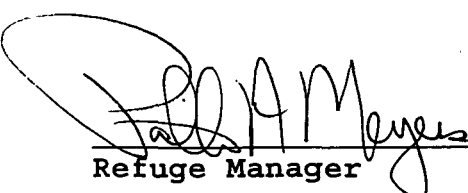
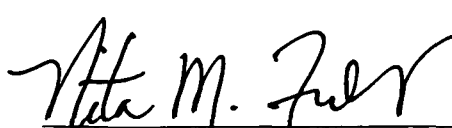


Horicon National Wildlife Refuge

Mayville, Wisconsin
Fiscal Year 2004

 3/14/05
Refuge Manager Date

 (3-19-05)
Refuge Supervisor Date

 3.21.2005
Regional Chief, NWRS Date

HORICON NATIONAL WILDLIFE REFUGE

Mayville, Wisconsin

ANNUAL NARRATIVE REPORT

Calendar Year 2004

**U.S. Department of the Interior
Fish and Wildlife Service
National Wildlife Refuge System**

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Introduction

Horicon National Wildlife Refuge was established in 1941 for the protection and preservation of migratory birds. It is located on the west branch of the Rock River in southeastern Wisconsin, 43 miles west of Lake Michigan and 65 miles northwest of Milwaukee. The Refuge comprises the northern two thirds (21,491 acres) of the 32,000 acre Horicon Marsh while the southern third is managed by the Wisconsin Department of Natural Resources as a wildlife area and fur farm. The marsh basin, gouged out by the Wisconsin Glacier thousands of years ago as a shallow peat-filled lake bed, is 14 miles long and from 3 to 5 miles wide. Horicon Marsh is bounded on the east by a sharply rising ridge of the Niagara escarpment which rises approximately 250 feet above the marsh to an elevation of 1,100 feet. The land to the west of the Refuge rises slowly and is dotted with many small potholes and several shallow lakes. Horicon Marsh is located in the upper reaches of the Rock River watershed.

Major land types identified on the Refuge include 16,961 acres of wetlands, of which the majority are classified as deep, freshwater marsh; and 4,336 acres of uplands, including 410 acres of forest land and brush land habitat.

In 1990, Horicon Marsh was designated a "Wetland of International Importance" by the Ramsar Convention, an intergovernmental treaty that obligates 45 signatory nations to consider wetland conservation through land use planning, wise use of wetlands, establishment of wetland reserves, and wetland research and data exchange. In 1997, the Horicon Marsh was accepted as a Globally Important Bird Area in American Bird Conservancy's United States Important Bird Areas program. The marsh received this recognition especially because more than 50 percent of the Mississippi Flyway Canada geese migrate through the marsh during the fall and two percent of the biogeographic population of mallards migrates through during the fall, with impressive numbers of other waterfowl. In the fall of 2004, the Horicon Marsh was recognized by the State as an Important Bird Area.



Climate Data

Climatological Review - 2004

Temperatures (in Fahrenheit)

Month	2004 Average		Normal *		2004 Highest Recorded	
	High	Low	High	Low		Lowest
January	23.7	6.5	26.0	13.3	44.1, Jan 3	-17.0, Jan 30
February	33.8	16.3	30.2	15.8	56.5, Feb 29	-16.8, Feb 4
March	46.5	31.6	39.2	24.9	68.5, Mar 28	10.2, Mar 12
April	61.4	38.2	53.5	35.6	83.5, Apr 17	25.2, Apr 5 & 13
May	69.4	47.9	64.8	44.7	83.8, May 13	29.1, May 3
June **	78.5	57.4	75.0	54.7	89.2, Jun 9	46.2, Jun 4
July **	78.8	56.8	79.8	61.1	84.2, Jul 28	49.3, Jul 26
August	76.0	55.2	78.4	50.2	84.4, Aug 2	41.2, Aug 21
September	78.4	55.1	71.2	52.5	85.6, Sep 4	36.9, Sep 29
October	62.7	42.9	59.9	41.9	77.0, Oct 7	27.3, Oct 6
November	49.3	33.5	44.7	29.9	64.8, Nov 7	17.1, Nov 25
December	34.1	18.6	32.0	18.2	52.2, Dec 31	-11.2, Dec 24

* Data from the National Weather Service Bureau, Milwaukee, Wisconsin

** Temperature sensor on weather station failed. Only days with correct readings were used to get averages and the highest and lowest temperatures.

Rainfall (in inches)

Total for the year
Greatest in 24 hours

Actual

39.3
3.37" on June 10

Normal

18.01

Snowfall (in inches)

Calendar Year 2004
Greatest in 24 hours

Actual

29
4" on Jan 23 and Feb 2

Normal

47.6

Climatic Highlights

Leap year started causing problems immediately with the dawn of the New Year. Several days into January, a problem was discovered with the software of the refuge weather station. The company (FTS) was informed and tried desperately to fix it right away. The problem affected hundreds of weather stations across the nation. The software didn't account for the leap year and reverted to the date January 1, 2001. Since the data logger knew it had collected that data already, it caused the weather station to "shut down". Several hours of data were lost when the weather station was finally repaired with the "fix" the company had for the software. The temperature and relative humidity sensor also failed in June and wasn't discovered until July when the software issue was resolved. Starting June 13th, the weather station was recording temperatures over 100 degrees with several days above 130 degrees. That is what we call extreme global warming.

Winter was typical and average for a change this year. January and February temperatures were near normal with several days in each month dipping well below zero. Several snowfalls in late January and early February made the winter seem more normal. Very few geese remained on the refuge which was a big change from previous years. In March, temperatures were in the forties and fifties with several days in the upper sixties.

Drought conditions during late summer and into fall of 2003 continued into early spring of 2004, but changed dramatically in May. It rained 19 days in May for a total of 10.93" putting the refuge near flood stage in many of the impoundments. All water control structures and the weir were opened. Despite these efforts, the water levels continued to rise. June saw 14 days with rain, totaling 7.71". The greatest twenty-four hour rainfall of 3.37" came on June 13th. The combined rain events put the refuge well above flood stage with water going over the spillway on Main Dike Road from May 27th through July 6th.

On the evening of June 23rd an F3 tornado came through the northern part of the refuge causing considerable damage. The multi-car garage at the maintenance complex was damaged beyond repair. Several of the vehicles that were parked inside at the time were also damaged. The floating boardwalk received major damage too, along with many trees throughout the northern part of the refuge.

It took until mid-August to get rid of all the flood water and return to pre-flood levels. September was hot and dry with temperatures in the seventies and eighties and only one inch of rain. October and November were fairly mild with average precipitation. December rounded out the year with a very cold spell of negative temperatures. However, the year ended with a record 52 degree day.

It was a year for Mother Nature to show us her might. A rare earthquake 8 miles northwest of Ottawa, Illinois, shook the area on June 28th at 1:11 a.m. recording a magnitude of 4.5. Tremors were recorded as far away as Madison. No damage or injuries were reported; however, people were awakened by the shaking.

The following pages showcase the flooding problems and tornado damage.

F3 Tornado damage from June 23, 2004 Boardwalk and Building



Flood Photos from May-June 2004
Starting on north side of the refuge to south.

Hwy 49 WCS



Carp Trap with high water



Carp Trap with receding water



Redhead WCS



Teal WCS with carp



Washouts at the 5-way pump station



Flooding over Old Marsh Road



Water over Ledge Road



Luehring structure washing out to Main Pool



14 Bay WCS on MDR



Main Dike Road



Main Dike Road



Flooding at end of Main Dike Road to Weir



Flood at Weir on Main Dike Road



Spillway flooding



Spillway flooding



1

Monitoring and Studies

1a. Surveys and Censuses

Total duck use days were down slightly as predicted, due to the high water levels caused by the flood.

Duck Use Days

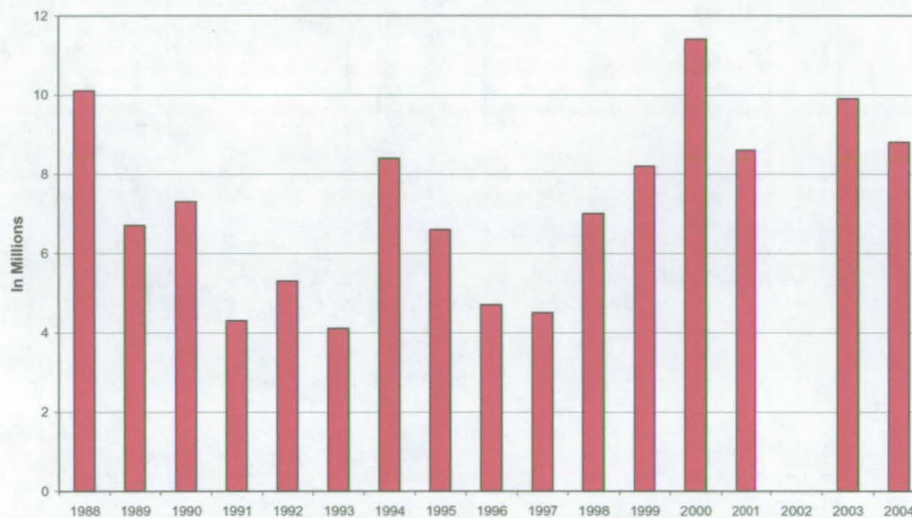


Figure 1a. Total Duck Use Days per Year

*2002 Data not calculated

**2003 Incomplete data set, surveys were only conducted June 1st – December 31st

Spring use was off to a good start. As the heavy rains began in mid-May, standard surveys were showing bleak numbers of ducks still using the Refuge. However, a survey using the marsh master indicated large flocks of ducks utilizing flooded fields of reed canary grass and sedge meadow along the western fringe of the Marsh.

Spring Peak Duck Numbers

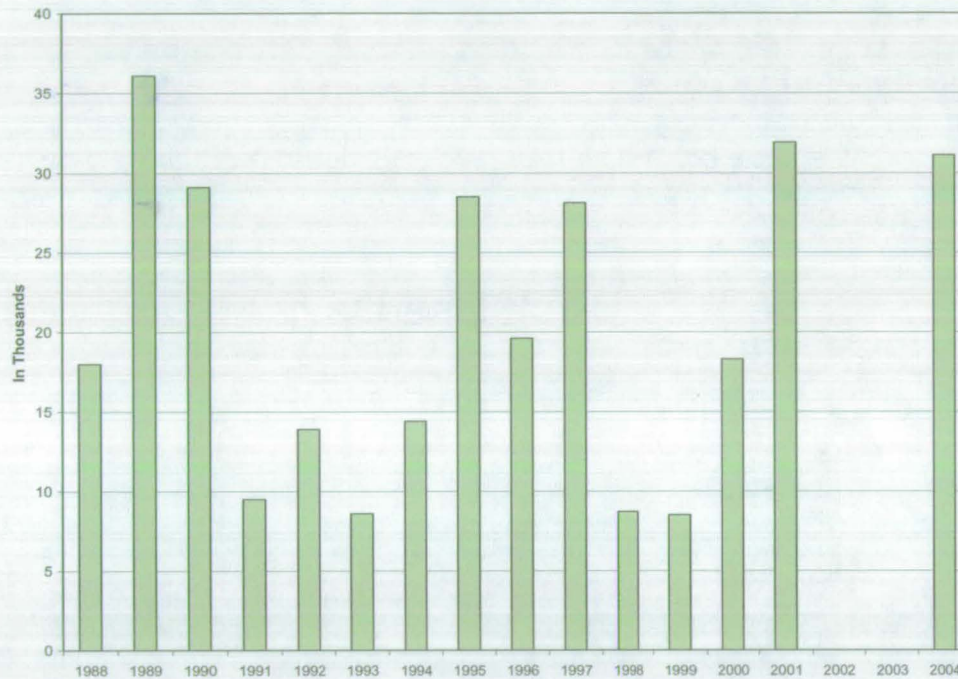


Figure 1b. Spring Peak Duck Numbers

*2002 Data not calculated

**2003 Incomplete data set, surveys were only conducted June 1st – December 31st

Brood surveys were conducted July 14 – August 18. Surveys were conducted later this year due to many waterfowl re-nesting after the flood waters had receded. Due to time constraints no data has been calculated.

The highest peak number of ducks in 2004 was October 13th. This was attributed to high numbers of mallards (33,489), greenwing teal (22,380), northern shovelers (17,468) and ruddy ducks (9,978). Mallards, however, peaked earlier in the summer on July 28th at 78,130 and blue-winged teal peaked on September 16th at 9,305.

Fall Peak Duck Numbers

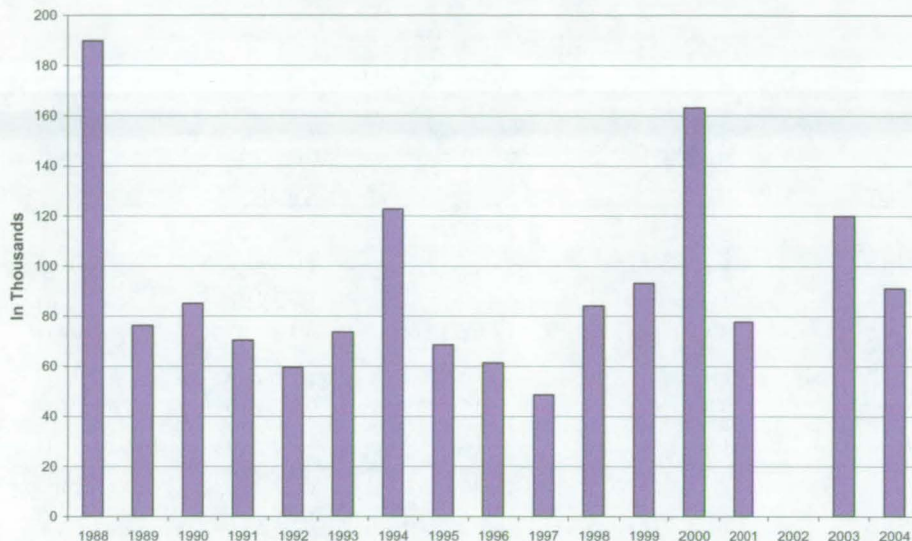


Figure 1c. Fall Peak Duck Numbers

Since the discontinuation of the Wisconsin Department of Natural Resources (DNR) aerial goose surveys in the fall, Canada goose population estimates are sketchy at best due to continuous movement of geese to various feeding and loafing areas throughout East Central Wisconsin. Refuge numbers are also best-guess-estimates by refuge and DNR staff as geese leave the refuge at sunrise and are not included during the routine road and airboat surveys. See Table 1a.

Table 1a. Canada goose data 1985-2004

<u>Year</u>	<u>Refuge Peak</u>	<u>Refuge Use Days</u>	<u>Horicon Area Peak</u>	<u>E.C. WI Peak</u>
1985	123,000	8,429,256	191,900	327,000
1986	160,000	8,145,540	172,000	266,300
1987	236,200	10,919,955	236,250	404,750
1988	149,000	11,508,440	201,250	348,750
1989	222,000	11,976,774	228,000	585,000
1990	188,000	12,897,500	199,100	499,500
1991	233,000	8,045,895	237,800	635,100
1992	115,800	5,667,945	117,600	274,500
1993	185,300	10,544,820	191,400	687,400
1994	250,800	12,322,758	255,800	608,500
1995	161,000	7,524,799	unknown	unknown
1996	170,000	11,155,731	unknown	unknown
1997	214,300	15,020,347	unknown	unknown
1998	223,700	15,880,497	unknown	unknown
1999	257,368	14,091,922	unknown	unknown
2000	276,795	13,097,483	unknown	unknown
2001	200,785	12,916,246	unknown	unknown
2002	*	*	unknown	unknown
2003	147,858	8,514,127	unknown	unknown
2004	153,002	9,032,088	unknown	unknown

The coot is considered an indicator species at Horicon, demonstrating the health of the marsh. Coot use in 2004 was high compared to previous years (see Table 1b.). A large number of coot arrived in the spring and utilized the higher water levels. Teal pool and Potato Lake were favorite impoundments for them to hang out in.

Table 1b. Coot Data 1988-2003

<u>Year</u>	<u>Spring Peak Migration</u>	<u>Fall Peak Migration</u>	<u>Use Days</u>
1988	19,000	4,000	1,091,790
1989	15,175	6,160	1,285,199
1990	19,000	34,000	2,788,220
1991	10,000	15,000	1,747,310
1992	10,800	21,400	1,136,967
1993	3,000	33,200	1,652,027
1994	4,600	87,700	2,187,756
1995	2,800	41,300	1,680,015
1996	17,100	12,500	805,807
1997	9,400	8,200	435,611
1998	3,000	12,200	995,343
1999	1,900	28,200	1,625,142
2000	8,000	45,000	1,986,153
2001	5,500	18,300	1,549,329
2002*			
2003**	-	15,700	803,895
2004	14,245	34,995	2,140,400

*Data not calculated

**Incomplete data set, surveys were only conducted June 1st – December 31st

A noticeable decline in moorhen use was visually observed during the survey season for 2004 (see Table 1c.). Luehring Lake and Potato Lake impoundments were used most heavily by the moorhens.

Table 1c. Moorhen Data, 1991-2003

<u>Year</u>	<u>Summer Peak Population</u>	<u>Use Days</u>
1991	482	8,897
1992	46	1,118
1993	58	3,246
1994	398	14,769
1995	1,500	56,548
1996	1,500	82,525
1997	191	8,030
1998	817	20,845
1999	982	51,340
2000	776	42,640
2001	2,069	125,156
2002*		
2003**	567	13,865
2004	507	21,604

*Data not calculated

**Incomplete data set, surveys were only conducted June 1st – December 31st

A Call Playback Marsh Bird Survey has been conducted for several years at Horicon Refuge using a broadcasted call and recording the responses. In 2001, the protocol for conducting the survey was changed to the National protocol recently established. The survey is conducted three times during the year (see Table 1d.).

Table 1d. Peak weekly number of individuals detected per point

	sora	Virginia rail	king rail	American bittern	least bittern	marsh wren	sedge wren	red-wngd blckbrd	yellow- headed blckbrd
1990	0.44	0.13	0.19	0.06	0.06	1.56	0.38	2.75	0.13
1991	0.31	0.19	0.25	0	0	1.36	0.12	2.69	0.25
1992	1.06	0.38	0.25	0.19	0	0.94	0.06	4.25	0.88
1993	1.19	0.38	0.13	0.19	0.19	2.5	0.06	3.25	0.56
1994	1.18	0.53	0	0.12	0.06	1.88	0	2.29	0.24
1995	2	1.44	0	0.13	0	3.69	0.25	3	0.56
1996	1.63	0.69	0.06	0.31	0.13	2.63	0.25	2.25	0.56
1997	1.44	1	0.06	0.13	0.13	1.63	0.06	3.44	0.13
1998	1.25	1.06	0.06	0.19	0.06	2.44	0.19	3	0.19
1999	1.63	0.94	0.06	0.31	0.19	2.44	0.13	4.31	0.31
2000	0.88	1.19	0.06	0.63	0.19	3.56	0.25	3.13	0.06
2001	3.36	0.57	0	0.29	0.14	3.36	0	3.43	0.14
2002	3.09	1.08	0.11	0.56	0.11	0.8	0	1.9	0
*2003	1.33	0.33	0	0.07	0.13	0.87	0	1.53	0.07
2004	3.43	0.88	0.06	0.18	0.06	1.24	0	5.5	0

*only one survey was conducted in 2003 due to time constraints

Due to lack of time, no woodcock surveys were conducted this year. Hopefully these surveys will resume in 2005.

The three colonies of double-crested cormorants from 1997 are down to one colony. Most of the nesting cormorants were using the "Hilton" island near the telephone poles. At that colony, some of the space has been lost to the pelicans. No telephone poles were used this year due to the poor condition of the poles having many of the nesting platform arms missing. This year's survey was conducted on June 1 amidst the flood conditions and rising



Water. A full nest count was never completed due to the high water. Many chicks were drowned by the rising water and many more were on the brink of being flooded out. Most island nesting space was covered with water, leaving little area for the remaining birds that were successful. Population estimates at the time were 300 adults and maybe 50 young that survived the flood. Peak population for double-crested cormorants was 432 birds on August 4th.

American white pelicans have been seen routinely during the summer since 1996. The first nesting attempt occurred in 1999 with 13 nests with eggs found on Hilton and S. Bush Islands. Unfortunately, none of the nests were successful. Since then the pelican population has exploded. However, a nest survey conducted on June 1st of 2004 revealed devastating



results. Pelicans started arriving at the end of March and by the beginning of May there were more than 1,000 birds in the area. They started nesting in all of the areas that were used in 2003. During the survey on June 1st only about 100 adults were found remaining with only 17 young alive. Many of the nests containing eggs were destroyed by the flood. It is guessed that the rising water levels caused many of the adults to leave and search out better nesting areas as far away as Green Bay. Peak pelican numbers for the year were was 1,266 on August 4.



The newly installed critter cam, used to view the pelicans, was flooded out. Several parts, including the battery needed for power, were underwater leaving it out of service for the remainder of the summer.

Table 1e. Colonial Bird Nesting and Population Survey							
<u>American White Pelican</u>							
Year		1999	2000	2001	2002	2003	2004
Number of Nests		13 *	*	*		522 ♦	
Number of Young		0	16	152	335	727	17
Peak Population		600	900	1100	1800	2750	1266
*No nest surveys conducted in 2000-2002 due to fear of nest abandonment							
♦No nest count due to flooding and disturbance to remaining chicks.							

Shorebird use this year was good despite the flooding and high water levels from May through July. Water levels in several impoundments receded enough to create shallow feeding areas and some mudflats. No official surveys were conducted but casual observation on several waterfowl surveys and bird outings revealed a variety of shorebirds including killdeer, greater and lesser yellowlegs, common snipe, long-billed dowitchers, black bellied plovers, and pectoral sandpipers. Flocks in the thousands were seen around the refuge at the end of September through the end of October.

Frog and toad surveys were conducted again this year. Robin McWilliams-Munson from the Bloomington ES Field Office coordinated the frog catching and survey for 2004. Collection took place on July 19th. Sixty-six northern leopard frog metamorphs were caught in the wetland along the auto tour route just south of I-2 and along Old Marsh Road next to Stoney impoundment. Four appeared to have some abnormalities. Of the four, one was missing toes, one had shortened/twisted calf (appeared to be broken and poorly healed in x-ray), one was



Jon Krapfl catching frogs. RMM03

missing toes with protruding bone and redness (probably injury), and one had about 50% of calf missing with a bleeding stub. None were sent in for parasitology analysis. Horicon Refuge was part of the Nationwide Malformed Amphibian Survey Project they were conducting. The refuge was part of this study from 2001-2003. This additional year was needed to obtain a larger field sample of frogs from these two areas. This was the last year for this study.

In 2000, a volunteer initiated a frog survey as part of the Marsh Monitoring Program sponsored by Bird Studies Canada and Environment Canada to study wetland amphibians and birds in the Great Lakes basin. Eight stations were set up and sampled three times in 2000. In 2001, volunteers Jack Bartholmai and Bill Holmes took over the survey mid-season. They conducted the surveys for a full season starting in 2002 and have continued the survey through 2004 (see table 1g).

Table 1g. Amphibian Survey

<u>Species</u>	<u>Number of sites where occurred</u>			
	2001 <u>8 Total Sites</u>	2002 <u>20 Total Sites</u>	2003 <u>20 Total Sites</u>	2004 <u>20 Total Sites</u>
Northern Leopard Frog	1	20	12	16
Chorus Frog	0	15	15	19
Wood Frog	0	1	1	0
Pickerel Frog	0	0	0	0
Blanchard's Cricket Frog	0	0	0	0
Bullfrog	0	0	1	0
Green Frog	8	16	10	20
American Toad	0	19	11	11
E. Gray Tree Frog	0	11	11	13
Spring Peeper	0	0	0	0

Point count surveys were conducted on the grasslands in 1995-1997 by contract. From 2001-2004, surveys were conducted using volunteers. Only one volunteer was available for 2004 and surveyed only 7 of the 36 points. Total number of species found on all seven sites were 22 species within 100 meters and an additional 22 species found outside 100 meters which compared to 2003 results where 33 species were within 100 meters and an additional eight species were found outside 100 meters. Henslow's sparrows continue to be found on the surveys and increased numbers of bobolink's. No meadowlarks were found on the survey which is of great concern.



The rookery in Radke Pool was used again this year by herons and egrets. On July 1st Biologist Woyczik canoed out there with the tern research crew from Loras College. They attempted a nest count from a distance to avoid disturbing the nestlings. Great egrets, cattle egrets, and black-crowned night herons were found nesting in dense dogwood and willow thickets that were flooded after the Radke Pool restoration project. Observations included approximately 30 great egrets, 50 black crowned night herons, and 17 cattle egrets in the area. Nineteen black crowned night heron and three cattle egret nests

were confirmed. Hundreds of "white" birds were seen using Radke as a feeding area. An evening survey on August 12th recorded 450 great egrets and several pelicans feeding before sundown. The carp hatch produced millions of young-of-the-year fingerlings making it an easy feeding ground for many marsh birds.



Bald eagle sightings were more frequent this year. The eagle nest, found on the south side of Potato Lake during the wildfire in December 2002, was used again this year. Early in spring several adults and immatures were seen in the area of the nest. The first eaglet sighting in the nest was on June 2nd. Later in the summer several immature eagles were observed. The eagles could be seen by visitors from the floating boardwalk of the egret hiking trail. With increasing sightings and interest from visitors, it was decided that a critter camera

may be installed at the eagle nest location with a direct link to a television screen in the visitor center. This will allow the visitors an inside peek of the nesting and fledging of bald eagles.

Turkey sighting have become so frequent they are no longer unusual, but they are still exciting. Several peregrine falcons were seen throughout the year. One of the peregrine falcons spotted along Highway 49 on August 28 was banded on the left leg with a black band having white numbering of 58 and below it a green band with the letter M. On the right leg there was a bright purple band. The most exciting spectacle was watching a falcon snatch a greenwing teal from the air and consume it in a nearby tree on Old Marsh Road. Otters have been seen throughout the refuge including Frankfurth, I-8, I-9, I-2, Radke, Redhead and Main Pool. Much activity was noted by beavers this year. Refuge staff tried to draw down I-8, but was unsuccessful due to a very determined beaver family. Beavers were also making short work of the trees on I-5, but no hut could be found.

Tundra swans found their way back to the refuge in late October. Numbers of the swans peaked around 200 by the first week in November. This was a big decrease in peak numbers from last year. The tundra swans were seen on Main Pool, I-9, Redhead, and Teal Pool.

An ibis (not sure what kind) was seen on the refuge on June 10. It was seen flying south from Teal Pool to Leuhring Lake. This was the area the white-faced ibises were seen in last year. Other unusual sightings for the refuge included: a red-necked phalarope and black-necked stilts in Redhead Lake, several red-necked grebes seen in Stoney Island Pool and I-9, common terns flying over Teal Pool, an osprey hanging out near the Frankfurth Marsh pump station, and a barn owl spotted on Headquarters Road near the woods.

Electro-shocking fish surveys were done this year. Scott Yess from the LaCrosse Fisheries Resource office came over to Horicon for several days of surveying. Previous fish surveys showed that the carp numbers were increasing, composing more than ninety-five percent of

the fish in the marsh. Refuge biologist Woyczik, bio-tech Krapfl, and intern Engstrom assisted Yess with shocking. Electroshocking efforts proved, once again, that the carp population is very high. Carp made up 98% of the catch followed by bullheads making up 1%. The remaining 1% contained a variety of other fish including: fathead minnows,



green sunfish, pumpkinseeds, two white suckers, golden shiners, one bluegill, and one large mouth bass. In July, Radke Pool became a popular feeding sight for the Great egrets and pelicans. Two fyke nets were set overnight to find out what the birds were eating and produced interesting results. Upon retrieval the next morning, the mini fyke net could barely be moved because of the number and weight of fish in it. More than 97,000 young-of-the-year carp were collected. The large mesh fyke net, set near the monument in Radke Pool, had a variety of fish including carp, black and brown bullheads, bluegill, green sunfish, golden shiners, brook stickleback, southern redbelly dace, and one northern pike.

The grassland surveys, initiated in 2001 using plant community associations at the point count sites, continued this year. These surveys were developed and tested in 1999 on several points at Horicon Refuge based on a similar grassland survey conducted at J. Clark Salyer NWR. In addition to several association changes based on local habitat, visual obstruction readings (VOR) using a Robel pole and litter depths were taken at each site. It is hoped that eventually the grassland survey will be correlated to grassland bird surveys and guide our grassland management program including prescribed burning. Many staff days and hours are required to monitor each site every year. In 2004, only three of the plots were completed. All three sites were on the Hishmeh tract near Leuhring Lake. This area is slated for burning in 2005. Survey methods are being looked at to see if they can be simplified to reduce the time involved on each plot by reducing the individual points down from 800.

The 29th Annual Crane count, sponsored by the International Crane Foundation (ICF) in Baraboo, Wisconsin, was held April 17. This was the first year that Refuge staff did not coordinate the count. ICF could not find anybody to replace the county coordinator so they did it themselves. A new coordinator has since been selected and will coordinate and receive the information. Ten of 13 sites were counted on the Refuge. Dodge County had a total of 65 people participate with 21 of those observers on refuge sites. Refuge sites will continue to be available for the crane count.

Crane numbers for Dodge County and the refuge:

Dodge County Total # of Cranes - 325
 Dodge County Total # of Pairs - 69
 Refuge Total # of Cranes - 108
 Refuge Total # of Pairs - 29

A roadkill survey has been conducted along Highway 49 since 2001. The roadkill survey is conducted daily most of the year, less frequently in winter. The survey is conducted at the same time of day, between 7:00 am and 8:00 am. The Friends of Horicon NWR has established a task force to research the traffic safety/roadkill issue and will use the data to assist in making possible changes along Highway 49 such as different signing and decreased speed zones through the refuge. Results from 2004 included a total of 379 individuals killed, representing 43 different species.



The changes in habitat on both sides of the highway influence what species are using the area. The table below shows the change in species and numbers killed over the years. Muskrat numbers using Radke Pool have decreased because it is at lake stage with more water than vegetation. Muskrat deaths have dropped dramatically in the last two years. American coot like the changes in habitat and are more frequent casualties as they try to cross the road.

Top 5 species killed							
2001		2002		2003		2004	
muskrat	597	muskrat	842	muskrat	71	coot	97
painted turtle	54	red-winged blackbird	87	painted turtle	42	painted turtle	66
coot	51	painted turtle	69	coot	25	mallard	20
least bittern	41	coot	64	tree swallow	21	snapping turtle	17
red-winged blackbird	40	Canada goose	41	Canada goose	18	red-winged blackbird	17
Frog and toad numbers are not included because they are too numerous to count.							

1b. Studies and Investigations

Dr. David Shealer from Loras College in Dubuque, IA, began a new study this year involving Forster's Terns with his research topic: **FACTORS INFLUENCING REPRODUCTIVE SUCCESS OF FORSTER'S TERNS AT HORICON MARSH, WISCONSIN.**

Nesting Forster's Terns were studied at Horicon Marsh (Dodge Co.) and Grand Lake (Green Lake Co.), Wisconsin during the 2004 breeding season to determine population sizes and the effects of habitat, food availability and predation on reproductive success. Seventy-eight nests were found at Horicon, but an unknown fraction of these represented re-nesting attempts by birds that failed in late May due to heavy rains that produced record-high water levels in the marsh. Only one impoundment (Teal Pool) produced fledglings, but productivity there was unusually high (0.83 fledglings/nest, or 29-33 fledglings total). All five nests monitored at Grand Lake failed on or near the time of hatching, most likely due to predation.



At Horicon Marsh, two areas (Main Pool, Teal Pool) clearly are important nesting areas for Forster's Terns, probably because these areas contain extensive stands of bulrushes. The importance of muskrat activity is less clear, although pairs nesting on muskrat lodges in 2004 had significantly higher reproductive success than those that placed their nests on floating rootstocks of mud mats close to the water surface.

A supplemental feeding experiment was conducted on nestling Forster's Terns at Horicon National Wildlife Refuge during the summer of 2004. Chicks from randomly-selected nests were given periodic supplements of fish by force-feeding them during daily nest visits. The results of this experiment suggest that Forster's Tern chicks at Horicon were gaining mass at the maximum rate in 2004, and that food availability does not appear to be a limiting factor in reproductive productivity at this site. The seasonal decline in growth rates of chicks is consistent with a parental-quality hypothesis. That is, early breeders are higher quality parents than late breeders and therefore are better at providing food to their chicks (Shealer, 2004).

2

Habitat Restoration

2a. Wetland Restoration



The Refuge Maintenance Mechanic rehabilitated a wetland scrape just east of the headquarters building. The scrape had become silted in and was not being utilized by waterfowl. The uplands surrounding the scrape were then seeded to native prairie grasses.

2b. Upland Restoration



This year 40 acres of native prairie was seeded in the I-7 uplands adjacent to the Office parking lot. The seeding was done on December 28th and 29th using a seed blower attached to the hitch of a vehicle. Preparation for the seeding included spraying the field to kill most of the white and yellow sweet clover and wild parsnip that had taken over. The area was then burned to provide good seed-to-ground contact. The seed mix included 21 forb species and 5 grass species, all Wisconsin

Genotype. Shown is the seed blower that was used to seed the property. It was borrowed from Leopold Wetland Management District.

As part of the Refuge's grassland management program, removal of treelines was initiated in 2001 and has continued. There are several old fencelines on the refuge that have grown up in a line of trees. These trees divide grassland units into smaller fields and increase edge habitat, bringing in undesirable competing species. Removal of the trees creates larger continuous blocks of grassland as well as reduces habitat for undesirable species such as predators and brown-headed cowbirds.

This past year, several thousand linear feet of trees were removed, as well as several acres of brush. These areas included the south fenceline of trees at Babbitt west, which was removed by the neighboring landowner, and an old fenceline of trees on the Stensaas tract. Also, tree and brush removal at the hiking trail complex on Highway 49 took place during the renovation of the hiking trails. The "triangle" unit along Oak Center Road bordered by the Wild Goose State Bike Trail has some of the last remaining native prairie on the refuge. Prescribed fire specialist Sallmann and fire-techs Hamilton and Stevens used chainsaws to remove many of the unwanted trees growing throughout this native prairie.



and hickory trees. A salvage harvest was conducted on the woodlot and all box elder was cut from the area.

Although much of the damage by the tornado was a devastating loss, it did provide an opportunity to restore several wooded areas on the refuge. The six acre woodlot just south of headquarters road was hit very hard by the tornado and many trees had blown over as shown in this photo. This gave the refuge staff a perfect opportunity to regenerate and revive this stagnant maplewood forest. Box elder and green ash trees had taken over the canopy of the woodlot choking out the maple



The loggers also cleared a 0.6 acre white pine and white spruce plantation that was planted prior to land acquisition by the Service. The plantation, located on the southeast corner of I-9, was a barrier between native grassland habitat and the adjoining I-10 wetland. Refuge staff will use prescribed burns to clean up the pine slash and then seed the area with native grasses.

3

Habitat Management

3a. Water Level Management

Major issues concerning water level management are summarized below.

Main Pool

During the flood, water levels on Main Pool reached a high of 79.40, over three feet above the desired water level (76.00 for nesting). The devastation to the nesting birds was our greatest concern on all of the impoundments. In addition, Main Pool was home to the pelicans and a large colony of Forester's Terns. Most of the waterfowl was able to re-nest on the dikes or higher uplands and the terns moved and re-nested in Teal, but unfortunately it was too late for the pelicans. They left the Marsh completely for several weeks and didn't



return until early fall. The flood and the tornado also caused hundreds of acres of cattail to be ripped from the bottom and become floating. These floating cattails caused major issues when the mats became lodged in the water control structures, especially the weir on Main Dike Road (left). In this instance the airboat was used to create waves which dislodged the mats, allowing them to flow through the structure. The floating cattail also altered survey routes used on Main Pool. Areas that were once accessible by airboat

are now packed with floating cattail mats and impenetrable by the airboat. Refuge staff are still looking at options on how to reestablish the survey routes.

I-8

I-8 was selected as a unit in the Cattail/Fire Monitoring Study that will be taking place at the Refuge over the next three years. The unit will be drawn down, burned and then refilled to monitor these external effects on the growth and vigor of the cattail. After reaching a high water level of 79.68 on June 10 during the flood, the impoundment was allowed to naturally drawdown until October. We stopped all drawdowns in October to protect the amphibians and turtles that had burrowed into the mud. Refuge staff hope to burn I-8 in the Fall of 2005.

Luehring

Luehring is the second impoundment that will be involved in the Cattail/Fire Monitoring Study. After reaching a high water level of 79.64 on June 25 during the flood, the impoundment was allowed to naturally drawdown until October when all drawdown activity stopped.



Floating cattail mats were a huge problem in keeping the water control structure open during the drawdown phase (left). An extendable pole tree trimmer was used to "saw" large mats into chunks that would then flow through the structure. During the first week in November, a "trash guard" was installed in front of the water control structure. This cable is designed to catch and hold cattail mats away from the structure and allow the free flow of water to the structure.

Frankfurth

Frankfurth was planned as a control impoundment for the Cattail/Fire Monitoring Study, but after several meetings, it was decided that no control was needed. Since we had already prepped Frankfurth for the drawdown stage, we continued with the drawdown. This impoundment was severely impacted by the flooding and tornado, resulting in a great deal of floating cattail.

Radke

Radke was in a drawdown phase by the beginning of spring. By May the unit was well on its way to a complete drawdown (water level at 857.68). Many mudflats had appeared and we were just about to start pumping out the ditches when the flood arrived. Vegetation did not have time to germinate, but the area was still used as a resting area for many birds.

3b. Moist Soil Management

I-5

This unit had been drawn down for the past seven years during spring and summer to promote emergent vegetation. During the fall and winter of 1997 to 1999 all the emergent vegetation was wiped out due to reflooding of the unit. In 2000, the unit was drawn down for the fall and winter as well, in hopes of sustaining an emergent vegetation cover and compacting the very deep mud layer that may have been the cause of the vegetation decline

after reflooding. An attempt was made to draw down I-5 again this year, but was unsuccessful due to the flood. Initial levels of the pool were at 77.72. The lowest drawdown level achieved was 77.10 on April 12. As we waited for the water levels in Main Pool to recede, the water in I-5 was left at a high level (80.06) because there was nowhere to go with the water. Without having the dry growing season for the vegetation (food source), along with having the deeper water, very little waterfowl used the unit.

3f. Fire Management

Horicon NWR received three new fire personnel this year. Sean Sallmann was hired as the Prescribed Fire Specialist. In addition, Thomas Stevens and Greg Hamilton were hired as Fire Technicians and started on May 16, 2004. Once again we received assistance during the spring prescribed fire season from Sabine NWR in Louisiana. Two people from their fire program came to assist for two weeks. Also, Dan Bell and Justin Cannon from Mayville returned as AD-2's for the prescribed fire season. As part of the crew, they participated in the same classes, physical training, and burning as the staff. The additional help proved invaluable to the refuge staff. They are available at a moment's notice, even taking off of work at their own jobs to help burn. We also received help on prescribed burning from Leopold WMD, Necedah NWR and Big Oaks NWR. Several staff members assisted on prescribed burns at Leopold WMD, Necedah NWR, and Rice Lake NWR. Staff assisted the National Park Service on a burn at Effigy Mounds National Monument in Iowa.

Fire danger reached extreme levels at the Refuge this spring. Staff patrolled the refuge and were on standby during these periods. Fire staff responded to three wildfires on the refuge this year. The first fire was on 4/5/04 north of Sommers Rd. The next two occurred two days apart on 12/13/04 and 12/15/04, both along highway 49. The Waupun Volunteer Fire Department responded to all the fires. One fire along highway 49 was likely caused by a spark off a trailer with a flat tire while the other two fire causes are unknown human caused. Several staff and equipment were made available to the Wisconsin Department of Natural Resources to assist with wildfires off-refuge. Staff responded to three off-refuge calls during the season.

Fire activity out west gave several of the fire staff at Horicon Refuge the chance to go out on crews this year. Maintenance mechanic Madel, fire technician Stevens and fire technician Hamilton spent two weeks in August on an engine detail in St. George, Utah. Prescribed Fire Specialist Sallmann spent three weeks in August on an engine detail at Hart Mountain National Antelope Refuge in Oregon.

Major equipment purchases and updates for fire included:

1. 2005 Polaris Sportsman 500 6X6 ATV. It was purchased from Fred's Fastrack in Fond du Lac for \$7,760.
2. 50 gallon slip-in unit purchased from Mallory Company for \$3,499.00.
3. A Pro Pack portable foam unit was purchased from L.N. Curtis for \$653.35.
4. PPE, handtools, miscellaneous fire cache items.

The following table shows the units and prescribed acres burned CY04 :

Burn Unit	Acres	Date	Refuge
FRBP01-Brush Piles	1.0	2/18/04	Fox River
Stensaas South	40.0	4/13/04	Horicon
Babbitt West 2	18.0	4/22/04	Horicon
ATR-Experimental	1.5	4/23/04	Horicon
Stensass North	63	4/23/04	Horicon
Stensass 2	1.5	4/23/04	Horicon
Peachy Rd. South	136.0	4/27/04	Horicon
Babbitt West 1	41.0	4/30/04	Horicon
FRNWR07	75.4	5/5/04	Fox River
Comfort Station	45.0	5/7/04	Horicon
Chimney	132.0	9/8/04	Horicon
HRR01-Brush Piles	1.0	9/27/04	Horicon
I-7a	5.0	9/27/04	Horicon
I-7b	28.0	9/28/04	Horicon
Rataczak	17.3	10/21/04	Fox River
West Muir	14.1	10/21/04	Fox River
I-7	75.0	11/3/04	Horicon
Total Acres	694.8		

The following table shows wildfires which occurred on Horicon NWR in CY04 :

Burn Name	Acres	Date	Location
Creek East	5.0	4/5/04	Sommers Rd.
Redhead Hwy 49	14.5	12/13/04	South of Hwy 49
Radke West 49	0.5	12/15/04	North of Hwy 49

Prescribed Burn History for Horicon NWR (includes satellites)												
Year	1999		2000		2001		2002		2003		2004	
Season	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Acres	582	0	434	0	120	10	820	0	455	230	422.4	272.4



2005 Polaris 500 Sportsman 6 X 6 with slip-in unit.



Keith Jensen lights a flanking fire on the Stensass North burn unit. 4/23/04.

3g. Pest Plant Control

The refuge continues to monitor the purple loosestrife infestation. Refuge staff stopped raising *Galerucella spp* beetles several years ago. Several beetle surveys in early spring showed poor survival of beetles in the areas of original release. It was hoped that the beetles would be self-sustaining and that some of the beetles could be translocated to new areas of infestation. This year was the first year that quadrat sampling at the Sterr Road plot was not done. Ocular observation of this plot did not show a significant increase or decrease from the previous year. Refuge staff will continue to monitor the changes around the refuge where beetles were released to see if additional beetles will need to be raised and released to combat the purple loosestrife. The original release sites have shown encouraging results over the last six years.

Leafy spurge continues to be a problem for the refuge. It was first discovered along Oak Center Road on the north end of the refuge. It has since been discovered along the Wild Goose State Bike Trail. The bike trail is an old converted railroad that likely contributed to the spread of the leafy spurge. In order to effectively control the leafy spurge, it will be necessary to involve the partners in Dodge and Fond du Lac Counties who manage the bike trail system, as well as the local townships that maintain the roads and ditches. Currently there is about one acre of refuge property infested with the leafy spurge. Previous measures to control the leafy spurge included spraying it with the herbicide Plateau.



This year wildlife biologist Woyczik and bio-technician Krapfl traveled to Trempealeau NWR on June 15 to collect beetles for bio-control of the leafy spurge. Several species of beetles totaling 100,000 were collected. This included three varieties of *Aphthona* flea beetles: *Aphthona nigriscutis*, *Aphthona cyparissiae*, *Aphthona czwalinae* and a long horned stem miner called *Oberea erythrocephala*. They are very tiny as seen in the picture with the dime.



Trempealeau has collection of beetles down to an art. Collectors walk through habitat containing the beetles, quickly swinging a net back and forth to trap the beetles. The net is then emptied into a separator where only the spurge beetles can get through the screen. They are tapped down into a bottle at the bottom of the separator and then the bottle is emptied.

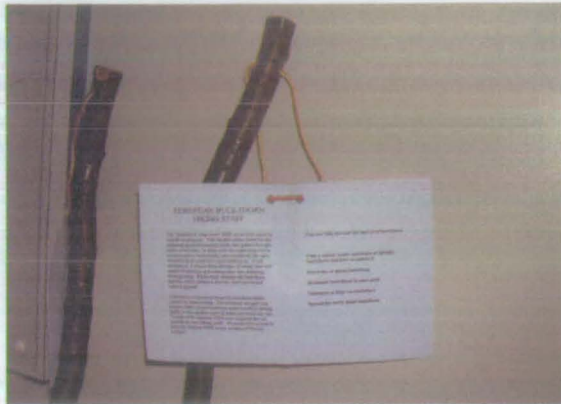


Beetles were put into paper bags and taped shut for transport in a cooler. The colder you keep them, the less active they are. They are so tiny that no matter how good we thought the bags were sealed, they still escaped. Obviously it wasn't cold enough either. As the beetles warmed up in the bags, they started jumping around sounding much like microwave popcorn popping.



Common buckthorn, *Rhamnus cathartica*, has become a problem around the refuge spreading through most of the woodlands. This summer, our YCC crew assisted refuge staff in the removal of some buckthorn from the egret hiking trail area (below).





Biologist Woyczik had seen walking staffs made from buckthorn poles and suggested that the refuge "Friends" group make some to sell in the Coots Corner gift shop. The walking staffs serve both as a hiking aid and an educational tool, reminding the public of the invasive nature of buckthorn.

Garlic mustard, *Alliaria petiolata*, a rapidly spreading woodland weed, was found in several locations this year. After the tornado and during the logging operations, a small patch was discovered in the woodlot along Headquarters Road and a large patch was found in the pine plantation near I-10. The patch in the pine plantation was sprayed using Roundup® and the patch in the woodlot on Headquarters Road was pulled. Both areas will be monitored closely and either hand pulled or sprayed with an approved herbicide. Garlic mustard, if left unchecked, will spread and dominate the forest floor, displacing native woodland wildflowers.

4

Fish and Wildlife Management

4a. Bird Banding

The banding quota of 400 mallards was not reached this year. The first attempt and shot was made August 31 with the last shot on September 21. There were several unsuccessful attempts made during that period. The flooding in May and June washed away about five feet of the banding site. Prior to setting up the site in August, cattail that had floated onto shore and clogged the site was removed with a backhoe. With the loss of shoreline, the net ended up partially in the water on several banding attempts. Ducks were plentiful in the area, but most shots had more wood ducks than mallards. In previous years only mallards used the site but this year more than 230 wood ducks were captured. Since the Wisconsin Department of Natural Resources had size 5 and 6 bands available, their staff assisted with banding the wood ducks. The last shot of the year had 132 ducks in the net, but only 17 were unbanded mallards and the remainder was 104 wood ducks. During a total of four successful shots, only 85 mallards and 1 black duck were banded. The mallard breakdown was AHY-M 16, AHY-F 46, HY-M 6, and HY-F 17.

4b. Disease Monitoring and Treatment

The risk of botulism was very low this year due to the flood. All drawdown attempts failed, leaving no exposed mudflats to worry about. No species were found dead on the pools of water.

Refuge staff assisted staff from the U.S. Geological Service National Health Lab in Madison, WI, with the collection of live coot to be used in the research of Avian Vacuolar Myelinopathy (AVM). Twenty-five coot were netted at night using an airboat in Teal Pool. These specimens were taken to the health lab where they were fed blue-green algae to see if they would show any symptoms of AVM. Field surveys and feeding studies conducted by scientists in the southeast show a probable link between a blue-green algae that grows on the leaves of invasive aquatic weeds, such as hydrilla (*Hydrilla verticillata*), Egeria (*Egeria densa*), and Eurasian water milfoil (*Myriophyllum spicatum*), and the recently identified bird disease, AVM. Since its discovery in 1994, AVM has been linked to the deaths of numerous bald eagles, American coots, Canada geese, great horned owls, mallards, and other species of waterfowl. AVM is a neurological disease that causes lesions in the brain and spinal cord of affected animals. Birds infected with the disease often appear disoriented and have difficulty flying, walking, and swimming.

Sick or dead eagles and coots have generally been found from October through March in the southern U.S.

4c. Re-introductions

As part of the carp control program and to improve marsh health after the carp treatment, predator game fish are being restocked at every opportunity. Restocking with game fish



in 2004 consisted of 60,000 northern pike fingerlings, 15,956 bluegill fingerlings, 9,205 yellow perch, 1,670 black crappie, 1,199 largemouth bass and a few escapee walleyes that came along for the trip. All fish were supplied by Genoa National Fish Hatchery. The fish were released at Schaumburg ditch, Ledge road, and on the Rock River at the carp trap. The Beaver Dam Charter School assisted releasing the fish on several occasions (left).

4d. Nest Structures

Refuge staff, with help from a volunteer, checked 57 wood duck boxes for use during the 2003 nesting season. For a change, more nest boxes were used by wood ducks and hooded mergansers (26) than starlings and tree swallow (23). Eighteen boxes had successful wood duck nests with a total of 134 young produced and eight boxes had successful hooded merganser nests with 49 young produced. Other nest box users included fox squirrels, mice, and the occasional screech owl. Only five wood duck boxes were not used at all.

Two volunteers, Jack Bartholmai and Larry Hopwood, checked and maintained the bluebird nest boxes at various sites around the refuge. In addition, Dennis Block and the Girl Scouts from Camp Silverbrook in West Bend helped check the nest boxes at the Environmental Education Barn. This year, many new nest boxes were constructed, donated, and installed by the volunteers. Most of the nest boxes on the refuge usually receive use by tree swallows, rarely bluebirds. Many nesting attempts are fouled by predators. Ninety-seven nest boxes were monitored over the summer. Tree swallows made 89 nesting attempts. Seventy-four were successful and fledged 348 young. Bluebirds made eight nesting attempts with six successful, fledging 20 young. Twenty nest boxes were used by house wrens and one house sparrow attempted a nest. Bluebirds are becoming more frequent sightings and are finally starting to use refuge nest boxes.

4e. Pest, Predator and Exotic Animal Control

The carp trap installed along the Rock River at the north side of the refuge was emptied several times this year. Carp started to fill the trap in early April. Nearly 200 pounds of carp (393 fish) were removed on April 14. In mid-May prior to the flooding, carp were removed by the pickup truck load. Two thousand pounds of carp were removed on May 14 and another 2,820 pounds were removed on May 17. Other game fish and desirable species caught in the trap and released included northern pike, walleye, crappie, yellow perch, bluegill, and white suckers. Several painted turtles were also released.



One rotenone spot treatment was conducted this year near the 5-way pump station. The small Main Pool cell north of the 5-way had thousands of fish gathered against the water current leaving Redhead and Teal impoundments. The cell was closed off from Main Pool and rotenone was stirred in the cell on May 18. On May 20 when the treatment was checked approximately 6,000 pounds of carp and bullheads were found dead. Previous spot treatments had taken place south of the weir on Main Dike Road while it was open, using the flow to draw more carp into the area. This year, during several monitoring trips, carp were not congregating there.



A variety of furbearer species are traditionally trapped on the refuge: muskrat, mink, raccoon, opossum, red fox, and weasel. Trapping units on the refuge are sold through an open auction held in September. Five dike units and two upland units were sold for the 2003-2004 season for a total of \$960. No marsh units or youth/senior units were offered.

Shown below are the trapping results for the last several years. In 2003/04, three of the trappers, including both upland trappers, never even came out to trap.

	<u>1999-00</u>	<u>2000-01</u>	<u>2001-02</u>	<u>2002-03</u>	<u>2003-04</u>
Muskrat	2,373	397	2,430	1,224	415
Mink	10	0	2	10	6
Raccoon	13	162	75	20	7
Opossum	36	75	28	57	12
Fox	0	0	0	0	0
Skunk	3	41	7	0	7
Weasel	2	2	0	0	1

5

Coordination Activities

5a. Interagency Coordination

Refuge staff have been involved with the **Rock River Headwaters, Inc.** (RRHI) since 1994, when the organization was under the name, Horicon Marsh Area Coalition. The mission of RRHI, a nonprofit organization, is to serve as a catalyst for cooperation between citizens, businesses, agriculture, and government to protect, restore, and sustain the ecological, economic, cultural, historic, and recreational resources in the Upper Rock River Basin through a watershed-based approach. RRHI has received three \$10,000 grants to be used to educate the residents of the Rock River watershed on the importance of water quality and better land management practices.

The Refuge's involvement with the **Marsh Management Committee**, formed in 1998, has continued. The committee is made up of representatives from non-profit organizations, government organizations, and the private sector for the purpose of guiding the management of Horicon Marsh for the benefit of a healthy ecosystem and the people who enjoy it. Refuge staff attended monthly meetings throughout 2004.

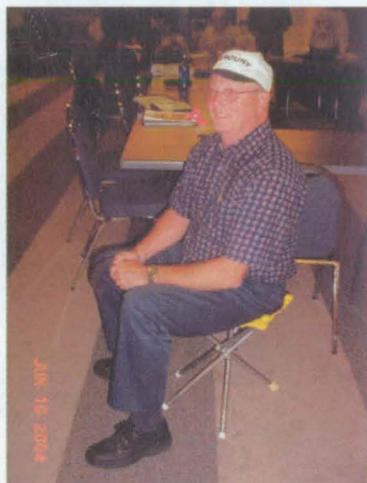
Throughout the year, Refuge staff coordinated with the local **Wisconsin Department of Natural Resources** staff on a variety of issues, including public use events and publications; water management; carp control; law enforcement; hunting programs; fire; maintenance; and trapping programs.

The Refuge participated in the Rural Fire Assistance Program for the fourth year, which provided financial assistance to **rural fire departments** in the community around the Refuge. This year three of the six departments took advantage of this opportunity by applying for the financial assistance and they all were granted. Oakfield Fire Department received \$945.00; Knowles Fire Department received \$2,250.00; and Waupun Fire Department received \$3,149.10. Refuge staff felt that it was a great partnership opportunity and hope to be involved with the program in the future.

5d. Cooperating Association

In Fiscal Year 2004, Coot's Corner, managed by the Friends of Horicon NWR, generated \$18,980 in sales and \$1,123 in donations for a total of \$20,103.

Thanks to creative Friends member Harold Steinback, Coot's Corner took on a new look in 2004. Harold used his skills in building a second, wooden t-shirt holder to match the existing one, as well as building a swivel display case (bottom right). A slat wall was also purchased, which doubled the size of the sales area (bottom left).



The Friends of Horicon National Wildlife Refuge hosted their third annual meeting on Thursday, July 8, at 6:00 pm. The meeting took place at the Horicon NWR visitor center. About 30 people attended. Activities at the meeting included a short business meeting, election of new officers, refreshments, and a program. A silent auction was held throughout the evening and culminated after the program (left, Art Ehlert demonstrates just how swell the auctioned cane chairs work.)

Election of board members included the Secretary, Treasurer, and President-Elect officer positions. Harold Steinback of Beaver Dam (previously President-Elect) automatically rolled into the President position. Assistant manager Diane Kitchen provided outgoing President Roy Zastrow with a framed photo taken by Jack Bartholmai of great egrets in Horicon Marsh on behalf of the staff in thanks for his leadership (right). Outgoing Secretary Betty

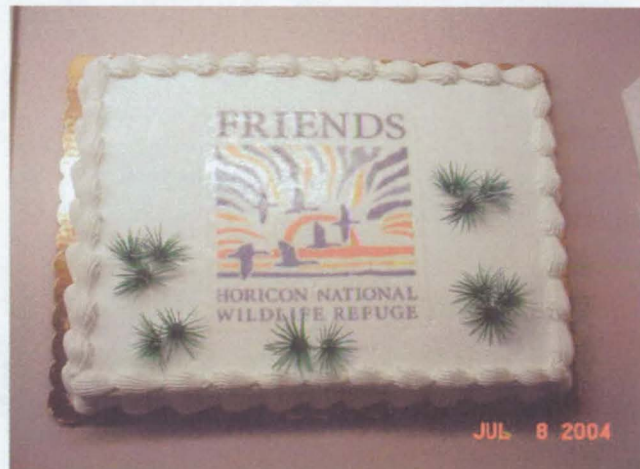


Flesch was also thanked for her many years of dedication to the board.



Nancy Hall of Fort Atkinson was elected the new President-Elect; Glenn Burg of Fox Lake continues as Treasurer; and Jenny Puls of Theresa was elected Secretary. Continuing board members included Dick Wanie of Fort Atkinson and Liz Roy of Fond du Lac. Newly elected board members included Roy Zastrow and Dawn Coulter of Mayville, Ken Puls of Theresa, and Beneeta Steinback of Waupun.

Refreshments included potluck appetizers and sheet cake provided courtesy of Friends members (right). An inspiring slide-music presentation called "Impressions of Horicon Marsh" by Jack and Holly Bartholmai of Beaver Dam followed.



Bidding on the silent auction ended at 8:15 pm. Forty-two donated items at a value of \$1,029 were auctioned including a deer tote cart, a signed and remarked great horned owl print by Don Kloetzke, folding cane chairs, flower note cards, an Audubon bird print copy of orchard orioles, and more. Donated items were provided by Friends members as well as the Waupun Chamber of Commerce, Schultz Cheese Haus, Mayville Tire Company, and LeRoy Meats of Horicon. The Friends received \$335.00 from the auction, which will benefit the Refuge.

The Friends of Horicon NWR now meets on the second Thursday every month at 6:00 pm at the Horicon NWR visitor center. A different program follows each meeting at 7:00 pm. Future programs will include presentations by various Refuge staff and Friends members about birds, wildlife, wildflowers, archaeology, and management of the Horicon Refuge.

6

Resource Protection

6a. Law Enforcement

Refuge Manager Meyers and Refuge Operations Specialist Kitchen both gave up their law enforcement commission in 2004. They both worked through the 2003 fall hunting seasons, but then did not return to the annual refresher in the spring. Since spring 2004, the Refuge has been without any law enforcement personnel.

Refuge staff were involved in several meetings to coordinate a search for Jerry Strege, a Waupun resident missing since October 2002. The case was resurrected in 2004 due to the efforts of a volunteer organization called Wisconsin Advocates for Families of Missing People. The group felt that when Strege was first declared missing, the search parties were remiss in not searching the Refuge, especially since he hunted the Refuge. Central Wisconsin Search and Rescue also participated in the two new searches in 2004, using seven dogs, but found nothing. The case continues to puzzle the community since Strege's wallet, keys, car, and motorcycle were all found at his apartment. No bank accounts were touched, no signs of disturbance or foul play were noted, and no note was left behind.

On August 26, 2004, Refuge staff discovered that the Hishmeh barn had been broken into. The items that were missing were all related to banding and included an ammunition container, an electrical stripper, four rolls of electrical tape, five pair of banding pliers, a detonation device, and a t-handle (for ignition). Fortunately, no blasting caps or charges were stored at this location. The incident was reported to the Dodge County Sheriff's Department and a list of the items was distributed to other sheriff's departments, but none of the items have turned up to date and no suspects were ever identified.

6b. Permits and Economic Use Management

Special use permits were issued last year to the trappers and their helpers. Several permits were also issued to individuals that wanted to take downed trees for firewood.

7

Public Education and Recreation

7a. Provide visitor services

Facilities and Access



The Refuge purchased and installed a Critter Cam (left), a remote wildlife viewing system where images are projected on a plasma screen in the Refuge Visitor Center. Up to four cameras can be placed at various locations on the Refuge. The system was purchased through Quest-Tek of Lake Forest, California, for a total cost of \$13,500. About \$6,000 was provided by the former Midwest Interpretative Association prior to their dissolution, \$3,000 was provided by the Friends of

Horicon NWR through a Ramsar grant, \$2,000 was provided through Refuge funds, and about \$2,300 was provided through Refuge donations. This system will increase public access in a virtual sense while minimizing disturbance to wildlife.

Refuge staff did most of the installation by placing the cameras, the antennae and the plasma television. On February 20, 2004, Joe Valencic of Quest-Tek visited the Refuge to provide final hook-up and provide training to staff. Two cameras were originally placed, one in a wood duck box and one on an island to view nesting pelicans. For several months, visitors and staff were able to enjoy watching live wildlife scenes from the comforts of the visitor center. Unfortunately, the camera and battery on the island were damaged by the spring floods and had to be removed. The electrical connections in the visitor center were also inadvertently disconnected. Refuge staff have been working on getting the system operational again.



Refuge staff constructed a wildlife **viewing platform** next to the parking area at the Bud Cook Hiking Area (left). The platform is accessible with a ramp and includes two spotting scopes, purchased from SeeCoast

for \$6,000. Visitors can use the scopes to see well into the marsh below the hill to the west, bringing wildlife closer while minimizing disturbance.



The Refuge's most popular attraction, the floating boardwalk, was damaged on June 24th when several tornadoes hit the area (left). The boardwalk was unhinged and swung into the water, as well as split in five different places. The boardwalk remained closed all summer.

During the week of September 13th, maintenance personnel from Region 3 spent time away from their stations and worked long days at the Refuge in order to

repair the 1,250-foot boardwalk. Mike Madel, maintenance mechanic from Horicon Refuge, spearheaded the repair by buying all the necessary supplies and removing all damaged sections and rebuilding them at the shop prior to the team arriving. Mike also provided all the direction during the week. Besides team leader Mike, members of the team included Dean Huhta from Rice Lake Refuge, Dennis Baird from Minnesota Valley Refuge, Rodney Ahrndt from Morris Wetland Management District, Keith Jensen of Horicon Refuge, Andy Anderson of Leopold Wetland Management District, and maintenance volunteer Bill Herman of Horicon Refuge. By the end of the week, the boardwalk was ready for National Public Lands Days volunteers to add the finishing touches to it by installing the rope handrails. Since its completion, Refuge staff have received many positive comments from visitors.

The platform at the EE Barn was also damaged by the tornado (below left) and later repaired by Refuge staff.



Refuge staff purchased and installed a new automatic gate on Headquarters Road and

began construction on an after-hours turnaround (above right). A kiosk with interpretive signs will be added to the turnaround in 2005. The automatic gate was purchased from Quality Fencing of Central Point, Oregon, for \$3,045. Sure-Fire, Inc. did the electrical wiring and hookup. So far this gate is proving to be problem-free. The new gate is also aesthetically pleasing, resembling a typical Refuge gate that swings open on both sides.

Due to the flooding in 2004, Main Dike Road was closed to all public access on May 28 and did not re-open again until July 15. Sections of both the upper and lower road were totally under water. Likewise, Old Marsh Road, which also had areas under water, did not open for hiking and bicycling until July 24. Ledge Road, which is a township road that intersects the marsh, was also closed by the town for a period of time.

Environmental Education and Interpretation



In FY04, about 4,311 people participated in on-site, staff-conducted, interpretive talks, tours, and demonstrations. In addition, about 5,571 people participated in environmental education and interpretation programming and services including workshops, activity trunks, on-site field trips, off-site programs, and self-led activities (left). (See Outreach for additional programs).

Although we expected the **Rhythms of the Refuge** curriculum and planning guides to become available in 2004, they were delayed and are now expected to become available in 2005 from the National Conservation Training Center.

More than 1,200, 3rd-8th grade students and teachers participated in 18 live, interactive **distance education** classes during the 2003/4 school year sponsored by Cooperative Educational Services Agency 6 and presented by Horicon Refuge. Statewide connections were made for monthly double sessions to seventeen communities or school districts including two correctional facilities which house incarcerated youth, Ethan Allan and Lincoln Hills. Horicon NWR is the first content provider to connect to these troubled youth.

Many of the 15 other locations are remote and rural and some have little or no access to the Refuge System or the Fish and Wildlife Service.

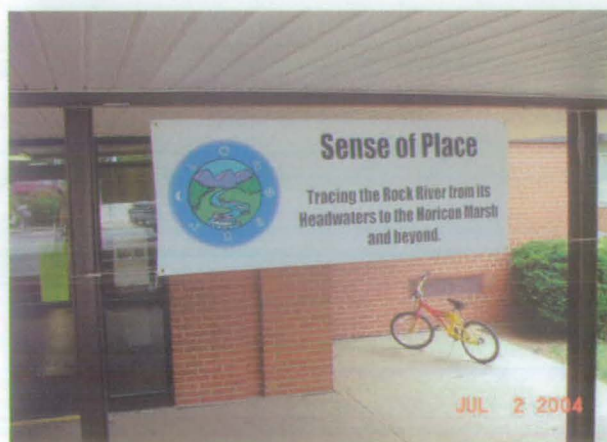
Several local school sites hosted and broadcast the sessions to a maximum of four receiving sites simultaneously per session via satellite technology available to all Wisconsin BadgerNet sites. Ranger Stoddard presented topics including Horicon NWR, spooky marsh tales and tails, marsh animals, wildlife trade, wildlife careers, the Refuge System, Canada geese, and bird identification. She coordinated for one guest presenter,

Barbara Harvey, a local raptor rehabilitator who showcased several of her education birds and inspired students to care about their "24-hour per day rodent control services".

Students colored marsh maps in a geography lesson, listened to true and historic marsh survival tales, became nature detectives solving wildlife mysteries using animal sign clues, narrated a slide show, handled illegal wildlife trade products, dressed up as a wildland firefighter and practiced using a fire shelter, searched for Refuges on the national visitor guide map, honked on goose calls, handled bird study skins, and much more. Teachers received lesson plans in advance via email and prepared for various dates by visiting the Refuge web site, reading stories, or creating wildlife collages.

This is the second year Horicon NWR has partnered with CESA 6 to provide distance education programming. In the first year, over 700 students and teachers participated for a total of almost 2,000 people in two years. CESA 6's distance education coordinator, Patrice Vossekuil, has been instrumental in making the partnership possible. These distance education classes are important because they create opportunities for multiple, high-tech contacts with teachers and students. They do not replace the on-site field trip experience but can help prep or extend field trips. Also, classroom visits can be consolidated and scheduled more efficiently. With statewide connections, distance education classes reach schools located geographically too far away for an on-site visit.

CESA 6 also partnered with the Refuge to complete an **audio-visual plan** for the visitor center which includes technology recommendations for on-site hosting of virtual field trips. The plan was provided to Wilderness Graphics during an on-site visit this summer and will be a valuable tool for their development of an interpretive plan for the Refuge, due for completion in 2005.



For the second year, Horicon NWR participated in local **Sense of Place** projects encouraging residents to experience, value, and protect the Rock River, Horicon Marsh, and their community's unique identity. Waupun's theme is depicted in their banner on display at Washington Elementary (left).

The phrase "sense of place" refers to a feeling of belonging to a special location which evokes memories and associations.

We become connected to places where we deeply experience life, places where our senses take hold, our feelings stake a claim, and where our humanity is sustained. Each of us is a voice for the places from which we can tell our stories. The purpose of Sense of Place projects in the Rock River basin is to rekindle or provide those deep experiences with a Rock River community and Horicon Marsh so that residents will articulate their

value, claim them, cherish them, protect them, and improve their ecology. As part of the Refuge System's centennial, the basin's first Sense of Place project was successfully piloted in Mayville with the hope of spreading it through the basin.

Over 30 Sense of Place partners joined forces to obtain grant funding including U.S. Fish and Wildlife Service challenge cost share grants for both years. Other funding includes Wisconsin DNR Lakes Planning Grants for both years, Wisconsin Humanities Council Grants for both years, and a 21st Century Community Learning Centers Grant. Total 2004 grant funding was almost \$20,000 (not including in-kind donations). The funding break down included DNR grant \$3,000, Lake Sinissippi grant \$3,000, Waupun CLC grant \$3,000, U.S. Fish and Wildlife Service challenge grant \$5,000, Waupun School District summer school program \$2,355.75, Wisconsin Humanities Council grant \$7,500, and \$400 donation from Waupun Historical Society for the writing contest.

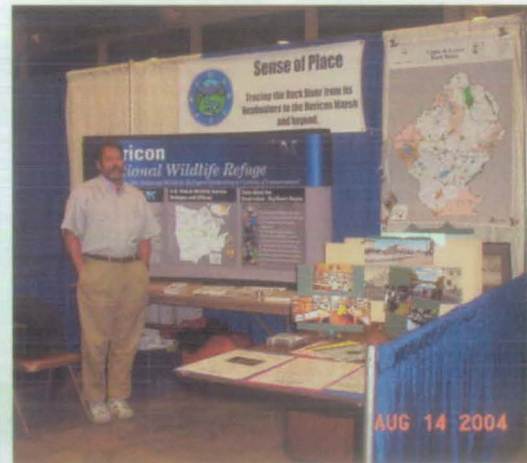


A coordinated Sense of Place project took place in Waupun this year. Partners integrated the Sense of Place theme into summer school classes including Canoeing on the Rock River; Reading, Writing, and Riding around Waupun; Geocaching; and Ready, Set, Action where students planted trees around town. Students in the Lights, Camera, Action! class performed two plays called "The Exterior Decorator" and "Sun Up!" during a culminating assembly event (above left). Singer/songwriter Ken Lonquist conducted a song writing workshop and students performed and recorded the new, original songs about Waupun and the Rock River during that same assembly (above right). Puddles (SCEP Hallie Rasmussen) was on hand to greet students as they arrived (below left), and ranger Stoddard addressed the assembly.



Students from the cooking class prepared and served refreshments afterwards (above right). Rasmussen and Stoddard provided educational programs using a watershed model during classes earlier in the summer session.

The Waupun Historical Society sponsored a K-12th grade writing contest around the theme "The Rock River Runs Through Us: Yesterday, Today, and Tomorrow." Eighteen students entered the contest and cash awards were provided by the society as well as a speed boat ride on the Horicon Marsh State Wildlife Area. (Some of the winners and partners are pictured below left.) Ten-year-old Renee Lechner, the overall winner, wrote about her daddy's memories growing up on the river including ice skating, fishing, muskrat trapping, canoeing, duck hunting, and snowmobiling. She also wrote about her own growing list of memories including fishing and sledding.



The society also provided historic photos from various sites in town, and Waupun committee coordinator Charles Osteen (21st Century Community Learning Center coordinator for the school district) photographed those same sites today for comparison. Both sets of photos were incorporated into Sense of Place displays at the Truckers Jamboree in August (above right) ...



... and in the Masonic Temple during Volks Fest in September which was enjoyed directly by about 150 people (left). They were also on display at the Fox Lake Public Library.



During the Truckers Jamboree, partners held a canoe race on the mill pond and Rock River with three age classes (9-12, 13-16, and 17+ years) and varying course lengths (above left). Adults had to portage their canoes across the park before entering the water (above right).



Medals were awarded by race coordinator Dave Imhoff to all 1st, 2nd, and 3rd place finishers (courtesy of the Truckers Jamboree organizers), and all participants received a key chain compass from Rutabaga of Madison. Adult 1st, 2nd, and 3rd place finishers also received trophies (above)

In September, one fifth grade class from Washington Elementary hosted a hands-on learning day at the mill pond where all 240 5th graders in the district plus the Christian school paddled in voyageur canoes and learned about the marsh watershed courtesy of refuge volunteer Nancy Hall. The group also conducted water testing at the municipal wastewater treatment plant, wrote in nature journals, and learned tree identification.

That same class started conducting water quality monitoring on the Rock River before it

enters Waupun, in town, and before it enters the Refuge. Their teacher attended water testing training at UW-Stevens Point through their WREN program (WI Rivers Educators Network) and received free equipment plus cash to order additional supplies. Their goal is to test monthly and enter their data on the WAV database through the internet.

Judge Laura Reynolds of Waupun will continue to coordinate the Horicon Marsh communities in Sense of Place projects including the Horicon Marsh comprehensive oral history video, and Waupun partners will create and staff a display for the Waupun Home Show this spring. With school curriculum revisions currently taking place, one teacher plans to incorporate Sense of Place into his lesson plans and make it a regular feature.

The Horicon Sense of Place project just started getting underway in 2004. Plans call for the school district to incorporate Sense of Place lessons into their curriculum. Partners are working on a couple of programs for the public library's winter series of workshops, one involving illustrating a story book about the Marsh and one involving a singer-storyteller who would facilitate kids writing a song about their environment. Partners would also like to work starting a local history project, possibly with the district's gifted-talented program.

Three communities, Waupun, Horicon, and Hustisford, held storytellers workshops this fall for a total of 35 participants. At each workshop, residents shared their stories, poetry, art, and photos of each community, its millponds, the Rock River, and Horicon Marsh with the goal of producing a local publication. The workshops included determining what makes a good story, messages, story development, sharing, and refreshments. Participants were invited to bring their own art supplies, photos, ideas, dreams and visions, and another person to help. The workshops were facilitated by Geri Weinstein-Breunig, a cultural geographer, principal of Cultural Waters, Inc. She works with residents to elicit their place-based attachments, memories, and experiences regarding the river or stream in their community, and uses the cultural values they place on the water resource to guide design, use, and manage decisions. About 15 people attended each workshop, and all three were videotaped for inclusion into a Horicon Marsh Sense of Place video to be produced over the winter and released next year.

On November 8, 2004, 28 people from 11 communities attended a Sense of Place ripple effect workshop at the Refuge visitor center in order to help spread the project further into the watershed. Presenters included partners who have conducted Sense of Place projects in their local communities and who encouraged the participants to initiate similar projects within the Rock River basin both up and down river from Horicon Marsh. They shared their coordinated, partnership efforts including oral history interview lesson plans, a radio drama, basin maps, historic photos, original music, video-taped oral history interviews, publications, potential funding sources, as well as successes and tips.

The diverse group of participants included home school educators, Wisconsin DNR employees, special education teachers, public and private elementary school teachers, a

UW-Madison master's student, a judge, school district administrators, a high school teacher and students, members of the Friends of Horicon NWR, and a 4H leader.

As a result, participants brainstormed activities they could initiate including:

- upgrading a school nature area to an outdoor classroom,
- partnering and collecting oral histories at Rush Lake,
- videotaping interviews during nursing home visits,
- collecting historic photos and photographing the same sites today for comparison,
- continuing to research the effectiveness of place-based education,
- continuing work on a Horicon Marsh sense of place video and publication,
- and incorporating sense of place activities into overnight camping programs on a farm.

The Friends believe one of their monthly programs could be on the topic of marsh history and include a tour of a local farm. They also hope to host a roundtable discussion where members can share their unique perspectives and stories of the marsh.

The media thoroughly covered the Sense of Place project with many articles in area newspapers. Volunteer, neighbor, and Friends member Joann Goodlaxson conducted personal oral history interviews with about one dozen marsh neighbors and the Fond du Lac Reporter printed the interviews as a full page-plus color story with a huge marsh graphic. The back side of the page contained an excellent story written by FDL Reporter Waupun Bureau Chief Colleen Kottke. Ranger Stoddard also wrote a Sense of Place feature story which appeared in local newspapers.

Horicon Refuge completed a Girl Scout partnership project with Girl Scouts of the Milwaukee Area, Camp Silverbrook in West Bend, and Carroll College in Waukesha. The project is named **Linking Girls to the Land** in support of the federal initiative among several conservation agencies including the Fish and Wildlife Service.

Girls Scouts from Camp Silverbrook have been visiting the Refuge each summer since 1997 as part of their camp experience. They have benefited from numerous educational programs provided by Refuge staff as well as self-guided recreational activities. Camp director Dennis Block attended Horicon's centennial celebration on March 14, 2003, and committed to expanding the partnership. Especially because of his initiative and effort in cultivating the needed relationships, in spring and summer of 2004, the partnership truly blossomed to include service learning opportunities and a career day.

The purpose of the project was to increase the use of Horicon NWR by Girl Scouts of the Milwaukee Area who use Camp Silverbrook located in West Bend in the spring and summer of 2004 "Going Places...Saving Spaces" project. The project integrated service, skills, career exploration, job shadowing and mentoring, and land ethics with popular summer adventure programs. Four destinations (one was the Refuge) and a unique group

of additional partners offered these opportunities and experiences.

The Girl Scouts of the Milwaukee Area, Inc. publicized the Going Places, Saving Spaces summer camp opportunities; coordinated participant recruitment and registration; provided equipment, transportation and logistical support to deliver summer camp programs at Horicon National Refuge; and provided funding and staff to support the project. They also worked with Camp Silverbrook to apply for a Girl Scouts USA Linking Girls to the Land grant which was unfortunately not awarded to this project this year.

Carroll College provided girls with global position systems training to navigate terrestrial features at the refuge; and provided staff to support the project.

As a result of the project, Horicon NWR served as one of three Career Week sites for 18 teenage girls to launch the overall "Going Places...Saving Spaces" summer camp program (GPS2). We hosted one additional recreational, self-guided Pedal and Paddle visit which included canoeing on the state portion of Horicon Marsh and bicycling on the Refuge's auto tour route. We provided high-quality, hands-on service learning projects for girls and counselors through the Refuge's volunteer program: 15 girls and especially 2 camp staff worked over 100 hours as volunteer bluebird box monitors.

Seven Refuge employees participated in the career day on July 7 which was attended by eight junior counselors from Camp Silverbrook, four senior girl scouts from Theinsville near Milwaukee, and the statewide GPS2 crew of six girls mostly from Milwaukee.



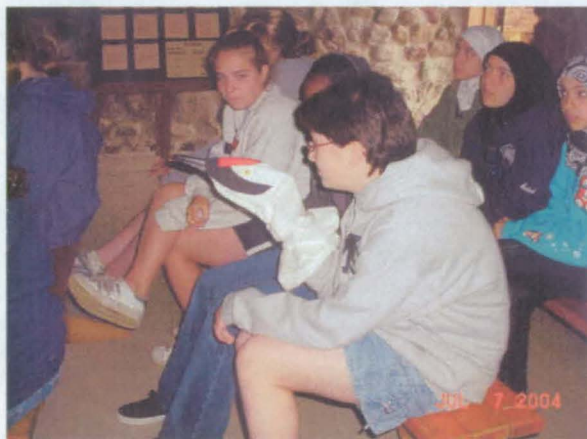
Ranger Stoddard and SCEP Rasmussen provided them with a hands-on career exploration activity based from World Wildlife Fund's Windows on the Wild curriculum. They matched wildlife career descriptions with their job titles and calculated their wildlife career profile. They also watched the FWS recruitment video. Stoddard and Rasmussen related their own career paths and highlighted firefighting. One girl dressed up in prescribed fire clothing and equipment (left).



The girls met fire technician Stevens and administrative officer Pieper during an office tour, and then maintenance mechanic Madel showed them a variety of heavy equipment during a tour of the shop area (above left). After lunch they rotated through four stations at the Environmental Education Barn and Bud Cook Hiking Area including Geocaching with bio tech Krapfl and volunteer intern Bergstrom (above right),



Crime Scene Walk with Assistant Manager Kitchen (above left), Water Levels with biologist Woyczik (above right),



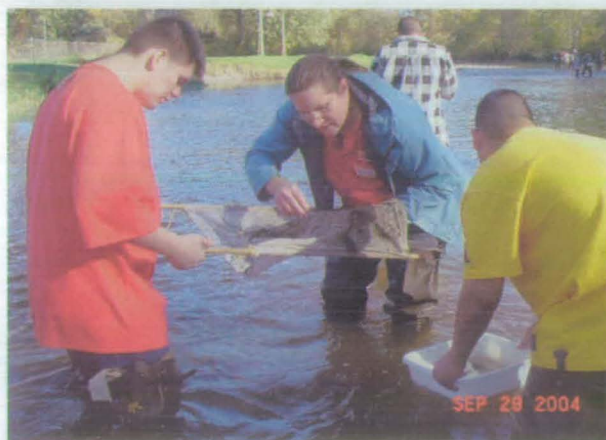
and Whooping Cranes with manager Meyers (left). During the wrap up for the day, one girl commented that now she would consider natural resources for a career where before she would not. Another girl said the day's experience confirmed her direction in wanting to pursue a wildlife-related career.

Benefits of this partnership included support of the U.S. Fish and Wildlife Service's Linking Girls to the Land

initiative; increased visitation of urban youth, an underserved audience; improved a long-term collaboration and cooperation with the Milwaukee Area Girl Scout Council; improved the connection of Girl Scouts to local and regional areas and involved them with the U.S. Fish and Wildlife Service and other agencies as partners to become responsible land stewards; provided an opportunity to encourage girls to consider fish and wildlife careers; and provided the opportunity to educate girls about conservation and the Horicon Marsh watershed. The project was supported by a Service challenge cost-share grant.

Camp Silverbrook and Girl Scouts of the Milwaukee Area have applied for a Nature of Learning grant from the National Fish and Wildlife Foundation to use towards supporting and continuing the project in 2005. We hope to expand the project to include possibly a mentoring luncheon, spring bluebird training workshop at camp for staff, camping in local county parks or an overnight at the Refuge, using geocaching to navigate to key visitor sites as part of ranger orientation day training, and/or building nesting boxes.

Refuge staff initiated a new partnership called **Watershed Monitoring Exchange Project**. In September 2004 participating teachers and students were trained at Riveredge Nature Center's "Testing the Waters" workshop. They learned how to conduct water quality monitoring in the Milwaukee River in Newburg on biotic and abiotic factors by rotating through several stations and touring the local landscape.



Ranger Stoddard staffed the macroinvertebrate station (left). Project participants include Spotted Eagle School in Milwaukee and Beaver Dam Charter School. Also in the fall, Charter school students were able to help release fish into the Rock River from the Genoa National Fish Hatchery and learn about fishery resources. In 2005, plans call for continued monitoring, sharing data on the WAV database, two exchange field trips, and one trip to Genoa.



group (above).

Public Visitation

About 406,884 people visited Horicon Refuge in FY04. About 17,564 people enjoyed marsh exhibits at the Visitor Center during the year. In order to more accurately

determine the number of visitors, volunteer rangers are now tallying the number of people per vehicle that enter the Refuge. The U.S. Fish and Wildlife Service overhauled the Refuge Management Information System report this year. The report is no longer required quarterly but annually. Because of these changes and in preparation for the Comprehensive Conservation Plan, volunteer rangers were also asked to help count the numbers of hunters they encounter.

Special Events

Numerous events marked the seasons: National Wildlife Refuge System Birthday (March), Earth Day (April), Marsh Melodies (April-May), National Fishing Week (June), National Public Lands Day (September), and National Wildlife Refuge System Week (October). For Friends-specific events, please refer to Cooperating Associations.



In celebration of **National Wildlife Refuge Week 2003**, Horicon NWR hosted two special School Field Trip Days on Thursday and Friday, October 16 and 17, and an Open House on Saturday, October 18. In addition, Wisconsin's Centennial Quilt and Mayville Sense of Place artwork were on display from mid-September through Refuge Week (above). (See 2003 narrative report for more details.) A total of 1,918 people entered the visitor center during the week, including 554 during the Saturday open house. Over 6,600 visitors have had the opportunity to view and enjoy the artwork and quilt.

For the School Field Trip Days, various sites around Horicon Marsh hosted activities and hikes for kindergarten through 12th grades. Ten schools registered at the Refuge, with nine showing up, for a total of 370 children and adults. Refuge activities included a "Celebrate the Centennial" program, "Nature Journal" outdoor activity, "Crime Scene" walk, and "Adaptations Everywhere" outdoor activity.

On Saturday, October 18, 2003, Open House activities included the first time 5K run/walk, guided bird watching tour, nature activities for kids, a centennial program, a goose talk, a free drawing for prizes, and more.



The Centennial 5K Run/Walk for the Refuge at the Horicon TernPike Auto Tour Route started at 10:00 am (above left) with 61 people finishing the race. Puddles assisted with registration (above right). Proceeds benefited the Friends of Horicon National Wildlife Refuge. This part of the open house was sponsored by the Fond du Lac Running Club and the Friends. All surfaces were paved and accessible to people with disabilities.



Commemorative t-shirts were included while supplies lasted for race day participants (above left). Other perks include apple cider and caramel apples courtesy of the Friends (above right) and a Friends membership display.

Kids Nature Activities and Games took place at the visitor center from 9:00 am – 6:00 pm with Fay's Fun-n-Learning, sponsored by the Friends of Horicon National Wildlife Refuge. Proceeds benefited the Friends. Walk-in visitors watched Refuge videos at the

visitor center. Several titles were available, from the five-minute Sights and Sounds edition to the 20-minute Where Wildlife Comes First edition and the 11 minute America's Refuge System. Volunteers Dennis Greeninger of Oshkosh and Nancy Hall of Fort Atkinson led the weekly Guided Bird Watching Tour to look for birds and other wildlife, 9:00 am – 11:30 am. Ten people observed 48 species of birds plus other wildlife including 13 waterfowl species and a coyote. Ranger Stoddard provided a Goose Talk covering the migration and management of Canada geese at the Highway 49 Viewing Area at 4:00 p.m. to enhance visitors' fall viewing experience. A free drawing for prizes was held at 5:30 pm. Prizes included a personal, guided Refuge tour and a complimentary membership to the Friends of Horicon NWR.

Horicon National Wildlife Refuge, celebrated 101 years of wildlife and habitat conservation along with hundreds of National Wildlife Refuges throughout the country on Saturday, March 13, 2004. About 40 people enjoyed the **Wild Things Birthday Parties** with ranger Molly Stoddard from 9:00 am to 11:00 am and repeated again from 2:00 pm to 4:00 pm. Geared especially for families, each party included a guided hike, slide show, and party games like pin the goose on the refuge and wildlife musical chairs. This program took place at the visitor center and outdoors on the Frankfurth dike, which is normally closed to the public. On the hike, participants observed our earliest migrants to Horicon Marsh including dancing sandhill cranes and Canada geese. They found plenty of rabbit, otter, deer, and goose sign. Puddles (volunteer and Friends president-elect Harold Steinback), made periodic appearances for photo opportunities. Throughout the day, kids could also color a paper goose mobile or affix a temporary tattoo of a goose. About 70 walk-in visitors were welcomed in the visitor center throughout the day.

Horicon Refuge and other marsh partners invited the public to celebrate spring in southeastern Wisconsin at the eighth annual **Horicon Marsh Bird Festival** on May 7-10, 2004. This special event also commemorates International Migratory Bird Day (May 8) and is a great way to celebrate Mother's Day (May 9). Unlike the past three years, the Refuge did not participate in the full-blown Marsh Melodies series since records indicated that visitation did not seem to justify the effort involved in planning and conducting these events.

Highlights for visitors during this four-day, marsh-wide event included a school field trip day, numerous guided hikes, canoe and boat tours, field trips, games, demonstrations, talks, exhibits, activities for kids, art displays, and a 24-hour big sit. Notable species observed this year included northern goshawk, red-shouldered hawk, Swainson's hawk, peregrine falcon, caspian tern, and red-breasted nuthatch. These species had never been seen during the festival since its inception in 1997.

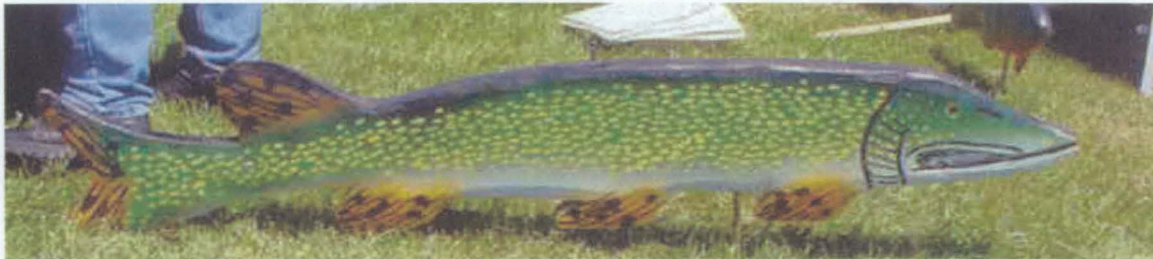
Refuge activities included the visitor center being open for the weekend. Visitors watched Horicon Marsh videos, used the spotting scopes on the deck, shared sightings, and obtained bird identification help. On May 8, from 10:00 am – 2:30 pm, a wood carving demonstration took place at the visitor center with several carvers from Mid-Wis

Chippers based out of Oshkosh and Neenah. They demonstrated woodcarving techniques such as chip carving and wood burning. About 500 people entered the building over the weekend.

For the school field trip day, various locations around the marsh provided activities for kindergarten through 12th graders. About 220 people from seven schools attended activities held on the Refuge, as well as one group of 60 people from the Horicon Marsh Bird Club. Activities included Binoc Basics demonstration and Who's Who Hike at the floating boardwalk; Migration Mysteries activity at the visitor center; Birds of the Marsh slide show at the visitor center; and Refuge Bingo hike at the Environmental Education Barn.

On May 8, from 1:00 pm – 3:00 pm, ranger Stoddard provided a Refuge Birds Mini Tour. Later that day she provided a program called Whooping Cranes Return to Wisconsin at the visitor center. That evening, she hosted the Wisconsin Federal Junior Duck Stamp Reception at the visitor center. The special guest was wood carver Eugene Breitbach of the Mid-Wis Chippers. This event celebrated the accomplishments of local kindergarten through 12th grade contest winners. Prints of all 1st, 2nd, and 3rd place artwork were on display throughout the month of May on loan/tour from Necedah NWR.

On both Saturday and Sunday afternoons, volunteer Roving Rangers at the floating boardwalk on the Egret Trail helped visitors enjoy the area looking for birds, muskrats, and signs of spring. Additional activities also took place at other locations around the marsh. Over sixteen bird festival partners made the event a success.



Horicon NWR hosted its annual Fishing Expedition on May 28 with about 120, 3rd-6th grade students, teachers, and parents from Horicon's Van Brunt Elementary School and St. Stephen's Lutheran School in celebration of **National Fishing Week**. The day was preceded by a visit to the school by ranger Stoddard to meet with teachers and prep the students using assembly presentations and slide shows on April 19. She provided each student with fish sunglasses and hats to decorate, both helpful in promoting fishing safety (eye protection) during the May 28 event and beyond. Horicon Mayor Lloyd Wagner signed a proclamation in advance of the event. (pike above by volunteer Roy Zastrow) On May 28, students rotated in small groups through 10 staffed "Pathways to Fishing"



learning stations which included: fish handling and ethics (above left), wet-n-wild (above center), fisho, fish printing, fish identification, regulations, knot-tying (above right), casting,



bait and equipment (above left), cleaning fish (above right), and a break station in the exhibit area of the visitor center. Normally in the afternoon, students would enjoy free fishing time on the refuge's fishing sites, with refuge staff assisting and providing live and artificial bait, lead-free sinkers, bobbers, hooks, first aid and fishing goody bags to each student. However, this year, due to flooding, no safe and accessible sites were available

anywhere at Horicon Marsh or on the Rock River, so fishing had to be cancelled for the first time in the more than eight year history of this event. Many volunteers staffed this event and did an outstanding job!

The goody bags included the ABCs of Fishing Coloring book, Fishing is Fun for Everyone brochures, Let's Get the Lead Out brochures, refuge brochures, bobbers, hooks, sticker rulers, Kool Aid, hard candy, insect repellent, and much more. Each child also received a bait card at the morning bait station. SCEP Rasmussen delivered the dry fish prints to the school the next week.

For the first time, Horicon Refuge partnered with Wal-Mart to sponsor this event as one of their nationwide Kids Fishing Derbies. Wal-Mart provided a derby kit which included numerous items already mentioned, plus hand sanitizer, two kids fishing rods and reels, fishing line, a disposable camera, a stocked tackle box, a banner, and entry forms for casting and photography contests as well as a drawing for savings bonds. The fishing expedition was also funded by a U.S. Fish and Wildlife Service, Region 3, Challenge Cost-Share grant.

Three employees, 15 volunteers, and one conservation partner staffed this event. Partners included the Friends of Horicon NWR, Beaver Dam Charter School, the WI Department of Natural Resources, the City of Horicon, St. John's Lutheran School, and Van Brunt Elementary School. Additional partners included Wal-Mart supported by Repel, Double Bubble, Fuji Film, Eagle Claw, Kool Aid, Zebco, Trilene, Purell, and Band Aid.

On September 18 in celebration of **National Public Lands Day**, sixteen hard-working volunteers and several Refuge staff rolled up their sleeves and added the finishing touches to the repair of the floating boardwalk. The 1,000-foot boardwalk was damaged by a tornado on June 23 and finally repaired by a FWS Regional Maintenance Action Team during the week of September 13 (see Facilities and Access in this section for more information). By the end of that week, the boardwalk was ready for National Public Lands Day volunteers to add the rope handrails. The group far exceeded expectations, working much faster than anticipated. After about 3 hours of work, the group was treated to a luncheon celebration, provided by the Friends of Horicon NWR. Many in the group were first time volunteers, but regular visitors to the Refuge, and were grateful for the opportunity to be part of repairing the boardwalk, an attraction that each of them have enjoyed for years.

Hunting

Hunting opportunities on the Refuge include ring-necked pheasant, gray partridge, cottontail rabbit, squirrel, and deer. Closed areas include the Viewing Area and Interpretive Displays on Highway 49, the Bud Cook Hiking Area, and a small area around the Office/Visitor Center. The Auto Tour Route/Hiking Trail Complex is closed to all hunting except during the deer gun season; a 600-acre area around the Office/Visitor

Center is closed to all hunting except for special hunts for hunters with disabilities; and the former Stensaas unit is closed to all hunting except for youth and novice pheasant hunters. The Refuge is closed to migratory bird hunting, other than a controlled Youth Waterfowl Hunt. State regulations apply to all Refuge hunters, except that all seasons close at the end of the deer gun season on the Refuge.

Chronic Wasting Disease (CWD) continued to be a problem within the southwestern part of the State. Fortunately there is still no presence of the disease on the Refuge or even within this part of the State. Refuge staff was required to write a CWD Plan and Environmental Assessment, which was completed by the end of the year but not yet approved.

For the fifth year, the Refuge participated in the State's early gun hunt in October 2004, only open to hunters with disabilities. The 880-acre area was opened October 2 to 10 for this special hunt. Hunters had to pre-register by the end of the summer, with a maximum of 12 selected. Nine hunters signed up to hunt, but only six ended up hunting, with one doe and one 8-point buck harvested.

During the regular nine-day deer gun season in 2004, ten hunters and their assistants hunted. Only two bucks were harvested.



One change in 2004 that may have affected hunter success during the two disabled hunts is that Refuge staff decided to open the area to everyone during the two T-Zone hunts. The T-Zone hunts are special four-day, antlerless-only hunts that the State offers at the end of October and beginning of December. Unfortunately, it is not known how many deer were harvested since hunters are not required to report their success to the Refuge. Most of the hunters with disabilities were disappointed that others were allowed to hunt in "their special hunt area," but the other people were pleased to have the opportunity.

The Youth Waterfowl Hunt in 2004 was held on October 9, 23, and 24. To be eligible to hunt in this special program, the youth must have completed hunter safety and one of the local Ducks Unlimited Greenwings Days or Wisconsin Waterfowl Association Waterfowl Skills Clinic. Each youth who is selected may have one youth partner who also has to

meet the above requirements and one adult sponsor who is not allowed to hunt. Twenty-one youth participated. Each party hunted one morning out of the three days that were selected for the hunt. A total of 39 ducks were taken, which consisted of eleven gadwall, ten shovelers, nine mallards, three redheads, one coot, one merganser, one wigeon, one pintail, one scaup, and one ruddy duck.

7b. Outreach

In FY04, about 164,542 people benefited from outreach efforts which included off-site presentations and exhibits. This number is so high because of the Refuge's participation in the Sports Show as reported in RMIS. Other off-site exhibits are described below.

Five federal agencies which comprise the America's Outdoors Center for Education, Recreation and Resources partnered to sponsor a booth at the Milwaukee Journal-Sentinel Sports Show held March 12-21. The five agencies included the National Park Service, Bureau of Land Management, Natural Resource Conservation Service, National Forest Service, and U.S. Fish and Wildlife Service. Three volunteers and one employee from Horicon National Wildlife Refuge helped staff the booth, representing the FWS. The Sports Show typically draws 150,000 people during the 10-day event, held in suburban West Allis at the Milwaukee County fairgrounds. It is estimated that 50,000 people visited the display during the show. It is an excellent opportunity for all of the America's Outdoors agencies to reach out to our public with recreation and career information and put a friendly face with the names of our government agencies. The primary purpose of the booth is to provide information about federal, outdoor recreation lands in Wisconsin, including national wildlife refuges. Blue goose mobiles and station brochures were provided. Information about federal lands in other states is also available.

In July, Dan Bell, Greg Hamilton, and Molly Stoddard helped staff a display for the Boise Interagency Fire Center at the AirVenture show at the EAA grounds in Oshkosh (below left). Many pilots appreciated learning about the temporary flight restrictions accessible for viewing on the center's web site via laptop computers in the display. About 1,500 people stopped by the booth.



In August, Refuge staff, including Patti Meyers, Diane Kitchen, and Molly Stoddard, staffed Horicon Refuge's display at the Ducks Unlimited Great Outdoors Show in Oshkosh. About 7,000 people visited the booth (above right).

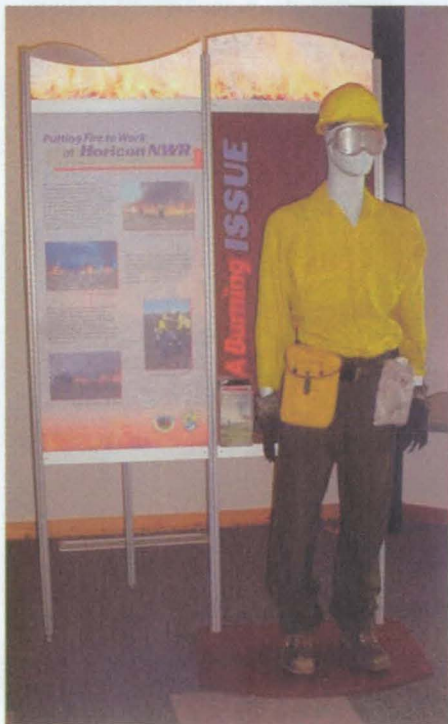


On September 18, Harold and Nancy Steinback staffed the Horicon NWR booth during Crane Fest at Necedah Refuge. About 3,000 people attended the event and about 500 people specifically stopped by the Horicon booth (left).

The Refuge participated in additional outreach events during 2004 as part of the Sense of Place project. These are outlined under the Environmental Education

section earlier in this narrative report.

Many Internet security improvements in the U.S. Fish and Wildlife Service led to decreased direct access to the Refuge web site during 2004. By the end of 2004, the software used changed back to FrontPage from Contribute and files are now edited and then emailed to the Regional Office web master Larry Dean for loading onto the site.



The Refuge received a fire display in 2004 which was fabricated by Wilderness Graphics and coordinated by Lauri Munroe-Hultman. There are actually three sides to the display, and the top has a holograph (left).

The Refuge distributed 20 electronic fax and email **news releases** via the Burrelles Information Dissemination System.

Ranger Stoddard developed a Horicon Marsh **events flyer** with special emphasis on Horicon NWR events. The Friends of Horicon NWR paid for printing of the flyer.

Two separate GIS-based **maps**, one for hunters and one for visitors, were again produced by the Wisconsin Department of Natural Resources with input from Refuge staff.

8

PLANNING AND ADMINISTRATION

8b. General Administration

Funding – 2004

Refuge Operations	1261	\$514,608
Volunteer Program	1261	\$ 3,500
Challenge Cost Share/CCI	1261	\$ 67,500
Maintenance Mgmt	1262	\$262,337
Chronic Waste Disease	1261	\$ 10,000
Bio Monitoring Database	1261	\$ 16,000
Team		
SCEP	1261	\$ 7,000
Maintenance Action Team	1261	\$ 8,500
YCC	1262	\$ 10,586
SAMMS	1262	\$ 20,000
Fire Preparedness	9131	\$ 22,966
Fire Use and Mgmt	9263	\$ 80,500
Wildland Fuel Reduction	9264	\$ 31,500
Projects		
Rural Fire Department	9265	\$ 6,345
Assistance		
NRDA	9822	\$262,284
Fire Study Funds	1971	\$ 2,900
Fox River Wetland	5521	\$ 17,500
Restoration		
Visitor Facility		
Enhancement	2821	\$125,000
Visitor Kiosk Funds	2821	\$ 20,800
Forster's Tern		
Productivity	1231	\$ 4,400
Forster's Tern		
Productivity	1234	\$ 5,000

Total		\$ 1,499,226
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Personnel

The following is a list of employees who were members of the staff at Horicon Refuge in 2004.

- | | | | |
|---|-------|--------------|------|
| 1. Patti A. Meyers
Project Leader | GS-13 | EOD 08/11/91 | PFT |
| 2. Diane M. Kitchen
Refuge Operations Specialist | GS-12 | EOD 05/31/92 | PFT |
| 3. Molly K. Stoddard
Ranger | GS-11 | EOD 06/23/96 | PFT |
| 4. Wendy Woyczik
Wildlife Biologist | GS-09 | EOD 05/05/03 | PFT |
| 5. Jean Pieper
Administrative Technician | GS-07 | EOD 01/24/84 | PFT |
| 6. Sean Sallmann
Prescribed Fire Specialist
Transferred from Leopold WMD, Portage, WI | GS-07 | EOD 02/09/04 | PFT |
| 7. Jon Krapfl
Biological Technician | GS-06 | EOD 04/18/93 | PFT |
| 8. Mike Madel
Maintenance Mechanic | WG-10 | EOD 08/17/97 | PFT |
| 9. Sherry Schwoch
Office Clerk | GS-02 | EOD 09/07/97 | PINT |
| 10. Angie Schraufnagel
Office Clerk | GS-02 | EOD 09/09/97 | PINT |
| 11. Jill Blanke
Office Clerk
Resigned August 22, 2004 | GS-02 | EOD 09/07/97 | PINT |

12. Mary Hull Office Clerk	GS-02	EOD 08/17/99	PINT
13. Michael Strupp Laborer Position ended August 31, 2004	WG-02	EOD 06/09/03	STEP
14. Dusty Balson Laborer	WG-02	EOD 11/13/04	STEP
15. Keith Jensen Engineering Equipment Operator	WG-08	EOD 06/10/02	TEMP
16. Duane Ketter Social Service Aid (YCC Crew Leader)	GS-05	EOD 06/16/04	TEMP
17. Shawn Papon Biologist (Fox River NWR)	GS-09	EOD 05/19/03	TERM
18. Jake Ivan Biologist (Green Bay and Gravel Island NWRs)	GS-09	EOD 07/28/03	TERM
19. Hallie Rasmussen Student Trainee (Ranger)	GS-04	EOD 05/27/03	SCEP
20. Michael Urish Biological Science Technician – Fire Study Resigned August 27, 2004	GS-05	EOD 08/09/04	TEMP
21. Julie Bohen Biological Science Technician – Fire Study	GS-05	EOD 09/07/04	TEMP
22. Greg Hamilton Range Technician	GS-05	EOD 05/17/04	TEMP
23. Tom Stephens Range Technician	GS-05	EOD 05/17/04	TEMP



4 3 2 5 1
15 6 17 8 7



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From May 26-August 20, 2004, University of Wisconsin Stevens Point undergraduate student Hallie Rasmussen worked in the Student Career Experience Program at Horicon NWR. This was her second summer working with the U.S. Fish and Wildlife Service in the SCEP position. She is the first such student in R3's SCEP program working mainly in visitor services, and she helped reach thousands of people in outreach and education efforts.

During the summer, Rasmussen observed, assisted with, led or coordinated as program director 533 people in 12 groups for the following educational programs offered by the refuge: Wild Work, Marsh Web, Our Wonderful Wetland Watershed, Here is the Wetland, Guess Who, Pathways to Fishing: Fish Handling and Ethics, Welcome Programs, Binoc Basics, and the Sense of Place performance. She also reached hundreds of people at the Truckers Jamboree in Waupun, provided roving interpretation at various trail heads, and worked in the Visitor Center.

Rasmussen assisted with three monthly Friends meetings, Rolling Readers volunteer training, and four Sense of Place project meetings. Hallie fielded phone calls from the media due to a natural disaster that occurred at the Refuge (tornado). She also wrote one news release and recorded messages on the Travelers' Information Service system (am1610).

Some of Hallie's projects included developing and implementing a form for volunteers to use as a traffic counter at certain sites on the Refuge and inventorying educational trunks and historical items. She also upgraded the Refuge's program on marsh history by expanding the lesson plan to highlight Native American history and upgrading materials. She partnered with individuals from the Ho-Chunk Nation and Dodge County Planning and Development office for information on this project.

Hallie was able to broaden her horizons by visiting the Regional Office and participating in cross program training with biologists, bio-techs, and maintenance staff. She is working towards a Bachelor of Science degree in environmental education and interpretation and hoping to continue toward a Masters degree in a related field in 2005.

The Refuge has partnered with the Fond du Lac Area Association of Commerce since 2002 in their student work program, recruiting students from Oakfield High School for our STEP program. Michael Strupp returned in 2004 as the Refuge STEP student for the maintenance program. Michael worked his second and last summer, June 14 to August 31, and gained valuable experience while being a tremendous help to the Refuge Maintenance Mechanic. A new student, Dusty Balson, was selected and began work on November 13, 2004. Dusty will work part-time through the school year and full-time during the summer.

Keith Jensen returned as a temporary employee, working 8 months out of the year, to assist in the maintenance program. Keith is a tremendous asset to the Refuge and especially in offering an extra hand to the Refuge Maintenance Mechanic. Unfortunately, Keith's three-year temporary assignment will end April 30, 2005.

The Refuge hosted a Youth Conservation Corps crew of four young adults and a crew leader for a third summer. The program was very successful. At first, Refuge staff were dismayed when the former crew leader decided not to return due to health reasons. Refuge staff quickly did some recruitment and was able to hire a new leader under the Emergency Hire Program. The crew leader was a retired Wisconsin Department of Natural Resources employee who had worked over 40 years on the state-owned part of the Horicon Marsh. He worked well with the enrollees, knew the marsh and Refuge staff already, and had a strong construction background.

The four young men and women accomplished a tremendous amount of work, along with supplying much needed assistance in the aftermath of the tornado. They spent several days after the tornado clearing trees and brush and removing the damaged boardwalk. Other projects included constructing benches, constructing accessible hunting blinds, harvesting seed, landscaping around the visitor center, pouring cement for several projects, placing and replacing signs, painting, placing gates, rehabilitating the duck banding site, waxing signs on the auto tour route, washing vehicles, repairing fish platforms, staining decks, trimming trees and brush, cleaning refuge facilities, placing culverts on the hiking trails, and cleaning the carp trap. The crew was also treated to several educational field trips, which was funded by the Friends of Horicon National Wildlife Refuge. Most importantly, the crew had an accident free summer.



left to right: Laura Reed (Mayville), Lindsey Nielsen (Mayville), crew leader Duane Ketter (Mayville), Cody Meyers (Waupun), and Aaron Streblow (Waupun)

Volunteers



In calendar year 2004, a grand total of more than 232 people volunteered in wildlife, habitat, outreach, administrative, and maintenance projects for the Horicon National Wildlife Refuge. They contributed over 4,573 hours of time and talent, at an estimated value of \$72,711 (mock check, left, presented by Liz Roy to Patti Meyers).

Those figures include 75 volunteers who worked more than 3,464 hours as individuals from at least 17 communities: Beaver Dam, Fox Lake, Brownsville, Mayville, Ripon,

Waupun, Madison, Cedarburg, Fond du Lac, Fort Atkinson, Hubertus, Juneau, Rubicon, Wauwatosa, Horicon, Campbellsport, and Oak Creek.

The figures also include more than 157 people who volunteered in eight groups from more than eight core communities: LeRoy, Beaver Dam, Fond du Lac, West Bend, Milwaukee, and Richland Center, WI; and several foreign countries.

The groups include the Friends of Horicon National Wildlife Refuge, Beaver Dam Charter School, Camp Silverbrook, the Cooper/Franke Families, the Linder Family, AFS, Tom Giese Family, Redeemer Lutheran Church Boy Pioneers, and Community Care, Inc.

Sixty-one people attended the annual volunteer recognition event held February 2, 2005 at the Refuge visitor center.



Bill Herman of Hubertus was named *volunteer of the year* (above left with Mike Madel). Herman worked 496 hours in 2004 assisting with a variety of maintenance projects including flood and tornado repairs, mowing grass, and picking up litter; biological work like carp management, wood duck boxes, surveys, and seeding; outreach as a ranger; habitat work as a traffic flagger during prescribed fires; and including jobs that would have required hiring professional help to complete. He also assisted with the red cedar day at Fox River NWR

(above right). A team of three volunteers selected the volunteer of the year from 8 nominations received from both employees and volunteers.

Through the Raptor Education Group in Antigo, WI, a contribution was made in Herman's honor for one square foot of space in the new Eagle Flight Building. He also received a framed and engraved bald eagle photo taken on the refuge by Jack Bartholmai of Beaver Dam and a complimentary one-year membership to the Friends of Horicon National Wildlife Refuge. His name has been added to an engraved plaque which hangs in the Refuge's visitor center.



Harold Steinback of Beaver Dam was recognized as the *individual* who worked the most hours (left, with Diane Kitchen). Steinback worked 598 hours in 2004 in many different jobs including manager of Coots Corner, president of the Friends of Horicon National Wildlife Refuge, traveling exhibit staff, visitor center staff, seed harvester, tour guide, and ranger. He also mowed the grass at the visitor center and Environmental Education Barn and built wood duck houses out of freon tanks for the Friends. Steinback has volunteered for the refuge since 2000 and

has cumulatively worked 1,424 hours. He and his wife Nancy received the Volunteer of the Year award in 2002.



The Beaver Dam Charter School was spotlighted as the *group* that worked the most hours (left, with Shawn Papon, in red shirt). In 2004, 71 people contributed 893 hours for Horicon National Wildlife Refuge plus 408 hours for Fox River National Wildlife Refuge near Portage for a grand total of 1,301 hours. They worked as office assistants, marsh stewards, seed harvesters, green thumbs, water action volunteers, maintenance assistants, and special event assistants. They participated in National Public Lands Day and helped manage water levels and carp. They helped process duck wings after the wingbee (above right). The BDCS has worked over 7,672 hours since they began volunteering at the refuge in 1996. They have received this award almost every year.

The Friends of Horicon National Wildlife Refuge were also recognized for their continued support. Refuge manager Patti Meyers provided officers with a U.S. Fish and Wildlife Service volunteer mug. Officers included: Harold Steinback of Beaver Dam, President; Nancy Hall of Fort Atkinson, President-Elect; Glenn Burg of Fox Lake, Treasurer; and Beneeta Steinbach of Waupun, Secretary. (below left, Nancy Hall, escorted by Theodore Roosevelt, receives her mug and pin from Patti Meyers.)

Many other groups and individuals were thanked by employees for their support as refuge volunteers.



Jimmy the Groundhog of Sun Prairie along with keepers Jerry and Maria Hahn provided a presentation for the volunteers and their guests at the recognition event (above right). The Hahns reported that Jimmy did not see his shadow earlier in the day and predicted an early spring. The volunteer dinner concluded a busy day for this grassland mammal which was preceded by visits to schools and a nursing home and of course early morning festivities with dignitaries. The Hahns continue a 57-year tradition in Sun Prairie, the groundhog capital of the world. Their visit was sponsored by the Friends of Horicon National Wildlife Refuge.

Other partners contributed to the recognition event, especially the Leopold Wetland Management District and the National Wildlife Refuge Association.



We are grateful for the outstanding support we receive from our volunteers!

FOX RIVER NATIONAL WILDLIFE REFUGE

Mayville, Wisconsin

ANNUAL NARRATIVE REPORT

Calendar Year 2004

**U.S. Department of the Interior
Fish and Wildlife Service
National Wildlife Refuge System**

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Introduction

Fox River National Wildlife Refuge, managed by staff at Horicon National Wildlife Refuge, encompasses 1,004 acres of wetland and upland habitat along the Fox River in Marquette County, Wisconsin. The majority of the current Refuge was acquired in 1978 under the U. S. Fish and Wildlife Service's Unique Wildlife Ecosystem Program for the purposes of protecting an area known as the Fox River Sandhill Crane Marsh from further drainage and protecting an important breeding and staging area for the greater sandhill crane. Refuge objectives include restoring, enhancing, and preserving the wetland and adjacent upland habitat historically found in extensive areas along the Fox River, namely Oak Savanna uplands and Sedge Meadow wetlands. Another objective is to restore, enhance, and preserve the wildlife populations that use the wetland and upland habitats along the Fox River, with special emphasis on those species dependent upon large expanses of natural marsh, such as the greater sandhill crane. Other objectives include protecting the habitats of any Federal or State endangered or threatened species that may utilize the Refuge, such as bald eagles, and to make the Refuge available for outdoor recreation, environmental education, and other public use activities compatible with the above objectives.

Climate Data

Climatological Review - 2004

Climate data for Fox River Refuge was similar to that at Horicon Refuge and is provided below.

Temperatures (in Fahrenheit) and Rainfall (in inches)

Month	2004				2004		2004 Rain
	Average		Normal *		Highest	Lowest	
	High	Low	High	Low			
					Recorded		
Jan	23.7	6.5	26.0	13.3	44.1, Jan 3	-17.0, Jan 30	0.09
Feb	33.8	16.3	30.2	15.8	56.5, Feb 29	-16.8, Feb 4	0.90
Mar	46.5	31.6	39.2	24.9	68.5, Mar 28	10.2, Mar 12	4.10
Apr	61.4	38.2	53.5	35.6	83.5, Apr 17	25.2, Apr 5 &13	1.96
May	69.4	47.9	64.8	44.7	83.8, May 13	29.1, May 3	10.93
Jun**	78.5	57.4	75.0	54.7	89.2, Jun 9	46.2, Jun 4	7.71
Jul **	78.8	56.8	79.8	61.1	84.2, Jul 28	49.3, Jul 26	3.11
Aug	76.0	55.2	78.4	50.2	84.4, Aug 2	41.2, Aug 21	2.76
Sept	78.4	55.1	71.2	52.5	85.6, Sep 4	36.9, Sep 29	1.04
Oct	62.7	42.9	59.9	41.9	77.0, Oct 7	27.3, Oct 6	2.83
Nov	49.3	33.5	44.7	29.9	64.8, Nov 7	17.1, Nov 25	2.23
Dec	34.1	18.6	32.0	18.2	52.2, Dec 31	-11.2, Dec 24	1.64

* Data from the National Weather Service Bureau, Milwaukee, Wisconsin

** Temperature sensor on weather station failed. Only days with correct readings were used to get averages and the highest and lowest temperatures.

Rainfall (in inches)

Total for the year
Greatest in 24 hours

Actual

39.3
3.37" on June 10

Normal

18.01

Snowfall (in inches)

Calendar Year 2004
Greatest in 24 hours

Actual

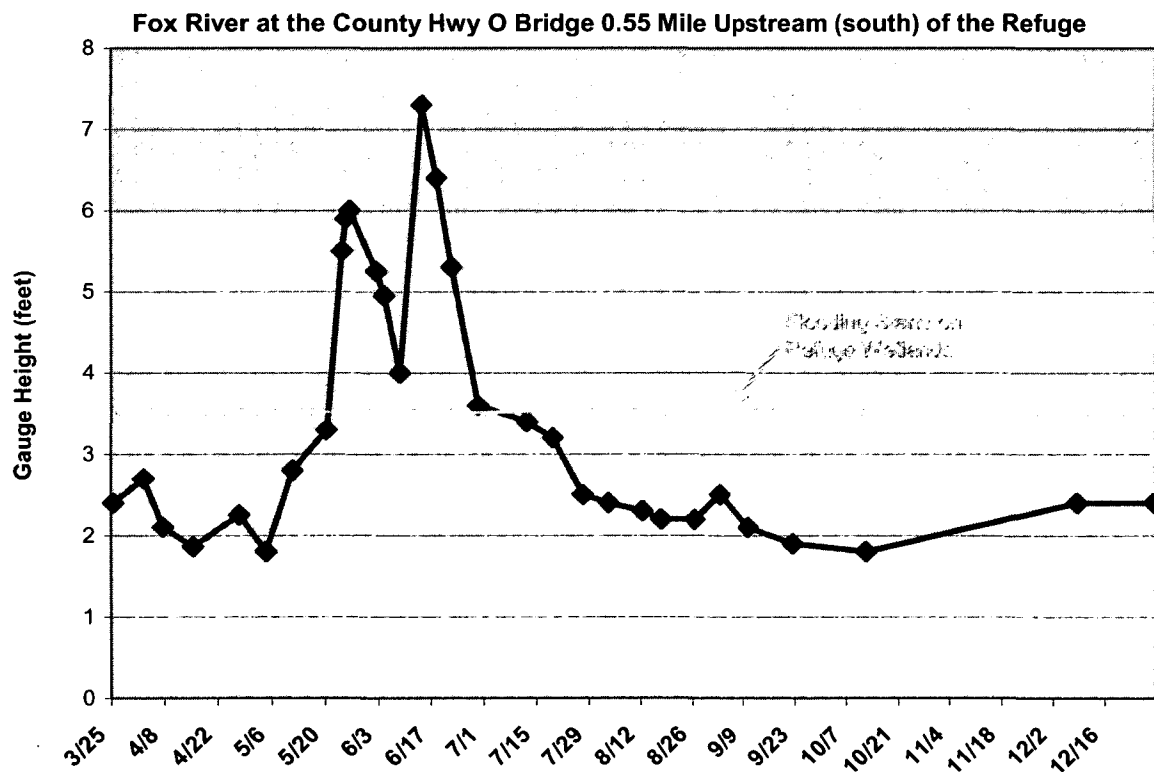
29
4" on Jan 23 and Feb 2

Normal

47.6

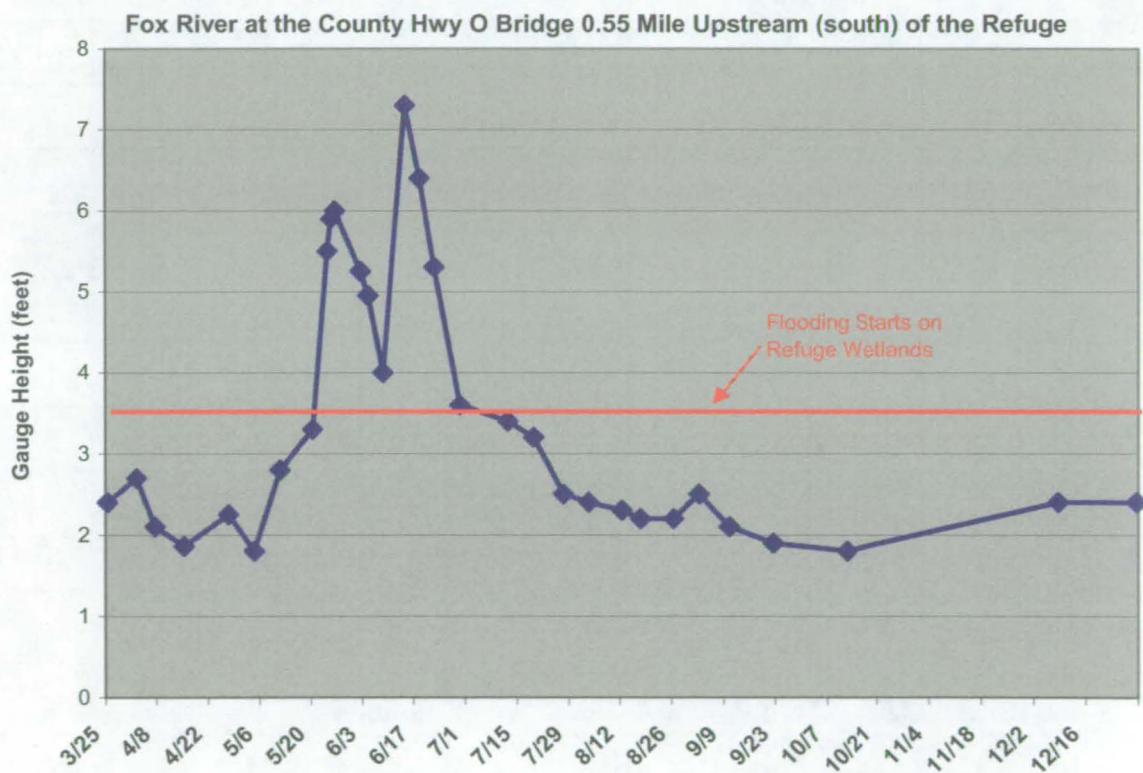
Climatic Highlights

Many of the same climatic events mentioned in the Horicon Refuge section applied to Fox River Refuge as well. Most notably were two major flood events in May and June that flooded the majority of wetland habitat on the Refuge. Heavy rains during May and June (as evidenced in the weather table) contributed to the flooding. At Fox River NWR, a rain gauge maintained by the biologist documented 20.66 inches of rain between May 8 and June 29! The flooding overtopped county highway O west of the Fox River bridge on the south side of the Refuge and also overtopped most vegetation in Refuge wetlands. The flood events undoubtedly flooded out crane, duck, and goose nests, but also provided valuable wetland habitat to waterbirds. The flood events provided a good glimpse at the topography of Refuge wetlands via observing water depths and flow patterns and also showed that the Refuge is functioning well as a natural floodplain. This information will be helpful in planning the wetland restoration project. On March 25th, the biologist installed a river gauge on the highway O bridge to document river levels and their relation to Refuge wetland habitat. That data is shown below.



Climatic Highlights

Many of the same climatic events mentioned in the Horicon Refuge section applied to Fox River Refuge as well. Most notably were two major flood events in May and June that flooded the majority of wetland habitat on the Refuge. Heavy rains during May and June (as evidenced in the weather table) contributed to the flooding. At Fox River NWR, a rain gauge maintained by the biologist documented 20.66 inches of rain between May 8 and June 29! The flooding overtopped county highway O west of the Fox River bridge on the south side of the Refuge and also overtopped most vegetation in Refuge wetlands. The flood events undoubtedly flooded out crane, duck, and goose nests, but also provided valuable wetland habitat to waterbirds. The flood events provided a good glimpse at the topography of Refuge wetlands via observing water depths and flow patterns and also showed that the Refuge is functioning well as a natural floodplain. This information will be helpful in planning the wetland restoration project. On March 25th, the biologist installed a river gauge on the highway O bridge to document river levels and their relation to Refuge wetland habitat. That data is shown below.





Aerial photo of Refuge wetland deeply flooded from the Fox River (highway O gauge = 17.0); meander scrolls and abandoned channels of the Fox River are evident (6/16/2004).



Looking SW from the NW corner of the oak island (6/18/2004).

1

Monitoring and Studies

1a. Surveys and Censuses

Vegetation and Habitat Surveys

The majority of the Refuge is sedge meadow, wet prairie, and shallow marsh wetlands dominated by many species of sedges, grasses, and cattail. However, other wetland types such as fens, lowland forest, shrub-carr thickets, deep marsh, and open water occur on the Refuge as well. Fens are a very rare wetland type in Wisconsin and harbor many state threatened and endangered plants. Upland habitats consist of closed canopy upland deciduous forest dominated by white, black, and bur oak, upland dry prairie, and oak savanna. Two spring-fed creeks flow through the Refuge, two other spring-fed creeks originate on and flow through the Refuge, and the Fox River forms the southern and western boundaries of the Refuge, adding to the diversity of the area. Eleven springs have been documented on the Refuge, and many other groundwater seeps are located throughout the Refuge. Soils in Refuge wetlands are predominantly deep and shallow mucky peat underlain by sand; soils in uplands are very sandy, ranging from loamy sand to sandy loam. The sand underlayment in Refuge wetlands means the groundwater table is very high, acting to keep the wetlands wet. Therefore, groundwater inputs are likely more important than surface runoff in the proper functioning of this unique wetland; water levels are less likely to fluctuate.

As mentioned last year, an extensive network of 100 survey points were randomly placed in six broad habitat types on the Refuge in order to monitor vegetation and wildlife communities, as well as abiotic conditions, namely the hydrologic regime (see map in 2003 narrative). At this point, the data has not been entered or analyzed, but a summary of common plant species and other habitat characteristics in each of the six habitat types surveyed follows. These surveys will provide good insight into the effects of management and restoration efforts on habitat and wildlife.

Wet Prairie - Emergent Marsh

This habitat type was very broad and included most treeless wetland habitats, such as wet prairie, sedge meadow, and shallow emergent marsh. Wet prairie and sedge meadow was difficult to differentiate as these two habitats tended to mix together. Wet prairie was drier than the sedge meadows and was dominated by tussock sedge (*Carex stricta*), flat-top aster, joe-pie weed, goldenrod spp., wild iris, smartweed spp., and sensitive fern. Wet prairie also tended to be overgrown in many places with shrubs such as red-osier dogwood, willow spp., poison sumac, and alder. Many of the wet prairie sites were also

fens, where rare plants characteristic of fens were documented, such as hedge nettle, swamp thistle, lousewort, obedient plants, sneezeweed, culvers root, water hemlock, downy willoweed, and St. John's wort, among others. There was rarely any surface water in the wet prairie, only moist soil. Sedge meadows were dominated by plant species with more flooding tolerance, such as lake sedge (*Carex lacustris*), *Carex lasiocarpa*, blue joint grass, marsh fern, some patches of tussock sedge, *Impatiens* spp., wild iris, and moss spp. The sedge meadows were much more monotypic than the wet prairies and had fewer forbs than wet prairie. Other species documented that were not too common included mint spp., bedstraw, and *Rumex* spp. Water depths in sedge meadows varied from 0 – 10 inches, with a mean close to 5 inches. Shallow emergent marsh had generally deeper water depths, ranging from 0 – 30 inches, with a mean close to 15 inches. Again, it was difficult to discern distinct differences in shallow marsh and sedge meadow, but shallow marsh tended to be dominated by cattail spp., lake sedge, some blue joint grass, *Epilobium* spp., *Sagittaria* spp., *Bidens* spp., *Rumex* spp., *Scirpus* spp. (wool grass, river bulrush, and softstem bulrush), smartweed spp., bur reed, and sweet flag.

Wetland Shrub-Scrub

These shrub-carr habitats were dominated by red osier dogwood, other dogwood spp., willow spp., alder spp., bog birch, tamarack, green ash, poison sumac, and some aspen. The herbaceous community and hydrology was similar to that of wet prairie, and as a result fens occurred in this shrub scrub habitat.

Wetland Forest

Dominant trees in this habitat type included tamarack (mostly), green ash, swamp white oak, red maple, elm spp., and some bur oak. Mid-canopy trees and shrubs included those mentioned previously, dogwood spp., bog birch, poison sumac, alder spp., and willow spp. The herbaceous layer was dominated by moss spp., *Carex* spp., grass spp., wild raspberry, fern spp., *Impatiens* spp., and nettle spp. Little, if any, surface water was present, but soil was very moist.

Upland Prairie

Only four survey locations were located in upland prairie (old agriculture fields). These points were dominated by monotypic cool season grass stands consisting of mainly smooth brome, quack grass, and Kentucky bluegrass. Goldenrod spp. and common mullein were the only common forbs found.

Upland Savanna

Upland savanna was similar to upland prairie, the only difference being that these sites were invaded by small red cedar and white pine, thus creating an old field savanna. This savanna is not the goal of management and restoration efforts – the goal is true oak savanna. These old field savannas did contain some good native plant species (in a limited amount) not found on upland prairie sites, such as big bluestem, little bluestem,

whorled, common, and sand milkweed, *Carex* spp., wild raspberry, aster spp., multiflora rose, western ragweed, bush clover, needle grass, *Cyperus* spp., horsemint, blazing star, and butterfly milkweed.

Upland Forest

All of the upland forest on the Refuge was historically oak savanna, dominated by white, black, and bur oak. Now, it is a closed canopy forest with many tree species that are not fire tolerant. Many remnant savanna trees exist in these forests, obviously open grown, with broad, spreading, drooping crowns. Dominant tree species were white oak, black oak, bur oak, black cherry, red cedar, elm spp., northern red oak, shagbark hickory, sugar maple, and some green ash. Mid-canopy trees and shrubs consisted of those dominant trees mentioned previously, plus mulberry, grape spp, winterberry, and dogwood spp. The herbaceous layer was dominated by huckleberry spp., wild raspberry, garlic mustard (not good), avans, nettle spp., grass spp., and burdock.

Open Water – Deep Marsh

This habitat type was not officially sampled with the methods used in the habitat types above. However, casual observations from open water/deep marsh wetlands on the Refuge are recorded here. Wild rice and variety of submersed aquatic vegetation (SAV) was present on Refuge open water wetlands. SAV consisted of water lilies, *Potamogetan* spp., coontail, wild celery, and a variety of others not identified.

Wildlife Surveys

The matrix of the many wetland and upland habitat types present provides excellent habitat for both wetland and upland associated wildlife, such as ducks, greater sandhill cranes, herons, rails, songbirds, deer, turkey, and bobwhite quail. Approximately 60 plus greater sandhill cranes used the Refuge during the summer, but more than 300 cranes used the Refuge as a staging area during most days of fall migration. Comprehensive plant, bird, fish, amphibian, reptile, or mammal lists need to be developed. These baseline surveys will provide good insight into the effects of habitat management and restoration efforts on wildlife.

Waterbird Surveys

Waterbird surveys were performed on 9 transects established either on or within 1.5 miles of the Refuge boundary during the spring. Survey data from all 9 transects was summed in order to get the data shown below. No corrections for disturbance or surveyor error were performed. Surveys performed on 4/7, 4/15, and 4/27 had a total number of five, three, and five transects surveyed respectively, and thus do not include all transects. Surveys were performed via boat and walking, except those mentioned above, which were performed only by walking.

A total of 29 waterbird species were documented on the Refuge during these surveys. Canada geese, greater sandhill crane, mallard, blue-winged teal, green-winged teal, northern shoveler, wood duck, and common merganser make up the majority of individuals documented on the Refuge. The table below shows a summary of species and groups documented on the Refuge. The "Geese" category below does include 100 white-fronted geese and two snow geese.

SUMMARY OF SPRING 2004 WATERBIRD SURVEYS AT FOX RIVER NWR											
DATE	CRANES	GEESE	DABLERS	DIVERS	COOT	GB HERON	RB GULL	F TERN	B TERN	OTHER	TOTAL
3/25/2004	163	4584	1033	50	0	0	14	0	0	0	5844
4/2/2004	292	621	643	76	50	0	13	0	0	1	1696
4/7/2004	299	2272	85	4	0	0	0	0	0	3	2663
4/15/2004	222	1665	89	0	0	0	0	0	0	0	1976
4/27/2004	119	5	80	0	0	1	0	0	0	4	209
5/11/2004	121	14	220	0	0	14	10	4	0	3	386
5/26/2004	39	4	121	7	0	2	2	10	10	0	195
6/18/2004	20	0	28	0	0	7	0	0	7	0	62
TOTALS:	1275	9165	2299	137	50	24	39	14	17	11	13031

Before the two spring flooding events, the refuge biologist documented seven active sandhill crane nests (two eggs each) and five active mallard nests.

Whooping crane 14-02 (female) from the eastern migratory flock re-introduction project was either on the Refuge or within 1.5 miles of the Refuge boundary from 6/30 – 8/3. She was only known to actually be on the Refuge from 6/30 – 7/1; during weekly and sometimes bi-weekly radio tracking checks between 7/2 and 8/3, she was located each time 1 to 1.5 miles north of the Refuge boundary in marsh along the Fox River. However, it is possible that she moved to the Refuge on some days, but just wasn't on the Refuge during the tracking check. She then moved to Dates Mill Pond 2.75 miles southeast of the Refuge until 8/18 and then to the northwest corner of Puckaway Lake approximately 12 miles east of the Refuge until she started fall migration. She was the first Whooping Crane from the eastern migratory flock to reach the wintering grounds near Chassahowitzka NWR, Florida.

Rail and Bittern Surveys

Thirteen of the 56 wet prairie-emergent marsh points were surveyed for rails and bitterns between 5/5 and 6/4 using standardized marsh bird monitoring protocol, namely tape playbacks of vocalizations. Three visits to each point is recommended; however, the flooding hampered the survey efforts and only allowed for all 13 points to be surveyed during the first visit and ten of the 13 points to be visited the second visit. No third visit was even started. The table below shows the species documented and number of individuals detected per point. In addition to the species documented below, vocalizations of least bitterns and king rails were also played but with no responses. In all, very few rails and bitterns were documented on the Refuge, likely a result of the deep flooding of many areas during the second visit. Areas with shallow surface water tended to hold more rails and bitterns than areas with deep water or no surface water. Most of the points that are currently drained by the ditch system did not have any rails or bitterns.

Yellow rails are state threatened and on Region 3's species of conservation concern list; thus, documenting this species on the Refuge is wonderful and further management and restoration efforts should take into account the life history needs of this species. Only one yellow rail was documented on the rail survey, but two others were heard on the Refuge; all were found in *Carex lasiocarpa* with 1-3" of surface water.

Species	Individuals per point (n=23)
Sora	0.57
American Bittern	0.17
Virginia Rail	0.13
Yellow Rail	0.04

Bird Point Count Surveys

Six habitat types were surveyed at the 102 survey points described above during summer and fall 2003 and spring 2004. Only data from the summer of 2003 has been entered and analyzed in 2004 due to time constraints. A summary of the overall species richness on the Refuge and among habitat types, as well as community and species relative abundance among habitat types follows. Each survey point was placed at least 100 meters apart and 50 meters from the edge of the respective habitat type. Point counts were performed for 10 minutes during the first 4 hours of sunlight with observations split by 0-3, 3-5, and 5-10 minute categories. Birds were recorded in less than 50 meter, 50-100 meter, and greater than 100 meter distance bands. Unless stated otherwise, all results given below pertaining to bird use *by habitat type* only used data from the less than 50 meters distance band to insure habitat type accuracy and results pertaining to the whole Refuge used all data. A one-way analysis of variance (ANOVA) statistical test with a Tukey mean separation procedure was used with all data concerning habitat types to determine if means were significantly different. Means in the following tables with the same letter are not significantly different.

Refuge Species Richness

Ninety-two bird species were documented on the Refuge during summer 2003 bird point count surveys. The most common species documented on the Refuge are listed below; however, these data are directly related to the amount of these species' preferred habitat on the Refuge. For example, nearly 75% of the Refuge is wet prairie-emergent marsh, thus you expect the most common species on the Refuge to be those species that prefer that habitat type. Twenty-two species are on the Regional conservation priority list. Of those, notable rare species documented included American bittern, Bald eagle, Henslow's sparrow, bobolink, sedge wren, Bell's vireo, yellow-headed blackbird, and yellow rail.

10 Most Common Bird Species Documented on the Refuge during the Summer of 2003		
Species	Number	Percent of Total
Greater sandhill crane	472	10.94
Swamp sparrow	395	9.15
Common yellowthroat	323	7.49
Red-winged blackbird	318	7.37
Sedge wren	219	5.07
Song sparrow	204	4.72
American goldfinch	192	4.45
Tree swallow	141	3.26
Canada goose	140	3.25
Mourning Dove	131	3.04

Species Richness Among Habitat Types

The following data show the number of bird species documented on point counts in each habitat type (see the vegetation and habitat surveys section for meaning of abbreviations):

Habitat Type	Species Richness
WF	46
WPEM	44
WSS	44
US	41
UF	38
UP	12

All habitat types except upland prairie had high species richness. The monotypic herbaceous layer with no vertical structure likely contributed to the low number of species found here. In addition, only four points were surveyed in this habitat type.

Mean Number of Species and Individuals documented per Point on the entire Refuge and by Habitat Type

On average, 8.42 species and 17.17 individuals were documented per point on the Refuge using only data from less than 50 meters (all habitat types combined; mean of all 102 points surveyed). The table below shows that WF, UF, and WSS had the largest number of species and individuals recorded per point. This is not surprising, as typically the more structurally complex the habitat is (more vertical structure), the more diverse the bird community. Although WPEM had only 5.7 species documented per point, this does not detract from the importance of this habitat type to those species that prefer this habitat (see next section).

Mean number of species and individuals recorded per point in each habitat type during Summer 2003. Means within columns with the same letter are not significantly different.		
Habitat Type	Mean Species Per Point	Mean Ind. Per Point
WF	13.90A	23.50A
UF	13.27A	21.36AB
WSS	12.78A	23.11A
US	10.18AB	19.46AB
WPEM	5.70B	14.30AB
UP	5.50B	11.00B

Relative Abundance of each Species by Habitat Type

The mean number of individuals of each species recorded per point in each habitat type is presented in the table below. Species with less than 15 total documentations less than 50 meters were not included in the table, unless the species was a species of conservation concern with more than five documentations.

These data reflect habitat preferences of given species and should be used as a baseline to determine if management and restoration actions should be done and the effects of those actions on given species. The five most common species in each habitat type are in bold.

Mean number of individuals of a given species recorded per point (species relative abundance) in each habitat type during Summer 2003. Means within rows with the same letter are not significantly different.

Species	Habitat type					
	UF	UP	US	WF	WPEM	WSS
American crow	0.18A	0A	0.09A	0A	0A	0.30A
American goldfinch	0.73AB	0A	1.55AB	1.80AB	0.80AB	2.22B
American robin	1A	0A	0.36A	0.8A	0.07A	0.8A
Barn swallow	0A	0A	0.45A	0A	0.26A	0A
Black-capped chickadee	0.73AB	0B	0B	1.3A	0.07B	0.5B
Blue-gray gnatcatcher	0.45AB	0B	0.09B	0.9A	0B	0.33AB
Brown-headed cowbird	0.36A	0A	0.54A	0.8A	0.17A	0.55A
Blue jay	0.91A	0C	0C	0.7AB	0.04BC	0.11BC
Bobolink	0B	1.5A	0.27B	0B	0.11B	0.11B
Blue-winged warbler	0.09AB	0B	0B	0.4A	0B	0.11AB
Clay-colored sparrow	0B	0B	0.55A	0B	0B	0B
Cedar waxwing	0.36B	0B	0.36B	0.4B	0.12B	1.8A
Chipping sparrow	0.36B	0.25B	1.27A	0.2B	0.02B	0.33B
Common yellowthroat	1B	0.75B	0.91B	2.7A	1.6AB	2.22AB
Eastern kingbird	0B	0.5AB	1.25A	0.2B	0.18B	0.44AB
Eastern wood-pewee	0.81A	0B	0.18B	0.1B	0.04B	0.11B
Field sparrow	0B	0.5B	2.36A	0.1B	0.01B	0.22B
Great-crested flycatcher	1.09A	0B	0.09B	0.2B	0.07B	0.11B
Gray catbird	0.64AB	0B	0.18B	0.9A	0.11B	0.67AB
Henslow's sparrow	0B	1A	1.54A	0B	0B	0B
House wren	0.73A	0A	0A	0.8A	0.09A	0.67A
Lincoln's sparrow	0.73A	0B	0B	0B	0B	0.22AB
Mourning dove	1.18A	0B	0.41AB	1.2A	0.12B	0.33AB
Northern cardinal	0.73A	0B	0.09AB	0.6AB	0B	0.7A
Northern harrier	0A	0A	0.09A	0.1A	0.18A	0A
Ovenbird	0.73A	0B	0B	0.2B	0B	0.11B
Rose-breasted grosbeak	1.18A	0C	0.18C	1.1AB	0.07C	0.33BC
Red-eyed vireo	0.73A	0B	0B	0.2B	0B	0.11B
Red-winged blackbird	0A	0.75A	0.18A	0.1A	1.79A	0.56A
Savannah sparrow	0B	0B	0.64A	0B	0B	0B
Sandhill crane	0A	0A	0.36A	0A	0.72A	0.4A
Scarlet tanager	0.45A	0B	0B	0.1AB	0B	0.11AB
Sedge wren	0B	0B	0B	0B	2.03A	0B
Song sparrow	0.64AB	0.75AB	2A	1.5AB	0.51B	1.5AB
Swamp sparrow	0B	0B	0.08B	0.7B	3A	1.11AB
Tree swallow	0B	4A	0.73B	0.4B	1.07AB	0B
Veery	0.27AB	0B	0B	0.8A	0B	0.4AB
White-breasted nuthatch	1.45A	0B	0.18B	0.3B	0.04B	0.3B
Yellow-throated vireo	0.82A	0B	0.27AB	0.5AB	0.03B	0.11B
Yellow warbler	0.27B	0B	0.27B	0.5B	0.16B	1.9A

Amphibian Surveys

Twenty-five wet prairie-emergent marsh points were surveyed for frogs and toads between 4/7 and 4/15. Protocol involved visiting each point for ten minutes and recording species present by listening to calls. The numbers of each species were documented if individuals could be distinguished, otherwise a “partial or full chorus” designation was written down if calls were overlapping or constant, respectively. Because surveys were only conducted in early April, species that typically vocalize later in the spring and summer were not detected. For example, the biologist documented gray tree frogs, cricket frogs, and green frogs on the Refuge later in the spring (not part of an official amphibian survey though). The table below shows the species documented and number of points where each species was documented.

Species	Number of points where documented (25 possible)
Chorus Frog	15
Spring Peeper	15
Leopard Frog	11
Wood Frog	1
American Toad	1

Red-headed Woodpecker Nesting Survey

On June 30, the biologist from Necedah NWR assisted the Refuge biologist in a survey for breeding red-headed woodpeckers. They are a species of conservation concern in Region 3 and the state of Wisconsin, thus monitoring their status on the Refuge is imperative. Moreover, with oak savanna restoration ongoing on the Refuge, it is important to document the response of this species to the restoration actions, i.e., selective thinning.

Two active nest cavities were located on the Refuge, both in an oak savanna restoration unit where trees had just been thinned three months earlier. Six adult birds were documented in oak savanna habitat around nest cavities located in large (>15 inch DBH) snags. In 2003, no nest cavities or red-headed woodpeckers were documented on the Refuge, thus the birds seem to be responding to the restoration actions.

Crane Surveys

In addition to data from the waterbird and bird point count surveys conducted on the Refuge during spring, summer, and fall, the Annual Sandhill Crane Count, sponsored by the International Crane Foundation, took place on April 17th all across Wisconsin and adjoining states. In Wisconsin alone, 12,779 sandhill cranes were documented (2,197 pairs) by 2,647 observers (4.83 cranes per observer). Marquette County, where 1,091 sandhill cranes (203 pairs) were recorded with 169 observers (6.46 cranes and 1.20 pairs per observer), contained the 2nd highest county population and the highest number of breeding pairs reported in Wisconsin. However, the county ranked 11th (of the 72

Wisconsin counties) in the state for the number of cranes documented per observer and 13th in the number of pairs documented per observer. Thus, it is safe to say Fox River NWR and Marquette County play an important role in the life history needs of Wisconsin sandhill cranes. Two survey sites (numbers 18 & 19), each 2 square miles, were located on Fox River Refuge and adjoining private property. Results for the past eleven years are shown below.

Totals:

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
Pairs	5	2	3	9	6	5	8	2	9	3	1
Total #	12	31	7	21	22	27	31	40	22	12	14

Fish Surveys

A formal baseline fish inventory was conducted on July 12 and 13 with the assistance of the La Crosse fisheries office. Long Lake, the Fox River, Muir Creek, and the Oxbow Lake were sampled with ½" trap, mini-fyke, and gill nets, as well as electro fishing techniques. In all, 26 species of fish were documented on the Refuge or in the Fox River adjacent to the Refuge. Very few carp were documented and the Refuge seems to support a very diverse and healthy population of fish in all habitat types sampled. A report detailing lengths and weights of fish caught and catch per unit effort is being prepared by the La Crosse fisheries Office. A summary of the species composition in each water body follows.

Long Lake

<u>SPECIES</u>	<u>TOTAL NUMBER</u>	<u>AVER. WT. (g)</u>	<u>AVER. Len. (mm)</u>	<u>RANGE Len. (mm)</u>
Bluegill	66	63	146	62-205
Black Crappie	8	245	249	190-305
Pumpkinseed Sunfish	6	54	130	69-176
Largemouth Bass	6	380	259	48-430
Black Bullhead	5	165	208	183-230
Northern Pike	2	1,585	654	654
Johnny Darter	2	1	35	34-35
Carp	1	3,100	608	-----
Yellow Bullhead	1	360	265	-----
Golden Shiner	1	4	96	-----
Total	98			

SPECIES	Gill Net (fish/hr)	L.M. Fyke (fish/hr)	Minifyke (fish/hr)
Bluegill	0.16	3.07	0.16
Black Crappie	0.08	0.27	----
Pumpkinseed Sunfish	0.05	0.22	----
Largemouth Bass	0.13	----	0.05
Black Bullhead	0.13	----	----
Northern Pike	0.05	----	----
Johnny Darter	----	----	0.10
Carp	0.03	----	----
Yellow Bullhead	----	0.05	----
Golden Shiner	----	0.05	----
Total	0.64	3.66	0.31

Bluegill is the dominant species in Long Lake, and the majority was collected in the large mesh fyke net, which had the highest catch per unit effort (CPUE) at 3.07 fish/hr. The size structure was diverse with a good percentage (47%) of the bluegill at or above quality size of 150 mm (6"). The bluegill fishery would provide angling opportunities at Long Lake, and with the occasional largemouth bass and northern pike, this would make a great site for a recreational fishing pier. A recommended lowered bag limit would help sustain this limited fishery.

Fox River and Backwaters

SPECIES	TOTAL NUMBER	AVER. WT. (g)	AVER. Len. (mm)	RANGE Len. (mm)
Bluegill	44	73	144	115-257
Yellow Perch	15	46	150	120-181
Largemouth Bass	11	456	236	43-535
Pumpkinseed Sunfish	7	46	125	80-165
Black Crappie	5	132	188	115-257
Carp	5	2,470	577	510-640
Golden Shiner	5			
Spotfin Shiner	4			
Channel Catfish	3	1,900	575	515-690
Yellow Bullhead	3	395	280	240-315
Bluntnose Minnow	3			
Smallmouth Bass	2	822	306	123-490
Bowfin	2	660	397	387-406
Rock Bass	1	60	130	
Freshwater Drum	1	390	325	
White Sucker	1	750	405	
Tadpole Madtom	1	15	75	
Total	113			

A total of 17 species representing seven families were collected from the Fox River. Centrachids dominated the catch; bluegill, largemouth bass, pumpkinseed sunfish and black crappie totalled 59% of the catch. Channel catfish, yellow bullhead and tadpole matdom represented the catfish family.

<u>SPECIES</u>	<u>Elec. Fish (fish/hr)</u>	<u>L.M. Fyke (fish/hr)</u>	<u>Minifyke (fish/hr)</u>
Bluegill	61.19	0.03	0.10
Yellow Perch	22.39	----	----
Largemouth Bass	16.42	----	----
Pumpkinseed Sunfish	8.96	----	0.05
Black Crappie	4.48	0.03	0.05
Carp	7.46	----	----
Golden Shiner	7.46	----	----
Spotfin Shiner	5.97	----	----
Channel Catfish	4.49	----	----
Yellow Bullhead	1.49	0.05	----
Bluntnose Minnow	4.48	----	----
Smallmouth Bass	2.98	----	----
Bowfin	----	0.05	----
Rock Bass	----	0.03	----
Freshwater Drum	1.49	----	----
White Sucker	1.49	----	----
Tadpole Matdom	----	0.03	----
Total	150.75	0.20	0.20

The above table illustrates the much higher CPUE for electrofishing (150 fish/hr) as compared to the large mesh fyke net and the minifyke net (0.20 fish/hr). Electrofishing proved to be an effective sampling method on this small river and shallow backwaters. The fyke nets were set in backwaters with extremely dense stands of aquatic vegetation which likely contributed to the low catch rate.

Muir Creek

<u>SPECIES</u>	<u>TOTAL NUMBER</u>	<u>CPUE (Fish/hr)</u>
Bluntnose Minnow	73	372.45
Fathead Minnow	20	102.04
Largemouth Bass	9	45.92
Central Mudminnow	6	30.61
Blackside Darter	6	30.61
Iowa Darter	4	20.41
Bluegill	4	20.41
Green Sunfish	2	10.20

Brook Stickleback	2	10.20
Bowfin	1	5.10
Pumpkinseed Sunfish	1	5.10
Johnny Darter	1	5.10
Golden Shiner	1	5.10
S. Redbelly Dace	1	5.10
Total	131	668.37

Muir Creek was electrofished for 707 seconds at two sites resulting in a catch of 131 individuals. A total of 14 species representing 6 families were collected. Muir Creek is a low volume creek (5-10 CFS) that flows out of Ennis (Muir) Lake. Several minnow species were present, as were darter, stickleback, mudminnow, bowfin and small centrarchids. Only three fish collected measured over 100 mm (4"), and all three were largemouth bass. This survey gives us a good baseline to evaluate future work.



Refuge biologist Shawn Papon holding a 21 inch, 5.5 lb. Largemouth Bass caught via electro fishing the Fox River on the northwest side of the Refuge (7/13/2004).

2

Habitat Restoration

Virtually all the work required at the Refuge is some kind of habitat restoration. After completion of wetland and upland restoration activities, Fox River Refuge will provide wonderful examples of habitats present before European settlement in 1850 and will be managed primarily by periodic prescribed burning, mowing, and monitoring/evaluation. General Land Office (GLO) records were found for the area and old aerial photos were collected that provide a glimpse into what the area used to look like. For example, a GLO surveyor in December 1832 described seeing what we call today oak savanna along a section line that runs through the Refuge: “land rolling, second rate, thinly timbered with oak.” In the wetlands the surveyor did not give much detail, only statements such as “land level and marshy, no trees.” However, the fact that the surveyors did not see any trees in the marsh is very notable as today, large blocks of tamarack, aspen, green ash, willow, and a variety of shrubs such as red osier dogwood exist in the former treeless marsh. This observation tells us that fire was likely present to keep the woody vegetation out of the marsh (most woody vegetation that can tolerate wet conditions is not fire tolerant). Other sources of information include old aerial photos from the 1930s – 1950s. These photos depict the current day Fox River NWR with oak savanna still present on the uplands (very little closed canopy forest as is seen today) and a nearly treeless marsh.

2a. Wetland Restoration

In 2004, funding was received and/or obligated for a 150 – 350 acre wetland restoration project on the Refuge from (a) the NAWCA Small Grants Program (\$17,500), (b) Ducks Unlimited (\$12,500 as a match for the NAWCA grant), (c) Wisconsin Waterfowl Association (\$10,000), and the FWS’s Cooperative Conservation Initiative (CCI; two grants of \$20,000 and \$2,500). Planning efforts were initiated to determine specific details regarding how, when, and where the restoration actions will take place. Elevation surveys were conducted throughout the project area in order to determine water flow patterns and post-construction water depths, and potential impacts to the private 15-acre inholding through which the largest ditch that needs to be filled passes. In addition, the biologist has initiated talks with this landowner and the possibilities for their cooperation (FWS habitat easement). The proposed project would raise water levels in this private ditch; at the end of the year, a memo was submitted to the solicitor to determine if we need to get a flood easement from this landowner in order to proceed with the project. In addition, a package was submitted to the DNR to determine if we need any permits to plug the large ditches west of the oak island (Muir creek might be navigable). All the ditches north and east of the oak island do not require any permits as the water flowing

through them is not navigable and as a result we are covered by a MOU between the FWS and DNR to fill existing ditches. Two potential contractors (LMS construction from Portage and Navis from Waupun) also visited the project site to discuss logistics and to familiarize themselves with the area for later bidding. Refuge staff and contractors have noted the need for soil surveys in a variety of sites before plans are prepared. The wetland restoration will involve filling and/or plugging ditches (via earthen and possibly sheet piling plugs) that drain approximately 150 - 350 acres of Refuge wetlands starting August 2005 and mowing shrubs that have invaded the fen communities in these wetlands starting January 2005.

In late February, Refuge staff completed the first part of this restoration project by re-establishing the historic stream course of "Eggleston Creek," a small spring fed stream that enters the Refuge along the northeast side of the Refuge. The stream was coursing down an old agricultural ditch (main ditch) completely across the Refuge and as a result the stream's benefits to wildlife species were greatly reduced. Refuge staff plugged the main ditch at the point where the stream entered the ditch and dug a pilot channel in the direction of historic stream flow to aid in restoring stream flow direction. After this restoration, the stream's year-round spring flow now progresses across a sedge meadow as shallow sheet flow (1-6 inches deep) and has restored 70 acres of wetlands. During the spring of 2004, rail surveys documented yellow, Virginia, and sora rails using this restored site. During the spring of 2003, no rails were documented in this area. Yellow rails are a species of conservation concern and are considered threatened in the state of Wisconsin. In addition to the above activities, one culvert was placed on Eggleston creek where our access road to the NE corner of the Refuge crosses the creek and another culvert was placed just to the north of the aforementioned culvert.



Pilot channel used to re-establish historic course of Eggleston Creek and restore 70 acres of Refuge wetlands (5/20/04).

2b. Upland Restoration

Dry Prairie Restoration

According to 1832 General Land Office surveys, uplands on the Refuge were oak savanna and dry prairie. A \$20,000 grant was received from the FWS CCI program to begin restoration of dry prairie habitats on the Refuge. The 2004 goal was to prepare and seed 85 acres of old agricultural fields dominated by quack grass and smooth brome to native dry prairie (Overlook, East Muir, and Rataczak units).

On March 3rd, the Refuge biologist led a work day to cut and pile invasive red cedar and white pine from the Overlook prairie restoration unit. Twenty-six wildlife professionals from three Natural Resource Conservation Service offices, four Fish and Wildlife Service offices, four Department of Natural Resources offices, one Nature Conservancy office, and one Wisconsin Waterfowl Association office, as well as four teachers and 32 student volunteers from two charter schools, and three individual volunteers helped with the project. These volunteers donated more than 260 hours of labor worth more than \$3,900 to Fox River NWR on the work day. The day was very successful as all the red cedar and white pine on the Overlook unit was cut and piled.

A May 5th prescribed burn of the Overlook unit burned the majority of the litter and nearly all the brush piles. The unit was sprayed on June 30th after a variety of contractor problems (see section 6a) with two quarts of roundup and one pint of 2,4-D per acre in order to kill the monotypic stand of quack grass and smooth brome. The East Muir and Rataczak units were mowed on Sept. 1st to stimulate green up of the cool season grasses, and then sprayed on Sept. 20th similar to that explained above, and then burned in October. The Overlook unit was sprayed again on September 20 with the same chemicals in order to get a good kill on the vegetation before prairie planting.

Between June and October, native prairie grass and forb seed was collected and cleaned from Waterfowl Production Areas (namely Shoenburg and New Chester WPA) and private land near the Refuge, as well as Goose Pond Sanctuary, with the aid of many volunteers from Beaver Dam and River Crossing charter schools. Goose Pond Sanctuary, Leopold Wetland Management District, and the Madison Private Lands Office aided with the seed collection and cleaning efforts. Five species of grass and 32 species of forbs were collected, valued at more than \$12,000 if bought from local vendors. Combining seed collected and bought, nine species of grass and 42 species of forbs comprised the seed mix of 2.6 lbs./acre of grass and 1.75 lbs./acre of forbs. On November 10th and 11th, 45 acres of the Overlook unit was planted with a no-till Tye drill set at a planting depth of just 1/4". Needle grass, prairie smoke, thimbleweed, and eastern prickly-pear cactus were planted by hand on the top of the hill north and east of the section corner in the Overlook unit. The remaining 45 acres in the East Muir and Rataczak units are ready to be planted the spring of 2005 after a spring spraying.



An employee from the DNR works hard cutting white pine and red cedar trees on the Overlook unit (3/3/2004).



Tye no-till drill used to plant the prairie grasses and forbs (11/10/2004).

Oak Savanna Restoration

Nearly all the historic oak savanna on the Refuge has changed from oak savanna to closed canopy forest due to lack of fire. Large, open grown oaks are present in these forests, but are being starved for sunlight due to encroachment by fire intolerant trees and thick stands of young black oaks. Fire intolerant trees such as red cedar, black cherry, green ash, and elm have colonized these oak savanna habitats and contributed to the closed canopy.

Oak savanna restoration in 2004 involved thinning of 45 acres of these closed canopy forests in the Cedar and Bur Oak units via SK Forest Products, Inc. of Montello, WI. The company cut fire intolerant trees mentioned above and thinned smaller oaks and hickories. All of the oaks and hickories above 16 inches DBH were not cut. The thinning opened up the forest and created an oak savanna, at least the tree portion of the savanna. For example, in the Cedar unit, more than 80 cord of red cedar was cut from less than 15 acres. Much slash remained on the ground as a result of the logging. In order to begin the process of restoring the grassland portion of the savanna, Refuge staff rented a chipper in July and chipped two days in the Bur Oak unit in an effort to reduce slash near Highway F. The chips were thrown into the dump truck and hauled to the Montello mulch site to reduce chances of invasion by invasive plant species and to enhance chances for a successful prescribed burn next year (piles of chips don't burn very well). The chipper is a great way to remove the slash, but requires extensive labor and funds to accomplish the goal. As a result, Refuge staff has planned to remove the slash via prescribed fire and public firewood harvesting. Chipping and hauling of the chips will be used as a last resort. The need for prairie grass and forb seeding will be evaluated after several successful prescribed fires have removed much of the slash.

It will likely take several years to restore all aspects of the historic oak savannas on the Refuge. As mentioned above, foremost on the restoration task list is removal of the large quantities of slash. In addition, stumps need to be cut lower to the ground and treated with herbicide to prevent re-sprouting. Lack of trained personnel for applying the herbicides during logging severely restricted the number of stumps that could be treated shortly after cutting. Aspen has re-sprouted in the Bur Oak unit and will need to be controlled in the future via burning, mowing, or chemicals. The remaining 45 acres of oak savanna restoration will commence in January 2005.



Overlooking Long Lake, oak savanna restoration on the Cedar unit reveals open grown white oaks previously concealed by fire intolerant trees such as red cedar and black cherry (3/15/2004).

3

Habitat Management

A habitat, fish, and wildlife management plan needs to be written to include monitoring, restoration, and management work needed at the Refuge in future years.

3a. Water Level Management

As mentioned in the wetland restoration section (2a), hydrological restoration in Refuge wetlands will be accomplished via ditch filling or plugging and stream course re-establishment. No water control structures that would require intensive management are needed on the Refuge in order to manage Refuge sedge meadow/shallow marsh habitats similar to historic conditions. The majority of the Refuge has significant groundwater inputs in numerous locations and surface water inputs from spring fed streams, precipitation, and a natural flood regime from the Fox River. As a result, the majority of the Refuge is very wet (see section 1a for a more detailed discussion of water levels). Surface water depths ranged from 0-30 inches above the spongy peat layer and some areas even had floating vegetation (water depths > 30 inches). Vegetation composition and structure varied along this water level gradient. Any wetland restoration that takes place will be designed so that only passive water level management will be needed and hydrological conditions will be restored as closely as possible to pre-European settlement conditions. For instance, after ditches are plugged or filled, periodic visits should be done to make sure that plugs are holding and ditches remain filled. Stream courses that were restored should be checked to make sure they are still coursing down the restored paths.

3b. Moist Soil Management

No intensive moist-soil management occurs on the Refuge because there is no need for infrastructure in the naturally functioning parts of this wetland. The 400 acres of wetland impacted by past ditching efforts will be restored by filling and plugging of ditches (no water control structures). Productive moist-soil areas naturally occur in various locations on the Refuge. The largest moist-soil wetland is Crane Pool, a 10-acre wetland on the southwest side of the Refuge. This wetland is directly connected to the Fox River and as a result, water levels fluctuate with river height. In 2003, high spring flows in the river filled Crane Pool, and lower summer flows and evaporation drained it. This natural water regime created thick stands of *Biden spp.*, *Echinochloa spp.*, and *Polygonum spp.* Water levels never increased in the fall of 2003, but high river flows during spring 2004 made this wonderful food source readily available to dabbling ducks and geese on spring migration. Other pockets of moist-soil exist throughout Refuge wetlands, but in all they total less than another 10 acres.



More than 3,000 Canada geese were present at any given time during spring migration, utilizing flooded moist-soil and perennial wetland vegetation (4/7/2004).

Nearly all the other Refuge wetlands function as wet prairie, sedge meadow, or shallow emergent marsh where more stable water levels across the seasons and years creates ideal conditions for perennial plant species such as *Carex spp.* The moist-soil areas seem to lack this stable water, likely as a result of little groundwater inputs on these sites (unlike the majority of the Refuge). These sedge meadow/shallow marsh areas with native perennial vegetation and more stable water regimes are also heavily used by waterbirds, namely greater sandhill cranes, Canada geese, blue-winged teal, and mallards. In many cases, the birds “roto-till” the marsh, eating tubers, newly sprouted shoots, and seeds. Waterbird use of these areas tends to be higher in the spring when more habitat and food sources are made available due to higher river flows, snowmelt, and precipitation.

Although wild rice production is not considered “moist-soil,” it should be noted for its significance on the Refuge. Wild rice occurs on the Refuge in shallow, open water areas, such as the outlet to Long Lake, in most Refuge streams and ditches with water flow, in the old Fox River channel slough on the northwest side of the Refuge, and along the shoreline of oxbow lake and the active Fox River channel. It is estimated that approximately 20 acres of wild rice exist either on or adjacent to the Refuge. These sites with wild rice are extremely attractive to fall migrating waterfowl as concentrations of 500 plus mallards were noted in the outlet to Long Lake throughout the month of October and November. Blue-winged teal, wood ducks, and black ducks were also seen in sizeable numbers in the fall, utilizing these wild rice stands. Not only was the wild rice good for fall migration, dabbling ducks used stands of wild rice during the breeding season for brood rearing areas.



This sedge meadow/shallow marsh was covered with *Carex spp.* before heavy spring migration use by waterbirds. The birds have nearly ate everything, including tubers, newly sprouted shoots, and seeds (3/25/2004).

3c. Graze/Mow/Hay

On September 1st, Refuge staff mowed (with a rotary mower at 8 inches tall) the East Muir and Rataczak burn units in preparation for a late September herbicide spraying. These two burn units were to be sprayed at the same time the Overlook unit was sprayed in June, but wet weather did not allow equipment to pass over the fields to get the spray work done. In fact, a sprayer got stuck June 9th in the East Muir unit. Plan B involved this mowing to jumpstart growth of the quackgrass and brome grass, both cool season grasses, so later spraying would better kill this unwanted, invasive vegetation.

3e. Forest Management

See section 2b.

3f. Fire Management

Historically, fire was an integral part of the oak savanna and sedge meadow wetland habitats present on the Refuge. Fire greatly reduced the abundance of fire intolerant woody and herbaceous vegetation, thus effectively maintaining the savannas and marshes. General Land Office notes describe Refuge wetlands in 1832 as “wet marsh, no trees.” Due to fire suppression efforts after human settlement, frequency of fire greatly diminished. Open forests became closed forests, treeless marshes became dominated by lowland forests or shrubs on the higher elevations, and dry prairies were invaded by woody vegetation. In order to reduce this woody component and aid in the process of restoring native habitats, prescribed burns are needed for the entire Refuge. Burn units were identified for the entire Refuge and a burn schedule discussed so that each unit is burned on a recurring 3-4 year schedule; the Horicon complex prescribed fire specialist is currently updating the fire management plan for Fox River NWR.

On May 5th, 55 acres of the Overlook unit was burned along with 11 cedar and white pine brush piles in the middle of the unit. These piles were produced on a cedar cutting day that the Refuge sponsored as an initial step in prairie restoration of the Overlook unit. This burn accomplished the objectives of removing a thick mat of litter and >90% of the biomass in the brush piles so that a herbicide spraying could take place shortly after on new growth from a monotypic stand of unwanted quack grass. On October 21st, burns of 13 and 19 acres on the East Muir and Rataczak burn units, respectively, were performed on dead vegetation from a previous herbicide spraying, for similar reasons as those for the Overlook unit. The acres burned above are included in the Horicon NWR burn totals.

3g. Pest Plant Control

The Refuge is very unique in that the abundance of exotic and invasive plants is extremely low as compared to other sites. Only small, scattered patches of exotic plants occur within a sea of native plants. Most of the quack grass and brome dominated fields were sprayed in 2004 as part of the prairie restoration project. Monitoring should be done on areas of (a) reed canary grass along the river bank and north end of the Refuge (disturbed areas), (b) phragmites (along old ditches), (c) purple loosestrife (small patch on NW corner of Refuge but other larger patches exist outside the Refuge boundary – NW of the Refuge and at the junctions of highways F and O), and (d) garlic mustard and aspen in oak savanna restoration units. All of the above species need control measures, the most important being purple loosestrife. The areas of reed canary grass are spreading and taking over native sedge meadow; Refuge staff need to identify the best control techniques for this exotic species and control it in the worst areas before the problem gets worse.



The largest cedar brush pile burning on the Overlook burn unit (5/5/2004).



FWS staff lighting a backing fire on the East Muir burn unit (10/21/2004).

4

Fish and Wildlife Management

4d. Nest Structures

In April, the Friends of Horicon NWR, donated five homemade wood duck boxes constructed of old Freon tanks. Two of these boxes were placed along Muir Creek on the east side of the Refuge, one on the north side of Oxbow Lake, and two others on the south bank of a slough on the northwest side of the Refuge. The two along Muir Creek were used by wood ducks in 2004; the other three were not checked as of the date of this writing.



Wood duck box along Muir Creek (4/7/2004).

4e. Pest, Predator, and Exotic Animal Control

Carp were seen in large numbers in Long Lake and the Fox River during the summer and have made areas of the lake very muddy, thus reducing production by submersed aquatic vegetation. Although large numbers were noticed casually, a formal fish survey conducted in July captured only 6 carp total during netting and electro-fishing samples.

5

Coordination Activities

5a. Interagency Coordination

The Refuge biologist has continued efforts to coordinate, plan, and implement wetland, dry prairie, and oak savanna habitat restoration efforts with the assistance and expertise of staff from Horicon and Necedah NWR's, Leopold WMD, Madison PLO, Green Bay ES office, numerous Wisconsin Department of Natural Resources (WDNR) offices, and the Natural Resources Conservation Service (NRCS). Horicon NWR staff is involved in all aspects of Refuge management and restoration as Fox River is a satellite of Horicon. The Necedah NWR biologist visited the Refuge on two occasions; one to provide advice on the oak savanna restoration project and the other to aid in performing a red-headed woodpecker survey in newly thinned oak savanna restoration units. Leopold WMD and the Madison PLO were more than helpful in the preparation of a fall prairie seeding on the Refuge. Many of their staff devoted time, expertise, and equipment to aid the biologist in seed collection and cleaning efforts, as well as site preparation and planting. WDNR staff members have visited the Refuge to determine applicable water regulations and provide advice for prairie, oak savanna, and wetland restoration and management. All of the above agencies and offices contributed much staff time to a red cedar cutting day held at the Refuge on March 3 to jumpstart prairie restoration efforts. Specifically, 24 wildlife professionals from three NRCS offices, four FWS offices, and four DNR offices contributed a days worth of labor to the Refuge during the cedar cutting day.

5d. Cooperating Association Activities

The Refuge biologist has also expanded cooperation with non-governmental organizations (NGO's) and volunteer groups, to include Ducks Unlimited (DU), Wisconsin Waterfowl Association (WWA), The Nature Conservancy (TNC), Friends of Horicon NWR, River Crossing and Beaver Dam charter schools, and numerous individual volunteers. In CY 2004, these NGO's and volunteers contributed 1,270 hours of labor to the Refuge, worth more than \$20,000. These non-federal dollars were used as a match to three challenge grants received from the FWS for restoration projects. DU and WWA strongly support the Refuge in wetland restoration efforts via planning and financial support. Staff from WWA visited the Refuge on five occasions to provide wetland restoration recommendations and aid in needed elevation surveys. In addition, WWA funded a flight over the Refuge to take needed aerial photos of the wetland restoration project area. River Crossing and Beaver Dam charter schools provided indispensable help with cedar cutting and piling, elevation surveys, prairie forb seed collection, and prairie planting efforts. All of the above NGO's and volunteers (except DU) contributed a days worth of time to the Red Cedar cutting day held at the Refuge on March 3.



Members of the River Crossing Charter School from Portage, WI, donated 658 hours of labor to the Refuge, primarily during prairie seed collection and removal of invasive red cedar (9/8/2004).

6

Resource Protection

6a. Law Enforcement

The Refuge contracted Grand River Cooperative to apply herbicide to a monotypic stand of quackgrass and smooth brome in an abandoned agricultural field on the Refuge in order to prepare the site for seeding of native prairie grasses and forbs. Fifty-five acres worth of chemical (2.5 quarts of roundup and 1 pint of 2,4-D Amine per acre) was mixed with 15 gallons of water per acre by the Coop on June 20 to spray a 55 acre field (Overlook unit). They sprayed 10 acres correctly and then became stuck in a soft spot. After the spray rig was pulled out by a local farmer from Glover Farms that same day, the Coop proceeded to dump the other 45 acres worth of chemical (25.75 gallon roundup and 6.45 gallon 2,4-D Amine) in a very localized area approximately ¼ mile to the southeast of the culvert across Muir creek. From a site visit it looked as if they opened a tank valve and let the chemical run onto the ground with the truck stationary. They then decided at some point to drive approximately 300 yards with the valve open.

Refuge staff never noticed the spill right after it occurred as we were only told that they were stuck and thus told them to come back and finish the job. On June 30, the Coop finished the job and sprayed another 35 acres correctly, thus “covering up” the spill site. Refuge staff became aware of the dumping incident on July 30 when the FWS received a bill for 55 acres of chemical but only 10 acres worth of application charges. After calling the Coop to discuss the bill, they admitted to dumping the chemical.

Refuge staff then filed a spill report with the Wisconsin Spill Hotline and the Federal Spill Hotline. The Wisconsin Department of Agriculture Trade and Consumer Protection (WDATCP) and the Madison FWS Law Enforcement Office responded to the spill. Soil samples were taken by WDATCP to confirm levels of chemicals spilled. Approximately 556 ppm of glyphosphate and 21 ppm of 2,4-D were documented on the surface at the main spill site and from 25-46 ppm glyphosphate along the path they drove with the tank valve open (no 2,4-D documented on this path). WDATCP recommended that the contaminated soil at the main spill site be excavated and transported to a landfill; a 10' X 20' X 2' pit was dug on August 12. Madison FWS Law Enforcement recommended the contaminated soil be placed on black plastic on the Refuge until a determination could be made as to whether it was to be considered hazardous waste. WDATCP and the FWS took composite samples of the excavated soil and both showed very low concentrations of 2,4-D, well below that considered to be hazardous waste. The Coop then transported the excavated soil to the Berlin, WI, landfill and brought in clean fill.

A spill case closure report from DATCP was sent to the Refuge on November 23. At the end of 2004, legal corrective actions were being pursued by Special Agent Ed Spoon of the Madison FWS Law Enforcement Office.



The 10 ft. X 20 ft. X 2 ft. pit dug to remove contaminated soil from the Refuge (8/12/2004).

6b. Permits and Economic Use Management

A special use permit (32524-10057) was issued to SK Forest Products of Montello, Wisconsin, to selectively log 92 acres of oak forest for oak savanna restoration. In addition, four other SUP's were given out to interested public to remove downed slash (for firewood) from the logging units.

6c. Contaminant Investigation

See section 6a.

6d. Contaminant Cleanup

See section 6a.

6g. Land Acquisition Support

The Refuge biologist has visited with the McCreath brothers throughout the year in order to gain their cooperation in the wetland restoration project on the Refuge. This inholding would be advantageous to own as the largest ditch on the Refuge runs through their property. Filling the entire ditch or at least plugging the ditch is key to the success of the restoration project; however, the FWS needs McCreath's cooperation as water levels would be raised on their property. They do not want to sell or do a land exchange, but are interested in a habitat easement with the FWS.

The Refuge biologist also visited with Scott and Bill Kempley, who own the majority of the land immediately north of the Refuge. FWS is interested in fee title acquisition or obtaining a permanent habitat easement on a 186 acre tract of drained wetland and a 38 acre parcel of intact sedge meadow. The Kempleys are open to both options and would like an appraisal. This land was inundated with water from April – December 2004 due to high spring flows on the Fox River and would be an excellent wetland restoration.



Aerial photo of Kempley's flooded field that has potential for acquisition. The NW corner of the Refuge is in the upper right corner of the photo (8-19-2004).

7

Public Education and Recreation

7a. Provide Visitor Services

Deer Hunting

The Refuge was again open to deer hunting during all state deer seasons in Unit 67A. No Refuge permits were required. The Refuge was located in an Earn-A-Buck (EAB) unit; thus, a buck could not be harvested without first harvesting an antlerless deer. In addition, Zone T antlerless-only herd reduction hunts were in effect. Below is a summary of the harvest regulations published in the Refuge's 2004 Deer Hunting Brochure:

One antlerless deer only, per license, plus additional antlerless deer per antlerless permit may be harvested on the Refuge during any of the following Wisconsin state seasons:

Archery: **Oct. 28 – Oct. 31**

Dec. 9 – Dec. 12

Gun: **Oct. 28 – Oct. 31**

Dec. 9 – Dec. 12

One antlerless deer, per license, plus one buck (if an antlerless deer is harvested first) and additional antlerless deer per antlerless permit may be harvested on the Refuge during any of the following Wisconsin state seasons:

Archery: **Sept. 18 – Oct. 27**

Nov. 1 – Nov. 18

Nov. 29 – Dec. 8

Dec. 13 – Jan. 3

Gun: **Nov. 20 – Nov. 28**

Muzzleloader **Nov. 29 – Dec. 8**

In 2003, a questionnaire drop box was placed on a kiosk in the parking lot and hunters were asked to fill out a questionnaire after their last hunt of the season. Because only four questionnaires were returned, a drop box was not placed in the parking lot this year. As a result, little is known as to the number of deer harvested on the Refuge. From conversations with locals and other evidence on the Refuge, at least four does and two bucks were harvested on the Refuge, although many more were likely harvested. Through casual observations and visits with locals, it appeared hunter use of the area decreased slightly from last year. Hunters reported not seeing as many deer this year as compared to last year.

New Parking Lot and Kiosk

On March 24, a new parking lot with a rock surface was developed along County Highway F on the south end of the Refuge. The parking lot was developed for deer hunters wanting to access the south side of the Refuge and as a parking area for staff performing surveys and management actions. In August, a two panel kiosk was installed on the west side of this parking lot; it will provide information on the Refuge system, Refuge regulations and maps, and interpretive information regarding the habitats and wildlife of Fox River NWR. A hiking trail from this parking lot to Long Lake was proposed, but decided against because of wildlife disturbance, loss of habitat, cost, invasive species, an existing county park with trails adjoining the Refuge, and logistics of monthly maintenance with limited staff.

7b. Outreach

A Fox River NWR web page was created on the Region 3 FWS website. The web page summarized Refuge habitat, wildlife, management activities, hunting program, contacts, and directions to the Refuge: <http://midwest.fws.gov/FoxRiver>

As partially explained in section 5a above, the Refuge biologist was involved in outreach efforts, namely environmental education, with two local charter schools. Tours of Refuge fens, shallow marshes, oak savannas, and prairies were given to the school groups. Flora and fauna were identified and natural processes such as fire and flooding discussed. Not only did these school groups learn a lot about the Refuge and the environment, they were given the opportunity to get their hands dirty and provide wonderful help on the Refuge's 85-acre prairie restoration project (cedar cutting/piling, prairie seed collection, and prairie planting). River Crossing Environmental Charter School from Portage donated 658 hours of labor to the Refuge and Beaver Dam Charter School donated 408 hours.

8

Planning and Administration

8b. General Administration

Since Fox River Refuge was acquired in 1978, there has been no staff or funds solely dedicated to this Refuge, until last year. Horicon Refuge staff has been expected to manage the Refuge under the Horicon Refuge budget and with no additional staff. As a result, before May 2003 virtually no planning, restoration activities, or baseline surveys of fish and wildlife populations and their habitats have been conducted for this Refuge.

A grant obtained from the Lower Fox River and Green Bay Natural Resources Restoration Project (Natural Resource Damage Assessment funds) still maintains a full-time term wildlife biologist, Shawn G. Papon, specifically for Fox River National Wildlife Refuge. The biologist's primary duties are baseline habitat, fish, and wildlife surveys, habitat management and other Refuge planning, habitat restoration, and grant writing. This position is expected to last one more year.



**WISCONSIN ISLAND WILDERNESS
GREEN BAY AND GRAVEL ISLAND
NATIONAL WILDLIFE REFUGE**

Door County, Wisconsin

ANNUAL NARRATIVE REPORT

Calendar Year 2004

**U.S. Department of the Interior
Fish and Wildlife Service
National Wildlife Refuge System**

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INTRODUCTION

Green Bay and Gravel Island National Wildlife Refuges (NWR) were set aside by Executive Orders in 1912 and 1913, respectively, as preserves and breeding grounds for birds. They were the 2nd and 3rd refuges established in the Great Lakes region. Originally under the Department of Agriculture, the islands came under the jurisdiction of the Department of the Interior by Presidential Proclamation, July 30, 1940. Gravel Island NWR is comprised of Gravel (10 acres) and Spider (25 acres) Islands. Hog Island (7 acres) is the lone component of Green Bay NWR. The two refuges were added to the Wilderness Preservation System in 1970 and together form the Wisconsin Islands Wilderness Area, one of the smallest in the country. No development has taken place on the islands and general public use is restricted to minimize disturbance to colonial nesting birds.

Presently, the U.S. Fish and Wildlife Service (Service), U.S. Coast Guard (USCG), and Bureau of Land Management (BLM) are working to transfer Plum (314 acres) and Pilot (6 acres) Islands to the Service in FY05. Upon transfer, Plum and Pilot will become part of Green Bay NWR. While they are not technically a part of the National Wildlife Refuge System at this time, refuge staff committed considerable effort toward a biological inventory of these islands in anticipation of their transfer, and a summary of that work is presented here along with work on refuge property. Portions of Plum and Pilot Islands were developed to serve as lighthouse facilities or life saving stations during the late 19th century. Many of the historic structures remain, some of which are included on the National Register of Historic Places. General public use of USCG property is restricted.

CLIMATE DATA

	Mean Temp (°F)	Min. Temp (°F)	Max. Temp (°F)	Precip. (Inches)	Snowfall (Inches)
September '03	59.0	40	76	3.24	0.0
October '03	46.6	33	71	1.53	0.0
November '03	35.6	17	50	2.69	0.0
December '03	29.1	10	43	1.82	2.0
January '04	13.3	-12	37	1.09	19.0
February '04	20.1	-7	39	2.31	26.5
March '04	30.9	5	52	4.07	12.0
April '04	39.9	19	72	2.78	0.0
May '04	47.4	31	70	4.47	0.0
June '04	57.8	42	77	3.30	0.0
July '04	64.4	49	83	3.14	0.0
August '04	61.8	41	79	4.00	0.0
September '04	62.2	31	78	1.95	0.0

(Data Source: NOAA National Climatic Data Center, Washington Island Weather Station, COOPID 478905. Data not available after 9/04).

MONITORING AND STUDIES

Surveys and Censuses

Baseline biological inventories are lacking for Green Bay and Gravel Island NWRs. During the 2004 field season, an inventory effort was initiated to document the current status of these islands. Identification and quantification of biotic resources (vegetation, migratory and breeding birds, small mammals, and herpetiles) began in April 2004 and will continue through the 2005 field season. A detailed report will be assembled in 2005; a brief summary of 2004 activities appears below.

Vegetation

General cover maps of all islands were digitized into a GIS using geo-rectified scans of 1:8000 color aerial photos taken in July 2003. Vegetation categories for these maps were based on physiognomic characteristics and followed the National Vegetation Classification Standard (NVCS) through the formation level (Federal Geographic Data Committee 1997; Table 1). Formation boundaries were ground-truthed in the field using aerial photos and GPS.

Table 1. Acres and number of patches of the 13 vegetation formations present on Green Bay and/or Gravel Island National Wildlife Refuges, 2004. Formation descriptions follow the National Vegetation Classification Standard, Federal Geographic Data Committee (1997).

Formation (National Vegetation Classification Standard)	#	
	Patches	Acres
Cold-deciduous woodland (<i>trees 25-60% canopy cover</i>)	8	124.0
Lowland or submontane cold-deciduous forest (<i>trees 60-100% canopy cover</i>)	4	92.8
Medium-tall temperate or subpolar grassland with a sparse cold-deciduous tree layer (<i>herbaceous vegetation dominant, trees/shrubs <25% canopy cover</i>)	10	35.3
Cobble/gravel beaches and shores	11	24.7
Pavement with sparse vascular vegetation	18	24.4
Conical-crowned temperate or subpolar needle-leaved evergreen forest	5	18.7
Semipermanently flooded temperate or subpolar grassland (<i>surface water persists throughout growing season in most years</i>)	2	16.7
Tall temperate or subpolar perennial forb vegetation (<i>forbs >1m tall</i>)	2	7.9
Low temperate or subpolar perennial forb vegetation (<i>forbs <1m tall</i>)	1	6.8
Temperate cold-deciduous shrubland (<i>shrubs ≥ 0.5-m tall, shrubs >25% canopy cover, trees <25% canopy cover</i>)	4	4.7
Low temperate intermittently exposed annual forb vegetation (<i>substrate usually exposed, but surface water can be present for variable periods</i>)	2	4.3
Permanently flooded temperate or subpolar hydromorphic-rooted vegetation	1	1.4
Cliffs with sparse vascular vegetation	1	0.5
Total	69	362.1

To provide more detailed descriptions and facilitate future monitoring efforts, vegetation sampling plots were randomly distributed within each of the formations present on the islands. Data gathering at vegetation plots followed standard overstory tree, pole-size tree, seedling tree, shrub, herbaceous, and fuel load protocols presented in the National Park Service's Fire Monitoring Handbook (FMH; U. S. Department of Interior National Park Service 2003). Following these protocols allowed Service staff to concurrently fulfill NVCS requirements so that the vegetative formations can be divided into alliances and associations and provided baseline data so that changes can be monitored through time using FMH software. Vegetation plots could not be set up on Plum Island due to conflicts with contaminant cleanup activities occurring there (see below); no plots were established on Gravel Island due to its relative lack of vegetation and propensity to be overwashed by waves and/or ice during high water. Thus, permanent monitoring plots were only established on Pilot, Hog, and Spider Islands in 2004. The single plots on Pilot and Hog Islands varied from the FMH protocol in that they were reduced in size to fit into the smaller patches of vegetation occurring on those islands.

Remnant forests still exist on Pilot and Hog Islands, although many overstory trees are dead or stressed due to colonial bird activity and understories are dominated by invasive or weedy species (Fig 1a, 1b). White birch (*Betula papyrifera*) was the dominant overstory tree on the Hog Island plot; northern white cedar was the most frequent on Pilot Island, although a few green ash (*Fraxinus pennsylvanica*) occurred as well. By a wide margin, the most frequent pole-size trees on both islands was chokecherry (*Prunus virginiana*). Red-berried elder (*Sambucus racemosa*) forms a dominant, and nearly impassable shrub layer on both properties. Intertwined among the elder or interspersed in open areas is a dense herbaceous mixture of weedy or exotic species. Fringed bindweed (*Polygonum cilinode*) and American black currant (*Ribes americanum*) were the most frequent species encountered on Hog Island. Island transects; bittersweet nightshade (*Solanum dulcamara*), catnip (*Nepeta cataria*), and common mallow (*Malva neglecta*) were the most frequently occurring species on Pilot Island.

Neither Spider Island nor Gravel Island has overstory vegetation layers. On Spider, nesting by great blue herons, and later double-crested cormorants and herring gulls reduced the white cedar, tamarack, and white birch overstory of the mid-1900s to a single snag in 2004. A few sandbar willow (*Salix exigua*) and eastern cottonwood (*Populus deltoides*) saplings are pioneering in the low-lying area near the north end of the island, but today Spider Island is mostly a mixture of exotic herbs (Figure 1c). Common mallow (*Malva neglecta*), tumble mustard (*Sisymbrium altissimum*), and wormseed mustard (*Erysimum cheiranthoides*) were the most frequently occurring species on the Spider Island plot. Gravel Island is treeless due to periodic overwashing by waves and ice during high water years. Judziewicz (2001) reported no vascular plants present during his visit to the island in July 1999. However, low water in recent years has allowed many plants to pioneer on Gravel. Service biologists canvassed the entire island in August 2004 and recorded 21 species, including American sea-rocket

(*Cakile edentula*), a state species of concern. Besides sea-rocket, vegetative composition of Gravel Island is very similar to that of Spider Island (Figure 1d).





Figure 1. Photos taken along centerline of permanent monitoring plots established on Hog (A), Pilot (B), and Spider (C) Islands, Green Bay and Gravel Island NWRs, Summer 2004. No permanent plots were established on Gravel Island, but photo (D) shows the general form of the vegetation that occurred there in 2004.

Migrant Landbirds

Incidental to ground-truthing vegetative cover maps, Refuge and Ecological Services (ES) staff recorded sightings of migrant landbird species on copies of aerial photos. On May 2, densities approaching 60 birds/hectare (up to 17 species/hectare) were recorded in some forest habitats. Staff observed 7 species of wood warblers and estimated up to 25 yellow-rumped warblers per tree in some locales.

Staff also recorded migrant songbirds observed while conducting fall shorebird surveys (see below) on Gravel and Spider Islands. Gravel and Spider are not forested and probably do not provide sufficient food or shelter for many landbirds, but they may be valuable rest stops for individuals migrating across open water. Horned larks, savannah sparrows, and American pipits were among the species observed on unvegetated, windswept portions of Gravel and Spider Islands.

Formal surveys to document migrant landbird use are planned for 2005. Methodology will follow that described below for breeding birds with the goal of mapping each island at least once during the last week in April through first 2 weeks in May.

Breeding Birds

Surveys for breeding birds followed the Area Search method described by Ralph et al. (1993). Accordingly, a GIS shapefile was created in which Plum Island was divided into 3-ha blocks. These shapefiles were downloaded to hand-held GPS units. During a survey, staff spent 20 minutes within each block mapping the location of all individuals detected by sight or sound. GPS and downloaded grids were used to guide observers through each plot and to estimate location of individuals observed. All surveys took place during the first 5 hours of daylight (approximately 5:00 am to 10:00 am). The entire island was mapped 3 times during the height of the breeding season (early-, mid-, and late-June). To reduce bias, the same 2 observers conducted all 3 surveys and alternated blocks and survey direction between successive surveys.

Sixty-six species were detected during the breeding season on Plum Island. The ubiquitous American redstart was observed more than twice as often as the next most common species (in order: house wren, indigo bunting, red-eyed vireo, red-winged blackbird). Canada geese, wood ducks, mallards, bald eagles, American woodcock, and northern flicker were among the Region 3 conservation priorities that use Plum Island during the breeding season. The eagle nest near the center of the island was successful again this year. In mid-June, Ecological Services and refuge personnel banded all 3 eaglets and collected blood samples for monitoring purposes.

The remaining refuge islands were not divided into a 3-ha grid owing to their small size and simple habitat structure. Instead, surveys on these islands were conducted by censusing the entire property over the course of approximately 1 hour. To minimize disturbance to large breeding colonies present on these islands, each was visited only once during June to record breeding species.

Spider Island contains 8 double-crested cormorants colonies (1.6 total acres) interspersed among a matrix of herring gull nests. In combination these 2 species cover most of the 25-acre island. A single Canada goose nest and 2 mute swan nests were observed on Spider Island during early spring visits to erect blinds for the cormorant demography study (see below). Killdeer pairs, ring-billed gulls, and mallards were also observed on the island during cormorant band re-sighting efforts in May. On Hog Island, several hundred herring gulls nested around the perimeter of the island on open rocks. During the June survey, staff also discovered a single red-breasted merganser nest and 5 great blue heron nests (Figure 2). Singing male song sparrows and red-winged blackbirds were observed as well. Pilot Island was home to several thousand double-crested cormorants occurring in 2 colonies (1.1 total acres). A single black-crowned night heron nest and a single red-breasted merganser nest were also located during the visit to Pilot Island. Red-winged blackbirds were the only non-colonial nesting species observed. Much like Spider Island, Gravel Island was covered almost entirely by a matrix of herring gull nests except for the northeast portion of the island where Caspian terns formed a colony of roughly 310 nests. Service staff also observed a pair of great black-backed gulls on Gravel and suspected that they nested there.



Figure 2. Great blue heron chicks on Hog Island, Green Bay National Wildlife Refuge, June 2004.

Migrant waterfowl and shorebirds

On Spider Island, occurrence of migrating shorebirds was recorded incidental to re-sighting efforts for the cormorant demography study (see below). In addition to a single ruddy turnstone and a single piping plover, Service staff noted flocks of 50-75 dunlins, ~50 semi-palmated sandpipers, and ~15 sanderlings feeding along the eastern shore of

the island. The eastern shores of Gravel and Spider Islands provide the best shorebird habitat on the refuge during low-water conditions. In such circumstances, a wide, flat area of dolomite pavement becomes exposed and numerous fissures and shallow depressions in the limestone retain water after rain, storms, or heavy seas. This water is quickly warmed and, along with racks of vegetation that wash up, supports invertebrates and feeding shorebirds (Figure 3).

During the fall migration (9/23), formal shorebird surveys were conducted by slowly walking shorelines of the islands, stopping intermittently to scan ahead using binoculars and 60x spotting scopes. A handful of least sandpipers, pectoral sandpipers, ruddy turnstones, and semi-palmated plovers were observed during the survey along with 50-75 semi-palmated sandpipers. Additionally, a hooded merganser, ~10 blue-winged teal and common mergansers, and 50-100 mallards and American wigeon were observed feeding and loafing on these shorelines.



Figure 3. Shorebird habitat along east shore of Spider Island, September 2004. Approximately 6 acres of fissured, depressed dolomite pavement support shallow pools, which warm and provide food for migrating shorebirds. About 1.5 acres of similar habitat occurs along the east shore of Gravel Island as well.

Small Mammals

Beginning in June, a trapping effort was initiated to document small mammals present on Plum Island. Trapping effort occurred along randomly distributed transects according to the following guidelines: 1) as a minimal effort, at least 1 transect (10 traps) was established per 25 acres of habitat, 2) every habitat type (i.e. NVCS formation) had to be sampled by at least 1 transect, and 3) no transect was <100m from an adjacent transect, and 4) with regards to spatial context, transects were distributed

evenly for habitat types with multiple patches occurring across the island (e.g. aspen patches occur in the northeast, northwest, southeast, and southwest quadrants of the island, therefore transects were distributed such that patches in at least 3 of the 4 quadrants were sampled). Transects were 75 or 150 m in length depending on patch size, and consisted of Sherman™ live traps placed every 15m. In addition, Tomahawk™ live traps (7" x 7" x 20" or 9" x 9" x 26") were placed at the first station in each line. Sherman™ traps were baited with a mixture of rolled oats, peanut butter, and sunflower seeds. Tomahawk™ traps were alternately baited with apples (to attract lagomorphs), nuts (to attract tree squirrels), and sardines (to attract small or medium-sized carnivores).

Across 725 trap-nights from June 17 through July 30 the only species captured was deer mouse (*Peromyscus maniculatus*). Mice were captured in all habitats trapped and were extremely abundant (often captured in $\geq 90\%$ of traps in a transect). Raccoon tracks were observed near the center of the island in September. White-tailed deer were observed intermittently throughout the summer, including a doe with a fawn. It does not appear that insectivores, lagomorphs, small carnivores, or other rodents have been able to successfully colonize the island, although it should be large enough to support at least some of these species. Trapping was not conducted on the other islands due to time constraints and diminished chances of mammals occurring there.

Herpetofauna

Coverboard transects were randomly distributed within each habitat type following the rules described previously for trapping transects. Three-eighths inch to ½" thick blandex boards (24" x 24" or 40" x 40") were placed every 15 m along transects. Staff removed vegetation at each station so that boards were placed directly on the soil. Twenty transects (154 boards) were established in July. At least one transect occurs on each of the 5 islands. Coverboards were left undisturbed for the remainder of the summer and will be checked twice monthly during the 2005 field season.

Incidental to other work on Plum Island, staff observed several western fox snakes (*Elaphe vulpina*), several northern water snakes (*Nerodia sipedon*), a brown snake (*Storeria dekayi*), common garter snakes (*Thamnophis sirtalis*), and a western ribbon snake (*Thamnophis proximus*). Staff also recorded calling American toads (*Bufo americanus*), northern spring peepers (*Pseudacris crucifer*), and eastern gray tree frogs (*Hyla versicolor*) on Plum. No herpetiles were noted on any of the other islands, although fox snakes have been reported to be abundant on Pilot Island in the past.

Studies and Investigations

The Contaminants Biologist at the Green Bay Ecological Services Office continues to lead a mark-recapture demographic study of double-crested cormorants on Spider Island. Ongoing since 2001, the objectives of this study are to 1) determine age of first nesting, 2) determine age specific survival rates, and 3) determine frequency of breeding by individuals. Refuge staff helped erect blinds for the study in April, collected re-sighting information on 2 occasions in May, and assisted in color-banding 397 nestlings in July.

All re-sighting histories were entered into Program Mark for a preliminary analysis in 2004. Based on Closed Jolly-Seber time-dependent models, adult survival from 2001-2002 was estimated at 0.694 ± 0.089 (Resighting probability = 0.343 ± 0.068); adult survival from 2002-2003 was estimated at 0.610 ± 0.061 (Resighting probability = 0.655 ± 0.062). Data collection will continue through at least 2006 on this project.

Several bands placed on cormorants at Spider Island have been recovered on the wintering grounds. Most of the recent recoveries have come from aquaculture facilities near the lower Mississippi River where cormorants are harassed or dispatched to minimize depredation of fish stocks. Band returns from this source has increased over the past 2 years following recent efforts to control cormorant populations.

RESOURCE PROTECTION

Contaminant Investigation

In June, a study was initiated to determine if herring gull chicks on Pilot Island were exposed to more lead (USCG soil sampling indicated that lead levels were highly elevated on Pilot Island) than chicks from Gravel Island (minimal human activity). Staff from the Service and MWH Americas, Inc. (USCG contractor) collected 12 herring gull chicks on Pilot Island and 6 herring gull chicks on Gravel Island (Figure 4). Blood and liver samples were extracted from each specimen. Liver lead concentrations were below detection limits from all 6 Gravel Island samples; 3 of the 12 Pilot Island liver samples had detectable levels of lead. Two of 6 blood samples from Gravel Island had detectable levels of lead, whereas 11 of 12 samples from Pilot had detectable lead. Blood lead concentrations were statistically greater on Pilot Island than on Gravel (Wilcoxon two-sample rank test, $U_s = 63$, $n_1 = 12$, $n_2 = 6$, one-tailed $P = 0.005$). A follow-up study may be initiated to determine if ingesting higher levels of lead poses a significant health threat for the gulls on Pilot Island.



Figure 4. Staff from the Service and MWH Americas, Inc. (U. S. Coast Guard contractor) collecting blood and liver samples from herring gulls, Pilot Island, June, 2004. The study was initiated to determine whether gulls on Pilot Island (abandoned Coast Guard facility with elevated soil lead concentrations) ingest more lead than gulls on nearby Gravel Island NWR (no history of human activity).

Contaminant Cleanup

From late July through August, USCG contractors completed the final stages of environmental cleanup at Plum Island. Five underground storage tanks were removed and all areas impacted by petroleum products were cleaned to EPA residential criteria. Lead-contaminated soils extending beyond the petroleum impacted areas were cleaned to 1200 ppm lead, the EPA Lead Soil Hazard Standard for bare soil in a residential yard. In total, 1200 tons of contaminated soil were excavated from lead-contaminated areas and sifted on site. Over 800 tons of fine particles were removed from the island; coarser gravel and cobble were backfilled into areas that were excavated. USCG covered excavated sites with clean fill from other parts of the island and planted a vegetative cap (Figure 5). Excavated areas and other locations where soil lead concentrations are below 1200 ppm, but >250 ppm (Wisconsin DNR residential criteria), are required to be under vegetative cover according to Wisconsin DNR guidelines. A land use restriction will be written into the refuge management plan to ensure that the vegetative cap is maintained and that future soil and groundwater uses are consistent with this level of clean up. Construction debris and dump site material were also removed from the island during the cleanup process. However, 2 historic dump sites were left intact due to their archaeological significance (see below). Service staff spent 4 days on site with USCG and its contractors to monitor activities, ensure minimal disturbance to critical resources (bald eagles, dwarf lake iris [*Iris lacustris*], and state-listed dune goldenrod [*Solidago simplex*]), and provide input regarding restoration of excavated areas.

No clean up activities occurred at Pilot Island, which is similarly contaminated with petroleum products, arsenic, and lead. The Service anticipates that a management restriction limiting public access will be used to address the contamination of Pilot Island.



Figure 5. Backside of USCG life saving station before, during, and after environmental cleanup activities, Plum Island, July through October 2004.

Cultural Resource Management

Prior to contaminant cleanup on Plum Island, the Public Service Archaeology Program, University of Illinois conducted an archaeological reconnaissance survey of the proposed remediation areas. Archaeologists surveyed a total of 0.80 acres via "pedestrian reconnaissance" and shovel tests (22 shovel tests total). No artifacts were located.

Before excavated areas were restored in October, the Public Service Archeology Program and BLM archeologists conducted more intensive shovel tests on sites proposed as borrow pits for clean fill. A handful of prehistoric artifacts were located on the open area northwest of the life saving station. Additionally, the household dump sites at the edge of the forest to the west of the life saving station and to the south of the keeper's quarters were deemed historically significant. Archaeologists left these dumps intact and recommended that a more thorough investigation take place in the future.

Land Acquisition Support

Work has continued on the acquisition process for Pilot and Plum Islands. Both are former USCG Stations that will be relinquished back into the public domain (i.e. to BLM) and would become part of Green Bay NWR upon subsequent transfer to the Service. A revised Level 1 Contaminants survey was conducted by Service staff

following USCG clean-up activities described above. Appropriate NEPA documents have been prepared and a decision package has been compiled. Consideration for addition of these islands to the NWR system should occur in Spring 2005.

LITERATURE CITED

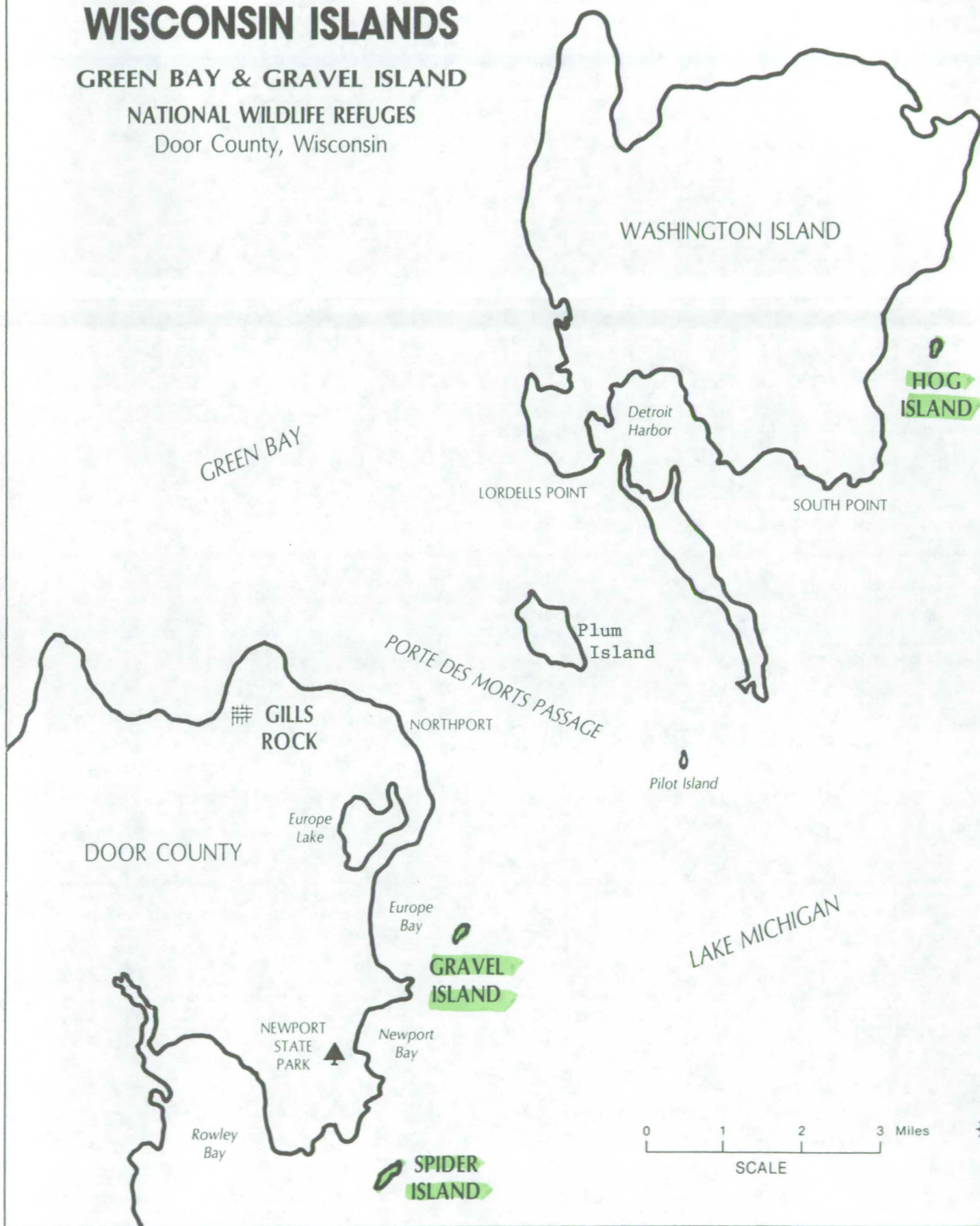
- British Columbia Ministry of Environment, Lands, and Parks: Resources Inventory Branch. 1998. Inventory Methods for Small Mammals. Standards for Components of British Columbia Biodiversity No. 31.
<http://srmwww.gov.bc.ca/risc/pubs>
- Federal Geographic Data Committee. 1997. Vegetation Classification Standard. 58p.
<http://www.fgdc.gov/standards/documents/standards/vegetation/>.
- Judziewicz, E. J. 2001. Flora and vegetation of the Grand Traverse Islands (Lake Michigan), Wisconsin and Michigan. *The Michigan Botanist* 40:81-208.
- U. S. Department of the Interior National Park Service. 2003. Fire Monitoring Handbook. Boise, ID: Fire Management Program Center, National Interagency Fire Center. 274p. www.nps.gov/fire/fmh/index.htm
- Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of field methods for monitoring landbirds. General Technical Report PSW-GTR-144, Albany CA: Pacific Southwest Research Station, Forest Service, U. S. Department of Agriculture. 41p.

WISCONSIN ISLANDS

GREEN BAY & GRAVEL ISLAND

NATIONAL WILDLIFE REFUGES

Door County, Wisconsin



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

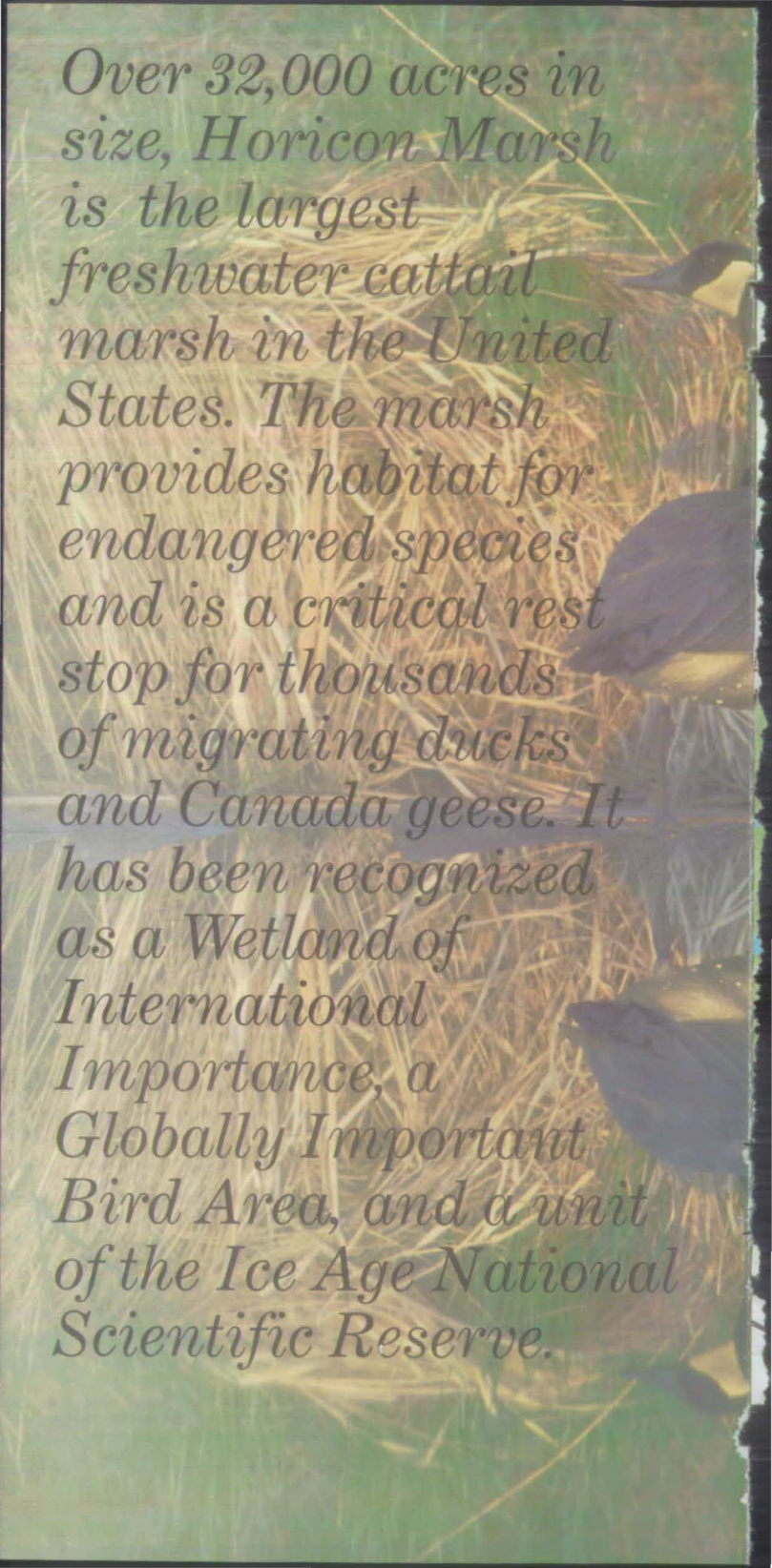


U.S. Fish & Wildlife Service

Horicon

National Wildlife Refuge





Over 32,000 acres in size, Horicon Marsh is the largest freshwater cattail marsh in the United States. The marsh provides habitat for endangered species and is a critical rest stop for thousands of migrating ducks and Canada geese. It has been recognized as a Wetland of International Importance, a Globally Important Bird Area, and a unit of the Ice Age National Scientific Reserve.

More than Geese!

Many visitors enjoy watching migrating Canada geese in the fall. Several hundred thousand interior Canada geese migrate between Hudson Bay and southern Illinois, stopping at Horicon Marsh. These birds are part of the Mississippi Valley population of Canada geese.

But geese are just part of the picture. Over 223 species of birds, along with white-tailed deer, red fox, river otters, muskrats, snapping turtles, garter snakes, and other animals call the marsh home. Horicon National Wildlife Refuge supports the largest nesting population of redhead ducks east of the Mississippi River. Thousands of redheads use the marsh each year.

Besides waterfowl, you may observe other types of birds at Horicon refuge, like shorebirds, marsh birds, terns, raptors, and songbirds. Notable species include American white pelicans, sandhill cranes, dowitchers, Forster's terns, wild turkeys, northern harriers, and yellow-headed blackbirds. The marsh supports the largest great blue heron nesting rookery in Wisconsin.

Hungry egret, Jack R. Bartholmai



Wetland habitat makes up the majority of the refuge, but valuable upland habitats, like prairie and woods, provide the diversity needed to support many types of wildlife through the seasons.

Horicon National Wildlife Refuge (21,000 acres) makes up the northern two-thirds of the marsh and is managed by the U.S. Fish and Wildlife Service. The southern one-third is administered by the Wisconsin Department of Natural Resources as the Horicon Marsh State Wildlife Area (11,000 acres). Both agencies work together to manage the marsh as one wetland ecosystem.

From Glacier to Refuge

Horicon Marsh is a shallow, peat-filled lake bed scoured out of limestone by the Green Bay lobe of the massive Wisconsin glacier. Look for the hills rising on the east side of this 14-mile long depression, survivors of an ancient, frozen past. The glacier entered this area about 70,000 years ago and receded about 12,000 years ago.

A source of food for many different Native American groups for thousands of years, Horicon Marsh attracted immigrants, too. In the 1800s, logging opened the uplands for farming. In 1846 a new settlement called Hubbard's Rapids, at the south end of the marsh, was renamed Horicon, meaning pure, clean water. That same year,



The dredge, circa 1910

settlers built a dam on the Rock River in Horicon that changed the marsh into the largest artificial lake in the world at the time, Horicon Lake. People used the lake to float logs and move farm products by steamboat. Water from this dam also powered a saw mill and a grist mill.

After the dam was removed in 1869, the lake reverted to a marsh once again. Over the next 30 years, people used Horicon Marsh for unregulated recreational and commercial hunting. Attempts to convert it to farmland about 100 years ago ultimately failed because the soil was simply too wet and peaty. Following a 20-year struggle by conservationists, especially the Izaak Walton League, Congress established the Horicon National Wildlife Refuge on July 16, 1941, for the protection and conservation of migratory birds.



Horicon Shooting Club, circa 1910



State legislative tour, 1927

Working for Wildlife

Horicon staff actively manage the refuge to benefit a diversity of wildlife for your enjoyment. Management activities include restoring upland habitat, monitoring waterfowl populations, providing artificial nesting structures, controlling invasive exotic species, and providing visitor services.



Fish survey,
Jack R. Bartholmai



Environmental
education,
J & K Hollingsworth

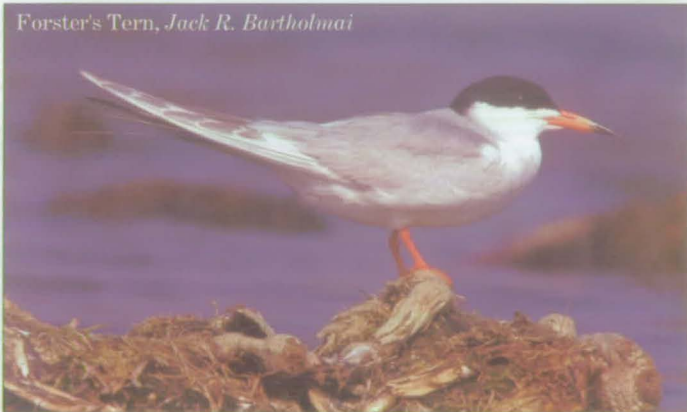


Prescribed burn,
Mike Husar

Manipulating water levels is the most vital management tool used to benefit waterfowl and shorebirds. The presence or absence of water, water depth, and timing are all coordinated to reduce carp and produce various stages of marsh plant succession upon which these birds rely. Various impoundments, which have been subdivided from the main pool of the marsh using a system of dikes and water control structures, are managed on seasonal, annual, and multiple-year cycles. Because of changing water levels, you may notice some wetland areas of open, deep water, others with dense cattails, and still others with bare mud.

Special care is taken to protect endangered and threatened species that use the refuge. For example, nesting platforms are provided for osprey. Essential habitat is provided for trumpeter swans, great egrets, Forster's tern, peregrine falcons and bald eagles.

Forster's Tern, *Jack R. Bartholmai*





Blue-winged Teal,
Jack R. Bartholmai



Muskrat.
Jack R. Bartholmai



You can help by reporting interesting wildlife sightings at the visitor center. Also, learn how to properly identify endangered species, especially trumpeter swans, so they are not accidentally shot while hunting.

The Refuge System and You

Horicon National Wildlife Refuge is one refuge of over 530 national wildlife refuges and 3,000 waterfowl production areas. These lands span more than 94 million acres across the continent. The National Wildlife Refuge System is the only network of lands primarily dedicated to the preservation and management of fish and wildlife resources. It is home to thousands of species of mammals, birds, reptiles, amphibians, fish, plants and many endangered species.

The refuge system is for people, too! About 400,000 people visit Horicon refuge each year to enjoy wildlife-dependent activities. Horicon refuge is accessible to persons with disabilities. Call or write before visiting to schedule a tour, obtain special event schedules, or inquire about other details.

Fishing at Horicon Marsh,
Mike & Lisa Husar



ot, *Jack R. Bartholmai*



Floating boardwalk
on the Egret Trail,
Jack R. Bartholmai

Things to Enjoy on the Refuge

Horicon National Wildlife Refuge is open during daylight hours only. There are a number of activities for you to enjoy during your visit.



X-Country skiing,
USFWS

- Auto touring
- Hiking
- Cross-country skiing
- Snowshoeing
- Bicycling
- Bird watching
- Wildlife observation
- Fishing
- Hunting
- Trapping
- Nature photography and art
- Environmental education
- Talks and tours
- Special events
- Educational resources

Wisconsin state regulations apply, as well as special refuge rules. The separate Horicon Marsh Visitor and Hunting Maps provide current details on these opportunities.

November is typically, but not always, the best month to observe peak numbers of migrating Canada geese. Most people visit in October, however, since the weather is



Mallards taking off!,
Ken Bahr

warmer and fall colors are peaking. In spring, the marsh comes alive after the quieter winter season. Duck and warbler watching is best in April and May respectively, as these birds wear colorful breeding plumage. In summer look for broods of redheads, American coot and yellow-headed blackbirds.

During your trip to Horicon refuge, be sure to stop at the visitor center. Here you can pick up maps, ask questions, enjoy marsh exhibits, view wildlife through spotting scopes, and shop for souvenirs and gifts at Coot's Corner. Proceeds help support visitor services. The visitor center is located on the east side of Horicon Marsh, 3.5 miles south of State Highway 49, and is open year-round.



Bird watching,
C. Anderson

If you have binoculars, be sure to bring them with you. The animals that use Horicon Marsh are wild and will flee if you come too close. Using binoculars brings wildlife closer to you without disturbing them and allows everyone to enjoy watching them feed, fly, swim, dive, and play.

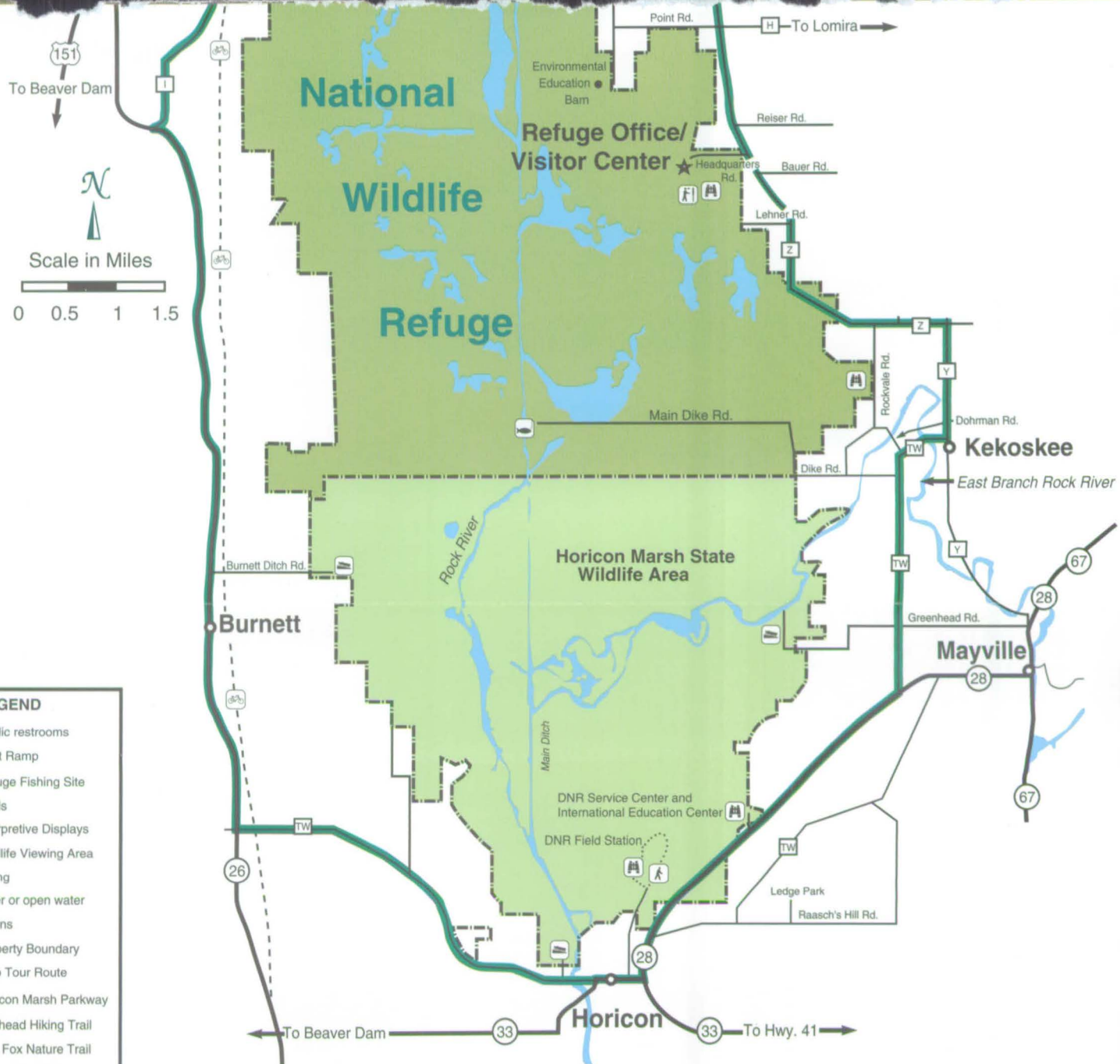
Other local wildlife viewing areas include Dodge and Fond du Lac County Parks, Kettle Moraine State Forest, and Theresa Marsh State Wildlife Area.

Nearby towns provide an array of restaurants, hotels, special events, and shopping opportunities to help you feel right at home. Several campgrounds are located within a 30-minute drive. Contact the refuge visitor center or a local chamber of commerce for details.



Visitor center,
USFWS





LEGEND

- Public restrooms
- Boat Ramp
- Refuge Fishing Site
- Trails
- Interpretive Displays
- Wildlife Viewing Area
- Biking
- River or open water
- Towns
- Property Boundary
- Auto Tour Route
- Horicon Marsh Parkway
- Redhead Hiking Trail
- Red Fox Nature Trail
- Egret Nature Trail



Help Protect Wildlife

Everything on the refuge is either a home or food for wildlife. Therefore, please remember ...

- Take only pictures, leave only footprints.
- Use official trails only.
- Respect refuge boundary signs, closed areas, and private property.
- Keep dogs leashed and on the trails at all times.
- Keep your distance – respect nesting wildlife.
- Pack your garbage out with you.
- Obey posted speed limits.

It is your responsibility to know and follow refuge regulations. If you need assistance, please ask for help at the visitor center.

Citizen Involvement

You can also help by joining a group that cares for the marsh!

- Refuge Volunteer Program
- Friends of Horicon National Wildlife Refuge
- Rock River Headwaters, Inc.
- Marsh Management Committee

Sunset crane, Jack Bartholmai

Horicon National Wildlife Refuge
W4279 Headquarters Road
Mayville, WI 53050
920/387-2658

<http://midwest.fws.gov/horicon/index.htm>

People with hearing impairments may reach Horicon NWR through Wisconsin's Relay Service at 1-800/947-3529 (V/TTY)
<http://www.fws.gov/horicon.html>

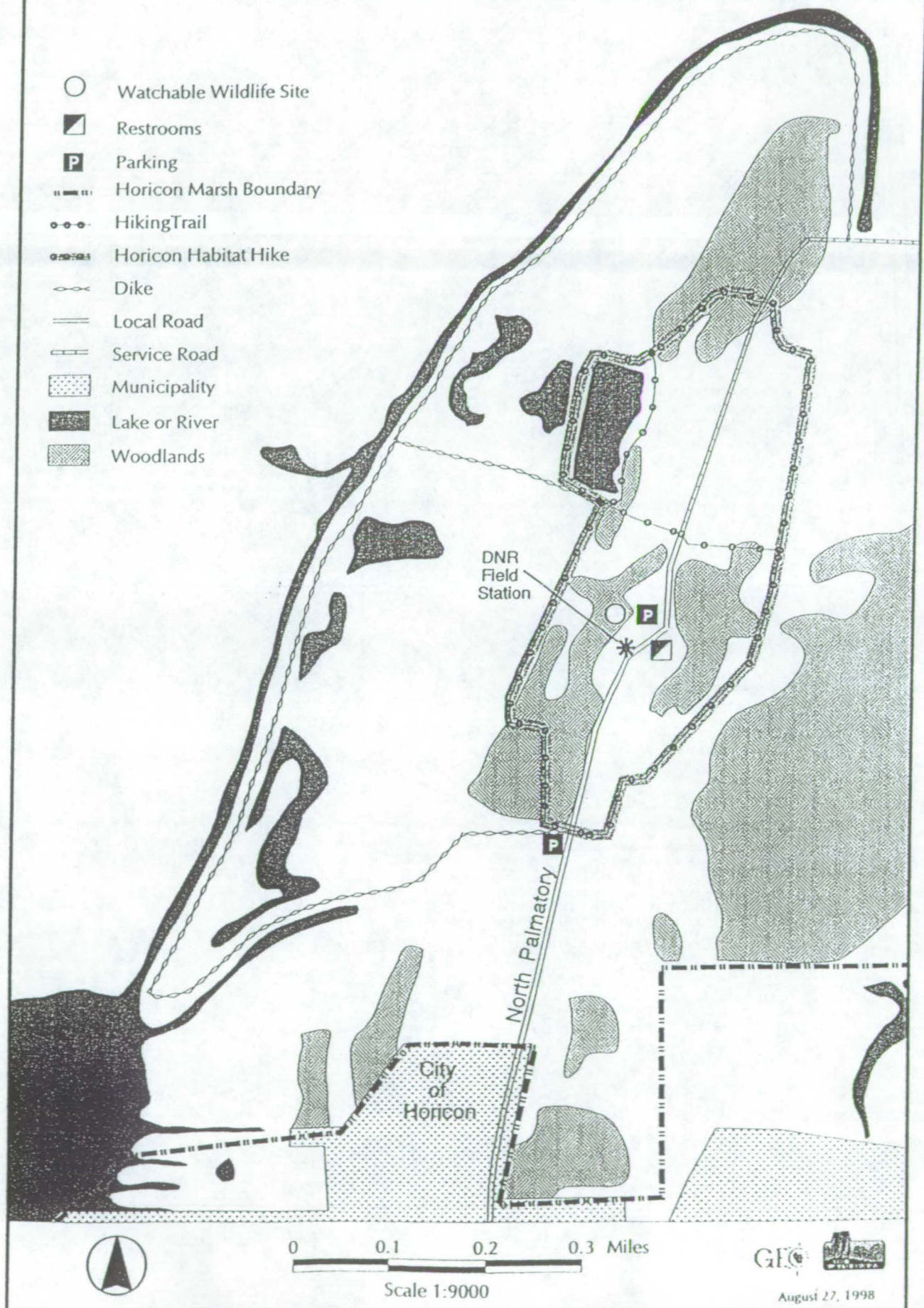
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<http://www.fws.gov>



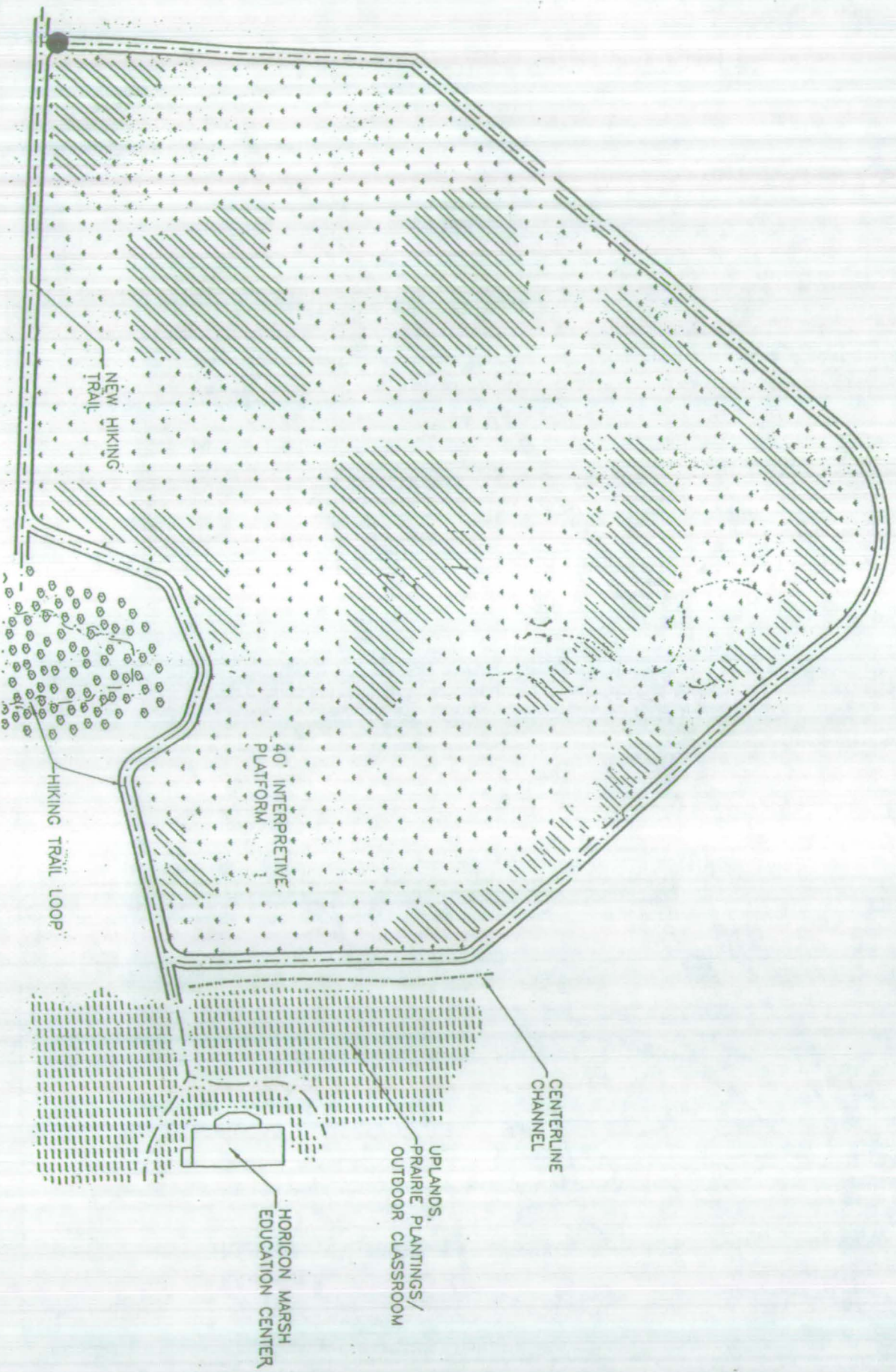
Redhead duck, Jack Bartholmai

Horicon Marsh State Wildlife Area

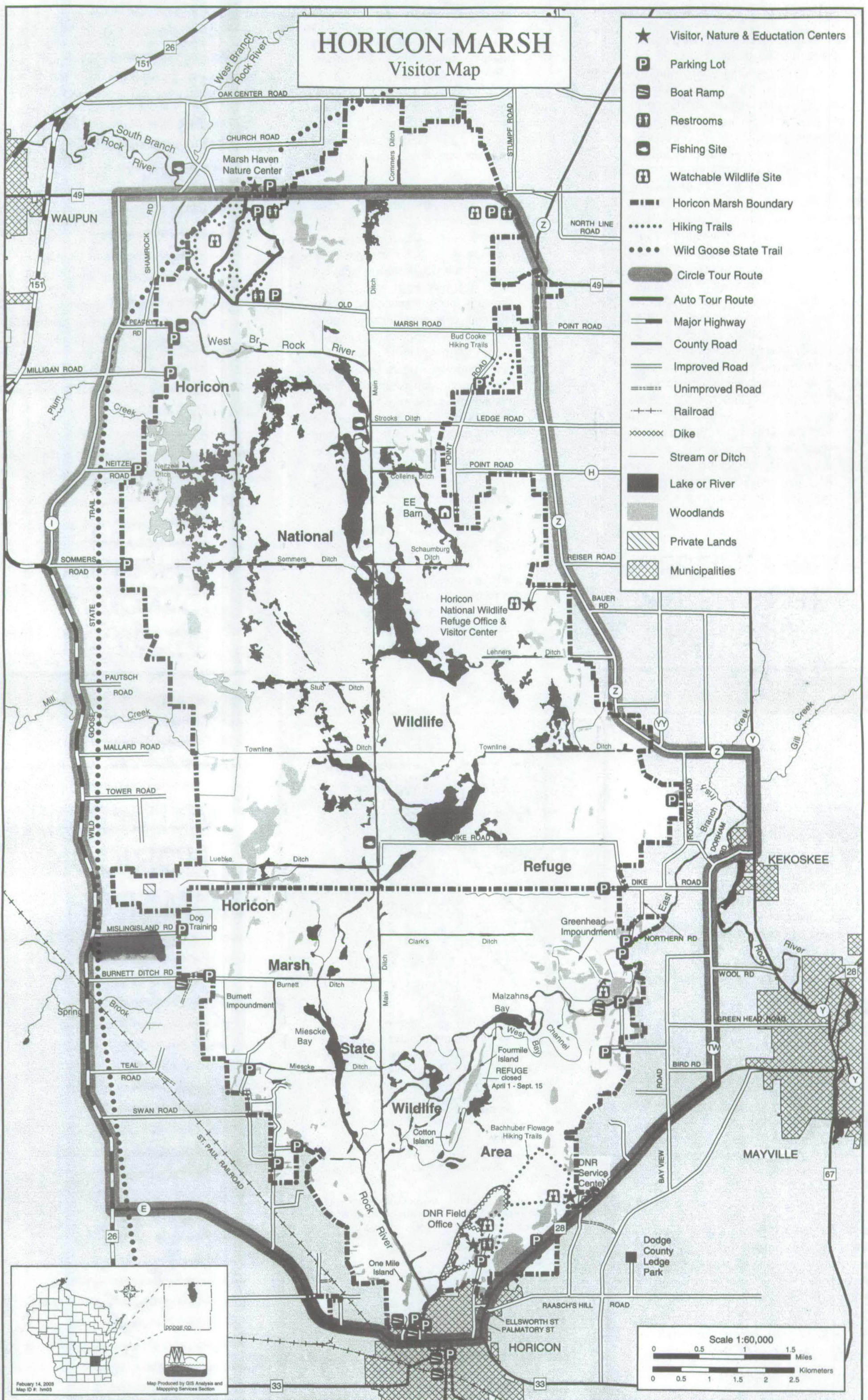
Hiking Trails On Quick's Point

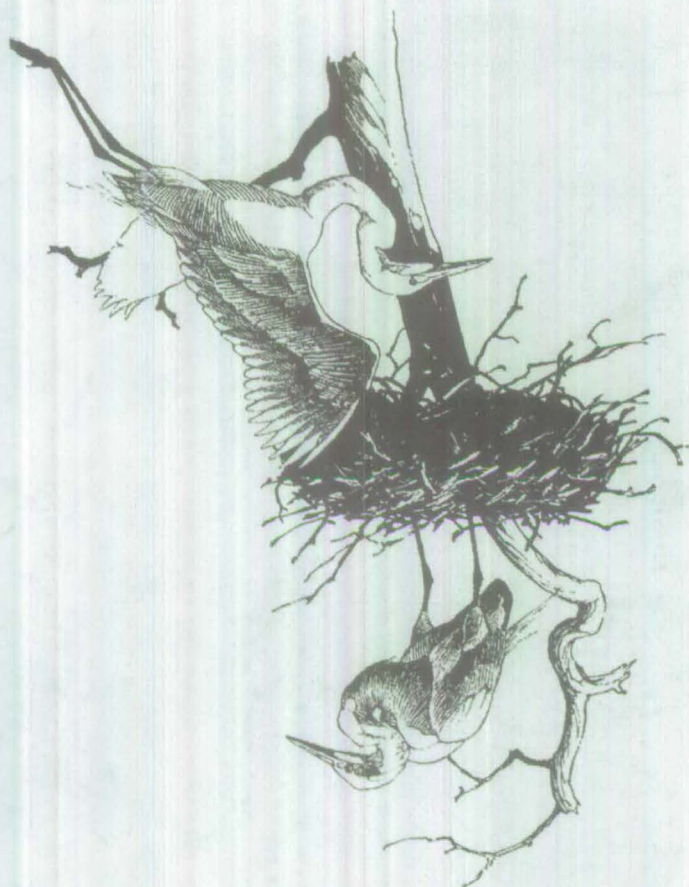


Bachhuber Flowage and Hiking Trails



Visitor Map





2003 HORICON MARSH Visitor Map



For further information, contact the Wisconsin Department of Natural Resources - Horicon Service Center, N7725 Highway 28, Horicon, WI 53032 (920) 387-7860. Office hours are Monday - Friday, 7:45 a.m. - 4:30 p.m.

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If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240.

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PUB-WM-435 2003

CELEBRATING A
CENTURY
OF CONSERVATION



*We hope you enjoy your visit to
Horicon Marsh. Please come
again!*

- 6) Dogs - Dogs are welcome on the Wildlife Area for hunting and recreation. However, as a courtesy to other trail users, dogs are not allowed on the hiking trail system. You are required to leash your dog on the entire area during the nesting season, from April 15 - July 31st.
 - 7) Hunting - The majority of the Wildlife Area is open to hunting during the various seasons. If you are not a hunter, as a courtesy you may want to limit your use to Quick's Point (a designated use area), at the north end of Palmaratory Street during open seasons.
 - 8) Trapping - The wildlife area is open to fur trapping. Trapping is administered through the Horicon Marsh Fur Farm, pre CH 29.749 Wisconsin statutes.
 - 9) Restrictions - Horses, snowmobiles, ATV's, bicycles, camping, open fires and overnight parking are not allowed on the Wildlife Area.
 - 10) Housekeeping - To help keep the marsh beautiful for others and your next visit, please take litter with you.
- For more information, contact the Horicon Service Center at N7725 Hwy. 28, Horicon, WI 53032. Office hours are 7:45 a.m. to 4:30 p.m. Monday through Friday.
Phone (920) 387-7860.
- Development and management of this property are largely funded by hunting and trapping license fees.

HORICON NATIONAL WILDLIFE REFUGE

Horicon National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service, was established in 1941 for the protection of migratory waterfowl. The Refuge consists of 21,000 acres of marsh and upland areas, comprising the northern two-thirds of the Horicon Marsh. The Refuge is one of over 500 National Wildlife Refuges in the U.S. Activities to enjoy on the Refuge:

- 1) Hiking/Snowshoeing/Cross-Country Skiing - Three trails are located off State Highway 49, including the floating boardwalk on the Egret Trail. Two trails are located at the Bud Cook Hiking Area, south of Highways 49 and Z. Refuge hiking trails are open every day, year-round.
- 2) Auto Tour Route - The Horicon Turnpike, with interpretive stops, is located in the northwest part of the marsh off State Highway 49. Open daily April 15 - September 15.
- 3) Hiking/Biking/Driving - Enjoy Main Dike Road, open daily, April 15 to September 15 or Ledge Road open year-round.
- 4) Fishing - The Main Dike Road fishing site is open April 15 to September 15 and the Ledge Road and Peachy Road fishing sites are open daily, year-round according to State seasons. All other State regulations apply. Bank fishing only.

- 5) Hunting - Call or stop by for a hunting map and details about various game, seasons, and regulations.
- 6) Educational Programs - Special events, tours, field trips and talks take place year round. Call for information. All visitor activities are allowed during daylight hours only.

Help protect wildlife and promote public safety. Remember that public use activities are allowed during daylight hours only. Dogs must be leashed and on the trails or roads at all times. Please pick up after your dog. No camping, boating, canoeing, ATV's, snowmobiles or fires are allowed on the Refuge. For law enforcement assistance or to anonymously report a violation, contact the visitor center or the sheriff's office.

For more information, contact the Visitor Center, Horicon National Wildlife Refuge, W4279 Headquarters Road, Mayville, WI 53050. Phone: (920) 387-2658. Deaf/hard of hearing individuals may reach Horicon NWR through Wisconsin's Relay Service at 1-800-947-3529 (v/tty). Visitor Center hours are 7:30 a.m. to 4:00 p.m. Monday through Friday year-round. Open weekends in fall and spring. www.fws.gov/r3pao/horicon/index.htm.

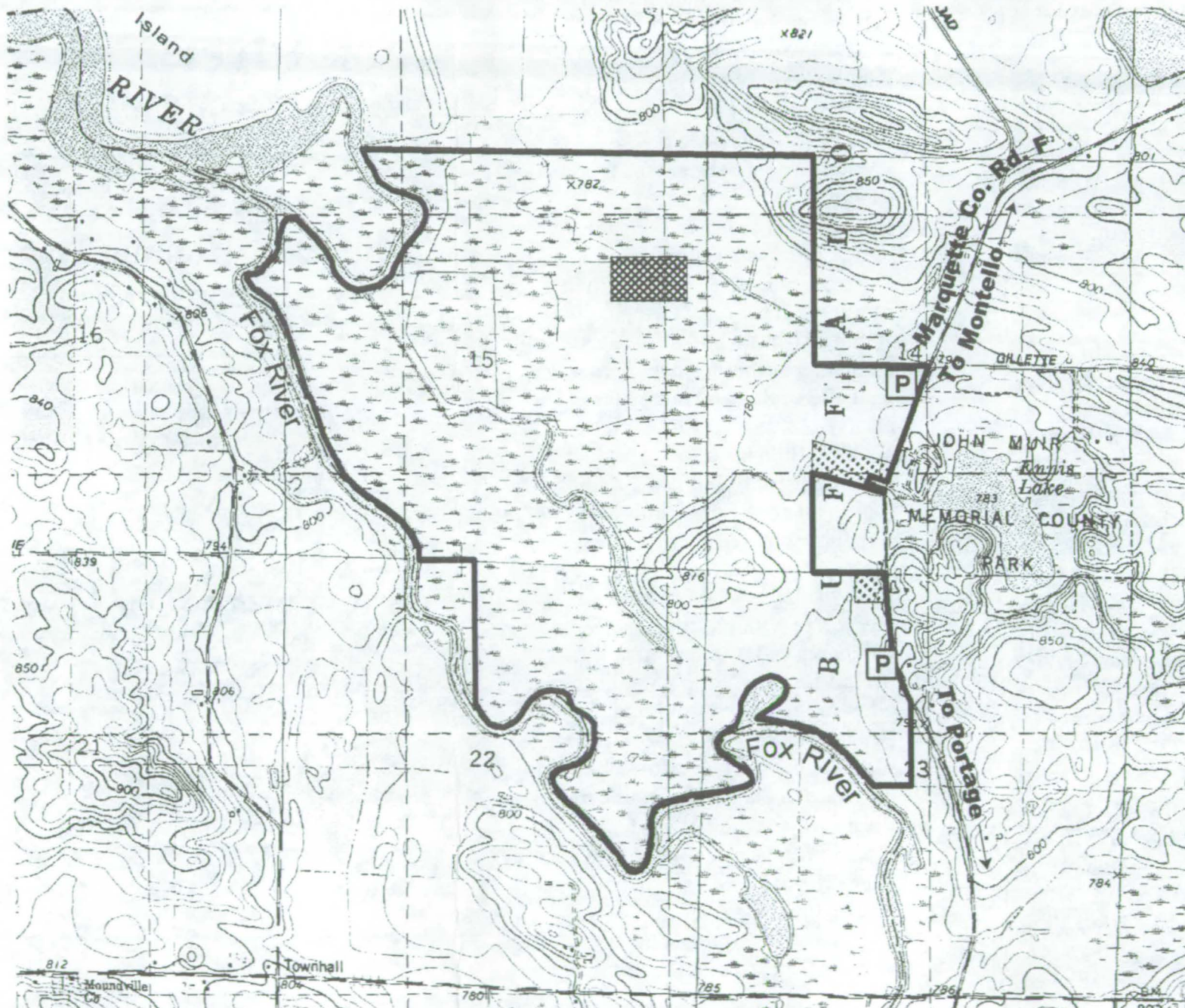
Equal opportunity to participate in, and benefit from, programs of the U.S. Fish and Wildlife Service is available to all individuals regardless of age, race, color, national origin, religion, sex, sexual orientation, or disability. Persons who believe they have been discriminated against should contact: U.S. Department of Interior, Office for Equal Opportunity, 1849 C Street, N.W., Washington, D.C., 20240.

HORICON MARSH STATE WILDLIFE AREA







Welcome to the Horicon Marsh Wildlife Area. This area is open daily from 5:00 a.m. to 10:00 p.m. for year-round enjoyment. The following information is provided to help you enjoy the property safely.

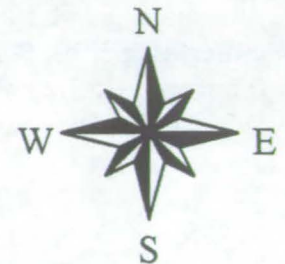
- 1) Hiking/Snowshoeing/Cross-Country Skiing - Hiking trails are open year-round. Hike, cross-country ski or snowshoe the trails in season. Cross-country ski trails are groomed by volunteers.
- 2) Biking - Hiking, biking and other uses are available on the Wild Goose Trail. Check for current regulations.
- 3) Canoeing - The best canoeing opportunities are available along the main river corridor and main ditch. Please be careful to minimize disturbance to wildlife and watch out for motorboats which also use the area.
- 4) Educational Programs - Group presentations are available on a reservation basis. Public naturalist programs are available on the weekends during spring and fall. Call 920-387-7877 for reservations or program schedules.
- 5) Fishing - The Wildlife Area is open for fishing. Check current regulations for season dates, bag and size limits.

Fox River NWR Hunting Map



LEGEND

-  No Hunting Zone
-  Private Property
-  Refuge Boundary
-  Parking
-  Wetland
-  Forest



Fox River
National Wildlife Refuge
Marquette County
Wisconsin

United States
Fish and Wildlife Service
Department of the Interior

1,004 Acres

T14N R9E

0.8 0 0.8 1.6 Miles

REGULATIONS

- Fox River National Wildlife Refuge is not open for any public use at this time except deer hunting.
- The Refuge is located within Deer Management Unit 67A; all Wisconsin state regulations for this unit are in effect, including Earn-A-Buck (EAB) Zone T herd reduction hunts. No special refuge permits are required.
- The Refuge is located in an EAB unit; thus, a buck can not be harvested without first harvesting an antlerless deer to obtain buck authorization.
- One antlerless deer only, per license, plus additional antlerless deer per antlerless permit may be harvested on the Refuge during any of the following Wisconsin state seasons:
 - **Archery:** Oct. 28 – Oct. 31
Dec. 9 – Dec. 12
 - **Gun:** Oct. 28 – Oct. 31
Dec. 9 – Dec. 12
- One antlerless deer, per license, plus one buck (if an antlerless deer is harvested first) and additional antlerless deer per antlerless permit may be harvested on the Refuge during any of the following Wisconsin state seasons:
 - **Archery:** Sept. 18 – Oct. 27
Nov. 1 – Nov. 18
Nov. 29 – Dec. 8
Dec. 13 – Jan. 3
 - **Gun:** Nov. 20 – Nov. 28
 - **Muzzleloader** Nov. 29 – Dec. 8
- Scouting for gun deer season is allowed Nov. 1-7 only.

- Parking in designated parking lots only
- Boats are prohibited on the refuge but may be used on the river to access the west side of the refuge.
- Foot travel only; do not litter.
- Hunters may not enter areas posted as "NO HUNTING ZONE."
- Portable tree stands may be used but cannot be left overnight.
- Construction or use of permanent blinds or tree stands are prohibited
- Other prohibited activities include: camping, fires in any form, baiting, and shining to locate or harvest deer.
- Hunters must not trespass onto private land. The refuge boundary (see map) is clearly posted with white "National Wildlife Refuge" signs.
- Practice firearm safety at all times
- Report all accidents or injuries to Refuge Headquarters (see address below)

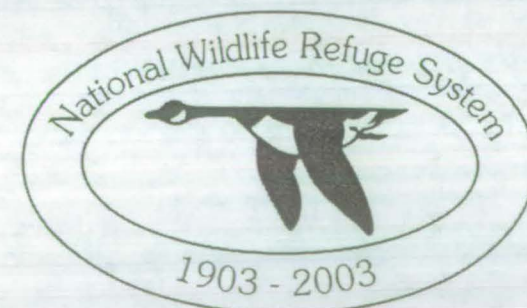
OTHER INFORMATION

- Fox River National Wildlife Refuge was purchased in 1979 to protect wetland habitat for the greater sandhill crane and other migratory wetland birds.
- Because more than 70 % of the refuge is wetland, hip boots are advisable. Also, be aware of deep water in ditches.
- Please respect the land and have a great time during your hunt.
- If you have questions or comments, please direct them to:
Shawn G. Papon, Wildlife Biologist
W4279 Headquarters Rd.
Mayville, WI 53050
(920) 387-2658 ext. 16

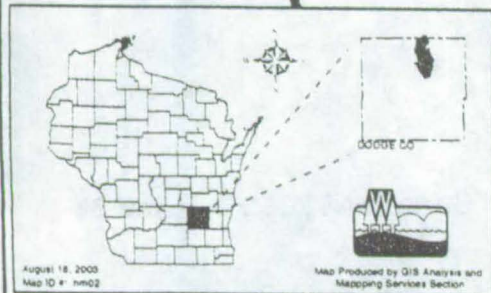
Fox River

National Wildlife Refuge

2004 Deer Hunting Map and Regulations



Hunting Map



Map Produced by GIS Analysis and Mapping Services Section

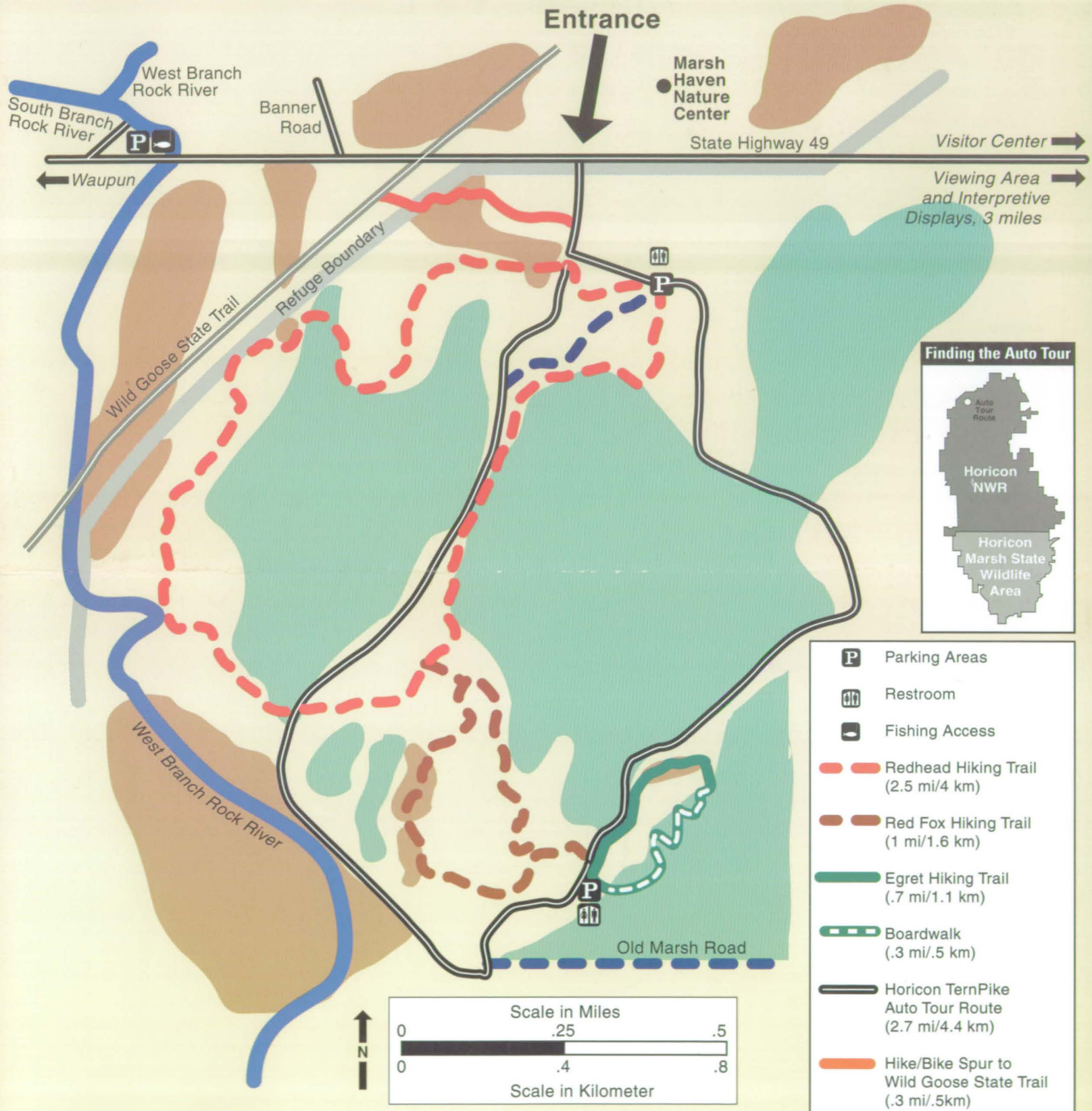
ALL OF HORIZON NATIONAL
WILDLIFE REFUGE IS CLOSED
TO WATERFOWL HUNTING

* see backside for details

* see backside for details

For further information, contact the Wisconsin Department of Natural Resources - Horicon Service Center, N7725 Highway 28, Horicon, WI 53032 (920) 387-7860. Office hours are Monday - Friday, 7:45 a.m. - 4:30 p.m.

Horicon NWR Auto Tour & Trails



Finding the Auto Tour



Horicon NWR Bud Cook Hiking Area

