Walnut Creek National Wildlife Refuge

Prairie City, Iowa
Fiscal Year 1996/1997

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INTRODUCTION

The Walnut Creek 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 1996/1997

- Hydrology and Water Quality Monitoring study is funded.
- A three year Indiana bat monitoring program is begun on the Refuge.
- Over 124 species of native forb and grass seeds were collected by volunteers.
- Bison and elk are reintroduced to Walnut Creek NWR.
- The Refuge held its grand opening with Vice President Al Gore as keynote speaker.
- In 1996 and 1997, almost 600 teachers participated in Project Bluestem workshops.
- The maintenance shop, vehicle storage and seed storage buildings are completed.
- The constructed wetland wastewater treatment facility is put into operation.
- The entrance road is completed.

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Monitoring and Studies

1.a. Surveys and Censuses

Research Advisory Committee
Neal Smith National Wildlife Refuge (WNT) Research Program includes monitoring, surveys, and research related to ecological restoration. The Research Advisory Committee for WNT contributes valuable assistance to the refuge by providing professional review of research proposals, recommending needed research, and promoting the Research Program. Members in 1996-1997 include: Dennis Keeney, Director of the Leopold Center for Sustainable Agriculture; Erv Klaas, Unit Leader of the Iowa State University Research Cooperative Unit; Jim Mattsson, Region 3 FWS Regional Biologist; Jerry Selby, Director of Science and Stewardship, The Nature Conservancy Iowa Field Office; Dr. Daryl Smith, Prairie Ecology Professor at the University of Northern Iowa, and Carol Thompson, Research Geologist, Iowa Department of Natural Resources, as well as Dick Birger, WNT Project Leader, and Pauline Drobney, Refuge Biologist. Formal research advisory board meetings were held on February 6 and June 3, 1996, and on June 27, 1997.

Research Brochure
In November of 1996, a brochure advertising research opportunities to potential researchers was developed. This brochure describes the ecological goals of the Refuge, facilities and resources available, and highlights some of the current research foci. The purpose of the brochure is to increase visibility of the Refuge research program and to describe the procedure for initiating a research contact with the Refuge. It will be distributed at scientific events and mailed to individuals requesting information about our research program.

Breeding Bird Survey Support at WNT
The Breeding Bird Survey was supported by a $2,500 grant from the Non-Game Bird Program in 1996 and $2,800 for 1997.

Regional Fire Monitoring Protocol Committee.
Pauline Drobney, Refuge Biologist was asked to participate in FWS Region 3 committee to develop standardized monitoring protocol for fire effects. She has participated in several meetings.

Acquisition and development of biological and geographical spatial data for Walnut Creek National Wildlife Refuge 1990-1994, final report. Cooperative Agreement No. 14-16-0009-1560 RWO No. 29. (1996)
This report written by Erv Klaas, Iowa Cooperative Fish and Wildlife Research Unit Leader and Todd Bishop, student at Iowa State University, was presented to the Refuge and to members of the Research Advisory Committee during a June 1996 meeting. This document details information about creation of GIS files on topography, soils, vegetation, transportation, land ownership, and surface water on the Refuge. In addition, files were developed to organize data collected in a 38 county area surrounding the Refuge to identify remnant prairies that could be potential sources of local ecotype seed for the Refuge. Finally, results of baseline faunal surveys conducted in 1994 were reported. Baseline information included birds, mammals, and selected invertebrate groups including ants, grasshoppers, moths, butterflies, and terrestrial invertebrates, were detailed. Voucher specimens are being temporarily stored at Iowa State University.

Walnut Creek National Wildlife Refuge Winter Bird Monitoring. Erwin Klaas, Unit Leader of the Iowa State University Research Cooperative Unit.
A winter bird monitoring project was designed and implemented using volunteer observers to monitor temporal changes in occurrence and relative abundance of wintering birds following prairie and savanna restorations at WNT, and provide recreational opportunities for area birders to enjoy WNT and participate in the acquisition of important data.

The Refuge is divided into polygons of about 160 acres. Observers census two polygons once for each month from December through February. The total 28 polygons on the Refuge are surveyed three times (once per month) using a minimum of 14 observers. Observer bias is avoided by randomly assigning two plots to observers each month such that no observer surveys the same polygon twice in a season.

Survey of breeding birds at WNT in Summer, 1997. Liessa Thomas, MS Thesis; Iowa State University. Advisor: Dr. Erwin Klaas.
Native bird species seem to be increasing at WNT, with woodland species possibly declining somewhat but probably not significantly. One problem in the bird study is that there are not enough plots in the crop category, because of a change in status to prairie reconstruction. To alleviate this problem, three to four crop plots have been added. In the past, 115 plots have been sampled three times to detect variation among plots, though statistical analysis may indicate that replicates are not necessary.

1997 Christmas Bird Count
During the Christmas Bird Count, 17 birders walked 29 miles and drove 11 miles to record 642 birds of 23 species. The birds most often counted were the mallard (181), followed by American crow (123), and American tree sparrow (51). Although not the most numerous birds, American crows and downy woodpeckers were the most widely distributed species recorded on the Refuge. There were eight Refuge units surveyed, with the three units accounting for 80% of all birds recorded: North Unit - 194 birds, Learning Center Unit - 170 birds and the South Unit - 148 birds.

Floristic Quality and Soil Characteristics on selected plantings on Walnut Creek NWR. Dr. Thomas Rosburg, Professor at Drake University, and Pauline Drobney, Refuge Biologist.
Vegetation survey transects following the Floristic Quality Assessment Technique (Swink and Wilhelm in Plants of Chicago Region; 1994) were established on 60 sites in late summer, 1997. Transects were established on 45 of the sites by Dr. Tom Rossburg of Drake University and on 15 by Refuge Biologist Drobney. The 60 sites represent 80% of all sites planted through 1997. Included in the project is soil data collection and analysis for soil nutrients, pH, minerals and a limited number of pesticides. This data will be useful in adaptive management of the Refuge with repeat monitoring events.

Deformed frog survey. Linda Gucciardo, PhD student at Iowa State University, Amy Springer, student at Iowa State University, and Pauline Drobney, Refuge Biologist.
In July of 1997, a deformed frog survey was conducted as a part of a regional effort to summarize the amount of deformities on a large scale. Only one area contained frogs in the critical stage of development. The location was Berkenbosch Sedge Meadow, at T-78N, R-21W, Sec. 27, SE 4, NE4 on the southern end of the Refuge. This site is dominated by reed canary grass, though some native species also exist on the site. Sampling occurred in drainage areas approximately 5-10 feet wide. These linear drainage areas appeared to hold stagnant water and were wider and deeper in some areas than others.

Frogs collected included 1 cricket frog, 13 leopard frogs and 100 gray tree frogs. Approximately 2% of the tree frog population had deformities.

Discovery of Gentiana curtissii on Hawthorne Prairie in Iowa. Rayford Ratcliff, WNT Volunteer and Pauline Drobney, Refuge Biologist.
Fall, 1996, Rayford Ratcliff, a dedicated seed collection volunteer observed that the gentians he had been collecting seed from on Hawthorne Prairie in the past year varied in color, stature, and leaf shape from either bottle gentian (*Gentiana andrewsii*) or downey gentian *(Gentiana puberulenta*) both present on the site. Drobney visited the site, took specimens, and ultimately identified the plants as Gentiana curtissii, a hybrid between bottle and downey gentian. This species has not been identified from Hawthorne Prairie in the past and is rarely recorded in Iowa. The hybrid flower varies from partially to fully opened, and may be a saturated or pale blue, plum or striped white and blue or plum. Mr. Ratcliff is gathering data on the size of leaves, flowers, and stems of the hybrids relative to the parent species.

Iowa Natural History Foray at WNT
The Iowa Natural History Association is an organization composed primarily of scientists involved in natural resource research and management, who meet informally for a weekend annually to explore and document aspects of the natural environment. In spring and summer of 1997, WNT was the Iowa Natural History Foray site. Butterfly, vascular plant, fungus, dragonfly and butterfly surveys were performed.

Fungal disease in big bluestem (Andropogon gerardii). Lois Tiffany, Botany Chairperson, Iowa State University, and George Knaphus, Professor at Iowa State University.
Monitoring of big bluestem (*Andropogon gerardii)* infected with fungal disease is on-going.

Spot water sampling on Walnut Creek. Renee Schindler, Central College Honors Student. Advisor: Dr. Catherine Haustein.
Renee Schindler performed spot water sampling from Walnut Creek at a roadside access point as a part of an undergraduate research project. Sampling occurred between September 23 and December 10. This sampling was conducted to facilitate an Honor Student's program and was approved to encourage development of interest in natural areas research.

Beetle Identification. Dr. David May.
In 1996, beetle specimens collected during baseline studies in 1994 were transferred to Dr. David May, an Iowa beetle researcher. This collection was housed at Iowa State University. Dr. Erv Klaas transferred the beetles to Dr. May, who will begin the identification process soon.

Game Animal Surveys
Pheasant numbers were considerably lower in 1996 on the Refuge, resulting in lower hunting pressure. Quail numbers were drastically reduced. This was in part due to a big blizzard in late January 1996.

Whitetail Deer numbers stayed about the same on the Refuge in 1996. As with last year, numbers bagged during the hunting season have remained low, due in part to the fact that hunters do not pursue the deer in heavy grass but rather stick to the timbered areas.

Turkey numbers appear to be stable on the Refuge. More work needs to be done to document these birds on site.

Biological Observation of Interest
On October 30, 1996, Project Leader, Dick Birger spotted a Prairie Falcon in flight over the Refuge.

1.b. Studies and Investigations

Meeting to Gain Support for Hydrology and Water Quality Monitoring at WNT
A meeting of researchers, agencies and organizations involved in watershed or hydrological research or management was held on February 7, 1996. Participants included Dick Birger, WNT Project Leader; Pauline Drobney, Refuge Biologist, as well as representatives from the Iowa Geological Survey, U.S. Geological Survey, Iowa Environmental Protection Agency, the U.S. Environmental Protection Agency, the Iowa Department of Natural Resources, the U.S. Department of Agriculture Soil Tilth Laboratory, the Leopold Center for Sustainable Agriculture, the University of Iowa Hygenics Laboratory, Iowa State

University, and other organizations. As a result of presentations by hydrologists, and watershed researchers, and research geologists, an intensive 10-year study of hydrology and water quality was funded at WNT.

Roost tree selection and use by the Indiana bat on Walnut Creek National Wildlife Refuge: First Year Progress Report. Daryl Howell, Threatened and Endangered Species Coordinator for the Iowa Department of Natural Resources.
A report of first year progress on a three year study to monitor bat populations and to track indicates that 36 bats were captured during 10 nights of mist netting on the Refuge in 1995. The only Indiana bat captured was an adult male; an anomaly because typically only adult females migrate to northern nursery habitat.

Refuge Biologist Drobney assists Daryl Howell in removing captured bat from mist net.

No maternal nursery colonies were located. On July 3, the adult male Indiana bat was captured and radio-tagged. Between July 4 and 17, six different roost trees were used by this bat during 9 days. Roost trees averaged 14.6 inches dbh, and red or slippery elm was most frequently used. The big brown bat (*Eptesicus fuscus*), was the most commonly captured species. Additional bat species included northern myotis, (*Myotis septentrionalis)*, red bat (*Lasiurus borealis*) and (*Nycticeius humeralis*). No juveniles were captured.

Note: Due to funding cuts, this project was not continued in 1996 or 1997.

A demographic and habitat-level assessment of the causes of decline in Iowa regal fritillary butterfly (*Speyeria idalia*) populations. Leisa Kelly, MS Thesis; Iowa State University. Advisor: Dr. Diane Debinski. (1996)
The regal fritillary butterfly (*Speyeria idalia*) is a rare endemic prairie butterfly. Laboratory research focused on larval food limitation and field research on host plant availability and adult butterfly population trends across Iowa and in neighboring populations of Kansas, Nebraska, and the Dakotas. Laboratory rearing of regal fritillary butterflies from the egg stage to adult successfully produced only one adult male. Field methods may be necessary for successful introduction of this species to a new site.

In addition to laboratory rearing experiments, Ms. Kelly inventoried several prairies with known populations of regal fritillaries and of prairie violets. Capture/recapture of regal fritillaries were performed and densities of prairie violets calculated. Data indicates that a positive relationship exists between the butterflies and presumed host larval food plant (prairie violets).

Ms. Kelly and Dr. Debinski, WNT staff and volunteers continued preparation for field reintroduction by developing critical habitat for the larval stage. The preferred host food, prairie violet *(Viola pedatifida)* is currently unavailable in sufficient numbers to support introduced butterflies. As such, 800 local ecotype common blue violets (*Viola sororia*) were planted around two prairie violet plots in late 1996 as a supplemental food source for the larvae. A thousand prairie violets were planted in 1995 in several plots. Despite dire predictions by some about the ability of prairie violets to be grown from seed or to survive the winter as a transplant, most of the prairie violets planted last year in plots survived winter, though some animal predation contributed to mortality. Many of the surviving prairie violets bloomed this summer (1996).

Regal Fritillary movements in prairies: Do butterflies cross the edge? Leslie Reis, MS Thesis; Iowa State University. Advisor: Dr. Diane Debinski,
In summer, 1997, a project relating conservatism (fidelity to high quality natural area) in butterflies began. Butterflies are used as a model organism to examine the effects of habitat fragmentation on prairie insects (movement of regal fritillaries were compared with monarchs). The movement patterns of several butterfly species were examined within prairies and in the intervening habitats of various vegetation types (e.g., native vegetation, brome grass, crop fields, and weedy vegetation).

Land use history of selected areas of WNT - Eric Buitenwerf, WNT Academic Intern and student at Simpson College. Advisor: Dr. William Gilbert. (1996)
A study of the land use history from European settlement to present is catalogued as much as is possible for a core area of the refuge. Data will be collected from government agencies, public libraries, and personal interviews with local residents over a four month period. Data can be used to assist WNT staff in ecological restoration, research, public use and operations activities.

Bison Grazing and Prairie Restoration at Walnut Creek National Wildlife Refuge - Stuart Allison; Central College.
Bison tend to preferentially feed on grass, possibly increasing the competitive edge for forbs and resulting in increased forb diversity. In this investigation 100 m^2 plot treatments are placed in a 1995 planting with roughly a 50:50 ratio of warm season to cool season grass species. Half of plots are fenced to exclude grazing, paired with an ungrazed, unfenced plot. Species richness diversity, % cover, canopy height and above ground biomass will be determined in 0.25 m^2 quadrats.

Walnut Creek watershed restoration and water quality monitoring. Dr. Carol Thompson, Iowa Geological Survey Researcher, Iowa Department of Natural Resources.
Study of the water quality and hydrology of Walnut Creek mainstem and tributaries including study of sedimenatation rates, flow rate, chemical characteristics, and biotic aspects continue.

In comparing Walnut Creek to the paired watershed, Squaw Creek, it is interesting to note that water samples collected at the northern (input) end of the Refuge generally had highest Turbidity, 5 Day BOD, and Nitrate Nitrogen values than the sampling point on the southern (output) area of the Refuge or than on Squaw Creek. The highest fecal coliform value was recorded on WNT on the output site in July. This seems anomalous considering there is currently no grazing on the Refuge.

Pesticide residual continues to be present in the stream. Atrazine levels are as high or higher on Walnut Creek than on Squaw Creek, even though atrazine has been banned on the Refuge for 4 years. Possibly off-Refuge sources are contributing to the presence of pesticide in the stream. Herbicide is present in rain as well as in terrestrial water, but does not account for high levels in the stream.

The historic stream apparently had a low angle bank profile. Recent and massive accumulation of sediment has increased the bank depth by 2-6 feet and has resulted in an abrupt bank angle. Researchers predict that Walnut Creek will remain highly turbid for decades because as the stream cuts, huge bank collapses will occur, resulting in muddy water. Historically, the stream was probably out of its banks frequently.

Research Funding for Ecological Restoration at WNT.
Among the many funding sources that support research at WNT, is one obtained in early 1997, by Dr. Thomas Jurik and Dr. Kirk Moloney that will fund several research projects. A $243,019 grant was awarded for a project entitled, "Methods for increasing biodiversity in tallgrass prairie reconstructions" for a 3 year study (1998-1999) to "...investigate methods of increasing plant diversity in prairie reconstructions with emphasis on incorporation of minor disturbance into management of prairie reconstructions as a means of simulating natural processes and incorporation of natural spatial patterns into reconstructions." Several projects are planned including investigation of:

- different methods of planting seed,
- effects of plant height at mowing during first three seasons after planting,
- effects of minor disturbance on introduction of forbs into established grass dominated sites,
- methods to introduce patterns found in natural prairies into prairie reconstructions and,
- differences in species diversity and distribution in remnant prairie communities to develop a model for WNT prairie plantings.

An initial project generated by this funding is described below:

The effects of seeding methods and early management on vegetative diversity of prairie reconstruction. Scott Moeller, MS thesis; Iowa State University. Advisor: Dr. Thomas Jurik.

The success of establishment of diversity of prairie species in four planting treatments (drilling all species, broadcasting all species, drilling grass and broadcasting forbs) and 3 mowing height (10, 20, and 30cm) treatments in a grid is investigated. Planting will be accomplished using Refuge planting equipment in order to better understand the effects of planting depth using standard refuge techniques. Planting area is 20' X 30' to accommodate WNT planting equipment. Plots are 2 X 2m with a minimum 2m buffer area. Sampling occurs in a randomly located 25 X 25cm quadrat. Data will include presence/absence of species, and a quantitative estimate of abundance of species. Sampling will occur in late July and August in the first year, and in late June and July in subsequent years, with spot sampling at other times of year. A data logger will be used to track the amount of light entering the canopy. Soil moisture will be recorded in buffer areas of plots.

A second investigation is similar except that vegetation is allowed to grow to 30cm and then mowed to 5, 10, and 15cm in different treatments. An initial plot is located in a lowland area on a current year's planting. Project began in June, 1997.

The role of soil arthropods in prairie reconstruction. Lisa Busch, MS Thesis; University of Northern Iowa. Advisor: Dr. James Dunn. (1997)

Changes in arthropod populations in reconstructed prairies are being investigated in this study. In this study, areas are carefully selected based on soil types, topography, and aspect. Arthropod abundance and diversity on Coneflower Prairie, a prairie remnant, is being compared to the current and the previous year's plantings. Straw taken from WNT seeding mixes and hand collected seed was placed in bags 10 cm. X 10 cm. Nine of three of these 10g litter bags were placed in each site. One bag was collected every four weeks until November and arthropods were collected. In addition, soil cores were taken and arthropods extracted using a Berlese-Tulgren funnel.

2

Habitat Restoration

2.a. Wetland Restoration

On-Refuge

Nothing to Report

Off-Refuge

Nothing to Report

2.b. Upland Restoration

On-Refuge

Hand collected seed

Volunteers are critical in introduction of plant species diversity to the Refuge, because machine harvests only result in the species that are mature at the time of harvest, usually in fall. In addition, many species are missed because of limitations of the machines. We are deeply grateful to the many volunteers who assisted us in seed collection from remnant prairies. In 1996, an enthusiastic core seed collection cadre of over 35 volunteers harvested over 65 pounds of native seed representing 124 species from 40 sites within our local ecotype zone. The total weight of seed harvested by volunteers climbed to over 140 pounds in 1997. There were over 140 species collected from 61 sites by 67 regular volunteers! Scores more volunteers assisted with the off-site seed collection efforts, and hundreds of school children harvested prairie seeds from sites on the Refuge.

Seed Harvest on WNT by Machine. Weights include both seed and inert material.

1995		
Site	**Pounds**	**Dominant Species**
9	18	Partridge pea *(Cassia fasciculata)*
18	450	Canada wild rye *(Elymus canadensis)*
14	70	Big bluestem *(Andropogon gerardii)*
15	130	Big bluestem *(Andropogon gerardii)*
8	700	Big bluestem *(Andropogon gerardii)*
1	50	Big bluestem *(Andropogon gerardii)*
10	300	Grass/forb mix
17	250	Little bluestem *(Schizachyrium scoparium)*
30	30	Indian grass *(Sorghastrum nutans)*
18	100	Indian grass and Little bluestem
Total	**2,098**	

1996		
Site	**Pounds**	**Dominant Species**
9	140	Partridge pea *(Cassia fasciculata)*
2	1,914	Canada wild rye *(Elymus canadensis)*
13	252	Big bluestem *(Andropogon gerardii)*
14,15	1,106	Big bluestem *(Andropogon gerardii)*
8	1,244	Big bluestem *(Andropogon gerardii)*
23	226	Indian grass *(Sorghastrum nutans)*
17	882	Little bluestem *(Schizachyrium scoparium)*
Interim	1,736	Mixed forbs
25	2,690	Mixed forbs
22	220	Mixed forbs
10, (22 and 33)	366	Mixed forbs
Total	**10,776**	

(Fiscal year 1996 harvest occurred in fall, 1995. Fiscal year 1997 machine harvest occurred in fall, 1996. Hand harvests occur from spring through frost and we are not able to break them up).

Planting

1996		
Site #	**Acres**	**Bulk lbs.**
52	5	149.3
47	6	179.2
48	20	597.3
49	40	1,194.7
50	29	866.1
51	23.5	701.9
Total	**123.5**	**3,688.5**

1997		
Site #	**Acres**	**Bulk lbs. seed**
53	19.5	819.0
54	28.3	1,188.6
55	42.2	1,772.4
56	7.0	182.0
57	9.5	247.0
58	6.7	174.2
59	4.5	117.0
60	30.0	780.0
61	48.0	1,248.0
62	6.5	169.0
63	10.0	420.0
64	25.0	650.0
65	5.5	143.0
66	6.0	156.0
67	6.3	163.8
68	43.5	1,131.0
Farmsteads	6.4	268.8
	3.7	155.4
	4.6	193.2
Subotal	313.2	9,978.4
Overseeding		
PLC	15.0	19.0
Roadway	44.0	1,119.0
Grand Total	**372.2**	**11,116.4**

(Rate of application varies depending on such factors as site hydrology, the species being sown, season, and stage of reconstruction or restoration.)

Maintenance Worker Boot plants native seed on a reconstruction site.

Prairie Rescue
Volunteers Glenda Buenger and Pat McAdams, rescued several truckloads of prairie plants from a prairie that was ultimately plowed for conversion to cropland. Several volunteers rallied to help transplant these plants around along the new entry road. Several moist prairie species were planted. Tim Barlow, an Australian ecologist who had specifically developed a grant to visit grassland restoration projects in the United States also participated.

Planting Failure on 15 Acres Surrounding the Prairie Learning Center
In 1996, approximately 15 acres surrounding the Prairie Learning Center building were planted. By early May, 1997, few plants had established either during the 1996 growing season or during the current growing season. The nearly bare soil of most of this planting area was in stark contrast to surrounding vegetated areas, including two adjacent 1996 plantings that had been growing vigorously. By mid-May, a sparse weedy plant community had established, with approximately a dozen native early successional species that appeared stunted. Biologist Drobney investigated why this planting was not succeeding.

Many of the same species planted near the building were in nearby plantings and growing well, planted using similar techniques, with the same weather. However, soil around the building was dense and lacked texture. Vegetable seeds germinated sluggishly and seedlings lacked vigor in the soil collected around the Prairie Learning Center, in contrast to more vigorous seedlings growing in soil collected from the successful prairie planting.

Staff associated with construction reported that the soil had been stockpiled and smelled "sour" or like "marsh muck", indicating anaerobic microbial activity. Soil probably heated in full sun, was wet for long periods of time, and the sheer weight compacted the pile, aggravating the situation. The seed bank in this soil likely rotted and "died" in the interior of the pile. Populations of micro-organisms beneficial to plant growth may also have been reduced or destroyed.

To remedy the problem, organic material was tilled into the surface of the soil, and the area replanted twice during the growing season with abundant opportunistic seed and with a dense nurse crops of Canada wild rye, and oats.

Management of Remnants
In 1996-97, we cleared approximately 5 acres of trees in natural community remnants including Thorn Valley Savanna, Coneflower Prairie, Buzzard Head, Don's I, and Don's II.

Off-Refuge
Nothing to Report

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 on Walnut Creek took on a new meaning this year with the release of 14 head of bison in 1997. These new Refuge tenants will have grazing privileges on 740 acres composed of native grasses and forbs and cool season grasses.

Haying is not a normally permitted Refuge activity, however, in special cases we have allowed this activity to take place. During 1996, as part of a management strategy for the native restoration, the Refuge hayed approximately 89 acres. These areas were hayed to remove a heavy growth of cool season grass. Bales taken from this haying went in part to the cooperator who did the haying and in part to the Refuge.

3.d. Farming

Nothing to Report

3.e. Forest Management

Nothing to Report

3.f. Fire Management

In 1996, the Refuge conducted five prescribed fires covering a total of 805 acres, for an average of 161 acres per burn. In 1997, the number of burns increased to six but the units burned were smaller, so total number of acres was only 267.5, for an average of 44.6 acres per fire.

Year	Fire Name	Fire Number	Date	Acres	Pres./Wild
1996	PCM School	3300	30-May	1.0	prescribed
	Learn CTR	3301	26-Apr	364.0	prescribed
	Flaherty	3302	26-Apr	125.0	prescribed
	South Savanna	3303	26-Apr	55.0	prescribed
	Office	3304	24-Apr	260.0	prescribed
	Acres			**805.0**	
	Acres/burn			**161.0**	
1997	Bison		17-Apr	78.3	prescribed
	Thorn Valley		25-Apr	20.1	prescribed
	PLC		25-Apr	29.2	prescribed
	High Point		25-Apr	76.0	prescribed
	Bison		29-Apr	7.5	prescribed
	PLC		13-May	56.4	prescribed
	Acres			**267.5**	
	Acres/burn			**44.6**	

3.g. Pest Plant Control

Pest control continues to take a major portion of the Operations Staff's time during the summer and early fall months. Mowing to control weeds, thistle and undesired brush took place on approximately 2,000 acres. This continues to be a part of the management strategy for new plantings.

Chemical control was done on 585 acres by Refuge staff. This control was done to control brush resprout, using Garlon 4 and burn down prior to planting of native species, using 2-4D and Roundup.

In 1995, we reported the use of Round-Up in a late fall application to control Reeds Canary, Brome and Switch grasses. It appears that a properly timed late fall application does indeed have controlling effects on these species. More work will be done to document this control method.

4

Fish and Wildlife Management

4.a. Bird Banding

Nothing to Report

4.b. Disease Monitoring and Treatment

Nothing to Report

4.c. Reintroductions

In September, 1996, WNT received the first eight bison for the WNT starter herd! Of the initial eight animals, four were bulls (a three-year old, a two-year old, and two yearlings) and four were cows (2 three year-olds and 2 two-year olds).

To increase genetic diversity, six bison from Wichita Mountain NWR in Oklahoma, were introduced in 1996. Of these animals, three were bulls and three were cows (all six-month olds).

Four bulls (a two-year old, a yearling, and two six-month olds) and four cows (a two-year old, a yearling, and two six-month olds) were introduced from Wichita Mountain NWR on October 8, 1996. On April 26, 1997 another six-month old cow was introduced to the herd. In that same spring, the first bison calf was born on the Refuge from a cow that was pregnant at introduction time.

Addition of bison to the Refuge has resulted in several media events and a great deal of interest from visitors and staff alike. Former Congressman Neal Smith, who obtained the congressional appropriation that initiated the Refuge, witnessed initial introduction of bison with other dignitaries and Refuge staff. Cars have begun to regularly travel through the bison enclosure and bison-watching has become a popular sport.

Elk Introduction

On February 20, 1997, four bull elk were introduced in the 750 acre enclosure with the bison. There was some concern that the elk may jump over the fence when released or within several days of release, and as such, two of the animals were fitted with radio collars in order to more effectively locate and retrieve the animals in such a case. However, all elk seemed content to remain in the enclosure.

4.d. Nest Structures

Nothing to Report

4.e. Pest, Predator and Exotic Animal Control

Nothing to Report

5

Coordination Activities

5.a. Interagency Coordination

Biologist Drobney participated in the Iowa River Corridor Project Meetings to develop natural communities along the Iowa River.

The staff worked on one FmHA Conservation Easement (CE), located near Indianola this year. ROS Heisler and Olawsky did the initial site visit to come up with a restoration plan of the area. This is a 30 acre site consisting of 10 acres of sedge-meadow/marsh and 20 acres degraded upland. This 20 acres will be seeded back to native vegetation. Through the use of a special use permit we will allow the landowner to harvest two-thirds of the upland each year in return for management activities (ie. burning and mowing). WNT will also retain the rights to harvest any wetland species for use on the Refuge or any other private land projects. Through the help of the Warren County Conservation Board, this site should be planted by early summer, 1997.

The Wetland Reserve Program (WRP) attracted less interest in the WNT local coordination area than in previous years. With passage of the 1996 Farm Bill, lands enrolled in WRP could be entered into permanent easements, 30-year easements, or restoration agreements.

ROS Heisler and ROS Olawsky accompanied NRCS personnel on four site visits to WRP intention sites and assisted in ranking and developing Preliminary Wetland Restoration Plans (WRPO's) for all approved intentions.

No new sites were enrolled in the Emergency Wetland Reserve Program (EWRP) in 1996. Heisler and Olawsky assisted NRCS personnel in revising WRPO's which had carried over from previous years for sites in Boone (1), Greene (1), and Polk (2) Counties.

Olawsky assisted NRCS with two wetland determination appeals and one minimal effect request within the WNT local coordination area. Heisler conducted a site visit to examine a potential FmHA Conservation Easement in Marion County. Heisler recommended WNT not pursue a Conservation Easement on the property.

5.b. Tribal Coordination

Nothing to Report

5.c. Private Land Activities

The Refuge received three requests for wetland restoration assistance in 1996. Due to physical or economic factors, none of the wetland restoration projects were feasible at this time. Technical assistance was provided for two of the projects, (both in Polk County) by the Service's Iowa Private Lands Office.

Of eight new requests for prairie restoration assistance, the Refuge was able to provide technical assistance for four projects in 1996. WNT was able to complete three prairie reconstruction projects totaling 11 acres. All three projects involved agreements where WNT provided Iowa ecotype grass and forb seed. As part of the agreements, WNT will secure seed harvest rights for 10-15 years for future private lands projects.

6

Resource Protection

6.a. Law Enforcement

Hunting pressure was down slightly during 1997 compared to 1996. This was, in part, due to the decreased population estimates for pheasant and quail in this part of the state. The majority of hunters using the Refuge are pursuing pheasants with the number two game animal being deer.

Deer hunting pressure remained low again in 1997. There was a slight increase in the numbers of hunters using the early muzzle loader season and the bow season. This still amounted to only a handful of hunters. Success rates were low for these seasons. The regular gun seasons showed about the same numbers of hunters during the openers and then numbers dropped off dramatically.

In FY96, law enforcement issues continued to be a challenge for Refuge staff. A total of 25 offenses occurred, which included larceny, vandalism, trespass and hunting violations. A total of 13 citations was issued for these hunting violations and vehicle trespassing. There were two collateral refuge officers on staff: ROS Petersen and Project Leader Birger. A majority of their law enforcement patrols were conducted during the hunting seasons.

In FY97, a total of 13 offenses occurred, which included vehicle trespass and hunting violations. A total of 10 citations were issued for these hunting violations and vehicle trespassing.

6.b. Permits and Economic Use Management

Cash rent continued as the method used for farming on the Refuge in 1996. Crop scouting also continued as a required part of this program.

Cropping on the Refuge was up slightly in 1996 due to new acquisitions. Cropped acres of corn and beans totaled 1,369 acres as compared to 1,246 in 1995.

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

In 1997, two pieces of property, a 40 acre and a 4 acre tract, became part of the Refuge. The forty acre piece of land is presently in agriculture and will continue to be farmed under a Special Use Permit by the previous landowner at least for the next few years. The 4 acre tract was a home site with a house, barn and garage. The house will be demolished and buried in place; the barn and garage will be sold and removed. Once the buildings are gone, the area will be smoothed and seeded to native prairie grasses and forbs.

6.h. Threats and Conflicts

Nothing to Report

7

Public Education and Recreation

7.a. Provide Visitor Services

Public Education and Recreation
Most of the educational programming was conducted on-site where stewardship was a part of the experience having students collect prairie seed and remove unwanted trees. Off-site educational programming was conducted at many local schools in order to build interest in the Refuge.

The Refuge recorded over 45,000 visitors in FY 1996. Over 3,850 visitors participated in educational programs, events or tours. The public use staff consisting of Outdoor Recreation Planner Dave Aplin and Park Ranger Shelly Sentyrz lead the educational programming and presented 245 environmental education programs for approximately 7,305 students. Over 85 scheduled groups learned about the Refuge and Prairie Learning Center during meetings and events held on and off the Refuge. A total of 178 scouts came to the Refuge to help clear the land for the prairie.

The Refuge recorded over 166,728 visitors in FY 1997. The majority of 28,000 Prairie Learning Center visitors participated in scheduled educational programs, events or tours. Public use staff provided 161 environmental education programs for 8,435 students during this period. Public use staff conducted 57 guided tours of the Prairie Learning Center and Refuge for 2,424 visitors.

Over 100 scheduled groups learned about the Refuge and Prairie Learning Center during meetings and events held in the Center's conference rooms and auditorium. The Center received over 15,000 walk-in visitors. Due to gross inaccuracies with the in-road traffic counters, their numbers are not being reported this year.

School kids coming to the Refuge for Environmental Education Experiences

The first teacher workshops for the Refuge's Project Bluestem curriculum were held. The workshops were well received by the teachers.

In April 1997, the Prairie Learning Center was opened to the public. A grand opening was planned for April 12th , but had to be postponed because of a freak winter storm that buried the Refuge in snow. The grand opening was held in June with Vice President Al Gore, U.S. Congressman Tom Harkin, and former U.S. Congressman Neal Smith providing the keynote addresses to a crowd of 1,100.

Many people came to celebrate.

The more the merrier.

Some people sang songs.

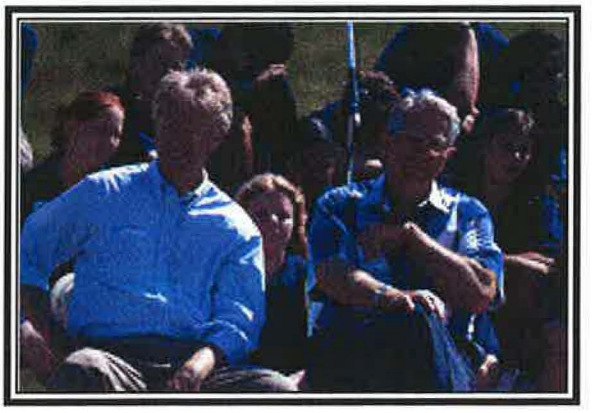
Some people played in the band.

And more people sang.

Several individuals talked and said wonderful things. The temperatures were high, but everyone had a good time.

Robin Fortney, Friends of Walnut Creek NWR.

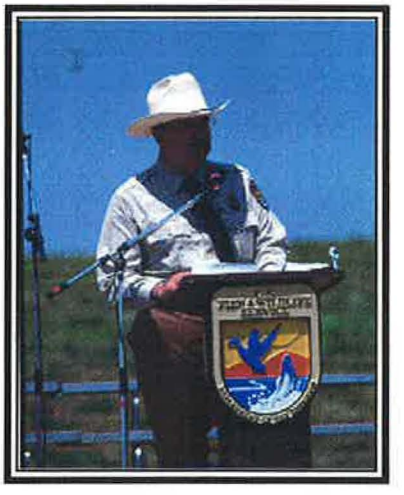
Susan Gardels, Poet



Attorney General Tom Miller and Neal Smith

Vice President Gore and Representative Leonard Boswell

Dick Birger, Project Leader
Walnut Creek NWR



Senator Tom Harkin

William Hartwig
U.S. FWS, Region 3 Director

Louis Larose, Bison Manager
Winnebago Tribe, NE

Larry Wilson, Iowa DNR

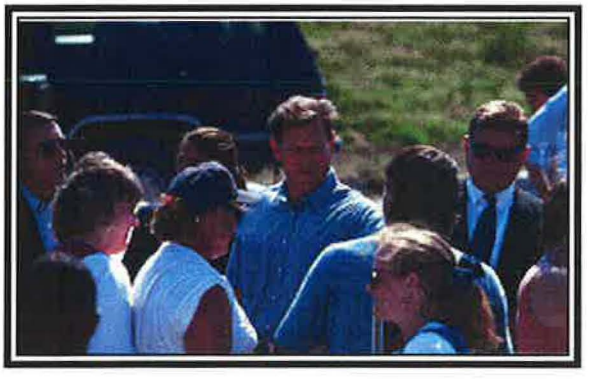
Former Congressman Neal Smith

The final speaker was Vice President Al Gore. He talked and then stayed to mingle with the crowd and enjoy a warm Iowa day.

Vice President Al Gore

Robin Fortney presents Vice President Al Gore with a gift as staff & their families watch.

Vice President Gore mingling with visitors.



Several enjoyed the opportunity to shake hands with Vice President Gore.

Exhibits and Facilities

In FY 96, the temporary office site's informational kiosk was the only true exhibit that the Refuge had for the visiting general public. There were also walking trails for the public to use with self-guiding brochures. Major construction of the new exhibits, trails and facilities were under way.

Temporary Office Kiosk and Visiting School Group

In FY97, the Center was finally opened and the public's response to the exhibits, movie, and facilities was extremely positive. So positive was the response that over 135,000 people visited the Refuge.

School children at the Prairie Learning Center Diorama

Exhibits were built by Neal Deaton, (a museum exhibit specialist) on prairie, soil cross-section, an underground maze. Three hiking trails and auto tour opened in October when the bison were released to the prairie from Fort Niobrara.

Environmental Education Activities
Curriculum/Teacher Training: Iowa Corps
In FY96, the second annual Iowa Corps Teacher Training Program brought 30 Iowa educators to the Refuge for 6 busy days of habitat stewardship and workshop activities. Coordinator Ginny Elliot facilitated the workshop and care of the Iowa Corps participants from their base camp at "William's Farm". Refuge staff provided instruction and directed stewardship activities. The Iowa Corps participants volunteered over 800 hours doing habitat stewardship projects.

Again in FY97, the third annual Iowa Corps Teacher Training Program brought 30 Iowa educators to Refuge for 6 busy days of habitat stewardship and workshop activities. The Iowa Corps participants volunteered over 800 hours.

Project Bluestem
In FY96, 245 teachers participated in Project Bluestem (PBS) workshops. Workshops have introduced participants to the PBS curriculum and the Refuge.

In FY97, 345 teachers participated in PBS workshops.

School Programs

Partnering with Naturalists from other agencies at the Prairie Learning Center

In FY96, approximately 7,300 students of all ages from 110 schools participated in scheduled activities at the Refuge. Following is a breakdown of environmental education customers by age groupings.

Level	# of Groups	# of Students
Elementary	54	3,583
Middle	29	1,924
High School	7	465
College	5	332
Home School	3	200
All Grades	12	796

Numerous groups were turned away as the demand for environmental education programs exceeded the Refuge's capacity throughout the year.

In FY97, approximately 9,300 students of all ages from 155 schools participated in scheduled activities at the Refuge. Following is a breakdown of environmental education customers by age groupings.

Level	# of Groups	# of Students
Elementary	71	4,260
Middle	39	2,340
High School	17	1,020
College	5	300
Home School	10	600
All Grades	13	780

As in FY 96, numerous groups were turned away as the demand for environmental education programs exceeded the Refuge's capacity throughout the year.

Traveling Educational Trunks
In FY96, the Refuge's prairie educational trunks were utilized by 21 school districts.

In FY97, the Refuge's prairie educational trunks were utilized by 30 school districts.

Scouting
Approximately 178 scouts participated in on-site stewardship activities in FY96.

7.b. Outreach

Special Events
Festivals

"Sow Your Wild Oats"
A springtime Planting of Prairie Celebration at the Refuge

Annual special events continue to be an important program element at the Refuge. When well marketed, the events draw large crowds of people who might not otherwise visit the Refuge.

Visitors in the Gallery

FY96 Date	# of Visitors	Event
10/95	163	National Wildlife Refuge Week
10/95	50	A.C. Morris Feed and Seed
4/96	17	Junior Duck Stamp
4/96	200	Grand Opening
5/96	120	International Migratory Bird Day
5/96	437	Sow Your Wild Oats
6/96	1,100	Rescheduled Grand Opening

Jr. Duck Stamp Contest Art Show at the Refuge

FY97 Date	# of Visitors	Event
10/96	360	National Wildlife Refuge Week
10/96	75	A.C. Morris Feed and Seed
10/96	1,000	Bison Release
4/97	21	Junior Duck Stamp
5/97	212	International Migratory Bird Day
5/97	410	Sow Your Wild Oats
6/97	350	Buffalo Day

Following is a list of events held at the Refuge during FY97 which1500 visitors attended: Refuge Open House, Neighbors Tour, AC Morris Seed and Feed, Junior Duck Stamp, International Migratory Bird Day, Sow Your Wild Oats and Iowa Science Teachers Fall Conference.

Restoration/Monitoring Seminars

The Refuge relies on volunteers to assist with a variety of biological monitoring and restoration activities. Volunteer training seminars and programs are offered to the general public to recruit new volunteers to specific Refuge restoration and bio-monitoring tasks.

FY96 Date	# of Participants	Event
6/96	60	Early Seed Seminar
8/96	67	Late Seed Seminar

FY97 Date	# of Participants	Event
3/97	55	Frog Survey
5/97	45	Butterfly Seminar
6/97	60	Early Seed Seminar
8/97	57	Late Seed Seminar

On-Site Biology Outreach:
Provided the field trip for the Conservation Section of the Iowa Academy of Science sponsored by the Iowa Natural History Association.

Provided an interview for the Iowa Public Television Program, "Living in Iowa" on November 3, 1995.

Provided perspectives in ecological restoration to Tim Barlow, a visiting grassland ecologist doing restoration work in Australia. Mr. Barlow had received a grant to study American grassland restorations and reconstructions to learn techniques to apply to his own projects. He learned of WNT via a paper written in Restoration and Management Notes by Pauline Drobney.

Hosted the Iowa Prairie Conference on July 19, 1997. This conference is held biennially and attracts prairie enthusiasts and professionals throughout Iowa and from other states.

Volunteer, Erma Selser presented a Butterfly Identification Seminar on May 2, 1997.

Off-Site Programming
In FY 96, Refuge staff presented off-site programs to 110 students and 3925 individual various groups. These groups included conservation agencies, natural resources professional groups, and service organizations.

In FY 97, Refuge staff presented off-site programs to 905 students and 9639 individual various groups. These groups included conservation agencies, natural resources professional groups, and service organizations.

A Radio Call show with WOI Radio gave Public Use Specialist Dave Aplin a chance to reach thousands during question and answer sessions.

Biological Outreach Efforts - Off-Site
Refuge Biologist, Pauline Drobney made the following outreach efforts:

- Presented perspectives about ecological restoration during a Prairie Symposium held to honor retiring Prairie Biologist, Dr. Paul Christiansen on Feb. 23, 1996.

- Presented a discussion of ecological restoration at WNT at a Prairie Symposium held on July 27, 1996, at the 1996 Environmental Education Conference.

- Served as Section Chair for the Conservation Section of the Iowa Academy of Science Meeting in Spring, 1996.

- Wrote a solicited article for the Roader's Digest a regular publication of the Iowa Roadside Vegetation Management Office at the University of Northern Iowa in Cedar Falls. The article suggested guidelines for harvesting in remnant prairies. October 2, 1996.

- Provided an interview for a documentary film on prairie entitled "Where the Sky Began" that was aired on the Discovery Channel.

- Provided an invited presentation for the Iowa Women in Natural Resources Conference on January 31, 1997. Conference title was "Restoration and Rejuvenation" and the presentation was entitled "Restoring Prairies and Savannas on Walnut Creek NWR.

- Provided a frog identification and monitoring seminar in spring, 1997.

- Provided an interview for an article about the Refuge that was ultimately published in the April 15, 1997 "American Way", a complementary general interest magazine of American Airlines.

- Participated in a panel discussion about local ecotype seed issues during the Iowa Prairie Conference in July, 1997.

- Assisted in development and provided review of the book entitled "The Tallgrass Restoration Handbook" edited by Stephen Packard and Connie Mutel. This book provides information on reconstruction, restoration, monitoring and management of natural areas from several perspectives.

8

Planning and Administration

8.a. Comprehensive Conservation Planning

Nothing to Report

8.b. General Administration

Refuge Funding - FY96 as compared to FY 95		**FY 96**	**FY 95**
Refuge Operations	1261	$423,870	$329,828
Volunteer Program	1261	2,000	1,100
Maintenance Management	1262	25,000	25,000
Non-Game/Neotrop	1230	2,500	3,000
Private Lands	1121	8,000	5,000
Law Enforcement	1221	1,000	0
Fire Management	9110	28,200	6,500
Total		$490,570	$370,428

Refuge Staffing

Below is a list of employees who were members of the staff at Walnut Creek NWR during FY96.

Permanent Full Time	Grade	OD Date
1. Birger, Richard M. Refuge Manager	GS-13	02/91
2. Aplin, David A. Outdoor Rec. Planner	GS-12	01/92
3. Petersen, Bernard J. Refuge Ops. Specialist	GS-11	11/92
4. Drobney, Pauline M. Wildlife Biologist	GS-11	03/92
5. Chio, Benjamin R. Program Analyst	GS-12	08/95 Transferred 8/96
6. Boot, Brian A. Maintenance Worker	WG-8	10/92
7. Heisler, John E. Refuge Ops. Specialist	GS-6	04/95
8. Dykstra, Carla J. Administrative Tech.	GS-6	05/91
Temporary/Term Appointments		
9. Van Ryswyk, Doreen D. Secretary (OA)	GS-4	04/95
10. Olawsky, Craig D. Refuge Ops. Specialist	GS-9	12/93
11. Sentyrz Buitenwerf, Michelle L. Park Ranger	GS-7	06/93
12. Pattison, Gregg A. Bio Science Tech (W/L)	GS-5	08/94 Terminated 8/96

Refuge Funding - FY97 as compared to FY 96		**FY97**	**FY 96**
Refuge Operations	1261	$557,788	$423,870
Volunteer Program	1261	2,500	2,000
Maintenance Management	1262	18,750	25,000
Non-Game/Neotrop	1230	3,300	2,500
Private Lands	1121	14,000	8,000
Law Enforcement	1221	0	1,000
Fire Management	9110/9251	3,587	28,200
Total		$599,925	$490,570

Refuge Staffing

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12. Pattison, Gregg A. Bio Science Tech	GS-6	11/96

Front Row: Bernie Petersen, Michelle Sentyrz, Pauline Drobney
Middle row: Doreen Van Ryswyk, Craig Olawsky, Brian Boot, Carla Dykstra, Dave Aplin
Back Row: Richard Birger, Gregg Pattison, John Heisler

New Construction

Construction of the Prairie Learning Center and Maintenance buildings began in FY 1995 and continued through FY 1997. The building process included removal of trees, re-shaping some land areas, installation of a five and one-half mile entrance road and parking areas. It was a long process with staff members involved in every step. This is a pictorial representation of the activities at the former Walnut Creek National Wildlife Refuge.

Prairie Learning Center Progress
as of July, 1995.
We started with a solid foundation.

A foot print is established by July, 1995.

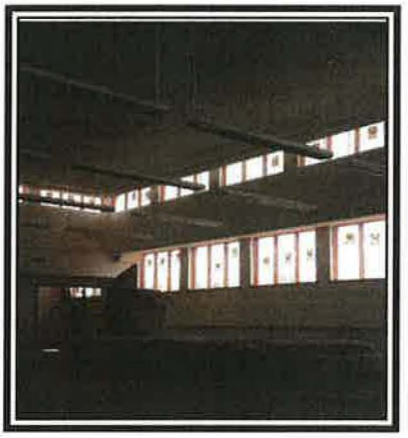
The walls begin to rise with framing in July, 1995

The Prairie Learning Center becomes more than just a foundaton. October, 1995

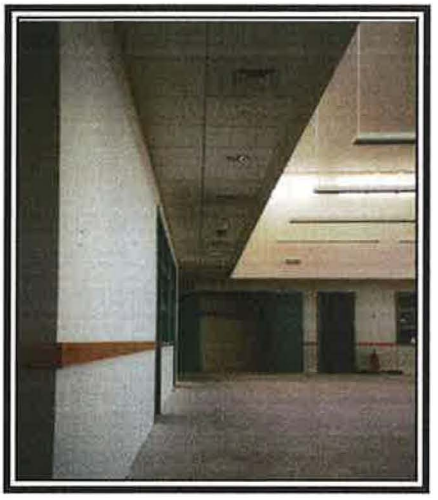
Skylights that reflect light through a tube into the bookstore. April, 1996

Windows that will provide views onto the prairie. April ,1996

Prairie Views



Office space almost finished.



Office area, June, 1996.

The building was finally completed and the interior was beautiful!

The exhibit area as seen from the front entrance.

The exhibit area is divided into "pods" with each pod highlighting a specific part of the prairie restoration/reconstruction program.

From the exhibit area looking toward the bookstore.

The bookstore

The wet lab is used by the Public Use Staff to prepare projects with children.

Another great place where kids can get muddy and dirty...clean up is a breeze, prairie breeze that is!

The Refuge provides outdoor and indoor eating areas for visitors who pack their lunch. After a day on the prairie, this indoor area is favored by school children.

Staff took beneficial occupancy of the maintenance shop, vehicle and seed storage buildings in May, 1997. The new shop area has allowed many projects to be completed during the winter months that we could not accomplish before.

Shop, storage and offices for maintenance.

Seed and equipment storage building.

The gas pumps were installed with computer connections to monitor gas use for each driver and vehicle. They are programmed to "beep" when service is needed for the vehicle being fueled.

An aerial view of the Prairie Learning Center after its completion.

An aerial view of the Maintenance Facilities.

Waste Water Treatment
The constructed wetland for waste water treatment was completed in the early fall of 1996. This system will treat all of the waste water produced from the facility. There was considerable difficulty in getting this constructed basin sealed due to the liner being spec'd too thin for the application. After many hours of frustration on the contractor's crew, the liner was completed and rock and planting of wetland plants took place. We have three cells which we can run the effluent through in any combination. This final polishing will clean the water sufficiently to allow discharge directly into a water way feeding a tributary of Walnut Creek. There is a great deal of interest in this system from both public and private organizations. The effectiveness of the system will be monitored closely.

Bison Enclosure
In preparation for the arrival of the bison, a contract was let in 1996 to construct 30,000 linear feet of 8 foot high, high tensil woven wire fencing. This contract was let in late May and completion was in late September. This fence encloses approximately 740 acres. Further preparation for the bison arrival was completed with the construction of two cattle grates, one at each end of the bison enclosure drive thru. These grates are 24 feet wide and 16 feet long each. The contract for this work was let in August and completion was in October. Care had to be taken to make these grates strong enough to handle the traffic of farm machinery and loaded grain wagons as this road is the current farm-to-market road, serving this section of Jasper County.

Rehabilitation
An old metal sheep barn was rehabilitated to be the new home for two horses purchased by the Refuge. Stall facilities were constructed and a hay storage area prepared.

Major Maintenance
Several abandoned wells were plugged, there still remains many to be taken care of. As time and dollars permit, we will finish plugging and sealing these wells.

A contract was let to clean up three farmsteads on the Refuge. The contractor, MAW from Phoenix, AZ, received the low bid and was awarded the contract in early 1996. The work was to completely remove all buildings, etc. from the sites and leave the area ready for planting. In April, the contractor arrived on site to start work. In June, the contractor had walked away from the job. In August, the job was cancelled and no further payments made to MAW.

A second cleanup contract was issued in June to demolish and cleanup three additional sites on the Refuge. A local Iowa contractor, Chitty Earth Moving, was awarded this contract. This contractor moved in and completed his work in about two weeks time. We were able to contract with him to finalize the first cleanup contract that was abandoned by MAW. All work was done and sites ready for re-seeding before the end of September.

Equipment Utilization and Replacement
The following equipment was acquired by the Refuge:

Shop Equipment: From surplus property the following pieces of equipment were acquired: 10" table saw, 14" radial arm saw, 300 amp welder, metal cutting band saw, several hand drills ranging from 3/8" up to 3/4", misc. hand tools, complete mobile machine shop, all terrain fork lift (with help from Trempealeau NWR), two enclosed trailers, rear mounted sweeper brush, hydraulic dolly jack with 10 ton rating, 6 rolling tool cabinets, parts cleaning tank, 6' blade with three point hitch mount, & 8 stainless steel top work benches.

Restoration Equipment: Agco-Gleaner Combine Model R-50 with bean head, Massey Ferguson Stripper Head Model 6020R Rice Special, and two barge box wagons.

Law Enforcement/Fire Equipment: Ford F-350 4-wheel drive pickup with utility box (from BLM Surplus), Slip-on pumper unit from Rice Lake NWR, 1986 Blazer 4-wheel drive (military surplus) and 2 Glock Model #23 40cal. Semi-auto pistols.

Lab Equipment: Magnifying light, high intensity illuminator, dessicant cabinet, 5 microscopes and light sources.

Misc. Equipment: Display trailer (surplus from Dept. of Agriculture), portable corral panels for bison work, 10 chests of drawers, and 2 cell phones.

Communications Systems
Maintenance was required on all of the handheld radios at the stations. The handheld radios are Johnson Scorpion models. We experienced a reduction in the distance we could transmit caused by an antenna connection coming apart. This is apparently a problem with this type radio.

During the year, we ordered new Motorola radios which included both handheld, mobile and a base. Throughout the later part of the year, components of this system arrived. We hope to have the system installed and running by early summer, 1997.

Training
Biologist Drobney attended the Refuge Management Training Academy in Charleston, South Carolina, from February 25 - March 15, 1996.

In July, 1997, ROS. Olawsky attended Hydric Soils training, hosted by the Natural Resources Conservation Service (NRCS).

Volunteer Program
Twenty-nine volunteers contributed 2,962 hours to the Refuge. Of those, 22 volunteers gave a total of 1,634 hours answering questions, directing the public, and providing general information at the front desk. Seven volunteers donated 1,328 hours pulling, collecting, cleaning, sorting and analyzing seed as well as transplanting and watering the plants.

Nightfall on the Prairie - there is much more to come.