AGASSIZ NATIONAL WILDLIFE REFUGE

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Middle River, Minnesota

ANNUAL NARRATIVE REPORT

Calendar Year 1995

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

Calendar Year 1995

Marguet M. Awterson July 17, 1996 Refuge Manager Date

1/21/16

ARD-Refuges and Wildlife

Date

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 4,184, shrubland 10,000, woodland 7,000, cropland 150, 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.



Figure 1.

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A. HIGHLIGHTS

A	Initiation of a Pilot Moose Research Project. (Section D.5.)
A	American Bittern study continues. (Section D.5.)
A	New Project Leader Margaret Anderson arrives. (Section E.1.)
A	Refuge receives Department of Interior Safety Award. (Section E.6.)
A	Completion of new administrative office. (Section I.1.)
A	Replacement of Parker/Agassiz and Ditch 194 water control structures. (Section I.2.)
A	Refuge receives new 325L Cat Excavator. (Section I.4.)



Wikstrom and Bennett receive Departmental Safety Commendation on behalf of the refuge. Award presented by Assistant Regional Director Marvin Moriarity and Acting WAM-1 Don Hultman. Award acknowledged the Safety Awareness Week effort by the staff. *Photo courtesy of RO*

B. CLIMATIC CONDITIONS

Weather in 1995 was by-far dominated by winter. The 1994-95 winter had a solid hold until mid-March; although two storms in April brought snow and the last freezing temperature on the 27th. Total snowfall from January to April was 26.9" with a maximum pack of 13". Pools were ice free by April 24 and frozen over by November 3. A brief summer brought above average temperatures and normal precipitation. The 1995-96 winter began September 20 with 1.5" of snow which melted the next day; snow accumulation began October 31. Snowfall from September to December was 38.3" with a maximum pack of 17"; setting the scene for the worst winter on record in 30 years. See Table 1 for complete weather data.

	Temperature							Precipitation				
			1995			30	<u>30 Year Average</u>			ipitation Snowfall		
	Mont	thly	Молт	hly Avera	ge							
Month	Max.	Min.	Max.	Min.	Daily	Max.	Min.	Daily_	1995	30-Yr *	1995	29-Yr •
January	36	-19	18	2	10	14	-8	3	0.53	0.64	5.5	9.4
February	43	-20	21	-3	9	21	-3	9	0.72	0.37	11.30	5.8
March	55	-20	37	19	28	35	12	23	1.25	0.69	6.6	5.6
April	58	1	47	27	37	53	29	41	0.50	1.37	3.50	2.0
May	87	35	67	43	55	68	42	55	2.60	2.53	0.0	0.0
June	95	41	82	59	71	76	51	64	2.30	3.76	0.0	0.0
July	93	45	80	59	69	79	52	66	4.96	3.34	0.0	0.0
August	89	51	81	58	70	79	52	66	3.31	2.95	0.0	0.0
Sept.	98	27	70	45	57	68	43	56	3.10	2.48	1.40	0.0
October	77	26	53	36	44	56	33	44	1.57	1.56	tr	1.0
Nov.	43	-11	26	11	18	35	17	26	1.65	0.91	23.5	8.0
Dec.	31	-29	16	0	8	19	0	10	0.78	0.55	13.4	7.8
Totals	15								23.27	21.15	65.2	39.6

Table 1.	Temperatures and precipitation for 1995 and the 30-year average (1961-1990) and snowfall for 1995 and the
	29-year average (1967-1995).

"National Climatic Data Center 30-year average from 1961-1990.

^bSnowfall not averaged by the National Climatic Data Center. Agassiz's 29-year average snowfall.



Winter began early with this snowfall on September 21, 1995. By December 31, 1995, over 38" had fallen. 9/21/95 Tischer

C. LAND ACQUISITION

4. Rural Economic and Community Development Conservation Easements

Bryl Inventory Property: On January 23, a letter was sent supporting the fee title transfer of the Bryl Inventory Property (Conservation Easement 21C Marshall County) to the Minnesota Department of Natural Resources (MnDNR) - Wildlife Division. Written confirmation of the transfer from FmHA National Office was received on March 27. An approved Management Plan was completed on September 13. Official county court house recording was January 2, 1996.

FmHA Inventory Property 14C in Marshall County: Proceedings continued in the effort to transfer this property to the Marshall County Soil and Water Conservation District. Several meetings and drafts of a management plan were negotiated during the year. The District demanded uncontrolled management of the property including the ability to farm the entire area and use the funds generated as they wished. FmHA's refusal to allow this transfer of rights eventually lead to the District withdrawing their interest in the property. Disposition of the property has yet to be determined.

Howard Inventory Property: On February 21, this property located in Pennington County received a second review via a FmHA Review Team. This review became necessary when a neighbor withdrew his purchase option. Approximately 170 acres were recommended for easement, an increase of 67 acres from the original proposal. The property was restaked May 3 to reflect changes in the easement boundary.

Conservation Easement 014-C Lake of the Woods County, formerly the Ranger FmHA Inventory property, was officially recorded as an easement in the courthouse on April 11, 1995. Total easement acres are 265.29. **Conservation Easement 014-C Pennington County**, formerly the Paulsen FmHA Inventory Property, was recorded as an easement on April 5, 1995. Total easement acres are 59.04. A preliminary grazing plan for proposed Conservation Easement 012 in Roseau County was completed in August. Tract #1 of this easement also had corners adjusted to reflect acreage limitations.

Two pre-inventory reviews were completed in Pennington County; the Bjerke Farm (158 acres) in August and Lundeen Farm (160 acres) in November. Approximately 9 acres of the Bjerke farm was recommended for easement.

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An inventory of FmHA properties is listed in Table 2, page 5.

	Property	D-dropped	Acres	lst Year	Original	Review Team	Date	Recorded
Beltrami	Porch	011-C	160	1988	160	10/13/93	11/15/94	27.60
Kittson	Klondike	010-C	8,414	1988	5,028	02/09/93	12/03/93	3,600.00
121211	Webster	n	200	1988				
	S Rinehart		160	1988	160	•	04/06/93	160.00
The	C Rinebart	011-C	280	1022	280		03/03/93	780.00
Ine Maada	Undahl	017-C	280	1986	125		01/10/90	115.18
woods	Undani	012-C	280	1966	600	0//13/03	01/10/20	115.18
	Lambrecht	013-C	710	1988	500	04/13/93		
	Forshen	D	200	1988	•	-		· ·
	Jerczek	D	160	1989	-	-	•	· ·
	Ranger	014-C	440	1992	110	04/13/93	04/11/95	265.29
	Brown	015-C	400	1993	37	04/13/93	06/28/95	111.60
Marshall	Barton	010-C	440	1988	50	•	01/25/90	8.09
	Dahlen	D	200	1988	-	-	- 1	•
	Carey	D	320	1988	-	-	-	•
	Westerlund	011-C	200	1988	113	03/11/93	04/08/94	113.55
	Larsen	012-C	560	1988	45	03/11/93		
	King	013-C	680	1988	200	03/11/93		
	Hanson	014-C	420	1988	100	03/11/93		Î
	Leader	D	200	1989	-	-		-
	R Solberg	- D	160	1989	-	-		
	TSeiberr	015-C	160	1089	32	•	10/16/90	32.80
	1.Solverg	015-0	100	1080				
	JOINTSON	D	200	1989	-			
	Loeshe	D	160	1989		-	-	
	Hendrickson	016-C	532	1989	140	03/06/93		
	Kaml	017-C	240	1989	4	07/14/94		
	Hoff	D	16	1990	-		-	•
	Helm	018-C	50	1990	21	05/18/93	8/26/94	18.69
	Wilkins	019-C	320	1990	21	05/06/93	12/22/94	19.56
	Cullen	020-C	240	1992	7	06/09/93	-	•
	Smsky	D	200	1992	-	•	-	· ·
	Bryl	021-C	160	1993	160	05/06/93		
Pennington	Peterson	010-C	76	1988	76	*	01/09/91	76.00
	Olson	011-C	440	1989	220	•	01/04/94	217.35
	Howard	012-C	240	1989	170	02/21/95		
	Anderson	D	105	1988	-		-	-
	Troska	D	943	1988	-			
	Bartha	- D	160	1989				-
	K Nelson	013-C	272	1990	30	05/06/93		1
	Muran		120	1990				
	lviyeis	D	155	1990			_	l .
	Iverson		133	1992		-		
	R&L Farms	D	158	1992	-	-	•	•
	Gallimore	D	640	1992	-	•	-	
	Paulson	014-C	160	1992	64	06/08/93	04/05/95	59.04
	Swanson	015-C	118	1992	20	04/12/94		
	D&B Farms	D	10	1993	-	•	-	•
	Sjulestad	016-C	160	1993	8	05/25/93		
	Hoffman	D	480	1994				
Red Lake	Bedker	D	80	1988	-	•	-	-
	Seegar	010-C	203	1989	46	•	07/26/91	46.10
	Laursen	011-C	242	1989	39	03/23/93		
	Клааск	D	160	1990	-		-	· ·
	Larson	D	160	1990	-		-	
	Almen	012-0	. 360	1997	140	10/01/93	9/29/94	90.57
	Findeland	012-C	300	1007	45	17/79/93		
	Raver	015-0	217	1000		•	12/03/90	R5 41
KOSEED	Sabada		500	1767		.	12/13/00	4.68
	Schadegg	011-C	160	1989	,	-	121390	4.00
	Dieter	D	150	1988	· ·		•	
	Sutherland	D	77	1988	-	•	•	
	Hepner	012-C	680	1990	174	03/10/94		
	Nelson	D	160	1991		•	-	
	Lund	013-C	960	1992	160	06/28/94		L
Totals	61 Properties	D=26	25,310	[8,508		16	1.000.00
	1	CE=35	Acres		Acres	1	Recorded	4,893.38

Table 2.FmHA inventory property status, 1995.

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*- Not subjected to 1990 FACTA rules.

D. PLANNING

4. Compliance with Environmental Mandates

During the year, East Valley Township completed work on a new township road along the west boundary of the refuge. This new road was not supported by many neighboring farmers because of the loss of a bridge and a road that gave them direct farm equipment access across the Thief River. These farmers wanted a low water crossing installed to replace the bridge in addition to the new road. Refuge outflow data for the past ten years was requested by the Township Board to show the impracticality of the low water crossing. In spite of pressure from both sides, the refuge remained neutral on the issue, stating that no matter what the decision the refuge would continue outflows necessary to fulfill wildlife objectives. An Environmental Assessment had been completed by Huschle in 1993.



Right of way request in 1993 resulted in a new 1 mile road on the west boundary. The new road replaces a township bridge that was condemned. The boundary road provides refuge personnel with quick access to the Farmes Pool Control Structure. 9/95 Brininger

5. Research and Investigations

PILOT MOOSE STUDY

Cooperators: Agassiz NWR & Red Lake Wildlife Management Area Principal Investigator: Eric Rosenquist, Biological Technician (Temp.), USFWS Field Collaborators: Gary Huschle, Refuge Biologist; Gretchen Mehmel, Manager Red Lake WMA

Objectives:

- 1. Begin evaluation of the decline of moose populations through a pilot moose calf mortality study.
- 2. Radio tag twelve moose calves, determine mortality to help define parameters for a three year graduate study
- 3. Evaluate techniques, radio packages and time commitment.

Preliminary Results:

Helicopter Wildlife Management Inc., Salt Lake City, Utah, captured and tagged six calves on the Refuge on May 23. One adult cow at Moose River Impoundments and an additional five calves at Agassiz were collared on May 24. Six calves were marked with expandable neck collars and five calves and the one cow were marked with solar ear tag radios. One calf tagged on May 24 died the next day from a blow to the head, possibly from the cow. The tag was replaced on a calf captured by airboat in Madsen Pool on June 12. Two more calves died: one on June 25 from an undetermined virus and another on July 12 from apparent black bear predation. In October, two ear tagged radios were shed and found, based on the mortality sensor transmission. By the end of the year over 700 radio-telemetry locations were mapped. A progress report on the pilot study was written, but analysis of the information will be part of the larger study needed to insure a scientific conclusion.

In the fall, several meetings were held between RM Anderson, Refuge Biologist Huschle and Minnesota DNR Area Managers from Thief Lake WMA and Red Lake WMA to develop a plan for expanding the moose research into a 3-year college graduate project. Items discussed included objectives, methods, proposal for bids, bid sources, costs, funding sources, project title, letter head, and mailing list.



Expandable radio collars were placed on 7 moose calves in May. They produced consistent signal up to 3 miles on the ground. They should stay on the on the moose for $1\frac{1}{2}$ - 2 years. 5/95 Huschle



Solar powered radio transmitters mounted on eartags were placed on 5 calves and 1 cow moose. Signals were not consistent due to animal movements and shading but still provided data at half the cost of collars. These tags should provide data for the life of the animal. 5/95 Huschle

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Helicopter Wildlife Management was contracted to capture 12 moose calves for \$10,000.00. 5/22/96 Huschle



Most calves laid down and were easily picked up to be radio marked. Older calves and the cow were captured with a net gun. *Photo courtesy of Helicopter Wildlife Mgt.*

AMERICAN BITTERN ECOLOGY IN A LARGE WETLAND COMPLEX

Cooperators: Agassiz NWR, St. Cloud University, Little Hoop Community College Principal Investigator: Wayne Brininger Jr., Cooperative Education Student, St. Cloud State University Field Collaborators: Gary Huschle, Refuge Biologist; Dr. John Toepfer, Wildlife Program Director, Little Hoop Community College; Dr. Al Grewe, Professor, St. Cloud State University

Objectives:

- 1. Evaluate capturing techniques and radio collar design for use on American bitterns.
- 2. Determine dominant vegetation type and water depth around each nest.
- 3. Determine local movements by monitoring radio-tagged bitterns.

Preliminary Results:

Four radio tagged adult bitterns migrated from the refuge in the fall of 1994; three returned in the spring of 1995. Two were males and one a female. One male was recaptured within 100 meters of the 1994 capture site, and the other male was 4 km from his original capture site. The female made a nesting attempt 0.5 km from last year's nest site.

A total of 35 bitterns were captured in 1995; 12 adult males, 9 adult females and 14 nestlings. There was no mortality in the adult bitterns, but mortality of nestlings was 42.8%. The recommended leg bands (size 6) were too tight for adult males as two recaptures had infections caused by the bands. After these incidents size 7A was used on adult males and suspected juvenile males. A shift in use by three radio-marked birds to Pool 8, which was burned last October, was observed. This type of response to management will be examined more closely in Phase II of the 7-year research project that begins in 1996.

6. <u>Other</u>

Contaminant Study: Dr. Joanna Burger, Rutgers University, NJ.

Feathers taken from American bitterns and Franklin's Gulls were analyzed for heavy metal contaminants. Levels of mercury and manganese were elevated in American bitterns but not high enough to negatively affect the birds. Mercury was not high in Franklin's Gulls. Food differences such as fish may be the source for the mercury in bitterns. It was decided additional bittern feathers should be examined. Feathers were collected and sent to Burger in October.

Agassiz Pool Sedimentation Study: Pennington County Soil & Water Conservation District, Red Lake River Watershed District, Agassiz NWR.

Efforts to evaluate the sediment loads entering Agassiz Pool from the Thief River began in April. Refuge personnel sample three locations three times a week during major runoff events or weekly during normal flows. The SWCD office is paying for the study. The 1995 analysis has not been received.

Private Road Construction Request: In January, Division of Realty received a request from Mr. Harley Olson to construct a road across LUP land within the Red Lake WMA. LUP lands are USFWS owned and managed under a cooperative agreement with the MNDNR. On May 24, ROS Bennett met with Mr. Olson and Red Lake WMA Assistant Manager Laudenslager to review the project. The field review revealed that the construction would negatively impact both a wetland flowage area and a winter deer yard in a cedar swamp. The Regional Office was advised that a policy on new roads across LUP lands needs to be developed. There are currently 110 inholdings with no vehicle access. Some are ten miles from the nearest road.

Marshall County Road 131 Construction Request: In August, the refuge received notice from the Marshall County Highway Dept. of road construction plans to extend County 131. Construction was to include reconstruction of road and drainage ditches. This drainage change would effect old private and ex-judicial ditches on the refuge. The refuge agreed to the reverse flow of the north branch of ex-judicial Ditch 30 and the blockage of off-refuge flow. Additional survey information on the potential to reverse the flow of the east branch of Ditch 30 was requested. No survey information has been received to date.

E. ADMINISTRATION

1. Personnel

Margaret Anderson	Project Leader	GS	12/05	 PFT
David F. Bennett	Supervisor Refuge Operations Specialist	GS	11/05	 PFT
Gary D. Tischer	Refuge Operations Specialist	GS	09/06	 PFT
Gary L. Huschle	Refuge Biologist	GS	11/05	 PFT
Beulah J. Wikstrom	Administrative Technician	GS	06/08	 PFT
Scot C. Wockenfuss	Maintenance Mechanic	WG	09/05	 PFT
David L. Myhrer	Engineering Equipment Operator	WG	r 08/03	 PFT
Steve Hodge	Forestry Technician	GS	05/02	 CSFT
Dan VanEps	Forestry Technician	GS	05/02	 CSFT
Wayne Brininger, Jr	Student Trainee (Biological Science)	GS	05/01	 CSFT
Eric Rosenquist	Biological Technician	GS	04/01	 TFT



Staff 1995. (Left to Right) Dave Myhrer, Gary Huschle, Gary Tischer, Beulah Wikstrom, Scot Wokenfuss, David Bennett, and Margaret Anderson. (Not pictured: Dan VanEps, Steve Hodge.) 12/25/95 Jim Hulteen



The research crew; Wayne Brininger Jr. (left) conducted the investigation of the American bittern and Eric Rosenquist (right) did the daily monitoring for the moose pilot study. 8/95 Tischer

Table 3.

Five year staffing pattern at Agassiz

Fiscal Year	PFT	CSFT	Temporary	Total FTE's
1991	8	1	2	9.75
1992	8	3	0	9.90
1993	7	3	0	8.82
1994	7	4	0	9.50
1995	7	3	1	9.02

2. <u>Actions</u>

Forestry Technician Hodge came on duty March 5-20 and Forestry Technician VanEps February 5-18 for special training. Their basic tour of duty was April 2 - November 11.

Cooperative Education Student Brininger entered on duty April 30. He continued work on the American Bittern study. He entered leave without pay status September 3 when he returned to St. Cloud.

Biological Technician Rosenquist was hired May 25 - September 2 to conduct the Pilot Moose Research project.

David F. Bennett continued as Acting Project Leader from January 1 - July 9. Dave served in this capacity for over a year. He guided the station through the planning and construction of a new office/visitor center, construction of several water control structures, and daily oversight of a diverse staff and program. Dave received a well deserved award on August 18 for his outstanding performance.

Margaret M. Anderson officially entered on duty as Refuge Manager on July 10. Maggie transferred from Petit Mann NWR in Maine, where she was Refuge Manager.

All refuge personnel except RM Anderson were subjected to two Congressional forced furloughs, November 14-17 and December 16-31. Anderson was selected for the "accepted" position. Engineering Equipment Operator Myhrer substituted for Anderson one week in December.

3. Other Personnel Programs

This was the fifteenth year that Agassiz was a work site for federal and state youth programs through the Inter-County Community Council, Inc., Oklee, MN. Six students were divided into two work periods. The first work period began June 12. Enrollees Todd Anderson, Desiree Kotrba and Nathan Wegge each contributed 300 hours, and Matthew Pittman contributed 72 hours. Enrollees Brandi Olson, Tracy Sannes and Jarrod Solberg began work on July 17 and contributed 222, 173, and 8 hours respectively. Lois Hejlik, Minnesota Department of Rehabilitation Services, Thief River Falls, functioned as work coach for Matthew Pittman and contributed 72 hours. A total of 1375 hours were contributed to Agassiz NWR through the youth programs.



SYEP enrollees included (left to right) Lois Hejlik (work coach), Matthew Pittman, Chris Calahan, Desiree Kotrba, Nathan Wegge, and Todd Anderson. 7/95 Tischer



Summer Youth Enrollees (left to right) Tracie Sannes and Brandi Olson. 7/95 Tischer

Volunteer Program

-				
	0	h	0	1
	21	11		-

4. Volunteer contributions to Agassiz NWR, 1995.

Volunteers	Dates	Hours	Work Area
Carly Dee	01/11-05/11	72.5	Nesting Structures
Brenda McCarty	01/09-01/13	16.0	Clerical
Thane Espe	02/07-02/10	20.0	Nesting Structures
Youth Enrolles (6)	03/01-05/31	322.0	General Maintenance
Wayne Brininger Sr.	05/13-6/18	68.0	Research
Richard Wockenfuss	06/01	6.0	Lawn Care
Daryl Wockenfuss	06/05-06/08	16.0	Lawn Care
Pam Wockenfuss	07/01-11/30	75.0	General Maintenance/Open House
Dan VanEps	09/01-12/30	68.0	Research
Middle River 6th Graders (6)	10/07-10/08	40.0	Open House
Larry Anderson	10/11-11/29	20.0	Prescribed Burning/Office Interior
NRCS Americorp (7)	11/2	38.5	Native Seed Collection
Total		762.0	



6. Safety

The staff completed the following safety meetings in 1995:

Date	Title/Activity
1/10	National Safety Council Defensive Driving Training
1/15	"HIV/AIDS in the Work Place"
4/11	"Employee Right To Know Act"
7/26	Respirators and general shop safety
8/30	Water Survival Techniques

Location

Thief River Falls Fergus Falls Northwest College, TRF Maintenance Center Franklin Middle School pool, TRF



Railing, toe board and weight rating was added to the loft in the 5-stall as part of Safety Awareness Week. *Tischer*

Assistant Regional Director Marvin Moriarty presented a *Safety Commendation* to the refuge on May 10. The Commendation was signed by Department of Interior's Safety Officer Claudia Schechter. The award was for the Safety Awareness Week conducted at the refuge in November 1994.

On July 26, while Engineering Equipment Operator Myhrer was moving the refuge excavator to another job site the boom hit and downed a powerline along County Road 6. The line was repaired by Roseau Electric Cooperative at a cost to Agassiz of \$170.06 via a tort claim.

7. <u>Technical Assistance</u>

The public road inventory was completed and sent to the Regional Office on January 31. The Annual Minnesota Pollution Control Agency's Hazardous Chemical Report for gasoline and diesel fuel was submitted on February 27.

The refuge received a draft of the Red River Water Management Board Restoration Guideline for Impoundments in Minnesota. Suggested procedures would greatly increase the cost of restorations. The document also claims that restorations increase down stream flooding. The document was forwarded to the Regional Office. ROS Bennett participated in a conference call on June 8 with personnel from the Fergus Falls and Detroit Lakes Wetland Districts, and St. Cloud Private Lands on how to address this new restoration procedure. The decision was made to list objections and state that previous restoration guidelines were more than adequate. Also, an offer for a partnership study on the effects of the small wetland restoration was made.

Kittson County: In March, a landowner requested permission to construct a road to a new house site. The road would pass through a wetland. The landowner indicated he would use culverts to prevent any flow blockage. He was hoping for a converted wetland nonagriculture determination. The request was denied as there were several alternate routes which would avoid the wetland altogether. The landowner has not given up his pursuit.

ROS Bennett assisted the Kittson County SWCD with the planning and development of their outdoor classroom. An 80-acre FmHA area was transferred to the District in 1994. In 1995, walking trails, pond locations, grassland management, and a parking area were reviewed. Due to wet conditions in the fall of 1995, construction was delayed until 1996.

Pennington County: On November 22, ROS Bennett completed a Consolidated Farm Services preinventory property review of the Lundeen property. The property had no environmental concerns requiring an easement.

ROS Tischer has been actively involved with the landscape development of the new Challenger Elementary School, Thief River Falls. Gary is spearheading plans to restore a small wetland and to develop a native prairie site. As a member of the Challenger Elementary School Environment Education Committee, he has spent many hours collecting seeds from native vegetation, conducting topography surveys for the restoration and submitting grants to the Legislative Commission on MN Resources Conservation Partners Grant Program. On ground action should begin in 1996.

Red Lake County: A property was viewed for debt restructuring in June. The property had no wetlands but was recommended for a native prairie restoration easement. The landowner did not accept the recommendation.

Roseau County: On February 17, Acting Project Leader Bennett assisted NRCS personnel with a conservation easement proposal for voluntary debt restructuring. A proposal was submitted, but no response has been received.

In July, a converted wetland nonagriculture request for developing a winter vehicle testing track was received. The proposal involved less than 1-acre of willows and the disturbance would only occur during the winter months. The proposal was accepted.

On August 3, ROS Bennett provided assistance to landowner Rick Russek on how to improve his land for wildlife. The 160-acre farm includes several large shrub-scrub wetlands and several smaller emergent wetlands. The smaller wetlands had some drainage which could be plugged. The uplands were cropped for hay. The landowner was interested in foodplots and increasing browse.

On November 28, ROS Tischer assisted community leaders of Badger, MN with ideas in developing a wetland area near the town. Community leaders are looking for an environmental learning area as well as an attractant for tourists. A plant and wildlife inventory will be completed in 1996 before recommendations will be made.

Wetland Restoration: The completion of Wetland Restoration Contract 14-48-92-00029 was finally successful on September 29. After three years of wet conditions and changing landowner's mind, all funds, \$19,275.00 were expended. TR Excavatioons, Oklee, MN completed the work. One new 3-acre restoration in Roseau County, seven rehabilitations in Marshall County and three 1-acre restorations in Beltrami County were completed.

WRP: In August, Wetland Reserve proposals were reviewed in Roseau (7), Marshall (17) and Lake of the Woods Counties (2). In Marshall County, three proposals were not eligible, five dropped out and the remaining nine were signed. All participants in the other two counties dropped out. Final actions on the remaining WRP proposals in Marshall County are still pending.

8. <u>Other</u>

Training, significant activities, and awards of refuge personnel in 1995:

Anderson

- ➤ Project Leaders Meeting, Brainerd, MN, November 1-3.
- ► File MakerPro Training, 12 hrs, Northland Community College, Thief River Falls, MN, Nov/Dec.
- ► Republican Task Force on Wetland Act public meeting, Northland Community College, TRF, MN, September 21.
- MN Senate Agriculture & Rural Development Committee public meeting on Wetland Act, Northland Community College, TRF, MN, October 3.

Bennett

- ➤ Fred Pryor Seminar "How To Supervise People", Grand Forks, ND, January 4.
- > Annual FACTA rules update meeting, St. Cloud, MN, January 9-11.
- ► RCRA Waste Management Regulations Course, Bloomington, MN, February 6-10.
- ➤ Army Corps 1995 Regulatory IV Wetland Identification and Delineation Workshop, Brainerd, MN, June 25-30.
- ► Received 20-year service pin, July 3.
- ► Performance Award, August 18.
- ➤ File MakerPro Training, 12 hrs, Northland Community College, Thief River Falls, MN, Nov/Dec.

Tischer

- ➤ MN Dept. of Agriculture Pesticide Applicator Workshop, Thief River Falls, MN, January 3.
- Franklin Planner Seminar, Duluth, MN., March 14.
- ➤ Minnesota Pesticide Recertification, March 16.
- ➤ Contracting Officer Representative Course, Fergus Falls, MN, March 21-23.
- ➤ Special Act Service Award, August 26.
- ➤ Midwest Environment Education Conference, Rochester, MN, October 12-14.
- ➤ File MakerPro Training, 12 hrs, Northland Community College, Thief River Falls, MN, Nov/Dec.

<u>Huschle</u>

- ➤ MN Wildlife Society Meeting, Brainerd, MN, February 1 & 2.
- ➤ Shorebird Management Workshop, Squaw Creek NWR, May 1-5.
- Franklin Planner Seminar, Duluth, MN, March 14.
- ► Received 20-year service pin, June 23.
- ► Deer Management Summit Meeting, Detroit Lakes, MN, June 29.
- ► Mn. Wildlife Society summer meetings, Grand Rapids, MN, August 10.
- ➤ Special Act Service Award, August 26.
- ▶ Prairie Grouse Technical Council meeting, Medora, ND, August 28-31.
- ▶ Partners in Flight Workshop, Cape May, NJ, October 2-6.
- ► File MakerPro Training, 12 hrs, Northland Community College, Thief River Falls, MN, Nov/Dec.

Wikstrom

- ► Franklin Planner Seminar, Duluth, MN, March 14.
- ► 21st Annual Federal Woman's Day Conference, Brooklyn Center, MN, May 18.
- ► Performance Award, August 19.
- ➤ File MakerPro Training, 12 hrs, Northland Community College, Thief River Falls, MN, Nov/Dec.

Myhrer

- > MN Dept. of Agriculture Pesticide Applicators Permit (A&C), test given at refuge, February 27.
- > Special Act Service Award, August 26.

Wockenfuss

- > RCRA Waste Management Regulations Course, Bloomington, MN, February 6-10.
- > Special Act Service Award, August 26.

Hodge

- > Interagency fire detail, Northeastern Minnesota, June 16-28.
- > Special Act Service Award, August 26.

VanEps

- > Interagency fire detail, Northeastern Minnesota, June 19 July 1.
- > Special Act Service Award, August 26.

Rosenquist

> Prairie Grouse Technical Council meeting, Medora, ND, August 28-31.

All Staff

- > Endangered Species Awareness Workshop, Fergus Falls, June 14.
- > Government furlough November 14-17 (Except RM Anderson).
- Government furlough December 16-31 (Except RM Anderson December 16-23 & Engineering Equipment Operator Myhrer December 24-30).
- "Employees Right To Know Act", Thief River Falls College, April 11.







Huschle and Bennett receive 20 year service awards. Tischer

F. HABITAT MANAGEMENT

1. General

Hydromowing activities began mid-January and continued through February. A total of 100 acres were cut in nine units plus five miles of fire breaks. Decadent willow areas were the primary targets.

The annual joint inspection tour of the Moose River Impoundments and Farmes Pool took place on May 9. Some cracks in the Moose River Impoundments need to be monitored.

2. Wetlands

The annual coordination meeting for **Farmes Pool** and **Moose River Impoundments** was held on March 21. No major issues or concerns were identified. Next spring, a late winter draw-down of the Moose River will be tried to fulfill a construction agreement requirement. The challenge will be thawing out water control structures.

On April 11, a washout of the **Thief River/Thief Bay dike** was discovered. A muskrat/beaver burrow collapsed allowing water to flow over the dike. The overflow was sandbagged for a quick fix, and the pool was lowered 6" to reduce hydraulic pressure. The dike was fixed in September with the new excavator backhoe.

East Pool continued in draw-down after spring runoff was allowed to flow through. The control structure was closed and dewatering by pumping began on April 19. Pumping continued periodically throughout the summer and fall. During October, sediment deposits were removed from internal ditches allowing additional areas of the pool to dewater.



Farmes Pool has lost emergent vegetation since first filling in 1992. Lower water levels will be planned for 1996. 5/95 Huschle

3. Forests

The refuge again assisted with the gypsy moth survey. Ten traps were placed throughout the refuge on July 6 - September 1. No gypsy moths were found.

Eight wood cutting permits were issued in October. For the second year permittees selected a plot with the requirement of clear cutting all aspen, balsam poplar and willow. The main objective of wood cutting is to enhance oak, ash and elm regeneration. Approximately 50 cords of wood were removed.

5. Grasslands

The restoration of 150-acres of cropland to grassland continued in 1995. Eighty acres had been seeded in October 1994. Sixty acres were seeded in June 1995. Wet field conditions prevented seeding of the last 10 acres. A native grassland mixture harvested from a native field near Fertile, MN in 1994 was used. Some evidence of seedling development from last fall's planting was detectable. All fields were mowed several times during the year to reduce competition from weeds.



140 acres of cropland were retired and planted to native prairie by Dan VanEps in the fall of 1994 and spring 1995. *Tischer*



Native prairie seedlings were mowed to suppress weeds that were most abundant in the first year. *Tischer*

9. Fire Management

Eighteen burning proposals were submitted for Regional office approval in February; approval was received in March.

All refuge staff that participated in fire line activities passed the step test or the 1.5 mile run in March.

The Annual Prescribed Fire Operating Plan, cooperatively written with the local DNR Wildlife and Forestry Stations, was signed on April 4. The agreement outlines agency responsibilities in both prescribed and wild fire situations.

Dialip software was installed on July 10. This has enhanced our capabilities to connect with the FMIS in Boise through Internet. The FY96 fire budget was completed via FMIS.

Unit	Date	Unit Size(acres)
Silo Unit	May 1	230
Headquarters	May 2	1,345
Golden Valley	May 12	1,710
Ease Unit Natives	May 18	32
Kelly Ridge	May 25	210
East Pool(West Side)	October 11	220
Agassiz Pool(sw Perimeter Only)	October 12	70
Total		3,817

Table 5.Completed prescribed burns in 1995.

10. <u>Pest Control</u>

Three beaver dams were removed in the fall; one from Angle Ditch #126 and two from Ditch 2.

There were only two depredation complaints in 1995. Both complaints were for ducks in wheat fields during August.

Winter wheat, barley and oat fields were sprayed with 2,4-D MCPA amine/banvel mix to control annual weeds from June 13-20 with excellent results. Other herbicide use can be found in Table 6.

Table 6.	Herbicide use in 1995

PESTICIDES USED	TARGET PESTS/PURPOSES	TREATMENT SITE TYPE	ACRES OR OTHER UNIT TREATED (Pounds AI or AE)	TOTAL AMOUNT USED	EFFICACY/ COMMENTS
Dicamba (Banvel) *used with MCPA	White cockle, Sheperds purse, mustard, peppergrass, Canada and sow thistle.	Cropland seeded with barley, oats and winter wheat.	144.0 acres	4.0 gallons product. 16.0 lbs A.L	Good control on Canada thistle with MCPA
2,4 Amine (MCPA) *used with Dicamba	White Cockle, Canada and sow thistle, used with Banvel.	Cropland seeded with barley, oats and winter wheat.	144.0 acres	18.0 gals. product 72.0 lbs. A.I.	Fair-good kill results with Dicamba.
Picloram (Tordon 22K)	Leafy spurge	Grassland-uplands	0.5 acre	0.50 gal. product. 1.0 A.I.	Excellent control. The best herbicide to control spurge.
Oxford 299 wetting agent	Used on all target pests.	All areas that were sprayed.	149.5 acres	10.0 gallons	Excellent wetting agent.
Fast Break antifoamer and defoamer	Used on all target pests.	Used on all sites.	149.50 acres	2 pints 0.20 A.I.	Used to control foam with all pesticides.
Roundup (Glyphasate)	Peppergrass, white cow cockle, Sheperds purse, smartweed, quackgrass, mustard, barley, Canada and sow thistle, foxtail and blue grass.	Cropland and other flat areas around buildings, propane tanks, gas tanks and boneyard.	2.0 acres	1.0 gallons 4 lbs A.I.	Good kill on all plant species.
Rodeo (Glyphasate)	Cattail, phragmites, quackgrass, smartweed, reed canary grass.	Wetland-waterfowl banding and loafing sites. Water control structures and bridges. Sewage lagoon.	3.0 acres	1.75 gallons 6.0 lbs. A.I.	Good to excellent control on all vegetation.

14. Conservation Easements

On January 24, ROS Bennett met with members of the Kittson County Soil and Water Conservation District, MNDNR Area Manager, local teachers and employees of the MN Board of Soil and Water Resources to develop a plan to present to county schools for development of an outdoor classroom. The outdoor classroom is an 80-acre easement that was transferred in fee title to the Kittson County SWCD. Hopefully, local schools in Kittson County will form an environmental club to complete projects and manage the unit.

A special-use-permit for a prescribed burn on the north unit of Conservation Easement 012C Red Lake County was issued to landowner Ron Coffin in April. The landowner wanted to burn an area outside the easement that was not separated by any break. A heavy litter accumulation and matted grasses warranted the burn. This unit was also posted on April 17.

A special-use permit was issued to the landowner of Conservation Easement 018C Marshall County on May 31. The permit allows the reseeding of grassland areas within the easement and haying each year after July 1. The haying will control weeds and invasion of shrubs.

On August 14, ROS Bennett discussed rules and regulations of Conservation Easement 015C, Lake of the Wood County with Dennis Johnson, the new landowner. The easement was formally recorded on June 28.

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G. WILDLIFE

1. Wildlife Diversity

Twelve amphibian and reptile cover boards were again checked in 1995. On July 14 one board revealed one wood frog and a second board had been disturbed by a black bear. During the May and September checks by classes no amphibians were observed.

2. Endangered and Threatened Species

Bald Eagles: Eagles were abundant during spring and fall migrations. Thirty eagles were counted on a weekly waterfowl survey April 12. About 25 eagles used Agassiz during the fall migration for a month. In early November, 24 eagles were observed repeatedly landing and flying up from the new ice on Agassiz Pool. They appeared to be feeding; however, we were unable to detect what attracted them there.

On February 14, Bruce Lenning, Non-game Office, MNDNR, Bemidji, did a condition inventory of the aspen tree supporting a bald eagle nest in the south Wilderness Area. The tree is 45' tall with a 13.5" dbh and located 0.1 mile from open water and 2.0 miles from a river. There are many aspen trees of similar size in close proximity. The nest is considered to be in no immediate danger. This nest and the nest in the north Wilderness Area were not used this year. The other nest in the south Wilderness Area had two eaglets in May, but none on June 9. What happened to the eaglets is unknown. The nest on the east side of Agassiz Pool fledged one eaglet. Although this nest has existed for several years, this was the first year it reared an eaglet.

Gray Timber Wolves: On February 15, ROS Bennett met with a landowner in Roseau County to examine a dead wolf. The wolf had mange and hair loss over a third of its body. The animal appeared to have died from exposure. Information was turned over to Special Agent Duncan.

In March, a dead timber wolf was found along a township road near Grygla, MN. State Conservation Officer Arhart determined that the animal had been shot. After several weeks of investigation no leads were found. Skoglund Taxidermy of Holt, MN was contracted to skin and tan the hide. The hide will be used in the visitor contact area of the new administrative building.

On October 11, Scott Gerum, a student at North Dakota State University, collected wolf scat for a class project to examine food habits of wolves. He will provide a report when the project is completed.

On June 13, five wolf pups were observed in the Middle CCC Pool area. The den was located on June 23. The den entrance and play area were on the back side of the spoil and would have gone unnoticed if Rosenquist had not walked the dike. This site was not used last year. Another den site was found on Elm Lake WMA in May by Huschle during breeding pair counts. This den site is from the second pack whose presence was documented in 1994.

There were 21 incidental observations of wolves recorded in 1995. These observations include 20 adults and 20 pups. There may have been additional observations; however, they were not recorded. The pups were so observable near the old secondary headquarters area during August that they became "common place". A local farmer also reported seeing 13 wolves together during mid-June along Ditch 20. He said several appeared to be pups.

3. Waterfowl

A major spring migration of **ring-necked** ducks occurred on April 15 and 16, exceeding 4,000 by May 5. All species of waterfowl except shovelers were observed by April 17.

The gosling brood count was conducted on June 6. Production was estimated at 846 goslings. This is down from 1049 (1993) and 988 (1994). The average since 1986 is 643.

Two 4-square mile pair counts were conducted on May 10 and 30. This information is forwarded to HAPET for analysis.

The 1995 waterfowl pair count was conducted on May 19. The estimated number of indicated pairs was 5634; a 14% decrease from 1994. Exceptional water conditions in eastern North Dakota may have attracted birds away from this area. Green-winged teal, wood duck, scaup and canvasbacks showed slight increases.

Two **brood counts** were conducted on July 7 and August 17. This traditional count uses a constant productivity rate of (0.35) multiplied by an index based on the number of broods observed per pairs observed. The 1995 brood estimate is 5886 dabblers and 6830 divers for a total of 12,716 ducklings. This is the lowest for the last three years but just above the 12,371 average for the last six years.

The first fall migrating geese were observed on September 8. Canada goose numbers peaked at around 10,000 and snow geese at 500. Mallards peaked at 15,000 during the last week of October. Eight surf scoters were observed in Farmes Pool on October 19.



Oops! Placing goose nesting material in goose tubs can be challenging! 3/95 Huschle

5. Shorebirds, Gulls, Terns and Allied Species

The Roseau #8 woodcock route near Hayes Lake State Park was conducted on May 16. Twelve woodcock were heard compared to four in each of the two previous years.

The **Franklin's Gull** colony was mapped and marker buoys placed 100' apart on 8 June. A photo flight was made on June 9. The Franklin's gull colony nest estimate was 21,667; an increase over last year's estimate of 16,550. The breeding population estimate was 44,000 birds. No marked birds from 1994 were observed.

The cormorant survey, conducted on June 8, revealed 32 nests in the Ditch 11 spoil bank colony; down from 35 in 1994. Also counted that day were 160 eared grebe and two western grebe nests near the western edge of the gull colony. The great blue heron rookery, located in the north half of the Wilderness Area, was not occupied this year. Black-crowned night heron nests were located in the same sites as the past few years and totaled 588; as compared to 128 nests in 1995.

6. <u>Raptors</u>

The only snowy owl of the season was observed on October 25.

7. Other Migratory Birds

This was the second year that a contract was issued to Shelley Steva, Thief River Falls, to continue point count surveys for breeding passerine birds. The major habitat areas inventoried, 43 points sampled, this year were aspen and oak forestlands. Of note was the documentation of the Philadelphia warbler, red-breasted nuthatch and ruby-crowned kinglet. Nesting by a yellow-rumped warbler was also documented in the Headquarters grove. This year the contract included entering data into the computer data base. Analysis of this information has not been completed.

8. <u>Game Mammals</u>

Cervids: The midwinter big game survey was flown February 14. **Deer** numbers decreased by 1217 from 2670 in 1994 to 1453. The 1994 estimate is considered high and 1995 low. The winter had been mild with little snow accumulation until February. Snow pack was 3-6" in January and 6-12" in early February. Deer had not concentrated in traditional wintering areas but were observed in nearby woodlands.

One buck out of 20 deer that fed at the maintenance center showed signs of mange. The deer had rubbed the hair off the back of his hind quarters and abdomen.

Biologist Huschle attended the Deer Management Summit Meeting with the MNDNR on June 29 in Detroit Lakes. The State is re-evaluating hunting units and objectives for the units. Public involvement will be sought. Managing deer unit 203 (Agassiz Refuge) as a quality (trophy) area was mentioned; no details were discussed. There is interest in long term research in the farmland and transitional areas of the state. Agassiz may be used as a videography study site since it has past census on deer and moose and now radio tagged moose.

The moose decline was confirmed by the midwinter survey. The estimate for the count was 120, only 11 more than the quadrate count in December 1994. This lead to a recommendation of no permits for the 1995 moose season for Unit 2. The recommendation was accepted without much discussion.

The 1995 moose population/classification survey was completed on November 29. An estimate of 115 animals is essentially unchanged from the 109 in 1994. The calf to cow ratio was 40:100, the fourth consecutive year below 50. The bull to cow ratio was 32:100, the second lowest on record and down from the average of 65:100. All this in spite of no hunting since 1993.



Agassiz welcoming committee. 3/95 Tischer

Black Bear: This was a record setting year for bear observations. Food shortages in Northwestern Minnesota kept bears moving throughout the area. This year's bear harvest for the state doubled; 4,956 were harvested compared to the average of 2,656 for the four previous years. Nineteen bear observations were recorded on Agassiz; one included three cubs. The previous record was 10, set in the food shortage year of 1981.

Furbearers: Four **bobcat** observations were recorded in 1995, one of a female with two kittens. This is an average number of sightings for the refuge.

There was a normal amount of **fisher** activity with three observations recorded for the year. Seven observations of **otter** were recorded for a total of 23 animals, which is average. Three of the four scent post surveys were conducted on October 10 and 12. Of 30 posts, nine were visited by red fox, one by a raccoon, four by mink, one muskrat, one mouse, two deer and one bear. Analysis of the state data suggested that raccoon were at an all time high for the state. Fox showed a substantial decrease state-wide with several exceptions, one area being Agassiz. The decrease was due to sarcoptic mange which causes the rubbing off of hair thus leading to death from weather exposure.

10. Other Resident Wildlife

Attempts to locate **sharp-tailed grouse** dancing grounds were made on five mornings in April. No grouse were observed. This is the first year no dancing grounds were active on the refuge. Only one sharp-tailed grouse was seen during the year on November 7 on Dahl Fields.

Ruffed grouse drumming routes were completed on April 27. Drums increased from 14 in 1994 to 17 in 1995.

14. <u>Scientific Collection</u>

The annual collection permit report was completed on January 31; several bitterns were collected.

15. Animal Control

Seven exploders were lent to two local farmers in August. The refuge is a facilitator for the U.S. Department of Agriculture Animal and Plant Health Inspection Services. Although landowners are encouraged to purchase their own exploders, they still feel the need for the refuge to provide some help. Several exploders were lent to Rydell NWR in July.

On October 31, a beaver dam was removed from Ditch 2 after a complaint was registered by the county commissioner. Water had backed up on the refuge causing water to remain in the ditch outside the refuge.

16. Marking and Banding

A new carousel was made by Engineering Equipment Operator Myhrer in March. The new design holds 1200 mallard bands, 400 to a side, to hold the four age/sex categories. The bands top load and are removed from the bottom.

Mallard banding began on September 8. A total of ten rocket net shots were made. Banding quotas of 300 each were met for hatch year males and females and 299 adult females (one band found in box during cleanup); however, only 221 adult males were banded. A record catch of 603 birds were banded on September 15. Four black ducks and 62 pintails were also banded.

H. PUBLIC USE

1. General

Public use opportunites are provided by the auto drive, foot trail, Marshall County Road 7, an adjacent township road, Parker Observation Deck and the 100 foot observation tower.

The Refuge Management Information System Public Use Output Report form was modified by the Washington Office at the beginning of 1994. The table on the following page shows the total public use visits using the old method and the new method. Observation towers, observation decks and photo blinds have been added as a new category. A big difference in calculating visits is that we may no longer include people who use Marshall County Road 7, even though they are observing wildlife. This drastically decreases the number of visits on the refuge by 13,578 as indicated in the total visits in table #7. The only people counted as visits are the people stopping on the refuge and participating in at least one public use activity.

A total of 24,190 visits and 16,720 activity hours were recorded for the refuge in 1995 under the old method and 11,425 visits were recorded under the new method. Not included in the total visits are 676 off-site visits under environmental education and education outreach.

The refuge newsletter "A Wild Note" continued in 1995. Four editions were mailed to refuge neighbors during the year.

On April 17, ROS Tischer participated in the Red Lake County Soil and Water Conservation District's (SWCD) five mini-sessions on wetlands. Each session was 20-minutes long with emphasis on wetland plants. Ten groups totalling 185 seventh graders from Thief River Falls Franklin Middle School participated in the sessions.

Moose Mania: Rob Hotakainen of the Minneapolis Star Tribune visited the refuge in June. He wrote a front page feature story on the moose research project for the Tribune's Sunday July 2 edition (see insert back cover). This was the beginning of an explosion of interest by the media in moose research and has placed Biologist Huschle in the lime light. Channel 11 KARE television, Twin Cities, MN spent three days in September obtaining footage for a five minute feature story aired during the Thanksgiving weekend. Leif Enger, Minnesota Public Radio, visited the Refuge in September to interview Biologist Huschle and Forestry Technician VanEps. The Feature aired on October 13.

Table 7. Public Use Figures for 1995.

Categories	Old Method	New Method
I. Total Number of Visits		
A. Includes people traveling County Road 7	24,194	11.405
B. Excludes people traveling County Road 7	10,616	11,425
II. Interpretation and Nature Observation (On-Site) - Total People	8,515	9,278
A. Staff/Volunteer Conducted Activities	366	366
1. Talks	183	183
2. Tours	128	128
3. Demonstrations	55	55
B. Visitor Centers	0	0
C. Administrative Office	920	920
D. Kiosks	2,360	2,360
E. Nature Trails	4,869	4,869
1. Foot	278	278
2. Boat	No Trail	No Trail
3. Auto	4,591	4,591
F. Observation Towers, Platforms, & Photo Blinds	No Estimate	763
III. Environmental Education	1,029	1,029
A. Staff/Volunteer Conducted	1,020	1,020
1. Teachers participating in workshops	0	0
2. Students taught on-site	414	414
3. Students taught off-site	606	606
B. Non-Staff Conducted	9	9
IV. Recreation	1,716	1,716
A. Hunting	1,716	1,716
3. Big Game	1,661	1,661
C. Trapping	87	87
V. Education Outreach (Off-site)	70	70
A. Group Presentations	50	50
B. Exhibits	0	0
C. Other	20	20
VI. Special Events	24	24
A. Number of News Releases	9	9
B. Number of Radio/TV Spots	10	10
C. Other Special Events	5	5

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Envirothon: The second annual Envirothon was held on April 20. Eighty-five high school students from five schools participated. Agassiz hosts the event while local SWCD staff do the organizing. A team from Lincoln High School, Thief River Falls, won the event. Biologist Huschle's daughter, Sarah, was a member of the team. This team won the State contest and placed 16th out of 32 competing teams at the Nationals in Idaho.



Agassiz hosted the Second Regional Envirothon Competition Tischer



Lincoln High School, Thief River Falls: The winning Envirothon Team. The team went on to win at the state level and placed 16th at National Competition. Team members: Justin Phillips, Adam Henney, Phillip Nelson, Sarah Leach, and Sarah Huschle. *Tischer*

2. Outdoor Classroom - Students

Outdoor classroom visits and activity hours were 414, a 28% decrease. Some teachers use the refuge on their own (1,695) but their numbers are included in the visits and hours.

A letter was sent in March to area high school environmental science classes inviting them to participate in the amphibian monitoring project. Lincoln High School, Thief River Falls, and Red River High School, Grand Forks, ND, responded. Marshall County Central High School participated for the second consecutive year by checking the amphibian cover boards. Very low use by amphibians has thus far been monitored.

During 1995, ROS Tischer was very involved with the landscaping of the new Challenger Elementary School grounds, Thief River Falls. He is spearheading plans to restore a wetland and a native prairie site on the property. Both sites would be used for environmental education. Seven times during the year, ROS Tischer and teacher Elizabeth Quick took fourth and fifth graders to local native prairie sites to collect seeds. The collection was coordinated with MNDNR personnel. At summer's end over thirty species were collected. The seeds will be planted at the school in 1996. ROS Tischer is also working with Cindy Buttleman, Mineral Specialist, MNDNR, to locate native rock specimens of Minnesota for a landscape display at the elementary school.

PRESENTER	SUBJECT	PARTICIPANTS (#)	DATE
Tischer	The Refuge and FWS	Our Saviour's Christian Academy (15)	Apr 20
Self-guided	Habitat and Ecology	Gladwyn Lynne's Biology Class (72)	May 4
Bennett	Wildlife ID; portable tree stands	New Folden Youth Firearm Safety (22)	May 6
Tischer	The Refuge and FWS	TRF Cub Scout Pack 59 (25)	May 7
Tischer	Environmental Problems	TRF Comm. College Env. Class (25)	May 9
Tischer	Wetland Plants	TRF Comm. College Botany Class (16)	May 16
Self-guided	Refuge Wildlife and Plants	Grygla Biology Class (21)	May 16
Self-guided	Birding for Ornithology Class	International Falls Comm. College (5)	May 19
Tischer	General Refuge	Clearwater Co. 4-H Youth (20)	May 20
Tischer	The Refuge and FWS	TRF Girl Scout Troop 206 (19)	May 22
Tischer	The Refuge and FWS	Students from Goodridge (35)	May 23
Huschle	General Refuge	Disabled Students	Jun 8
Self-guided	Summer ornithology class	UMN Itasca State Park (6)	Jul 3
Huschle	Duck Banding/Amphibian Board	Marshall County Central Environmental Science Class (25)	Sep 15
All Staff	3rd Annual Public Banding Night	General Public (55)	Sep 19
Tischer	General Refuge/Duck Banding	E. Grand Forks HS Biology Class (40)	Sep 21
Tischer	Refuge Activities	MN Assoc. Of Resource Conservation & Development Council	Sep 29

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4. Interpretive Foot Trails

A quarter mile hiking trail is located on the four-mile Lost Bay Habitat Auto Drive. Total visits and activity hours were 278 and 136, respectively for the year.

5. Interpretive Tour Routes

The Lost Bay Habitat Auto Drive was open from April 25 to November 1, during which 4,591 visits and 2,296 activities hours were recorded. Eight new interpretive signs were developed for the auto drive. Wilderness Graphics, Tallahassee, FL, was contracted to finalize the graphics and camera ready product. Final revisions were approved in December. Signs will be produced at the US Fish and Wildlife Service, Winona National Sign Shop, Winona, MN.



New Headquarters and Auto Tour sign at Refuge Headquarters. 40 new signs were put up in 1995. *Tischer*

6. Interpretive Exhibits/Demonstrations

Total visits and activity hours were 3,280 and 1,735, respectively.

The refuge, in cooperation with the MNDNR, developed a new visitor map. The map highlights major features and vegetation types. The refuge's share of the project was \$650.00, which purchased 1,500 maps. The maps will be used for general public distribution.

Two new mounts, a male American bittern and female canvasback, were added to the display area. Lietzau Taxidermy of Cosmos, MN did the work for \$270.

ZeAnn Linder, Thief River Falls, completed wildlife line drawings for the new refuge kiosk signs. Four drawings cost \$400.00. Ross Heir, MNDNR, Crookston, a volunteer, also completed six wildlife drawings for the kiosk. The kiosk signs will be produced by the National Sign Shop in Winona, MN in 1996.



Bennett and Anderson make Final Edit on the Entrance Kiosk map. *Tischer*

7. Other Interpretative Programs

Total visits and activity hours were 366 and 915, respectively.

ROS Tischer and Biologist Huschle conducted two career day sessions, March 14, for 26 students from Franklin Middle School, Thief River Falls, and March 26 for 23 high school students. Biologist Huschle attended Boy Scout Wilderness Camp in June with his troop from Thief River Falls. During the week he gave presentations to two Environmental Science merit badge groups.

National Wildlife Week was April 16-22. ROS Tischer asked the National Wildlife Federation to distribute annual National Wildlife Week packets to 41 area schools. This years theme was "Home Is Where The Habitat Is".

Radio Interviews: Biologist Huschle was interviewed, February 17, by Todd McDonald, KTRF Radio, on deer survey results. He was interviewed again, March 3, by Clark Hendrickson, KTRF Radio, on the midwinter big game survey. The fall weekly live radio interview *Outdoor Report* on KTRF Radio started on September 22 and ended November 17. The weekly interviews with refuge staff generally cover hunting and wildlife issues.

The local KTRF Radio Station does a daily half hour *Coffee Time* show that is broadcast live at 9:30 a.m. and taped for rebroadcast at 6:30 p.m. on the same day. The show is shown over the local TV cable channel. Table 9 summaries the shows conducted by refuge staff.

offee nine i	litter views.	
Staff	Торіс	Date
Anderson	Introduction - new manager	Aug 11
Tischer	General Information, NWR Week and Weekend Events	Sep 25
Anderson	Deer numbers/Hunting	Oct 23
Huschle	Furlough, Bird Feeding, Birding	Nov 21

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PRESENTER	PROGRAM TOPIC	PARTICIPANTS (#)	DATE
Bennett	Refuge Activities	Kiwanis Breakfast Club(18)	Jan 17
Tischer	F&WS events	TRF Rotary Club	Mar 27
Tischer	Wildlife Mgt.& ID	TRF Firearm Safety (24)	Mar 30
Tischer	Wildlife Mgt.& ID	TRF Firearm Safety (17)	Apr 17
Bennett	Wildlife Mgt.& ID	Newfolden Firearm Safety Class (37)	Apr 20
Tischer	Mammals	K-3 Students at Viking Elementary (101)	May 4 & 5
Tischer	Wildlife Mgt.& ID	Plummer Firearm Safety (9)	May 4
Tischer	Wildlife Mgt.& ID	TRF Firearm Safety (28)	Jun 1
Tischer	Wildlife Mgt.& ID	TRF Firearm Safety (11)	Jul 25
Anderson	Refuge Activities	Lions, TRF (50)	Sep 6
Tischer	Wildlife Mgt.& ID	TRF Firearm Safety (16)	Sep 11
Tischer	Waterfowl Management	Marshall Co. Conservation Days	Sep 12
Tischer	Wildlife Mgt.& ID	TRF Firearm Safety (30)	Sep 18
Anderson	Refuge Activities/Mgt.	Agassiz Audubon (30)	Oct 10

Table 10.Interpretive programs, 1995.

Table 11.Open house activities, 1995.

DATE	EVENTS	TOPIC
Jun 13	International Migratory Bird Day - Presentation by Jodie Provost; Bird Tour by Shelly Steva	Cranes/Sandhill Cranes
Jun 25	Office and roads open. Presentation by Biologist Huschle on radio telemetry.	Moose research
Jul 23	Office and East side Roads open. Presentation by ROS Tischer	Endangered Species.
Aug 13	Office and West Gate and Farmes dike roads open. Presentation by Wayne Brininger, Jr.	American bittern study
Oct 8	Bus tours, videos, drawings	National Wildlife Week

Moose Mystery (hallenge: This initiative was developed by area MNDNR managers and refuge staff as an outreach and fund raising effort for the moose research project (see **D.5**). A four-page handout titled **MOOSE DYNAMICS in NORTHWEST MINNESOTA (A 3-year Study Proposal)** was developed. Information on moose history, the pilot study, project proposal and cost summary were included. Text and layout were completed in December. Martha Minchak, MNDNR area biologist, was finalizing the art work. Along with the handout a cover letter with project letterhead and envelopes were also developed. The final product will go to the printers in January 1996. A mailing list of nearly 300 local businesses, sportsmen and conservation groups, media, schools and possible grant foundations was pulled together.

Schools will be participating in the **(hallenge** through the *Adopt-A-Moose* program. This dimension of the project was added in November. Radio collared moose will be put up for adoption to local schools and youth groups at no charge. Area businesses will be invited to sponsor the moose. Adoption and birth certificates will be designed and monthly updates will be sent to participating schools. The whole idea is blossoming and will hopefully come into full bloom by spring.

8. <u>Hunting</u>

The 1995 deer firearm hunting season was held November 4-12. There were 602 applications for 650 antlerless permits. An additional 72 deer management permits were available for purchase. Total hunters for Zone 2 (Agassiz and three adjoining state WMAs) was 973, down 9% from 1994. Hunters harvested 547 deer, which is equal to the 10-year average of 528. The age and sex of dear harvested is as follows: Adults - 209 males, 230 females; fawns - 51 males, 59 females.

10. Trapping

The 1994-95 trapping season went from October 29, 1994 through February 28, 1995. Muskrat trapping was authorized on three of the eight units. Otter trapping was authorized for the first time on the refuge allowing two otter per unit. Bids totalled \$592.50 for the eight units. Results are: Total number of visits - 238; total number of man hours - 500; total number of trap days - (leghold) 3,428 and (conibear) 1,461; total number of trap days and number of each species trapped were: mink - 942 and 36; muskrat - 2,400 and 1,160; raccoon - 942 and 20; red fox - 538 and 25; skunk - 538 and 6; river otter - 40 and 8; beaver - 952 and 116.

The 1995-96 trapping season went from October 28, 1995 through February 29, 1996. Eight trappers each received one of the eight trap units. Bids ranged from \$37.00 to \$189.00 totalling \$594.50. Early and deep snow, questionable safe ice conditions and cold temperatures made trapping miserable after the first week of trapping. Results will be reported in next year's narrative.

Table 12.	Fa	ll fur harvest	<u>1987-95.</u>					
YEAR				SPECIE	S			
	MINK	MUSKRAT	SKUNK	RACCOON	BEAVER	FOX	COYOTE	OTTER
1987	266	3157	44	61	37	22	*	*
1988	110	*	22	48	*	35	*	*
1989	84	*	6	14	35	31	*	*
1990	60	*	27	21	4	31	*	*
1991	43	*	28	10	40	42	*	*
1992	29	*	12	23	31	33	*	*
1993	17	· · *	13	11	100	8	*	*
1994	36	1160	6	20	116	25	*	8
1995	8	340	l	9	12	2	*	0

* Trapping not permitted

11. Wildlife Observation

Agassiz is known nationally for a wide variety of birds (280 species) and its moose herd, but the question asked most often is, "Where can we see a moose?" A large portion of our visiors are serious birders who are looking for special interest species. Many of these birders provide summaries of their observations.

17. Law Enforcement

On January 4, a refuge neighbor reported finding snares along the North Boundary Refuge Road. Refuge Officer Huschle investigated and found the name of a refuge permittee trapper attached. The permittee said that several of his snares had been stolen. Conservation Officer Arhart did surveillance and further investigations. Apparently there were some conflicts between the refuge neighbor and the trapping permittee. No apprehensions were made.

On May 1, two American bitterns were found dead in Ditch 35, along the west boundary of the refuge. They appeared to have been shot by a small caliber gun. State Conservation Officers completed investigating but no leads developed.

During the waterfowl season refuge officers were involved with two tickets: possession of lead, and a loaded gun in a moving boat. Both violations were handled through state court. Three written warnings and one verbal warning were issued. During the firearm deer season two tickets

were issued: uncased loaded gun, and not tagging deer prior to transport. Violations were handled through state court. Five verbal warnings were issued. Snowmobile trespass increased in 1995 but activity was sporadic. No NOVs were issued and no one was identified. Refuge Officers Bennett and Huschle completed the annual L.E. refresher in Des Moines, Iowa March 27-31. Bennet, Huschle and Anderson attended fall re-qualification at the Sandstone Federal Prison, September 20.

I. EQUIPMENT AND FACILITIES

1. <u>New Construction</u>

Administrative Building: On January 31, Ms. Belmont of Kathy Belmont Interiors, Thief River Falls, MN, visited the refuge to discuss interior colors for the new building. A soft green theme was selected. Interior decorating research has shown that more people get a warm welcome feeling from green than any other color.

I. EQUIPMENT AND FACILITIES

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The administrative site was laid out at the head of the auto tour separating it from the residence and garages. 9/95 Brininger

Eagle Construction, Remer, MN, resumed construction of the new building on April 20. Framing was completed in May. Sheet rocking, plumping, electrical, heating, wall insulation and primer paint coat were completed in June. A new phone line was installed by Wikstrom Telephone Company on October 3. The new phone system was purchased from AT&T. Final building inspection occurred in October and touch ups were completed in November. The building was officially accepted on November 21.



Contruction of the new administrative building and associated outdoor facilities proceeded throughout the year. *Huschle*

After accepting the new building, refuge staff began final construction design. Internal walls to separate offices were installed in November and December. The new office furniture purchased from Steel Case Furniture, Twin Cities, MN was installed during the first week of December. Storage cabinets were also installed.

The total cost of the building was \$356,637.25. The following is a breakdown.

Contractor:	\$312,226.61
Force Account Interior Finish:	6,124.47
Furniture:	28,088.86
Sidewalk/Parking:	7,421.25
Phone System:	2,776.06

Furloughs, blizzards and extremely cold temperatures delayed moving into the new office until January 1996.



Finally finished in December, 1995, we moved into the new administrative building inbetween snow storms in January, 1996. 12/95 Tischer

2. Rehabilitation

Water Control Structures: Red Lake Builders, Red Lake, MN, were awarded the Parker/Agassiz and Ditch 194 water control structures contract for \$148,780.00, contract # 14-48-0003-95-00032. A preconstruction conference was held on June 21. After several threatening letters from Contracting-RO, the contractor finally began work on September 11. In October, the bases and walls of both structures were completed. Ditch 194 structure was also backfilled in October. Coffer dams at both sites were removed before freeze up. Railing, general cleanup, road repair and final touch-ups will occur in 1996.



The replacement structure on Ditch 194 was completed in October. Stop logs could no longer be adjusted in the old structure. 10/95 Bennett



Slumping on Ditch 11 below the control structure did not stabilize in 1995. The slump was brought up to grade 3 times during the year. Refuge and RO staff are weighing options for rehab of this 2 mile dike. 4/95 Bennett

Ditch 1 Bridge: In October, 1994, Ditch 1 bridge was replaced with a 9.5' diameter culvert. The culvert was delivered in three sections and installed with bands. Installation was coordinated with engineers from the Red Lake Watershed District. However, there was a size problem with the matching ends of the main section on the upstream end. There was a 6" difference in diameter! The company (ConTech Inc.) sent a representative, who recommended using shims and filter fabric to correct the problem. All worked fine until the main runoff in March of 1995. Flowing water managed to siphon soil through the bottom splice, eventually causing a large enough void, allowing the pipe to fall. As the down stream side of the upper section fell, the current caught the front end of the pipe. This caused the pipe to separate from the main section and stand nearly straight up. Representatives from ConTech revisited the site on April 5. Although ConTech accepted responsibility for the problem it took until August 5 before an agreement was signed. Unfortunately, a wet summer and fall left the problem unfixed. ConTech has paid a local vendor to correct the problem. Work should be completed in 1996.

Ditches: Two requests for ditch cleanouts were received in April. Roger Kilen, north of the refuge, has an eighty-acre field that is dependent on a private ditch that drains to the refuge. The ditch has grown up with phragmites which restricts flow. The second request was on Old County Ditch 30 on the east side. The County Highway Department took over jurisdiction of a township road and is revamping the road surface and ditch flow. The request on the north portion of Ditch 30 is to block off the flow so water from the refuge does not cause extra wetness on adjacent

fields. The request on the east portion of Ditch 30 is to clean out vegetation and sedimentation. The problem with the latter request is that wetlands on the refuge will be negatively impacted. In both cases the area county commissioner is not a friend of the refuge and is pro ditching. Neither projects were completed in 1995 and will resurface in 1996.



Production design failure caused the upstream section of the 9'6" pipe on Ditch 1 to be dislodged during spring runoff. A repair agreement was reached in August with the contractor. 4/95 Bennett

Refuge Quarters: This building has been very energy inefficient. Residents have had to pay an unreasonable amount of money for fuel. Although insulation was blown into the attic in the Fall of 1994, there appears to be no insulation in several walls. The old siding is rotten in many locations and holes attract nesting birds and small mammals. In August, a request was submitted and approved for a transfer of \$15,000 to this station from the Regional Office Quarters Funds.

In September, Doug Johnson, Engineering Technician-RO, Scot Wockenfuss, Maintenance Mechanic and building resident, and RM Anderson completed a quarters inspection for contract language and blueprint. Doug Johnson provided the specs for the contract (P.O. # 32510-6-004; amount \$14,908.00) which was issued in November to JD. U.S. Seamless Inc., Roseau, MN. The contract is described as a Residence Energy Retrofit and includes removal of old wood siding and roof shingles, installation of wall insulation, new roof shingles, seamless steel siding, soffit, fascia and trim, two basement egress windows, replacement of three windows and an exterior door.

An emergency purchase of a furnace was made in October. The existing furnace was not dependable, the thermostat was bad, zone pump bearings gone, and thermocouples, a safety feature, did not work. Arts Repair of Middle River replaced and installed a new furnace for \$2,849.00. The following is a cost breakdown: furnace - \$1,805, installation - \$365.00, flu system, circulating pump, zone management, tubing and chemicals - \$679.

A 30-foot square concrete apron was poured next to Quarters 1 on August 18. The apron provides a car port and reduces dirt being tracked into the Quarters.

Miscellaneous: July: A new water pump with pvc line was installed on the well for the new office. The work was completed by force account, cost *Sxxxx*. Additional gravel was placed on the old office parking lot. Excessive rainfall was making the lot very soft. The summer youth enrollees re-coated the Parker Observation Deck with seven gallons of wood preservative.

August: Madsen bridge (#86) was removed. The old bridge, which was used as a water control structure was replaced many years ago and served no purpose. Concrete was crushed and buried. The site was filled with dirt and renovated to match the surrounding dike and slope. The bridge had been considered unsafe after recent bridge inspections.

4. Equipment Utilization and Replacement

A new 325L Cat Excavator was delivered on June 16 and the extension stick was installed on June 19, total cost \$179,462. The extension stick was manufactured by Paul Weaver Construction and cost \$17,750. These two items replaced the old Lima Crane. During August, the excavator developed hydraulic cylinder problems and was returned to Zieglers Company, Crookston, MN for repairs. Repairs were covered by warranty but GSA had not negotiated transportation costs in the federal contract. The refuge paid \$228.00 for transportation.



The new 325L Cat Excavator will be much more versatile than the old Lima Crane. *Tischer*

8. Other

The old silo, received as part of a land trade in 1968, had become unsafe due to deterioration from wet conditions and animal burrows. The silo was dismantled on August 24.



Some thought the old silo would be an observation tower. Some thought the top would make a nice gazebo. Others thought it needed to be removed. 8/95 Huschle



There goes the gazebo! 8/95 Huschle



The rubble was buried to complete the removal. 8/95 Huschle

An Excess Property Sale was held May 22-26. There were 64 lots which brought in \$4,472.86.

J. OTHER ITEMS

3. Items of Interest

Refuge Revenue Sharing: Administrative Technician Beulah Wikstrom delivered a refuge revenue sharing check to the Marshall County Auditor in the amount of \$35,306 on April 21. This amount represented 77.1% of the 1994 entitlement and was \$348 less than last years payment.

Regional Appraiser Rick Johnson conducted a five-year revenue sharing review for Agassiz on August 7. Agassiz' appraised value for the 61,046 acres subject to revenue sharing was \$5,773,500, which is almost double the 1990 appraised value of \$2,900,000. The average gross value of land equivalent to habitat at Agassiz sold for \$125/acre over the last two years. This would equal a revenue sharing payment of \$47,026 based on 100% of payment at the 3/4 of 1% of the unit value.

4. Credits

ROS Bennett drafted the narrative and all staff participated in the editing process. C. Brininger, volunteer, assembled the narrative.



The great Minnesota moose mystery July2



Staff Photos by John Lee

A moose cow ran through the cattails at Agassiz National Wildlife Refuge as a calf, its ears just visible, followed. After reaching a high of 437 in 1981, the number of moose at the refuge has dropped to an all-time low of 109. Some think the moose may have fallen prey to bears or wolves, but experts suspect disease or migration.

As once-thriving herd at Agassiz dwindles, researchers ask why

By Rob Hotakainen Staff Writer

Middle River, Minn.

The morning fog is much too thick to see the moose, but Eric Rosenquist knows it's nearby. As he twists a special antenna poking through the roof of his Chevy pickup, he hears a beep.

It's the sound of radio signals from a female calf in the marshes of Agassiz National Wildlife Refuge. She's wearing a transmitter, broadcasting at 165.319 megahertz.

"Each moose has its own frequency," says Rosenquist, 26, a wildlife technician who's out to help crack a real Minnesota moose mystery.

While the state's overall moose population is healthy, the size of the herd at Agassiz is plunging rapidly, and no one knows why. If there's a precise reason, wildlife biologists are banking on a new study to help them find it. Call it a wild moose chase.

In May, researchers used helicopters to capture 12 moose — 11 newborn calves and one cow — and then equipped them with radio transmitters to track them.

Each transmitter, which is roughly the size of a 50-cent piece, includes a mortality sensor. If a moose remains still for three hours, it sends out a frequency twice as fast as normal, signaling a possible death.

Researchers hope that if they arrive on the scene quickly enough, they'll be able to examine the carcass before it's eaten by other animals. Rosenquist said the mortality sensor will not activate while a moose is sleeping because the animal is likely to stir at least slightly.

Minnesota still has nearly as many moose as Hopkins has households: 7,693, according to the most recent estimated count. That's one moose for every 594 Minnesotans. It's a resilient population that's in no danger of serious decline, experts say.

Yet something is askew in Agassiz, a remote pocket of northwestern Minnesota where moose have been a trademark since the late 1930s. After hitting a high of 437 in 1981, the number of moose at the refuge has dropped to an all-time low of 109, the smallest



On an airboat in Agassiz, wildlife technicians Eric Rosenquist, left, and Wayne Brininger used an antenna to locate moose equipped with radio transmitters in hopes of learning why the herd is dwindling. Of the dozen moose originally tracked, two have died.

since 1968, when the first aerial surveys were done. The population, which has fluctuated over the years, had never dropped to less than 200 until the winter of 1993-94.

It's cause for concern at Agassiz, where moose are even pictured on the entrance signs. Officials say the refuge has had one of the most productive moose herds in the country.

"Before they become so rare that you can't find one, we thought we should start looking into what's going on," said Gary Huschle, a wildlife biologist with the U.S. Fish and Wildlife Service at Agassiz.

Moose continued on page 6A



Moose / Six days of monitoring, and Saturdays off

Some speculate that the moose may have fallen prey to black bears or wolves, which have been sighted more frequently lately at Agassiz. But experts say the moose could be falling victim to disease or simply migrating to new territory.

One of the 12 moose in the study One of the 12 moose in the study died last Sunday night, and the cause was not readily apparent. Its body was boxed and sent to a laboratory in Madison, Wis., for an autopsy. It was the second animal to die since the study began May 24. A calf died from a severe blow to the head on the first day first day.

"Probably kicked by Mom," Huschle

The moose are monitored six days a week. Rosenquist is off on Saturdays, the only time the animals are not subjected to government surveillance.

"They don't get harassed on Saturdays," joked Rosenquist, a graduate student at St. Cloud State University who is studying the ecology of Minesota's prairie chickens as part of a master's degree program. One of his projects involved equip-ping the chickens with radios, pro-viding experience for his work with the mose the moose

Half of the moose in the experiment wear the radios in expandable neck collars, while the rest wear them on ear tags. The moose had to have their ears pierced to make room for the tags, which are solar-powered. The collar tags run on batteries and are held by elastic with a cotton thread-ing that will rot and eventually fall off. Part of the experiment is to find out which tags work best.

When the moose calves were cap-tured, they were between one and four days old and weighed 40 to 75 pounds. They were loaded onto a helicopter, weighed and tagged, and then released. Rosenquist said the calves already weigh 130 pounds and are 4 feet tall — mostly legs.

'That's our moose . . .

It's just a summer job for Rosenquist, who's earning \$8.50 an hour from the Fish and Wildlife Service. He begins his rounds at 6:30 a.m., driving 50 to 100 miles on gravel roads each day, depending on how far the animals have strayed.

When he hears the signal, he grabs a pen from a Crest toothpaste box that's taped to the truck's stick shift. He scribbles the location on a clip-board, then says matter-of-factly: "That's our moose there."

He must get within 2 miles of each animal to pick up its frequency. It takes him three hours to make the rounds; he stops at least 30 times to open and close gates and take read-ings. When he's done, he goes back to the office to plot many chowing to the office to plot maps showing where the animals have moved.

So far, the calves haven't moved too far. They like to stay low in the marshes, munching on willow leav and aquatic plants. When it's hot, vleaves



Half of the moose in the study were equipped with solar-powere transmitters like this one, which is attached to the animal's ear.



Staff Photos by John Lee

Eric Rosenquist begins his rounds in Agassiz National Wildlife Refuge at 6:30 every morning — except Saturday — in a Chevy pickup truck with a special antenna that pokes through the roof to track the moose.

they stay in the water.

On days when he can't pick up the animal's radio signal by truck, Rosenquist uses an airboat — a boat equipped with an airplane engine — to plow through miles of green muck.

"It'll go through about anything," he

Indeed, the front of the boat is Indeed, the front of the boat is squared off and has protruding steel bars that batter 8-foot cattails, send-ing yellow puffs of pollen flying. There's a steady hum of horseflies and a stench of algae as Rosenquist zips over plants such as duckweed and bladderwort, chewing sunflower seeds as he goes. The boat jolts when he hits a muskrat house. The water is shallow, an average of 4 feet. When Rosenquist hits drier spots, he guns it, and the engine screams. He wears earplugs. It's no pleasure cruise on Lake Minnetonka.

Even though it's the first time the radio techniques have been used at Agassiz, they've worked elsewhere.

Alaskan researchers in the 1980s were the first to use radio telemetry to show the link between moose to show the link between moose deaths and bear predators, said Murray Lankester, professor of biol-ogy at Lakehead University in Thunder Bay, Ontario. The study showed that bears were killing 50 to 60 percent of the moose calves in the first few weeks after they were born. A similar study was done later in Newfoundland.

Following the clues

"Bears zero in on these calves and, once a mother bear learns how to do it, she apparently teaches her young," said Lankester, co-editor of the scientific journal Alces, the sci-entific name for moose. "With a bear kill, it's very distinctive because they skin the animal. You'll find the hide there just turned inside out like a glove. If you get in soon enough, then glove. If you get in soon enough, then you can determine with some certainty the cause of death. If you don't have the collars that tell you the ani-mal is dead, it might be a couple weeks before you ever find it and, by then, the foxes and the crows and the ravens have consumed everything."

Minnesota officials say that radio transmitters have been put on adult moose on two other occasions, but the Agassiz project is the first in the state involving newborn moose.



U.S. Fish and

Minnesota's moose population has slipped by nearly 10 percent in the last decade, from 8,537 in 1984-85 to 7,693 in 1994-95, according to state estimates.

State officials say the 10-year statisbits can be misleading: The mose population rebounded strongly after hitting bottom in the late 1980s, when the parasitic winter tick killed many.

"Despite the fact that moose num-bers dropped dramatically because of that parasite, they bounced back," said Mark Lenarz, leader of the Forest Wildlife Populations and Research Group of the state Department of Natural Resources (DNR) in Grand Rapids. And there's no need to fear a disappear-ing moose population, he said: "The habitat is out there. They're going to be doing fine."

Ultimately, researchers want to put radios on 60 moose over three years, but the size of the Agassiz experi-ment will depend on funding. The study is a joint project of the DNR

and the Fish and Wildlife Service and covers roughly 130 square miles. The cost of the first phase is \$20,000.

For now, there's only enough money to pay for daily tracking of the moose until September, when Rosenquist's job will end. He knows the job is unusual — not many people get to earn a living by trailing the majestic and elusive moose.

Wearing a helmet and life jacket, he pulls his airboat next to a beaver dam and holds a 4-foot antenna to the sky. His headset is plugged into a receiver that he holds in his other hand, making him look a little like one of Al Franken's characters from Saturday Night Live, the self-pro-pelled broadcaster.

"I got a couple quick beeps," he says, ready to move on again. So it goes.

Rosenquist rarely sees the moose he follows, but he's philosophical: "You know everywhere they've been for their whole life, basically, but you've never seen them."



Sometimes we don't see the wildlife, but we see their_____

Have you seen any today?



Which animals did you see in:

Marsh

Woods

Brush

Look for wildlife homes too!





Spider's webBird's nest



Beaver lodge



Hole in the ground Who lives there?

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



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





A Checklist For Kids

A Vital Link

Agassiz National Wildlife Refuge lies within the area of glacial Lake Agassiz. The contiguous 61,500 acres are located in the aspen parkland region of northwestern Minnesota, the transition zone between the coniferous forest, tall grass prairie, and the prairie pothole region of the United States. Agassiz is composed of 40,094 acres of wetland, 10,000 acres of shrubland, 7,000 acres of forestland, 4,256 acres of grassland, and 150 acres of cropland. Peat fires that occurred mainly during the early 1900's formed many of the smaller wetland basins that dot the refuge today. This area was a paradise for waterfowl and other wildlife before man made changes to the land.

In 1910, a very extensive drainage project was approved by District Court Order of Marshall County. By 1933, approximately one million dollars had been expended on the Judicial Ditch 11 system. The Mud Lake area had been drained and became so tax delinguent that Marshall County was protected from bankruptcy by the state legislature. The State appropriated \$750,000 to absorb the delinguent drainage taxes. In return, the State, through its Conservation Department, had the right to use those lands for conservation purposes. The area became so expensive to maintain that authorization was given to the state Conservation Department (through funds provided by the U.S. Resettlement Administration) to purchase the lands. The state turned the lands over to the Bureau of Biological Survey, now the Department of the Interior, U.S. Fish and Wildlife Service, on March 23, 1937. Agassiz National Wildlife Refuge was established and developed as a vital link for waterfowl and wildlife in the chain of National Wildlife Refuges in the Mississippi Flyway. Today, Agassiz Refuge is one of over 500 national wildlife refuges totalling 92 million acres throughout the United States.





Revitalized Wetlands

In 1937, a major program began to restore the wetlands of this area. A dike system was formed, drainage ditches were closed, and since then, 19 pools have been developed that range in size from 100 to 10,000 acres.

Forty thousand acres of various wetland types now exists on the refuge. Water levels are managed with a system of dikes, water control structures and spillways. Cattail is the dominant emergent plant in the wetlands. Bulrush, reed grass, white top, reed canary grass, duckweed, spike rush and other sedges, are other typical emergent vegetation. The dominant submergent vegetation includes water milfoil, muskgrass, coontail, and pondweed species. Approximately 3,000 acres of black spruce and tamarack grow in the north-central area of the refuge.

Wildlife

Natural and managed habitats at Agassiz Refuge provides a haven for many wildlife species. The bird list includes 280 species, about half which are resident nesters. Fortynine species of mammals, 12 species of amphibians and 9 species of reptiles also inhabit the refuge.

The refuge supports 17 species of breeding ducks as well as giant Canada geese. In an average year 10,750 pairs of ducks and 250 pairs of Canada geese nest at Agassiz. Colonial nesting birds include Franklin's gulls, great blue herons, great egrets, black-crowned night herons, double-crested cormorants, and eared and western grebes.

The diversity of wetland and upland habitat provide excellent protection for ducklings, goslings and molting waterfowl. By late September they are strong enough to migrate south. By November, less than 20 species of birds remain for the winter.













One of the greatest visitor attractions is the opportunity to view moose in the wild. The best times to see moose are in late summer or fall during early morning or late afternoon hours. Drive slowly and watch the willow thickets. The average moose population on the refuge and adjoining state wildlife management areas is 250.

White-tailed deer are abundant and may be seen throughout the refuge.

Agassiz is one of several National Wildlife Refuges in the lower 48 states to have a resident pack of eastern gray wolves. Wolves roam the entire area during the winter months, but favor the grassland and forest on the east side during the rest of the year.

Maintaining a Balance

In order to maintain a diversity of wildlife habitats at Agassiz, several management practices are used.

Water management is directed at providing a variety of wetland types with emergent and submergent plant communities.

Prescribed burning and winter brush mowing maintain grasslands for waterfowl nesting and early successional habitat for moose and deer. Controlling natural succession maintains the mosaic of grasslands, sedge meadows and forestlands that is needed by native wildlife species.

Farming for migratory waterfowl provides high protein foods during migration. The primary crops planted are barley, oats and winter wheat. Resident wildlife are also benefactors of the refuge farming program.



Wilderness Area

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

Visiting the Refuge

"Lost Bay Habitat Drive," a four mile long selfguided auto drive, with a one-quarter mile long hiking trail, provides you with an opportunity to visit the refuge for nature study, wildlife photography, or observation. The drive and trail are open from early spring through October during daylight hours. Mammal and bird leaflets, other refuge leaflets, and U.S. Fish and Wildlife Service leaflets are available at refuge headquarters. 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 only during office hours.

University classes and other groups may be given talks and tours when arrangements are made in advance.

Accommodations

Camping is not allowed on the refuge. Designated primitive camping sites, located on adjacent state wildlife management areas, are available year round and are cost free.

Nearest motel accommodations are available in Thief River Falls, 23 miles southwest on State Highway #32 and at Grygla, 16 miles east of the refuge headquarters on State Highway #89.

Headquarters Location and Hours

Headquarters is located 11 miles east of Holt on Marshall County Road 7. Office hours are 7:30 a.m. to 4:00 p.m., Monday through Friday.

Information

Additional information will be provided by contacting: Refuge Manager, P.O. Box 74, Middle River, Minnesota 56737. Phone: (Holt) 218/449-4115.

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Equal opportunity to participate in, and benefit from, programs of the U.S. Fish and Wildlife Service is available to all individuals regardless of age, race, color, national origin, religion, sex, or disability. Persons who believe they have been discriminated against in any program, activity, or facility operated by the U.S. Fish and Wildlife Service should contact:

> U.S. Department of Interior Office for Equal Opportunity 1849 C Street, N.W. Washington, DC 20240



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

August 1995

Agassiz National Wildlife Refuge

Minnesota



Agassiz National Wildlife Refuge

Agassiz National Wildlife Refuge occupies part of the bed of glacial Lake Agassiz in northwestern Minnesota. Containing 61,459 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 comprised of aspen, elm, oak and ash are consipicuous. Two spruce-tamarack bogs with associated bog lakes comprise a wilderness area within the refuge.

The restored shallow water marshes contain interspersed open water and emergent plants and attract 17 kinds of breeding ducks each year. An established flock of giant Canada geese also nests on the refuge. The primary management objective of Agassiz Refuge is to provide optimum habitat conditions for duck production.

BIRD	s		F	W
Common Loon	0	r	0	
Pied-billed Grebe*	a	a	а	
Horned Grebe*	u	0	u	
Red-necked Grebe*	C	C	С	
Eared Grebe*	u	u	0	
Western Grebe*	u	C	u	
American White Pelican	C	C	C	
Double-crested Cormorant*	С	C	С	
American Bittern*	C	C	C	
Least Bittern*	u	u	u	
Great Blue Heron*	С	C	C	
Little Blue Heron	r			
Great Egret	u	u	u	
Snowy Egret	r	r		
Cattle Egret	r	r	r	
Green-backed Heron*	u	u	u	
Black-crowned Night Heron*	C	C	С	
Yellow-crowned Night Heron		r		
Tundra Swan	C		C	
Greater White-fronted Goose	0		٢	
Snow Goose	u		C	
Canada Goose*	С	С	С	

BIRD	S	s	F	N
Wood Duck*	u	u	u	1
Green-winged Teal*	С	u	a	
American Black Duck*	0	0	u	
Mallard*	a	a	a	
Northern Pintail*	C	u	a	
Blue-winged Teal*	a	a	a	
Northern Shoveler*	С	С	С	
Gadwall*	C	С	a	
American Wigeon*	С	C	a	
Canvasback*	С	C	u	
Redhead*	С	С	С	
Ring-necked Duck*	С	С	С	
Greater Scaup	, u		u	
Lesser Scaup*	C	u	a	
Oldsquaw	r		r	
White-winged Scoter	0	r	0	
Common Goldeneye*	C	r	u	
Bufflehead*	C	r	u	
Hooded Merganser*	С	u	u	
Common Merganser	С	r	C	
Red-breasted Merganser	0			
Ruddy Duck*	С	С	C	
Turkey Vulture	r	r	r	
Osprey		r	r	
Bald Eagle	u	0	u	0
Northern Harrier"	C	C	C	
Snarp-sninned Hawk*	u	u	u	
Northern Cosheukt	0	0	0	
Northern Gosnawk	0	u	0	u
Swoincon's Howk	u	0	u r	
Pod toilod Howk*	-	-	1	
Eorrigipous Howk	C r	C	C	
Pough logged Howk	-		~	
Golden Eagle	0		0	0
American Kestrel*				
Merlin		ŭ	11	
Peregrine Falcon(F)	0		0	
Grav Partridge*	0	0	0	0
Ruffed Grouse*	C	C	C	C
Greater Prairie Chicken	r	r		-
Sharp-tailed Grouse*	u	u	u	u
Yellow Bail*	u	u	-	-
Virginia Rail*	C	C	C	
Sora*	C	C	C	
Common Moorhen	r	r		
American Coot*	a	a	a	
Sandhill Crane*	C	U	C	
Black-bellied Plover	0		0	

BIRD	s		F	w
Lesser Golden Plover	0	r	0	
Semipalmated Plover	C	С	С	5
Piping Plover*(E)	r	r		
Killeer*	. C	C	С	
Greater Yellowlegs	C	C	C	
Lesser Yellowlegs.	.C	C	C	
Solitary Sandpiper	u	u	u	
Willet	r		r	
Spotted Sandpiper*	C	C	C	
Upland Sandpiper*	0	0		
Semipalmated Sandpiper	C	c	u	1.0
Hudsonian Godwit	ŭ	-	-	
Marbled Godwit*	U.	0	11	
Buddy Turnstone		r	r	
Sanderling	0		0	
Western Sandniner	0		r	
Least Sandniper	0	0	C	1.2
White supped Sandpiper	0	5	0	
Beird's Condeiner	0	-	0	
Bairo's Sanopiper	0	0	0	
Pectoral Sanopiper	C	C	C	
Ovite Operations	u		0	
Stilt Sandpiper	u	u	u	
Buff-breasted Sandpiper	.r		r	
Short-billed Dowitcher	u	0	u	
Long-billed Dowitcher	C	0	С	
Common Snipe"	C	C	C	
American Woodcock*	u	u	u	
Wilson's Phalarope*	C	u	u	
Red-necked Phalarope	u		u	
American Avocet*	0	٢		
Franklin's Gull*	.a	a	C	1
Bonaparte's Gull	u	0	u	
Ring-billed Gull	C	u	C	
Herring Gull	u		u	
Caspian Tern	0	0	0	
Common Tern	0	٢	r	
Forster's Tern*	C	C	0	
Black Tern*	С	C	0	
Rock Dove	r	r	r	
Mourning Dove*	C	C	C	
Black-billed Cuckoo*	u	u	U	-
Eastern Screech Owl	r	-		
Great Horned Owl*	C	C	C	C
Snowy Owl	0		II	U.
Barred Owl	r		r	r
Great Gray Owl			r	T
Long-pared Owl	r			
Short cared Owl*	0		0	0
Northern Court Out	0	-	0	0
Northern Saw-whet Owl	t	T		r

BIRD	S		F	W
Common Nighthawk*	u	0	u	
Whip-poor will*	u	u		
Chimney Swift	r	٢		
Ruby-throated Hummingbird*	u	u	U	
Belted Kingfisher*	u	0	u	
Red-headed Woodpecker	0	0	0	
Yellow-bellied Sapsucker	u		u	
Downy Woodpecker*	С	C	С	C
Hairy Woodpecker*	C	C	C	C
Black-backed Woodpecker	r	r	r	r
Northern Flicker*	C	C	C	
Pileated Woodpecker*	0	0	0	0
Eastern Kingbird*	C	C	0	
Western Kingbird	u	0		
Great Crested Flycatcher	u	u	0	
Eastern Phoebe	u	u	u	
Yellow-bellied Flycatcher		F		
Alder Flycatcher*	u	u		
Olive sided Elvesteber	C	C	u	
Eastern Wood Decwort	1	-		
Horood Lork*	C	C	u	11
Purple Martin*	u	u	u	u
Troo Swallow*	u	u		
Northern Bough-winged Swallow	C	r	u	
Bank Swallow			0	
Cliff Swallow*	C	a		
Barn Swallow*	C	c	C	
Grav Jav*	r	r	r	0
Blue Jay*	u.	i.	u	-
Black-billed Magpie*	u	u	u	u
American Crow*	c	C	c	
Common Raven*	u	r	u	C
Black-capped Chickadee*	C	C	C	C
Boreal Chickadee			r	r
Red-breasted Nuthatch	0		0	0
White-breasted Nuthatch*	u	0	u	u
Brown Creeper	0		0	
House Wren*	u	C	u	
Winter Wren*	r	0	r	
Sedge Wren*	u	C	u	
Marsh Wren*	a	a	u	
Ruby-crowned Kinglet*	C	U	C	
Golden-crowned Kinglet*	C	u	C	
Eastern Bluebird*	0	0		
Veery*	u	C	0	
Gray-cheeked Thrush	0		0	
Swainson's Thrush	u		0	
Hermit Thrush	u		U	

BIRD	S	s	F	w
American Robin*	C	C	C	
Gray Catbird*	u	C	u	1.1
Northern Mockingbird	r			
Brown Thrasher*	u	u		100
Water Pipet	0		u	
Bohemian Waxwing	٢		r	0
Cedar Waxwing*	u	C	u	
Northern Shrike	0		u	C
European Starling*	u	u	u	1.1
Solitary Vireo	0		0	100
Yellow-throated Vireo*	0	u	0	
Warbling Vireo*	.u	C	u	-
Philadelphia Vireo	.0		0	
Red-eyed Vireo*	u	u	u	
Tennessee Warbler	C	C	C	
Orange-crowned Warbler	u	r	u	
Nashville Warbler*	0	C	u	
Northern Parula	u		u	
Yellow Warbler*	C	C	u	
Chestnut-sided Warbler*	0	0		
Magnolia Warbler	u			1
Cape May Warbler	u	u	U	
Yellow-rumped Warbler	a	u	a	
Black-throated Green Warbler	u		0	
Blackburnian Warbler*	r	r		
Palm Warbler	C	0	C	
Bay-breasted Warbler	.0		0	
Blackpoll Warbler	.C		C	
Black-and-white Warbler	u	u	u	
American Redstart*	U	U	u	
Ovenbird*	.u	u	0	100
Northern Waterthrush	u	U	u	
Connecticut Warbler*		r		
Mourning Warbler	0	0		
Common Yellowthroat*	C	C	C	
Wilson's Warbler	u	U	0	
Canada Warbler	0	0		
Scarlet Tanager	r	r		100
Rose-breasted Grosbeak	u	C	0	_
Indiao Buntina.	l.r	r		
Rufous-sided Towhee		r		
American Tree Sparrow	.c		C	
Chipping Sparrow*		U	U	
Clay-colored Sparrow*	. 4	C	u	
Vesper Sparrow*	U	H	H	
Savannah Sparrow*		C	U	
Grasshopper Sparrow		r		
Le Conte's Sparrow*	a	a	11	
Sharo-tailed Sparrow*	r	11		
monarp tailed opariow minimum		u		

BIRD					w
Fox Sparrow		C		C	
Song Sparrow*		C	C	u	
Lincoln's Sparrow		u		u	
Swamp Sparrow*		u	C	u	
White-throated Sparrow*		C	II	C	12.0
White orouged Sparrow			-	Ň	
Harrie' Coarrow	*********	u			
	*********	u		u	
Dark-eyed Junco	*****	C	0	C	100
Lapland Longspur	*****	u		u	1000
Snow Bunting		u		C	C
Bobolink*		u	C	0	
Red-winged Blackbird*		C	C	C	
Western Meadowlark*		С	C	C	
Yellow-headed Blackbird*		С	C	C	
Busty Blackbird		u		C	
Brewer's Blackbird*		11	11	11	100
Common Grackle*		0	11	0	-
Drawn booded Combinds		-	u	-	
Brown-neaded Cowbird		C	C	C	
Orchard Oriole	******	r			
Northern Oriole"		C	C	0	
Pine Grosbeak		0		0	u
Purple Finch*	***********	u	u	u	
Red Crossbill			r	0	0
White-winged Crossbill			r	0	0
Pine Siskin		u	T	u	r
American Goldfinch*		C	C	C	
Evening Grosbeak		п		II	IF
Common Rednoll		C		ŭ	C
Hoany Rednoll		0		~	0
House Sparrow*			1.0		
House Sparrow		u	u	u	u
Accidental Bi	rds				
Tri-colored Heron	Yellow-bille	o be	luck	00	
White-faced Ibis	California	Gull	U. U.I		
Atlantic Brant	Ross' Gull	Ci Gin			
Cinnamon Teal	Northern H	law	(-O)	WI	
European Wigeon	Boreal Ow	1			
Surf Scoter	Mountain B	Blue	bird		
Red-shouldered Hawk	Wood Thru	Ish			
Gyrfalcon	Sage Thra	she	r		
Prairie Falcon	Spraque's	Pipi	t		
King Rail	Loggerhea	dS	hrik	e	
Whimbrel	Golden-winged Warbler				
Red Knot	Prothonotary Warbler				
Ruff	Western T	ana	ger		
House Finch	Field Span	row			
Northern Cardinal					
Smith's Longspur					
Laughing Gull					
Snowy Plover					

Time in Field: Weather:____ Observers:__ Location: Birdwatching is encouraged. Please check at the Refuge office for times and places of entry. Please obey posted signs.

Sighting Notes

Date:___

For further information contact: Refuge Manager Agassiz NWR Middle River,MN 56737





-					
(eć	gen	d		
S	list	contains	280	spec	ies

Thob	is list contains 280 species which have been served in recent years. Those species marked with
an	asterisk(*) have been found nesting on the refuge.
Th	e list was developed following the most recent
A.	O.U. checklist.
S	SpringMarch-May
s	SummerJune-August
F	FallSeptember-November
W	WinterDecember-February
а	Abundant common species that is very numerous
C	Commoncertain to be seen in suitable habitat
u	Uncommonpresent but not certain to be seen
0	Occasionalseen only a few times during season
r	Rare seen at intervals of 2-5 years

- (E) Endangered
- Solid lines indicate approximate taxonomic categories.



Lost Bay Trail

The four mile long Lost Bay Trail will give you an Introduction to the refuge. Numbered signposts refer to the descriptions that follow. The auto drive is open during daylight hours in spring, summer and fall.

1. The flat topography and mineral soils of northwestern Minnesota tell us that Glacial Lake Agassiz once covered most of this area. The trees growing here indicate that the land is a little higher in elevation than the surrounding marsh. The refuge headquarters is actually located on a small island. Watch for other islands of trees as you drive.

2. At Agassiz, water management is the most Important tool that refuge managers use. This water control structure enables water to flow from Headquarters Pool on the right to Agassiz Pool on the left. The dike you are driving on forms the barrier between the pools.

Water levels determine vegetation types. Managers manipulate water levels to encourage a desirable interspersion of plant growth and open water. This provides better habitat for waterfowl, especially for duckling broods.

3. Agassiz Pool is the largest refuge pool. Its average depth is only about three feet. Pelicans and cormorants use this pool extensively during the summer, and it is very important as a waterfowl brood rearing and molling area. Rafts of migrating ducks congregate in the fall. Historically Agassiz Pool was known as Mud Lake. In the early 1900's, the lake was drained and its bottom opened to homesteading.

4. "Prescribed burning" is another management tool used to improve wildlife habitat. Controlled fires have periodically swept through this area killing the tops of mature willow and matted grasses. Re-sprouted willow shrubs are tender and nutritious food for deer and moose. The lush new grass and forbs are excellent nesting cover for ducks.

5. Upland nesting areas are as important to ducks as water. The dense vegetation provides secure nesting cover. Combined with the small potholes and level ditches in this area, it has become ideal spring and summer waterfowl habitat.

6. A one quarter mile foot trail begins here. Park the car and stretch your legs while you explore and look for birds, deer and other wildlife in this small upland.

The top level of this dike has been raised to provide better water control. Higher water levels will restore Lost Bay Pool and improve it for waterfowl. The water control structure is similar to the one at Station 2, but on a smaller scale.

7. Agassiz's wellands serve many functions. They absorb spring flood waters like a giant sponge. Water passing through wetland areas is cleansed by filtration of sediments and nutrients. This keeps the marsh a very rich community.

Wildlife diversity in wetlands includes much more than waterfowl. Many marsh and shorebirds such as great blue herons, Franklin's gulls and black terns can be seen, and muskrats and beavers also live in the marsh. Marsh management maintains the diversity of bird and animal life.

8. In this transition area, where the trees meet the marsh, wildlife managers refer to the "edge effect." Where two types of habitat meet, wildlife benefits are higher. There is more food and cover available and therefore wildlife diversity is increased.

One of the goals in wildlife management is to create and maintain diversity by encouraging "edge." At Agassiz, this is often accomplished during the winter months with bulldozers. By shearing off over-mature willow, natural succession is interrupted. Young willow and other types of vegetation grow creating "edges" along older willow.

You have driven through just a small portion of the vast wetland complex at Agassiz National Wildlife Refuge. Wildlife and people will continue to benefit from the management and preservation of areas like Agassiz.

Additional information may be obtained from:

Refuge Manager Agassiz National Wildlife Refuge Middle River, MN 56737 (218) 449-4115

at the second