEN

Dokken's column this week appears with the special snow goose report in Sections A and B.

▶ A biologist fits a numbered metal tag on a blue-winged teal during Thursday night's public banding event at Agassiz National Wildlife Refuge.

A crash course in Banding

▲ As a young girl looks on apprehensively, Scot Wockenfuss of Agassiz National Wildlife Refuge pulls a mallard from a cage for banding. Refuge biologists banded 139 mallards and 38 blue-winged teal Thursday night and hope to put tags on 1,200 birds by Oct. 1.

Biologists at Agassiz National Wildlife Refuge get the public involved for a night of fun-filled waterfowl management

By Brad Dokken
Herald Staff Writer

HOLT, Minn. — The problem with ducks is they don't always do what humans want them to do.

But hey, that's half the fun. ...

About 100 people — from kids to grown-up types — found that out for themselves here Thursday night when Agassiz National Wildlife Refuge hosted its annual duck-banding night.

Part wildlife management, part organized mayhem, the event offers the public an opportunity for some up-close and hands-on interaction with ducks.

The birds, if they could speak, might say otherwise, but from a human perspective, a good time was had by all.

Instant hit

According to Gary Tischer, refuge operations specialist, Agassiz has offered public banding nights for six years. The event was a hit from the start, he said, attracting about 60 people the first year and averaging that many ever since.

Photos by Chuck Kimmerle, staff photographer

Boosting Thursday night's total were student groups from Perham (Minn.) High School and the University of Minnesota-Crookston.

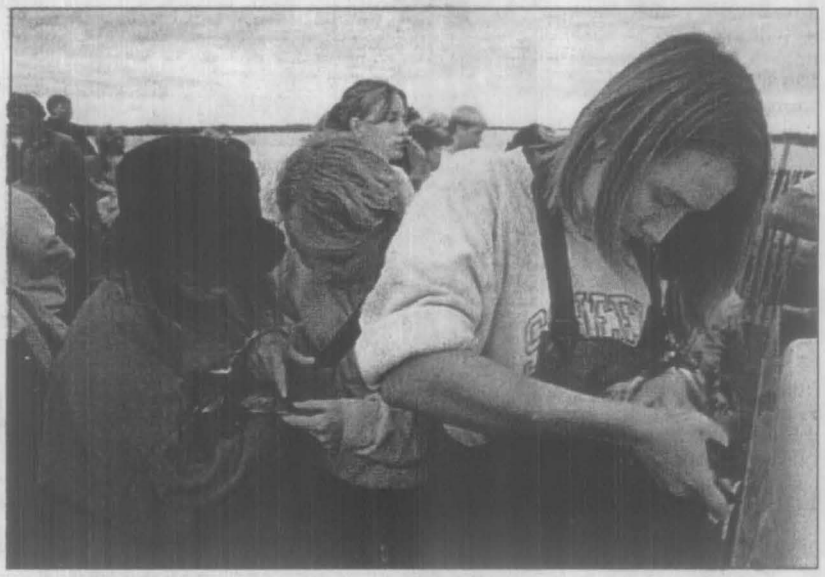
"We thought this was a good activity" for involving the public, Tischer said. "People like to get out and see how (banding) is done."

A common technique in waterfowl management, banding involves putting a numbered metal tag on a duck's leg. The duck then carries the number wherever it goes, enabling biologists to learn more about migration habits from hunters who return the bands or biologists who recapture the birds.

The fun begins

Getting this many ducks in one spot is an adventure in itself — a mix of ballistics, science and good timing.

Biologists had been attracting ducks for several days by baiting the site with grain. Unbeknownst to the ducks, the biologists also had set up two 40-by- 60-foot lengths of ¼-inch-mesh net. The nets are fastened to six rockets, which, when detonated, propel the mesh over the ducks.



▲ Sue Aker, right, was a member of the Minnesota Department of Natural Resources team that helped the U.S. Fish and Wildlife Service band ducks Thursday night at Agassiz National Wildlife Refuge. About 100 people showed up to help capture, hold and band the waterfowl.

Herald graphic

Thursday night, just moments before the crowd of people converged, an Agassiz employee stationed 100 yards away pushed a button that set off the rockets and shot the mesh over more than 200 feeding ducks.

That's when the real fun began.

Their instinct to take flight impeded by the nets, the ducks were herded into a series of cages. Some of the people attending Thursday night's banding session helped — or attempted to help — with the job; others watched.

Still others wanted to help, but couldn't quite get up the nerve. One little girl didn't think much of holding a living thing with flapping wings.

"It's not going to hurt you," her father said, encouraging the girl hold a small blue-winged teal. "It's just like holding your Barbie doll."

Young experts

Dallas and Dakota Jacobson of Thief River Falls weren't afraid of the ducks. The twin boys, who are 5 years old, took to a blue-winged teal like ... well, like a duck takes to water. With their flashy yellow Fisher-Price binoculars, they even looked like they might be experts in the ways of waterfowl.

Their father, Brian Jacobson, said he'd brought his 9-year-old daughter, Kyrie, to the banding night in previous years, but this was the boys' first close-up experience with the ducks.

BANDING: See Page 3C

Agassiz to host waterfowl expo Sept. 26

Herald Staff Report

Agassiz National Wildlife Refuge will host a waterfowl expo from 1 to 5 p.m. Sept. 26.

Scheduled one day after National Hunting and Fishing Day and National Public Lands Day, the waterfowl expo will feature several activities, including the Simulated Action Firearm Education Training for Youth — or S.A.F.E.T.Y. — computer-laser shooting system. Real shotguns and rifles shoot a laser beam at filmed wildlife in different hunting scenarios. The system records hunters' shot locations, telling them where the shot or bullet hit. Wildlife featured with the system are deer, pheasants, ducks, rabbits and turkeys. People old enough to handle a gun properly can try the laser system, which will run throughout the afternoon.

Refuge personnel will give a program on waterfowl identification at 1 p.m. At 2 p.m., dog trainers Howard Thorson and Doug Schoenborn will use several breeds to demonstrate the use of trained hunting dogs to retrieve birds. At 3 p.m., Schoenborn will discuss waterfowl decoy placement and hunting techniques.

Howard Lipke, antique waterfowl decoy collector from Detroit Lakes, Minn., will have antique decoys on display all afternoon. At 4 p.m., Lipke will present a program on the history of decoys.

Throughout the afternoon, the 1999 U.S. Fish and Wildlife Service "Status of Waterfowl" video will be shown. This annual North American waterfowl survey is one of the oldest and most comprehensive in the world.

The 20-minute video explains waterfowl breeding population numbers, wetland habitat conditions, fall flight forecast and the history of the service's waterfowl survey. This year's population of breeding ducks rose 11 percent to 43.4 million birds, representing a 32 percent increase over the 1955-98 average. Meanwhile, the fall flight

EXPO: See Page 3C

▲ No worse for the wear, a mallard duck takes flight after receiving a numbered metal leg band at Agassiz National Wildlife Refuge.

Chuck Kimmerle, staff photographer

BANDING/

Continued from Page 2C

"They enjoy it," Brian said. "I was a little concerned about how they were going to do, but they both wanted to hold a duck."

Successful night

Beyond hands-on experience for the public, Agassiz refuge's banding night also helps biologists fulfill their annual quota for the birds. Each year, Tischer said, the goal is to band 1,200 birds. Banding typically begins in mid-September, he said, and has to be wrapped up by Oct. 1.

This year, bad weather has delayed the banding. Thursday night was the first attempt, and for a debut effort, it was a big success. With the assistance of those who attended, biologists banded, aged and sexed 139 mallards and 38 blue-winged teal in about an hour. They also released about 50 green-winged teal that weren't necessary for this year's banding, Tischer said.

For a public banding night, that's a lot of birds.

"The idea, maybe, is not to catch so many on a (public banding) night such as this," Tischer said. "But that's OK. We were a little bit behind schedule."

Mallards and teal dominated the catch Thursday night, but sometimes, Tischer said, the nets catch wigeon, wood ducks, pintails and black ducks. Most of the banded birds migrate to places such as Arkansas, but last year, a duck banded at Agassiz in 1997 showed up in Japan.

That kind of information sheds a whole new light on the natural world. And that's why many of the people who attended Thursday night's banding say they come back every year.

Tim Engelstad of Thief River Falls is one of those regulars.

"It's just a great education for the kids," Engelstad said.

Kids of all ages.

EXPO/

Continued from Page 2C

duck population is projected at 105 million birds, a substantial increase from 1998.

The Thief River Falls chapter of Ducks Unlimited will serve doughnuts, cookies and refreshments throughout the afternoon. Door prizes, including prints, will be drawn at 5 p.m. You don't need to be present to win.

As part of the waterfowl expo, refuge roads and public use facilities be available, offering the opportunity for people to see a variety of ducks.

All presentations will take place at refuge headquarters, located 11 miles east of Holt, Minn., on Marshall County Road 7. In case of inclement weather, all activities will proceed except dog retrieving and waterfowl decoy placement and hunting techniques, which have to be completed outdoors.

For more information, contact Agassiz National Wildlife Refuge at (218) 449-4115, extensions 211 or 214.

Help Solve the Minnesota Moose Mystery

Moose B8164, where are you? That's the question students in Minnesota and across the country are asking. And if they log on to a special Web site, they can find out the answer.

Since 1996, moose B8164 has worn a collar with a device that sends out radio signals. Scientists using special equipment can detect these signals and tell where the moose goes. When a moose gets a collar, it also gets a check-up. Scientists put the information they find on the Minnesota Moose Mystery Web site at **www.fws.gov/r3pao/agassiz/moose.html**. That way, students everywhere can learn about the moose and follow its movements.

Why do scientists want to know where this moose and others go? Because the number of moose in Northwest Minnesota began to drop rapidly in the early 1990s. In the Agassiz National Wildlife Refuge, for example, moose had numbered above 400. Now there are only about 50. Are the moose dying of disease? Are they having to live in unsuitable areas because of habitat loss? Are too many being hunted by humans, bears, or wolves? By tracking radio-collared moose, scientists hope to learn the answers so they can help the moose.

And you can learn along with them. If you visit the Web site, you can follow the travels of two moose, including B8164. Trace their paths on a map and read updates on them every two months. Learn when they have calves and see where they migrate throughout the year. You can even hear a moose call and watch a video showing how scientists capture and collar a moose for the study.

MORE ANIMALS TO TRACK ON THE WEB

If you like keeping track of animals like the Minnesota moose, you'll also enjoy following the travels of other animals that scientists are tracking with radio transmitters. In the Atlantic Ocean, scientists are learning about the movements of the endangered Northern Atlantic right whale. Check out the mission log of ships tracking the whales at

If you visit the Web page of the International Wolf Center, you can follow the travels of gray wolves in Minnesota's Superior National Forest. There is a map of the forest, stories of individual wolves, and lots of info to download and study. The site is at

You can fly high with albatrosses when you check out , where scientists are following the movements of these huge sea birds in Hawaii.

EARTHSAVERS® Activity Guide
A PUBLICATION OF THE NATIONAL WILDLIFE FEDERATION®
SUMMER 1999

3. Mysterious Moose

Why are moose disappearing in the Big Bog area of Minnesota? Scientists as well as school children in that state and across the country want to know. As reported in the Summer 1999 *EarthSavers*, students can follow the travels of radio-collared moose and get a glimpse of what might be causing a steady decline in moose numbers over the last 30 years. Your club members can join in. By examining the actual data scientists have gathered, kids can begin to draw some conclusions about the mystery of the missing moose.

CAUSES OF DEATH
(RADIO–COLLARED MOOSE ONLY)

Calves Younger Than Six Months of Age
1—preyed upon by bear
1—disease, parasites, or starvation
1—abandoned
2—unknown

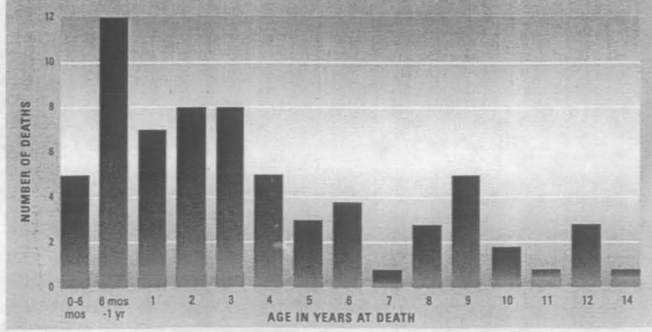
Calves from Six Months to One Year of Age
12—disease, parasites, or starvation

Adults More Than One Year of Age
1—scavenged/preyed upon by wolves
19—disease, parasites, or starvation

AGE AT DEATH

This information includes moose that were radio-collared as well as others that were not. When scientists find dead moose that have not been radio-collared, they still examine them to learn about their causes of death. They are able to estimate the animal's age by looking at its teeth.

Age Summary



AN ES ACTIVITY
Moose News You Can Use

Objective:
Analyze data gathered from radio-collared moose in Minnesota to draw some conclusions about the reasons for their decline.

Ages:
Advanced (grades 5–8)

What You Need:
Copies of the moose data on page 3, access to the Internet (optional)

What You Do:
1. Since the Minnesota Moose Mystery project began about three years ago, 109 moose have been collared. Of these, 77 were adult cows and 32 were calves that were at least several days old. Club members will need this information as they work on the activity.

2. Explain that when scientists began studying the decline in moose numbers, they hypothesized (scientifically guessed) that it might be caused by increased predation by bears and wolves. (Note: Humans are also predators of moose, but because of the animal's decline, no hunting of moose has been allowed in the study area for the past few years.) To test their hypothesis, scientists have attempted to determine the causes of moose deaths. They can tell when a radio-collared moose dies because the collar gives off a tell-tale signal if a moose stops moving for several hours. Scientists then find the animal so they can examine it.

3. Help your kids use the data provided to prove or disprove the hypothesis and answer the questions posed (below, left).

4. Kids should come to the conclusion that moose are dying from disease, parasites, and starvation. Starvation may be caused by severe winters or may result from disease or parasite infection. Encourage club members to discuss possible ways scientists could find out why these problems are affecting the moose.

MOOSE MYSTERY QUESTIONS

1. At what age do most moose die?

2. What might explain the deaths at that age?

3. How do the deaths of calves six months of age and younger differ from those of calves six months of age to one year?

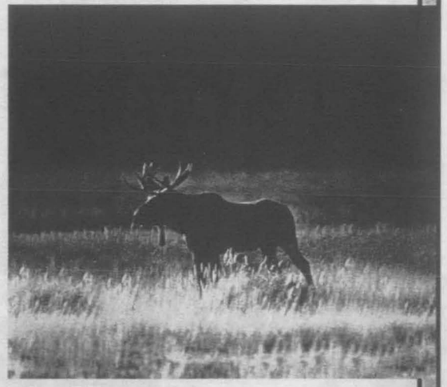
4. Compare the causes of death between calves and adult moose. What do you find?

5. How might you explain that fewer older moose die than younger ones?

6. Do you agree with the scientists' hypothesis that moose numbers were declining because of predation? Why or why not? If you disagree, what do you believe appears to be the cause of the decline?

ANSWERS TO QUESTIONS

1. Most moose die before they reach one year of age (between six months and one year, to be exact).



2. In nature, it is normal for young animals to have a high death rate. Young animals are often easier targets for predators, and they may be more susceptible to disease or parasites. Very young animals may even be abandoned by their mothers.

3. Calves under six months of age seem to be as likely to die from predation or even abandonment as from disease or starvation. Calves more than six months of age succumbed to disease, parasites, or starvation.

4. After six months of age, nearly all calves and adults died of the same causes—disease, parasites, or starvation.

5. There are fewer older moose in the population, since many have died already. Older moose may also be more adept at finding food and avoiding predators.

6. Predation seems to be of little importance in the moose decline, whereas disease, parasites, and starvation are the main culprits. You can learn more about the parasites that afflict the moose by visiting the Web site at **www.fws.gov/r3pao/agassiz/moose.html**. Once there, go to the area "Research Summary." Scientists are just beginning to study why the moose are suffering from disease and parasites. Keep checking the site for updates as scientists learn more.

Ditch 83 petitioners shown suggestions for alternatives

Potential alternatives to extensive repair of State Ditch 83—known for the most part as the Thief River—were presented at the regular meeting of the Red Lake Watershed District board Thursday, April 8, in Thief River Falls, with a number of petitioners for repair of the ditch and others interested in attendance.

Paul Swenson, regional administrator for the Minnesota Department of Natural Resources in Bemidji, moderated the presentation made to the watershed district board and the assembly in the board room of the watershed district office.

The watershed district has received a petition for the repair of State Ditch 83, which covers most of the upper reaches of the Thief River flowing out of Agassiz National Wildlife Refuge to within a couple of miles north of Thief River Falls. The petition requests removal of trees, debris and silt and the side sloping of the ditch bank—all intended to increase water flow and alleviate flooding.

Thursday's presentation was made by a group of agencies which wants the watershed board and petitioners to consider alternative methods of alleviating flooding without the extensive repair work to Ditch 83 and effectively the Thief River.

Presently cooperating in the effort to develop alternatives are the Minnesota Department of Natural Resources (DNR), U.S. Fish and Wildlife Service (USFWS), Minnesota Board of Water and Soil Resources (BWSR) and the Minnesota Audubon Council (MAC).

The group had funded an engineering study to gather flow information on State Ditch 83 and its tributaries—primarily County Ditch 20 which enters State Ditch 83 from the east. Presenting information from that study were Nate Dalager, St. Hilaire field office engineer with HDR Engineering of Minneapolis and Charlie Anderson, engineer with Widseth Smith Nolting & Associates of Crookston.

Also speaking at the meeting were Cheryl Miller of the Minnesota Audubon Society and Al Kean of the Board of Water and Soil Resources.

Dalager reviewed streamflow records and studies involving Ditch 83 and Ditch 20 and preliminary computer models showing effect of upstream impoundments along Ditch 20. Anderson presented information on how a diversion channel to the east could divert water from State Ditch 83 and bring it to the Thief River below the south end of Ditch 83. Control structures along the diversion channel would be used to regulate the flow and minimize downstream flooding. Overall cost for the impoundments and diversion was placed at $5 million in the estimate presented at Thursday's meeting.

Cheryl Miller noted that the agencies involved in proposing the alternative flood relief plan are all committed to working to secure funding for project costs. It was noted at the meeting that efforts should be made to complete planning in order to make a funding request to the Minnesota Legislature in the year 2000 session.

Another meeting is expected to be held soon to further discuss the proposal and possibly other alternatives. A summary of the hydrologic

(Continued on Page 10)

Seasonal fire restrictions include part of this area

To reduce property damage and fire suppression costs, the Division of Forestry of the Minnesota Department of Natural Resources will restrict outdoor burning this spring, according to the division office in Wannaska.

Restricted burning area will be east and north of a line extending from the Canadian border south along Highway 310 to Roseau, along Highway 89 from Roseau to the Beltrami county line one mile east of Grygla, then south along the Beltrami and Pennington county line and continuing along the western boundaries of Clearwater, Becker and Otter Tail counties to Highway 94.

During the period from April 15 through May 17, no burning permits will be issued in this area except for prescribed fire projects, agricultural practices and construction projects. No permits for roadside burning or burning of yard debris, brush piles, leaves or grass will be issued. Charcoal grills and campfires are not restricted, but caution is advised.

The area west and south of the above-described line will secure burning permits as usual, from the local township fire warden, rural fire department or Division of Forestry office.

Agricultural burning which needs to be done during the restricted period can be accomplished by visiting the local township fire warden, who will phone a Forestry office for approval. If approved, the permit will be issued by the Forestry office.

According to the Wannaska office, DNR Forestry officers and local fire departments respond to more than 2,000 wildfires every year, most of which occur during April and May when vegetation is dry and very flammable. About 40 percent of the wildfires are caused by careless or unnecessary debris burning. Fires can spread quickly through dried vegetation and get out of control.

Forestry supervisor Mark Carlstrom at Bagley said that the debris burning ban should eliminate many wildfires, thereby saving taxpayers property and money.

For further information, contact any of the following area Forestry offices: Wannaska, 425-7793; Grygla, 294-6115; and Warroad, 386-1304.

Ditch 83 suggestions

(Continued from Page 1)

feasibility study was available at the meeting and covers the basic information presented. The text of that summary follows:

Flood Record

Streamflow records on the Thief River begin in 1909. The gaging station is located just downstream from State Ditch 83 in Section 3 of south Excel township, Marshall county. U.S. Geological Survey published data from 1909 through 1997 includes 82 years of record. The gage was not in service during 1918, 1919, 1922, 1925, 1926, 1927 and 1928.

Flooding typically occurs along SD 83 when flow exceed about 1,300 cubic feet per second (cfs). This flow was exceeded at least once during 46 of the 82 years of record. This indicates a historic flood return period of about 1.8 years.

Agricultural damages are primarily associated with summer flooding. Summer floods with peak flows exceeding 1,300 cfs occurred during 21 of the 82 years of record. This indicates a summer flood return period of about 3.9 years.

Floods on the Thief River are characterized by long duration. This is due to the large amount of natural and impounded storage. While this storage tends to reduce peak flows, it also increases the probability that a flood will occur during the flow period of a preceding flood. Five of these floods occoured during the recession period of a spring flood event, when flows in the channel were still above 500 cfs. Long duration spring flood events can also substantially delay spring planting, with a resulting reduction in yield potential.

Flood Damage Reduction Strategy

Flood damage reduction may be accomplished by different methods. In general, they fall into the categories of (1) reducing flows, (2) increasing flow capacity and (3) improving flood tolerance. This study considers (1) reducing flows by storing flood waters and (2) increasing flow capacity by constructing a controlled diversion channel.

Because SD83 is upstream from other significant flood damage areas, alternatives are necessarily limited to those that would not significantly increase downstream flooding potential. The downstream flood damages are primarily related to high peak flows during major spring floods. Increasing flood storage will tend to reduce flows in all downstream areas and is therefore a regionally preferred solution. Increasing flow capacity will tend to increase downstream flows and therefore should only be done in a controlled manner that avoids contributing to downstream high peak flows.

Controlled Diversion Channels

The diversion channels are essentially an alternative to increasing SD83 channel capacity. SD83, from Agassiz downstream, is an enlarged and somewhat straightened reach of the Thief River. Further enlarging SD83 would significantly impact the existing natural resource values of the river and its riparian corridor. It would also allow an uncontrolled increase in downstream flood flows.

The diversion avoids disturbing the riparian corridor, and flows on the diversion can be controlled to avoid downstream flood impacts. The diversion channel may also be thought of as a bypass channel. During periods of high flow some of the water will bypass SD83, entering the Thief River downstream from where SD83 ends, where the natural channel capacity is greater.

The capacity of SD83 is inadequate from Agassiz to the downstream end. However, because of the substantial flow contribution of County Ditch 20, SD83 and the diversion will be considered as two reaches. The upper reach is from Agassiz to CD 20. The lower reach is from CD20 to the downstream end of SD83.

The capacity of the upper reach is about 1,100 cfs. The capacity of the lower reach is about 1,300 cfs. Early in the flood event the lower reach is limiting because of high uncontrolled flows from CD 20. Late in the flood event the upper reach is limiting because of the long duration of flows released from storage from Agassiz and the other upstream impoundments.

The maximum desirable capacity of the diversion depends on the capacity of the Thief River downstream from the diversion. Determining this capacity would require a survey of damage prone properties, which is beyond the scope of this study. For the purposes of this study, downstream capacity has not been considered to be a limiting factor. Control facilities will be operated to prevent significant downstream flood damages.

GRAND FORKS HERALD
FRONT PAGE
May 12, 1999

RE: Thief River 10-83

Don't dump on me

▪ TRF-area homeowners say Red Lake Watershed District isn't controlling upstream drainage

By Jaime DeLage
Herald Staff Writer

THIEF RIVER FALLS — Directors of the Red Lake Watershed District will address a complaint Thursday by 39 homeowners who say upstream drainage threatens their homes.

The homeowners live along the Thief and Red Lake rivers upstream of the Thief River Falls dam. They signed a petition asking the watershed board to minimize the high-water risk at their homes, which they believe is aggravated by drainage activities upstream.

"They feel the management of the water is out of control," said Loren Sanderson, acting administrator. "We're going to explain to them our views."

One of the petitioners, Tony Rader, said his riverside home is outside the 500-year flood plain,

WATERSHED: See Page 6A

MEETINGS

Two notable meetings are scheduled this week at the Red Lake Watershed District's office on Main Avenue in Thief River Falls.

This afternoon the district directors will meet with area farmers and representatives of the Minnesota Department of Natural Resources and the state Audubon Society. They'll be discussing a proposed dredging and clear-cutting project on the Thief River, and potential alternatives, from 1 to 3 p.m.

On Thursday, homeowners along the Thief and Red Lake rivers will air their complaints about upstream drainage. They're on the agenda at 10 a.m.

WATERSHED

Continued from Page 1A

but he's had to deal with a progressively higher flood three of the past four springs. In 1996, the water blew out his basement drain plugs, so he built a dike. In 1997, an ice jam pushed the river to the top of his dike, so he built it up, two feet above the high-water mark. This spring the Thief River came within a foot of topping his new dike.

Rader decided to do some investigating. He started taking different routes to job sites, observing maintenance work on the enormous ditches that drain all the way from the edge of the Beltrami Island State Forest to the Thief River.

Deeper and wider

"I was born and raised on a farm, and I know what ditch maintenance looks like and what intensifying looks like," Rader said. "They're not just taking sediment out, they're taking a foot of yellow clay out of the bottom of the ditches."

Rader believes the watershed board, whether intentionally or negligently, is allowing the ditches in the district to get deeper and the culverts to get wider. And that's causing the spring melt to overwhelm the Thief River. Rader says he's ready to hire a lawyer to collect damages from the watershed district.

"I'm not spending 10 more cents to protect my house from a problem that shouldn't exist more than every 500 years," Rader said.

Sanderson said the watershed directors would listen to the petitioners Thursday but would also point out the limits of their abilities.

"Three of the last four years have been extremely wet. There's been a lot of snowfall, a lot of moisture. We've had over 3 inches of rain just this week," Sanderson said. "That's not under our control."

Officials release wolf management plan

ST. PAUL (AP) — Scientists estimate 2,445 timber wolves roam Minnesota, a 50 percent increase from a decade ago.

A wolf management plan presented by state and federal officials Thursday would prohibit hunting and trapping them for at least five years after the animal is taken off the endangered species list.

"If wolves are to be delisted, Minnesota must have a management plan," said Allen Garber, commissioner of the Department of Natural Resources.

The proposal, which now goes to the Legislature, would allow people to kill wolves that are attacking livestock, pets or other people. But to ensure a population of at least 1,600, the plan prohibits hunting and trapping for at least five years, when the issue would be looked at again.

The plan also increases compensation to farmers when wolves kill livestock and provides for a public education campaign.

Federal officials expect the animal will be taken off the federal list within 18 months in much of the country, including Wisconsin and Michigan, where it's listed as endangered, and Minnesota, where its status was upgraded to threatened in 1978.

"The Minnesota plan represents one of the final chapters in a tremendous gray wolf success story," said Bill Hartwig, service regional director for the Fish and Wildlife Service.

Bills are expected to be introduced in the House and Senate next week to put the proposed rules into place. The DNR won't ask for money to accompany the plan until after the wolf is taken off the federal list, but will request $935,000 the year after removal and $845,000 the following year.

The money would pay for three more conservation officers, two wildlife staff, a wolf specialist and research biologist, population monitoring, research and increased compensation.

Gov. Jesse Ventura has said he supports the management plan, but hasn't given any indication on funding.

"We'll make the best case we can," said Garber, who is a late comer to the issue, taking office earlier this month.

Under federal law, the U.S. Fish and Wildlife Service must remove a species from protected status and return management to states once the animal has been brought back from the brink of extinction.

After months of difficult meetings, a 33-member roundtable of varying interests reached consensus last summer on most issues, which the DNR then put into the plan.

Lisa McGinn, a commander with the St. Paul Police Department, was one of the roundtable members. She is pleased with the final plan and the proposed bill.

"This was a struggle for all of us," she said.

That 33 people representing such diverse groups as Help Our Wolves Live and the Minnesota Cattlemen's Association could reach a consensus is remarkable, she said.

"My hope is that they (the Legislature) will look very closely at the management plan that has been presented to them and listen to what the people of Minnesota said," McGinn said.

Feb 25, 1999

Additional obituary information may appear in the Classified section

Wolf Delisting

STATE LEGISLATURES

Wolf De-listing
Page 1

Panel changes wolf proposal

▪ House committee approves earlier hunting, trapping of animals than citizens' panel wanted

Thursday, March 11, 1999

Grand Forks Herald

By Ashley Grant
Associated Press

ST. PAUL— A gray wolf management plan endorsed by a House panel Wednesday likely would allow hunting and trapping of the animals much sooner than when a citizens' panel had recommended even considering the issue.

The House Agriculture Committee agreed to allow hunting and trapping immediately after the animal is taken off the federal endangered species list if the numbers exceeded 1,600. Scientists recently estimated Minnesota has 2,445 wolves.

A 33-member "roundtable" on the wolf issue last summer recommended prohibiting any hunting or trapping for at least five years after the wolves are removed from the list in Minnesota, Wisconsin and Michigan. That's expected to happen within 18 months.

'Unacceptable'

"This is totally inconsistent with what the roundtable agreed to," said Ginny Yingling, state director of the Sierra Club and a roundtable member.

The roundtable recommended that the number of wolves should not be allowed to fall below 1,600.

"They took our minimum number of wolves and made it a maximum," Yingling said. "As amended, this bill is unacceptable."

She said her organization will lobby to return the bill to what the Department of Natural Resources had written at the conclusion of the roundtables.

If that doesn't work, her organization will work to defeat the bill.

Her other concern is that funding is not attached to pay for more conservation officers, biologists, population monitoring, research and increased compensation for farmers' losses.

That's expected to cost about $935,000 the first year after the wolf is taken off the endangered list and $845,000 in subsequent years.

Not surprised

DNR spokesman Mike DonCarlos, who was integral in drawing up the bill from the roundtable's proposals, said he was not surprised by the committee's decision, but that the DNR would fight to get the original wording restored.

"The bill as passed out of the Ag Committee does not reflect the roundtable agreement," he said.

The bill now will go to the House

WOLF: See Page 6A

WOLF/

Continued from Page 1A

Environment and Natural Resources Committee. A similar bill is expected to be heard in the Senate Environment and Natural Resources Committee early next week.

About the law

Under federal law, the U.S. Fish and Wildlife Service must remove a species from protected status and return management to states once the animal has been brought back from the brink of extinction.

Dave Mech, a wolf researcher who served as an adviser to the roundtable, recently said he disagreed with the management plan. The biologist calls himself a promoter of wolves but also says the state's wolf population needs more control than the plan provides.

'A giant step'

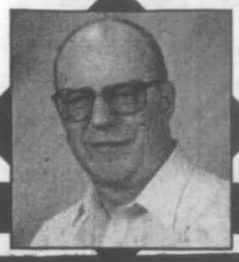
Chairman Bob Lessard, DFL-International Falls, agreed with Mech and called the changes to the bill "a giant step in the right direction."

"The wolves basically should be in the forest areas of the state," Lessard said. "They were never meant to be that prevelant in the farming areas."

Rep. Tom Bakk, DFL-Cook, said the bill as passed in the agriculture committee has a decent chance of passing in the House.

Gov. Jesse Ventura has said he supports the management plan but hasn't given any indication on funding.

Northern Watch



EDITORIAL OPINIONS

CRP

Marvin Lundin, *Editor*
Thief River Falls, Minnesota
John P. Mattson, *Publisher* • David Hill, *Associate Editor*

Hugoson Unfairly Made Scapegoat for CRP

Hey, guys, have a little understanding for Gene. The way Minnesota Commissioner of Agriculture Gene Hugoson has been maligned lately is unbefitting his meritorious service in a position which can hardly be considered enviable in today's agricultural situation.

Most recently Hugoson received the back of the hand from State Senators LeRoy Stumpf of Thief River Falls and Roger Moe of Erskine who spoke against his confirmation as Commissioner by the Senate last Saturday. That shin-kicking was uncalled for, especially when the senators chose to publicize their action by sending out news releases citing their testimony. The attempt to capitalize politically on an unpopular action by Commissioner Hugoson is obvious.

Hugoson, folks in the area will recall, wrote a letter to the Minnesota director of the federal Farm Service Agency in which he cited reasons he didn't think it was a good idea to extend CRP acreage to 30 percent of cropland in Pennington, Roseau and Marshall counties. Minnesota FSA was requesting the extension from the U.S. Department of Agriculture, and included the letter from Hugoson with the request sent to Washington.

In denying the request for extension, USDA cited the letter from Minnesota's Commissioner of Agriculture as one of its reasons for denial. Folks who had been counting on the additional five percent of CRP acreage in the three counties were angry with the decision, and particularly with the Hugoson letter. They thought he should have been more in tune to the special needs of the three counties.

That was the point made by Senators Stumpf and Moe when Hugoson's reappointment by Gov. Jesse Ventura came up in the Senate Saturday. Under Minnesota's Constitution, the State Senate must confirm the Governor's appointments of state agency commissioners. Hugoson, who had originally been appointed by Gov. Arne Carlson, had his reappointment confirmed on a voice vote.

"It's outrageous that the Commissioner isn't supporting farmers in our state every chance he gets," Sen. Stumpf said during the debate (according to his news release). "His action shows a lack of commitment to helping farmers in their time of need."

jeopardizing the office of someone who has an extensive record of being a friend to farmers on a statewide basis.

If Senators Moe and Stumpf want to take someone to task for denial of the CRP extension, it should be the representatives of the Clinton Administration in Washington who did the deed. It wasn't the Minnesota Commissioner of Agriculture who nixed the increase. To fail to give Hugoson credit for influencing positive actions in USDA while blaming him for a single perceived negative one is totally improper.

And farmers in this area who may be upset with the Commissioner's letter would be well advised to temper their animosity. They have a hard-working representative in the commissioner's office and they shouldn't condemn him to being a scapegoat for a federal decision.

"The Commissioner said he was worried that adding CRP acres would limit the availability of land for young farmers some time in the future," Sen. Moe was quoted as testifying. "But because of his action, these farmers who can't get in CRP may not have a future."

The senators' testimony smacks of the old "What have you done for me lately?" theme, and it is patently unfair. If there has been a Minnesota Commissioner of Agriculture who has expended half as much effort on behalf of this state's farmers as Commissioner Hugoson has, it had to be decades ago. In 45 years of newspaper work, we haven't seen one.

We may have been a party to criticism of the Commissioner in our news reports and editorial comment regarding denial of the CRP extension, and we stand by our contention that Hugoson did not give sufficient consideration to the dire straits of CRP applicants in Pennington, Marshall and Roseau counties. But our criticism is confined to that point alone, and it is not sufficient to justify

LETTERS

To The Editor:

I am writing you concerning the CRP acreage limit extension in Marshall county, In the earlier CRP signup (17th) the eastern one-fourth of the county was not eligible to sign up. The rest of the county was eligible and put in about 21 percent of the allowable acres. In the 18th signup the Congress opened up the eastern end of the county to the priority area, but by then there was only about three to four percent of the eligible maximum acres left in the county.

The eastern side of the county is flat, poorly drained, lower quality land where a lot of farmers are having great hardship right now due to weather, low prices, scab, etc. That is why we needed, so much, the five per cent extension of the allowable acres to 30 percent.

If the acreage had been extended to 30 percent, it would have held back water during the spring flooding and heavy rainfall as flood control for Thief River Falls, Crookston, Grand Forks and the Red River of the North. It would also affect water quality and wildlife enhancement, which are the main objects of CRP.

I feel the small towns, schools, ag-related businesses, etc., are going to be hurt much more now than if five percent more of the land would have been put in the CRP. I think it is better for the community to lose the business from five percent of the acres than to lose 100 percent of the business from all the family farms that this decision is going to put out of business.

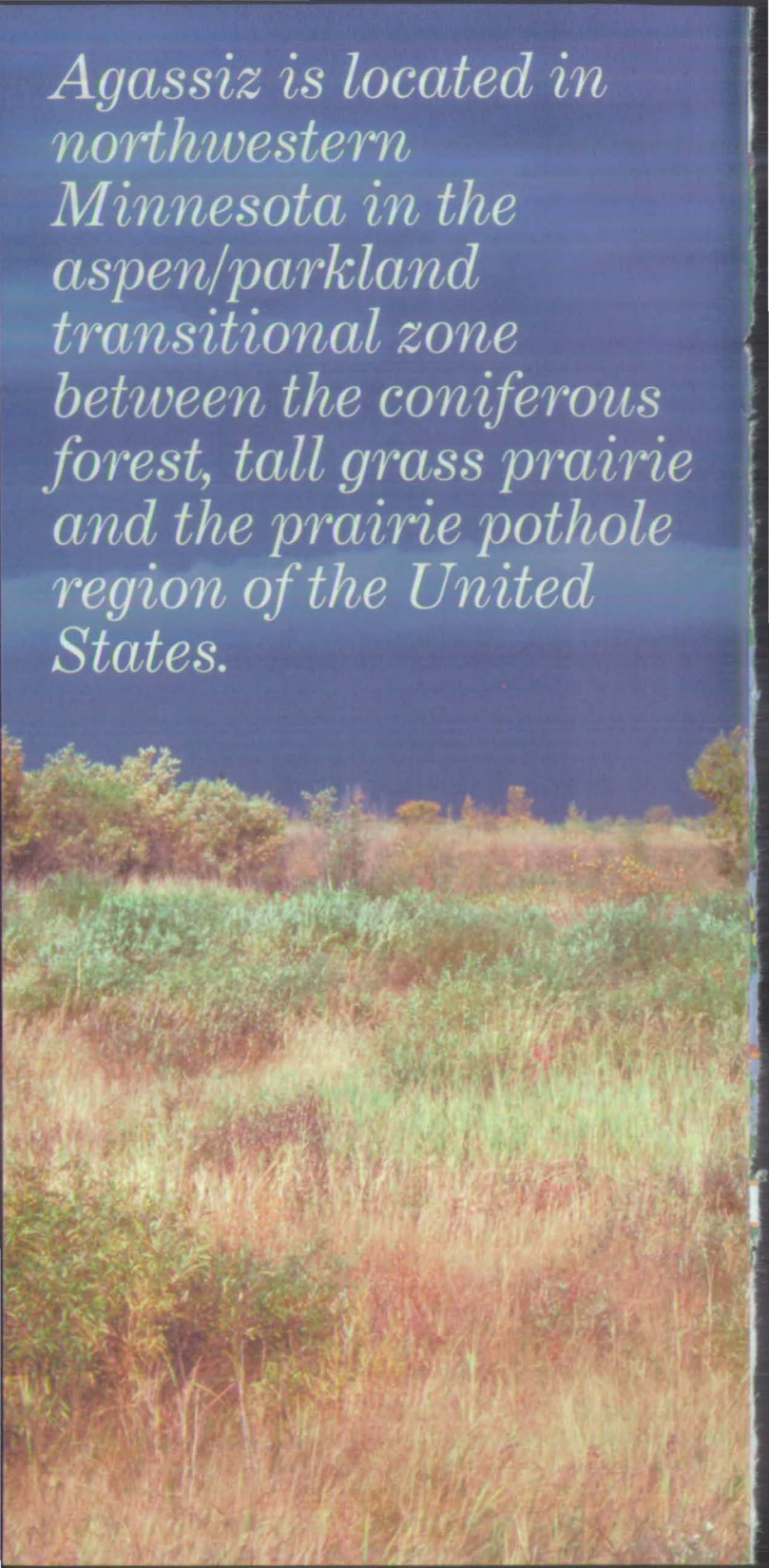
CRP may not have been the answer, but it was the only thing offered, right now, that might keep some of us from having to liquidate. If we would be getting a fair price for our crops and livestock we wouldn't be in this position.

Sincerely,
Rodney Wayne
Goodridge, MN
Farmer and Chairman of the
Marshall County FSA board

U.S. Fish & Wildlife Service

Agassiz

National Wildlife Refuge


Agassiz is located in northwestern Minnesota in the aspen/parkland transitional zone between the coniferous forest, tall grass prairie and the prairie pothole region of the United States.

Aspen/Parkland Vegetation
G. Tischer, USFWS

Agassiz: A Vital Link

Agassiz National Wildlife Refuge was established by Franklin D. Roosevelt's Executive Order on March 23, 1937. Many refuges were established during the "Dirty Thirties" to counter the devastating effects of the Dust Bowl Era on people and wildlife when severe drought conditions dried up much of the nation's midsection. Today, Agassiz is comprised of

- 40,100 acres of wetland,
- 10,000 acres of shrubland,
- 7,000 acres of forestland,
- 4,250 acres of grassland, and
- 150 acres of cropland.

This "Blue Goose" symbolizes the National Wildlife Refuge System, a network of over 500 refuges protected and managed for wildlife, habitat and people.

An additional 22,440 acres, managed by the Minnesota Department of Natural Resources, borders the refuge and creates 83,940 acres of unfragmented habitat for wildlife.

Agassiz is located in northwestern Minnesota in the aspen/parkland transitional zone between the coniferous forest, tall grass prairie and the prairie pothole region of the United States. The area was formed by a glacier that encompassed an area larger than the size of the the present-day five Great Lakes. Meltwaters from the receding glacier created Lake Agassiz over 10,000 years ago, resulting in a very flat terrain varying from one-to-two feet per mile.

Aerial View of Agassiz Pool
G. Tischer, USFWS

In an effort to improve farming operations, an extensive drainage project was undertaken in 1909. By 1933, over one million dollars had been spent trying to drain the Mud Lake area. Farming proved unsuccessful and Marshall County became so tax delinquent that the State Legislature appropriated $750,000 to save it from bankruptcy. In return, the State retained the right to use the lands for conservation purposes. Maintaining the land proved to be costly, and the State turned them over to the Bureau of Biological Survey (now the U. S. Fish and Wildlife Service) and the area became the Mud Lake Migratory Waterfowl Refuge in March of 1937.

In 1961 the name was changed to Agassiz National Wildlife Refuge. Agassiz comes from the famous Swiss-American naturalist/geologist Jean Louis Rodolphe Agassiz, for whom the prehistoric glacial lake was named. Today, Agassiz is one of more than 520 national wildlife refuges totaling more than 93 million acres throughout the United States. The National Wildlife Refuge System is the only network of lands in the world primarily dedicated to the preservation and management of fish and wildlife resources.

Managing for Diversity

The diversity of plants and wildlife is maintained by several management practices used to produce a diversity of wildlife habitats.

Revitalized Wetlands

J. Mattsson, USFWS

Upon establishment, wetlands were restored through a system of dikes and water control structures. Twenty pools have been developed ranging in size from 100 to 10,000 acres. Water management is used to create a variety of wetland types with a mix of emergent and submergent plant communities. Manipulating water levels is a vital management tool used to benefit waterfowl and shorebirds. The presence or absence of water, water depth and seasonal timing are all regulated to produce various stages of marsh habitat upon which these birds rely. Cattail is the dominant emergent plant in the wetlands. Bulrush, reed grass, white top, reed canary grass, spike rush and sedges are other typical emergent vegetation. The dominant submergent vegetation includes water milfoil, muskgrass, and sago pondweed. Abundant free floating aquatic plants include bladderwort, coontail and duckweed.

Canvasback Pair © *S. Nielsen*

Fires

G. Tischer, USFWS

Natural and man-made peat fires formed many of the smaller wetlands that dot the refuge today. Prescribed burning and brush mowing are tools used to maintain the grasslands and shrublands for nesting waterfowl as well as to provide habitat for moose and deer. This human intervention maintains the mosaic of grasslands, shrublands, forestlands and sedge meadows needed by native wildlife species.

Farming

USFWS

Farming provides foods essential for waterfowl embarking on their annual migration south. Primary crops include barley, oats and winter wheat. Resident wildlife species also benefit from the farming program.

Wilderness Area

Pitcher Plants
W.D. Vasse

In 1976, 4,000 acres in the north-central portion was designated as "Wilderness" and is managed under the *National Wilderness Preservation System*. It is one of the most westerly extensions of black spruce-tamarack bog in Minnesota. Two lakes in this area, Whiskey and Kuriko, were formed by deep peat fires which occurred prior to settlement of the area.

Wildlife

Agassiz National Wildlife Refuge provides a haven for many wildlife species. As many as 280 species of birds use the refuge; half which nest on the refuge. Forty-nine species of mammals, 12 species of amphibians and 9 species of reptiles also call Agassiz home.

The refuge supports 17 species of breeding ducks as well as giant Canada geese. In an average year 7,500 pairs of ducks and 250 pairs of Canada geese nest at Agassiz. The diversity of wetland and upland habitat provides excellent protection for ducklings, goslings and molting waterfowl.

Annual migrations bring peak numbers of waterfowl in May and October. Fall duck numbers can be as high as 100,000 and Canada geese 25,000. The Eastern Prairie Population of Canada geese is the most abundant goose subspecies that migrates through Agassiz.

Colonial nesting birds include large colonies that average 25,000 nesting pairs of Franklin's gulls, 50-to-150 nesting pairs of eared grebes and

Photos: Common Yellowthroat, *M.H.Lee;* Mallards, *S. Nielsen;* Canada Goose and Franklin's Gull, *J. Mattsson, USFWS*

Flock of Ducks
Photo: *J. Mattsson, USFWS*

500 nesting pairs of black-crowned night herons. Smaller colonies of western grebes, great blue herons and double-crested cormorants also nest here.

For many years the average moose population on the refuge and adjoining state wildlife management areas was 250. In 1993 the population declined sharply for unknown reasons; since 1998 the population has slowly increased from its low of 50 animals!

Deer are usually abundant and have attained a peak population of 3,000 animals. However, severe winters in 1995-96 and 1996-97 reduced the herd to a record low of 430 animals.

Agassiz also has two resident packs of eastern gray wolves. These wolves roam the entire area during the winter months, but favor the grassland and forestland on the east and south sides during the rest of the year.

In 1992, after a 30-year absence, bald eagles began renesting on the refuge. Four pairs nested in 1999.

Photos: Black-crowned Night Heron, ©*B Silliker;* Moose, *G. Tischer, USFWS;* White-tail Deer and Gray Wolf Pup, *J. Mattsson, USFWS;* Bald Eagles, ©*S. Nielsen*

Watchable Wildlife Viewing Opportunities

One of the most popular visitor attractions is the opportunity to view a moose in the wild. Although moose can be observed in all habitat types, focus your attention on willow thickets. September and October are the best months to observe moose.

White-tailed deer can be observed throughout the refuge and adjoining state wildlife management areas.

Gray wolf observations occur infrequently on and off the refuge.

Bald eagles are observed most frequently during spring and fall migration.

Snowshoe Hare
J. Johnson, USFWS

Canada geese start arriving in mid-March; ducks in early April. May through mid-June is the best time to observe ducks, when their colorful spring plumage makes identification easier. Goslings can be observed as early as the first week in May, and ducklings as early as the third week in May. Peak fall populations of Canada geese and ducks occurs from late-September through October.

Best Wildlife Observation Periods

- Franklin's Gulls: May 1-July 15
- Warblers: May 15-25
- Sandhill Cranes: April 25-May 5 and September 25-October 10
- Sparrow species: May 15-25
- Shorebirds: May 20-30 and August 15-September 15
- Moose Calves: May 15-June 15
- Moose Rut: September 15-October 31.

Wildlife observation opportunities are best in the early morning or late afternoon hours, during feeding times. Staying in your vehicle and using it as a blind usually improves your chances of seeing wildlife.

Public Use Opportunities

Lost Bay Habitat Drive is a four-mile self-guided auto drive. *Maakstad Hiking Trail* is a quarter-mile foot trail along the auto drive. *Headquarters Hiking Trail*, a one-half mile self-guided foot trail, is located at Headquarters. The drive and trails provide opportunities for nature study, wildlife photography and observation. All are open from May through October during daylight hours. Hiking is only allowed on the drive and designated hiking trails.

A 100-foot observation tower and a 14-foot observation deck are available for viewing the refuge. Use of the 100-foot tower is permitted during the snow-free months, during office hours. A key must be obtained at the office.

Refuge Information
Information about Agassiz and the U.S. Fish and Wildlife Service are available at refuge headquarters and at kiosks along Marshall County Road 7. Exhibits of wildlife mounts are on display in the office building. Also, guidebooks and gift items can be purchased; *proceeds help support activities on the Refuge!*

Deer hunting is allowed during the regular firearm season in accordance with Minnesota's deer firearm season regulations and special Refuge regulations.

Several weekend events are held from May through October. Wildlife or plant related programs are presented at these events. Annual recurring events are *International Migratory Bird Day* (May), waterfowl banding (September), and *National Wildlife Refuge Week* (September/October). Check the Fish and Wildlife Service home page, **http: //www.fws.gov/r3pao/**, for announcements pertaining to Agassiz and other National Wildlife Refuge events.

Schools, universities and other groups are welcome to visit and study nature. Tours, talks and demonstrations can be planned with staff members.

Meadow Vole,
D. S. Licht

Accommodations

Camping is not authorized on the refuge. Designated primitive camping sites, located on adjacent state wildlife management areas, are available year round and can be used free of cost. Camping with facilities are available at Old Mill State Park, 30 miles west of refuge headquarters, or in the Thief River Falls Tourist Park, 23 miles southwest of the refuge.

The nearest motel accommodations are available in Thief River Falls, 23 miles southwest on State Highway #32 and at Grygla, 18 miles east of the refuge headquarters on State Highway #89.

Headquarters Location and Office Hours

Refuge headquarters is located 11 miles east of Holt, Minnesota on Marshall County Road 7. Office hours are 7:30 am to 4:00 pm, Monday through Friday, excluding federal holidays.

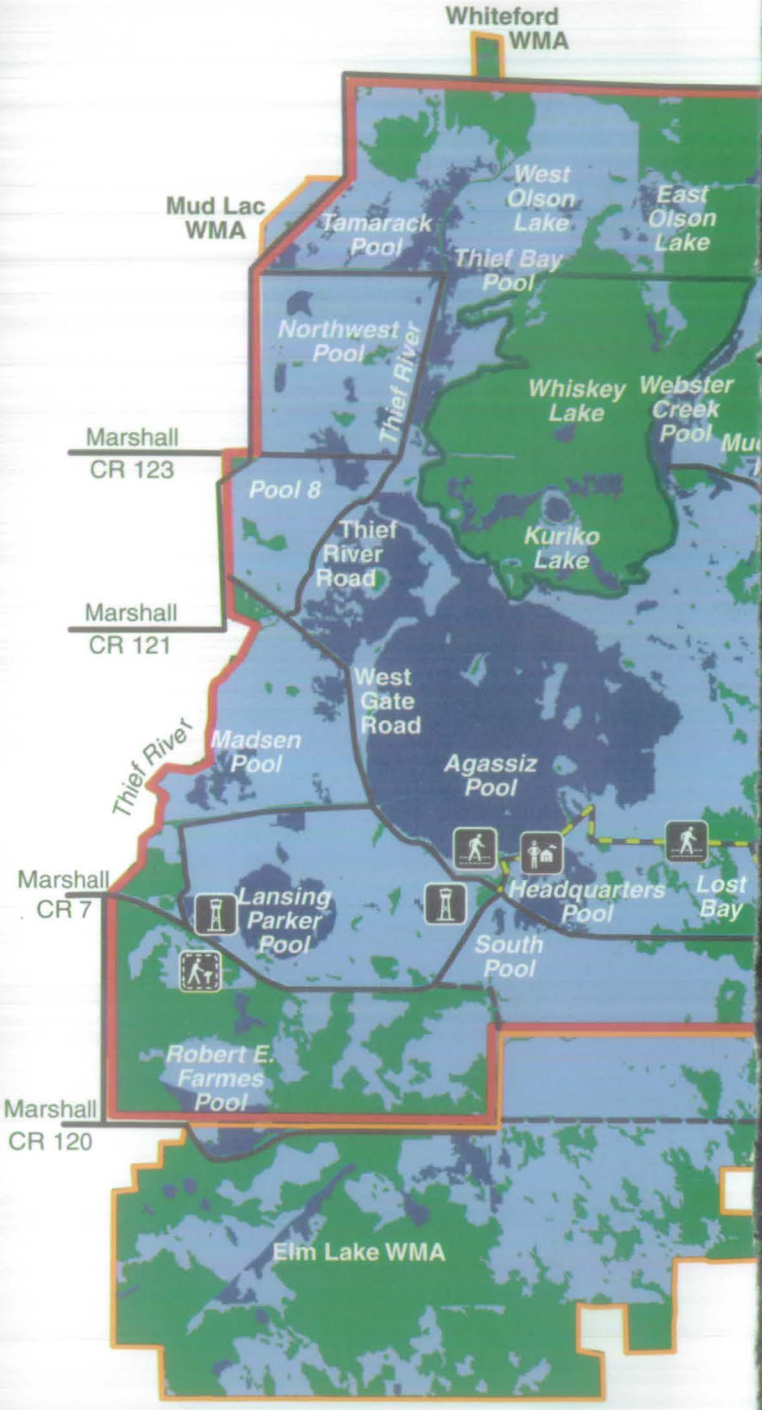
Need More Information?

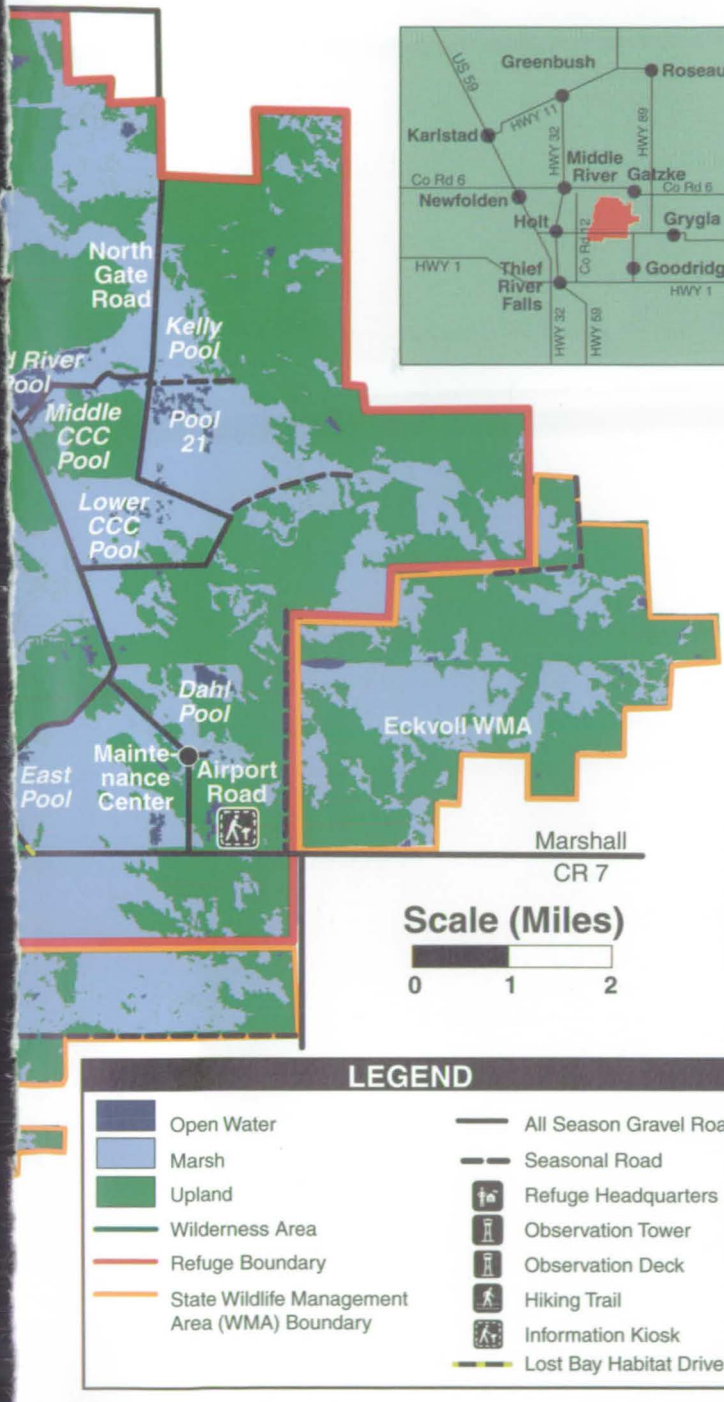
For additional information contact:
Refuge Manager
Route 1, Box 74
Middle River, Minnesota 56737-9653.
Phone: (Holt) 218/449-4115.

Information on Agassiz National Wildlife Refuge can also be found on Agassiz's Home Page http://www.fws.gov/r3pao/agassiz/index.html.

Equal opportunity to participate in, and benefit from the programs and activities of the U.S. Fish and Wildlife Service is available to all individuals regardless of age, race, religion, color, sex, national origin, or disability. Contact: U.S. Department of the Interior, Office for Equal Opportunity, 1849 C Street, N.W., Washington, D.C. 20240.

Available in alternate formats upon request.


Whiteford WMA
Mud Lac WMA
Tamarack Pool
West Olson Lake
East Olson Lake
Thief Bay Pool
Northwest Pool
Thief River
Whiskey Lake
Webster Creek Pool
Marshall CR 123
Pool 8
Thief River Road
Kuriko Lake
Marshall CR 121
West Gate Road
Madsen Pool
Agassiz Pool
Thief River
Marshall CR 7
Lansing Parker Pool
Headquarters Pool
Lost Bay
South Pool
Robert E. Farmes Pool
Marshall CR 120
Elm Lake WMA

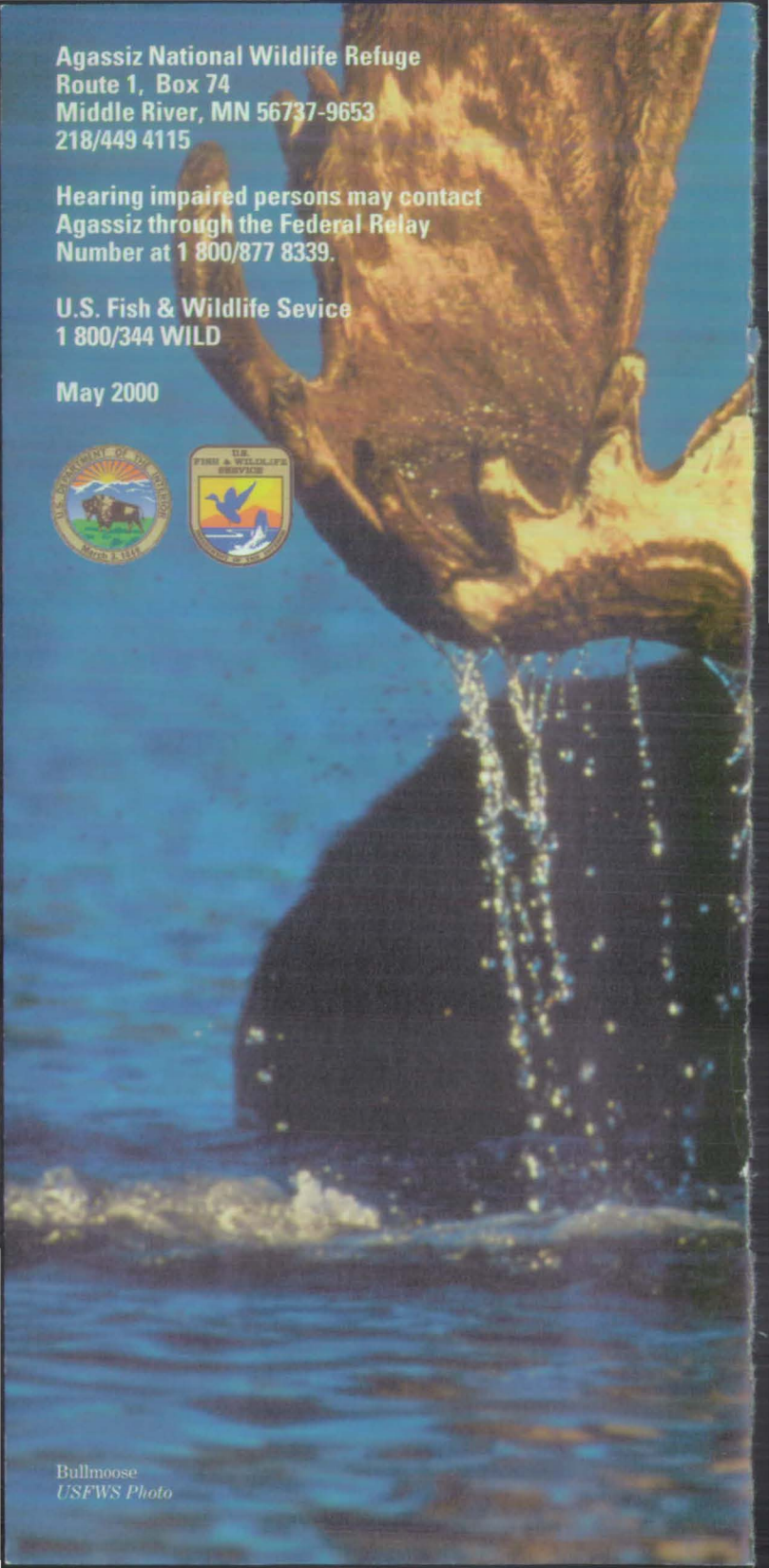

Greenbush
Roseau
US 59
Karlstad
HWY 11
HWY 32
HWY 89
Middle River
Gatzke
Co Rd 6
Newfolden
Holt
Co Rd 12
Grygla
HWY 1
Thief River Falls
Goodridge
HWY 59
North Gate Road
Kelly Pool
Middle CCC Pool
Pool 21
Lower CCC Pool
Dahl Pool
Eckvoll WMA
East Pool
Maintenance Center
Airport Road
Marshall
CR 7
Scale (Miles)
0
1
2
LEGEND
Open Water
Marsh
Upland
Wilderness Area
Refuge Boundary
State Wildlife Management Area (WMA) Boundary
All Season Gravel Road
Seasonal Road
Refuge Headquarters
Observation Tower
Observation Deck
Hiking Trail
Information Kiosk
Lost Bay Habitat Drive

Agassiz National Wildlife Refuge
Route 1, Box 74
Middle River, MN 56737-9653
218/449 4115

Hearing impaired persons may contact Agassiz through the Federal Relay Number at 1 800/877 8339.

U.S. Fish & Wildlife Sevice
1 800/344 WILD

May 2000



Bullmoose
USFWS Photo

U.S. Fish & Wildlife Service

Agassiz

National Wildlife Refuge Mammal List

Introduction

*The "**Blue Goose**" symbolizes the National Wildlife Refuge System, a network of over 500 refuges protected and managed for wildlife, habitat and people.*

Agassiz National Wildlife Refuge, established in 1937, occupies part of the eastern bed of glacial Lake Agassiz in northwestern Minnesota. This aspen parkland area is located between the tall grass prairie to the west and the coniferous forest to the east. Open water and freshwater marshes occupy 40,000 acres of the refuge. Extensive areas of willow, trees and grasses are found on an additional 21,500 acres on higher ground. Common trees growing in the hardwood forest are aspen, bur oak, green ash, elm and box elder. Two black spruce-tamarack bogs with associated bog lakes comprise a 4,000 acre wilderness area.

Prior to colonization 81 species of mammals were found in Minnesota. Today there are 74 resident species within the state. Over half, 49 species, can be found on the refuge, because of the plant diversity which provides food and shelter.

Mammals on the refuge range in size from the small pygmy shrew to the large Northwestern moose. Mammals are important in the ecology of the refuge. Herbivores such as mice, squirrels, rabbits, hares, muskrats and deer change plant food energy into animal protein which then becomes available to predators such as mink, gray wolf, hawks and owls. Some of the mammals such as raccoon, red fox and coyote play the role of scavengers, as well as predators.

Many mammals are fairly common and are most active during early morning or late evening. Others are rare, secretive, or appear only at night. Mammals select habitat which provides good cover making observation more difficult than birds. Some of the best ways to determine a mammals presence is to look for their tracks, droppings, dens, holes, beds, or mounds. Binoculars and a picture field

guide will help you identify mammals. Should you observe an unlisted, rare, or uncommon mammal species, please contact the refuge office.

Scientific names and the order in which they appear follow Jones, et. al., *"Revised Checklist of North American Mammals North of Mexico, 1975;"* while common names are taken from Burt and Grossenheider *"A Field Guide to the Mammals, 1962."*

Bull Moose
(J. Mattson)

Moose

Four subspecies of moose are recognized in North America. Agassiz is home to the third largest subspecies, the Northwestern. Standing six feet tall from the shoulders, bulls weigh from 800 to 1100 pounds and cows weigh from 600 to 800 pounds.

Moose are the largest member of the deer family. Both sexes have a "bell" attached to the throat, which is a distinct pendulous flap of skin and hair.

Rutting, or breeding season, lasts from mid-September through October. After an eight month gestation period cows calve in late May and June, usually producing a single calf, weighing between 25 to 35 pounds. For at least the first year of their life calves are dependent on the cow for protection, warmth, and in the winter for gaining access to food and shelter by following her trail through the snow. Normal winter population of moose on the refuge and the three adjoining state wildlife management areas is 250 animals. Willow is their preferred food, but in summer they also feed on submerged aquatic plants.

Moose can be observed throughout the refuge and state areas. Cows with calves are best observed in June and bulls are frequently observed during the breeding season. For your safety do not approach cows with calves or bulls during the breeding season.

Gray Wolf
(J. Mattson)

Wolf

In February 1982, establishment of a wolf pack on Agassiz was confirmed. Since 1982 a second pack has been established on the refuge and adjoining state wildlife management areas. Although secretive, wolves may be observed throughout the year.

Gray wolves are divided into five subspecies in North America. Wolves in Minnesota are considered to be the Great Plains Wolf subspecies. Adult wolves stand 30 inches high at the shoulder and weigh from 60 to 120 pounds. Color varies from almost white in the arctic to nearly black, with gray being most common. The number of wolves in a pack ranges from 6 to 12 animals. The pack is composed of a dominant breeding pair of adults, which mate for life, and offspring from previous years. Four to seven pups are born in late April. Pup mortality exceeds 50% during the first year of life. A wolf pack's territory varies from 50 to 150 square miles depending on food availability.

Gray wolves were originally the most widely distributed land mammal in the world, living on all four northern hemispheric continents. Gray wolves lived throughout North America before colonial settlers arrived. With settlement, the wolf was eradicated throughout most of its former range. Consequently, it was protected under the Endangered Species Act of 1973. Before 1973, there were about 650 wolves in Minnesota. As of 1997, their numbers have increased to about 2000. This increase has prompted the U.S. Fish and Wildlife Service to consider removing the gray wolf from the Endangered Species List in Minnesota and the Great Lakes Area.

White-tailed Deer *(J. Jave)*

White-tailed Deer

White-tailed deer are one of the more commonly observed animals on the refuge. Annual deer population ranges from 1,000 to 3,500 deer on Agassiz and the three adjoining state wildlife management areas. Look for deer in all types of habitats. Fawns are born in late May or June.

Fisher *(D. Licht)*

Fisher

Fisher, a tree dwelling weasel larger than the ground living weasel species, is about the size of a red fox. Pine marten, a close relative to the fisher, is smaller and lives in the coniferous forest of Minnesota. Color of the fisher is dark brown, almost black, with a grizzled appearance caused by white bands on the guard hairs. The tail is long, hairy and bushy. One to four young are born in late March or early April. Although fisher have lived on the refuge for many years, the first documentation of fisher born on the refuge was in June of 1993. Fishers are solitary, except during mating and when rearing their young. Fishers live mainly in the hardwood forest and are rarely observed.

River Otter
(D. Licht)

River Otter

River otters are large weasel-like mammals, three to four times the size of a mink. Otters present a sleek appearance with their fairly small head, long slender body and long, thick tapering tail with short hair. Fur color is dark brown, a bit lighter on the underside, and often grayish or silvery on the throat. The otter's eyes are located toward the front of the face giving better frontal vision. Usually 2 to 4 young are born in April or May. Otter crossings between pools and ditches can be observed along the roads and trails. Otters can be observed in wetlands, especially ditches, throughout the refuge.

Muskrat
(J. Mattson)

Muskrat

Muskrat are rich brown in color with a silver colored belly and a long, black, naked tail. Muskrat are sometimes confused with beaver, but beaver are larger and have a flat, broad tail. Five to six young are born per litter with some females producing up to three litters per year.

Muskrat begin building houses in September out of cattail, bulrush, and other wetland vegetation. Their houses provide loafing and resting sites to Canada geese and ducks which nest on top of muskrat houses.

Mink *(D. Engler)*

Mink

Mink may be observed in any of the wetlands. Mink and otters look similar, except mink are smaller in size and have a hairy, bushy tail. In the winter, mink feed almost exclusively on muskrat.

Coyote *(D. Licht)*

Coyote

Coyote, sometimes referred to as a "brush wolf", look like a medium-sized dog and are gray or reddish gray, with rusty legs, feet, and ears. Throat and belly are white color. Five to ten pups are born in April. Since the gray wolf became established, coyote numbers have declined and are rarely observed.

Red Fox
(K. Hollingsworth)

Red Fox

Red fox have the appearance of a small dog. Four to nine pups are born in April. Young fox disperse from the parent's territory in September - October. Red fox may be observed on roads, trails and dikes or in any of the upland habitats throughout the year.

Complete Mammal Listing

Masked shrew *(Sorex cinereus)*
Water shrew *(Sorex palustris)*
Arctic shrew *(Sorex arcticus)*
Pygmy shrew *(Microsorex hoyi)*
Short-tailed shrew *(Blarina brevicauda)*
Star-nosed mole *(Condylura cristata)*
Little brown myotis *(Myotis lucifugus)*
Big brown bat *(Eptesicus fuscus)*
Red bat *(Lasiurus borealis)*
Hoary bat *(Lasiurus cinereus)*
Eastern cottontail *(Sylvilagus floridanus)*
Snowshoe hare *(Lepus americanus)*
White-tailed jackrabbit *(Lepus townsendii)*
Woodchuck *(Marmota monax)*
Thirteen-lined ground squirrel *(Spermophilus tridecemlineatus)*
Franklin's ground squirrel *(Spermophilus franklini)*
Eastern chipmunk *(Tamias striatus)*
Gray squirrel *(Sciurus carolinensis)*
Fox squirrel *(Sciurus niger)*
Red squirrel *(Tamiasciurus hudsonicus)*
Northern flying squirrel *(Glaucomys sabrinus)*
Plains pocket gopher *(Geomys bursarius)*
Beaver *(Castor canadensis)*
Deer mouse *(Peromyscus manicuslatus)*
White-footed mouse *(Peromyscus leucopus)*
Gapper's red-backed vole *(Clethrionony gapperi)*
Meadow vole *(Microtus pennsylvanicus)*
Muskrat *(Ondatra zibethicus)*
●Norway rat *(Rattus norvegicus)*
House mouse *(Mus musculus)*
Meadow jumping mouse *(Zapus hudsonius)*
Porcupine *(Erethizon dorsatum)*
Coyote *(Canis latrans)*
Gray wolf *(Canis lupus)*
Red fox *(Vulpes vulpes)*
Gray fox *(Urocyon cinereoargenteus)*
Black bear *(Ursus americanus)*
◆Raccoon *(Procyon lotor)*
Fisher *(Martes pennanti)*
Ermine (Shortailed weasel) *(Mustela erminea)*
Least weasel *(Mustela nivalis)*
Long-tailed weasel *(Mustela frenata)*
Mink *(Mustela vison)*
Badger *(Taxidea taxus)*
Striped skunk *(Mephitis mephitis)*
River otter *(Lutia canadensis)*
Bobcat *(Lynx rufus)*
★American elk *(Cervus elaphus)*
White-tailed deer *(Odocoileus virginianus)*
Moose *(Alces alces)*

● Exotic species
◆ Not native to area before colonial settlement
★ Not a resident mammal of the refuge

Agassiz National Wildlife Refuge
Route 1, Box 74
Middle River, MN 56737
218/449-4115

1 800/657-3775 (V/TTY)
State Relay Service
for the Hearing Impaired

U.S. Fish & Wildlife Sevice
1 800/344 WILD

July 1998

Agassiz

National Wildlife Refuge Bird Checklist

Agassiz National Wildlife Refuge occupies part of the bed of glacial Lake Agassiz in northwestern Minnesota. Containing 61,500 acres, it is a unit in a chain of National Wildlife Refuges in the Mississippi Flyway extending from Canada to Mexico. It was established in 1937.

County Highway 7 passes through the southern portion of the refuge and provides an excellent cross-section of the local habitat types. The terrain is flat with an average of only 1 foot of change in elevation per mile. Open water and freshwater marshes occupy 40,000 acres. On higher ground, extensive areas of willows, open grasslands and scattered stands of hardwoods are conspicuous. Two spruce-tamarack bogs with associated bog lakes comprise a wilderness area within the refuge.

The refuge's shallow water marshes and emergent plants attract breeding waterfowl and provide optimum habitat conditions for production.

This list contains 280 species which have been observed on the Refuge. The information is obtained from Refuge personnel and other interested birders, such as yourself. **Visiting birders are encouraged to share their rare or unusual sightings with refuge staff!**

Legend

S - Spring ..... **March - May**
s - Summer ..... **June - July**
F - Fall ..... **August - November**
W - Winter ..... **December - February**

a .. Abundant ... Common species that is very numerous
c .. Common ..... Certain to be seen or heard in suitable habitat
u .. Uncommon Present, but not certain to be seen
o .. Occasional . Seen only a few times during a season
r ... Rare ..... Seen at intervals of 2-5 years
***** ..... Nesting species
# ..... State threatened and endangered species

Common Name	S	s	F	W
Loons				
Common Loon	o	r	o	
Grebes				
Pied-billed Grebe*	a	a	a	
Horned Grebe*	o	r	o	
Red-Necked Grebe*	c	c	c	
Eared Grebe*	u	u	o	
Western Grebe*	o	o	o	
Pelicans				
American White Pelican	c	c	c	
Cormorants				
Double-crested Cormorant*	c	c	c	
Herons and Bitterns				
American Bittern*	c	c	c	
Least Bittern*	u	u	u	
Great Blue Heron*	c	c	c	
Great Egret*	u	u	u	
Snowy Egret*	r	r		
Little Blue Heron	r			
Cattle Egret	r	r	r	
Green Heron*	u	u	u	
Black-crowned Night-Heron*	c	c	c	
Swans, Geese and Ducks				
Tundra Swan	c	r	c	
Trumpeter Swan	r			
Greater White-fronted Goose	o		r	
Snow Goose	u		c	
Canada Goose*	c	a	c	
Wood Duck*	u	u	u	
Green-winged Teal*	c	u	a	
American Black Duck*	o	r	u	
Mallard*	a	a	a	
Northern Pintail*	c	u	c	
Blue-winged Teal*	a	a	a	
Northern Shoveler*	c	c	c	
Gadwall*	c	c	a	
American Wigeon*	c	c	a	
Canvasback*	c	c	u	
Redhead*	c	c	c	
Ring-necked Duck*	c	c	c	
Lesser Scaup*	u	c	c	
Greater Scaup	u		u	
Oldsquaw	r		r	
White-winged Scoter	o	r	o	
Common Goldeneye*	c	r	u	
Bufflehead*	c	u	u	
Hooded Merganser*	c	u	u	
Common Merganser	u	r	o	
Red-breasted Merganser	o			
Ruddy Duck*	c	c	c	
Vultures				
Turkey Vulture	o	o	o	
Hawks and Eagles				
Osprey	r		r	
Bald Eagle*#	u	u	u	o
Northern Harrier*	c	c	c	
Sharp-shinned Hawk*	u	r	c	
Cooper's Hawk*	o	r	o	
Northern Goshawk*	o		o	u
Broad-winged Hawk*	u	r	u	
Swainson's Hawk			r	
Red-tailed Hawk*	c	c	c	
Rough-legged Hawk	c		c	u
Golden Eagle	r		r	r
Falcons				
American Kestrel*	u	u	u	
Merlin	o		o	
Peregrine Falcon#	o		o	
Upland Game Birds				
Gray Partridge*	o	o	o	o
Ruffed Grouse*	c	c	c	c
Sharp-tailed Grouse*	o	o	o	o
Rails and Coots				
Yellow Rail*	u	u		
Virginia Rail*	c	c	c	
Sora*	c	a	c	
American Coot*	a	a	a	
Cranes				
Sandhill Crane*	c	c	a	
Shorebirds				
Black-bellied Plover	o		o	
Lesser Golden Plover	o		o	
Semipalmated Plover	c	r	c	
Killdeer*	c	c	c	
American Avocet*	r	r		
Greater Yellowlegs	c	o	c	
Lesser Yellowlegs	c	u	c	
Solitary Sandpiper	u	o	u	
Willet	r		r	
Spotted Sandpiper*	c	c	c	
Upland Sandpiper*	o	o		
Hudsonian Godwit	u			
Marbled Godwit*	o	o		
Ruddy Turnstone	r		r	
Sanderling	o		o	
Semipalmated Sandpiper	c	o	u	
Least Sandpiper	c	c	c	
White-rumped Sandpiper	o		r	
Baird's Sandpiper	o		o	
Pectoral Sandpiper	c		c	
Dunlin	u		o	
Stilt Sandpiper	u		u	
Buff-breasted Sandpiper	r		r	
Short-billed Dowitcher	u	o	u	
Long-billed Dowitcher	c		c	
Common Snipe*	c	c	c	
American Woodcock*	u	u	u	
Wilson's Phalarope*	u	r	o	
Red-necked Phalarope	o		o	
Gulls and Terns				
Franklin's Gull*	a	a	o	
Bonaparte's Gull	u	r	u	
Ring-billed Gull	c	r	c	
Herring Gull	u		u	
Caspian Tern	o		o	
Common Tern	o		r	
Forster's Tern*	c	c	c	
Black Tern*	c	c	c	
Doves				
Rock Dove	r	r	r	
Mourning Dove*	c	a	c	
Cuckoos				
Black-billed Cuckoo*	u	c	u	
Owls				
Eastern Screech Owl	r			
Great Horned Owl*	c	c	c	c
Snowy Owl	o		u	u
Northern Hawk Owl				r
Barred Owl	r		r	r
Great Gray Owl		r	r	r
Long-eared Owl	r	r		
Short-eared Owl*	o	r	o	o
Northern Saw-whet Owl*	r	r		r
Nighthawks and Nightjars				
Common Nighthawk*	u	u	u	
Whip-poor-will*	u	u	u	
Swifts				
Chimney Swift	r	r		
Humingbirds				
Ruby-throated Hummingbird*	u	u	u	
Kingfishers				
Belted Kingfisher*	o	o	o	
Woodpeckers				
Red-headed Woodpecker	o	o	o	
Yellow-bellied Sapsucker	u	u	u	
Downy Woodpecker*	c	c	c	c
Hairy Woodpecker*	c	c	c	c
Black-backed Woodpecker	r	r	r	r
Northern Flicker*	c	c	a	
Pileated Woodpecker*	u	u	u	u
Flycatchers				
Olive-sided Flycatcher	r	r		
Eastern Wood-Pewee*	c	c	c	
Yellow-bellied Flycatcher		o		
Alder Flycatcher*	u	c		
Willow Flycatcher	r	r		
Least Flycatcher*	c	c	u	
Eastern Phoebe*	o	o	o	
Great Crested Flycatcher*	u	c	o	
Western Kingbird	u	r	u	
Eastern Kingbird*	c	c	c	
Larks				
Horned Lark*	o	o	o	r
Swallows				
Purple Martin*	o	r		
Tree Swallow*	c	c	c	
Bank Swallow	o		o	
Cliff Swallow*	c	a	c	
Barn Swallow*	c	u	c	
Jays and Crows				
Gray Jay*	r	r	r	o
Blue Jay*	c	c	c	
Black-billed Magpie*	o	o	o	o
American Crow*	c	c	c	
Common Raven*	u	o	u	c
Chickadees and Titmice				
Black-capped Chickadee*	c	c	c	c
Boreal Chickadee	o	o	o	o
Nuthatches				
Red-breasted Nuthatch	o	r	o	o
White-breasted Nuthatch*	c	c	c	c

Common Name	S	s	F	W
Creepers				
Brown Creeper	o		o	
Wrens				
House Wren*	c	c	c	
Winter Wren	r	r	r	
Sedge Wren*	u	a	u	
Marsh Wren*	a	a	u	
Kinglets, Bluebirds and Thrushes				
Golden-crowned Kinglet*	c	r	c	
Ruby-crowned Kinglet*	c	r	c	
Eastern Bluebird*	u	u	u	
Veery*	u	c	o	
Gray-cheeked Thrush	o		o	
Swainson's Thrush	u		o	
Hermit Thrush	u		u	
American Robin*	c	c	c	
Mimics				
Gray Catbird*	u	c	u	
Northern Mockingbird	r		r	
Brown Thrasher*	u	u	u	
Pipits				
American Pipit	o		u	
Waxwings				
Bohemian Waxwing	r		r	r
Cedar Waxwing*	u	c	u	
Shrikes				
Northern Shrike	o		o	r
Starlings				
European Starling*	o	o	o	
Vireos				
Solitary Vireo	o		o	
Yellow-throated Vireo*	o	o	o	
Warbling Vireo*	u	c	u	
Philadelphia Vireo	o	r	o	
Red-eyed Vireo*	c	c	u	
Warblers				
Golden-winged Warbler			r	
Tennessee Warbler	c		c	
Orange-crowned Warbler	u		u	
Nashville Warbler*	o	c	u	
Northern Parula	r		r	
Yellow Warbler*	c	a	c	
Chestnut-sided Warbler*	o	o		
Magnolia Warbler	u		u	
Cape May Warbler	u		u	

Common Name	S	s	F	W
Yellow-rumped Warbler*	a	o	a	
Black-throated Green Warbler	u	r	o	
Blackburnian Warbler*	o	u	o	
Pine Warbler	c		c	
Palm Warbler	c		c	
Bay-breasted Warbler	o		o	
Blackpoll Warbler	c		c	
Black-and-white Warbler	u	o	u	
American Redstart*	u	u	u	
Ovenbird*	u	u	o	
Northern Waterthrush	u	r	u	
Connecticut Warbler*	r	r		
Mourning Warbler	o	o		
Common Yellowthroat*	c	a	c	
Wilson's Warbler	u		o	
Canada Warbler	o	r		
Tanagers				
Scarlet Tanager	r	r	r	
Grosbeaks, Buntings and Sparrows				
Rose-breasted Grosbeak*	u	c	o	
Indigo Bunting	r	r	r	
Eastern Towhee		o		
American Tree Sparrow	c		c	
Chipping Sparrow*	u	o	u	
Clay-colored Sparrow*	c	a	c	
Vesper Sparrow*	u	c	u	
Savannah Sparrow*	u	u	u	
Grasshopper Sparrow		r		
Le Conte's Sparrow	u	c	u	
Nelson's Sharp-tailed Sparrow*	o	u		
Fox Sparrow	c		c	
Song Sparrow*	c	c	u	
Lincoln's Sparrow	o		o	
Swamp Sparrow*	u	c	u	
White-throated Sparrow*	c	c	c	
White-crowned Sparrow	u		u	
Harris' Sparrow	u		u	
Dark-eyed Junco	c		c	
Lapland Longspur	u		u	
Snow Bunting	u		u	o
Blackbirds and Orioles				
Bobolink*	o	o	o	
Red-winged Blackbird*	c	c	c	
Western Meadowlark*	o	o	o	
Yellow-headed Blackbird*	c	c	c	
Rusty Blackbird	u		u	
Brewer's Blackbird*	o	o	o	
Common Grackle*	c	o	c	
Brown-headed Cowbird*	c	a	c	
Baltimore Oriole*	c	c	o	

Common Name	S	s	F	W
Finches				
Pine Grosbeak	o		o	u
Purple Finch*	u	o	u	
House Finch	r			r
Red Crossbill			o	o
White-winged Crossbill			o	o
Common Redpoll	c		u	c
Hoary Redpoll	r			r
Pine Siskin	u	r	u	o
American Goldfinch*	c	c	c	
Evening Grosbeak	u		u	u
Old World Sparrows				
House Sparrow*	o	o	o	

Rare and Accidental Birds

Yellow-crowned Night Heron	Red Knot
Tri-colored Heron	Ruff
White-faced Ibis	Laughing Gull
Brant	Ross' Gull
Cinnamon Teal	California Gull
European Widgeon	Boreal Owl
Surf Scoter	N. Rough-winged Swallow
Red-shouldered Hawk	Mountain Bluebird
Ferruginous Hawk	Wood Thrush
Gyrfalcon	Sage Thrasher
Prairie Falcon	Sprague's Pipit
Greater Prairie Chicken	Loggerhead Shrike
King Rail	Yellow-throated Warbler
Common Moorhen	Prothonotary Warbler
Snowy Plover	Northern Cardinal
Piping Plover*#(1981)	Field Sparrow
Whimbrel	Smith's Lonspur

Agassiz
National Wildlife Refuge
Route 1, Box 74
Middle River, MN 56737
218/449-4115

U.S. Fish & Wildlife Service
1 800/344 WILD

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

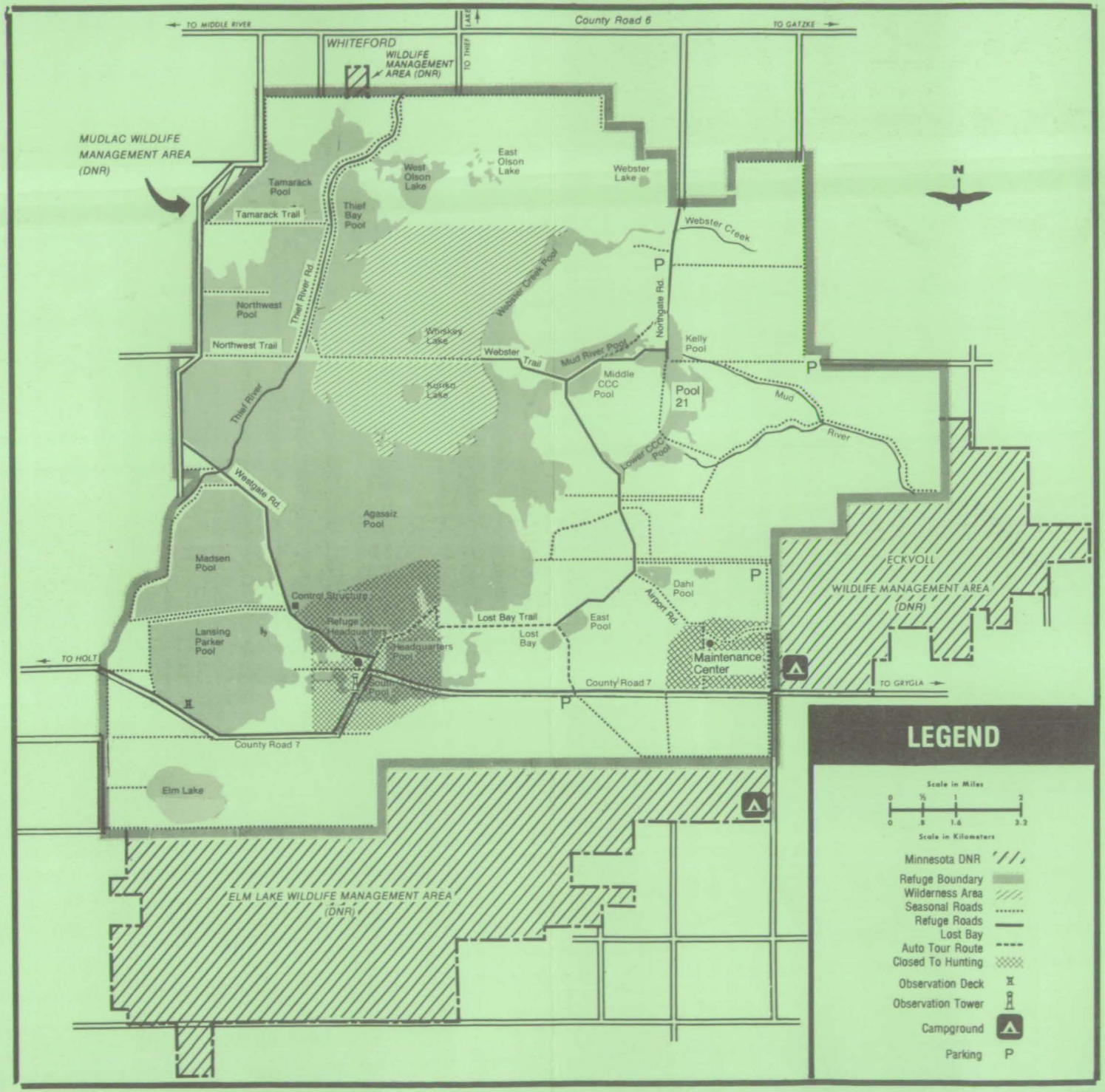
August 1997

U.S. Fish & Wildlife Service

Agassiz

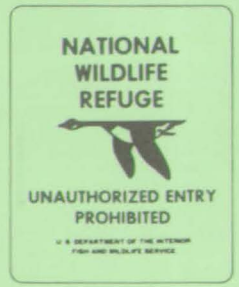
National Wildlife Refuge Bird Checklist

Hunting Map



REGULATIONS ON BACK SIDE OF MAP

REFUGE SIGNS — KNOW THEIR MEANING



REFUGE BOUNDARY SIGN —

HUNTING PERMITTED

SANCTUARY AREA — OFF LIMITS TO THE PUBLIC UNLESS OTHERWISE SPECIFIED — NO HUNTING

Hunting Regulations

BIG GAME	SEASON DATES
Deer (Gun)	State season for appropriate zone

SPECIAL CONDITIONS

- The Agassiz National Wildlife Refuge is open *only* to the hunting of deer in accordance with all applicable State regulations and as posted. Note Refuge Headquarters areas are closed to hunting.
- All other wildlife species are protected and may *NOT* be killed.
- Hunters will not be allowed to enter the refuge before 6:00 AM and must leave the refuge by dark each day.
- Vehicles must remain on designated roads and parking areas.
- All-terrain vehicles and snowmobiles are prohibited. Trail bikes and motorcycles will confine themselves to designated roads and parking areas as required of other vehicles. Travel by any conveyance off designated roads will constitute a violation.
- Overnight camping and open fires are *NOT* permitted on the refuge. Primitive camping sites are available on nearby State Wildlife Management Areas.
- All injuries or accidents occurring on the refuge must be reported immediately to the Refuge Headquarters, Agassiz National Wildlife Refuge, Middle River, Minnesota 56737. Phone Number 218/449-4115.

QUALITY HUNTING DEPENDS ON YOU
PLEASE RESPECT ALL REGULATIONS

JULY 1982

HUNTING

MAP & REGULATIONS

AGASSIZ

National Wildlife Refuge/MN

35th North American Moose Conference & Workshop

The 35th Annual Moose Conference & Workshop will be hosted at the Grand Portage Reservation nestled between the beautiful scenic shores of Lake Superior and the majestic boreal forests of northern Minnesota. This is the first time this conference will beheld on a Native American/First Nation Reservation.

The Grand Portage area is rich in wildlife including moose, wolves, deer, bear as well as other wildlife that inhabits the boreal forests of the area. The Grand Portage area is also steeped in history and tradition which provided the backdrop for the fur trade and European interaction with the "Anishinabeg" or "Original" people of the area.

This will be an unique conference combining the technical aspects of a traditional moose conference with the flavor of Native American culture. It will highlight the importance of *Alces alces* to this region and all its' people.

A major highlight of this conference will be the opportunity to visit Isle Royale. Isle Royale is located 13 miles off shore in Lake Superior and is home to the longest ongoing moose/wolf study in the world.

Conference Highlights

Technical Sessions

We plan to focus a portion of the presentations on Isle Royale's moose population. Additional presentations will cover moose management and research across North America as well as related topics of interest to moose biologists.

Field Trips

Isle Royale is famous for having the highest known, year-round density of moose anywhere within the species' world-wide range, as well as for a high-density wolf population that preys on moose. Forty years ago this winter, the renowned, systematic study of moose-wolf ecology was initiated.

The field trip will afford a look at the island's moose habitat and moose impacts on prey structure, vegetation, etc, with words from those involved with ecological research there. We hope to offer a short aerial view of the landscape along with visits to exclosures and other features on the ground.

Field trip space to Isle Royale is limited and will be on a first-come first-served basis for those who register for the conference.

IF the boat does not fill up through conference registration, a mechanism to distribute available seats for guests will be developed.

Additional field trips may be set up if a significant number of people choose not to participate in the trip to Isle Royale.

Please indicate your preference on the enclosed registration form. The visit to Isle Royale will involve a 6 hour round trip boat ride and may not be desirable to those prone to seasickness.

Traditional Feast

The conference will host a traditional feast, featuring native foods including moose, lake trout, wild rice & fry bread. Lake Superior will provide the backdrop for the feast and the evening will culminate in a special presentation highlighting one of the most unique natural attractions in the area.

Banquet/Auction

There will be a banquet and auction as part of the conference. Please consider donating an item to the auction. Proceeds from the auction will go towards the printing of the *Alces* Journal and funding of travel awards.

Banquet Tickets are $17.50 apiece and will be sold at the conference. In order to assist in the planning, please indicate on the registration form how many tickets you plan to purchase.

Workshop

There will be a workshop focusing on specific topics of interest to moose biologists. Topics are still in the development stage, but likely will include forest moose habitat.

Special Presentations

There will be special presentations that are geared towards giving a historical perspective on the area, it's resources, and culture.

Program Information

Location

The 35th Annual North American Moose Conference & Workshop will be held at the Grand Portage Lodge & Casino. The lodge is located on Lake Superior, 150 miles north of Duluth, Minnesota and 40 miles south of Thunder Bay, Ontario in the northeastern tip of Minnesota.

Technical Session Topics

Presentations will be limited to 20-30 minutes including discussion.

Posters

Posters will be available for viewing throughout the conference and during a special session when authors are expected to be present.

Deadline for Abstracts

Deadline for abstracts is March 1, 1999.
Submit the following information in English:

1. Title of abstract
   Name of author(s)
   Authors affiliation and address
   Telephone, fax, and e-mail address
2. Body of abstract (no more than 1 page)
3. Indicate your preference for an oral or poster presentation
4. Indicate need for travel assistance

Please send this information by e-mail to rmoen@sage.nrri.umn.edu. We will confirm receipt within one week of arrival. If you do not have access to e-mail please send this information on 3.5 diskette for IBM compatibles in MS Word or ASCII format and three (3) printed copies to:

Ron Moen PH (218) 720-4372
NRRI/CWE
5013 Miller Trunk Highway
Duluth, MN 55811

Three copies of the manuscript must be presented to the session chair at the symposium. Authors should consult a recent copy of *Alces* for guidance in manuscript preparation.

This information can also be viewed at http://www.lakeheadu.ca/~alceswww/instruc.html or is available from symposium organizers.

"NEWCOMERS" TRAVEL AWARDS

In an effort to encourage new attendees who will report on recent studies of moose ecology and who will submit a manuscript for possible publication in the journal *ALCES,* the North American Moose Group will pay up to $800.00 CDN of the costs associated with attendance. If you are interested in further details, please contact Ron Moen (see deadline for abstract info) for application package.

"SENIORS" TRAVEL AWARDS

In recognition of the potential for retired moose biologists to continue to contribute to our knowledge and understanding of moose ecology, the North American Moose Group will pay up to $1,000.00 CDN of the costs associated with attending an annual conference. If you are interested in further detail, please contact Ron Moen (see deadline for abstract info) for application package.

Distinguished Moose Biologist Award

An award was established by the North American Moose Conference and Workshop to honor the outstanding contribution of a particular individual or organization(s) to moose management. Criteria are listed in recent issues of *Alces*. Moose biologists from outside North America are eligible for the award as well. Send nominations to:

Dr. Murray Lankester
c/o Department of Biology
Lakehead University
855 Oliver Road
Thunder Bay, Ontario, P7B 5E1
CANADA

RECREATIONAL OPPORTUNITIES

- ✓ Canoe/Fish the Boundary Waters Canoe Area Wilderness (need reservations)
- ✓ Hike the Grand Portage
- ✓ Learn the local fur trade history
- ✓ Excellent springtime lake trout fishing
- ✓ Explore Superior's North Shore
- ✓ International Wolf Center - Ely, MN
- ✓ Or just grab a seat and relax by the lake

Conference Sponsors

1854 Authority
Grand Portage Band of Chippewa
Gunflint Trail Association
Hedstrom Lumber
Isle Royale National Park
MN Dept of Natural Resources
MN Chapter of the Wildlife Society
Potlatch Corporation
US Fish &Wildlife Service
US Forest Service - Superior National Forest
University of Minnesota

RECYCLED PAPER
Conserving Our Resources

35th NORTH AMERICAN MOOSE CONFERENCE & WORKSHOP

HOSTED BY
The Grand Portage Chippewa
Grand Portage Minnesota

First Call for Papers

Grand Portage, Minnesota
May 15 - 20, 1999

35th North American Moose Conference & Workshop

Travel - Accommodation - Registration - Information

While the Grand Portage area is attractive in its natural splendor and beauty, the setting is somewhat remote and there are definite limitations on services. It is our desire to accommodate you in your travel as best as possible, therefore we have developed the following information:

TRAVEL

The Grand Portage Lodge & Casino is located 150 miles north of Duluth, Minnesota and 40 miles south of Thunder Bay, Ontario. To get there, here are your options:

1) Drive - Grand Portage Lodge is located right along Highway 61, the only highway between Duluth and Thunder Bay.

2) Fly into Thunder Bay, Ontario — Rent a car and drive south to Grand Portage
Shuttle service to the lodge will be available at specific times

3) Fly into Duluth, Minnesota, rent a car and drive three hours north to Grand Portage (very scenic)

4) Fly into Minneapolis/St Paul, Minnesota, rent a car and drive six (6) hours north to Grand Portage

ACCOMMODATIONS

A block of rooms has been set aside at the Grand Portage Lodge & Casino. Rooms are $49.50/nite based on double occupancy. Extra persons are $10.00/nite. Please consider sharing rooms as we are expecting a large turnout.

Please call the Lodge & Casino directly to make your reservations at 1-800-543-1384 or (218) 475-2401 and tell them you will be attending the 35th North American Moose Conference. A $100.00 per room deposit is required by the lodge by April 1, 1999. Deposits will be refunded if canceled before May 8, 1999.

You are strongly encouraged and cautioned to make your reservations as early as possible as there is only a limited number of rooms available at Grand Portage! Save money and space by buddying up!

There are a number of lodging alternatives available in Grand Marais, Minnesota or Thunder Bay Ontario, but both are about 40 miles away from the conference site. For alternative lodging information, please contact the Grand Marais Chamber of Commerce at 1-800-622-4014 or North of Superior Travel Association at 1-800-265-3951.

Meals

The Grand Portage Lodge & Casino will be serving buffet style meals in their restaurant throughout the conference. There is also a snack bar in the casino. Food availability outside of the lodge is limited.

Climate

The springtime weather in northeastern Minnesota is anybodies guess (about 55° Fahrenheit), but don't count on anything. There is little chance of snow on the ground, but due to Grand Portage's proximity to Lake Superior, the weather is consistently cool. Bring along something warm (especially for the boat ride), you can always take it off. Rain gear and good footgear are also strongly recommended for the Isle Royale field trip.

Visa and Passport

If you are traveling across international borders or via Thunder Bay, please take care of the necessary travel requirements before you leave home in order to avoid any problems. Both Canadian & U.S. immigration authorities expect citizens of these two countries to show a passport or birth certificate; this is particularly the case for children traveling with you.

REGISTRATION INFORMATION & FORM

Pre-Registration

Pre-registration for the conference is strongly recommended. Persons who do not pre-register are not guaranteed materials, food service, or other amenities associated with the conference. The registration fee includes all conference sessions, materials, and North American Moose Conference & Workshop Proceedings. Banquet tickets are optional. ***Important: the field trip to Isle Royale will be limited due to boat capacity. Space will be strictly first come first serve through conference registration.*** Confirmation notices will be sent to all registrants giving final details about the conference.

REGISTRATION

To register, please complete the registration form and mail or FAX to:

BILL PETERSON
PO BOX 115
GRAND MARAIS, MN 55604
USA

Office (218) 387-3034
Home (218) 387-1082
Fax (218) 387-3035
E-mail mooses@boreal.org

Registration payment will be accepted by check or money order in U.S. Dollars only. Make checks or money orders payable to: 35th North American Moose Conference & Workshop

Cancellation/Refunds

All registration cancellations must be received in writing; mail or faxes accepted by May 8, 1999. Refunds, minus a $30.00 processing fee, will be made until May 8, 1998. After that date, no refunds will be made. Substitutions are allowed, but notification of substitutions is appreciated prior to the conference, if possible.

Registration

35th North American Moose Conference & Workshop

Please type or print

_____
Last Name First Name M.I.

_____
Organization/Affiliation

_____
Address

_____
City, State, Zip or Province, Country, Postal Code

_____
Daytime Phone Fax

_____
E-Mail

Field Trip Interest

- ❑ I want to take the field trip to Isle Royale
- ❑ I would prefer an alternative field trip
- ❑ I would be interested in a post conference visit to the International Wolf Center in Ely, Minnesota

Banquet Tickets

I plan to purchase _____ Banquet tickets.

All banquet tickets will be sold at the conference

Additional Guest Information

I will be bringing _____ adults, and _____ children with me.

Registration Fee	Before Mar 1st	After Mar 1st	
❑ Full Registration	$ 75.00	$ 100.00	____

Optional Items

❑ T-Shirts _____ Shirts @ $ 10.00 each ____

___ Small ___ Med ___ Lg ___ XL ___ XXL

TOTAL ____

Please return completed registration with check or money order (U.S. funds only) to Bill Peterson at address above.

PLEASE NOTE:

All arrangements for accommodations and meals are to be made directly with the lodge at:

Grand Portage Lodge & Casino
PO Box 233
Grand Portage, MN 55605

1-218-475-2401
1-800-543-1384