

Neal Smith
National Wildlife Refuge
Prairie City, Iowa
Fiscal Year 2002

Nancy Gilbertson 1/24/03
Refuge Manager Date

Don Kauffeld 1/29/03
Refuge Supervisor Date

Nita M. Fier 2-18-2003
Regional Chief, NWRS Date

Table of Contents

Introduction

Highlights

Monitoring and Studies	1
1.a. Surveys and Censuses	1
1.b. Studies and Investigations.....	3
Habitat Restoration.....	23
2.a. Wetland Restoration	23
2.b. Upland Restoration.....	24
2.c. Deepwater/Riverine Restoration.....	30
Habitat Management	31
3.a. Water Level Management	31
3.b. Moist Soil Management.....	31
3.c. Graze/Mow/Hay	31
3.d. Farming.....	34
3.e. Forest Management	34
3.f. Fire Management.....	34
3.g. Pest Plant Control	37
Fish and Wildlife Management.....	39
4.a. Bird Banding	39
4.b. Disease Monitoring and Treatment	39
4.c. Reintroductions	39
4.d. Nest Structures	39
4.e. Pest, Predator and Exotic Animal Control	39
Coordination Activities	40
5.a. Interagency Coordination.....	40
5.b. Tribal Coordination.....	45
5.c. Private Land Activities.....	45

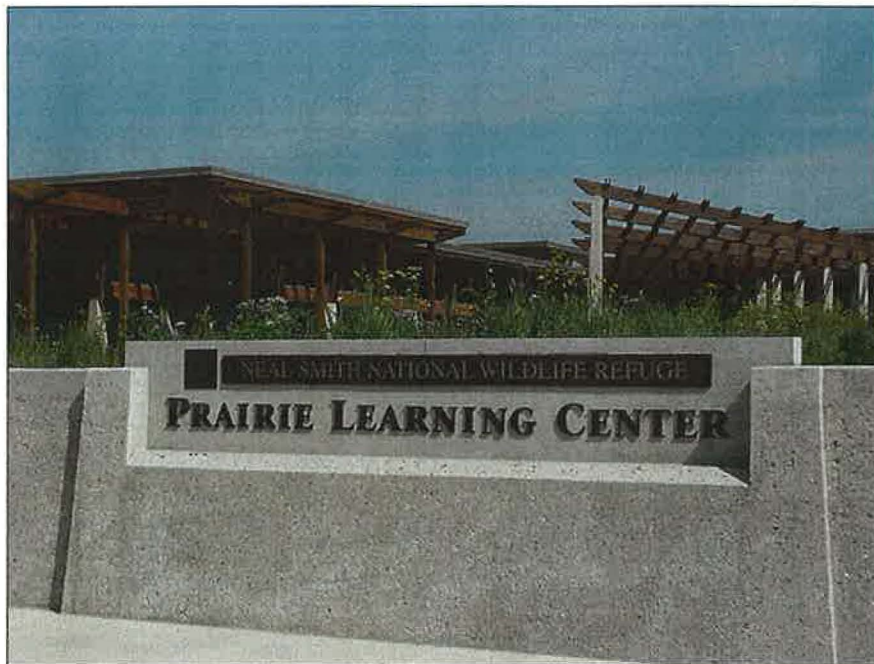
Resource Protection	47
6.a. Law Enforcement	47
6.b. Permits and Economic Use Management	48
6.c. Contaminant Investigation	49
6.d. Contaminant Cleanup	49
6.e. Water Rights Management	49
6.f. Cultural Resource Management.....	49
6.g. Land Acquisition Support	49
6.h. Threats and Conflicts	49
 Public Education and Recreation.....	 50
7.a. Provide Visitor Services.....	50
7.b. Outreach	61
 Planning and Administration.....	 69
8.a. Comprehensive Conservation Planning.....	69
8.b. General Administration	69

INTRODUCTION

The Neal Smith National Wildlife Refuge and Prairie Learning Center is among the most unique and valued initiatives in restorative landscape ecology in the United States. The Refuge is located in Jasper County, Iowa, approximately 20 miles east of Des Moines. Prior to Euro-American settlement, the rolling landscape of this portion of Iowa was dominated by tallgrass prairie with islands of oak savanna.

Establishment of the Refuge by the U. S. Fish and Wildlife Service was authorized by Congress on May 25, 1990 for the purposes of restoring native tallgrass prairie, wetland, and woodland habitats; serving as a major environmental education center providing opportunities for study; providing wildlife dependent outdoor recreation benefits to the public; and providing assistance to local landowners to improve their lands for wildlife habitat.

The 8,654 acre project is unlike any existing refuge in that it has been established by Congress to restore a major expanse of tallgrass prairie. The Refuge is the largest prairie reconstruction effort in the country and is symbolic of a growing national and international interest in healing the environment.



HIGHLIGHTS FOR 2002

Refuge becomes one of first Land Management and Research Demonstration sites.

Regal Fritillary butterflies return to the Refuge.

Carbon sequestration study produces interesting preliminary results.

New irrigated production plots are installed and planted.

Bison round-up a success.

Fire Management Plan completed.

Refuge has most successful fall burn ever.

Refuge hosts National Wildlife Refuge Association Board Meeting.

FmHA easement inspections are completed.

Friends of PLC provide funding for four internships.

A generous benefactor provides for a new exhibit.

Over 20,000 volunteer hours are recorded.

Refuge staff and Friends' representatives attend first NWR Friends' Conference in Washington.

1

Monitoring and Studies

As part of the 1998 Keystone Conference, the Refuge System's "Fulfilling the Promise" to improve its role as a model for land management techniques that maintain and restore wildlife populations and their habitats, developed a promise to designate Land Management Research and Demonstration (LMRD) sites throughout the Refuge System. These sites will showcase successful management techniques and develop and validate new techniques through applied research. The Service envisions these as places that will serve as learning centers and training grounds for land managers, where people both inside and outside the Service can come to see land management practices happening on the ground. Neal Smith NWR applied for status as one of the first sites in the United States. We were thrilled to find out in late FY2002 that the Refuge had indeed been selected as one of eight sites to be funded in 2003.

On March 14, the Research Advisory Committee met to review a historical perspective of the Refuge research program, as well as research in progress, and new research proposals. Members present included Drobney, Gilbertson, Jim Mattsson, (FWS Regional Biologist), Keith Schilling (Iowa DNR Geological Survey Bureau), Daryl Smith (University of Northern Iowa Professor, Biology), Jerry Selby (TNC), and a new member, Dave Otis, who is the new Iowa State University Research Cooperative Unit Leader. Absent were Dennis Keeney, Erv Klaas and Jim Pease. Drobney coordinated the meeting. The Research Advisory Committee continues to be invaluable in guiding the research process at the Refuge by providing a diversity of ecological restoration expertise and perspectives. This dedicated cadre of scientists and land management professionals assists in research proposal review, in developing research priorities and in promoting the research program at the Refuge.

1.a. Surveys and Censuses

Breeding Bird Point Count

Breeding bird point counts continued on the Refuge for the ninth straight year. The value of the data collected increases each year as we statistically document the changes in the abundance of and distribution of birds around the Refuge. Brett Geisler performed the counts again this year. The total number of species counted increased from 55 in 2001 to 61 in 2002. Once again the red-winged blackbird was the most commonly counted species, but was present on the second highest number of points. The species observed on the highest number of points was the American goldfinch at 45 out of 109 points. Points were classified as being in one of four cover types: herbaceous, riparian, woody, or crop. More birds were counted on points within riparian areas than any other cover type, with 237 birds counted. Woody areas were second at 199 birds, followed by herbaceous areas at 123 birds, and crop areas produced only 56. Three points produced no birds at all and they were all in cropland.

Species observed, either counted or between counts, which are on the Service's list of Species of Management Concern for the Upper Midwest include the northern harrier, upland sandpiper, yellow-billed cuckoo, red-headed woodpecker, northern flicker, sedge wren, wood thrush, loggerhead shrike, dickcissel, field sparrow, grasshopper sparrow, Henslow's sparrow, bobolink, and eastern meadowlark.



Loggerhead Shrikes were observed on the Breeding Bird Survey

Christmas Bird Count

Despite a generally mild winter, the Christmas Bird Count day (December 28), was very cold and windy. Possibly as a direct result of the weather, both human and avian turnout were low. Eight counters saw a total of just 448 individuals from 27 species on the day of the count and added one individual of one more species during the count week period. No rare or unusual birds were encountered, but one bald eagle, one rough-legged hawk, and two northern harriers were included in the count. Dark-eyed juncos were the most frequently counted species at 95 individuals; American tree sparrows came in second with 71 individuals; and house sparrows were third at 50. Charland has been working hard at increasing awareness of the birding possibilities on the Refuge within the local birding community, so we hope participation increases in the coming years.

Woody Macro-plot

Biology Intern, Megan Corte, installed woody species macro-plots and collected data on woody species occurring within them on the Dogleg Remnant.

Fourth of July Butterfly Count

During the summer, a Fourth of July butterfly survey was conducted at NSM. The sites included the Tallgrass Trail, the Savanna Trail and the Basswood Trail. The count was taken on July 13, 2002. Field notes and photographs were taken during the surveys at each site. Butterflies, plants and plant associations were noted. No butterflies were netted or taken as specimens. Unknown or hard to identify butterflies were photographed using close-up techniques for later identification. Butterflies were identified according to Scott (1980), Heitzman and Heitzman (1987), Shull (1987), and Glassberg (1999).

The most species and individuals noted were on the Tallgrass Trail, with 17 species and 100 individuals. The Savanna Trail had 5 species and 14 individuals, and the Basswood Trail had 4 species and 17 individuals. The greater species diversity along the Tallgrass Trail is expected because this trail is longer and has more habitat types. It is of interest that no butterflies were noted along Basswood Trail in the woods. In this area, butterflies were only observed within 20 yards of the parking lot along the trail, or in the parking lot itself. Eighteen different species were observed combining data from all sites.

The Eastern Tailed Blue was the most numerous butterfly along the Tallgrass Trail, and Clouded Sulfur was the second most numerous. On Basswood Trail, Clouded Sulfurs were the most numerous.

The American Painted Lady was not seen in 2002, though common in 2001. This butterfly, however, tends to have boom and bust years, and thus their lack this year is not of concern.

Initial Bacteria Survey

In October, two researchers from Pittsburgh, PA took water samples from Basswood Trail pond as a part of a national investigation designed to catalogue bacterial and viral diversity. Results will be reported later. These researchers have an interest in developing a formal research relationship with Neal Smith NWR.

1.b. Studies and Investigations

Walnut Creek Watershed Study, Ongoing

(Principle Investigator: Dr. Keith Schilling, Geological Survey Bureau, IA DNR).

A report on the Walnut Creek Watershed Restoration and Water-Quality Monitoring Project was published in February 2002. The report consisted of a series of articles that summarized the results of monitoring activities in Walnut and Squaw Creek watersheds in Jasper County for water years 1995 to 2000. As discussed in the introductory article of the report, the Walnut Creek project was established in 1995 to monitor the effects of large-scale prairie restoration occurring at the Neal Smith National Wildlife Refuge on water quality in the Walnut Creek watershed.

results from the first three years of monitoring (water years 1995 to 1997), including land use, discharge and suspended sediment, surface and groundwater quality, and biological monitoring (Schilling and Thompson, 1999). In 2000, results of discharge and suspended sediment monitoring in Walnut and Squaw Creek watersheds for water years 1995 to 1998 were examined in closer detail (Schilling, 2000). Unlike previous reports, the 2002 report was organized as a series of articles in order to present more discussion associated with individual project components and make individual topics more accessible for viewing on Iowa Department of Natural Resources, Geological Survey Bureau's web page (www.igsb.uiowa.edu).

Following an introductory article describing the project background and land use changes, other articles in the report focused on specific aspects of surface water quality monitoring, including:

- nitrate, chloride and sulfate concentrations and loads,
- herbicide concentrations and loads,
- fecal coliform concentrations,
- common field parameters of pH, specific conductance, turbidity, etc.,
- biological monitoring of macroinvertebrates and fish.

Discharge and suspended sediment data were not included in the summary report. This information will be discussed in a later report in conjunction with presentation of a sediment erosion and delivery model currently being prepared for the Walnut and Squaw Creek watersheds.

We hope that the monitoring topics discussed in this report are of interest to those following the Walnut Creek project as well as those interested in water quality monitoring in the State of Iowa. Lessons from this project,, both positive and negative, offer valuable insight on strategies for monitoring watershed scale relationships between land use and water quality. Improved understanding of these relationships moves us closer toward being able to track the effectiveness of best management practices to reduce non-point source pollution.

Reduced baseflow transport of agricultural pollutants along a restored prairie riparian corridor in Iowa.

(Principle Investigator: Dr. Keith Schilling, Geological Survey Bureau, IA DNR. Summary of research presented at the American Water Resources Association Specialty Conference: Ground Water/Surface Water Interactions, Keystone, CO, July 2002.)

A baseflow survey of 41 tributary creeks conducted in October 2001 investigated the transport of atrazine, nitrate-nitrogen, chloride and sulfate in two 5,000 hectare Jasper County, Iowa watersheds. The watersheds comprise a long-term paired study to evaluate the effects of large-scale conversion of row crop to prairie in Walnut Creek watershed compared to highly agricultural Squaw Creek watershed. Discharge and chemical concentrations measured at sub-watershed outlets were used to assess

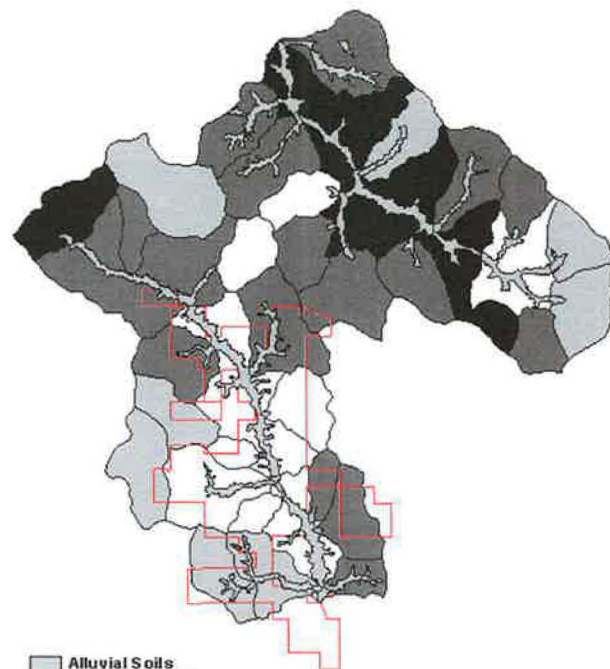
chemical losses. Streamflow varied considerably among sub-watersheds but was found to be significantly related ($p < 0.05$) to the amount of alluvial soils present in drainage areas. Two methods were used to estimate baseflow from riparian corridors where discharge could not be directly measured: 1) a watershed flow budget; and 2) a regression equation related to the amount of alluvial soils present. Diffuse groundwater discharge along major tributary corridors was found to be the major source of streamflow and pollutant loading in both watersheds. Concentrations of atrazine (< 0.05 to $0.24 \mu\text{g/l}$), nitrate (< 0.05 to 14 mg/L) and chloride (6.2 to 34 mg/L) varied but were highest in water draining predominantly row crop areas. (See Figure 1) Baseflow from restored prairie sub-watersheds contained low concentrations of ag-pollutants. Prairie restoration concentrated in the riparian corridor of the Walnut Creek watershed has produced a different pollutant-loading pattern compared to Squaw Creek. In Walnut Creek watershed, nitrate losses occurred primarily in headwater drainages dominated by row crop. Nitrate concentrations decreased downstream as baseflow from restored prairie areas diluted stream nitrate concentrations. In Squaw Creek, no differences in nitrate losses were observed among sub-watersheds. Nitrate concentrations in Squaw Creek increased downstream as baseflow containing elevated nitrate concentrations discharged from riparian row crop areas.

Water level monitoring at the riparian well transect continued in 2002. A series of 35 shallow, nested groundwater monitoring wells were installed across the Walnut Creek floodplain in 2001. The entire transect of wells spans a distance of 1800 feet from upland landscape positions on both sides of the floodplain (Figure 2). One objective of the study has been to monitor potential hydrologic changes as portions of the area are restored from reed canary grass to native floodplain vegetation.

The west side of the riparian zone of Walnut Creek was subject to chemical treatment to eradicate *P arundinacea* in mid-May 2002. The area between W1 and midway between W5 and W3 was sprayed with a herbicide (glyphosate), which effectively removed the overlying vegetation during the growing season of 2002. As a result, water table elevations on the west side of the transect were significantly different than the east side (Figure 3). Comparing the water table elevations in equivalent 1, 2, and 3 locations over a 120-day period indicated that hydraulic heads were as much as 1.2 m lower on the untreated east side compared to the treated west side (Figure 4). The east side of the transect dominated by dense cover of *P arundinacea* showed steady water table declines throughout the growing season due to plant transpiration. Water table elevations on the east side were similar between fall 2001 and fall 2002 whereas the west side of the transect had limited plant transpiration occurring; subsequently, the water table remained similar to spring 2002 levels.

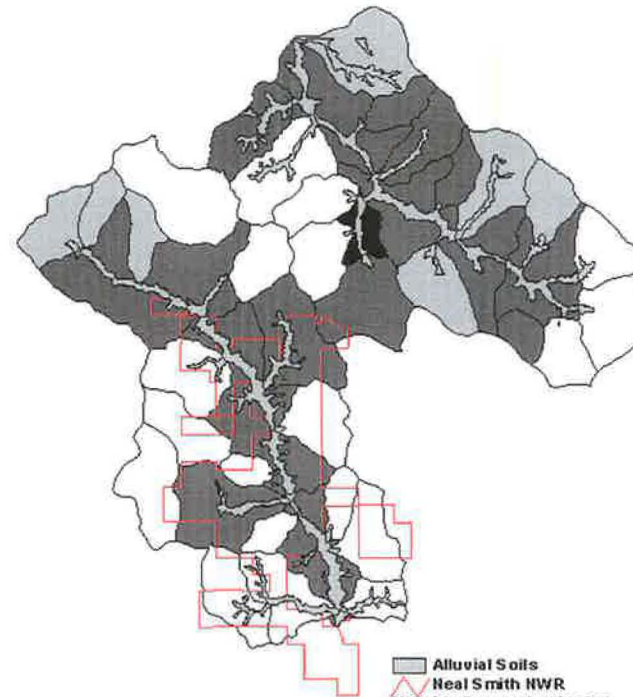
On April 27, 2002, water levels monitored continuously in four wells captured their response to a runoff event in Walnut Creek (Figure 3). Approximately 35 mm of rainfall within a 12-hr period increased discharge in Walnut Creek from approximately 0.5 to $4.2 \text{ m}^3/\text{s}$ and produced a 0.4 m rise

Nitrate Export



Alluvial Soils
Neal Smith NWR
Nitrate Export (kg/day/ha)
-2.95 - 0.04
0.04 - 0.75
0.75 - 1.13
1.13 - 2.95
2.95 - 21.99

Chloride Export



Alluvial Soils
Neal Smith NWR
Chloride Export (kg/day/ha)
0.11 - 3.05
3.05 - 7.24
7.24 - 15.32
15.32 - 25.75
25.75 - 157.9

4 0 4 Kilometers

Figure 1

represented a flow that exceeded 95% of the daily mean discharges measured in Walnut Creek for the previous seven year period (pers. comm., D. Eash, U.S. Geological Survey, Iowa City, Iowa).

The hydraulic head in W1C, located 6.7 m from the stream, increased slightly in response to the rise in stream stage (Figure 3). Based on hydraulic head relations, groundwater at W1C continued to discharge into Walnut Creek even during this runoff event; thus bank storage of streamflow propagated less than 6.7 m into the streambank. Thus, the potential for interaction of streamflow with aquifer materials during high flow events in this incised channel system was limited to a narrow zone immediately adjacent to the channel.

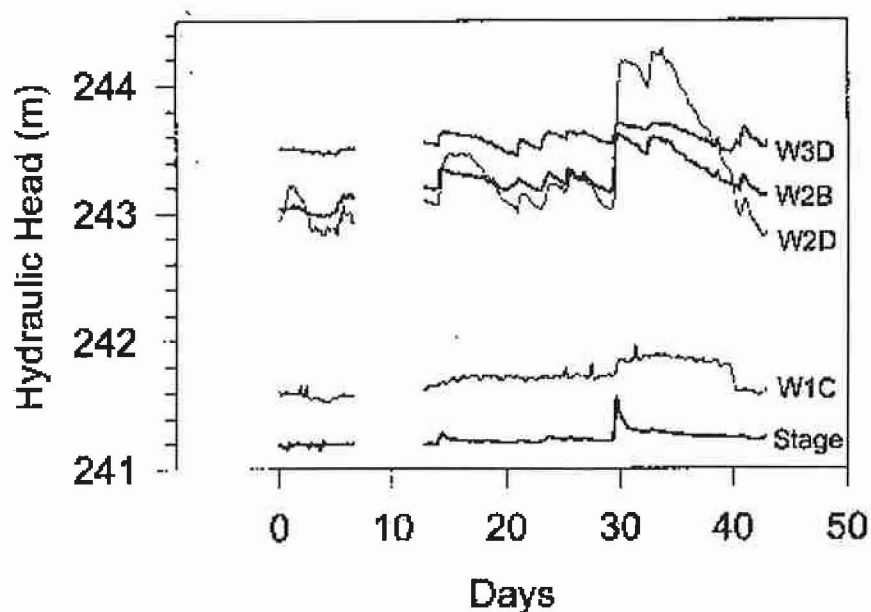


Figure 3. Differences in hydraulic head between treated east side of the floodplain and the untreated west side of the floodplain. Note the water table lowering on the west side of the floodplain due to plant transpiration.

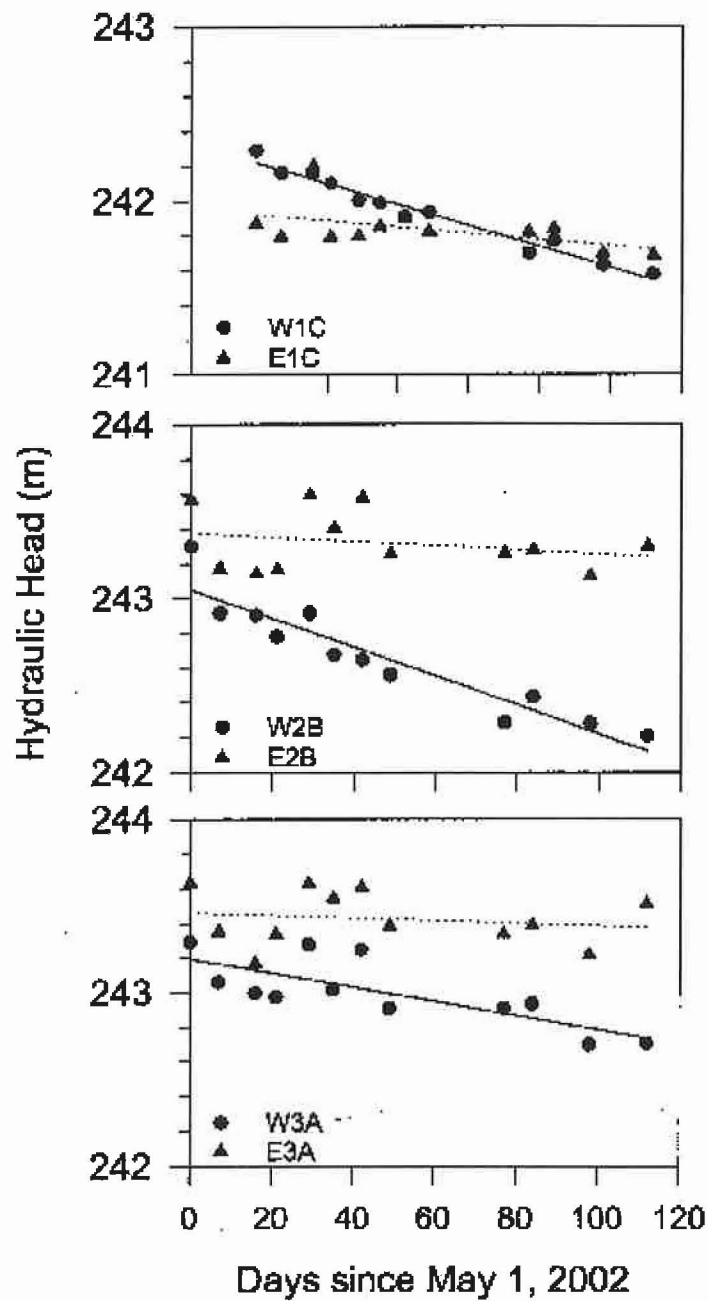


Figure 4. Hydraulic heads monitored during a runoff event in Walnut Creek. Note how the stream stage does not rise above the head measured in well W1C located approximately 25 feet from the channel.

Changes in water quality with conversion of row crops to prairie vegetation in the Walnut Creek Watershed, Jasper County, Iowa.

(Abstract of paper presented at the 18th North American Prairie Conference, June 23-27, at Kirksville, Missouri. Co-authors include: Keith Schilling, Iowa Department of Natural Resources, Geological Survey Bureau and Pauline Drobney. Drobney presented).

Conversion of row crop to prairie on Neal Smith National Wildlife Refuge in Jasper County is correlated to reductions of atrazine, nitrate-nitrogen, chloride, and sulfate when comparing attributes of Walnut Creek within the Refuge to the control watershed, Squaw Creek. In 1992-1993, 100 foot buffers of exotic perennial vegetation were installed along all agricultural waterways in the Walnut Creek watershed as a soil conservation measure and precursor to prairie reconstruction. Since 1992, prairie reconstruction has occurred on approximately 2,300 acres, with the majority of plantings in the riparian area occurring since 1997. Pollutant-loading patterns in the riparian corridor are different in Walnut Creek than the highly agricultural Squaw Creek. Primary loading of nitrate in Walnut Creek occurred in the heavily cropped, off-refuge headwater area. Downstream baseflow from reconstructed prairie diluted stream nitrate concentrations. No differences in nitrate loading were observed among subwatersheds in Squaw Creek. Though variable among subwatershed outlets, stream flow seemed to be significantly related ($p < 0.05$) to the amount of alluvial soils present in drainage areas. Diffuse groundwater discharge along major tributary corridors was found to be the major source of streamflow and loading in both watersheds. Concentrations of atrazine (< 0.05 to 0.24 g), nitrate (< 0.05 to 14 mg/l), and chloride (6.2 to 34 mg/l) were highest in water draining row crop areas. A five-year study revealed that baseflow is primarily responsible for chemical export in both watersheds, ranging from 61-68% of the total load. Ongoing studies involve relating floristic quality to changes in hydrology and water quality, including conversion of reed canary grass (*Phalaris arundinacea*), to diverse sedge meadow community.

Soil carbon assessment across a native prairie restoration chronosequence.

(Abstract of paper presented at the 18th North American Prairie Conference, June 23-27, at Kirksville, Missouri. Co-authors include: Cindy Camberdella, USDA-ARS-National Soil Tilth Lab; Keith Schilling, Iowa DNR Geological Survey; Thomas Isenhardt, Iowa State University; Richard Schultz, Iowa State University; and Pauline Drobney. Camberdella presented).

Native tallgrass prairie ecosystems allocate a large percentage of photosynthetically-fixed C belowground. Restoring disturbed prairie systems to the native state can potentially result in large increases in soil C. This study focused on quantifying soil profile C at Neal Smith National Wildlife Refuge (NSM) near Prairie City, Iowa to determine the effect of time since prairie reestablishment on soil C accumulation. Blocks of land have been restored to native prairie at NSM every year since 1993. We used a stratified sampling design to identify sampling locations within 8 restored areas, 3 native remnant areas, and 3 cultivated areas blocked by 3 upland soil types.

area grid and random number generator were used to select exact sampling locations. GPS coordinates were used to locate sampling sites in the field. Soil cores were collected in May 2000 to a depth of 120 cm using a truck-mounted Giddings soil sampler. Total soil C to a depth of 120 cm averaged across all sites ranged from 77.0 to 123.0 Mg per hectare. Coefficients of variation ranged from 2.7 to 45.7%. We didn't observe a consistent positive change in soil C contents in the prairie restoration chronosequence with time since restoration. Cultivated or remnant sites didn't have consistently less or more soil C than restored sites. Variability was relatively high despite the stratified design. Landscape-scale changes in total soil C are difficult to detect over the short term, primarily due to landscape-scale spatial heterogeneity in soil C contents and inconsistent impacts of historic management practices on current soil C stocks. Future work at the Refuge will focus on minimizing these problems in order to optimize our ability to detect changes in ecosystem parameters.

Regal Fritillary Butterfly Introduction Research

(Investigators: Diane Debinski and Stephanie Shepherd, ISU, Ames, IA).

The research undertaken in the summer of 2002 at Neal Smith NWR had two main objectives. The first was to characterize the butterfly community and its relationship to the plant community in 12 planting units on the Refuge property. The second was a component of a longer project and was aimed at evaluating our efforts to reintroduce the Regal Fritillary (*Speyeria idalia*), a declining prairie endemic butterfly, to the Refuge.



Regal Fritillary on a Prairie Blazing Star

To accomplish our first objective, butterflies were surveyed in 12 planting units chosen for the diverse levels of vegetative quality they possessed. Two 100 meter long transects were established in each planting unit and were surveyed for butterflies three times between late May and mid-August. Butterflies seen within the transect were identified down to species, and numbers of each species, their activity when seen and nectar plants used were recorded. A list of species seen during the surveys is indicated below in Table 1. In addition, twelve 0.5 X 0.5 meter quadrats per planting unit were used to survey the plant community three times during the summer in conjunction with the butterfly community. Plants were identified down to species whenever possible and their percent cover within the quadrat as well as number of ramets in bloom for each species was recorded.

These plant data have been used to estimate plant diversity, and to establish a coefficient of conservatism value for each planting unit. These data in turn are being used to determine if butterfly communities, through their abundance and diversity are responsive to differences in the vegetative quality of a reconstruction site. Information on the number of ramets in bloom and on the nectaring preferences of butterflies is being used to determine if nectar availability is important in determining butterfly community structure. These analyses will help us understand, when compared to data collected at other reconstructions as well as native prairies, the nature of how reconstructions are promoting and affecting butterfly communities.

Our second objective was an outgrowth of a 5-6 year ongoing project to establish, at the Refuge, a population of the declining prairie butterfly, the regal fritillary. In the early part of the summer established plots of the regal fritillary's host plant, the blue prairie violet (*Viola pedatifida*) were surveyed. Survival and spread of the violets are being monitored. Survival has been good among all the areas except those established in the bison enclosure. We also noted some limited spreading this summer with approximately nine new plants being recorded.

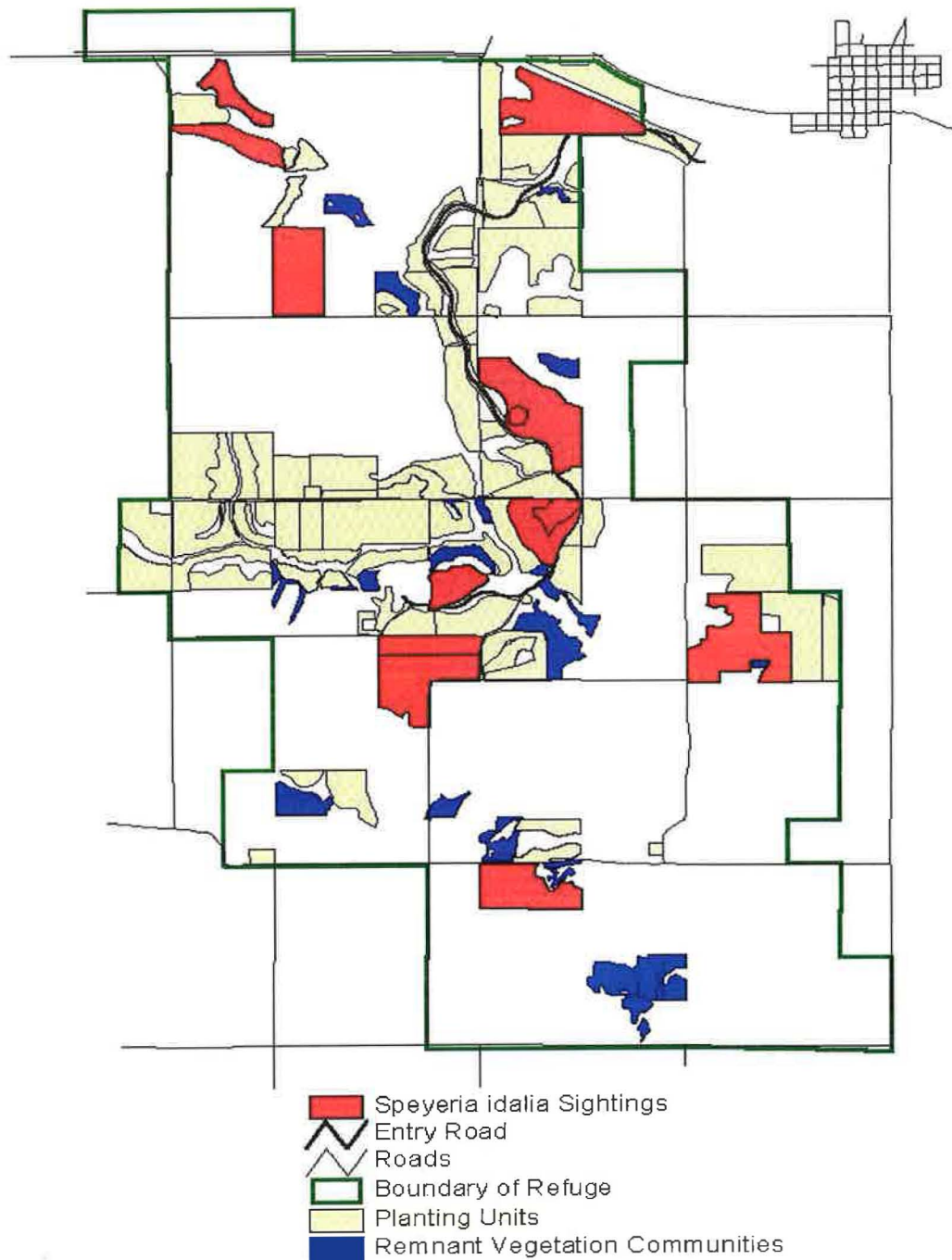
In the summer of 2001, three gravid regal fritillary females were introduced into two of the violet plots in two different areas. In mid-June of 2002 we began surveying those two areas for adult regal fritillaries. We caught and identified a male regal fritillary on one of the reintroduction sites. As we continued to survey various unrelated planting units as a part of the butterfly community study, we began seeing regal fritillaries in several locations around the Refuge, some of them removed a good distance from the reintroduction sites. We had also been finding regal fritillaries at a number of other new locations throughout central Iowa. We surmised from these observations that regal populations were high this summer and that individuals were probably dispersing to the Refuge naturally. It was decided to initiate a mark-release-recapture study at the Refuge and not to attempt the introduction of any new gravid females this summer.

The mark-release-recapture took place in three planting units where regal fritillaries were deemed to be most abundant. Seventeen individual regal

two recaptures occurred and they were both of the same individual. In addition, we had 74 sightings of regal fritillaries in the three surveyed planting units. We marked three additional individuals outside of the three designated sampling areas and saw 20 more. A map with locations of regal fritillary occurrences on the Refuge is shown below.

Table 1: Butterfly Species for Neal Smith National Wildlife Refuge, 2002.

Species Name	Common Name
<i>Anatrytone logan</i>	Delaware Skipper
<i>Ancyloxypha numitor</i>	Least Skipper
<i>Cercyonis pegala</i>	Common Wood Nymph
<i>Chlosyne nycteis</i>	Silvery Checkerspot
<i>Colias eurytheme</i>	Orange Sulphur
<i>Colias philodice</i>	Clouded Sulphur
<i>Danaus plexippus</i>	Monarch
<i>Epargyreus clarus</i>	Silver-spotted Skipper
<i>Euptoieta Claudia</i>	Variegated Fritillary
<i>Eurema lisa</i>	Little Yellow
<i>Everes comyntas</i>	Eastern-tailed Blue
<i>Junonia coenia</i>	Common Buckeye
<i>Limenitis archippus</i>	Viceroy
<i>Lycaena dione</i>	Gray Copper
<i>Lycaena hyllus</i>	Bronze Copper
<i>Papilio glaucus</i>	Eastern Tiger Swallowtail
<i>Papilio polyxenes</i>	Black Swallowtail
<i>Phoebis sennae</i>	Cloudless Sulphur
<i>Pholisora catullus</i>	Common Sootywing
<i>Phyciodes tharos</i>	Pearl Crescent
<i>Pieris rapae</i>	Cabbage White
<i>Speyeria cybele</i>	Great-spangled Fritillary
<i>Speyeria idalia</i>	Regal Fritillary
<i>Thymelicus lineola</i>	European Skipper
<i>Vanessa atalanta</i>	Red Admiral



Map of Neal Smith NWR with locations of regal fritillary (*Speyeria idalia*) occurrences colored red.

Restoring native savanna ecosystems in the prairie-forest transition zone of Iowa.

(Principle Investigator: Dr. Heidi Ashjornsen. Abstract of proposal accepted by Neal Smith NWR).

Savanna ecosystems once comprised a dominant feature of the vegetation mosaic in the North-Central region of the United States prior to their destruction by deforestation and agricultural conversion. With the loss of these ecosystems, many native plant and wildlife species are now endangered, and invasion by exotic species such as garlic mustard, buckthorn, and honeysuckle are escalating. Further, important regulatory functions performed by savanna ecosystems related to the cycling of water, nutrients and energy have also diminished, as reflected by increased nutrient and sediment loading of surface waters, declining soil productivity and growing frequency of drought and flooding. These changes directly threaten the ecological and economic sustainability of Iowa's agroecosystems. Efforts to reestablish the oaks, grasses and forbs that once comprised the native savanna ecosystems are showing tremendous promise for ameliorating these environmental problems by restoring important ecological functions and enhancing biodiversity. However, our understanding of the effects of different restoration techniques and models on current vegetation communities and their effectiveness in achieving restoration objectives for savanna ecosystems is poor. We propose to establish an integrated management and research program for restoring native savanna/woodland vegetation communities to the landscape mosaic in the north-central U.S., focusing on the Neal Smith Wildlife Refuge and several additional high-priority sites in Iowa for this pilot project. To conduct this research, we have assembled a well-qualified team of researchers from various disciplines (hydrology, forest ecology, animal ecology, soil science) and collaborating institutions (University of Iowa, Iowa State University, Soil Tilth Lab). The implementation of the integrated management and research activities proposed for this project will result in the creation of model restoration systems that demonstrate techniques for significantly improving in the quality of the soil, water, and vegetation that underpin the ecological productivity on which communities in Iowa depend upon for their sustainability.



Crude, yet effective, means of retrieving soil samples



Removing Sample



Finished Product

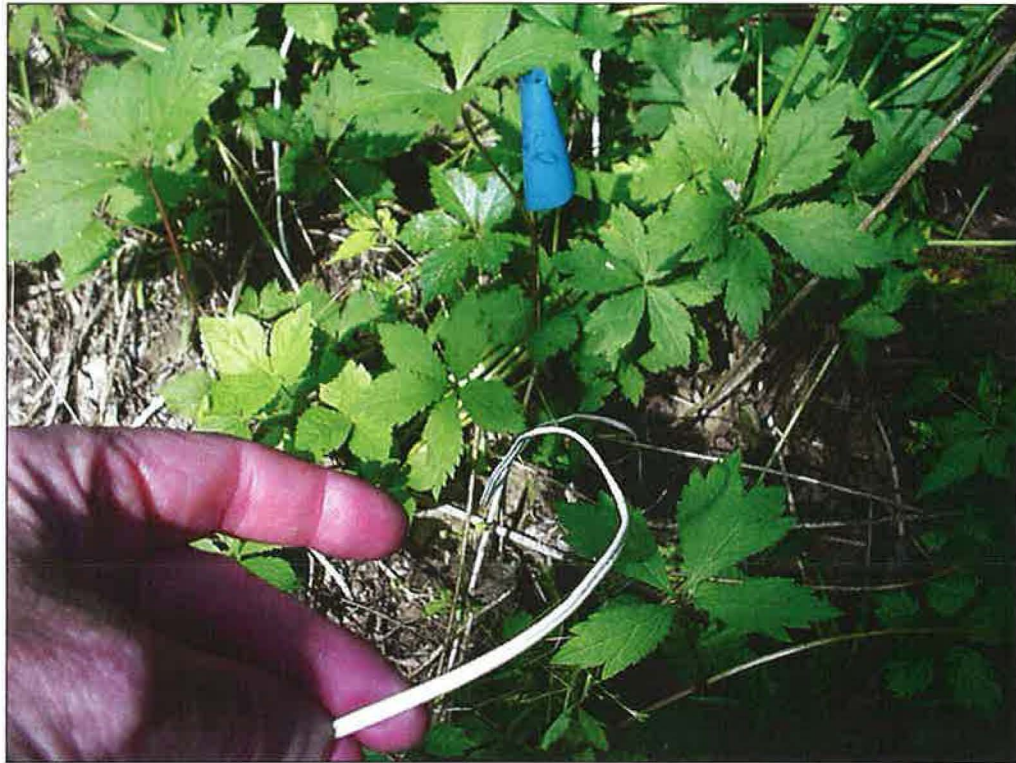
Methods:

Experimental treatments:

- At each plot on selected study sites, approximately half will receive restoration treatments, while the other half will remain untreated as a control. Initial treatment will consist of manual removal of all understory trees and shrubs not considered part of the native savanna. The leaves of the cut material (which contain most of the plant nutrients) will be allowed to dry and fall to the ground to decompose naturally on site, while the woody material will be piled outside the site and burned.
- The restoration treatment site will be burned periodically (every 2-3 years) during the first 10 years until a healthy understory of herbaceous plants has established.
- On sites where the canopy overstory does not currently contain an adequate population of savanna woody species and where seedlings of these species are not regenerating naturally in the understory, seedlings will be produced in a tree nursery using seed collected from trees growing near the site and transplanted to the site.

Ecological measurements:

- Vegetation: Plant species composition and diversity will be monitored prior to the treatments and annually following the treatments to determine changes in the plant community over time due to restoration treatments.
- Productivity and carbon sequestration: Biomass of the overstory trees will be assessed over time based on height and diameter measurements. Biomass of the understory herbaceous vegetation will be assessed by harvesting sub-samples from 1m² quadrants. Leaf area will be determined using hemispherical photography. Changes in belowground biomass and productivity will be estimated using sequential root coring techniques. Combined, the above measurements will be used to estimate productivity and the contribution of the vegetation communities to carbon cycling.
- Water cycling and plant-soil interactions: Soil moisture at different depths (Time Domain Reflectometry-TDR) and evapotranspiration will be monitored periodically to determine changes in water cycling due to restoration processes. Physiological responses of the dominant plant species to changes in site moisture conditions will be assessed using pre-dawn moisture potential measurements and by monitoring changes in plant growth and leaf area.



Device Measures Soil Moisture

Fieldwork implemented in 2002:

Permanent transects were established at one of the three proposed savanna restoration sites (Bird Head). The site was divided length-wise (north-south) into two sections of similar size, and a single north-south transect established in the center of each section (approximately 170 m long). The following data were collected during the summer of 2002:

1) Soils:

- a. Gypsum blocks were installed along each transects (3 sampling points per transect) at 4 different depths per sampling point (10, 30, 60, and 100 cm). Moisture readings were obtained weekly with assistance from the Refuge staff.

2) Vegetation:

- a. Overstory trees (dbh > 2.5 cm) – height, dbh, species; 2 m on either side of the transect.
- b. Saplings (dbh < 2.5 cm, height > 1 m) – height, dbh, species; 1 m on either side of the transect.
- c. Seedlings and shrubs (height < 1 m and > 30 cm) – species, basal diameter; 10 m intervals, 3 m radius
- d. Seedlings and herbaceous plants (height < 30 cm) – species and basal diameter (seedlings); percent cover (grasses and herbs); 10 m intervals, 1 m quadrant
- e. Canopy cover (hemispherical photography); 10 m intervals.

Microhistological analysis of bison diets in Central Iowa on reconstructed prairie.

(Summary of a presentation given at the 18th North American Prairie Conference by Smith.)

Neal Smith NWR introduced bison to newly re-constructed prairie in 1996. The bison were released within a 700 acre enclosure in order to contribute to biotic interactions that would normally take place in tallgrass prairie habitats. Prairie that is in the process of reconstruction is fragile due to the lack of deep sod development and low diversity of plant species present. It is vital to closely monitor the impacts of bison on the prairie and to monitor bison activities and behavior, including diet preferences, within the enclosure. A scarcity of food habits information about bison within tall grass prairie habitats diminishes the efficacy of management decisions. Current literature that is available suggests that bison are grazers consuming primarily grasses and sedges with a preference for sedges when available. A vital aspect of managing bison within an enclosed area and protecting that area from degradation is a thorough understanding of seasonal food habits. Neal Smith NWR provides a unique opportunity to study the food habits of bison during tallgrass prairie re-construction and provide a sound basis for bison management in prairie environments.

Originally, the objectives of the 2 year study were to determine diets of bison within the 700 acre enclosure, identify key seasonal forage plants of bison within the enclosure and to determine forage production and percent botanical composition within the enclosure. However, due to illnesses and employee transfers, the project was changed to a 1 year pilot study.



Volunteer Karen Balmer reading vegetation transect.

Twenty-five fresh fecal samples, 50 grams each, were collected from bison each month for one year. A monthly composite sample was made from the twenty-five samples. Composite samples were grouped by season and year for comparison: winter (December 22 through March 21), spring (March 22 through June 21) and summer (June 22 through September 21). Diet differences may exist between different age and sex groups so it was necessary to attempt to collect samples that represent the entire herd structure; calves/yearlings, cows and bulls. Fresh feces were collected immediately after animals had moved away from an observed area.

Diets were determined using fecal microhistological analysis. Each fecal sample was oven-dried then ground in a Wiley cutting mill using a 1 mm screen. A composite sample was made by measuring equal portions of each of the 25 samples collected each month. Five slides were prepared from each composite sample using the method developed by D. R. Sparks and J. G. Malechek using Permount Solution as a mounting medium. The slides were analyzed using 20 fields from each slide for a total of 100 fields. Percent composition and frequency of occurrence was determined for each plant species using the formula $PC = A \times 100/B$ where A is the occurrence of each plant species and B is the occurrence of all plant species. Final results of the diet analysis will be available in the 2003 annual narrative. (Literature citations are available upon request to the Refuge Manager.)

The effect of bison on prairie process rates and its significance for restoration.

(Principle Investigator: Dr. Brian J. Wilsey, Iowa State University).

The objectives of this project are to look at relationships between plant species composition and diversity, light and soil water availability, and net primary productivity and ecosystem carbon exchange as a function of grazing intensity. These objectives will be addressed by comparing processes within and outside of large exclosures built inside the bison enclosure.

Permanent bison/elk exclosures will be set up inside the enclosure. A variety of environmental data will be collected inside (no grazing) and outside (grazing) the exclosures. The plan is to build the exclosures so that they are big enough to allow for future small scale experiments and sampling to be added to the design. Within each grazed plot, estimate consumption and grazing intensity with small moveable exclosures (1 m x 1 m). By comparing the plant biomass in 0.25 m² subplots inside and outside the temporary exclosures, estimates of consumption (biomass in - biomass out)/time and grazing intensity (consumption/net primary productivity) can be made.

In each exclosure and grazed plot, the following environmental variables will be measured:

- Soil water availability with TDR rods.
- Net primary productivity, species composition, and diversity (species richness and evenness).
- Canopy light capture.
- Net ecosystem CO₂ exchange.

After some time has elapsed and differences begin showing up inside the exclosures, then seed addition experiments will be conducted. Seeds of several native, important species will be added to 0.5 m² subplots inside exclosed and grazed plots to look at how grazing might affect seedling establishment. Seedlings will also be counted in nearby control (no seeds added) plots. The diversity of the species pool will be varied by adding different numbers of species as seed to plots. Germination, elongation and establishment will be monitored.

During the summer, plots were established and time 0 data were collected. Sites were chosen to reduce visibility to Refuge visitors and those that remained visible will be the object of interpretive activities. Time 0 data were collected by clipping and weighing samples from all plots.

Preferential grazing of *Bison bison* and its contribution to erosion at Neal Smith NWR.

(This undergraduate research project by Laura Elliot of Drake University in Des Moines, Iowa, will be completed next year.)

Laura Elliot, a Drake University student has been conducting a bison behavior study involving observing time bison are using different areas of their 700 acre enclosure. Of special interest is the relationship of bison use of areas that have been planted to prairie within the last few years in drainages with varying degrees of erosion. These areas were mapped and plotted on a topographic map. Bison are being observed once per week for eight hours. Every ten minutes during observation periods, bison have been counted within and outside these drainages. Additional observations will be made this fall. All data will be analyzed to determine if bison are selecting areas randomly and if time spent in drainages is statistically higher than in other areas. If significantly more time is being spent in eroded areas, bison are probably greatly contributing to erosion problems in the enclosure. Such information can assist staff in adaptively managing to correct the problem.



Laura Elliot observing bison behavior.

Drake University Restoration Ecology Class, Instructor: Keith S. Summerville

In the fall of 2002, my (Summerville's) Restoration Ecology class participated in three major activities at Neal Smith NWR. First, students in the class conducted a short-term study to determine the effects of prairie age and management history on orthopteran communities (grasshoppers, crickets, and katydids). The class found that prairie age was a significant predictor of orthopteran diversity, but management history was the most important determinant of species composition. In addition, the class established a long-term experiment within one prairie patch to assess the effects of different management practices on populations of four thistle species. My students generated the experimental design in conjunction with Drobney and myself, and data collection is scheduled to begin in the spring of 2003. Furthermore, students in my class worked on the removal of woody species from a section of remnant prairie known affectionately by the USFWS employees as the "Dogleg". Management of the "Dogleg" remnant will likely become a regular component of the laboratory accompanying my Restoration Ecology class, particularly during months when the weather prohibits more formal experimentation.

Finally, I (Summerville) recently submitted grants to the Iowa Science Foundation and the National Geographic Society to fund summer research at the Refuge. The objectives of my proposed study are to inventory moth species diversity at Neal Smith NWR and test hypotheses for how variation in savanna size, isolation, and habitat quality affect moth communities. Moths

will be sampled from savanna remnants in using blacklight traps, and relationships between the moth diversity and savanna area, isolation, and habitat quality will be examined using multiple regression. Thus, this research will generate baseline data on moth species occurrences in Iowa and provide insights on the value of degraded habitats in conservation efforts. Furthermore, data from this study will be used to identify critical thresholds in savanna size, isolation, and habitat quality below which lepidopteran diversity becomes significantly impoverished.

2

Habitat Restoration

2.a. Wetland Restoration

On-Refuge

Conversion of a reed canary grass (*Phalaris arundinacea*) dominated area to a diverse sedge meadow began in an area north of Thorn Valley Savanna, and bounded on the northeast by Walnut Creek. A first step began last year with installation of a plant transect using the Floristic Quality Assessment Technique (Swink and Wilhelm, 1994) in this area, and in a similar area across the stream to the northeast. This low wet area of reed canary grass was nearly exclusive of other species. In 2001, several well nests were also installed on each side of the stream (see 1.b. Studies and Investigations). This will allow staff to begin to develop an understanding of the relationship of vegetation and hydrology.

In 2002, the area was mowed when blooming, followed by treatment with glyphosate in mid-summer to stress or kill reed canary grass. Results were good in the centrally located treatment area; most of the vegetation dried up and actually blew away. Additional treatment of the perimeter identified as part of the study area was not possible because standing or downed trees prevented use of motorized equipment. However, water level data in nested wells bisecting the treated area indicated that the water level was three feet higher here relative to the control side. This difference was attributed to a considerably diminished transpiration ability on the treated area.

Patches of reed canary grass still occur, and a flush of germination of reed canary grass is expected in the spring. A follow-up treatment will be necessary. Woody species inhibit this work.

In anticipation of spring 2003 planting, plugs of prairie cord grass (*Spartina pectinata*) and a couple of sedge species have been propagated in Refuge greenhouses. A thousand containers of approximately 25 species of forbs suitable for wetlands have been reserved for planting. Arrangements have been made with the Polk County Conservation Board for taking samples of several conservative species of sedge from Engeldinger Marsh, a high quality prairie pothole in the adjacent county to the west, for spring propagation and later planting.

Off-Refuge

Nothing to Report

2.b. Upland Restoration

Hand harvest

Volunteers and staff hand harvested more than 54 pounds of native prairie seed this year. The number of people involved in harvesting seed is hard to pinpoint as groups harvesting, such as school groups, are listed only by organization and not the individuals participating, but the total must certainly be well into the hundreds. Sheer numbers of participants on the Refuge allow them to harvest larger quantities of seed than collectors off-refuge. However, a dedicated cadre of volunteer seed collectors continues to harvest rare seed from prairie remnants, primarily within 20 miles of the Refuge. A major portion of this seed is harvested by seed teams led by seed team leaders Laurie and Dan Fenimore (Polk and northwestern Jasper Counties), and LaVerne Collister (northern Jasper County). Individuals and groups on these teams assist in harvesting from several prairie remnants that harbor seed of rare or difficult-to-get species that are currently unavailable on the Refuge.

Seed cleaning team leader, Jonathon Yentis, spends many days working with others to get an estimate of the amount of seed harvested by hand. Volunteer Erma Selser continues to efficiently enter data about each harvest in the seed database for use in developing seed prescriptions. Seed is then stored in our environmentally controlled seed room or stratified in refrigerators for use in plantings in the field or green-houses. Greenhouse grown plants are used in production plot development to augment diversity in general plantings and for special high-visibility areas. Though it is impossible to precisely estimate the number of seeds collected, 81 species of native prairie seed were collected from at least 44 sites. The contribution to increasing plant species diversity on the Refuge cannot be overstated.



Volunteers hand harvest seeds on the Refuge

On-Refuge

Production plot/irrigation system installation

Seed production plots have been used by the Refuge for a number of years. These production plots provide a consistent source of seed for species which are either unavailable in machine harvests or in insufficient quantities from hand and machine harvests. Some species are currently rare or difficult to obtain. The original plots were located in the vicinity of the interim office complex on the east side of the Refuge and were winter plantings of seed in strips. Weeding was difficult, time consuming, and minimal.

A new set of plots, closer to the Prairie Learning Center, was installed this spring. The new plots are plantings of seedlings that had been grown in 8" deep and 1 3/4" wide "conetainers" in the Refuge propagation greenhouse. In the production plots, the plants are planted in rows punched through synthetic woven weed barrier to limit weedy growth. Plants are spaced such that canopies meet to help limit weedy species growth and to maximize number of plants in the planting area. An irrigation system optimizes establishment success allowing plants to be planted at any time during the growing season. It also maximizes seed production during drought. A minimum of 10 gene pools (10 seed donor sites) is being developed for each species planted in an effort to maintain maximum genetic diversity.

The first seedlings were planted by Refuge staff, biology interns, volunteers, and members of Iowa Corps on June 22. Between June 22 and July 9, over 2,600 seedlings were planted. Approximately 47 person hours were invested in the effort. Species planted include: creamy indigo (*Baptisia bracteata*), false indigo (*Baptisia lactea*), butterfly milkweed (*Asclepias tuberosa*), compass plant (*Silphium laciniatum*), rough blazingstar (*Liatris aspera*), prairie blazingstar (*Liatris pycnostachya*), scaley blazingstar (*Liatris squarrosa*), prairie lily (*Lilium philadelphicum*), and prairie phlox (*Phlox pilosa*).

Acquisition of supplies for the irrigation system began in August 2000 with the purchase of enough supplies for a single bed. Acquisition efforts continued in August 2001, bringing the total number of beds to seven. The installation process was facilitated with the contribution of \$2,000 from the Friends of the Prairie Learning Center.

Each bed is 250 feet long, with five drip lines having emitters at 18 inch spacings, allowing total coverage of each bed. The system includes a Toro control unit allowing the system to expand to include up to 30 beds, all of which can be operated either manually or automatically.

Biology Intern, Shannon Tuttle, developed a detailed program for the production plots that included tracking by date of planting, mapping locations, origin of all seedlings planted, tracking mortality, and additional planting needs. Shannon's work includes an "Adopt a Plot" segment to be implemented this spring enabling volunteers to weed, feed, and harvest production plots. She also designed a newsletter to explain the need for and operation of the production plots, as well as ecological issues such as local ecotype concepts. The newsletter also promotes the "Adopt a Plot" program. Shannon included a power point presentation and a Public Relations blurb for newspapers, as well as a flier for informal distribution.

Machine Harvest

Approximately 4,462 bulk lbs. of seed were harvested from five sites this year. The Operations staff harvested and processed the seed. Seed was dried and cleaned at the Refuge and kept in Refuge storage facilities in new storage boxes. The Refuge retained 2,906 bulk lbs. and provided the Iowa DNR with 1,556 lbs.

Analysis of seed viability and purity of material harvested by machine on-refuge this year indicated low purity in grass crops, though viability was only somewhat lower than average on filled seed. Average purity from Indian grass was 10%, big bluestem was 5%, and Canada wild rye was 49%. Average viability of Indian grass was 69%, big bluestem was 77%, and Canada wild rye was 70%. Little bluestem did not occur in our harvests as a major crop this year, due to especially poor seed set in this species.

Refuge seed had always been processed and stored in grain bags. The bags were not entirely bird or rodent proof and were easily infested by rodents who would nest in the bags over winter. This infestation created a health risk in

the seed storage facility when the bags were opened to prepare seed mixes in the spring. After rodents chewed holes in the bags, seed would spill onto the floor attracting birds to a winter food source. Birds entered the building when doors were left open and would nest in the beams. The fecal droppings inside the building were a periodic problem and added to the airborne health risk associated with histoplasmosis. One way to solve the problem would have been to build a rodent and bird proof cage in which to store the bags. Instead we purchased grain boxes to store seed that would not require additional pallets or special storage sites. The boxes that replaced the bags are molded fiberglass plastic and are commonly used now by grain companies. They are rodent and bird proof, are stackable, making them easy to store when not in use. They have allowed us to eliminate a food source for rodents and birds which has brought about a dramatic decline in their presence. The seed storage area stays clean and free of odors and other health risk issues.



Full seed box next to old seed bag



New seed boxes nested & stacked in seed storage facility.

Three sites totaling 84 acres were planted in June. Planting was greatly delayed this year due to rain or poor field conditions. Two areas were planted into soybean stubble and one into corn stubble after a pre-treatment of Roundup and 2,4-D. The ground was lightly scarified with a disk, broadcast seeded, and cultipacked. The seeding rate was 22 pounds per acre of bulk seed mix which was machine harvested from the Refuge last fall, in addition to hand harvested species of foxglove beardstongue, skyblue aster, and prairie larkspur.

Friends Stewardship Saturday

Every second Saturday of the month, a group of volunteers met to do stewardship related to the Friends of the PLC Prairie area. This year, groups of 6 to 60 people met to harvest, clean, and plant seeds, to plant plants, enhance prairie violet plot perimeters with nectaring plants for regal fritillaries, plant sedges, propagate plants, establish production plots, cut woody species, and participate in seminars. All in all, great fun was had and lots of work done. This weekend event is a convenient way for people to drop in and work and have fun with us doing ecological restoration, without feeling that they have to commit to a certain number of hours.

Last Thursday of the Month

Volunteer, Jonathon Yentis, organized stewardship so that volunteers who can't meet on weekends can engage in Refuge stewardship at least one evening a month. There was a small but constant group attending these events which began with a brown bag supper, followed by an informative

presentation and then by stewardship activities until dark. Work done was similar to that occurring during Stewardship Saturdays. Especially popular was the two-part seed harvesting seminar by Drobney, during which 15 people per night attended.

Off-Refuge

Approximately 1,556 lbs of bulk seed was transferred to Iowa DNR as part of the partnership for using local eco-type seed on Iowa restoration sites.

Friends Interns

The Friends Prairie Builder Interns continue to be a superlative group. Shannon Tuttle and Megan Corte provided the biology department with increased enthusiasm, fresh ideas, a determined work ethic, and competence in every project they approached. Both earned chemical applicator certification and provided invaluable help in controlling invasive species. They provided vital help in getting the new production plots on line by transplanting seedlings in the hot sun, weeding (in the hot sun), labeling the seedlings in the plots, and documenting the whole process. Shannon and Megan spent many long hours in the (hot) greenhouse weeding, sowing, and reorganizing thousands of seedlings. Additionally, they coordinated with ISU researcher Heidi Asbjornson to collect soil moisture data for the savanna restoration project in the Game Farm. Thanks to the Friends of the Refuge, both were able to attend the 18th North American Prairie Conference in Kirksville, MO, providing them with a valuable opportunity to meet other prairie preservationists and restorationists and learn about important issues in prairie restoration and management.

Shannon Wohl also started his association with the Refuge through an academic internship with Des Moines Area Community College (DMACC). At the completion of his internship, Shannon provided weeks of effort as a volunteer and eventually, we were able to enroll Shannon in the STEP program. A horticulture student at DMACC, Shannon was a natural fit for the biology department, immediately proving his competence in the greenhouse and assuming responsibility for much of the maintenance in the new production plots. Shannon provided constancy and continuity when Charland was called out for wildland fire details over the summer. As the growing season ended, Shannon very ably assumed other responsibilities including prescribed fire preparations.



Megan Corte, Shannon Wohl, and Shannon Tuttle transplant seedlings in the new production plots.

2.c. Deepwater/Riverine Restoration

On-Refuge

Nothing to Report

Off-Refuge

Nothing to Report

3

Habitat Management

3.a. Water Level Management
Nothing to Report

3.b. Moist Soil Management
Nothing to Report

3.c. Graze/Mow/Hay

Grazing

A bison roundup was conducted at the end of October 2001 with 64 of 70 animals captured. All animals were checked for general health condition and common bovine diseases. Blood was drawn from each animal to monitor the genetic structure of the herd. Loren Clary, Bob King and "Skip" Palmer from the National Bison Range came to the Refuge with their trusty steeds and gave us a hand in the roundup. Their expertise on horse back was invaluable. Dr. Tom Roffe, DVM from USGS at Montana State University, assisted by Dr. Tim Yoder, a local veterinarian, collected blood for genetic data and gave the animals a general physical. The bison were tested for various common bovine diseases.

We learned a great deal this year and think we will be much more prepared next year. Thirty-six animals were culled from the herd. One bull was put down after it was gored by another bull while moving the animals through the chutes. Four animals were donated to local County Conservation Boards for educational purposes. Sixteen were donated to the Winnebago Tribe of Nebraska and another 16 to the Red Lake Band of the Chippewa in northern Minnesota. The herd size was reduced to 33 head.

The Refuge is currently able to support 35 head of bison and 15 elk within its 700 acre enclosure. These herds are on a continuous grazing regime which is estimated to produce approximately 1,125,000 to 1,500,000 pounds of forage annually. The newly established prairie within the enclosure is capable of sustaining the current herd size at a 35 to 40% utilization rate, with a 30% slope correction. Bison herd reductions will be made each year as needed to prevent habitat damage while allowing the bison to continue playing a vital role in the establishment and ecology of the prairie.



Here they come!



A good catch!



A little bit fed up with the hold up.

Mowing

Mowing is an integral part of prairie re-construction at Neal Smith NWR. Mowing takes place as a first and second year management tool on new prairie plantings. Also, mowing is used to control broadleaf weeds and woody vegetation to promote native growth. Approximately 816 acres were mowed in FY02, consisting of prairie plantings, firebreaks, demolition sites and weed management sites.

Maintenance Mechanic Boot used the hydra-axe during FY01 and the beginning of FY02. He was able to clear approximately 25 acres of trees during FY02.



The Hydra-Axe is very popular in some circles.

Haying

Nothing to Report.

3.d. Farming

Nothing to Report

3.e. Forest Management

Nothing to Report

3.f. Fire Management

2002 NSM Fire Crew: Burn Boss-Drobney; Staff Crew Members-Below, Boot, Bradshaw, Charland, Gilbertson, Heisler, Jorgensen, Murray, Rieck, Smith, Sokolowski; IPLO Staff-Mike Rich; Adjunct Crew members (AD's)-Jeff Braun, Shawn Brandow, Chris Bradshaw, Steve DeBruin, Todd Fritz, Hammie Gerard, Daniel Preston, Mark Samson, and Trelan Wilson; PFS from Union Slough-Dan Angelo. Administrative and Base Radio Contact: Dykstra and D. Van Ryswyk.

Volunteer Smoke Spotters and Traffic Control: Gene Brown, Larry Cline, Rex Emerson, Michele Crow, Bob Buyert, Karen Balmer, Lynn Huebler, Ed Wade, Scott Van Ryswyk, and Shannon Wohl.

Wildfire Fighters: NSM Staff-Below, Bradshaw, Charland, Heisler, Murray, AD's-Shawn Brandow, Jeff Braun, Steve DeBruin, and Mark Samson.

Fire work includes much more than burning, and this year included some important administrative accomplishments. In October, a Section 7 evaluation was completed for our Fire Management Plan; the plan was signed

on October 23. Several unit burn plans were revised and approved prior to the burn season.

In addition to the usual preparation of fire lines and pre-suppression work done by operations and biology staff, two hard-working fire techs detailed from North Dakota did quite a lot of work cutting trees along the southeast corner of the Deer Valley fire unit this spring. Tree removal means better light penetration and more even development of fine fuels, as well as removal of snags that often ignite near the perimeter during a burn. These two techs also helped us with the Dogleg burn and Coneflower North attempted burn.

Prescribed Fire

The year was a particularly good one for the fire crew. Starting out with completion of the necessary paperwork, several burn plans were revised, and sent through the approval process. The Refuge had its most successful fall burn season ever. Between November 2nd and the 21st, we conducted six burns for a total of 773 acres. This was the first time the Refuge had successfully conducted fall burns and was especially significant because the previous spring had been too wet to burn at all. Spring 2002 was even more successful. From March 18th to April 26th we managed eight fires totaling over 1,100 acres. Included in that total were two important burns within the bison enclosure.

Year	Name	Date	Acres
2001 Fall	Henslow Hill S.	11/2	150
	High Point	11/3	191
	PLC NE	11/6	91
	Interim North	11/15	100
	Interim South	11/20	200
	Henslow Hill N	11/21	41
	Total Acres		773
	Acres/burn		128.8
2002 Spring	Thorn Valley	03/18	150
	Deer Valley	04/04	100
	Dog Leg	04/13	182
	Coneflower North	04/14	1
	Coneflower South	04/17	70
	North Bison	04/20	300
	Coneflower North	04/23	123
	South Bison	04/26	200
	Total Acres		1,126
	Acres/burn		140.75

During this burn season, Burn Boss Drobney focused on development and use of a strong AD program. The skills that Braun, DeBruin and Samson brought to our crew, as members of the Prairie City VFD, and that Braun brought as a Prairie City EMT, were extremely valuable on the fire line. These local AD's also served as excellent ambassadors of our program.

Several other AD's had experience in prairie management and came equipped with skills in burning in the highly flammable fuels of tallgrass prairie. The dedication, capability, and availability of our nine AD burn crew members were keys to our successful burn seasons, as they filled out our burn crew when staff members were committed to other tasks. In addition to participating in our prescribed fire program, four of them went out west to fight wildfire.



A hot prescribed burn

Wildfire

This summer was also exceptional in that our fire fighters were the first from an Iowa refuge to be detailed to western fire through the Missouri Coordination Center, putting Iowa "on the map". Nine NSM fire fighters (including AD's) were sent on a total of 11 details. Our fire fighters went out on hand crew details, an engine presuppression detail, and a law enforcement detail. Drobney coordinated the Refuge wildfire effort. With the help of Chris Acceturo and the staff at the Missouri Coordination Center, our wildfire fighters were able to gain valuable experience in fire suppression, expand our coordination network, and make new contacts within the fire community.

Charland came to the Refuge with well developed prescribed and wildfire experiences and anxious to burn. Paul's high energy and dedication to safe burning and a willingness to share his knowledge was an excellent asset in mentoring new or inexperienced crew members in both prescribed and wildfire situations.

Training

Several staff members participated in fire-related training this year. In February, Drobney completed S-131, Advanced Firefighter and attended the Burn Boss Refresher, both hosted by NSM, and taught by Dan Angelo, PFS from Union Slough. Charland and Heisler attended S-290, S-131, and sat in on burn boss refresher to learn more about what is expected of burn bosses and their responsibilities.

Gilbertson, Drobney, Charland, Boot, Jorgensen, and Heisler attended a workshop at Minnesota Valley NWR that covered fire management and conservation of invertebrate populations in tallgrass prairie, oak savanna and aspen parlands. This meeting was organized as the final session of the Northern Tallgrass Prairie Ecoteam Meeting. Jerry Selby, Director of Science of TNC in Iowa, joined us as a NSM partner.

Drobney conducted a Prescribed Fire Refresher on March 13, assisted by Charland, who tested fire shelter capabilities of crew members, and by Boot, who provided a refresher on use of pumpers and fire related vehicles.

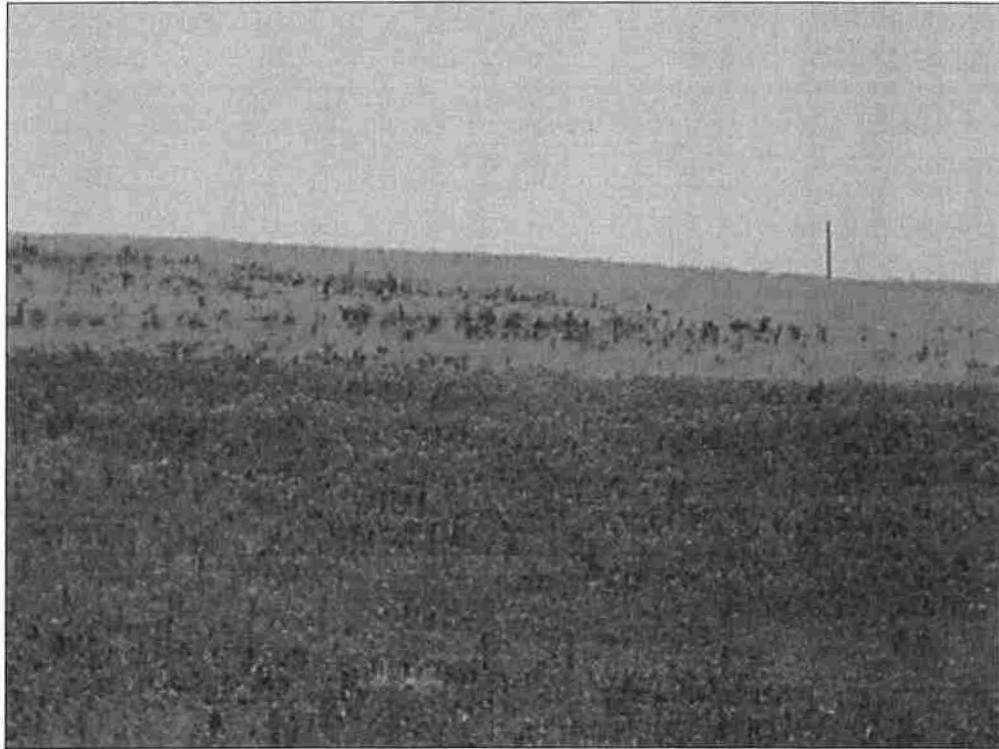
A Prescribed Fire Specialist (PFS) position was moved from Union Slough NWR to NSM. The PFS will provide technical expertise to all refuges in Iowa in preparing burn plans, providing training opportunities, equipment acquisition and standardization, and coordinating activities between refuges. The potential for increased standardization and cooperation within the state and across state lines is tremendous.

3.g. Pest Plant Control

Canada thistle is a problem throughout the Refuge and is treated using TransLine and early mowing. Strategies to eliminate this problem species are being explored by the Refuge biologist. Reed canary grass is a problem in dry creek bottoms and is treated with well timed mowing and spraying sequences using RoundUp. Other target species included sweet clover, musk thistle and black locust, yellow and white sweet clover, crown vetch and *Rubus parvifolius* (no common name available).

Charland and teams including interns and volunteers have worked valiantly to eliminate black locust on two sites on the Refuge, one near Thorn Valley Savanna, the second on the south side of Planting Site 23. Garlon and RoundUp were used and both resulted in varying degrees of success.

Rubus parvifolius is a member of the raspberry family, is relatively new and does not show up in most botanical keys. In Iowa, it was distributed by the DNR State Forest Nursery in Ames in the 1960's for conservation purposes. On NSM, it thrives in partial shade as a decumbent vine with pink flowers. Charland and interns have focused on killing a population that has become alarmingly extensive in one savanna. Much progress in controlling this species has been made using RoundUp, though vigilance is necessary to totally eliminate this difficult-to-manage species.



The dark areas are Canada thistle.

Pesticide records are maintained on the Refuge to document the amount and type of chemical used within each planting site or other management area. Sixty-one gallons of chemical were used this year including RoundUp, Rodeo, 2,4-D, Garlon 3A and Transline. A volunteer, Elmer Blythe, entered the years of data onto a database. Bio Tech Charland also created a database that was later adopted as the master with the information that Blythe created merged into it.

4

Fish and Wildlife Management

4.a. Bird Banding

Nothing to Report

4.b. Disease Monitoring and Treatment

Nothing to Report

4.c. Reintroductions

During spring 2001, an additional 17 calves were born bringing the herd size to 70 animals. The elk herd was diminished by the loss of a cow and an older bull at the end of winter. The cow was found with a fetus intact. Necropsy information showed that the animals died of unknown causes. It is believed that this winter was colder with more snow pack than previous years and may have played a role in food availability. A total of 11 elk remain in the herd from the original 10 that were introduced and 4 calves born during 2000.

Efforts focused on reintroduction of the rare prairie endemic regal fritillary butterfly, which have been on-going for the past eight years. This year a number of regals occurred on the Refuge. For more information, see Section 1.b. Studies and Investigations.

4.d. Nest Structures

Nothing to Report

4.e. Pest, Predator and Exotic Animal Control

House sparrows have been an intermittent problem in the seed storage facility and trapping is an on-going effort. Birds are able to enter the building through open doors and other small openings. Sparrow traps are baited with seed and water. The use of water escalates the success of the traps during the summer and the building remains relatively bird free for short periods of time. However, with the on-set of very cold Iowa winters and heavy snow, the birds return. The water-proof heat mat placed under the trap last year did not improve trapping success.

Mice are a continual problem and are dealt with through the use of bait stations and pellets of zinc phosphite. Zinc phosphite has no carryover properties, secondary poisoning is not a problem.

5

Coordination Activities

5.a. Interagency Coordination

Carney Marsh Power Line Hazard Mitigation

Loren Lown, Polk County Conservation Board, contacted the Refuge inquiring about Federal guidelines for marking power lines to prevent bird strikes along a power line corridor that was being routed along the Carney Marsh County Wetland. Charland contacted Refuge volunteer and Friends' member Robin Fortney, Senior Environmental Coordinator for MidAmerican Energy Company (MEC), the utility company responsible for installing the power line. Charland also consulted with Bruce Ehresman of the Wildlife Diversity program within the Iowa Department of Natural Resources, who had recently mitigated a similar hazard involving white pelicans (*Pelecanus erythrorhynchos*) near a state-owned property, on possible mitigation techniques. Fortney, Lown and Ehresman collaborated to develop strategies for minimizing risk to waterfowl. MEC and the county eventually agreed on an action plan that involved line marking and post-construction evaluation. While no Refuge staff took an active role in the decision or installation processes, we were able to provide the necessary links that protected migratory waterfowl from a potentially hazardous situation.

Gilbertson was invited to become an advisory board member of the University of Northern Iowa's Native Roadside Vegetation Management Center (NRVMC). The work and direction of the NRVMC complements the Refuge mission. This will be much more evident when the Refuge's Land Management and Research Demonstration program gets off the ground in the coming year.

Gilbertson, Tom Prall and Dave Penning (NSM Friends' president and past president), participated in the Region 3 – Iowa, Illinois, and Missouri sub-region Friends' Networking Meeting at Crab Orchard. It is important that refuge managers attend these networking meetings to show support for not only their Friends' group but for the entire Refuge Friends' system.



Puddles and Ron Bell talk about the Centennial at the Crab Orchard meeting.

The Refuge and the Friends of PLC hosted the National Wildlife Refuge Association's semi-annual board meeting. Deputy Director Marshall Jones and retired congressman Neal Smith were guests.



Deputy Director Marshall, Gilbertson & Smith



National Wildlife Refuge Foundation Board Meeting Attendees

Drobney and Gilbertson participated in the DOI annual bison coordination meeting in Custer, SD. A number of topics were discussed at length including bison genetics work, wildlife disease issues, bison handling facilities, and the Inter-Tribal Bison Cooperative memorandum.

Drobney participated as a member of the Iowa Invasive Species Steering Committee in planning and initiating several awareness-raising efforts about invasive plant and animal species in Iowa. Work included conference planning, a bus tour to sites with invasive species issues, and talks and discussions at various meetings. A program was experimentally begun with volunteers to detect selected invasive species throughout Iowa using an adaptation of the "Nature Mapping Program". An Iowa Invasive Species Poster was also developed by the committee hiring Mark Mueller to do the art work. Organizations represented on the committee include USFWS; Iowa DNR, Forestry; Iowa DNR, Research Unit; Northern Iowa Community College; Iowa State University Extension; Iowa Weed Commissioner; and Iowa DNR, State Entomologist.

In January, Gilbertson and Drobney participated in a meeting at Ames, Iowa, to evaluate the Iowa DNR local ecotype seed production program. Several agencies and organizations participated including USFWS, Iowa DNR, The Nature Conservancy, NRCS, the Iowa Prairie Network, the Iowa Native Plants Society, the Iowa Natural Heritage Foundation, the Iowa Native Seed Growers Association, the Native Roadside Vegetation Center, Integrated Roadside Vegetation Management Program, the Iowa Ecotype Program and others. A

follow-up meeting was held several weeks later at Neal Smith NWR, with Drobney representing the USFWS. Several action items resulted.

In February, Drobney provided three presentations at the "Winterfest" Statewide Meeting of the County Conservation Boards. Included were a 1 ½ hour talk and interactive discussion on Fire Ecology, and two 20-minute segments that were parts of a multi-agency presentation on Invasive Species. Approximately 250 people attended this meeting.

On February 21 and 22, Drobney and Charland attended a facilitated fire discussion at the Y-Camp near Boone, Iowa. This meeting, organized by Jean Eells of the Iowa DNR, was designed to provide a forum for discussion of a variety of fire issues facing natural lands managers from air quality issues, to fire effects and relationship of fire to natural lands management goals. The goal is to develop partnerships to mutually strengthen programs.

In February, Drobney provided information to several land managers and others interested in natural resource management, including representatives from NRCS, the National Forest Service, an Iowa native seed producer, Port Louisa NWR, Crab Orchard NWR, Guthrie County Conservation Board, and the Des Moines Metro Waste Authority. Prairie and savanna ecological restoration and native seed propagation were specifically addressed.

In March, Drobney provided Iowa prairie and savanna data including location, preliminary species lists, and landowner information to Jerry Selby, Director of Science and Stewardship for The Nature Conservancy Iowa Field Office. The Refuge has had the largest database in the state about prairies and savannas in the Refuge 38 county local-ecotype range, due to early efforts to find remnant prairies that could serve as seed sources. TNC has provided intern time to transfer this data about the more than 2,000 prairies and savannas to a GIS database. This database will be used to assist in understanding the accuracy of interpretations of aerial imagery regarding presence of natural communities on the Iowa landscape. Ultimately, this exercise and the data will assist in determining purchasing priorities for TNC.

In July, Drobney and Iowa Private Lands Coordinator, Jim Munson, met with several scientists and land managers from Louisiana who are urgently engaged in ecological restoration of Coastal Prairies. Coastal prairies formerly occupied approximately 2.5 million acres in Louisiana, but now are limited to 100-200 acres. This group was especially interested in learning about the process of ecological restoration in the Midwest, so they could adapt techniques and approaches for their work.

Drobney participated in several meetings this year with the Promises Team chartered to develop Habitat Management Program training for refuges. Drobney noted that several refuges focused on ecological restoration or preservation of pristine natural features were excluded by or would have difficulty with the language of the document. As such, she suggested changes in the wording, some of which were adopted in the final document

developed in the Washington office this year. Drobney's contribution to the training is the section on defining resources of concern on refuges.

In July, Drobney provided definition of local ecotype and rationale for use of local ecotype prairie seed to the Farm Service Association, National Resource Conservation Service, and members of several land management organizations including The Nature Conservancy, Iowa DNR, Iowa Prairie Network, Iowa Prairie Rivers RC & D, Iowa Natural Heritage Foundation, Pheasants Forever, the Iowa Crop Improvement Center and several others. Jim Munson of the Iowa Private Lands Office coordinated this meeting. The object was to begin dialogue that could lead to development of incentives for use of Iowa ecotype seed on federal farm bill program projects in the state such as those generated by the Conservation Reserve Program.

On August 6, a group of nine Nebraska and Illinois scientists and land managers from The Nature Conservancy and from the Prairie Plains Resource Institute met at the Refuge to discuss and share successes and difficulties relative to prairie ecological restoration. All participants were engaged in ecological restoration on a large scale and Neal Smith NWR was one of several stops on this interstate learning trip. Drobney has been invited to continue networking with this group.

Drobney provided an interactive presentation on Prairie Restoration Techniques as an instructor during the "Habitat Restoration Techniques" Workshop at NCTC on December 12.

In February, Drobney provided outreach during Iowa Public Television's fund raising drive, during live TV spots discussing prairie restoration issues. A segment of an IPTV gardening show aired that day, and also several times since then. The segment focused on ecological restoration, prairie plantings, and use of native plants in gardens during a walking interview with Drobney on the Refuge.

Drobney and biology interns, Tuttle and Korte, attended the 18th North American Prairie Conference in Kirksville, MO, from June 24-27. Drobney co-authored two papers including, "Soil carbon assessment across a native prairie restoration chronosequence" (co-authored with Camberdella, Schilling, Isenhardt, and Schultz), and "Changes in water quality with conversion of row crops to prairie vegetation in the Walnut Creek Watershed, Jasper County, Iowa", (co-authored with Schilling). Drobney presented the latter paper.

This fall, Drobney worked with Drake University Professor, Dr. Keith Summerville to develop a new class entitled, "Ecological Restoration". This course is a take-off on the former "Walnut Creek Watershed" course offered in previous years. Students developed proposals for Canada thistle control research, sampled orthopterans along transects on nine prairie plantings and did stewardship on the Refuge.

5.b. Tribal Coordination

The Refuge coordinated with the Red Lake Band of the Chippewa in Minnesota and the Winnebago Nation in Nebraska for the transfer of bison.

Representatives of the Inter-Tribal Bison Council (ITBC), Native American Liaisons from Regions 2, 3 and 6, and refuge managers from "bison" refuges met at NSM to discuss changes to the Memorandum of Understanding for the transfer of Service bison to tribes within the ITBC. While a number of issues were resolved, the year ended without a new agreement.

5.c. Private Land Activities

This period was a tough year in pitching the Partners for Wildlife Program. It appeared as though most landowners were waiting for the new Farm Bill to be signed. Initial reports indicated there would be many opportunities for habitat restoration within the new Farm Bill and the bill would have the best conservation package to date. ROS Heisler started 2002 by sending a letter to 26 Pheasants Forever chapters explaining opportunities the Partners for Fish and Wildlife Program could provide. Again, with only one chapter responding, it appeared early on that it would be a slow year for habitat restoration projects.

Heisler attended a two day Winterfest Conference in Waterloo, IA. This conference is for all County Conservation Board personnel statewide and invited guests. Heisler and Mike Rich, Assistant Iowa Private Lands Coordinator, were invited as guest speakers. Several contacts were made during the event.

A summary of the year follows with these highlights:

- ROS Heisler was an invited speaker at Jasper County's Habitat Seminar/Workshop.
- Heisler was involved with Lucas County in the preparation of two Debt for Nature projects. This involved partnership work with the Natural Resources Conservation Service (NRCS), the Farm Services Agency (FSA), Pheasants Forever and the Iowa DNR. The projects consisted of approximately 350 acres.

The year concluded with Heisler attending the Farm Progress Show. The Refuge and the Iowa Private Lands Office participated in a booth in the Conservation Tent. The tent had many booths for landowners to stop at and gather information on improving wildlife habitat on their land. These booths included agencies such as the Farm Service Agency (FSA), the Natural Resources Conservation Service (NRCS), Soil and Water Conservation Districts (SWC&D), Iowa Department of Transportation, Iowa DNR, Environmental Protection Agency and Pheasants Forever. Approximately 20,000 people visited the Conservation Tent during the three day event.

Through the Partners for Fish and Wildlife program approximately 20 site visits were conducted. Agreements were established for two of these. The remaining landowners were given technical assistance, affecting approximately 600 acres. The two agreements protected 125 acres consisting of wetland and upland habitats. The restoration cost to the FWS was approximately \$5,000 for dirt work and seed purchase. In addition, partners donated time, money, equipment, goods and services.

Neal Smith NWR is responsible for 21 Farm and Home Administration easements scattered throughout 11 counties in south-central Iowa. Although these easements have been under the charge of the Refuge for about 8 years, 2001 was the first year staff began inspecting the easements. Heisler again visited all the easements throughout 2002. There were no major violations; one landowner with a small infraction was instructed on making the necessary corrections to be in compliance.

6

Resource Protection

6.a. Law Enforcement

John Below is a collateral duty officer and the only Refuge staff employee with law enforcement authority. Compliance checks of pheasant and deer hunters are the main LE duties. Officer Susan Cooper (Desoto NWR) provided much needed help checking 200 hunters during the opening weekend of pheasant season.

Officer Below went on two LE details for a total of four weeks. The first detail was for Homeland Security to St. Louis over the 4th of July week and the second detail was to Oregon doing a fire security LE detail.

A new regulation requiring non-toxic shot on the Refuge went into effect in FY02 for all upland game hunters. Signs were posted and 47 warnings were issued for hunters who were not in compliance with the new law. Five citations were issued for blaze orange and parking violations during the fall hunting seasons. Dumping of meth lab materials is still a problem especially during spring and early summer. The sheriff's department has cleaned up several sites on the Refuge.



Meth Lab

Other problems occurring on the Refuge were breaking and entering old buildings that are Refuge property and littering, particularly during the hunting seasons. Volunteers collected seven truckloads of garbage from the ditches after the hunting season.

6.b. Permits and Economic Use Management

A special use permit was issued to Iowa Public Television to allow low level flying over Refuge property for aerial photos and video for a public television program. A permit for low level flying was also issued to the Hawkeye Council Calvinist Cadet Corps for photos/video for a brochure promoting an upcoming camporee. An individual requested permission to shoot video for a documentary was given approval.

Seven permits were issued to individuals to allow for cropping privileges during 2002. Seven local farmers managed approximately 850 acres of Refuge lands under Special Use Permits. The Refuge retired approximately 75 acres of row crops in its efforts to restore the tallgrass prairie ecosystem. Through this effort, two cooperators had their farming operation reduced. Also, we acquired another farm adding another cooperator and 38 acres into our farming operation.

Agricultural lands are kept in crops until the Refuge is ready to convert them to prairie. The farming program is designed to allow the permittee a reasonable rent on the land while giving the government a good return on the operation. Permittees are required to use No-till® farming practices and reduce the amount and kinds of chemicals applied to the land. Rent ranges from \$60 to \$75 per acre which is comparable to rents collected in the area for similar ground. Rent was collected in two installments with 30% due in May, and the balance due in December. Final rent figures are based on the Report of Planted Acres which each permittee submits to the Farm Services Agency (FSA). Deductions from rent figures include the cost of crop scouting at \$5 per acre, the cost of Precision Ag Services at \$7.50 per acre, mowing costs for buffer strips at \$12 per acre, and any chemical application in preparation for ground being planted back to native plants by the Refuge.

Crop Scouting was utilized as a part of the Integrated Pest Management (IPM) program on the Refuge. The Farmers Co-Op Exchange of Prairie City was used as in previous years. As noted above, the cost of this service was paid by the permittees and then deducted from their cash rent. Success of this program has been very good, giving both the Refuge and the cooperating farmers sound information and recommendations regarding the condition of the crops. Sometimes crop pests go above the allowable threshold levels and a chemical application needs to take place, thereby preventing further losses for the farmer and neighboring farms.

A permit authorizing an individual to observe phenology of plants was issued during the period.

A Drake University professor was given a permit to allow for short term research for grasshopper diversity on Refuge property.

6.c. Contaminant Investigation
Nothing to Report

6.d. Contaminant Cleanup
Nothing to Report

6.e. Water Rights Management
Nothing to Report

6.f. Cultural Resource Management
Nothing to Report

6.g. Land Acquisition Support
One tract of land totaling 111 acres was purchased in 2002. This was a vital piece because of its proximity to the bison enclosure, and will eventually be incorporated into the enclosure.

Land and Water Conservation funding for FY2002 was one million dollars. While the refuge does not rank high on the Land Acquisition Priority System, it does have a stalwart advocate in its namesake. We appreciate Mr. Smith's continued support.

6.h. Threats and Conflicts
Nothing to Report

7

Public Education and Recreation

7.a. Provide Visitor Services

In April, Park Ranger Heidi Rieck, transferred to Carlsbad Caverns National Park after 14 months working here as an interpretive ranger.

Sara Hollerich accepted a detail at the NSNWR and helped out for several weeks as a refuge interpretive ranger at the end of April and during the month of May. In September, Sara was hired as a refuge ranger permanently and works closely with the environmental education/interpretive program.



Sara Hollerich

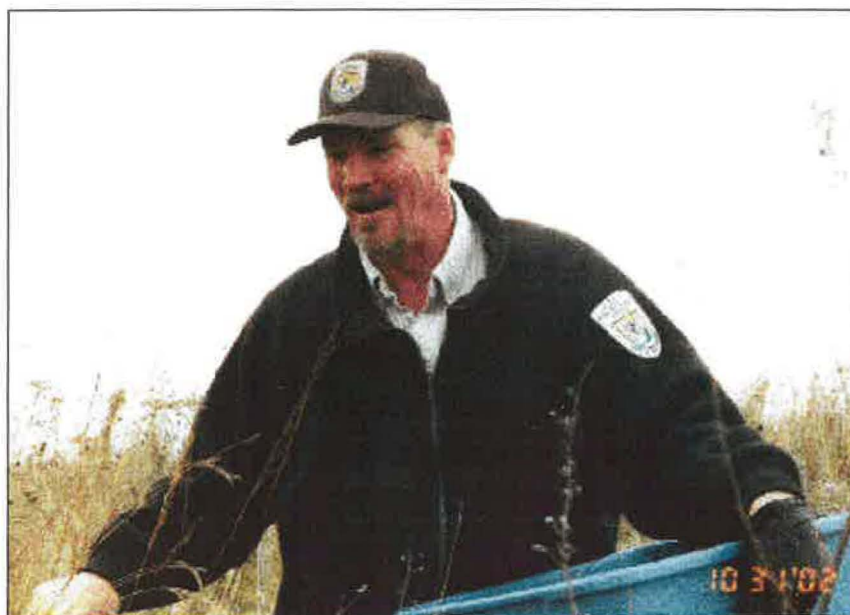
Interns

Friends of the Prairie Learning Center funded two summer interns for the Public Use program. Abby Hade and Laura Elliott each completed the nine week commitment to the Refuge and proved to be valuable assets to our environmental education program and outreach missions. Abby and Laura were very motivated and talented in creating new displays and activities as well as tweaking programs in use and making them better.

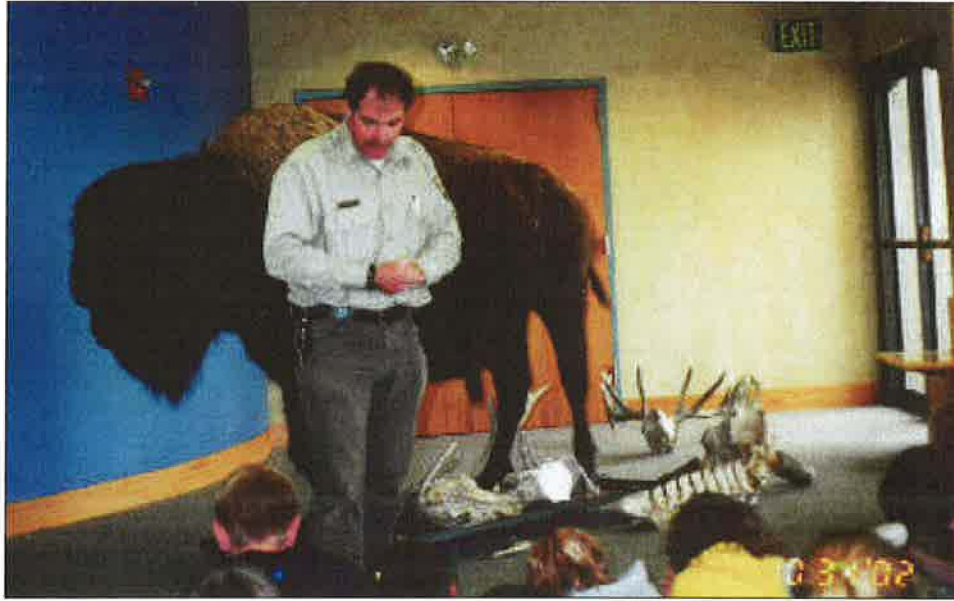


Laura Elliott and Abby Hade

On May 20th, both Gary Shea and Al Murray came on board as interpretive refuge rangers. Gary transferred from Great River NWR and Al was with the National Park Service at Big Cypress National Park in Florida. Gary is serving as the environmental education coordinator and Al is coordinating scout programs and the stewardship program.



Al Murray



Gary Shea

The Refuge recorded over 162,250 visitors in FY 2002. The majority of over 32,000 Prairie Learning Center visitors participated in scheduled educational programs, events or tours. Public use staff provided 940 environmental education programs for 11,320 students, scouts, and visitors during this period.

Public use staff conducted 30 guided tours of the Prairie Learning Center and Refuge for 715 visitors. Over 2,731 visitors learned about Neal Smith NWR/PLC during meetings and events held in the Center's conference rooms and auditorium. The Center received over 17,691 walk-in visitors. The winter of FY02 was mild with many days above freezing and road conditions were generally good.

The Refuge multi-purpose room was utilized well during the year. Numerous societies, networks, clubs and organizations held annual meetings or their own particular special event at the Refuge. All these groups were presented the Refuge video and toured the exhibits.

Exhibits and Facilities

Artists featured in the J.N. "Ding" Darling Art Gallery included:

- February -- Duck Stamp Art from the Ukraine
- April -- Iowa Federal Junior Duck Stamp contest winners



Best of Show - Federal Junior Duck Stamp

- June -- Buffalo Day Photo contest
- July/August -- Karen Hollingsworth "Reflections of Nature" from the National Wildlife Refuge System photography
- September -- Jim Fox "Images of Norwest Iowa" photography

In July, the Refuge received a large kiosk donated by The J.N. "Ding" Darling Foundation, Inc. The kiosk originally welcomed visitors coming into Iowa at the Des Moines International Airport. The kiosk was moved to the Des Moines Botanical Center and graced their entryway for a year. The staff moved it to our "Ding" Darling art gallery where it sets today, providing information about Darling's career, his contribution to conservation and to the refuge system.



"Ding" Darling Kiosk

A collection of Native American cultural objects was donated to the Friends' of the Prairie Learning Center along with a \$200,000 endowment to construct a Native American/prairie connection theme exhibit in the Prairie Learning Center. Titled "People of the Prairie", the new exhibit opened in June and dedication ceremonies took place during the annual Buffalo Day event.



New Exhibit Entrance Reading Rail and Sculptured Elk



People of the Prairie Exhibit

Environmental Education Activities

Project Bluestem

During FY02, 35 teachers participated in two Project Bluestem (PBS) workshops. To date, over 579 teachers have attended PBS workshops, which introduces participants to the PBS curriculum and the Refuge.

School Programs

Approximately 11,620 students of all ages from 200 schools participated in scheduled activities at the Refuge. Over 90% of the school groups visiting the Refuge participated in day-long programs that utilized the PLC, trails, and public use staff.



School children enjoy their visit to the Refuge

Stewardship Activities

Stewardship activities reached new heights when the EE staff coordinated school groups to plant over 5,000 seedlings of bergamot, partridge pea, pale purple coneflower, and purple prairie clover in the interior area of the overlook trail. Public Use staff and volunteers continue to plant seeds and prepare containers and potting soil to handle the thousands of plants projected to continue flowing out of Public Use stewardship activities.



Wet Lab Nursery

Traveling Educational Trunks

The Prairie, Elk and Songbird Traveling Educational Trunks were sent out three times during the period. Schools utilize the materials in these trunks to prepare for visits to the PLC.

Scouting

Approximately 850 scouts participated in on-site activities in FY02. One Eagle Scout completed his Eagle Scout project at the Refuge.

Volunteer Report

Volunteers donated 20,007 hours during the period. The hours of work are categorized into nine different departments. Two recruiting events were held to try to bring in volunteers resulting in 77 first time volunteers to the Refuge.

The category of Upland Restoration had the most volunteers and hours with 127 volunteers donating 10,158 hours. They collected seeds, worked in the greenhouse, cleaned seeds, cut brush, and worked in the seed production plots. Over 2,000 students also helped in upland restoration. Stewardship Saturday and the Last Thursday of each month represent about 2,000 hours and these volunteers do a variety of projects. These special days are listed under Public Use but several departments are actually represented on these days.



Cleaning Conetainers

In Visitor Services, 82 volunteers contributed 6,355 hours. Volunteers helped teach environmental education; worked in the bookstore and staffed the front desk; helped with special events; photography; and organized storage areas, environmental education labs and the Public Use nursery.



Bookstore Volunteer, Hazel Van Ekeren

Outreach involved 13 volunteers who donated 1,437 hours. These volunteers helped with the Friends' board, worked at the state fair booth, and gave presentations at various service groups.

In the area of Operations and Maintenance, a group of 12 volunteers donated 1,013 hours. These volunteers helped with mowing and keeping our building attractive. They also drove long hours when vehicles needed to be moved or picked up. These volunteers have assisted the Refuge through some difficult logistical situations.

Research projects as a volunteer category falls under Studies & Investigations or Surveys and Censuses. This does not include any of the college research that is taking place on the Refuge. Eleven volunteers helped with butterfly and bird studies or helped with scatology and bison feces collection.

In the areas Fire Management and Pest Plant Control, 6 volunteers donated 312 hours. These volunteers provided traffic assistance during prescribed fire by watching for smoke or blocking roads, and applying chemicals to kill tree stumps or invasive plants.

The entire Refuge staff, coordinated by Volunteer Coordinator Below, honored our volunteers at a volunteer recognition dinner and awards ceremony on January 26th. This was the 3rd annual volunteer banquet with 98 people attending. Iowa Lt. Governor Sally Pedersen was the guest speaker and gave a short thank you from the State of Iowa for all that the volunteers have done at the Refuge. Refuge staff greeted guests and served the food and beverages. Awards were given out for hours of time donated as well as for special recognitions such as "Unsung Hero", "Magnificent Obsession" and "Locust Buster" awards. Certificates of excellence were given out to all volunteers who contributed over 200 hours in 2001. Dave Wharff was our Volunteer of the Year and Scott and Julie Karl were our Outstanding New Volunteers. After the meal, the volunteers and staff were treated to some fine bluegrass music. The Friends of the Prairie Learning Center generously provided monetary support for the catered dinner and the Hoe-Downers band.



Lt. Governor Sally Pedersen thanks volunteers at Recognition Dinner.



Refuge staff offered their appreciation at Volunteer Recognition Dinner

The annual "Volunteer Day Bus Tour" took 35 volunteers to Union Slough NWR this year. Friends of PLC provided snacks and lunch. The staff at

Union Slough graciously hosted and provided tours of the refuge and wetland management district.

Thanks to the Friends of the Prairie Learning Center and a grant from the Maytag Community Innovation Award monies, the Prairie Learning Center now has an Electric Convenience Vehicle for visitors who cannot walk or stand for long periods of time.



Electric Convenience Vehicle

7.b. Outreach

Workshops

Jorgensen, Below and Rieck presented a Project Bluestem and NSNWR EE program overview at the National Association of Interpreters Workshop held in Des Moines in November 2001. During the workshop, one day was devoted to field trips and over 300 NIW attendees came to NSNWR and were given tours by the EE staff.

Special Events

Annual special events continue to be an important program element at the Refuge. These events draw large crowds of people who might not otherwise visit. The Friends of PLC provide monetary assistance for music, prizes and food during these events. Following is a list of events held at the Refuge in FY02:

- **Refuge Week**
In October, National Wildlife Refuge Centennial Week was sparked by the Audubon Society Recognition of the National Refuge System and volunteer day held at the PLC. About 100 participants attended.
- **Cabin Fever**
Previously deemed "Cabin Fever", Dolce far Niente translates into a relaxing day at the PLC where, starting at 10 a.m. and going until 3 p.m. on Saturday, February 16, people enjoyed videos playing in the theater; Winter Survival, a talk about how bugs and critters get through the winter; a chili stew lunch and music played by the Hoe Downers. Visitors watched and learned from wood carvers, spinners, quilters, and weavers. Some visitors made their own dream catchers.
- **Refuge Centennial Birthday Party**
The National Wildlife Refuge System Birthday provided a relaxing day at the PLC where, starting at 10 a.m. and going until 3 p.m. on Saturday, March 16th, people enjoyed videos playing in the theater, a special program on Theodore Roosevelt by volunteer Mary Jordan, and ice cream and cake.
- **Wings and Wild Oats**
This event is a combination of the former "Sow Your Wild Oats" day and International Migratory Bird Day. Junior Duck Stamp Award recipients are also honored during a special ceremony. Despite a rainy Saturday, May 11, over 250 people attended.



Jr. Duck Stamp Award Recipients

Staff in attendance presented programs, conducted ceremonies and oversaw stewardship activities. Visitors were treated to a variety of activities focusing on birds and prairie restoration. Seminars including wildlife watching skills, a lecture on prairie restoration, and a live bird program added an entertaining, yet informative twist to the day. Bot Z Boo and Dot Z Doodle were clowning around with the kids making balloon birds, performing magic tricks and talking to the kids about owls. Forty kids earned a Jr. Birder Patch by visiting three of the activities during the day and completing a scavenger hunt in the PLC.



Wings and Wild Oats Entertainment

- Buffalo Day
On Saturday, June 8th, over 750 people visited the Refuge during Buffalo Day. Staff assisted in presenting programs, conducting ceremonies and working with stewardship activities. Buffalo burgers and hot dogs were sold by the Newton Jaycees.



Jaycees Food Stand

Arts and crafts, flint knapping, buffalo hair spinning, hide tanning, buffalo chip throwing contest and guest presentations were some of the activities. Professional story tellers performed from 10:00 - 11:00 a.m. and from 1:00 - 3:00 p.m.



Many participated in Buffalo Day craft activities

Michael He Crow, from the Pine Ridge Reservation (Lakota/Apache) in South Dakota, entertained with his stories and Native American flute music and also shared his expertise in tanning hides with traditional Native American methods.



Mike He Crow demonstration



Eugene Fracek, Principal at Des Moines Granger Elementary and adjunct instructor at Simpson College, told stories about the environment and buffalo.

The grand opening and dedication of the Native American Exhibit, People of the Prairie, took place in the exhibit hall at 11:00 a.m. The

exhibit is a donation to the Prairie Learning Center, through the Friends of the Prairie Learning Center, from the estate of Charles Petersen, who collected Native American items.



Petersen daughters assist with ribbon cutting

Special guests Neal Smith and Congressman Leonard Boswell attended the ceremony. Mildred Petersen, who donated the money and Native American objects, was unable to attend but family members were on hand for the ribbon cutting. The Petersen Exhibit also includes a beautifully sculpted life-like elk with an unusual “see-through” prairie backdrop which entices the visitor to the back of the Center’s exhibit entrance.



Congressman Boswell, Neal Smith, Nancy Gilbertson and Petersen family

Representatives of the Refuge and the Friends of the Prairie Learning Center attended the first National Refuge Friends Conference in Washington, DC in February. The meeting was inspiring and it was gratifying to be surrounded by so many "friends".



Friends on "the Hill"

Off-Site Programming

Refuge staff presented over 50 programs to off-site groups during FY02. These groups included conservation agencies, natural resources professional groups, and service organizations, sports and vacations shows, community events, parades, and the Iowa State Fair for an outreach of over 34,000 contacts.



Old Settlers Day Parade Entry

The Iowa State Fair this year featured the National Wildlife Refuge Centennial display. Refuge employees and volunteers staffed the booth with two people per shift for a total of 264 hours.

8

Planning and Administration

8.a. Comprehensive Conservation Planning
Nothing to Report

8.b. General Administration
Refuge Funding

Fund	FY 2002	FY 2001	FY 2000	FY 1999	FY 1998
1261	916,054	845,369	804,702	755,997	710,595
1261 (VOL)	8,000	7,000	4,900	6,400	8,900
1261 (LE)		500			
1262	483,164	30,000	80,000	62,700	17,200
1121	7,000	7,000	7,000	7,000	10,000
1230/1231		1,000			
9110/9251	13,629	3,000	5,400	5,400	5,400
9263	17,734	15,522	10,659	11,660	44,375
9264	7,500				
TOTAL	1,453,081	909,391	912,661	849,157	796,470

Base salary funds totaled \$776,309, with \$34,220 in RONS Invasive Species Project dollars added to fund a Bio Tech position. Operating expense money included \$96,600 base funds and \$7,925 in challenge cost share money to be used for butterfly research.

We received \$30,000 for deferred maintenance projects in 1262 money. New radios were purchased with \$132,000 and a 1997 2800 used track truck was purchased for \$35,000. This replaced a 2500 gas track truck which was purchased by Windom Wetland Management District. A Case IH 2096 tractor was traded for a John Deere 6420 for \$25,000. An additional \$40,000 was received for ductwork in the visitor center. The roof membrane was replaced for \$213,520.

We were fortunate to again receive funding for the YCC program. A crew leader and four students accomplished several tasks with funding totaling \$15,644.

In addition to the items noted above, we purchased a "mule" ATV with fire funding, along with a computer, digital camera, and laptop computer for use by a prescribed fire specialist, whose position was funded late in the year. We also procured three projectors to replace those currently used in our theater, a computer for power point presentations, and a floor scrubber. We contracted with Capitol Furniture to re-design the administrative system furniture to ease space problems and allow for added privacy.

Progress Industries was awarded a contract to provide cleaning services. We opted to discontinue their services at the end of the contract period. We were given authority to hire a wage grade employee to perform janitorial duties which will be more cost effective.

Refuge Staffing

Below is a list of employees who were members of the staff at Neal Smith NWR during FY 2002:

<u>Permanent Full Time</u>	<u>Grade</u>	<u>OD Date</u>
Gilbertson, Nancy M. Refuge Manager	GS-13	09/98
Drobney, Pauline M. Wildlife Biologist	GS-12	03/92
Jorgensen, Donald E. Park Ranger	GS-12	02/01
Smith, Joyce C. Refuge Ops. Specialist	GS-12	06/00
Boot, Brian A. Maintenance Mechanic	WG-9	10/92
Below, John J. Park Ranger (Volunteer Coord.)	GS-9	04/98
Heisler, John E. Refuge Ops. Specialist	GS-9	04/95
Shea, Gary L. Park Ranger	GS-9	05/19
Rieck, Heidi G. Park Ranger	GS-7	12/01
Hollerich, Sara Park Ranger	GS-7	Transferred 04/02 09/02
Dykstra, Carla J. Administrative Technician	GS-7	05/91
Charland, Paul C. Bio Science Technician	GS-5	06/01
Hager, Richard C. Bio Science Tech (Wildlife)	GS-5	06/02
Murray, Allan A. Park Ranger	GS-5	05/02
Stapleton, Glenn S. Maintenance Worker	WG-5	08/02
Van Ryswyk, Doreen D. Secretary (OA)	GS-5	08/97
<u>Student Temporary Experience Program</u>		
Sokolowski, Angela J. Bio Science Technician	GS-4	10/99 Terminated 12/01
Van Ryswyk, Scott A. Bio Science Technician	GS-3	06/01
Van Zee, Eric Bio Science Technician	GS-3	06/01



Refuge Staff: Back row – Brian Boot, Pauline Drobney, Joyce (Christy) Smith, Carla Dykstra, Doreen Van Ryswyk, Rick Hager, Glenn (Steve) Stapleton. Front row – John Below, Al Murray, John (Jack) Heisler, Sara Hollerich, Paul Charland, Donald Jorgensen and Nancy Gilbertson.

The public use staff encountered several changes during the fiscal year. Heidi Rieck transferred in April to work with the National Park Service. Two Park Rangers joined the staff on May 20th, Gary Shea transferred from Great River NWR and Al Murray transferred from Big Cypress National Preserve. On September 8, Sara Hollerich became a member of the public use team, also as a Park Ranger. She transferred from Port Louisa NWR.

Operations staff increased during the period. Richard Hager came on board on June 2nd as a Biological Science Technician. Rick brought with him a wealth of experience and knowledge. A Maintenance Worker position was approved and Glenn (Steve) Stapleton was selected to fill the vacancy. Steve joined the staff in August and performs janitorial duties and other maintenance responsibilities throughout the Learning Center.

The biology department also experienced staff changes. Angela Sokolowski, a Bio Science Technician step student, graduated from Iowa State University in December and was no longer eligible for the program. Shannon Wohl, a student at Des Moines Area Community College, began working as a step

student in June. Shannon has worked in many aspects of the biology program.

The Refuge continually works toward "Green Up". This year 1,850 gallons of soy diesel product was purchased to be 100% green with alternative diesel product use. Office paper, cardboard, styrofoam, food cans, aluminum cans, glass, plastics 1 & 2 and refundable pop bottles are all recycled. Two volunteers, Julie and Scott Karl, keep the program running and working well.



Scott & Julie Karl

The Refuge cleared quite a bit of excess property from its shelves this year including old dishwashers, seed drills, over a dozen old computers, copy machines, printers, fuel storage tanks, grain bins and more. Most of it was auctioned through GSA but some of the office equipment was stripped of toner cartridges and hauled to the landfill as a last resort. Five dump truck loads of scrap metal, metal fence posts and wire were recycled locally.



Grain bins being dismantled by a company from Missouri

Spill catchment pads (PIG) were placed under the glycol tanks that provide glycol to the geothermal heating and cooling system.

The Safety Committee met quarterly to discuss and resolve various safety issues on the Refuge. One incident occurred with minor injuries when STEP Van Zee rolled an ATV over into a ditch while spraying for thistle and clover around the parking lot. A lacerated elbow required 17 stitches but he did not suffer any other injuries. The accident was discussed during a staff safety meeting to determine the cause and how the accident could be avoided in the future. STEP Van Zee was using proper PPE including gloves and a helmet with face shield. Using proper PPE was believed to be instrumental in reducing injuries in this accident.

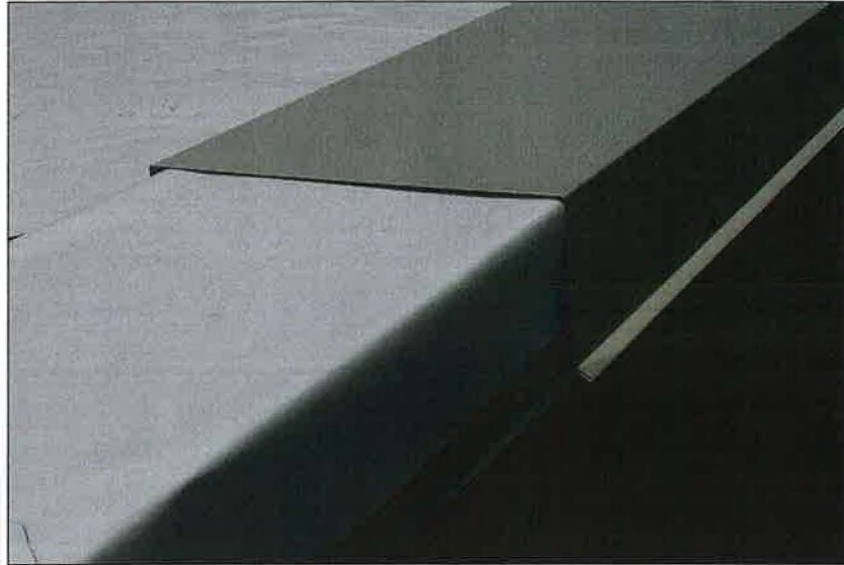
Facility Repair

When the Prairie Learning Center was completed, many construction problems were discovered. Moisture seeped through the floor. The roof leaked. The security system was defective. If that were not enough, the road developed an uneven surface. The floor was repaired during FY 2001.

Roof

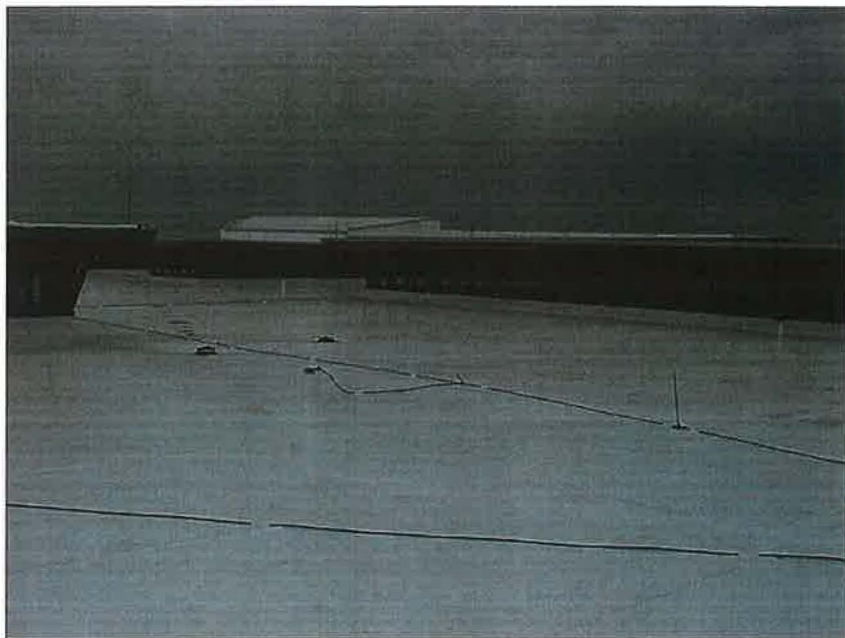
The Learning Center was built with a roof surface that was not fully adhered. It was rated for wind speeds no greater than 55 mph. Wind speeds at the Learning Center often exceed that speed and caused the roof to flop and tear. Leaks developed throughout the membrane and caused damage to displays within the Center. After months of investigation and discussions with the

RO Engineering Dept., Denver Engineering and our staff, it was decided that the only solution was to place a new roof on the building. After determining that portions of the original membrane, foam and decking were dry and in good condition, Academy Roofing installed a fully adhered, Sarna-fil roof over the existing roof. Small portions of the original roof were removed due to moisture damage. The new roof has no leaks and can withstand Iowa weather.





Various stages during roof replacement



The new roof after a rain

Windows

After the new roof was installed, STEP's Van Ryswyk and Van Zee caulked all the clearstory window mullions to prevent leaks. When storms blow in, they often come at an angle that pushes water through the mullions which then leaks through the ceiling.



STEP Van Zee caulking clearstory windows.

Toilets

Shortly after the completion of the Learning Center, it was noted that some of the wall mounted stools in the public restrooms were sagging. The sag was not greatly pronounced at first but over the past year, the walls began to crack behind the stools and the floor tiles cracked where the wall met the floor. Two contractors were asked to look at the problem and analyze how serious the problem was. It was determined that unless something was done to repair the toilets, they would fall to the floor possibly injuring someone. The contractors both determined we would have to remove all the toilets, tear out the walls, replace the entire mounting system behind each toilet, then replace the toilets and the wall. A local plumber, Chuck Samson, was recruited as a volunteer by Brian Boot, Maintenance Mechanic, to look at the situation and give us a recommendation. The stools were indeed falling and could possibly be a hazard to the public. With the placement of about \$1 worth of hardware on each toilet, the problem was solved. STEPs Van Zee and Van Ryswyk were shown how to remove the toilets and place the hardware on studs behind the wall, then remount the stools. The entire fix with replacement of some wall tile cost less than \$300.00 saving the Refuge thousands of dollars and time.



A few cracks in the wall

Security System

Steve Dedon, RO Electrical Engineer, directed the planning and development of a new security system. Design consultants from Custom Engineering, Inc.

and Control Installations of Iowa, Inc. met with us and spent a day going over the buildings and determining our needs.

Return Air Duct

Part of a continuing problem with water seepage under the building was that two return air ducts were filling with water from time to time. The only way to resolve the problem and avoid health issues was to abandon the old air ducts and install new ducts in the overhead space of the exhibit area. Craig Swedenborg, RO Engineer, visited the Refuge to determine and design a fix to the problem.

Wastewater Wetland

Another facility that required direct attention was our wastewater wetland facility. Neal Smith NWR has a three celled wetland facility to handle its sewage and wastewater. Sewage and gray water from the buildings enters a septic tank where it is mixed with a supply of microbes to begin a breakdown process. Overflow from the septic tank then enters a wetland cell where sediments fall out and some of the water and nutrients are taken up by plants. The remainder of the water is physically filtered through roots and gravel before it exits the facility and enters a drainage that eventually flows into Walnut Creek. The input into the system is monitored daily as well as the outflow from the wetlands. Outflow water samples are collected once each month and tested for biological oxygen demand, pH, total suspended solids and ammonia. All water samples since the establishment of the wetland have been far below limits set by the state.

Building Monitoring Systems

Heating, cooling, security and fire alarm functions within the PLC are monitored through computer systems that page the appropriate personnel for response when something goes wrong. One software computer program used to monitor the Learning Center's heating and cooling system is Johnson Control Metasys. The software tells the responder when a heat pump is down or filters are dirty. The fire panel is on a Notifier system that also alerts staff when the system is down for any reason, when smoke or fire detectors are malfunctioning or when the fire alarm system is triggered. The fire alarm and sprinkler systems are inspected yearly to ensure their operation.

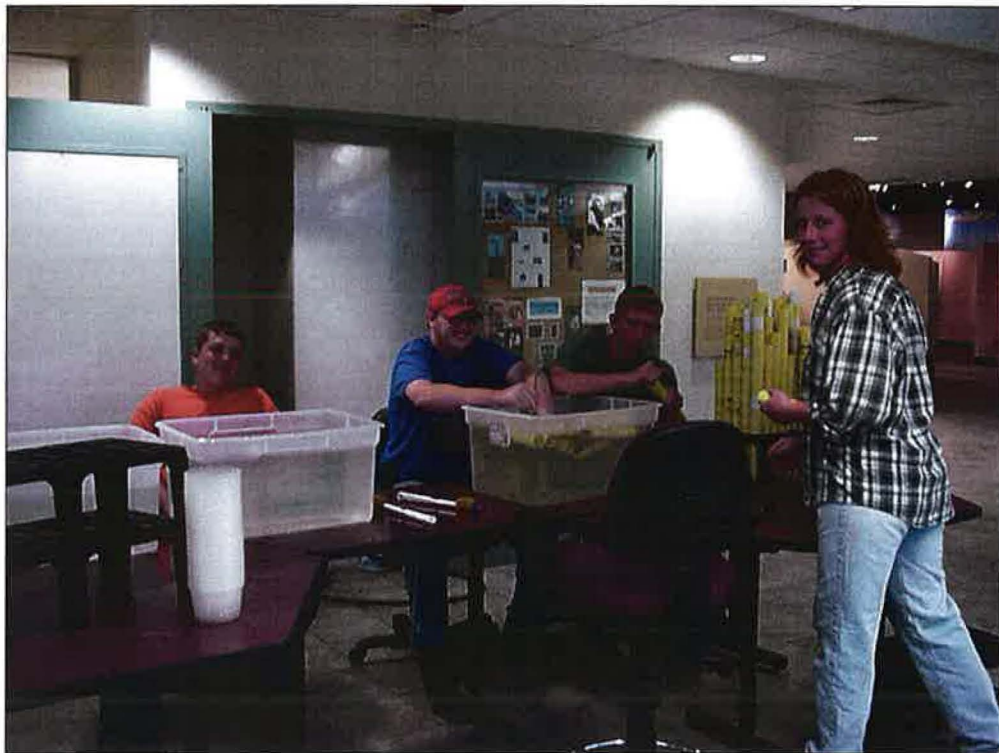
Neal Smith NWR 2002 YCC Program

The 2002 YCC summer program at Neal Smith NWR accomplished many important tasks during the eight-week period. The enrollees were recruited from three area high schools. Four males were selected from a pool of seven male applicants. No minorities or females applied this year. One student quit after the first week and a replacement was selected from the remaining three. These four enrollees completed the rest of the program successfully.

The total cost of the program was approximately \$15,612 entirely from 1262 funds (Y3NS). Staff salary costs were \$4,506, enrollee salaries \$6,314 while \$4,792 was spent on materials and tools to complete assigned projects. Our cost of the program increased from previous years, however, we

accomplished more and employed four students that successfully completed the term.

The enrollees participating in this year's program brought different skills and attitudes that contributed great benefits to the YCC team and the Refuge. The enrollees learned skills and accomplished many tasks that they did not think they could complete at the beginning of the program. By challenging themselves and being challenged by the program they left with greater confidence and skill levels, team building experience, safety awareness, as well as a stronger work ethic. They left the Refuge understanding the effort required to reconstruct native prairie and natural habitats and are now a possible, skilled resource to draw upon later. One of the enrollees inquired about finding a full time position with the FWS and specifically, Neal Smith NWR.



YCC Group Leader Staci Boot, YCC members Joel Steenhoek, Josh Brant and Jason Elam. Not Pictured: David Patterson

In addition to the enhancement of the Refuge, the youths involved in the program learned about prairie plant identification, environmental ethics and teamwork. This year there were 10 project types addressed including weeding and hand grubbing acres of prairie, facilities and signs; maintaining wastewater wetlands; washing hundreds of containers for greenhouse plantings; planting and weeding production plots; cleaning maintenance buildings and areas; trail clearing; washing, waxing and detailing vehicles; residence cleaning to assist Iowa Corps; pulling several miles of fence and filling wells.

At the conclusion of their tour of duty, Ranger Shea took the YCC group on a field trip to Conard Environmental Research Area located by Grinnell College. They observed a diverse community of native prairie plant life led by the CERA manager who gave them a tour of the facilities and a nature hike. It was a great conclusion to a prodigious amount of work being completed.

Iowa Corps

The Iowa Corps consists of a group of educators who, through Iowa's REAP program, secure grants to pay for tuition for continuing education. Their experience here counts towards two college credits. Four the 5th consecutive year, the group has worked at the Refuge for one week during the summer in a number of prairie restoration areas.

Friends of the Prairie Learning Center

The Friends of the Prairie Learning Center held their annual meeting in October and presented Mildred Petersen with the Friends' "Pride of the Prairie" award for her generous donation of \$200,000 and the Petersen Native American collection for the Refuge's new exhibit.



Friends' President Tom Prall and Mildred Petersen

The Friends and Refuge staff held their annual planning meeting in November. Hundreds of great ideas were brought to the forefront. The list was whittled down to a manageable number and, in January, the projects were formulated into the budget package for the year. The Friends budgeted \$58,000 for Friends and Refuge projects in 2002. Over \$12,000 was

budgeted for Refuge events; \$8000 for the intern program; \$1000 for the “volunteer house” furnishings; and \$2000 for the production plot irrigation installation.

While generous donations from members continue to come in, the major source of revenue for the Friends is the Prairie Point Bookstore. The bookstore has become regionally renowned for its selection of prairie and wildlife related books. There are now over 500 book titles available in the store.



Excellent materials are available at the Prairie Point Bookstore

PRAIRIE WIND

VOLUME 9 - NUMBER 1

WWW.TALLGRASS.ORG

SPRING 2002

In this issue ...

2001 Volunteer Banquet	1
Federal Junior Duck Stamp Contest, Christmas Bird Count	2
Prairie Scoop	3
Browsing with Mary	4
Volunteer View, What's New?	5
Special Events	6
Make Connection, NatureMapping Workshop	7
President's Message	8

2001 Volunteer Banquet

By John Jennings

Nearly one hundred guests were on hand January 26 as the Neal Smith National Wildlife Refuge took on an old-time feel for the annual volunteer recognition banquet. Those in attendance enjoyed a meal of barbecued pork or chicken on focaccia bread with exotic trimmings and lemonade served in Mason jars by bib-overalled staff members. The dinner was catered by Cooking with Bonnie of Urbandale. Following the meal, Iowa's Lieutenant Governor Sally Pederson spoke about the importance of volunteering.

A Neal Smith National Wildlife Refuge shirt and name tag were presented to 51 volunteers who reached the 50-hour level. Seventeen volunteers at the 100-hour level were awarded a volunteer pin. Coffee mugs were presented to 13 who had reached the 200-hour level. Twelve volunteers at the 350-hour level were given paperweights, eight at 500 hours received pins, and pen and pencil sets were awarded to 10 volunteers for reaching 700 hours of service. A pin and gift certificate to the Prairie Point Bookstore were presented to Dan and Laurie Fenimore, Dave Wharff, Erma Selser, and Jonathan Yentis for 1,000 hours of service. Erma Selser and Laurie Fenimore received windbreakers for 1,400 volunteer hours. A pin and a gift certificate went to Larry Jordan for his outstanding 2,000 hours of service and a gift certificate was awarded to Mary Jordan for her amazing 3,000 hours of dedication to the affairs of the Prairie Point Bookstore. The Volunteer of the Year award went to Dave Wharff. Scott and Julie Karl were the Outstanding New Volunteers.

Following the awards presentations, the evening was capped with a rousing round of country music provided by The Hoe Downers of Grinnell.

Congratulations to all and thanks for a job well done.



Project Leader Nancy Gilbertson and Lieutenant Governor Sally Pederson.



Volunteer of the Year, Dave Wharff

PRAIRIE WIND

Spring 2002
Volume 9/Number 1

Published by the
**Friends of the
Prairie Learning
Center**

Board of Directors
Tom Prall
President
Runnells

David Penning
Past President
Newton

Amy Johnson
Secretary
Des Moines

Neal Westin
Treasurer
West Des Moines

Elaine Haugen
Granger

John Jennings
Newton

Laurie Fenimore
Mitchellville

Jonathan Yentis
Clive

Executive Director
Jonathan Yentis
Clive

Prairie Wind Editors
John Jennings
Carla Dykstra
Doreen Van Ryswyk

Prairie Wind is a newsletter about the activities of the Friends of the Prairie Learning Center/Neal Smith National Wildlife Refuge. To subscribe, send your name and address to Friends of the Prairie Learning Center, P.O. Box 399, Prairie City, Iowa 50228. Visit our website at www.tallgrass.org.

Prairie Wind is printed on recycled paper using soy-based ink.



The Federal Junior Duck Stamp Contest

Each year tens of thousands of budding young artists from all across the United States compete in the Federal Junior Duck Stamp Contest. Each state is judged separately and the Best of Show from each state compete against each other for the national honor of the next year's collectors' item, the Federal Junior Duck Stamp. Proceeds from the sale of the stamps support conservation education scholarships.

The goal of the Junior Duck Stamp Contest is to instill an appreciation for waterfowl and wetland conservation in young people. The entries are judged in groups: kindergarten through third grades, fourth through sixth grades, seventh through ninth grades, and tenth through twelfth grades. The judging occurs at the Neal Smith National Wildlife Refuge/Prairie Learning Center.

This year's Iowa Best of Show is awarded to David Schmitz, of Ionia, Iowa. He is 17 years old and attends Charles City Community School. His acrylic painting is of a male and female lesser scaup. David was

also the winner of the Iowa contest in 2001. There were a total of 232 entries in the contest.

The Award Ceremony for the Iowa competitors will be held at the Neal Smith National Wildlife Refuge/Prairie Learning Center on May 11, in conjunction with the "Migratory Bird Day" festival. All winning and honorable mention entries will be on display in the gallery.



The 2001 Neal Smith NWR Christmas Bird Count

By Paul Charland

On December 29, eight hardy souls braved near Arctic-like conditions to conduct the 2001 Christmas Bird Count on the Refuge. Counters walked over 25 miles in temperatures barely above single digits with a stiff wind out of the northwest, but determination and warm clothes got them through. The species total for the count was 28, while the number of birds observed within the Refuge count area was 450 individuals. Participants included some regular volunteers, a couple of new faces, and Refuge staff. The regular volunteers were Carl Nollen, Robin Fortney, Ron VanNimwegen, and Jane Overland. The new faces were: Tim Humpal and Ginger Soleberg. Rounding out the group were regular Christmas Counter Gordon Brand, and Refuge Bio Tech Paul Charland.

The most abundant species on the count was the Dark-eyed Junco at 95 individuals counted. The rest of the top five include:

American Tree Sparrow at 71 individuals, House Sparrow - 50, American Crow - 43, and Mourning Dove with 37 individuals counted. Some of the more noteworthy observations include one Harris' Sparrow, two Barred Owls, a Short-eared Owl, and one Red-headed Woodpecker.

The Harris' Sparrow sighting is significant in that it is not currently listed on the Refuge bird list at all for the winter, suggesting we would not expect to see it during the course of a normal winter. Obviously this was not a normal fall, so the presence of a species outside its normal range may be a result of the unusual weather. But, then again, we can't say that for sure. Since the Refuge is young and still developing and maturing, our knowledge of the bird use on the Refuge is evolving, and will continue to for years. We may yet learn that

Continued on Page 3

Getting a Real Scoop on the Prairie!

By Christy Smith

The Neal Smith NWR introduced bison to newly reconstructed prairie in 1996. The bison were released within a 750 acre enclosure in order to contribute to biotic interactions that would normally take place in tallgrass prairie habitats. Prairie that is in the process of reconstruction is fragile due to the lack of deep sod development and initial low diversity of plant species present. It is important to closely monitor the impacts of bison on the prairie and to monitor bison activities and behavior, including diet preferences, to manage the herd and the reconstruction effort effectively.

Volunteers Jonathan Yentis and Karen Balmer are helping me study the food habits of bison at the Refuge through fecal microhistological analysis. In simple terms, we are studying bison "plops". The objectives of the 2 year study will be to identify key seasonal forage plants and determine diets of bison within the 750 acre enclosure.

Twenty-five fresh fecal samples, at least 50 grams each, are collected from bison each month. Fresh "plops" are collected immediately after animals have moved away from an observed area. The plops are first frozen for at least one week to kill micro-organisms, then dried in an oven at no less than 65 degrees Celsius. After each plop is completely dry, it is broken into smaller pieces and ground in a Wiley mill to 1 mm size. Grinding the feces to a uniform 1 mm size is important for statistical analysis later on when slides are prepared and "read". After each plop is ground up, exactly 1 gram from each of the 25 samples is mixed together to form a composite sample. From the monthly composite sample, 5 microscope slides are prepared for analysis.

Plants from the bison enclosure are also collected, dried, ground and slides are made. A trained observer

identifies each of the plant species by examining the cell tissues (stomata, cork cells, long cells, and other silica structures in the leaf tissue) through a microscope and begins fecal slide analysis.

From the slide analysis, the percent of each plant species found in the feces is recorded and statistically tested to determine and compare the diets of bison from month to month, season to season and year to year. Diet differences may exist between different age and sex groups so it is necessary to attempt to collect samples that represent the entire herd structure: calves/yearlings, cows and bulls.

Jonathan and I have now collected 7 months of feces and have made several visits to the Iowa State University Bessey Microscopy Facility where Research Associates Tracey Pepper and John Mattila, directed by Dr. Horner, have helped us with slide preparation.

Knowing what the bison eat is not enough. It is also important to know what is available to them monthly, seasonally or yearly, so that we can understand whether or not they just eat what is there or if the bison are actually choosing one species over another. To determine availability, Karen and I have set up a series of transects with 1 meter quadrats spaced along each transect throughout the entire 750 acre enclosure. The quadrat is laid on the ground and each plant species within the square is identified, stems counted and percent cover of each species is determined. Sound simple? It is not. Depending on the season, it is very difficult to identify many of the plants in the quadrat and counting each and every grass stem is very tedious. Karen has been able to provide a tremendous amount of expertise to this vital aspect of the study.

Christmas Bird Count continued . . .

we should expect to see Harris' Sparrows or we might learn that the winter range of Harris' Sparrows is expanding. Nature is not static. That's why we keep observing and counting. The Red-headed Woodpecker is described on the bird list as "occasional" for the winter months, meaning it is only expected to be seen a few times a season. The same is true for the Short-eared Owl, but as a grassland species it's one we're especially pleased to know is using the Refuge. The Barred Owl considered to be uncommon on the Refuge, meaning it is usually there, but not often seen. Owls tend to be rather secretive, so any time an owl is seen it is noteworthy.

The species total and the number of individuals seen were both consistent with expectations for grasslands in Central Iowa during frozen conditions. Central Iowa is well within both the summer and winter range of the dedicated bird watcher and many have been observed throughout the region, with the highest

concentrations in Des Moines and Ames. Unfortunately, some of the climatic factors affecting bird distributions and activity are also correlated to bird watcher distributions, especially the wind and cold, so a scarcity of bird watchers on the Refuge the day of the count was almost guaranteed. Additionally, this is a relatively young refuge, so it is likely that few bird watchers have established territories encompassing all or parts of the Refuge. Finally, we didn't have a Christmas count last year, so awareness of the count among the local bird watchers was probably minimal.

All in all, we consider the Christmas Bird Count a success. The goal of the count was not to see and count a large number of birds, but to record what was there. Another goal of the count, like so much of what we do here at the Refuge, was to provide another way for the public to connect with the land and to increase public awareness of who we are and why we're here. I think we did that.

Did you know?

Friends' members receive a discount at the Prairie Point Bookstore!

Friends' members with a current membership card and at least \$25 giving level -- 5% on consignment items and 10% on all other items.
No credit card sales.

Refuge Staff -- 5% on all items. If Friends' member, then Friends' discount only applies.
No credit card sales.

Prairie Point Staff who are not Friends -- Same discount as Friends if worked more than 30 hours during a year.

Browsing with Mary -- An update from Prairie Point Bookstore

By Mary Margaret Jordan

A special effort is made to include the newest and most interesting titles to resources offered in the Refuge's bookstore. Just off the U. of Iowa Press is *The Guide to Iowa's State Preserves* by Ruth Herzberg and John Pearson which sells for \$14.95. If you enjoy getting off the beaten path, you'll find this book gives specific directions to the most secluded and enchanted spots in Iowa, the state that often is mistaken for an endless field of corn. This is a "must read" for anyone who likes to travel our state to see its wonders. The Trust for Public Land has just issued a new edition of its *Our Land, Ourselves* which is a collection of diverse readings on the many themes of people and places. This book selling at \$16.95 is compact and would make an excellent traveling companion.

Tinkering with Eden is the winner of the PEN/Jerard Award; its author, Kim Todd, is one of the new century's freshest voices. In this book, she tells the natural history of exotics in America using both tales of humor and of science. It is priced at \$26.95. Anyone who likes a good story, especially those of you who are educators, will want to have Dennis L. Olson's *Shared Spirits: Wildlife and Native Americans* priced at \$19.95. The author focuses on 12 animals, including the buffalo, which are revered by Native Americans. These stories are accompanied by gorgeous photographs.

Those of you who are interested in prairie gardens will like Lorraine Johnson's *Grow Wild*. She provides loads of information that readers will find useful and practical in their efforts to garden naturally. This book priced at \$32.95 was recommended by Dr. Eileen Robb on WHO's program "Gardening Today".

"Our Wild World" is a series designed for young readers. Two of the titles have just been added to our selection: *Bison* and *Whitetail Deer*. The text of each is combined marvelously with colorful photographs and illustrations. They sell for just \$7.95. Readers of all ages can experience nature close up with the new "Golden Photo Guides" from St. Martin's Press. Prairie Point now has *Insects* and *Reptiles* in hardback for just \$7.95. Children ages 4 through 10 will enjoy *Birds in Your Backyard* by Barbara Herkert. This title is an excellent tool to help kindle the spark of interest in birds at an early age and sells for \$8.95.

Bird lovers will be happy to learn that we have recently added several extremely excellent titles to that section of the bookstore thanks to Paul Charland, member of the Refuge staff and our resident bird expert. *Prairie Birds: Fragile Splendor of the Great Plains* is by Paul A. Johnsgard, one of America's prominent ornithologists. He blends science, nature and personal observations to tell the life histories of 33 grassland birds. Illustrated with black and white line drawings and maps, this title retails at \$29.95. *Bird Sounds* by Barry Kent MacKay tells how and why birds sing, call, chatter and screech. Beautifully illustrated in color, this book sells for \$19.95.

Visit Prairie Point Bookstore for the best and the newest resources on nature. We are always happy to help find just the right book for you.

Come Grow With Us

The power of a Friends group is its members. We represent a variety of interests, talents and financial support allowing the Friends of the Prairie Learning Center to meet its mission and goals. We encourage you to renew your support or become a new Friend by completing the membership form below. Friends of the Prairie Learning Center is a nonprofit organization and all donations are tax deductible.

\$25 -- Big Bluestem Friend

\$100 -- Savannah Saver

Other -- \$ _____

\$50 -- Buffalo Buddy

\$250 -- Prairie Patron

Please circle one.

New Member

Renewal

Be sure to check and see if your company matches contributions....

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Date _____

E-mail _____

Circle your donation level and mail to Friends of The Prairie Learning Center, PO Box 399, Prairie City, Iowa 50228

Volunteer View

By John Below

Great things are happening with the volunteer programs but we still need lots of help. First things first, we need crew leaders for stewardship programs on weekends. Knowledgeable volunteers are needed to supervise other volunteers in the areas of seed cleaning, seed collecting, brush cutting, and greenhouse work. These volunteers will be trained by Pauline Drobney to work on weekends to help new volunteers on special events and weekends other than Stewardship Saturday.

Second, we need to have complete teams for brush cutting. This includes three areas (tree cutters, brush removers, and chemical applicators). If you are interested in either of these opportunities, please let me know.

Large stewardship groups have been coming this spring and have been doing a great job clearing brush and helping prepare the greenhouse for spring activity. Public Use has started planting plants in the wet lab and volunteers have responded to the challenge by helping with every aspect of the operation. These plants will be planted along the Overlook Trail on April 20 (Earth Day), May 11 (Wings and Wild Oats Day) and will be used by those who "Adopt-A-Trail. Come out see what new opportunities are available.

All volunteers who have put in at least 30 hours in the current year or 30+ hours the previous year, get a 10% discount on cash purchases at the Prairie Point Bookstore. Feel free to contact me if you are unsure of your hours.

What's New?

By Don Jorgensen

Thanks to the "Friends" of the Prairie Learning Center and a Grant from the Maytag Community Innovation Award monies, the Prairie Learning Center now has an Electric Convenience Vehicle for visitors that cannot walk or stand for long periods of time. Bookstore volunteer Rex Emerson demonstrates how easy the instructions are to follow and how easy the ECV is to operate.



The Stewardship activities at the Neal Smith NWR Prairie Learning Center are taking on new endeavors. Two new programs, Adopt-A-Trail and EE Stewardship Planting will utilize the wet lab area in the PLC to produce seedlings to plant on the prairie. Over 5,000 seedlings are soon to be transplanted on the Prairie Overlook and 2 Mile Tallgrass Trail this spring. Thanks to a tremendous volunteer effort, the programs are beginning to blossom.

Robin Fortney, Project Manager for the new Peterson Exhibit in the PLC, stands in the area where part of the new exhibit will be placed. Robin is holding a photo of the 7' x 30' mural that will depict how Prehistoric People of the Prairie utilized the bountiful ecosystem.



Neal Smith National Wildlife Refuge 2002 Special Events

April 20	9 a.m. - 4 p.m.	Earth Day/Savanna Stewardship
May 11	10 a.m. - 4 p.m.	Wings & Wild Oats Day & Stewardship
June 8	10 a.m. - 4 p.m.	Buffalo Day
Sept. 28		National Public Lands Day (Volunteer Expo)
Oct. 12		National Wildlife Refuge Week
Dec. 28		Christmas Bird Count

Stewardship opportunities the second Saturday of every month, 9 a.m.- 1 p.m., and the last Thursday of every month from 6 - 9 p.m.

Wings and Wild Oats Day

The Annual Special Event, "Wings and Wild Oats", is scheduled for May 11, 2002 from 9 a.m. - 2 p.m. This day recognizes the return of Spring by celebrating migratory birds and the renewal of life promised by seeding and planting on the prairie.

Special programs are planned and exhibitors will be on hand at the Neal Smith National Wildlife Refuge - Prairie Learning Center. Woodcarvers who specialize in birds will be here all day showing their skills and products. Special programs begin at 9:00 a.m. with "Watching Wildlife Skills". This program will start with a video and continue with a hike. The Junior Duck Stamp Contest Awards Presentation will be held at 10:00 and the art will be on display in the halls for all to see. Clowns will be gamboling about at 11:00 to provide roving jocularly. A live bird program from Iowa State University begins at 11:30. A special all day program connected to all the activities and events is a Patch-Earning Program that teaches children about birding. Kids will earn a patch by participating in scavenger hunts, attending the special programs such as the "Watching Wildlife Skills" and the "Live Bird Program".

Prairie Planting will begin at 1 p.m. inside the Overlook Trail. This year's theme is "Planting for Diversity" with the goal of bringing more plant varieties and color to the hilltop.

5th Annual Buffalo Day

On Saturday, June 8, 2002, the Neal Smith National Wildlife Refuge will celebrate its fifth annual Buffalo Day. Activities will begin at 10:00 a.m. and end at 4:00 p.m. at the Prairie Learning Center. This fun, free event brings us together to share stories and pictures of the large animals that once roamed our prairies. Bring friends and family for a chance to view the buffalo calves born this spring. The buffalo herd was dispersed last fall with the relocating of 34 bulls, cows and calves and now totals about 32 adults and some calves. Currently there are 14 adult elk and several calves.

Buffalo burgers and hot dogs will be cooked and sold as in previous years. Arts and crafts, flint knapping, pottery making, hide scraping and tanning, hikes, storytelling, and guest presentations are some of the activities in which you can participate. Winners of the buffalo photo contest will be announced at 2:30 p.m. A buffalo chip throwing contest will complete the day's activities.

Send or bring your 4" x 6" photo of buffalo to the Prairie Learning Center by June 7, 2002 to enter the photo contest.

Meet & Eat

The Friends' Picnic on the Prairie and 2002 Annual Meeting will be held at the Prairie Learning Center on July 27th starting at 6:00 p.m. We are planning potluck this year. Plan to attend and enjoy being with Friends!

Make the Connection

By Laurie and Dan Fenimore

Yesterday I attended a most amazing event, a Citizenship Ceremony at the U.S. Federal Court-house. Now, you may be thinking, "what does a citizenship ceremony have to do with the Prairie"... hopefully by the end of this article, you will see the connection.

While waiting for my friends to arrive, I stood just inside the entrance and watched everyone enter. There was quite a diverse assemblage of people gathered together old, young, black, white, brown, Asian, Hispanic, European. I closed my eyes and listened to the many, varied languages. Since I could not understand what was being said, I concentrated on the excited rhythms of the voices. It reminded me of an early spring morning as various birds are chirping their excitement of the dawning day.

Soon, my friends, Alma, Dino, and their children, Lamija and Aydin, arrived and we all went up to the courtroom. Dino expressed surprise that I was there and I said I couldn't imagine not attending.

Later on, during the ceremony, the judge encouraged all the new citizens to learn English, and learn it well, but to also keep their own native languages and cultures alive. He mentioned that America is a great place because of the diversity of its people.

Today, I walked in the prairie. I stood just inside the gated entrance and looked across at the view. There was quite a diverse assemblage of plants, birds, and animals.

I watched the movement of the wind in the big bluestem and the Indian grass and the wildflowers; prairie violet, wood betony, and blue-eyed grass. I imagined the animals burrowed in their soil shelters under the grasses and flowers. I thought of what I had seen at the ceremony. I thought of what the judge had said during the citizenship ceremony about keeping what is native alive. Diversity - isn't it great!

NatureMapping Workshop

By Johathan Yentis

A Level 1 NatureMapping workshop will be held at the Refuge on Saturday, June 15, 2002. This workshop is hosted by the Friends of the Prairie Learning Center. The workshop begins at 9:00 a.m. and ends at 4:00 p.m. and will be held in the multi-purpose room at the Learning Center. Lunch will not be provided, so you will need to bring a bag lunch.

NatureMapping is a volunteer based wildlife monitoring program designed to collect and map location and habitat data for Iowa's common terrestrial vertebrate. Wildlife NatureMapping volunteers are required to attend a one-day workshop and are train in the "basics" of wildlife monitoring. NatureMapping is an ideal way to involve the public in efforts by various management agencies who wish to implement long term monitoring projects as an element of resource management. Also, incorporating NatureMapping into the classroom is an ideal way to use real science to learn about local wildlife, habitats, and the human interactions of both. Using their own data, students can experience meaningful, hands-on inquiry-based learning. Teachers, naturalists, natural resource agency employees, businesses, and anyone interested in contributing to a statewide effort to map Iowa's biodiversity is encouraged to become involved with NatureMapping.

Join the Iowa NatureMapping Program at the Neal Smith National Wildlife Refuge for a day of hands-on training in wildlife identification, map reading, monitoring basics, and field monitoring. Directions to the Refuge can be found at www.tallgrass.org.

To register go to <http://www.extension.iastate.edu/naturemapping> by clicking on "How to get involved", then "Upcoming workshops", where you will see the Neal Smith NWR workshop on the list. Print out the registration form and mail with the registration fee, to arrive no later than June 11, 2002, to:

Jonathan Yentis/NatureMapping
Friends of the Prairie Learning Center
P.O. Box 399
Prairie City IA 50228

The registration cost is \$10.00 made payable to Iowa State University. Participation is limited to thirty people.

A Message from the Friends' President

Friends' Mission

Increase public awareness and appreciation of the Refuge

Encourage public participation in prairie restoration and preservation

Promote public use and enjoyment of the Refuge

As you read this, spring will be well under way. The fall controlled burn areas that were black and lifeless all winter are

turning a bright green and new growth is evident throughout the prairie.

As a result of the many hours our bookstore volunteers have dedicated, a new group of interns will soon be starting their growth experience at the Refuge. Two will be working with environmental education and two will be assisting with restoration.

During our mild winter, more outdoor stewardship activities were conducted than in past winters and the 2001 seed harvest has been cleaned. Our Last Thursday of the Month Stewardship Program will get a boost since Daylight Savings Time has gone into effect.

Through your membership support, the Refuge's special events and outreach

efforts continue to expand. If you haven't attended Wings and Wild Oats or Buffalo Day in awhile, you'll notice some major expansions in these upcoming activities. I want to thank the members and volunteers for your continued sponsorship, and together, we'll bring back the tallgrass prairie.

BOARD OPENING

There is an opening on the Friends' Board for a Programming & Events Coordinator.

Duties include:

- * Organize & host Friends' Events**
- * Work with Refuge staff on Friends' Annual Budget**
- * Communicate & host events for National Leaders involved with the NWRS.**

If interested, contact me at 515/966-2275 or e-mail: buffalo@tallgrass.org.

Friends of



the Prairie Learning Center

Neal Smith National Wildlife Refuge
P.O. Box 399
Prairie City, Iowa 50228
515-994-3400

NON PROFIT
U.S. POSTAGE
PAID
DES MOINES, IA
PERMIT NO. 4333

PRAIRIE WIND

SUMMER 2002

WWW.TALLGRASS.ORG

STATE FAIR EDITION

In this issue ...

New Irrigation System	1
New Exhibits, YCC	2
Internships	3
Calendar	4

NEW IRRIGATION SYSTEM

An Invaluable Addition to Prairie Plant Production

Over the past year, the Friends of the Prairie Learning Center raised \$2000 to give to the Refuge for an irrigation system. This system has been anticipated for three years and with its installation, it is hoped that production of rare prairie plants will greatly increase both in number and ease.

The planting of the plot itself was in the capable hands of the Iowa Corps members, volunteers, Friends, and biology staff and interns this summer. Seeded in the new plot are: false indigo, creamy indigo, rough blazing star, prairie blazing star, prairie phlox, prairie lily, butterfly milkweed, and compass plant. The seed used was gathered from ten different prairie remnants in order to assure genetic diversity and started in a greenhouse one to three years ago.

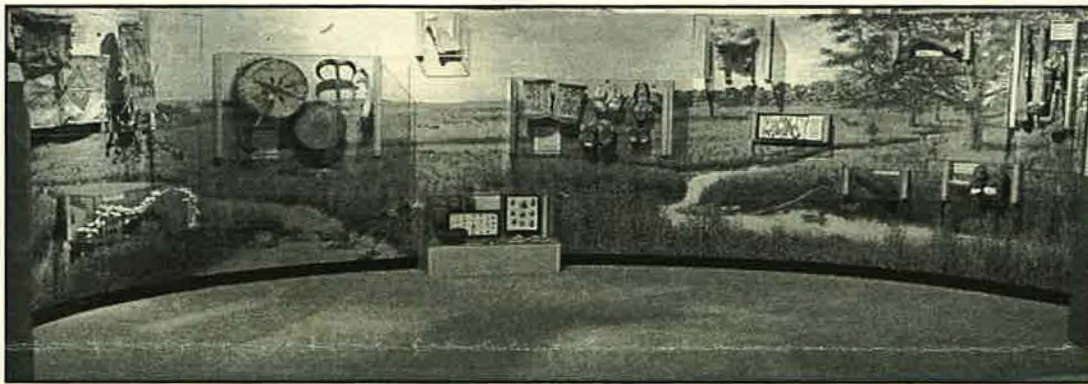
This irrigated production plot is the newest of three on the Refuge; it joins an already established non-irrigated plot and a separate plot used by Iowa Private Lands. Once it is fully up and running, there are plans to include an interpretive area for interested Refuge visitors.

Adopt-a-plot! Volunteers are needed to take care of an 8 by 240 foot row. This includes weeding, reporting on its condition, and harvesting seed. If you are interested, please contact the Refuge.



New Exhibits at the Prairie Learning Center

The grand opening and dedication of the Native American Exhibit, "People of the Prairie", took place on Saturday, June 8, at the Neal Smith NWR. The exhibit is a donation to the Refuge, through the Friends of the Prairie Learning Center from the estate of Charles Peterson, who collected Native American items. The display is an array of Native American artifacts backed by a mural depicting the tallgrass prairie of 200 years ago. In conjunction with the "People of the Prairie" exhibit is a new display about the elk on the Refuge, featuring a life-size model and touchable antler.



Youth Conservation Corps

This summer, four capable students joined leader, Stacy Boot, for a rip-roarin' good time. And some rippin' out of non-native species. The Youth Conservation Corps, established at the Refuge in 2000 as a summer position for area high school age students, spend much of their time out on the Refuge grounds eradicating weeds, removing nuisance brush, planting native species, and doing other odd jobs as needed.

"This job has given me a chance to learn about the Midwest's pre-settlement landscape and has made me think I might want to pursue a career in this area," says Josh Brant. His co-workers, Jason Elam, Joel Steenhoek, and David Patterson "are invaluable for getting work done around here," says Gary Shea, primary supervisor for this summer's crew. For more information about next year's crew, please contact the Refuge at (515) 994-3400.



YCC 2002

Back row, l to r: Joel Steenhoek, David Patterson,
Leader Stacie Boot
Front row: Josh Brant, Jason Elam

Summer Internships at Neal Smith NWR

The intern program at Neal Smith NWR is in its fourth year and growing successfully. Stemming from an idea – and funding – from the Friends of the Prairie Learning Center, the program has developed into four intern positions: two in Biology and two in Public Use. “This is a great opportunity,” says Biology Intern Megan Korte, “and what we learn here is definitely applicable to future jobs.” Shannon Tuttle, another Biology Intern, agrees. “What we’ve accomplished this summer will stay with us – and the Refuge – for a long time.”

Interns for Biology spend time caring for prairie production plots and assisting in a number of research projects taking place on the Refuge. Public Use Interns are responsible for providing programs to numerous groups of visiting children and adults.

Interns are awarded grants in four stipends from the Friends, with the funding coming from proceeds from the Prairie Point Bookstore. Housing is provided at no cost to those living outside of the commuting area.

Interested persons should visit the Friends’ website at www.tallgrass.org for more information. The application and instructions are available starting in late January and are due by March 15. Selections are made one month later after an interviewing process with Refuge staff.

“This is a way I can make a lasting contribution to the Refuge,” Public Use Intern Laura Elliott says. “And it’s so rewarding to be around enthusiastic kids who are learning about the prairie for the first or second or hundredth time,” adds Abby Hade, the other Public Use Intern.



Abby
Hade



Laura
Elliott



Megan
Korte



Shannon
Tuttle

Come Grow With Us

The power of a Friends group is its members. We represent a variety of interests, talents and financial support allowing the Friends of the Prairie Learning Center to meet its mission and goals. We encourage you to renew your support or become a new Friend by completing the membership form below. Friends of the Prairie Learning Center is a nonprofit organization and all donations are tax deductible.

\$25-- Big Bluestem Friend

\$100 -- Savannah Saver

Other -- \$ _____

\$50 -- Buffalo Buddy

\$250 -- Prairie Patron

Please circle one.

New Member

Renewal

Be sure to check and see if your company matches contributions....

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Date _____

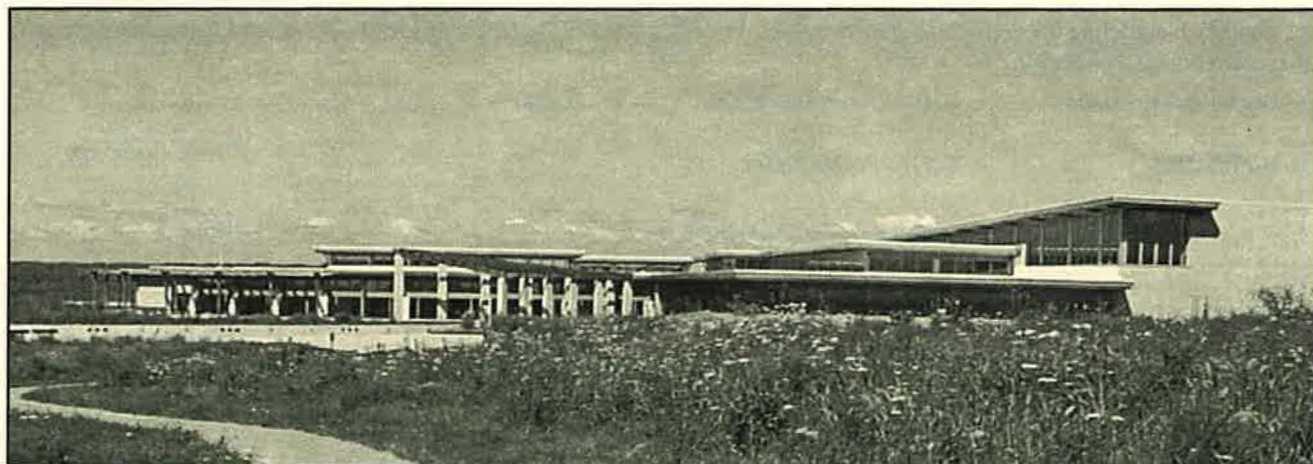
E-mail _____

Circle your donation level and mail to Friends of The Prairie Learning Center, PO Box 399, Prairie City, Iowa 50228

Neal Smith NWR Calendar of Special Events

September 2002 - October 2003

- The Second Saturday of each month from 9:00 a.m. to 1:00 p.m. and the Last Thursday of each month from 6:00 p.m. until 9:00 p.m. are volunteer stewardship work times.
 - **October 13, 2002 National Wildlife Refuge Week** will climax with Ding Darling Day as the central theme. This special event will focus on the work and life of Ding Darling and his contribution to the National Wildlife Refuge System. Stewardship activities planned are seed collection, seed cleaning, and invasive species control.
 - **February 8, 2003 Cabin Fever** An afternoon and evening of activities that break the monotony of winter.
 - **March 15, 2003 The Birthday of the National Wildlife Refuge System** A Saturday to celebrate the Refuge System with special events. The focus will be on the Refuge System Centennial.
 - **April 12, 2003 Volunteer and Stewardship Highlight Workday** A day to focus on volunteer and stewardship efforts and showcase their accomplishments.
 - **April 19, 2003 Earth Day** A special day of savanna and prairie stewardship partnering.
 - **May 10, 2003 Wings and Wild Oats International Migratory Bird Day** A celebration of Spring, the returning birds, and renewal.
 - **May 10, 2003 Iowa Junior Duck Stamp Award Ceremony**
 - **June 14, 2003 Buffalo Day** Celebrate the buffalo on the Refuge with special speakers, activities, and food at the Prairie Learning Center.
 - **October 11, 2003 National Wildlife Refuge Week**
-





U.S. Fish & Wildlife Service Neal Smith National Wildlife Refuge

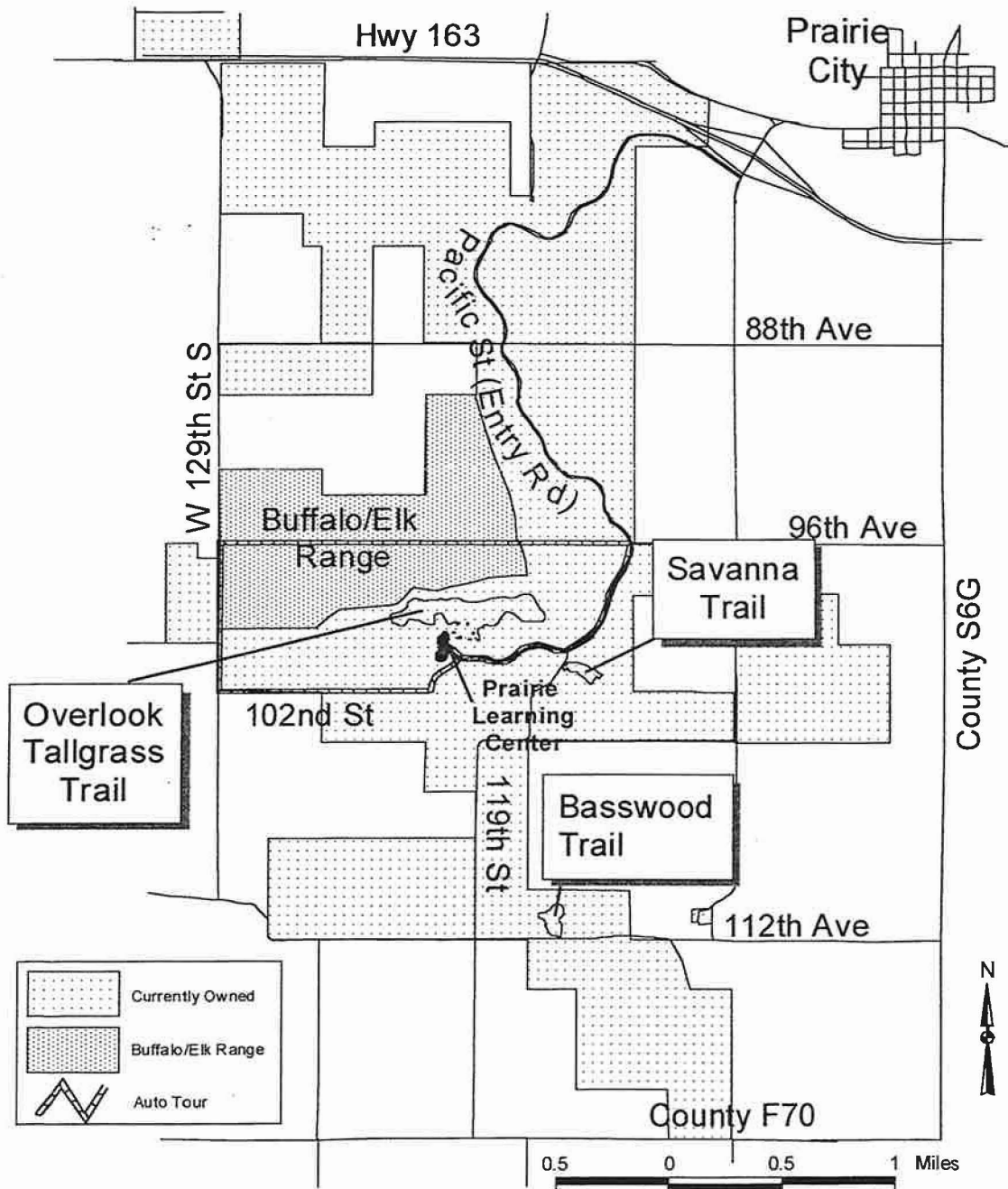
PO Box 399, Prairie City, IA 50228 (515) 994-3400

Prairie Learning Center hours:

Mon. – Sat. 9 am – 4 pm

Sunday 12 pm – 5 pm

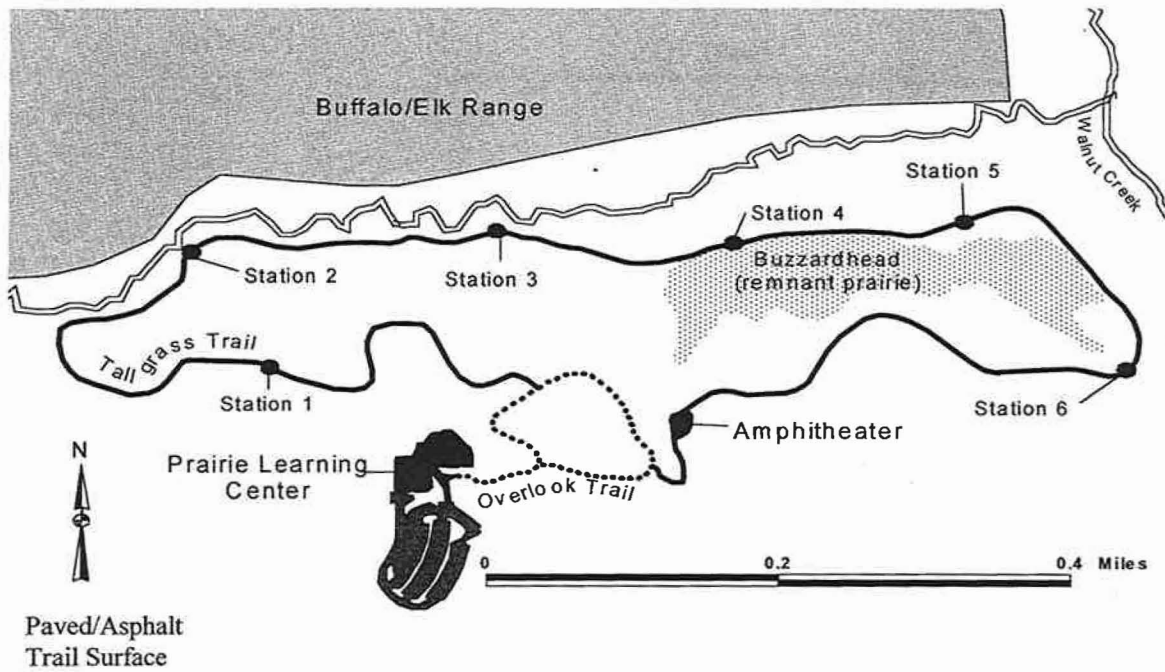
Auto Tour Route and Trails: Daylight hours



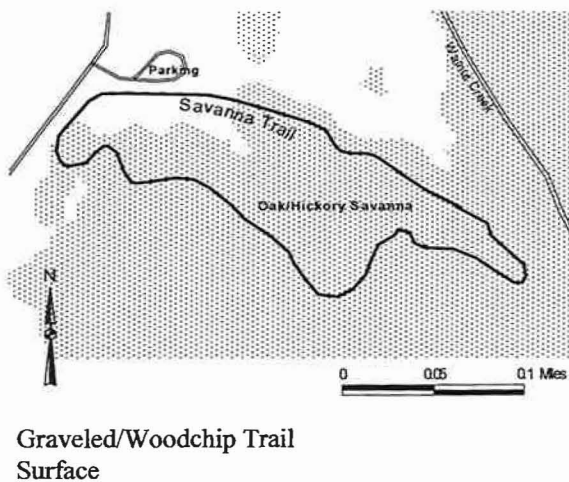
Neal Smith NWR Trail System

Trails are open for foot traffic only during daylight hours.

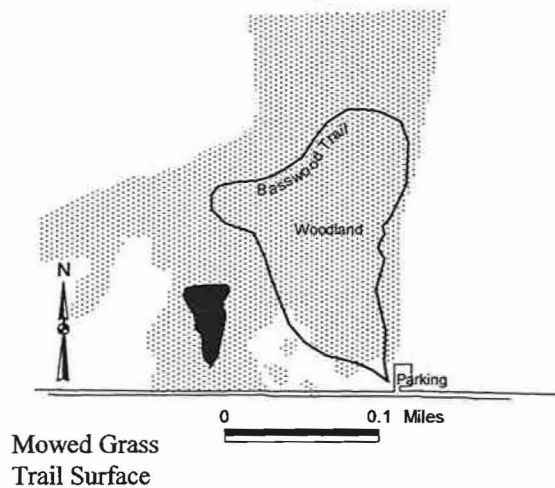
Overlook/Tallgrass Trails



Savanna Trail



Basswood Trail



Neal Smith National Wildlife Refuge Hunting Seasons 2002-2003

Note: All hunting on the Refuge ends January 10, 2003.

<u>Game</u>	<u>Dates</u>	
Upland Game Birds		
Rooster Pheasant	Oct 26-Jan 10	
Bobwhite Quail	Oct 26-Jan 10	
Whitetail Deer		
Bow	Oct 1-Dec 6 Dec 23-Jan 10	
Muzzle Loader	Oct 12-Oct 20 Dec 23-Jan 10	
Shotgun	Dec 7-Dec 11 Dec 14-Dec 22	Note corrected dates! This brochure supercedes all others.
Small Game		
Squirrel	Oct 1-Jan 10	
Cottontail Rabbit	Oct 1-Jan 10	

Hunter Ethics

- Ethical hunters respect the rights and property of Refuge tenants, neighbors, and other Refuge users.
- Be alert for trespassing. Watch for boundary and closed area signs, as shown on the map side of this sheet. Please be aware of the litter problem. Everything you brought to the Refuge must go with you when you leave.

Hunting Regulations

Please refer to the State of Iowa Hunting Regulations for shooting hours, definition of approved weapons, clothing, bag limits, license requirements and other important information. Contact the Iowa Department of Natural Resources at (515)281-5145.

Special Refuge Regulations

Below are regulations specific to hunting on the Neal Smith National Wildlife Refuge. These do not include all applicable regulations. Direct any questions to a Refuge Officer.

- **Non-toxic shot is required for the hunting of small game and upland game birds for the 2002-2003 season.**
- Hunting of a species not listed on this sheet is prohibited on the Refuge. Hunting of listed species is permitted only within the dates listed on this sheet.
- Refuge access is from 1/2 hour before sunrise to 1/2 hour after sunset. See map and posted signs for areas closed to hunting.
- Do not block roads or field entrances. Do not drive into fields or grassland areas. Do not park on Refuge roads, including entrance road and auto tour loop. Parking lots are designated on the map; do not drive past the yellow posts.
- Trapping of fur-bearing animals is prohibited on the Refuge.
- Construction or use of permanent stands or ladders is not permitted. Portable stands may be used but must be removed at the end of the day. Steps, ladders, and stands will be constructed in a manner that does not damage trees.
- All persons engaged in gun hunting activities are **required** to wear an article of solid blaze orange outerwear or a hat.
- Use of spotlights or other artificial lights to spot, locate or take any wildlife within the boundaries of any Refuge or along the right-of-way on public or private roads on any Refuge is **prohibited**.
- When hunting deer with firearms, refer to the State of Iowa Hunting Regulations regarding clothing.
- **Report all accidents and injuries to Refuge Headquarters:**
Neal Smith National Wildlife Refuge
P.O. Box 399
Prairie City, IA 50228
Telephone: (515)994-3400

Neal Smith National Wildlife Refuge

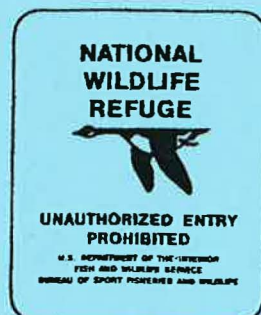
Hunting Map

2002-2003

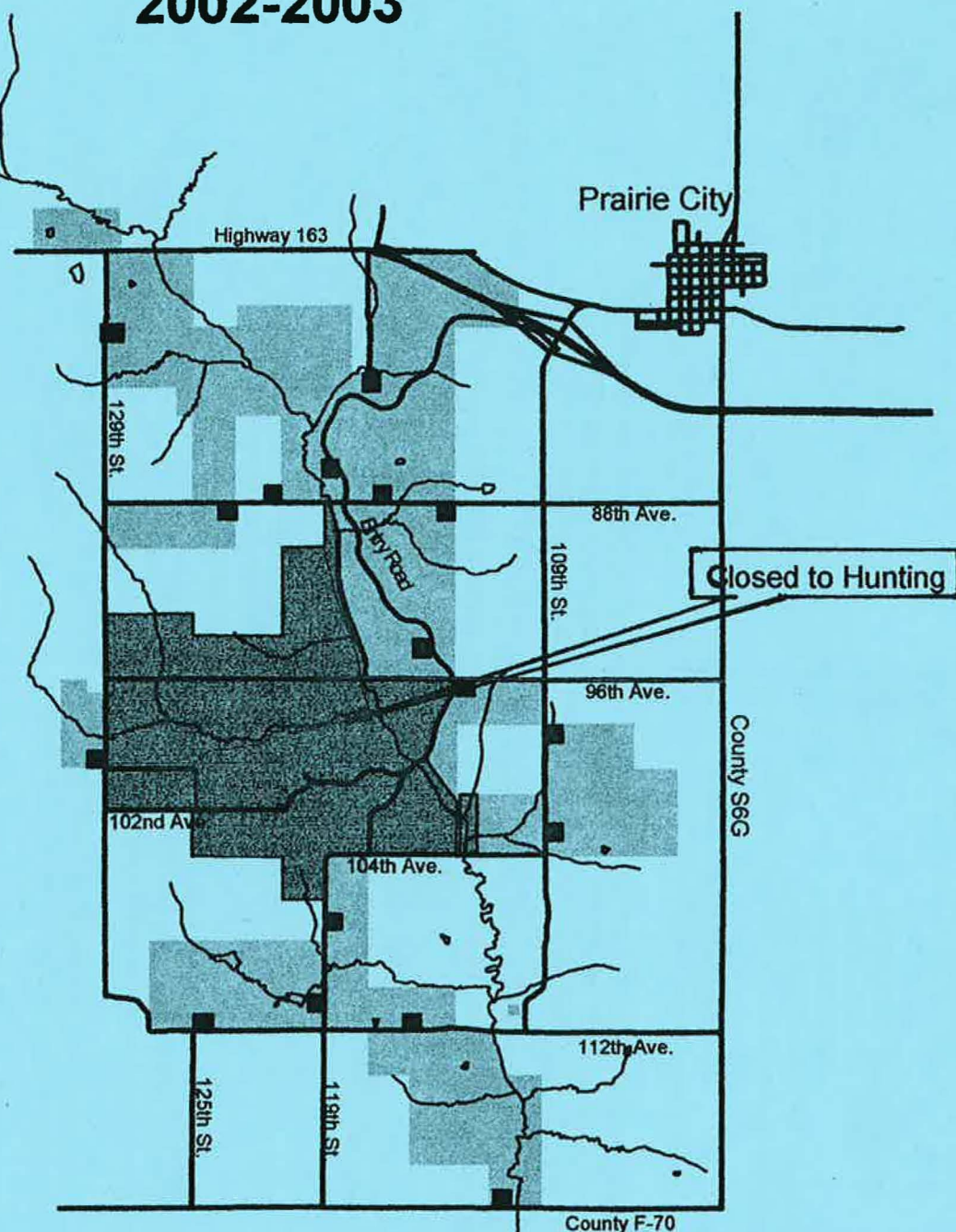
Refuge Signs



No Entry



Refuge Boundary



1 0 1 2 Miles

- Roads
- Parking Areas
- Closed to hunting
- Refuge Boundary



Neal Smith National Wildlife Refuge
and Prairie Learning Center

The Tallgrass Trail

*Where
Prairie and Sky
Meet*

Funding for this brochure was provided by
the National Fish and Wildlife Foundation
and Friends of the Prairie Learning Center



Friends of



Neal Smith National Wildlife Refuge
P.O. Box 399
Prairie City, Iowa 50228
515-994-3400

The Tallgrass Trail - Where the Sky and Prairie Meet

Bench 1:

Panorama of Prairie

Look below to the bison/elk enclosure fence and then beyond across the small valley to the hillside. The panorama you see before you offers a hint of what the tallgrass prairie once was and will become again.

The land you are standing on was once a prairie, then was turned into crop land, and is now undergoing the process of reconstruction and recovery back to a prairie.

Bench 2:

Water on the Go

The creek meander slows the water down and gives beaver a place to build their dams. The ponds and creek provide a wetland habitat for many different kinds of animals.

Some types of plants begin life from seed each year, grow fast, produce seeds and then die. The cut bank and sandbar conditions

created by the creek and beaver pond flooding make good conditions for plants like these. The curves of the trail mimic the creek as you continue past **Bench 3** on the floodplain and past **Bench 4** where the trail begins to climb slightly.

Bench 5:

Valleys of Slow Change

The waters of two creeks combine to form one where two valleys join. Looking west toward station 2, notice the hillsides and valley. The valley was formed by the movement of water and the shifting of soil over several hundred thousand years — a natural erosion process. Prairie plants are deep rooted and hold soil in place that otherwise would be washed into the stream.

Bench 6:

Trees Along the Creek

Trees have grown up along Walnut Creek where 200 years ago tall grasses and wild flowers grew. Looking to the east, you

can see a remnant oak savanna. Typically an oak savanna consists of large oaks with a ground cover of prairie grasses and flowers. The fires that swept across the land hundreds of years ago kept the land in an open prairie, killing most species of trees. The oaks were fire resistant so they survived on the prairie in these savannas. After pioneer settlement, fire was suppressed and now other trees have taken over the land next to Walnut Creek. With a combination of tree cutting and fire re-introduction, we hope to eventually restore this area to its pre-settlement state.

Amphitheater - Last Stop:

Horizon Near and Far

Here you can let the memories of your visit build scenes in your mind's eye. Enjoy the chorus of sights, sounds, and scents where the sky meets the prairie and every day is different in some way.

VOLUNTEER OPPORTUNITIES

The volunteer program at Neal Smith National Wildlife Refuge plays an active and vital role in the operation of the Refuge. Much of the restoration of this Savanna Area has been accomplished by volunteer efforts.

You can get involved to help restore and maintain this and other Savanna areas on the Neal Smith National Wildlife Refuge by volunteering your services.

Please contact the Refuge Volunteer Coordinator and join a team of staff and volunteers that are making a difference.

Friends of



the Prairie Learning Center

Neal Smith National Wildlife Refuge

P.O. Box 399

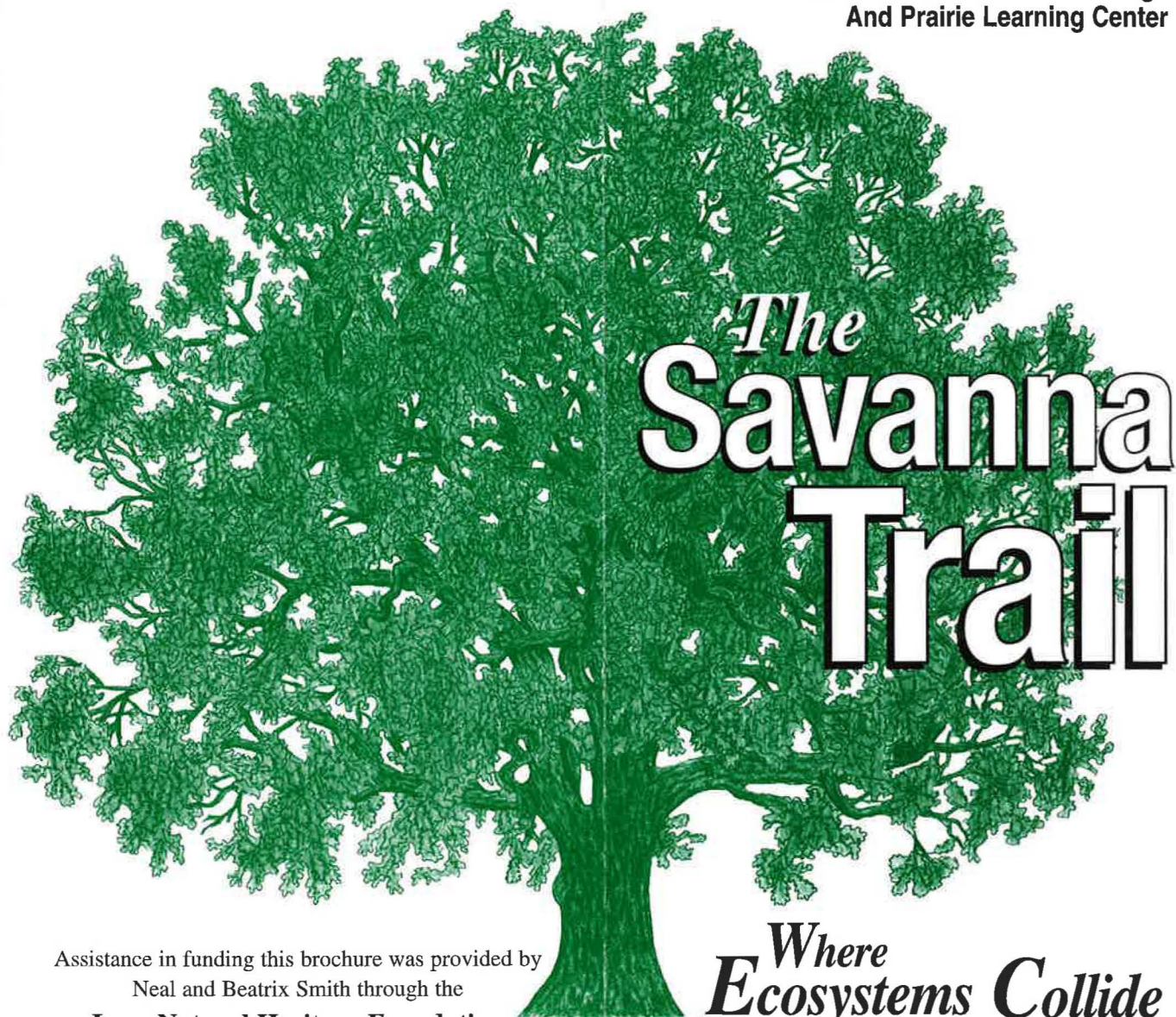
Prairie City, Iowa 50228

Phone (515)994-3400

WWW.tallgrass.org.



Illustration by Mark Muller



Assistance in funding this brochure was provided by
Neal and Beatrix Smith through the
Iowa Natural Heritage Foundation



505 Fifth Avenue, Suite 444
Des Moines, IA 50309-2321

1-800-475-1846

www.inhf.org

*Where
Ecosystems Collide*

Three types of ecosystems once common in Iowa border one another on this hillside. Prairie grasses and wildflowers live next to Savanna trees and plants. Woodlands made up of many types of trees and shade tolerant wildflowers and shrubs are spreading into both the Prairie and the Savanna. The addition of so many trees soon results in Prairie and Savanna loss.

POST 1 — WHAT'S A SAVANNA?

A savanna consists of open grown oak trees growing with an open grass, wildflower, and sometimes shrub understory. Understory plants in savanna get indirect sunlight as shade patterns change during the day. Savanna plant communities are maintained by fire, rainfall and by browsing and grazing wildlife. Over the previous 150 years, fire was eliminated and wildlife grazing and browsing has changed and so have the types of plants found here.

POST 2 — SAVANNA SPECIMEN (BUR OAK)

Iowa savannas are usually called oak savannas because of the bur oaks that grow here. Iowa's State tree, the bur oak is adapted well to savanna life. The bur oak's thick corky bark and deep roots protect all but the youngest trees from prairie fires.

Grown out in the open or on the edge of the savanna, a bur oak will grow wide and tall. Coupled with the grass and wildflower understory, a park-like appearance is created.

POST 3 — WHERE ECOSYSTEMS MELD

Savanna becomes woodland where the trees become plentiful and there is more shade than sun. Trees also drink up lots of moisture and both conditions make a difference to the plants.

The shaded understory has a different look as many wildflowers and grasses that thrive in savanna don't survive in the shade of woodlands.

Many wildflowers, grasses, and shrubs grow quickly or leaf out and flower early in the spring before the trees reach full foliage.

POST 4 — INTO THE WOODS

As the woods get thicker, the trees grow toward the light. They can become tall with bare trunks and small crowns of branches or grow limbs that twist and turn to find the sun.

Some trees that grew well in the savanna cannot survive with so little sunlight and some woodland type trees are able to grow well in the shade.

POST 5 — RESTORING THE SAVANNA

Drought, floods, insects, disease, and other natural causes can contribute to the loss of savanna areas. This savanna lost the natural dynamic of fire and wildlife browsing and grazing. Due largely to fire suppression, this area has changed and continues to change to woodland.

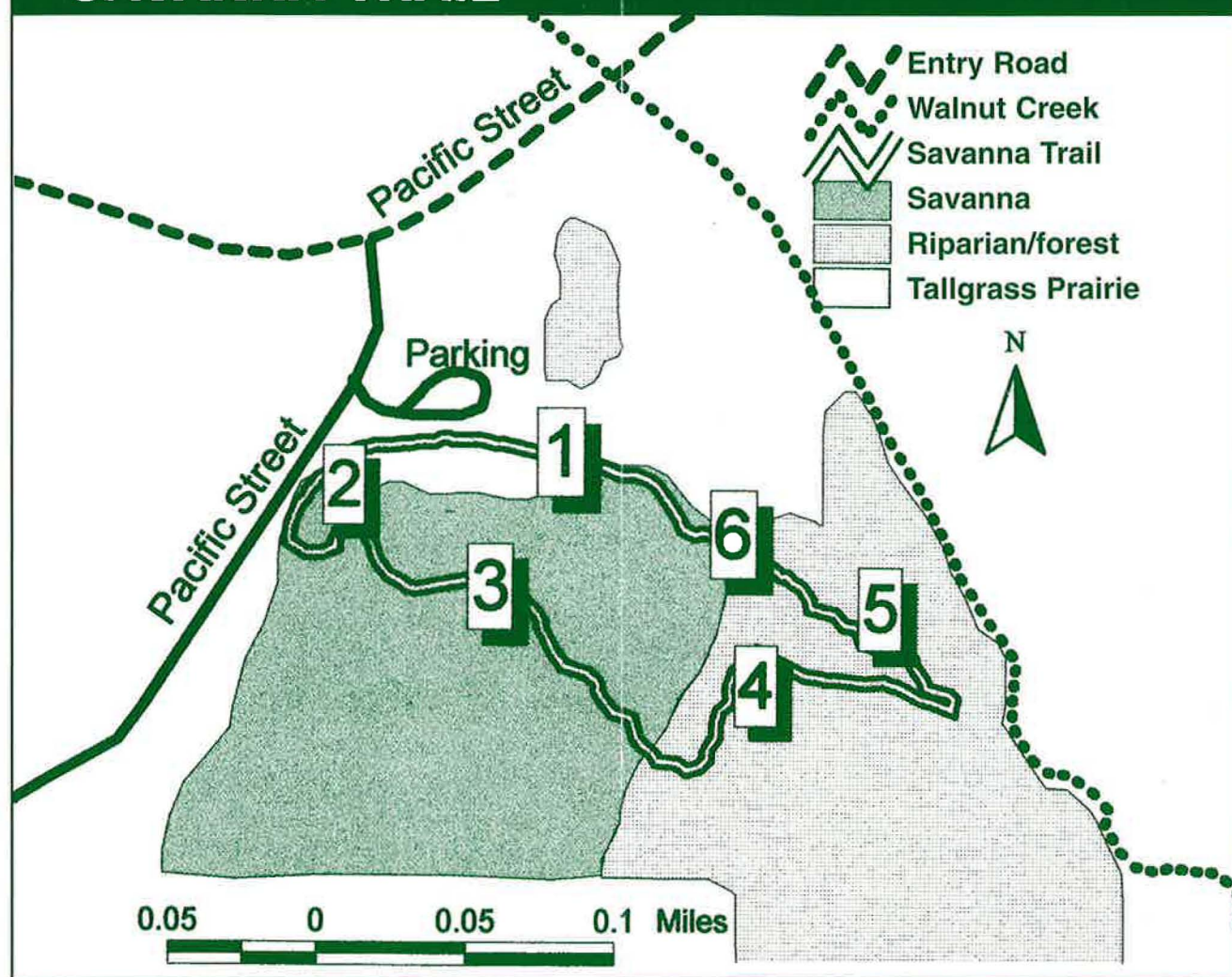
In order to reestablish a savanna, non savanna trees and other plants will have to be removed. People will have to recreate the natural dynamic fires and wildlife effects that created the savanna.

POST 6 — LIVING ON THE EDGE

Food, cover, nesting, and brood rearing habitat are found in woodland, savanna, and prairie. However, a savanna provides valuable habitat for some species that cannot thrive in woodland or prairie. The loss of true savanna and prairie has left many species homeless.

The edge habitat offers some aspects of both prairie and woodland and as a transition between the two. Restoring the savanna will re-supply a very rare habitat for wildlife that once lived on the edge.

SAVANNA TRAIL



Neal Smith
National Wildlife Refuge



Prairie Learning Center

The Tallgrass Trail

Back to the Future?

This 2-mile long trail is paved and has benches about every 1/3 mile to rest and watch the prairie life around you. It has long, gradual slopes that will take you down by the stream and a buffalo enclosure that you can see from the top of the hill, just north of the Prairie Learning Center. This trail is accessible to everyone, including those who use wheelchairs, walkers or crutches — although it does require some endurance.

Please enjoy this trail and all of the Refuge and help protect it!

- Stay on the trails.
- Collecting plants or animals, building fires, or taking pets along are all prohibited.
- Please do not litter; pick up any litter you find that may have been left behind by others.
- To protect people on foot, no bicycles or skateboards are allowed on the Tallgrass Trail.

This trail will allow you to see firsthand some of the plants and animals you've learned about in the Prairie Learning Center (PLC). It will show you some reintroduced plants and animals. It will take you back to what the Tallgrass Prairie once was. It will also take you forward into what this Refuge will become. It will ask you to look, listen, and ponder. The six stations in this brochure refer to the six wide places in the trail with benches. You can locate them on the map below.

You may want to consider taking along:

- a bottle of water (it can be hot on the prairie on a summer day),
- binoculars to spot prairie birds or buffalo,
- a book on prairie wildflowers and plants, and
- a hat to protect you from the prairie sun.

Station 1

Probably it's already quieter than when you left the trailhead. Though the Learning Center is closeby behind you, you are lower on the slope and surrounded by restored tallgrass prairie. Listen and watch closely. You may hear the sweet calls of meadowlarks and see them landing in a patch of Indiangrass. Their black "necklace" on a yellow chest is often visible. Meadowlarks build their hidden nests on the ground at the base of clumps of plants. Unlike many native prairie birds, meadowlarks can also nest in agricultural landscapes. For reasons we do not yet fully understand, their populations have been declining in recent years. Hopefully, more habitat like this Refuge and other grasslands will help bring them back.

Look around you and other prairie life may be visible. Butterflies may be sipping the nectar of prairie wildflowers. Many prairie plants are coming back. Some have been hanging on here for many decades. This

hillside was difficult to farm. Over the years, it was seeded with non-native grasses, grazed, planted with corn, even bulldozed. But, because of their deep roots and adaptation to prairie weather, some prairie plants survived. Now this hillside is managed to preserve the native plants and encourage them to grow.



Meadowlark

Watch for

- compass plant
- roundheaded bushclover
- stiff goldenrod
- pheasants (the 20th Century replacement for native prairie chickens)
- monarch butterflies

Station 2

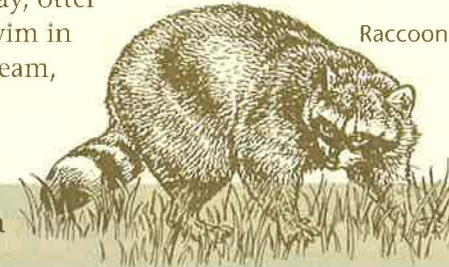
Creeks were the veins of water that flowed through and connected the prairie landscape. Like the one in front of you, they provided essential water for wildlife and plants. As a result, they were travel corridors for many animals.

"In every part of this whole District, beautiful rivers and creeks are to be found, whose transparent waters are perpetually renewed by the springs from which they flow." This was written by Albert Miller Lea, a man who explored this area in 1835. Much has changed since then. As prairie was broken by the plow, streams became muddy. Bringing prairie back slows erosion. One day this

stream may be clear again—and bring back the life that was once common here.

River otters, for example, were once common in Iowa. By 1900, they were gone because of unregulated trapping and loss of habitat. In the 1980s, otters were brought back to Iowa. Several now live in Red Rock Reservoir, downstream from this creek.

Someday, otter may swim in this stream, too.



Raccoon

With for

- cottonwood trees (right across the creek from you)
- damselflies
- tracks of skunks, rabbits, raccoons, or turtles in the mud
- cupplant
- Joe-Pye weed

Station 3

Large, hooved grazers were an important part of tallgrass prairie. Buffalo and elk once roamed here by the thousands. Unrestricted and unregulated market hunting destroyed those herds. If you're lucky, you may catch a glimpse of the Neal Smith NWR buffalo. Relatives of the few that were left, these buffalo have been brought back to view and help us understand the importance of these one-ton grazers to prairie. They eat prairie plants and trample them as well. But they are important to its survival. Their grazing and

trampling helps the prairie grow, often thicker because of them, and "selecting" certain species for survival over others.

Another prairie animal you may see here is the brown-headed cowbird. Cowbirds used to follow the nomadic buffalo herds, eating insects from buffalo backs and insects kicked up by buffalo hooves. During the spring, if cowbirds nested for several weeks like other prairie birds, they'd lose the buffalo herd. So, they evolved an adaptation of laying eggs in other birds' nests for the other birds to raise. Today cowbirds still lay eggs in others' nests, even though the buffalo herds are gone. This "nest parasitism" is an interesting problem for many grassland birds.



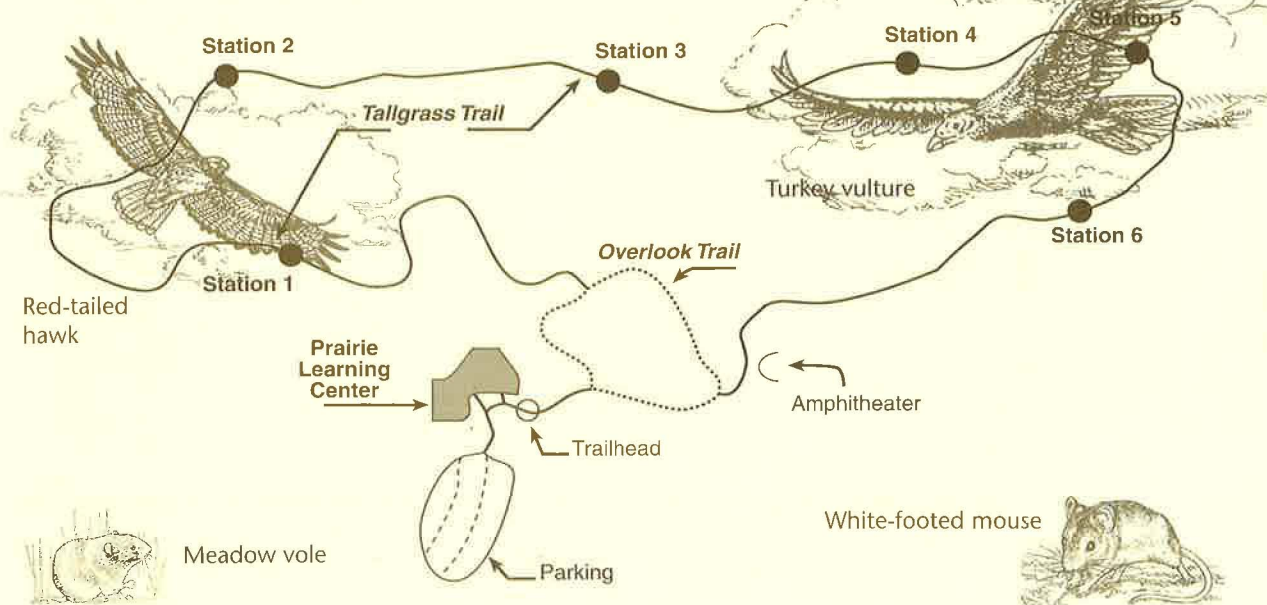
Fritillary butterfly

Watch for

- harriers (also called "marsh hawks") flitting up and down
- Indiangrass
- red fox tracks
- fritillary butterflies
- rattlesnake master (can you guess why this plant is called this?)

Station 4

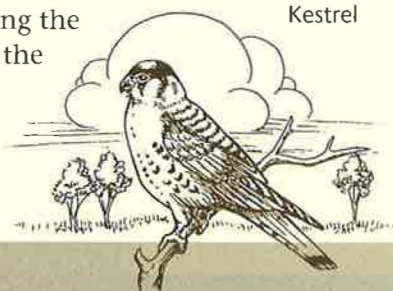
Neal Smith NWR is both a reconstruction and a restoration. We **reconstruct** areas, like fields that have been plowed for years, by planting prairie seeds. We **restore** areas like this, where some native plants still exist.



This steep, rocky hillside has never been plowed. Some prairie plants survived here, along with invading non-prairie plants. Because fires didn't burn here, trees and brush gradually took over.

When this Refuge was established, this whole creek bottom was lined with trees and shrubs. The suppression of prairie fires in the last 100 years allowed them to grow up here. In addition, the rich prairie soils that once were on the surrounding hills had filled this creek bed over 20 feet deep! The creek has steep sides and a silt bottom. The Refuge has now removed the trees, reshaped the creek bottom, and reestablished prairie plants along the creek.

Prairie detective work helped us to discover this prairie remnant. Prairie soils differ from woodland soils in color, texture, and makeup. The soils here were typical of prairie. Also, despite the competition from the invading trees and shrubs, some tough prairie plants survived. Knowing what to look for, prairie managers were able to tell that this spot was, indeed, a prairie remnant. Since 1994, we have been removing the trees so that the land can gradually be restored to prairie.



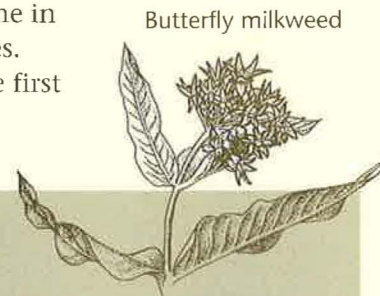
Kestrel

Watch for

- kestrels hovering overhead (watching for insects and mice to eat)
- little bluestem grass
- skipper butterflies
- pocket gopher mounds
- purple spikes of blazing star

Station 5

If you were looking for a place to live on the prairie, where would you go? What would you, as a pioneer settler, need to survive? Shelter, food, fuel, and water. This place has it all! Wooded streamides and oak savannas have been favored by many cultures over many centuries and many countries. Native American groups camped in the shelter of trees and hunted game in the open prairies. James Elliot, the first settler of Prairie City, built his



Butterfly milkweed

Watch for

- nests of red-tailed hawks in trees across the creek
- turkey vultures and red-tailed hawks soaring overhead
- black-eyed Susans
- butterfly milkweed
- bats along the stream at dusk
- prairie crab-apple

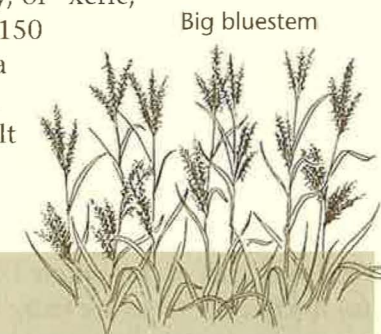
cabin across the stream from here, too. Many animals also favor these spots. Indiana bats, a federally endangered species, live in the savanna and woods near open water and eat flying insects. They like to roost under the loose bark of shagbark hickory, in the hollows of burr oaks and other trees, allowing them to adjust their temperature when they want simply by moving to the bark on the other side of the tree. Each spring, pregnant females leave wintering caves in Missouri and return to here to raise their young.

Elk also used the savanna and prairie. Now found mainly in the western

United States, elk (called "wapiti" by Native Americans) once were numerous here. This area was perfect for them: water from the creek, shrubs to browse beneath the savanna, and prairie plants on which to graze. As for so many creatures, prairie and savanna provided the resources they needed. Perhaps someday they also will return.

Station 6

Prairie conjures up many images in people's minds. For some, it is an unending expanse of grass with little diversity. In only a short distance, however, you have seen that there was much diversity here. Prairie changes from place to place and from season to season. As you've followed this trail, have you noticed how it changes? This spot provides a good place to see the diversity. You can see woods along a stream and the wet prairie beside it. To the south-east, you see the open-grown trees with large lower branches typical of an oak savanna. And, you are now sitting or standing in the middle of a dry, or "xeric," prairie. About 150 years ago, Iowa was like this: a patchwork quilt of natural communities.



Big bluestem

Watch for

- wild turkey
- badger holes in the hillside
- dragonflies catching other insects over the wet prairie
- big bluestem grass
- Canada wild-rye

Open prairie near oak savanna is perfect habitat for wild turkeys. They may nest in the dense brush along the creek, hunting insects in the prairie and acorns in the savanna. Unregulated hunting and habitat loss drove wild turkeys from Iowa by 1900. Today, resource managers are shifting the odds, bringing back prairie and the critters that lived there.

The diversity of life that was once tallgrass prairie is on the way back here at Neal Smith National Wildlife Refuge. Its history has been varied, with many different plants, animals, and people inhabiting it. What more changes will the future bring?

Keep following the trail. The Prairie Learning Center is about a half-mile up the trail.

REMEMBER: Buffalo are wild, unpredictable animals. They may look like domestic cattle, but they are NOT tame and may be dangerous. DO NOT try to approach them!

Neal Smith National Wildlife Refuge
Prairie Learning Center, Box 399
Prairie City, IA 50228-0399
Phone: 515/994-3400
WEB address:
<http://www.tallgrass.org>

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



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

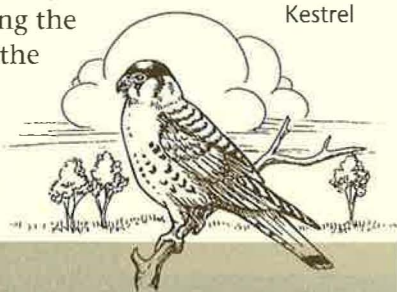


Printing Compliments of
Des Moines Founders Garden Club

This steep, rocky hillside has never been plowed. Some prairie plants survived here, along with invading non-prairie plants. Because fires didn't burn here, trees and brush gradually took over.

When this Refuge was established, this whole creek bottom was lined with trees and shrubs. The suppression of prairie fires in the last 100 years allowed them to grow up here. In addition, the rich prairie soils that once were on the surrounding hills had filled this creek bed over 20 feet deep! The creek has steep sides and a silt bottom. The Refuge has now removed the trees, reshaped the creek bottom, and reestablished prairie plants along the creek.

Prairie detective work helped us to discover this prairie remnant. Prairie soils differ from woodland soils in color, texture, and makeup. The soils here were typical of prairie. Also, despite the competition from the invading trees and shrubs, some tough prairie plants survived. Knowing what to look for, prairie managers were able to tell that this spot was, indeed, a prairie remnant. Since 1994, we have been removing the trees so that the land can gradually be restored to prairie.



Kestrel

Watch for

- kestrels hovering overhead (watching for insects and mice to eat)
- little bluestem grass
- skipper butterflies
- pocket gopher mounds
- purple spikes of blazing star

Station 5

If you were looking for a place to live on the prairie, where would you go? What would you, as a pioneer settler, need to survive? Shelter, food, fuel, and water. This place has it all! Wooded streambanks and oak savannas have been favored by many cultures over many centuries and many countries. Native American groups camped in the shelter of trees and hunted game in the open prairies.

James Elliot, the first settler of Prairie City, built his

Butterfly milkweed



Watch for

- nests of red-tailed hawks in trees across the creek
- turkey vultures and red-tailed hawks soaring overhead
- black-eyed Susans
- butterfly milkweed
- bats along the stream at dusk
- prairie crab-apple

cabin across the stream from here, too. Many animals also favor these spots. Indiana bats, a federally endangered species, live in the savanna and woods near open water and eat flying insects. They like to roost under the loose bark of shagbark hickory, in the hollows of burr oaks and other trees, allowing them to adjust their temperature when they want simply by moving to the bark on the other side of the tree. Each spring, pregnant females leave wintering caves in Missouri and return to here to raise their young.

Elk also used the savanna and prairie. Now found mainly in the western

United States, elk (called "wapiti" by Native Americans) once were numerous here. This area was perfect for them: water from the creek, shrubs to browse beneath the savanna, and prairie plants on which to graze. As for so many creatures, prairie and savanna provided the resources they needed. Perhaps someday they also will return.

Station 6

Prairie conjures up many images in people's minds. For some, it is an unending expanse of grass with little diversity. In only a short distance, however, you have seen that there was much diversity here. Prairie changes from place to place and from season to season. As you've followed this trail, have you noticed how it changes? This spot provides a good place to see the diversity. You can see woods along a stream and the wet prairie beside it. To the south-east, you see the open-grown trees with large lower branches typical of an oak savanna. And, you are now sitting or standing in the middle of a dry, or "xeric," prairie. About 150

years ago, Iowa was like this: a patchwork quilt of natural communities.

Big bluestem



Watch for

- wild turkey
- badger holes in the hillside
- dragonflies catching other insects over the wet prairie
- big bluestem grass
- Canada wild-rye

Open prairie near oak savanna is perfect habitat for wild turkeys. They may nest in the dense brush along the creek, hunting insects in the prairie and acorns in the savanna. Unregulated hunting and habitat loss drove wild turkeys from Iowa by 1900. Today, resource managers are shifting the odds, bringing back prairie and the critters that lived there.

The diversity of life that was once tallgrass prairie is on the way back here at Neal Smith National Wildlife Refuge. Its history has been varied, with many different plants, animals, and people inhabiting it. What more changes will the future bring?

Keep following the trail. The Prairie Learning Center is about a half-mile up the trail.

REMEMBER: Buffalo are wild, unpredictable animals. They may look like domestic cattle, but they are NOT tame and may be dangerous. DO NOT try to approach them!

Neal Smith National Wildlife Refuge
Prairie Learning Center, Box 399
Prairie City, IA 50228-0399
Phone: 515/994-3400
WEB address:
<http://www.tallgrass.org>

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

U.S. Fish and Wildlife Service should contact:
U.S. Department of the Interior
Office for Equal Opportunity
1849 C Street, N.W.
Washington, DC 20240



Printing Compliments of
Des Moines Founders Garden Club

Neal Smith National Wildlife Refuge
Prairie Learning Center, Box 399
Prairie City, IA 50228-0399

Neal Smith's website address:
<http://www.fws.gov/r3pao/walnut>

U.S. Fish & Wildlife Service
1 800/344 WILD
<http://www.fws.gov>

Deaf/hard of hearing individuals may
reach Neal Smith NWR through the Federal
Information Relay System at 1 800/877 8339.

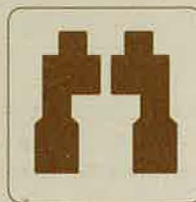
Available in alternative formats upon request.



U.S. Fish & Wildlife Service

Neal Smith

National Wildlife Refuge Bird Checklist





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

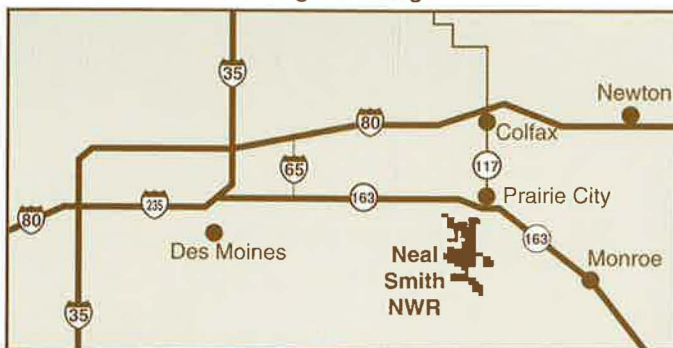
Neal Smith National Wildlife Refuge Bird Checklist

Approximately, 85% of pre-settlement Iowa was once blanketed by native tallgrass prairie. Today, less than 1% of that prairie remains in small isolated fragments. As the tallgrass prairie disappeared, grassland bird populations associated with this prairie ecosystem also disappeared or greatly declined. Birds like the greater prairie chicken, once a common sight, are now merely a memory.

Over the past several years much of the Neal Smith National Wildlife Refuge landscape has been transformed from crop land to tallgrass prairie. The reconstructed and restored prairies and savannas are providing food, cover, and breeding habitat for local and migratory birds. Each year, ornithologists conduct singing bird surveys and the results have shown that more and more grassland-dependent bird species are using the refuge.

Primary sources for this list include refuge personnel, local ornithologists, university researchers, and Iowa bird literature. Not all species listed have been observed within the refuge at the time this list was compiled, but regional distributions of species indicate that they may be observed in the future.

Finding the Refuge



Symbols used are as follows:

* indicates nesting on the refuge
has recently occurred

Sp March-May

S June-August

F September-November

W December-February

a abundant: a common species
which is very numerous

c common: certain to be seen or
heard in suitable habitat, not
in large numbers

u uncommon: present but not
always seen

0 occasional: seen only a few times
during the season

r rare: seen every 2 to 5 years

*Birdwatching is encouraged! For more
information, or to report any unusual
sightings, please contact refuge personnel.*

Short-eared Owl
©Jim Brandenburg



	Sp	S	F	W
Grebes				
___ Pied-billed Grebe	c	u	u	
___ Red-necked Grebe	r		r	
___ Western Grebe	r		r	
Pelicans				
___ American White Pelican	o		r	
Cormorants				
___ Double-crested Cormorant	u		o	
Hérons and Bitterns				
___ Least Bittern	r	r		
___ Great Blue Heron	c	c	c	
___ Cattle Egret	o	r		
___ Green Heron	u	r		
___ Black-crowned Night-Heron	r			
Vultures				
___ Turkey Vulture*	u	u	u	
Swans, Geese and Ducks				
___ Snow Goose	o		r	
___ Canada Goose	c	c	c	o
___ Wood Duck	u	u	u	
___ Gadwall	o		r	
___ Mallard*	c	u	c	u
___ Blue-winged Teal*	c	c	u	
___ Northern Shoveler*	u	r	o	
___ Green-winged Teal	o		o	
___ Ring-necked Duck	o		o	
___ Lesser Scaup	o			
___ Ruddy Duck	o		o	
Hawks and Eagles				
___ Osprey	r		r	
___ Bald Eagle	o	o	o	o
___ Northern Harrier*	u	r	u	r
___ Sharp-shinned Hawk	o		o	o
___ Cooper's Hawk	o		o	o
___ Broad-winged Hawk	o		r	
___ Swainson's Hawk	o		o	
___ Red-tailed Hawk	c	c	c	c
___ Rough-legged Hawk	o		o	o
Falcons				
___ American Kestrel*	c	c	c	u

	Sp	S	F	W
Upland Game Birds				
___ Ring-necked Pheasant*	a	a	a	a
___ Wild Turkey*	u	u	u	u
___ Northern Bobwhite*	o	o	o	o
Rails and Coots				
___ Sora	o	o		o
___ American Coot	c	o		o
Cranes				
___ Sandhill Crane	r	r		r
Shorebirds				
___ Black-bellied Plover	r	r		r
___ American Golden-Plover	r			
___ Semipalmated Plover	r			r
___ Killdeer*	a	a		a
___ Greater Yellowlegs	r			r
___ Lesser Yellowlegs	o			o
___ Solitary Sandpiper	o	r		r
___ Spotted Sandpiper	o	r		r
___ Upland Sandpiper*	r	r		r
___ Least Sandpiper	r	r		r
___ Pectoral Sandpiper	o	r		o
___ Short-billed Dowitcher	r			
___ Long-billed Dowitcher	r			
___ Common Snipe*	u	o		o
___ American Woodcock*	u	u		u
___ Wilson's Phalarope	r			
Gulls and Terns				
___ Franklin's Gull	o			
___ Bonaparte's Gull	r			r
___ Ring-billed Gull	o			o r
___ Herring Gull	o			o o
___ Black Tern	r			
Doves				
___ Rock Dove*	c	c		c c
___ Mourning Dove*	c	c		c u
Cuckoos and Roadrunners				
___ Black-billed Cuckoo	o	r		r
___ Yellow-billed Cuckoo*	u	u		u

	Sp	S	F	W
Owls				
___ Eastern Screech-Owl*	o	o	o	o
___ Great Horned Owl*	u	u	u	u
___ Barred Owl*	u	u	u	u
___ Short-eared Owl*	r	r	r	o

Nighthawks and Nightjars

___ Common Nighthawk	u	c	u	
___ Whip-poor-will	r	r		

Swifts

___ Chimney Swift*	u	c	u	
--------------------------	---	---	---	--

Hummingbirds

___ Ruby-throated Hummingbird*	u	u	u	
--------------------------------------	---	---	---	--

Kingfishers

___ Belted Kingfisher*	u	u	u	
------------------------------	---	---	---	--

Woodpeckers

___ Red-headed Woodpecker*	u	u	o	o
___ Red-bellied Woodpecker*	c	c	c	c
___ Yellow-bellied Sapsucker*	o	u	o	
___ Downy Woodpecker*	c	c	c	c
___ Hairy Woodpecker*	u	u	u	u
___ Northern Flicker*	c	c	c	u
___ Pileated Woodpecker	r	r	r	r

Flycatchers

___ Olive-sided Flycatcher	o		r	
___ Eastern Wood-Pewee	c	c	c	
___ Yellow-bellied Flycatcher	o	r	o	
___ Acadian Flycatcher*	r	r		
___ Alder Flycatcher*	r	r		
___ Willow Flycatcher*	r	r		
___ Least Flycatcher*	o		o	
___ Eastern Phoebe*	o		o	
___ Great Crested Flycatcher*	u	c	u	
___ Eastern Kingbird	u	c	u	

Shrikes

___ Loggerhead Shrike*	u	u		
___ Northern Shrike	o	o	o	o

Vireos

___ White-eyed Vireo	r	r		
___ Bell's Vireo*	r			
___ Solitary Vireo	o	o	o	

	Sp	S	F	W
___ Yellow-throated Vireo*	o	o		
___ Warbling Vireo*	u	c	u	
___ Philadelphia Vireo	r			
___ Red-eyed Vireo*	u	c	u	

Jays, Magpies and Crows

___ Blue Jay*	a	a	a	a
___ American Crow*	a	a	a	a

Larks

___ Horned Lark*	c	c	c	c
------------------------	---	---	---	---

Swallows

___ Purple Martin*	r	o	r	
___ Tree Swallow*	c	c	u	
___ Northern Rough-winged Swallow*	o	o		
___ Bank Swallow*	o	o		
___ Cliff Swallow*	o	u		
___ Barn Swallow*	c	c	c	

Chickadees and Titmice

___ Black-capped Chickadee*	a	a	a	a
___ Tufted Titmouse	u	u	u	u

Nuthatches

___ Red-breasted Nuthatch	o	r	r	o
___ White-breasted Nuthatch*	a	a	a	a

Creepers

___ Brown Creeper	u		u	u
-------------------------	---	--	---	---

Wrens

___ House Wren*	a	a	c	
___ Sedge Wren*	u	u	u	
___ Marsh Wren	o	o		

Kinglets, Bluebirds, and Thrushes

___ Golden-crowned Kinglet	o	o	r	
___ Ruby-crowned Kinglet	c	o	c	
___ Blue-gray Gnatcatcher	u	u		
___ Eastern Bluebird*	u	u	u	
___ Veery	o			
___ Gray-cheeked Thrush	o	o	o	
___ Swainson's Thrush	u	o	o	
___ Hermit Thrush	u		u	
___ Thrush	r	r	r	
___ American Robin*	a	a	a	o

Bobolink
S. Maslowski



Mimics

	Sp	S	F	W
___ Gray Catbird*	u	a	a	
___ Northern Mockingbird	o	r		
___ Brown Thrasher*	a	a	u	

Starlings

___ European Starling	c	c	c	c
-----------------------------	---	---	---	---

Waxwings

___ Cedar Waxwing*	o	c	e	r
--------------------------	---	---	---	---

Warblers

___ Blue-winged Warbler	r		r	
___ Golden-winged Warbler	o	r	o	
___ Tennessee Warbler	c	r	c	
___ Orange-crowned Warbler	o		o	
___ Nashville Warbler	c		c	
___ Northern Parula	o			
___ Yellow Warbler*	c	u	u	
___ Chestnut-sided Warbler	u		u	
___ Magnolia Warbler	c		c	
___ Cape May Warbler	o		r	
___ Yellow-rumped Warbler	c		c	
___ Black-throated Green Warbler	o		r	
___ Blackburnian Warbler	u		u	
___ Yellow-throated Warbler	r			
___ Palm Warbler	c		c	
___ Bay-breasted Warbler	u		r	
___ Blackpoll Warbler	u		u	
___ Cerulean Warbler	r		r	
___ Black-and-white Warbler	c		u	
___ American Redstart	c	u	c	
___ Prothonotary Warbler	r			
___ Ovenbird	c	c	u	
___ Northern Waterthrush	o		o	
___ Louisiana Waterthrush	r			
___ Kentucky Warbler	r			
___ Connecticut Warbler	r			
___ Mourning Warbler	r			
___ Common Yellowthroat*	c	a	c	
___ Wilson's Warbler	c		c	
___ Canada Warbler	o		r	
___ Yellow-breasted Chat*	r			

Tanagers

___ Summer Tanager	r			
___ Scarlet Tanager*	o	o	o	

Sparrows, Buntings and Grosbeaks

	Sp	S	F	W
___ Eastern Towhee*	u	u	o	
___ American Tree Sparrow	c		c	c
___ Chipping Sparrow*	c	c	c	r
___ Clay-colored Sparrow	r	r		
___ Field Sparrow*	c	c	c	
___ Vesper Sparrow*	u	u		
___ Lark Sparrow*	r	r		
___ Savannah Sparrow	r			
___ Grasshopper Sparrow*	r	r		
___ Henslow's Sparrow*	r	r		
___ Le Conte's Sparrow	r	r		
___ Fox Sparrow	u		u	
___ Song Sparrow*	a	a	a	u
___ Lincoln's Sparrow	u		u	
___ Swamp Sparrow*	u	u	u	
___ White-throated Sparrow	c		c	r
___ White-crowned Sparrow	u		u	
___ Harris's Sparrow	u		u	
___ Dark-eyed Junco	c		a	a
___ Lapland Longspur	o		o	
___ Snow Bunting			o	
___ Northern Cardinal*	a	a	a	a
___ Rose-breasted Grosbeak*	u	c	u	
___ Indigo Bunting*	u	c	u	
___ Dickcissel*	o	c	c	

Blackbirds and Orioles

___ Bobolink*	u	u	r	
___ Red-winged Blackbird*	a	a	a	r
___ Eastern Meadowlark*	c	a	c	o
___ Western Meadowlark*	c	a	c	o
___ Yellow-headed Blackbird	u			
___ Rusty Blackbird	o		o	
___ Common Grackle*	u	c	c	r
___ Great-tailed Grackle	r	r		
___ Brown-headed Cowbird*	c	a	a	r
___ Orchard Oriole*	o	o		
___ Baltimore Oriole*	u	c	u	

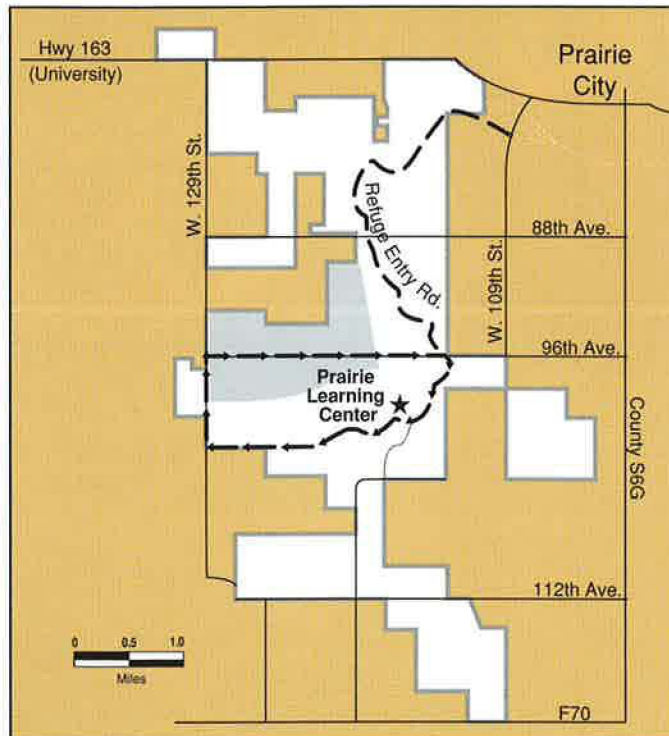
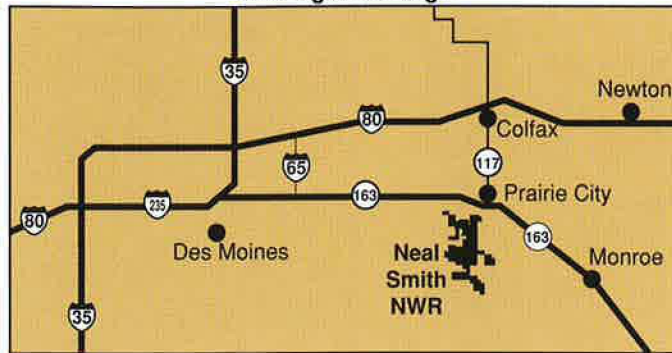
Finches

___ Purple Finch	u		o	u
___ House Finch*	c	c	c	c
___ Pine Siskin	o		o	
___ American Goldfinch*	a	a	a	a

Old World Sparrows

___ House Sparrow*	a	a	a	a
--------------------------	---	---	---	---

Finding the Refuge



Bison and Elk Enclosure

- Refuge Entry Road
- Refuge Boundary
- Roads
- Bison and Elk Range
- ← Auto Tour Route

Neal Smith National Wildlife Refuge
Prairie Learning Center, Box 399
Prairie City, IA 50228-0399

Phone: 515/994 3400

Web address:
<http://www.fws.gov/r3pao/walnut/>

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



U.S. Fish & Wildlife Service

Neal Smith

National Wildlife Refuge



American bison
USFWS photo

Welcome back
to the Tallgrass
Prairie!



Neal Smith National Wildlife Refuge

Over the last 150 years, we have converted the prairies to gravel roads and highways, to towns and cities, to farms and industries. We transformed it to the Midwest we have today. The tallgrass prairie that once covered part or all of 13 states is almost gone.

One hundred fifty years ago, tallgrass prairie covered 85% of Iowa's 36 million acres. *Today, only one-tenth of one percent of that prairie remains!* That's why Neal Smith National Wildlife Refuge exists -- to bring back some of the plants and animals that were the tallgrass prairie.

*Paths of wind,
Patterns of rain*

If you travel across the Rockies from the west on Interstate 80, you climb the tree-rich and well-watered western slopes. As prevailing westerly winds rise up over the mountains, they release most of their moisture in the form of rain. By the time these winds blow down the eastern slopes and spill out onto the Great Plains, they are dry. The plants of these plains are low-moisture plants – prairie grasses and other flowering plants. The Great Plains stretch out to the east in a nearly treeless landscape. This short-grass prairie is typical of the western portion of what is called the “prairie wedge.”

As the winds proceed toward the east across the Plains, they collide with the moisture-rich winds sweeping up from the Gulf of Mexico and rainfall grows more plentiful. As more moisture becomes available, the prairie species gradually change – from mixed-grass species in Nebraska to the tallgrass species of Iowa.

The U.S. Congress authorized the acquisition of 8,600 acres – land purchased from landowners willing to sell. Within those acres, there are several miles of surfaced trails to wander and an auto tour to drive; both provide good opportunities to see bison, elk, deer and other prairie wildlife.

Prairie Learning Center



The Prairie Learning Center is at the heart of it all, teeming with fascinating exhibits for all ages – a place to see prairie research in action and *the* place to begin your visit.

As early Euro-American pioneers gazed across the seemingly endless prairie, they reasoned that “*If it can't grow trees, it must be poor ground,*” so they passed it by. Later, however, Iowa was found to contain some of the richest soils in the world.





Some day it may all look like this. But for now...



Meadowlark
B. Angus, USFWS

The tallgrass prairies provided a diversity of wild life – hundreds of plant species – over 350 species of birds – nearly 100 species of mammals – scores of amphibians and reptiles and fish – and uncounted thousands of insect species.

Often dry and unpredictable? To be sure. Lifeless and dull? Hardly.

Neal Smith National Wildlife Refuge offers a rare peek at this incredible collection of life we call the tallgrass prairie.



Canada Wild Rye
USFWS Photo

Lead plant
USFWS photo



*Adaptation –
the key to
prairie life.*



Coyote
USFWS photo

Take a driving tour through this developing remnant of our history. Search for the bison and elk herds in their native tallgrass habitat. Wander through the myriad of prairie blooms with a new show each week during the growing season. Lend a hand by helping plant prairie seeds in the spring. Take a walk among the open-grown oaks of the oak savanna with the ghosts of thousands of elk.

In the shortgrass prairies, trees were few, restricted almost entirely to the river bottoms. In tallgrass prairies, trees grew also in savannas – those scattered oases of tree groves with prairie plants beneath that dotted the tallgrass landscape. The trees were often oaks, burr oaks especially – trees with thick bark that could withstand the prairie fires. Their spreading branches provided welcome shade to the bison and elk that roamed these lands.

The plants and animals growing and living in prairies are adapted to the hot summers, cold winters and endless cycles of floods and droughts. They also adapted to fires that often swept over them. The plants and animals in the prairie are strong survivors.

Saving the Pieces

“The first law of intelligent tinkering is to save all the pieces.”

Aldo Leopold, 1948



*Prairie chickens
may someday be
a part of the
landscape of Neal
Smith NWR.*

While we won't be able to save all the pieces, Neal Smith NWR is saving as many as possible by:

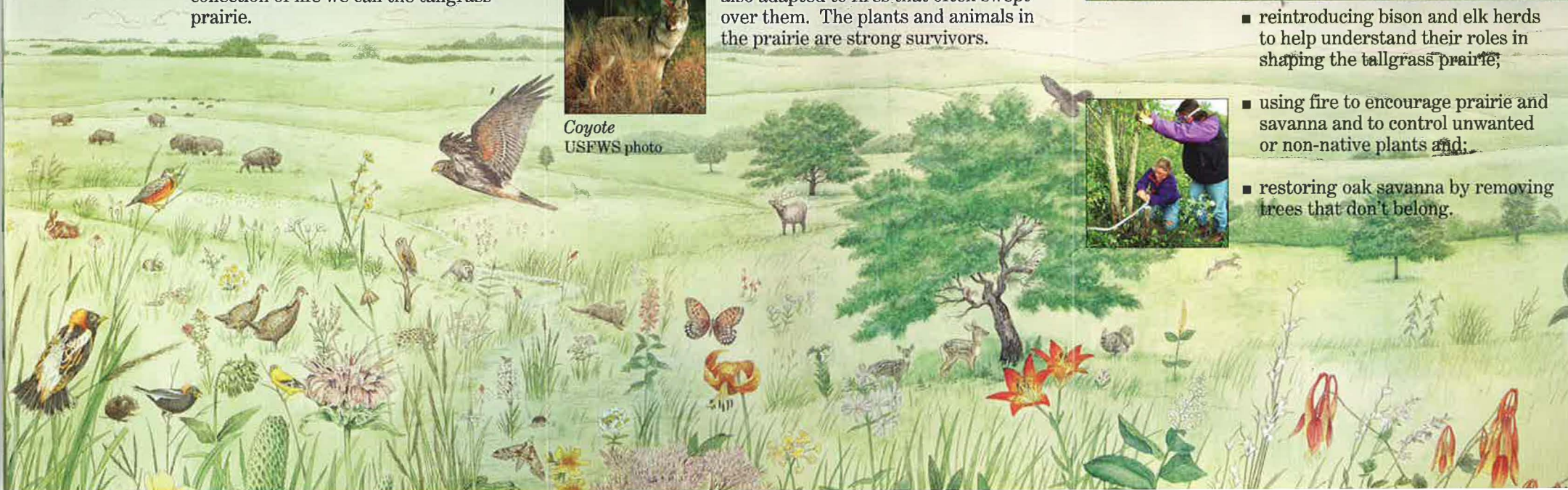
- restoring small prairie remnants that were left, including some savannas;
- reconstructing prairies by planting prairie seeds, many collected by volunteers from tiny remnants in cemeteries, roadsides, and railroad tracks in south-central Iowa;



- reintroducing bison and elk herds to help understand their roles in shaping the tallgrass prairie;

- using fire to encourage prairie and savanna and to control unwanted or non-native plants and;

- restoring oak savanna by removing trees that don't belong.





*Stiff tickseed
(left)*
USFWS photo

Neal Smith NWR is one of the *National Wildlife Refuge System's* 520 refuges which manage more than 93 million acres throughout the United States.

Goals of Neal Smith NWR

- to increase biodiversity by restoring and reconstructing tallgrass prairie and savanna habitats;
- to increase public knowledge and understanding of prairie through environmental education;
- to increase scientific knowledge and understanding of the prairie and savanna through ongoing research; and
- to provide diverse wildlife-related recreational opportunities.

Some day...



*Great Spangled
Fritillary
Butterfly*
Alex Theirman

It is possible that elk, prairie chickens, great spangled fritillary butterflies, northern harriers, upland sandpipers, short-eared owls, glass lizards, sedge wrens, pocket mice, speckled king snakes, and spotted skunks will all once again call Neal Smith NWR home.

For now, we are just beginning. But already Neal Smith NWR may be more than you ever imagined. Then we can all say "Welcome back!"

Refuge Information

- Bison are wild, unpredictable animals. Remain in your vehicle.
- Designated trails are for foot traffic only.
- For additional or specific regulations contact the Refuge.
- Visitor Center hours are Tuesday-Saturday from 9am-4pm and Sunday from noon to 5pm.
- Refuge trails and auto tour route are open daily from sunrise to sunset.



American bison
USFWS photo

The Refuge and the Prairie Learning Center are located south of Highway 163, just 20 miles east of Des Moines and 8 miles south of I-80.