REVIEW AND APPROVALS

WALNUT CREEK NATIONAL WILDLIFE REFUGE - PRAIRIE LEARNING CENTER

Prairie City, Iowa

ANNUAL NARRATIVE REPORT

Calendar Year 1994

Refuge Manager — Date: 3/21/95

Refuge Supervisor Review — Date: 4/27/95

Regional Office Approval — Date: 5/1/95

WALNUT CREEK NATIONAL WILDLIFE REFUGE - PRAIRIE LEARNING CENTER

Prairie City, Iowa

ANNUAL NARRATIVE REPORT

Calendar Year 1994

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVALS

WALNUT CREEK NATIONAL WILDLIFE REFUGE - PRAIRIE LEARNING CENTER

Prairie City, Iowa

ANNUAL NARRATIVE REPORT

Calendar Year 1994

Refuge Manager — Date: 3/31/95

Refuge Supervisor Review — Date: 4/27/95

Regional Office Approval — Date: 6/8/95

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INTRODUCTION

Walnut Creek National Wildlife Refuge - Prairie Learning Center is located in southwest Jasper County, approximately 20 miles east of Des Moines, Iowa. The project was established in September 1990, 30 days after release of an Environmental Assessment and signing of a Finding of No Significant Impact. Authority for establishment was the Fish and Wildlife Act of 1956 and the Emergency Wetlands Resources Act of 1986.

Authorized size is 8,654 acres. The core of the project was 3,622 acres formerly owned by Redlands Corporation, a subsidiary of Iowa Power and Light Company. The land had been purchased originally in the late 1970s and early 1980s as the site for a nuclear power plant cooling lake. The plant was never built and the land had been intensively farmed by tenants.

The rolling topography within the Walnut Creek watershed contains lands which are highly erodible with steep slopes draining into Walnut Creek. Land currently not restored or reconstructed to prairie includes approximately 36% corn and soybean acres, 7% pasture and small grain acres, 11% forest, 9% "other" and 37% unrestored CRP. Wooded areas are mostly oak savanna and riparian corridors along Walnut Creek.

The primary purposes for establishment are: "(1) to restore native tallgrass prairie, wetland, and woodland habitats for breeding, migratory birds and resident wildlife, (2) to serve as a major environmental education center providing opportunities for study, (3) to provide outdoor recreation benefits to the public, and (4) to provide assistance to local landowners to improve their lands for wildlife habitat."

A preliminary feasibility study done by the Service indicated a traditional waterfowl refuge was not viable nor in keeping with purposes for which this project was established. Reconstruction of the tallgrass prairie ecosystem, providing a major environmental education facility and providing an opportunity to work on private lands and Service lands within one discreet watershed; these are all new goals for the Service and as such, this project takes on a new and more critical significance.

A. HIGHLIGHTS

Over 300 supporters of the Refuge helped celebrate prairie restoration and reconstruction at the third annual Sow Your Wild Oats Festival held May 21.

Staff planted 600 Refuge acres using 14,500 pounds of bulk materials; including over 100 native species.

Eleven teachers worked with Refuge Public Use Staff during the summer months to complete a tallgrass prairie environmental education curriculum project.

Director Mollie Beattie welcomed over 650 people gathered for a Walnut Creek NWR - Prairie Learning Center ground breaking ceremony on September 1.

A team of biologists contracted through the Iowa State Wildlife Co-op Unit collected baseline insect, mammal, bird, and herpetological data.

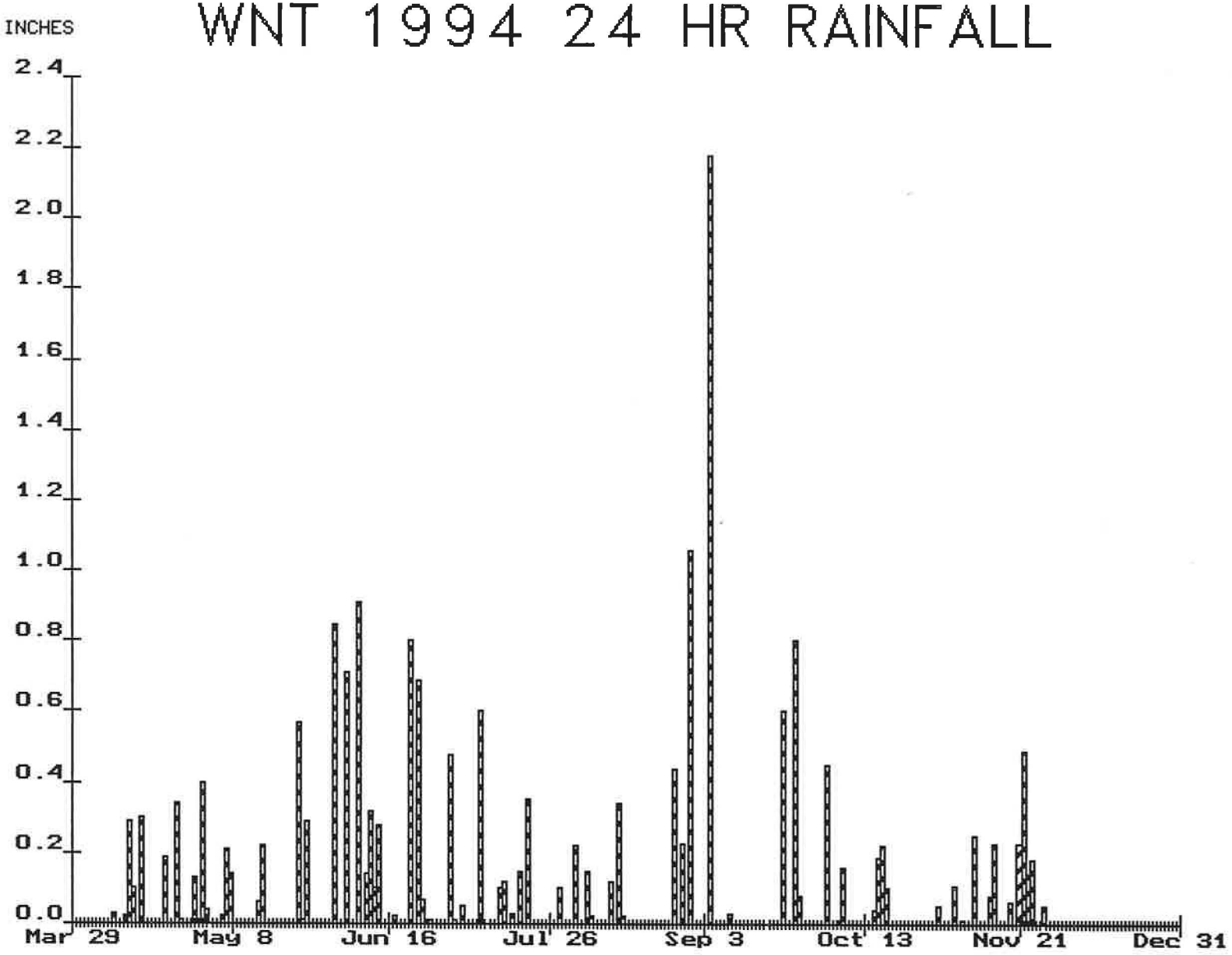
A Station Evaluation, conducted November 14-18, helped define a Refuge vision, establish restoration/reconstruction goals and refined the organization and function of the Refuge team.

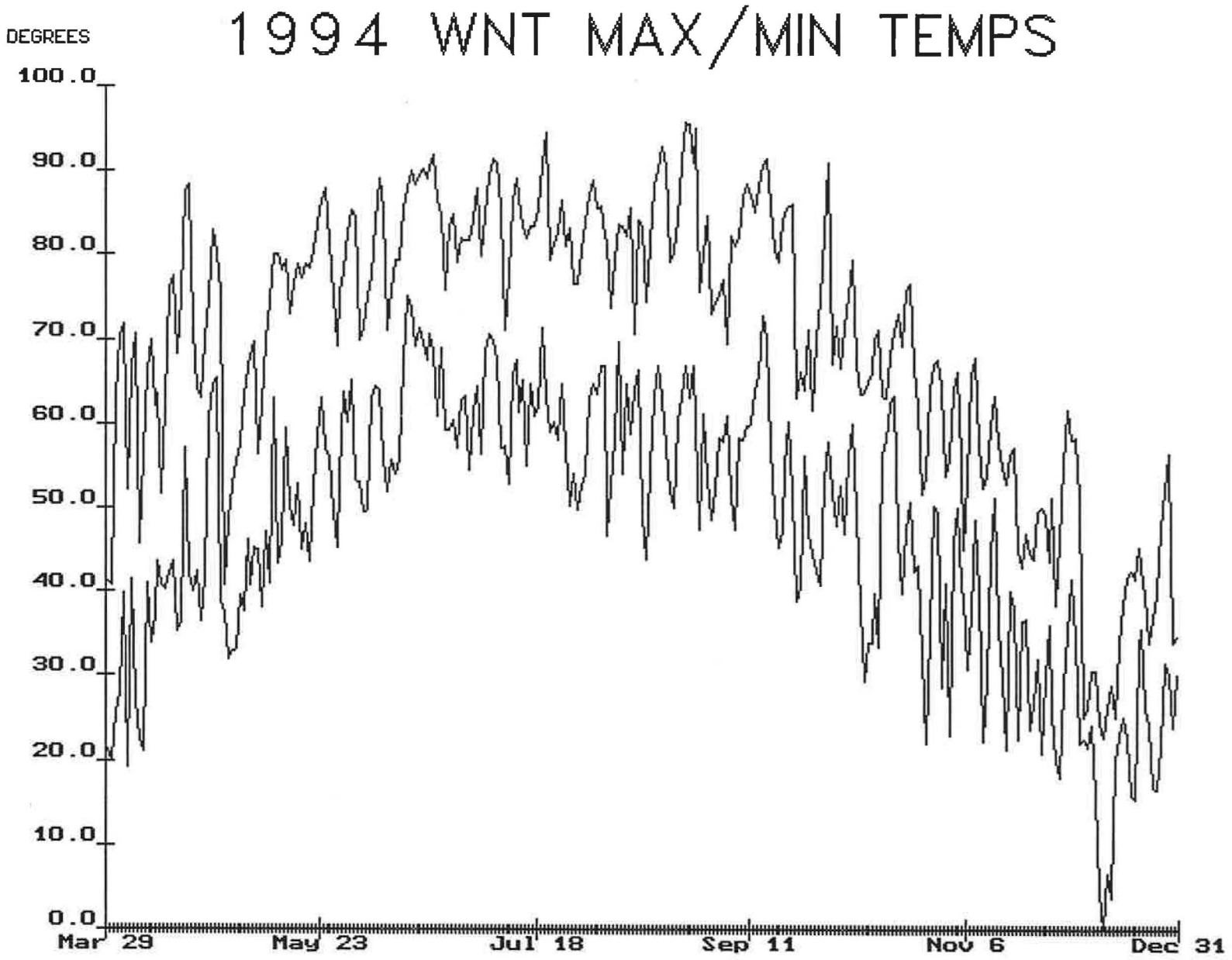
B. CLIMATIC CONDITIONS

The weather in 1994 was pleasantly different than the major flooding which occurred in 1993. January was the coldest month recorded in over ten years with many days registering temperatures below zero. The cold persisted through February but fortunately, March and April provided "normal" spring weather. The prime conditions which existed throughout spring offered staff ample time to complete spring planting with minimal weather-related disruptions. Timely showers during the summer months and a relatively mild winter resulted in an ideal year "weather-wise."

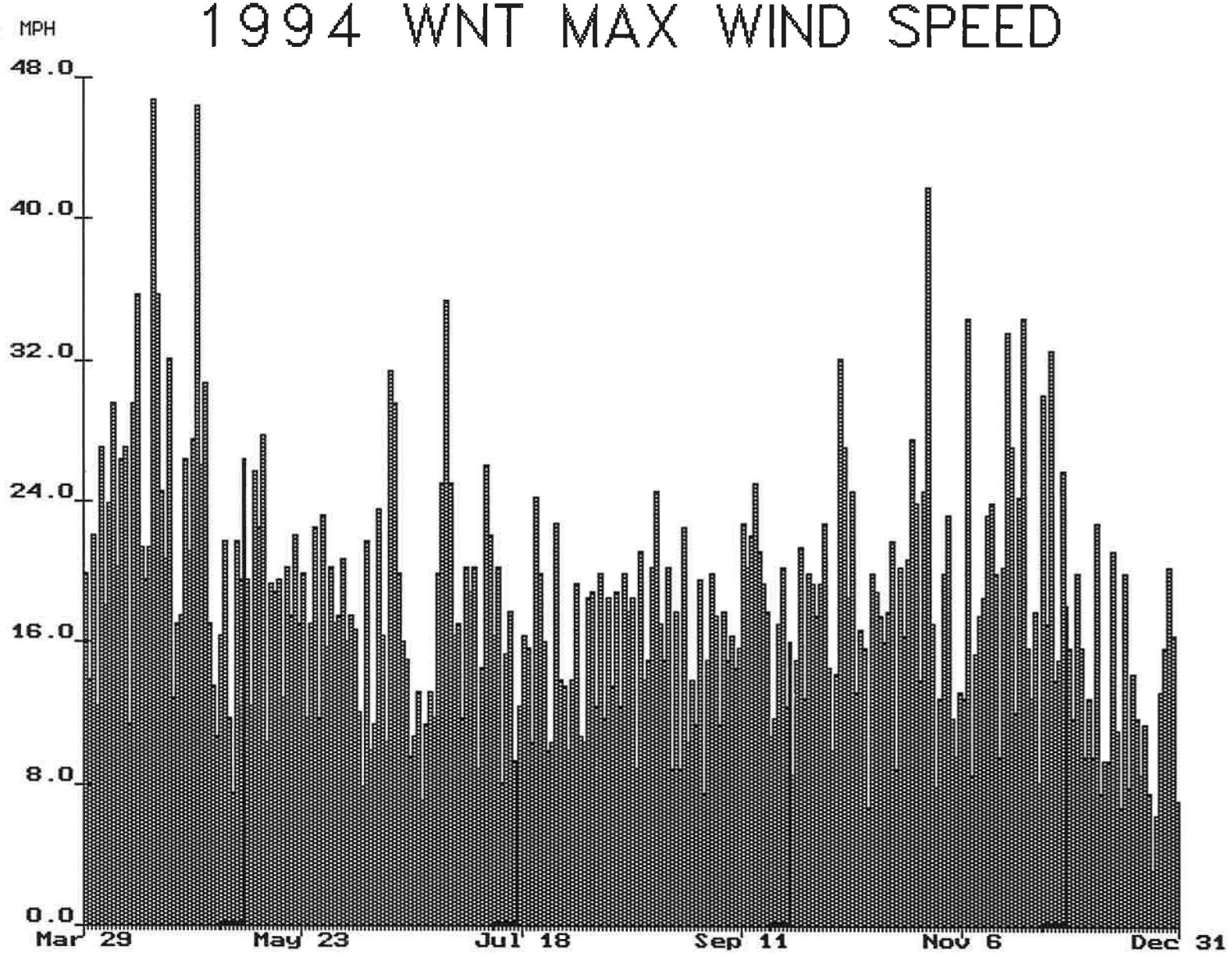
A FWS-11, Fire Weather Station from Forest Technology Systems, Inc. was installed in late March. The latest weather technology was made available using a dial-up program accessible with a PC. This weather station provided total weather data collection and management. During the prescribed burning season, it was an invaluable tool in determining weather-related burn conditions. The following graphs indicate weather information gathered from late March through year end. They display maximum/minimum temperatures, 24 hour rainfall and maximum wind speed.

WNT 1994 24 HR RAINFALL




1994 WNT MAX/MIN TEMPS
DEGREES
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Mar 29
May 23
Jul 18
Sep 11
Nov 6
Dec 31

1994 WNT MAX WIND SPEED



C. LAND ACQUISITION

1. Fee Title

Efforts continued in 1994, several offers were made, but no tracts of land were added to the land base. (Refer to WNT Ownership Map). Don Kleven, WAM3-Fergus Falls, MN, continues as the Realty Specialist working for WNT. Don has been consistent in developing sound relationships with potential sellers.

Appraisals are still seen as being low by local landowners and little land is being sold in the neighborhood. Locally, no realistic market has been established, although the few sales which have taken place indicate a rise in prices. There seems to be a definite discount in land values south of U.S. Highway 163 compared to land with a comparable Corn Suitability Index (CSI) north of the highway.

Local custom traditionally divides offered price by total acres to arrive at the "price per acre." This skews the real value by not deducting the value of buildings and other improvements and makes comparison of one tract to another difficult. As always, our land acquisition efforts are a hot topic at the local coffee shop.

2. Easement

Nothing to report.

3. Other

Nothing to report.

4. Farmers Home Administration Conservation Easements

Nothing to report.

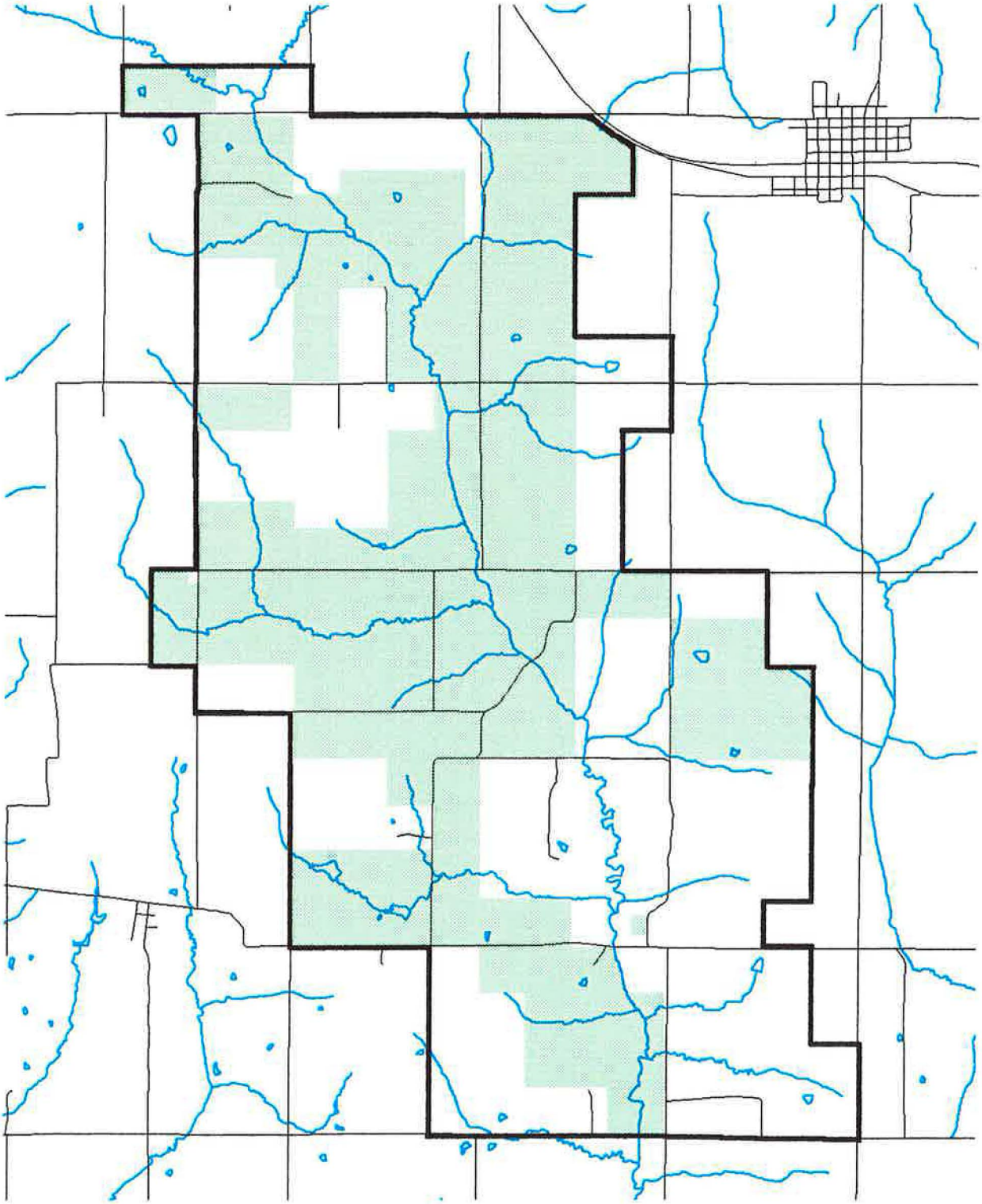
D. PLANNING

1. Master Plan

The Record of Decision for the Environmental Impact Statement was signed off on shortly after January 1, 1994.

The Master Plan itself was finalized and published in 1994. This is the source of guidance for the initial development of the project.

1994 WNT Ownership



2. Management Plan

Specific management planning took place at many levels again during the past year. Refer to individual sections for details. At this stage in the development of the WNT project, stepping down from the Master Plan to specific on-the-ground details is very important and takes a great deal of effort on the part of all involved.

Fire plans for specific Prescribed Burn Units were written and approved prior to burning in the spring. An overall Refuge Fire Plan is still being drafted.

The Hunting Plan developed and approved in 1992 was the basis again for this year's hunting program.

The most inclusive and unique plan being developed is the Prairie Restoration/Reconstruction Plan. Work continues on this major effort, guided by DRAFT plans. As in most realms, everything works some time and nothing works all the time. At WNT, we strive to never let planning get in the way of reality.

The Master Planning process produced a comprehensive approach to Refuge development and mountains of paper.

3. Public Participation

The Refuge Manual calls for this section to "... Describe any refuge activities involving public participation in the planning or decision making process ....".

Activity at Walnut Creek National Wildlife Refuge - Prairie Learning Center is so replete with public participation, (it is after all a verb, not a noun), that to document any single segment or event would be meaningless. We have decided once again to skip this portion of the Annual Narrative in favor of including some of the specifics in appropriate sections.

ROS Craig Olawsky helps Refuge visitors prepare a mixture of prairie seeds and sand for planting during Sow Your Wild Oats III.

4. Compliance With Environmental and Cultural Resource Mandates

Nothing to Report.

5. Research and Investigations

To assist in facilitation of WNT's Monitoring/Research Program, a Research Advisory Committee was formalized in January. Committee members included: Richard Birger and Pauline Drobney, WNT; Jim Mattsson, US F&WS Region 3; Dr. Bill Clark, Iowa State University (ISU); Dr. Dennis Keeney, Leopold Center for Sustainable Agriculture; Dr. Erv Klaas,

Iowa Cooperative Fish and Wildlife Research Unit; Dr. John Pearson and Dr. Carol Thompson, Iowa DNR; Dr. Jerry Selby, The Nature Conservancy Iowa Field Office; and Dr. Daryl Smith, University of Northern Iowa (UNI).

The group worked to identify critical baseline data gathering priorities and associated costs for the 1994 growing season. Data gathering efforts focused on remnant prairies and savannas with some Refuge-wide data gathering efforts.

After identifying important parameters to monitor, animal surveys were contracted through the Iowa Cooperative Fish and Wildlife Research Unit coordinated by Dr. Erv Klaas. Plant surveys were conducted under contract with Dr. Daryl Smith, UNI Biology Department.

In addition to developing baseline data gathering priorities, the Research Committee developed a process for review of pre-proposals and proposals. Also, a Research Program Brochure was developed. The purpose of this brochure is to present research opportunities at WNT to potential researchers.

Biologists Tim Anderson (left) and Ted Siler collect insects as part of baseline data gathering efforts on the Refuge.

"Initial Survey of Select Animal Taxa on WNT" (30147-8) WNT NR94

Avifauna - Bird baseline data gathering was funded from the FWS Nongame Bird Conservation Program. The primary focus of surveys was on 31 areas that retained some characteristics of the historic native plant community. Investigators hired through the Iowa Co-op Fish and Wildlife Research Unit included: Roland Sachs, ISU; Tim Anderson, Madison, Wisconsin; David Wachtel, Northbrook, Illinois; Ted Siler, South Haven, Michigan and Pete Melde, Marshalltown, Iowa. Below is a modified summary of bird, mammal and butterfly survey data as provided by Erv Klaas.

Birds on WNT were counted three times on each of 106 randomly selected 50 meter circular plots within four general habitat cover classes: herbaceous (28), row crop (24), woodland (28), and riparian (26). Cover classes included all remnant natural communities. Observations were recorded in three, five, and ten minute intervals so data could be comparable to other accepted recording schemes.

The ten most abundant species over all plots were red-winged blackbird, house wren, gray catbird, common yellowthroat, American robin, northern cardinal, dickcissel, song sparrow, blue jay, and mourning dove. The red-winged blackbird was the most common species on herbaceous (24 of 28) and row crop plots (19 of 24) and occurred in all four habitats. The song sparrow also occurred in all habitats but was the most common species on riparian plots (25 of 26). The northern cardinal was most common on woodland plots (28 of 28) although house wren was a close second (26 of 28).

Only a few species were unique to only one habitat. The bobolink, chipping sparrow, American kestrel, and ruby-throated hummingbird were seen only on herbaceous plots. The Canada goose, upland sandpiper, and cliff swallow were each recorded on one plot in row crop habitat. Several upland sandpipers were seen in herbaceous habitat but not on census plots. The ovenbird, great-blue heron, American woodcock and spotted sandpiper were recorded only on riparian plots. The American crow, eastern tufted titmouse, red-eyed vireo, hairy woodpecker, rufous-sided towhee, chimney swift, and Bell's vireo were unique to woodland plots.

Riparian habitat had the highest diversity with 53 species, followed by woodland with 50 species, herbaceous with 43, and row crop with 32. A comprehensive bird species list occurs under the Other Migratory Birds Section.

In addition to formal point count data, four short eared owls were identified on Walnut Creek NWR in late May. Two of the owls were smaller and two larger, suggesting the

possibility that these birds could be members of a family group. These birds are one of Iowa's rarest nesting species.

Mammals - Mammal data has not yet been fully analyzed. From May 15 to June 30, a total of 20 quarter-sections contained entirely within Refuge boundaries were surveyed for presence or absence of medium-sized mammals. Sections were walked and searched for tracks and other signs. Five live-traps were set and baited with fish oil or cat food for four consecutive nights on each section. A coyote census was done in late July using the siren-response technique; no coyotes responded. All streams were walked to check for beaver activity; five dams were located.

Butterflies - Butterflies were collected or noted while walking broad meandering transects on 30 plots on prairie and savanna remnants. Remnant patches were divided into 3 groups based on the quality of native plant community as evaluated by Drobney and Bryant in a study performed in 1991 entitled "Walnut Creek National Wildlife Refuge Native Plant Community Assessment". Butterfly sampling occurred once each week from mid-June to mid-July between 10 a.m. and 3 p.m. on days with 50% or less cloud cover and minimal wind. Sampling was accomplished using 17-inch aerial nets.

Not more than four specimens of each species were collected, pinned and labeled to document presence. A total of 48 species were collected on remnant plots and four additional species were collected off the plots. Ten species were recorded on 16 or more plots. These were: cabbage white (28), pearly crescentspot (27), common sulphur (25), great spangled fritillary (24), monarch (19), red admiral (19), eastern tailed blue (18), tiger swallowtail (18), orange sulphur (17), and black swallowtail (16).

Moths - Moths were collected using a black light and a gas-lantern between 2 a.m. and 4 a.m. Collections were made in the 12 natural community remnants of highest quality based on the "Walnut Creek National Wildlife Refuge Native Plant Community Assessment" (Drobney and Bryant, 1991). Up to four specimens of each morph observed were collected from each remnant sampled. A report of moth data is due by June, 1995.

Terrestrial Invertebrates - Terrestrial invertebrates were sampled with pitfall traps on 12 primary remnants. Four traps were installed in each of three clusters. Traps were checked once a week for seven weeks. A few traps were disturbed by raccoons or other animals and caused trapping to be discontinued in two plots. Analysis of terrestrial invertebrate data is proceeding, and thus far 18 higher taxonomic groups have been identified.

Of special note was the finding of one mature, sexually active specimen of the crayfish, *Procambrus gracilis*, collected on a prairie remnant. This species has a limited distribution in the Midwest and in Iowa, is restricted to the southeastern one-half of the state. No records previously existed for Jasper County.

Ants - Ants occupy important ecological niches in tallgrass prairie and oak savanna. Their ability to aerate soil rivals that of earthworms and they concentrate seeds and nutrients in underground chambers. Because they feed on sugar-rich excreta of homopterans (sap-sucking insects), they defend homopteran colonies on plants, in effect protecting these plants from other herbivorous insect species. For these reasons there are important implications about the role of ants in prairie and savanna restoration and reconstruction. Because many species are specific to plant community type and because populations of these species become more robust as the plant community becomes healthier, they can be used as indicators of natural community quality. For these reasons and because ants are easy to sample, a separate effort was designed to develop ant baseline data.

Ants were sampled once on each of 23 remnant prairie and savanna plots and along the edge of six row crop fields using tuna fish baits and aspirating ants into a glass-collecting vial. Baits were checked every ten minutes for a period of two hours between 10 a.m. and 2 p.m. Ants were preserved in 70% ethyl alcohol and labeled with date and locality information. Thanks to Dr. James Traeger, Missouri Botanical Society Arboretum, St. Louis, Mo. who has volunteered to identify WNT ant collections. Though a final tally of species has not been completed, Dr. Traeger believes that two previously undescribed species of ants have been found at WNT. Ant survey results are due in 1995.

<u>"Assessment of Natural Community Remnants at Walnut Creek National Wildlife Refuge in 1994" (30147-9) WNT NR94</u>
Plant surveys were conducted from July through October under the direction of Dr. Daryl Smith, UNI. Field work was performed by Carol Kern, crew leader, Nancy Slife and Sheryl Trinka, all of UNI. Permanent plant surveys will be used to evaluate progress toward restoration and reconstruction goals.

Twenty-five permanent plant transects on 21 sites were established on prairie and savanna remnants throughout the Refuge. Two hundred meter transects were used on 19 sites, and two parallel 100 meter transects were used on two smaller sites. Fifty randomly located 0.1 meter plots were located along each 200 meter (or sets of two 100 meter)

transect. Species diversity, cover, and frequency data were recorded in each plot.

Species of plants not identified in previous surveys were sampled and positively identified. Transects were permanently marked using a one foot long, one inch wide piece of conduit that can be later relocated with a metal detector. Each conduit was drilled and a numbered aluminum tag attached for later identification. Sites were mapped on two foot contour topographic maps. Data analysis is pending.

"Walnut Creek Watershed Restoration and Water-Quality Monitoring Project: Walnut Creek National Wildlife Refuge, Jasper County, Iowa." (30147-10) WNT NR94

Soil water availability, agricultural sedimentation, the velocity of the stream, water quality and general water movement patterns throughout the landscape are all critically important to the ability to restore ecosystems. Hydrological characteristics directly affect the ability to establish plant species and to reintroduce animal populations. In addition, restoration of the native landscape directly involves restoring more natural hydrological characteristics including water quality and the morphology and course of Walnut Creek.

Restoration of the hydrology of WNT is a long term project, much of which will be accomplished indirectly by converting agricultural land to native plant communities. On January 6, a meeting was held in Des Moines to discuss cooperative hydrological and water quality monitoring potentials. This meeting was largely organized by the Iowa Department of Natural Resources (IDNR) - Geological Survey Bureau, and was attended by representatives from several agencies.

An initial collaborative effort in 1994 included WNT, the Ecological Services Rock Island Field Office, IDNR-Geological Survey Bureau, University of Iowa Hygienic Laboratory, and the US Geological Survey - Water Resources Division resulted in establishment of a stream flow and sedimentation gaging station on the southern end of Walnut Creek (refer to USGS Gauging Station Map). This equipment records daily stream flow and sedimentation levels electronically and was installed in mid-August. One problem encountered has been beavers depositing material on the sensors in the stream. Wood and cornstalks have been removed, as have the beavers.

In addition to the gaging station, baseline water quality analysis occurred on the five tributaries of Walnut Creek. A single water sample was taken from each tributary after a rainfall event of one inch or more in late June, and again in mid-September. Samples were analyzed by the Iowa

Hygienic Laboratory for ammonia, fecal coliform, and for the most common Iowa herbicides including Analyte, Atrazine, Bladex, Dual, Lasso, Sencor, Sutan, Treflan, Acetochlor, Desethyl Atrazine, and Desisopropyl Atrazine. This data was supported by field measurements of pH, dissolved oxygen and temperature.

To date, results are typical of a small to medium size agricultural stream in Iowa. One anomaly is a single data point indicating very high levels of fecal coliform. We suspect that this high reading could have resulted from a application of manure on a nearby farm field. If this is the case, it supports the need for buffer zones between farm fields and streams.

Water quality data will become more meaningful as we have additional readings for comparison. We expect that most noticeable changes will occur as prairie vegetation becomes better established.

A more in-depth proposal was advanced to the EPA for support of a second gaging site on the northern half of the Refuge for several groundwater wells to monitor water level and water quality changes. The proposal also includes monthly surface water chemistry analysis including nitrogen forms pesticides, common ions, BOD, DO, turbidity, chlorophyll A, fecal coliform, conductivity, and temperature. Additional samples would be taken from the stream quarterly and analyzed for nitrogen, temperature, and conductivity to allow evaluation of the incremental contribution to overall basin response and evaluation of land-use changes in smaller areas. Aquatic and stream corridor vegetation, aquatic macro-invertebrates and fish populations would also be monitored. All of these installations and activities would be duplicated on an appropriate paired watershed, if funded, so that an equivalent agricultural stream could be compared to Walnut Creek.

<u>"Beaver Population and Density at Walnut Creek National Wildlife Refuge" (30147-11) WNT NR94</u>
Nikelle Roland, a student from Central College at Pella, Iowa performed a survey of beaver activity under the supervision of her professors, Stuart Allison and Sandy Whidden. Roland Sachs, the crew leader for the Animal Monitoring Team, served as a mentor for Ms. Roland as she developed her methodology and familiarity with field techniques. Assistance was also provided in experimental design development by Dr. Erv Klaas, ISU Coop Research Unit. Field assistance was provided by Rod, Reva, and Janel Roland and Dave Elfvin.

"Small Mammals on a Savanna at Walnut Creek National Wildlife Refuge" (30147-12) WNT NR94
Heather Hoffman, a student at Drake University in Des Moines, Iowa conducted a small mammal survey under the supervision of her professor, Dr. Phyllis Kingsbury. Terry Van De Walle assisted in field identification of mammals. Mammals were live-trapped in employing the Lincoln-Peterson method of capture-recapture on seven remnant natural community sites. This information will supplement data gathered on grassland sites at WNT in 1993. Preliminary results indicate that species found are typical of Iowa woodlands. A full report of this study is due in 1995.

"A Preliminary Survey of Leafhoppers at Walnut Creek National Wildlife Refuge" (30147-13) WNT NR94
Jeff Curry, a student at William Penn College in Oskaloosa, Iowa, conducted a study of leafhoppers on ten prairie remnants on WNT, under the direction of his professor, Pat McAdams. Leafhoppers are considered by many entomologists to be important indicators of prairie quality, though often perceived to be difficult to identify. Mr. Curry gathered leafhoppers and conducted preliminary identification of the insects using a simplified key developed by Andy Hamilton, a leafhopper ecologist from Canada. Positive specimen identification will be made by Hamilton. A preliminary analysis indicated that 150 specimens from at least 32 genera were captured this year. Most common genera in open areas were Prairiana, Flexamia, and Draeculacephala. No genera appeared to dominant on wooded areas, though several genera were represented. Generic representation appeared to be different on prairies and savannas. A report is due in the spring of 1995.

"Ecology and Taxonomy of Land Snails at Walnut Creek National Wildlife Refuge" (30147-14) WNT NR94
An autumn survey of land snails was conducted by Bill Gilbert, a professor at Simpson College in Indianola, Iowa, with assistance from his former student, Gregg Pattison. Ten samples of leaf-litter, duff and loose surficial soil were collected and analyzed for presence of land snails. Snails were identified per site and sites characterized relative to vegetation type, topography, aspect and other physical features. In preliminary findings, the only species present is Anguispira alternata, a forest floor, litter dwelling land snail. This is the most common snail identified in surveys of several wooded areas in Iowa, including wooded backwaters areas of Lake Red Rock, approximately five miles south and east of WNT. A final report of findings is pending.

6. Other

Nothing to report.

E. ADMINISTRATION

1. Personnel

Front row (left to right) - Outdoor Rec Planner Dave Aplin, GS-023-12; Refuge Operations Spec Craig Olawsky, GS-485-09 and Refuge Operations Spec Bernie Petersen, GS-485-11. Back row - Refuge Manager Dick Birger, GS-0485-13; Park Ranger Shelly Sentyrz, GS-025-6; Wildlife Biologist Pauline Drobney, GS-486-09; Maintenance Worker Brian Boot, WG-4748-08; and Admin Tech Carla Dykstra, GS-303-06. (Not pictured - Bio Science Tech (Wildlife) Gregg Pattison, GS-404-5)

Unfortunately no new staff were added to the project in 1994. We were fortunate to have Gregg Pattison as a temporary employee during the latter part of the year. Gregg previously had been a volunteer and an important component of the team working on getting seed in the ground. Gregg has a Bachelors Degree in Biology from Simpson College, Indianola, IA.

	Permanent Full-Time	Part-Time	Temporary	Term	Total FTES
FY 1994	6	0	.5	2	8.5
FY 1993	6	0	.5	2	8.5
FY 1992	6	0	.5	0	6.5
FY 1991	2	0	0	0	2.0

John (Jack) Heisler, Cooperative Education Student from Concordia College, successfully completed a three month work period at WNT. Jack worked in all areas of the WNT program:

biology, operations, public use, administration and gained understanding of the tallgrass prairie/oak savanna restoration project. During his stay, Jack became an integral part of the staff.

Co-op Education Student John (Jack) Heisler joined WNT staff for three months.

2. Youth Programs

Work with the Boy Scouts of America has been disappointing to date with few accomplishments to report. A new member of the Friends of Walnut Creek, Mr. Laverne Collister, is active in scouting and his involvement may result in better success. Efforts to find a contact within Girl Scouting have been unsuccessful. Efforts will continue.

There were no YCC or other youth programs in 1994.

3. Other Manpower Programs

Nothing to report.

4. Volunteer Programs

Over 320 volunteers donated more than 2100 hours of service to WNT in 1994. Volunteer activities included service projects, research and special events.

A Volunteer Orientation session held in early March provided over 65 people with the opportunity to learn about available

volunteer positions at the Refuge. The orientation was well-received and a similar session is planned for 1995.

The volunteer management software, Matchpoint, was used successfully throughout the year to fill Refuge volunteer positions based upon the skills and interests of registered individuals. It was also used to organize mailing lists and generate statistics on WNT's volunteer program.

A Migratory Bird Count held in May resulted assistance from 15 volunteers. Three volunteers helped with a nesting bird survey during prescribed burn season in April. They walked pre-arranged transect lines following a burn to record evidence of nesting birds.

WNT participated in the Earth Day EcoFair at Merle Hay Mall in Des Moines on April 22-24. Eighteen volunteers worked at the hands-on prairie planting exhibit, drawing a consistent crowd.

A Simpson College graduate volunteered over 500 hours June-August assisting with Refuge operations. The volunteer's academic background and general knowledge of prairie restoration techniques were useful in assisting WNT staff in planting over 600 acres.

The Third Annual Sow Your Wild Oats prairie planting event was held May 21 with 26 volunteers supporting Refuge staff in the organization of mini-workshops, exhibits, crafts, games, and planting events. Over 300 people attended. Mr. Tom Cady, WNT Volunteer of the Year for 1993, was recognized during the activities with the presentation of a commemorative plaque. The event was featured on the local television news broadcast.

A Ground Breaking Ceremony for the Prairie Learning Center was held September 1. Over 30 volunteers assisted Refuge staff with planning, set-up tasks, answering phones, parking, attending the guest register and arranging seating for the audience.

Volunteer seed collection was another tremendous accomplishment. School groups, families, individuals and organizations contributed over 1100 hours by hand-harvesting seed. Three Volunteer Seed Harvest Teams were organized in September. They were comprised of a volunteer leader and 20-30 volunteer collectors from across central Iowa. Teams met weekly at assigned locations to hand-harvest delicate and rare prairie species most desired for the WNT restoration. Conservative estimates place the total value of donated seed and labor at $100,000.00.

Refuge Ranger Shelly Sentyrz and ORP Dave Aplin recognize 1993 volunteer of the year, Tom Cady.

A Christmas Bird Count was hosted by the Refuge in conjunction with the National Audubon Society on December 31. Unfortunately, inclement weather reduced attendance to seven birders joining Refuge staff in the count.

5. Funding

Walnut Creek Nat'l Wildlife Refuge-Prairie Learning Center Funding

	Operations & Maintenance		Regional	
	Needed Base	Received Base	Addition	Other
FY 1994	$495,100	$302,129	$18,900	
FY 1993	$343,318	$303,125	$ 4,300	
FY 1992	$354,000	$300,000	$ 9,100	
FY 1991	$303,700	$298,000	$ 300	$13.55m

6. Safety

Safety remains a high priority at WNT as we completed 1994 accident-free. Monthly safety meetings included discussions on winter safety, vehicle emergencies, ways to "beat the heat", exercise and nutrition, and hunting safety.

Convex mirrors were placed on four Refuge vehicles and disposable flares were placed in all Refuge vehicles.

Maintenance Worker Boot and Bio Tech Pattison both received their Commercial Pesticide Applicator License in February.

In March, Ranger Sentyrz, ROS Olawsky and Co-op Ed Student Trainee J. Heisler attended I-220, S-130 and S-190, Basic Fire Training.

Heavy Equipment Certification (Ag Tractor) Training was presented by Paul Irthrum in April. Employees participating in this training were: Birger, Aplin, Drobney, Sentyrz and Heisler. Two employees, Olawsky and Pattison, received this same training in August, presented by a private instructor.

Minnesota Valley NWR's Paul Irthrum (in vest) and Walnut Creek NWR Staff take a break during equipment operation training in April.

Boot and Pattison attended video-conferences on Roadside Weed Management in October and Pest Management, Calibration & Pesticide Regulations in December.

Boot was certified in HVAC Electrical Troubleshooting in November.

7. Technical Assistance

Nothing to report.

8. Other

Management Training Program - ORP Aplin and 18 other Service employees were selected to attend the Region 3 Management Training Program (MTP). The core curriculum for this intensive four week training program was the Zenger-Miller Frontline Leadership Course. In addition to Frontline Leadership Training, guest speakers presented programs on a variety of topics including: effective professional writing and reading, outward bound initiative, equal opportunity training, and health and wellness training. The course also included panel discussions lead by MTP graduates and FWS Directorate.

The class was divided into teams to address four issues suggested by FWS Regional management and former MTP participants at the end of week one. Aplin and four classmates worked over the next nine months to examine barriers to the successful implementation of existing endangered species recovery plans. Team recommendations were consolidated into a bound report "Diagnosis and Prescription for a Healthy, Robust Recovery Process" and presented to the Regional Directorate on September 15.

Station Evaluation - A station evaluation of the Refuge was conducted during the week of November 14-18. The Evaluation Team consisted of Liz Jones, ROS, Cypress Creek NWR; Bobbi Frans, Chief, Branch of BA; Wendell Olson, Fire and Prairie Ecologist, Fergus Falls Wetland Complex; and Matt Kerschbaum, WAM2.

The Team focused on the areas of (1) biodiversity and ecosystem approach to management; (2) Prairie reconstruction; (3) Environmental Education, Public Use and Recreation; (4) Work Force and Personnel; (5) Administration and (6)the Station Vision and vision process.

During the evaluation, several issues or themes were dominant. These included the organization and function of the Refuge Team, a group of highly talented and enthusiastic people; a common vision of what the Refuge will be, achieved through consensus and owned by all; realistic and achievable level of prairie reconstruction that we will have by August, 1996 and beyond; and need for O&M sufficient to operate.

The evaluation proved valuable for Refuge staff and pending issues are being addressed.

F. HABITAT MANAGEMENT

1. General

Cropped areas on the Refuge continue to be high priorities for prairie reconstruction (planting prairie from scratch). To date, prairie has been planted on approximately 800 acres of former agricultural land and on 28 planting units. In 1994, WNT was forced to "catch-up" on plantings planned for 1993, but delayed because the extremely rainy season made fields too wet for planting.

We continually attempt to refine our seed acquisition system in order to strive toward a more efficient method of developing and fulfilling WNT seed needs. Prior to purchase of seed harvested in 1994, a list of species needed for 1995 planting was generated from a list appropriate to the WNT landscape (refer to Table A). Species included had one or more of the following characteristics:

- seeds of the species are known to establish well in early planting;
- species are readily recognizable or showy species important to educational and aesthetic goals of the Refuge;
- species are important members of the developing native landscape.

Seed delivered to the Refuge was entered on an Excel data base to facilitate tracking species, seed origin, collectors name and amounts of seed donated or purchased by the Refuge. All material machine harvested is tested for purity and subjected to a tetrazolium test to indicate viability. The data-base system provides a running tally of seed available at WNT and is used for developing planting prescriptions.

Hand collected seed was documented, sorted and combined by species and general collection area, cleaned and finally tested for viability. Large machine harvested seed lots were combined so that a diverse seed mix results. These large machine harvests served as a matrix into which a diversity of hand collected seed were mixed.

In 1994, volunteer hand collected 105 prairie species. In 1993, volunteers collected 71 species.

Table A. Plant Species List For 1994 WNT Seed Purchase

Species	Common Name
Actinomeris alternifolia	wingstem
Agastache nepetoides	giant yellow hyssop
Amorpha canescens	lead plant
Amorpha fruticosa	indigo bush
Andropogon gerardii	big bluestem
Anemone cylindrica	thimbleweed
Anemone virginiana	virginia anemone
Artemisia ludoviciana	gray sage
Asclepias incarnata	marsh milkweed
Asclepias purpurascens	purple milkweed
Asclepias sullivantia	Sullivant's milkweed
Asclepias tuberosa	butterfly milkweed
Asclepias verticillata	whorled mildkweed
Aster azureus	sky-blue aster
Aster ericoides	heath aster
Aster novae-angliae	New England Aster
Astragalus canadensis	milk vetch
Baptisia bracteata	creamy indigo
Baptisia lactea	false indigo
Bouteloua curtipendula	side oats grama
Brickellia eupatoriodes	false boneset
Cacalia atriplicifolia	pale Indian plantain
Cacalia plantaginea	tuberous Indian plantain
Cassia fasiculata	partridge pea
Ceanothus americanus	New Jersey tea
Ceanothus herbaceus	redroot
Coreopsis palmata	prairie coreopsis
Coreopsis tripteris	tall coreopsis
Dalea candida	white prairie clover
Dalea leporina	foxtail prairie clover
Dalea purpurea	purple prairie clover
Delphinium virescens	prairie larkspur
Desmodium canadense	Canada tick trefoil
Desmodium illinoense	Illinois tick trefoil
Echinacea pallida	pale purple coneflower
Elymus canadensis	Canada wild rye
Elymus villosus	silky rye
Elymus virginicus	virginia rye
Eryngium yuccifolium	rattlesnake master
Eupatorium altissima	tall thoroughwort
Eupatorium perfoliatum	boneset
Eupatorium purpureum	purple Joe Pye weed
Euphorbia corollata	flowering spurge
Euthamia graminifolia	grass-leaved goldenrod
Gaura biennis	gaura
Gentiana alba	creamy gentian
Gentiana andrewsii	bottle gentian
Gentiana puberulenta	downey gentian
Gnaphalium obtusofolium	pearly everlasting
Helenium autumnale	sneezeweed
Helianthus occidentalis	western sunflower
Helianthus rigidus	prairie sunflower
Heliopsis helianthoides	ox-eye daisy
Heuchera richardsonii	alum root
Hieracium longipilum	hairy hawkweed
Hypericum pyramidatum	giant St. John's wort
Hystrix patula	bottlebrush grass
Koelaria macrantha	June grass
Lespedeza capitata	round-headed bushclover
Liatris aspera	rough blazingstar
Liatris squarrosa	scaley blazingstar
Liatris ligulostylus prairie	blazingstar
Liatris pycnostachya	prairie gayfeather
Lobelia cardinalis	cardinal flower
Lobelia syphilitica	great blue lobelia
Monarda fistulosa	horsemint
Oenothera biennis	evening primrose
Onosmodium molle	false gromwell
Panicum virgatum	switch grass
Parthenium integrifolium	wild quinine
Physostegia virginiana	false dragonhead
Potentilla arguta	prairie potentilla
Prenanthes racemosa	glaucus white lettuce
Psoralea argophylla	silverleaf scurf pea
Psoralea tenufolia	scurf pea
Pycnanthemum tenufolium	mountain mint
Pycnanthemum pilosum	mountain mint
Pycnanthemum virginianum	mountain mint
Ratibida pinnata	drooping coneflower
Rosa arkansana	prairie rose
Rosa blanda	meadow rose
Rudbeckia hirta	black-eyed Susan
Rudbeckia subtomentosa	sweet black-eyed Susan
Ruellia humilis	prairie petunia
Schizachyrium scoparium	little bluestem
Scripus atrovirens	bullrush
Silphium integrifolium	rosinweed
Silphium laciniatum	compass plant
Silphium perfoliatum	cup plant
Solidago canadensis	tall goldenrod
Solidago nemoralis	field goldenrod
Solidago rigida	rigid goldenrod
Solidago speciosa	showy goldenrod
Sorghastrum nutans	Indian grass
Sporabolus asper	rough dropseed
Sporabolus heterolepis	prairie dropseed
Stipa spartea	needlegrass
Teucrium canadense	germander
Tridens flavus	purple top
Triostemum perfoliatum	horse gentian
Verbena hastata	blue vervain
Verbena stricta	hoary vervain
Veronia baldwinii	Ironweed
Veronicastrum virginicum	culver's root
Talictrum dasycarpum	meadow rue
Tradescantia ohiensis	spiderwort
Zizia aurea	golden Alexander

This year seemed to be a good year for Indian grass production (*Sorghastrum nutans*). However, compass plant (*Silphium laciniatum*), round-headed bush clover (*Lespedeza capitata*), and false indigo (*Baptisia lactea*) did not produce seed well. In the case of compass plant and false indigo, seed apparently failed to form on most plants. On some especially low wet areas, false indigo was unusually small and seemed to lack vigor. Round-headed bush clover, on the other hand, produced seed heads, but they tended to be small and riddled with insect damage. Among the many possible reasons for crop failure among certain species is that wet conditions in 1993 caused some root damage in deep rooted species on moist soils, and these species are sacrificing seed production for root repair. Wet weather last year could also have favored disease organisms feeding on species like round-headed bush clover.

Planting - Spring planting began May 27 and ended July 26. Approximately 20 acres were planted in the first two weeks in November and some seed was reserved for a winter frost seeding. Approximately 14,500 bulk pounds of more than 100 species of material was planted on 600 acres during 1994.

Prior to planting, herbicide (Roundup and 2-4D) was applied to most plantings. A nurse crop of oats were planted in most cases, in some instances, Canada wild rye was substituted for oats. Most plantings were mowed once or twice during the growing season to reduce weedy competition and to provide light to developing prairie species. We also baled a cover crop of oats to remove non-native plant material and expose developing prairie species to sunlight.

2. Wetlands

Nothing to report.

3. Forests

Though no forested areas exist at WNT, there are some dense groves of trees located along steep sided agricultural gullies that are actively eroding. A low diversity and often a low density of highly shade tolerant herbaceous species and brushy species grow in the understory. Surveyor's notes made in 1846-1847 indicate that these areas were treeless or nearly so when prairie dominated the landscape. In 1994, tree removal began in some of these gullies so that a more natural drainage pattern and perennial herbaceous prairie vegetation could be restored.

Decades of fire suppression has allowed poor quality brush and trees to shade prairie remnants on the Refuge.

Removal of trees along Refuge drainages reveal the effects of a century of agriculture on highly erodible land. Steep sided gullies will be reshaped and stablized during 1995.

4. Croplands

The cash rent system continued to be used for cropland at WNT. This system is designed to yield a fair return to the government and still keep rent within the general range for this area. Rental rates were determined using the existing yield data for each tract within the Refuge boundary, the average price per bushel of corn, and the cash rent guidelines established by the Jasper County Extension Office. The resulting rent figures fell at the lower end of the cash rent scale used by Jasper County's SCS office. Rent was paid in two installments, the first 30% due in May, the remainder due in November. Final payment was based on the ASCS Planted Acres Report. Average rent for farming WNT crop units was $65.00 per acre, with a range of $60.00 to $71.00. This does not reflect the $8.00 per acre they were required to pay for the crop scouting service.

Liquid nitrogen continued to be used as an alternative to anhydrous ammonia. The cost for this form of nitrogen is higher than for other forms; however, this is offset by savings in both fuel and equipment costs. Liquid nitrogen is applied during the same pass as the herbicide application, resulting in less soil compaction. Detrimental effects upon soil micro-organisms is also minimized by using liquid nitrogen.

Integrated pest management (IPM) continued to be used at WNT. Due to several complaints from Cooperators in 1993, a new crop scouting firm was contracted by the Prairie City Farmer's Cooperative. Crop scouting was utilized on all Refuge crop units. Refuge Cooperators paid $8.00 per acre directly to the Prairie City Co-op. This cost was offset when calculating the use fee for the unit. The overall success of the new firm hired was excellent. By receiving accurate and timely crop scouting information, Cooperators were able to use IPM much more effectively.

Row crops on the Refuge during 1994 was:

Corn & Soybeans	1095.0 acres
Oats	200.0 acres
Total Crop Acres	1295.0 acres

Weather conditions were favorable for crop production. In general, fields were planted on schedule. Harvests produced higher than average yields for row crops.

5. Grasslands

Prairie Reconstruction - In 1994, seeding was accomplished using a Truax drill, a mulcher blower, and a Val-Mar air flow seeder with a 40 foot boom. Some prairie reconstruction sites were planted under contract with A-

Seeding Company using a Great Plains Drill. Various challenges occurred throughout the planting process. Mulcher blowers work well, but are slow moving and produce inaccurate application rates. Truax drills provide more consistent application rates, but are not ideally adapted to planting coarse material. Air seeders provide consistent metering, can move quickly across the landscape, and can accommodate some differences in particle size. The challenge with an air seeder is finding a carrier to move material through the machine. Peletted limestone at a rate of 50 lbs/acre was not a satisfactory carrier because it tended to become compacted in the machine. Cracked corn at a rate of 50 lbs/acre was the most successful solution to the problem that we found. One result, however, was that corn plants occurred sparsely throughout the planting area.

ROS Petersen plants native seed into corn stubble with a Truax drill.

A harvest of a prairie that supports the federally threatened prairie bush clover (*Lespedeza leptostachya*) was planted on a 26 acre site with characteristics similar to those found on the harvest site. For more details, see Threatened and Endangered Species.

The degree of success in any plantings to date is difficult to objectively assess until systematized monitoring of these areas is possible. We did note, however, apparent differences in abundance and diversity of native species among fields, and differences in abundance and species of the dominant species occurring as a result of the seed bank.

On Planting Site 17 (refer to WNT Planting Sites map), planted in 1993, the density of vigorously growing native grasses is estimated to be 1 plant per ft.^{2} and initial weedy species appeared poorly established. The apparent dominant species early in 1994 was dandelion (*Taraxicum officionale*). Foxtail and other weedy species increased in abundance as the season progressed.

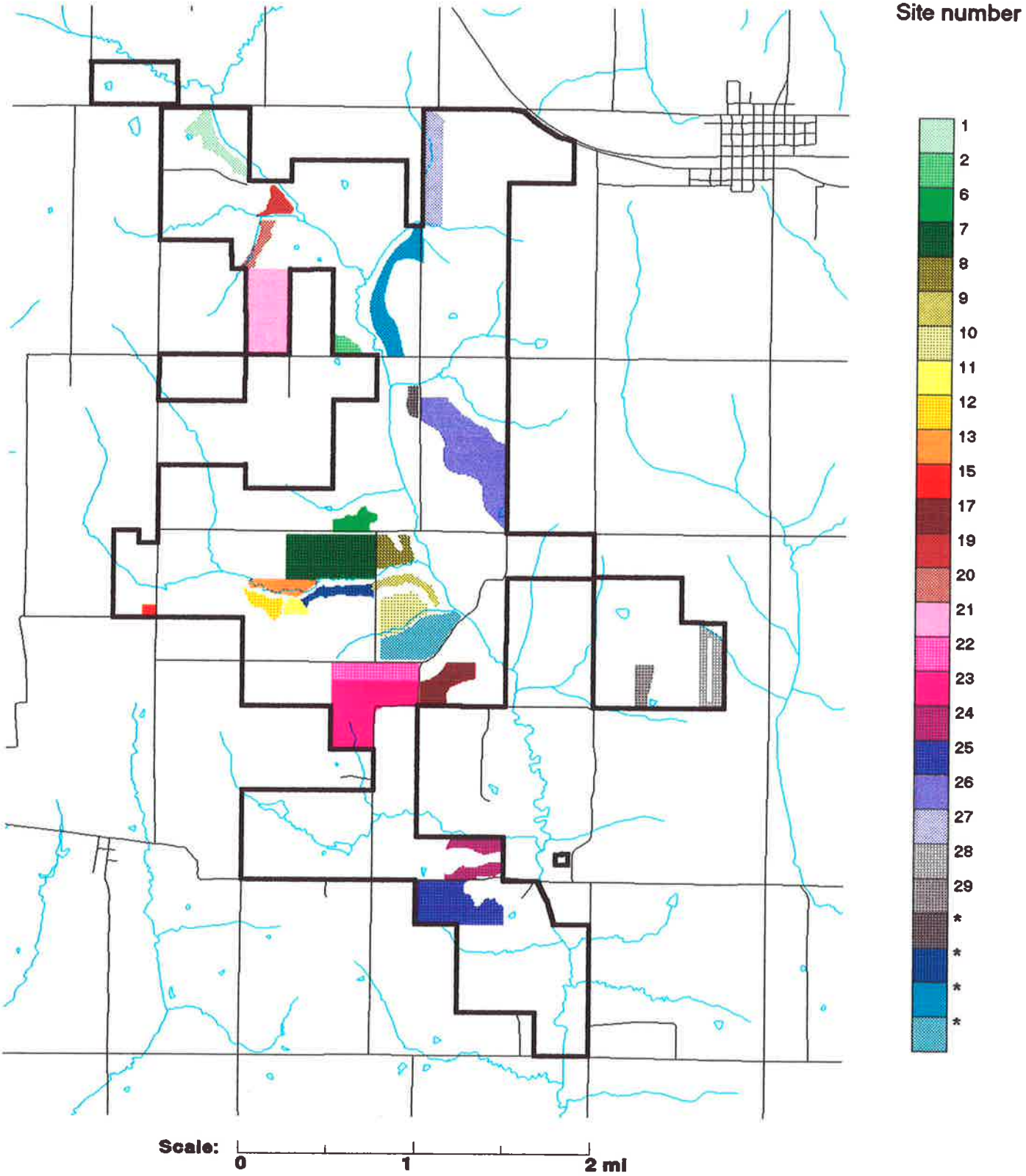
Big bluestem takes hold among the foxtail in a 1992 planting.

On 1993 Planting Site 10, prominent populations of forbs including black-eyed Susan (*Rudbeckia hirta*), drooping coneflower (*Ratibida pinnata*), mountain mint (*Pycnanthemum tenuifolium*), and evening primrose (*Oenothera biennis*) added splashes of color within a year of planting. Though the most visually dominant species on this site is horsetail (*Conyza officionale*), well established populations of Canada wild rye (*Elymus canadensis*) and Virginia rye (*E. virginicus*) also occurred.

The 1994 plantings were even more difficult to assess and first impressions were sometimes bleak. It is not unusual to observe low densities of prairie species immediately after planting, however, and as the season progressed and we took a closer look, we noted several native species of seedlings were indeed present. A better picture of the success of this year's plantings will be possible next year when the planting is in its second season of growth. Densities of one to five seedlings/foot^2 are an acceptable range of seedling densities in year two. Diversity in a

1994 WNT Planting Sites

Detailed Legend on Following Page



* = Seeded to oats only; no site number assigned

1994 WNT Planting Sites-Detailed Legend

Site number	Acres	Planting Method/Date
1	22.0	Broadcast seeded 3/9
2	11.9	Broadcast seeded 3/10
6	13.0	Broadcast seeded 3/10
7	88.0	Drill seeded 5/21
8	17.4	Broadcast seeded 7/27
9	17.0	Seeded with fertilizer wagon 4/9
10	18.5	Broadcast seeded 3/9
11	5.5	Drill seeded 5/31
12	7.2	Drill seeded 6/2
13	14.0	Drill seeded 6/3
15	3.6	Drill seeded 5/15
17	20.1	Broadcast seeded 11/8
19	13.3	Drill seeded on contract 6/30
20	4.7	Drill seeded on contract 6/30
21	72.0	Air seeded 6/28
22	26.0	Air seeded 6/29
23	77.0	Air seeded 7/26
24	24.0	Drill seeded on contract 6/30
25	60.0	Broadcast seeded 6/16
26	70.0	Broadcast seeded 6/27-29
27	25.0	Air seeded 6/19
28	20.0	Drill seeded 5/27
29	15.0	Drill seeded 5/27
*	6.0	Drill seeded to oats 6/17
*	14.6	Drill seeded to oats 6/10
*	29.2	Drill seeded to oats 6/11
*	49.0	Drill seeded to oats 6/09

second year growing season on a general seeding should be in a range of at least 25 - 40 native species.

One pass planting--Maintenance Worker Boot pulls a coulter cart, a Truax broadcast seeder and cultipactor to plant native seed.

Because WNT is using only local ecotype seed, a non-local ecotype switchgrass is being eradicated. A 25 acre switchgrass planting immediately north of Coneflower Prairie was burned in early May, and sprayed with Roundup at a rate of 2 quarts/acre, and with 2-4D ester at a rate of 0.5 quarts/acre when switchgrass was approximately 8 inches tall. Oats were seeded to provide a temporary cover.

Switchgrass populations were reduced significantly in this area due to herbicide treatment except in areas missed by sprayers along the fence line. As a result, a band of switchgrass persisted that is approximately 40 feet wide on that field edge.

Prairie Restoration - Several prairie remnants exist on WNT in various degrees of degradation. Coneflower Prairie has a high density of native species but low native diversity. Exotic diversity and density is relatively low, though three dense patches of white sweet clover (*Melilotus alba*) occurred, one each on the northern, southern, and western boundary. The white sweet clover on the western boundary occurred among red elm trees (*Ulmus rubra*). These patches were apparently released during past fires and because no management of these populations occurred in 1993, they were

expected to be dense and expanding in 1994. To control the sweet clover populations, a late burn was prescribed in this area and on May 5, a burn was conducted. Though fine fuels were sparse in the understory of sweet clover, which was approximately 18 inches tall and vigorously growing, fire carried through the northern and southern populations. The western population was not within the burn unit. We expected a reduction in sweet clover, but were surprised at the extreme reduction, and the lack of release of seedlings by fire. Only a couple of seedlings were observed in these areas this summer.

A second result of fire on this unit was an increased density of the dominant native species, rough dropseed (*Sporobolis asper*), and a spectacular blooming of pale purple coneflowers (*Echinacea pallida*). Reproduction was apparent in pale purple coneflowers and in compass plant as evidenced by an abundance of seedlings. It is possible that blue-eyed grass (*Sisyrinchium campestre*) populations could have been inhibited by this year's fire, as they were in full bloom at the time of burning. A few vigorous clumps of switch grass, apparent escapes from the non-local ecotype switchgrass field adjacent to the north, were treated with glyphosate.

Exotic species are probably inhibited in this prairie remnant due to poor soil and extreme moisture conditions. Prairie species thriving on this site are mostly between 2 - 3 feet tall. Light tends to penetrate to the soil surface relatively easily, especially since the site is on a south facing slope. It is potentially a good site for introduction of some of the more conservative prairie species. On June 18, volunteers and WNT staff sowed approximately two pounds of 53 prairie grass and forb species on Coneflower Prairie. Moisture loving species were sown in swales and seeds of drought tolerant species were sown on the drier upland areas. The soil surface was scarified after sowing using a garden weasel. This tool has spikes on wheels that serve to disturb the soil surface to facilitate good seed-to-soil contact.

Two consecutive annual burns have apparently stimulated growth and vigor of prairie species in a prairie remnant known as "Badger Digs" southeast of Refuge Headquarters. Populations of many prairie species including Indian grass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and rosin weed (*Silphium integrifolium*) appear to have expanded in areas dominated by brome.

6. Other Habitats

WNT was involved in a cooperative project with the Jasper County Conservation Board and the Iowa Department of Transportation (IDOT). A roadside prairie planting was seeded along five miles of Highway 163, which runs along the Refuge's north boundary. The purpose of the project was to produce a local ecotype prairie roadside to protect WNT from contamination by non-local ecotype seed; and to provide a prairie landscape for visitors entering the Refuge. Through this project, approximately 90 acres of local ecotype prairie was planted in Jasper County. The Living Roadway Trust Fund Project, administered by IDOT, provided funding and the Refuge secured seed for the project. Under a cooperative agreement, WNT and Jasper County Conservation Board will share future harvest rights for the roadside prairie planting.

7. Grazing

Nothing to report.

8. Haying

Nothing to report.

9. Fire Management

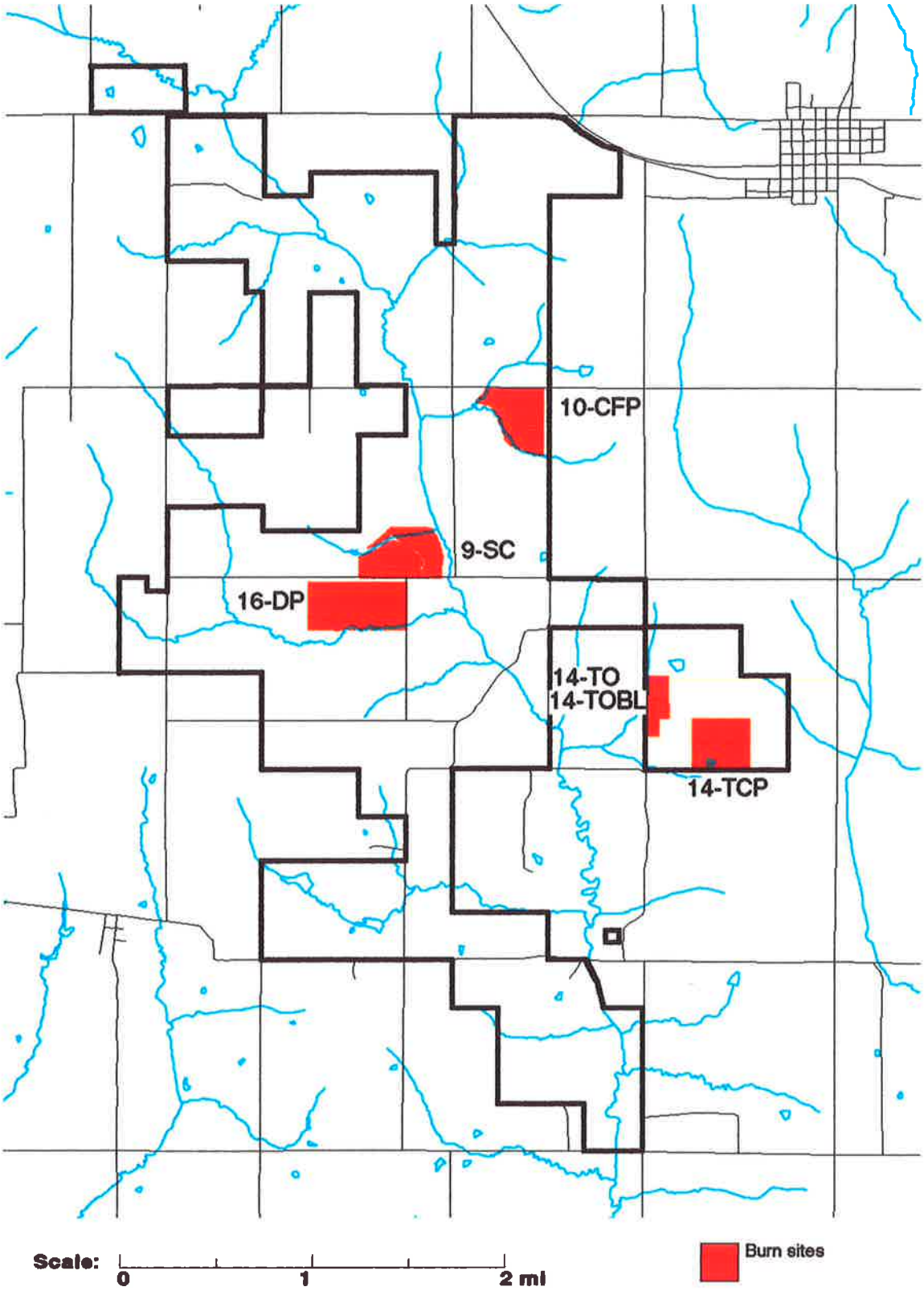
Seven prescribed burns including 328 acres were planned to be conducted between April 4 and May 30 on six burn units. Six of these burns, including 227 acres, were accomplished and occurred on Sites 14-TO, 14-TOBL, 10-CFP, 14-TCP, 9-SC, and 16-DP (refer to Prescribed Burn Areas Map). Because Site 14-TO includes the Refuge Headquarters, a blackline was established around the building as one prescribed fire to prepare for a larger burn conducted later. Site 21-WW was not burned due to insufficient staff availability during favorable burn weather.

Two sites burned (Sites 10-CFP and 14-TCP) included prairie remnants that had previously been burned at least once since the Refuge was established. Stimulation of growth of prairie species during the first burn resulted in a greater fuel load for the 1994 burn.

Site 10-CFP (75 acres) can be divided approximately into thirds, with the southern third being a prairie remnant dominated by rough dropseed, the middle third consisting of planted switchgrass (*Panicum virgatum*), and the northern third dominated by smooth brome (*Bromis inermis*). Cool season species were actively growing, but dried fine fuels were sufficient to effectively carry a fire throughout most of the site. We were pleased to note that as a result, two

1994 WNT Prescribed Burns

227 Total Acres



large populations of the exotic species, white sweet clover, were effectively controlled after fire killed 18 inch tall, second year plants. It was noted that rough dropseed and sedges present on the site grew vigorously and seemed to fill in bare spots on the site. In addition, there was abundant germination of pale purple coneflower and compass plant.

Project Leader Birger briefs Refuge staff before a prescribed burn. The 1,000 gallon tank mounted on the Refuge dump truck services two pumper units.

Smooth brome dominates much of Site 14-TCP (10 acres) and was actively growing when the site was burned, causing fire to move sluggishly in low elevation areas where dense concentrations of green vegetation occurred. Burn objectives on this site included stressing brome and stimulating growth of prairie species. Though the precise impact of this fire on populations of smooth brome has not been measured, populations of several prairie species are growing vigorously and have apparently expanded in brome dominated areas on this site this year.

Sites 14-TO (16 acres) and 9-SC (56 acres) both are prairie reconstruction sites with some brome acreage. Prairie plantings occurred within the last two years on bare soil. Vegetation is sparse, therefore the ability to burn was limited. Site 14-TO consists of prairie reconstruction and includes Refuge Headquarters' buildings on the north end and in the middle of the unit.

A blackline was effectively placed around the buildings to protect them from vandal fires and any potential dangers resulting from the burn of the entire unit. The unit burn was patchy, due to uneven fuel distribution. Fuel primarily consisted of the remainder of an oat cover crop, foxtail and various young plants of prairie species. Despite the uneven burning and slow moving fire, prairie species in the areas that were burned were apparently stimulated by the fire.

Site 9-SC had fuels similar to those occurring on Site 14-TO in prairie reconstruction areas. Such areas occurred on approximately two-thirds of the site and continuous fine fuels in a smooth brome dominated area occupying about one-third of the site. A stream crosses the extreme eastern edge of the unit, isolating approximately six acres of land dominated by reed canary grass (*Phalaris arundinacea*). This six acre area was not burned due to time limitations.

Smooth brome was actively growing and fuels were moist on Site 9-SC at the time of the burn. These factors, in addition to sparse fuels in planted areas, resulted in an uneven burn and large amounts of smoke, most of which traveled to the south over land owned by the Refuge.

The northern sub-unit of Site 16-DP (75 acres) consists of big bluestem planted in 1992 and a variety of other annual and perennial species. Big bluestem had not developed sufficiently to add to fuel characteristics in 1994. In some areas, fine grassy fuels were abundant and in other areas, fuel was more sparse, coarse and stalky. Areas with contiguous fuels burned well and as expected, sparsely vegetated areas resulted in an incomplete burn. The most completely burned area was in the center portion, approx. half of the site. In the summer, big bluestem, evidently stimulated by the fire, was apparent throughout the site, and by late summer, produced flowering stalks.

The process of writing burn prescriptions for sites at WNT was frustrating because NFFL Fuel Models were inadequate to describe fuels present on prairie reconstructions. To best describe some reconstructed areas, a hybrid of NFFL Fuel Models 2 and 9 was used, based on fuel characteristics on burn sites and on output from BEHAVE, a computer software package developed for the Intermountain Research Station in Ogden, Utah. To attempt to better understand the quality of fuels and fire behavior these fuels produce, a preliminary fire program to monitor rate of spread and flame length was begun in 1994. The few data available from these efforts indicated that the fire conditions were within acceptable range as predicted by our hybrid fuel model. Mike Benscoter of the National Interagency Fire Center in Boise, Idaho, assisted a great deal in developing appropriate fuel model hybrids.

Annual burns are crucial in the establishment of prairie plantings. Here, flames consume foxtail, mares tail and other exotic species.

10. Pest Control

As part of Integrated Pest Management (IPM), the Refuge required Cooperators to use crop scouting. The crop scouting firm determined that a significant cutworm problem existed in corn fields on the Refuge and recommended spraying. A request was made and granted to use specific insecticides not on the Regional Approved List.

11. Water Rights

Nothing to report.

12. Wilderness and Special Area

Nothing to report.

13. WPA Easement Monitoring

Nothing to report.

14. Farmers Home Administration Conservation Easements

Nothing to report.

15. Private Lands

The Refuge received four requests for wetland restoration assistance and three requests for prairie restoration/ reconstruction assistance in 1994. Due to physical or economic factors, three of the wetland restoration projects were not feasible.

WNT was able to assist the Polk County Conservation Board and Ducks Unlimited with restoration of a 23.7 acre wetland complex. Tile lines were plugged or removed and dikes were constructed to back up shallow water. A total of six wetland basins were restored.

Of the three requests for prairie restoration assistance, the Refuge was able to complete two projects totalling 21 acres. Both projects involved cooperative agreements where WNT provided local ecotype grass and forb seed. As part of the agreement, the Refuge will secure seed harvest rights for 10-15 years. Completion of the third project is expected in 1995 and will have a similar cooperative agreement.

WNT also assisted Polk County SCS personnel with a minimal effect site inspection on land owned by Pioneer Hi-Bred International, Inc. Pioneer proposed to install an elaborate tile system to achieve equal drainage throughout a field for crop research plots. Seven farmed wetlands totalling 3.5 acres would be affected. State Private Lands Assistant Coordinator Nancy Derey and ROS Olawsky toured the site in June and recommended that a minimal effects exemption be denied. Subsequent meetings resulted in a Wetland Mitigation Agreement which would restore 4.0 acres of prior converted cropland to wetland. As part of the agreement, the restored Wetland Easement Area will be surrounded by a 100 foot wide grassed buffer strip with haying restricted. Wetland restoration should begin early in 1995. The restored wetland is located in a high visibility area and will provide an excellent showcase for wetland restoration.

Several training sessions were attended by ROS Petersen and Olawsky during the year. In February, they attended the Private Lands Coordinators Annual Meeting in Prairie City. In February, Petersen attended a meeting on the Wetland

Reserve Program in Waterloo. In September, Olawsky participated in Interagency Wetland Identification and Delineation Training.

The 1994 Wetland Reserve Program (WRP) attracted a great deal of interest. The 1994 WRP was expanded to 20 states from the eight states involved in the 1992 pilot program. This program was developed to assist landowners who wished to restore and protect wetlands through the purchase of perpetual easements. To be eligible for WRP, land had to meet the following criteria:

- the land had been considered planted at least one year between 1986 and 1990,
- the land had physically been able to be planted in 1992 or 1993,
- the site was at least two acres and no larger than 1,000 acres,
- at least 75% of the land was designated as farmed wetland, prior converted cropland, or a wetland farmed under natural conditions,
- the land had to be restorable to wetland

Acceptance of eligible sites into the WRP was determined by both state and national ranking criteria.

Inspections of WRP intention sites were conducted by Olawsky, with assistance from SCS personnel in the following counties: Adair (2), Boone (2), Greene (6), Madison (7), Marion (7), Dallas (8), Polk (8), Warren (9), Marshall (12), Story (12), Guthrie (13), and Jasper (19). Of the 105 sites examined, rankings and preliminary wetland restoration plans were developed for 67 sites. Two sites in Jasper and Polk Counties were ultimately accepted into the WRP program.

Emergency Wetland Reserve Program (EWRP) site visits, as well as work on Preliminary Wetland Restoration Plans and Final Wetland Restoration Plans, continued in 1994. Since use of a diverse mix of Iowa ecotype grasses and forbs was encouraged for upland seeding, Olawsky assisted SCS personnel in developing planting prescriptions for upland portions of both WRP and EWRP sites. Requirements for eligibility in EWRP were similar to those in 1993:

- the land had to have been flooded during 1993,
- the land had to have been cropped one of the last five years,
- the cost of the easement was less than the cost to restore the land back to crop production,
- the land had to be restorable to wetland,
- at least 75% of the land was designated as farmed wetland, prior converted cropland, potential wetland or a wetland farmed under natural conditions.

In 1994, SCS broadened EWRP selection criteria to include societal cost. Societal costs included what the government would save in terms of disaster payments, etc. if areas were not restored to cropland and dikes were not repaired. Many sites which had previously been disqualified due to lack of cropland damage were re-submitted and accepted. Site inspections were conducted by Olawsky and SCS personnel in Marshall (1), Guthrie (1), Story (3), Dallas (5), and Polk (6) Counties. Preliminary and Final Wetland Restoration Plans were developed for all 16 EWRP sites, although one landowner later withdrew from consideration.

16. Other Easements

Nothing to report.

G. WILDLIFE

1. Wildlife Diversity

Nothing to report.

2. Endangered/Threatened Species

Indiana Bats - Indiana bat work was limited to development of methodology for long term studies of Indiana bats this year. A document entitled "Suggestions For Long-Term Bat Studies At Walnut Creek National Wildlife Refuge: With Emphasis On The Federally Endangered Indiana Bat" was submitted in fulfillment of a 1993 study performed under Dr. John Bowles' direction. In this document, Dr. Bowles recommends methodology and general schedules for mist-netting, telemetry work, roost tree exit counts and micro- and macro-habitat study of Indiana bat summer habitat.

Prairie bush clover - On July 11, 1994, material containing prairie bush clover seed (*Lespedeza leptostachya*), that was harvested from Flaherty Prairie (Clark County, Iowa, T73N, R27W, Section 35, SW4, NE4) under Threatened and Endangered Sub-permit number 93-38-R was delivered to WNT. This material was stored in a dry metal pole building until planting on the Refuge on July 29 and planted using an air seeder at a rate of 38 pounds per acre and an estimated rate of 50 seeds/ft^2 on 26 acres.

The site was located on WNT on Planting Unit 22 (T-78 N, R-21-W, Sec. 16, SW4, SE4). Edaphic and topographic conditions on this site were matched as nearly as possible to conditions documented on sites in Iowa that support prairie bush clover. In a study of several sites including Flaherty Prairie (sometimes known as Madison Prairie), prairie bush clover occurred on silty clay loams that are

moderately to strongly sloping. On three sites in Clarke County, prairie bush clover populations occurred in clay loam with slopes of 14-18% or 18-25%. On a fourth site, this species occurred on clay loam with a slope of 9-14%. Planting Unit 22 on WNT included Tama silty clay loam, Ladoga silt loam, Judson silty clay loam, Ackmore silt loam, Matrisburg silt loam, Gara loam, and Alluvial land, Nodaway complex. Four of these soil types include slopes between 9 and 25%.

3. Waterfowl

Nothing to report.

4. Marsh and Water Birds

Nothing to report.

5. Shorebirds, Gulls, Turns & Allied Species

Nothing to report.

6. Raptors

Nothing to report.

7. Other Migratory Bird

Avifauna - This year's Christmas Bird Count was conducted by volunteers and WNT staff on December 31. Thirty-nine species and 3,038 birds were observed. The day was snowy with temperature ranging from 28-35° F.

A migratory bird count was conducted on May 14, again with volunteers and WNT staff. Sixty-six species and 778 birds were recorded.

A Breeding Bird Count was conducted in June and July. Relative abundance of 70 species of breeding birds were observed on three replicate 10-minute counts made on 106 circular plots at WNT by the ISU Cooperative Research Unit.

Results of the Christmas Bird, Migratory Bird and the Breeding Bird Counts are recorded in Table B.

Table B. Results of Christmas Bird Count (CBC), Migratory Bird Count (MBC) and Breeding Bird Count (BBC).

Species	CBC	MBC	BBC
American Crow	215	6	4
American Goldfinch	122	68	51
American Kestrel	4	2	1
American Robin		8	112
American Tree Sparrow	730		
American Warbler		2	
Bald Eagle	13		
Barn Swallow		6	27
Barred Owl		1	4
Bell's Vireo			1
Belted Kingfisher			2
Black-billed Cuckoo			7
Black-capped Chickadee	49	4	63
Blackpoll Warbler		5	
Blue Jay	19	8	78
Blue-gray Gnatcatcher		2	
Bob-o-link			10
Brown Headed Cowbird		53	68
Brown Thrasher		8	32
Canada Goose	780	2	9
Cedar Waxwing		3	32
Chimney Swift		2	1
Chipping Sparrow			1
Cliff Swallow			1
Common Goldeneye	2		
Common Grackle		11	21
Common Nighthawk		1	
Common Merganser	16		
Common Yellowthroat		40	132
Cooper's Hawk	1		
Dark-eyed Junco	198		
Dickcissel		25	99
Downy Woodpecker	12	2	39
Eastern Bluebird		1	8
Eastern Meadowlark		1	6
Eastern Phoebe		5	3
Eastern Wood-Pewee		1	24
European Starling	200	2	26
Field Sparrow		22	24
Grasshopper Sparrow		16	44
Gray Catbird		30	142
Great Blue Heron			2
Great-crested Flycatcher			15
Great Horned Owl	2	1	
Hairy Woodpecker	3	2	2
Herring Gull	2		
Horned Lark	135	4	23
House Finch	10		
House Sparrow	126		2
House Wren		38	213
Indigo Bunting		4	49
Killdeer		4	50
Lapland Longspur	77		
Least Flycatcher		4	
Loggerhead Shrike	1		
Mallard	37	3	4
Marsh Wren		8	
Meadowlark sp.	8		
Mourning Dove	2	13	78
Nashville Warbler		10	
Northern Bobwhite	1		3
Northern Cardinal	77	23	115
Northern Flicker	4	7	14
Northern Harrier	4		
Northern Mockingbird		1	
Northern Oriole			2
Northern Rough-winged Swallow		2	
Orchard Oriole			2
Ovenbird			2
Red-bellied Woodpecker	4	14	
Red-eyed Vireo			3
Red-headed Woodpecker		7	21
Red-tailed Hawk	18	4	13
Red-winged Blackbird		99	546
Ring-billed Gull	66		
Ring-neck Pheasant	19	11	22
Rock Dove	28		
Rose-breasted Grosbeak		38	67
Rough-legged Hawk	4		
Ruby Throated Hummingbird			1
Rufus-sided Towhee			1
Scarlet Tanager		2	
Sedge Wren		3	49
Snow Goose	21		
Song Sparrow	17	37	99
Spotted Sandpiper			1
Swainson's Thrush		3	
Swamp Sparrow	8		
Tennessee Warbler		36	
Tufted Titmouse		3	3
Turkey Vulture		2	
Upland Sandpiper			3
Vesper Sparrow		4	21
Warbling Vireo		12	8
Western Meadowlark		9	37
White-breasted Nuthatch	3	7	33
Willow Flycatcher			20
Wilson's Warbler		1	
Wood Duck		2	6
Wood Cock			6
Yellow-billed Cuckoo			33
Yellow Warbler		10	18
Yellow-rumped Warbler		1	

8. Game Mammals

Census data on game animals (except deer) was included in general mammal surveys conducted in the summer during baseline data gathering efforts. At time of publication, the Iowa Cooperative Fish and Wildlife Research Unit had not fulfilled its contract.

In the absence of our own deer population data, we rely on information from the Iowa Department of Natural Resources for population trends. According to IDNR data, deer populations increased dramatically in the mid-70s to mid-80s. Deer populations from 1988 to present have stabilized at relatively high densities. Though 1994 data are not yet available, in 1993, 600 deer were harvested, resulting in an average statewide density of 1.4 deer/mile^2.

The deer density for Jasper County based on hunter harvests is 0.8 deer/mile^2. For comparison, the estimated deer density in Allamakee County in the northeast corner of the state is 4.9 deer/mile^2 and in Grundy County in north-central Iowa, the deer density is 0.1 deer/mile^2. Differences in these rates reflect differences in general land use patterns that affect available deer habitat, and differences in hunting regulations. Allamakee County has a relatively large amount of woodland and rough terrain, in contrast to Grundy County, a more level and heavily agricultural part of the state.

Jasper County rates are somewhat higher than in some other parts of the state because woodland and CRP areas exist throughout the hilly landscape. In addition, the hunting season is limited to bucks only in the first season, though it is for any sex in the second season. This hunting system favors survival of females and an overall increase in reproduction.

9. Marine Mammals

Nothing to report.

10. Fisheries Resources

Nothing to report.

11. Other Resident Wildlife

Nothing to report.

12. Wildlife Propagation

Nothing to report.

13. Surplus Animal Disposal

Nothing to report.

14. Scientific Collections

Duplicate collections of butterflies, moths, ants and terrestrial invertebrates which were taken on the Refuge during monitoring efforts occurring during the 1994 growing season are housed at Iowa State University.

Duplicate sets of plants collections made this summer are housed at the University of Northern Iowa.

One of each of these duplicate sets will be available for use at WNT when the facility opens.

15. Animal Control

Nothing to report.

16. Marking and Banding

Nothing to report.

17. Disease Prevention/Control

Nothing to report.

H. Public Use

1. General

Prairie Learning Center Ground Breaking - More than 650 people gathered at the Refuge to celebrate the start of construction of the Prairie Learning Center, Refuge offices and maintenance facilities during a ground breaking ceremony September 1. Friends of Walnut Creek President, Penny Thomsen and Refuge Project Leader, Richard Birger were joined by several prestigious speakers including FWS Director Mollie Beattie, Congressman Neal Smith, and FWS Regional Director Sam Marler. Fourteen schools and more than 250 school children also took part in the event.

The festivities were briefly interrupted by 1847 U.S. Land Surveyor Samuel Jacobs (a.k.a. Rob Nurre - "The Surly Surveyor") who interpreted the surveying and settling of Iowa 150 years ago. The ground breaking event concluded with a ceremonial planting of prairie plants and a panoramic photograph of the site and all in attendance. A near perfect day and the hard work of Refuge Staff and many volunteers contributed to an outstanding program.

Planning and publicity efforts were confounded by weekly (and occasionally daily) changes in the availability of Secretary Babbitt and/or Director Beattie. Final word on who would represent the Department of Interior and/or the U.S. Fish and Wildlife Service came less than 48 hours before the event. In the end, Director Beattie assumed the role of DOI and FWS representative after the President sent Secretary Babbitt to Panama to represent the United States at the Inauguration of a new Panamanian President.

PL Birger and ORP Aplin coordinated the event. Physical arrangements, site preparation and parking coordination were handled by ROS Bernie Petersen and the operations staff. Refuge Ranger Sentyrz coordinated more than 31 volunteers who assisted with the event. Biologist Drobney secured the prairie plants symbolically planted by the honored guests and participated in a briefing for Director Beattie before the event.

The Friends of Walnut Creek NWR supported the ceremony by hosting a luncheon and briefing for Director Beattie and other dignitaries at the Des Moines International Airport. Friends Group President, Penny Thomsen welcomed the speakers and guests during the dedication ceremony and presented Director Beattie with a Walnut Creek tee shirt to commemorate the event.

Refuge staff worked to maximize the visibility of the event and were pleased with the media campaign. Press packets, including sketches of the new Prairie Learning Center and photographs of Director Beattie and Secretary Babbitt, were distributed to major media outlets. Packets distributed to television stations included a three minute pre-produced video story with narration and "B-roll" footage of the Refuge. A news release went to all state news outlets via the IowaLink Media Service in Iowa Falls. We worked with the Director's staff to arrange a follow-up interview for the environmental correspondent of the Des Moines Register.

Coverage before and during the event was excellent and follow stories were written by regional and national writers who were unable to attend.

Over 600 people turned out for the Ground Breaking Ceremony including children representing 14 school districts.

Early morning showers gave way to bright sunshine and cool temperatures.

Dignitaries present included FWS Director Mollie Beattie.

Rob Nurre interprets the historic landscape as Surveyor Samuel Jacobs.

Attendees stood side-by-side to outline the Prairie Learning Center for a panoramic photo commemorating the event.

Refuge Biologist Pauline Drobney oversees a symbolic planting of native species.

Public Use Facilities Planning Completed - Exhibit and interpretive planning remained a high priority in 1994. ORP Aplin dedicated over half of his time to completing designs for visitor center exhibits as well as trail signs and other interpretive features. Primary attention was given to the development of a $3.7 million exhibit package; the development of four audio-visual programs (budgeted at $1.2 million); the placement, design and interpretive development of an auto tour route and five hiking trails.

The planning process has emphasized meeting the spirit of the American's with Disability Act (ADA). Floor plans, exhibit mechanisms and texts, audio-visual program presentation methods, trail design and staffing requirements have been examined by a variety of "experts", including Ray Bloomer of Bradford-Woods and the Regional Offices Accessibility Committee, under the direction of ARD-OHR Barbara Milne. The effort guarantees that the Prairie Learning Center will be one of the most accessible public facilities in the Service.

Successful completion of interpretive sign and exhibit design would have been impossible without the full time assistance of Walnut Creek Planning Team Member Lisa Friedlander. Lisa's strong background in graphic and exhibit design helped move the planning process toward completion while maintaining the highest quality standards.

Refuge Ranger Shelly Sentyrz and a Dowling High School student share a craw-dad during an E.E. lesson.

Completion of Environmental Education Curriculum - WNT's Curriculum Writing Team of 11 teachers reconvened at the Refuge for a week in June to complete work on Refuge environmental education materials. The Team put the finishing touches on 75 educational units, including pre- and post-visit activities for K-12 students. Environmental Educator, Dr. Jim Pease, is editing materials for printing scheduled for spring of 1995.

Friends of Walnut Creek - Supporters of Walnut Creek announced the formation of the **Friends of Walnut Creek National Wildlife Refuge-Prairie Learning Center** in the Volume One, Number One issue of the group's newsletter *Prairie Wind*. Discussions among Refuge staff and a small group of individuals and representatives from civic and conservation organizations began in November 1993. Winter meetings resulted in the election of a board of directors as well as the completion and submission of Articles of Incorporation, bylaws, and an Internal Revenue Service application for 501(c)(3) non-profit status. Bylaws filed state that the group was established to:

- Increase public awareness and appreciation of the Refuge,
- Encourage public participation in prairie restoration and preservation,
- Promote public use and enjoyment of the Refuge.

In addition to completing the organizational process, the group:

- Recruited over 70 members,
- Attained a not-for-profit bulk mail permit,
- Ended the year with a treasury balance of $1000.00,
- Published three issues of their newsletter *Prairie Wind,*
- Developed membership drive strategy, and
- Hosted a luncheon for FWS Director Mollie Beattie and other dignitaries attending the Ground Breaking Ceremony.

Over 40 members attended the first annual meeting of the group held November 15 at Prairie City's Cardinal Inn.

2. Outdoor Classroom - Students

Regional Office staff contacted the Refuge in September 1993 with notification that the Department of Health and Human Services would provide funding for after school "Latchkey" environmental education programming for students affected by the flood of 1993. Program guidelines emphasized the need to provide activities that were "healthy alternatives to drugs and alcohol" for elementary

age children whose daily lives had been disrupted by the flood.

Contacts with the West Des Moines Parks and Recreation Department and the Phenix Elementary School faculty lead to a series of meetings beginning on December 7, 1993. Discussions lead to the creation of a two phase program with West Des Moines School's (WDM) Community Education Program. Through a cooperative agreement, $31,150 was transferred from the Service to the WDM Community School District, Department of Community Education.

Participants in the WDM Flood Program get their hands dirty during a soils lesson with ORP Aplin.

3. Outdoor Classroom - Teachers

Recruiting and training teachers remained a high priority of the Refuge public use staff. The primary goal of this effort is to create an informed and trained cadre of teachers who will be capable of using Refuge resources when the doors open in 1996. To that end, Refuge Public Use Staff participated in the following programs:

January 14-15 - Refuge Staff presented WNT EE opportunities at Iowa Environmental Education Winter Solstice Conference at Camp EWALU.

March 7 - Refuge staff presented WNT curriculum and a review of Refuge education facilities to Des Moines School District teachers and administrators.

June 20-24 - WNT EE Curriculum Team of 11 teachers met in June to complete 50 educational activities for K-12 teachers. Environmental Educator, Dr. Jim Pease edited, formatted and prepared materials for graphic layout and printing.

August 30 - Aplin and Sentyrz presented WNT EE opportunities to in-service teachers at Hoyt Middle School on Des Moines' East Side. Teacher and administrator interest generated on-going discussions of educational partnership opportunities.

October 20 - Refuge staff, EE Team teachers, and Dr. Pease presented prototype EE curriculum to Iowa Academy of Science teachers for their review.

4. Interpretive Foot Trails

A year's worth of coordination with representatives of the architect/exhibit design firms resulted in the design, staking and interpretive text development for four trails by Fish and Wildlife employees. In November 1993, Mike Marxen of the WNT Design Team, Charlie Fasano of the Denver Service Engineering Center, and WNT ORP Aplin staked the overlook, savanna, tallgrass trail and prairie study area trails. Interpretive development of these facilities was consolidated by Exhibit Designers Hilferty and Associates with content from Aplin and Friedlander.

In September, an interim foot trail was located in the southern portion of the Refuge. The one-third mile trail was located by ORP Aplin and cleared by Bio-Tech Pattison with loppers and weed whacker. The trail was completed in two days and serves causal visitors and school groups. An interpretive brochure is being developed.

5. Interpretive Tour Routes

A permanent auto tour route has been designed through the master planning process. Construction of the route is on hold due to ownership issues.

Refuge staff explored options for an interim tour route but abandoned the concept due to construction activities and road closures scheduled to begin this winter.

6. Interpretive Exhibits/Demonstrations

Refuge staff participated in a variety of on and off Refuge exhibits and demonstrations in 1994. Highlights included:

- Eagle Days, Pella Community Center and Red Rock Reservoir. (Feb. 26-27)
- Earth Fair 94, Merle Hay Mall, Des Moines (April 23-24)
- Sow Your Wild Oats III, WNT Headquarters (May 21)

7. Other Interpretive Programs

Refuge Biologist Drobney offered weekly installments of Prairie Stewardship Training workshops through the month of September. The evening programs introduced Refuge volunteers and interested members of the public to management issues and techniques related to prairie and savanna restoration and reconstruction.

Two dozen volunteers and members of the public participated in the third annual Feed and Seed program held at the A.C. Morris Prairie in Jasper County on September 17. Participants met at the Mariposa County Park to enjoy music provided by the BBC Bluegrass Band during a potluck supper. The group then proceeded to the nearby A.C. Morris Prairie to hand collect prairie forb and grass seed.

Four "public" prairie seed harvest programs were organized on the Refuge. These programs were in addition to harvests organized and carried out by Refuge harvest teams throughout the WNT local ecotype zone.

In December, 18 Bolivian land managers visiting Iowa toured the Refuge to learn about landscape scale restoration.

The first group of tour buses visited the Refuge in 1994. A group of 40 senior citizens from Grinnell toured Prairie City and the Refuge in October as part of a library literary study group. In August, Refuge staff boarded three buses carrying non-game biologists attending a neo-tropical conference in Des Moines for a tour of the Refuge.

ORP Aplin offered on-site Refuge tours and presented a program on interpretive technique and interpretive planning to natural resource students at ISU and UNI.

Aplin, Sentyrz and other Refuge staff were busy throughout the year presenting over 40 programs on Walnut Creek to diverse audiences including the Des Moines Chapter of the Izaak Walton League; the agricultural subcommittee of the Des Moines Chamber of Commerce; the Indianola, Des Moines, and Grinnell Chapters of the National Audubon Society; and many others.

8. Hunting

With minor exception, the 1994 WNT hunt was concurrent with State of Iowa seasons and bag limits for upland game bird, squirrel and white tail deer. WNT confined all hunting to the period between October 1 and January 10. No special permits were required. Refuge staff produced a hunting leaflet that included the following Refuge specific regulations:

- Hunting of species not listed in the brochure is prohibited on the Refuge.
- Refuge access is from one-half hour before sunrise to one half hour after sunset.
- Trapping of fur bearing animals is prohibited on the Refuge.
- The construction or use of permanent stands or ladders is not permitted.
- All portable stands must be removed at the end of the day's hunt.
- Hunting of species is permitted only within the dates indicated by this brochure.

Hunting was authorized for the following species and seasons:

Upland Game Birds	
· Cock Pheasant	October 29 - January 10
· Quail	October 29 - January 10
· Gray Partridge	October 8 - January 10
White Tail Deer	
· Bow	October 1 - December 2
	December 20 - January 10
· Muzzleloader	October 15 - October 23
	December 19 - January 10
· Shotgun	December 3 - December 7
	December 10 - December 18
Other	
· Squirrel	October 1 - January 10
· Cottontail	October 1 - January 10

1994 Refuge upland game bird hunting was good. Populations of Ringnecked Pheasant recovered dramatically from the low 1993 numbers caused by extremely wet spring and summer conditions throughout central Iowa. Quail and gray partridge populations, however, did not experience similar recoveries.

Initial bird hunting pressure was high. Published reports describing Walnut Creek as an undiscovered "8,000 acre pheasant hunting paradise" in a national sporting magazine generated a great deal of interest for hunters throughout the Midwest. Checks made opening weekend estimated 100 vehicles and 220 hunters on October 29 and 24 vehicles and 60 hunters on October 30. Spot checks of hunters revealed fair to good success opening weekend with an average of 1.5 birds/per hunter/per visit. Hunters reported few quail and no partridge taken. The greatest barrier to hunter success opening weekend may have been the crowded conditions that led in some cases to less efficient hunting strategies.

Hunting pressure declined substantially for the remainder of the season.

Refuge staff predicted strong hunting pressure and solid harvest figures for the 1994 shotgun season. These predictions were based on the historic success of local hunters who harvested 23 deer on the Refuge during the 1992 season. While 1993 harvest success declined, Refuge staff predicted that the increased knowledge of public hunting opportunities at WNT would increase hunting pressure and success. In anticipation of a large harvest, WNT staff recruited members of the ISU Fish, Wildlife, and Biology Club to operate a deer check station. Students were in place during the first two weekends of the seasons to weigh, age and check deer for external parasites. In the end, the station became the Refuge equivalent of the Maytag Repair headquarters, with only one year and a half old buck being checked during the entire season.

Actual deer/shotgun season results revealed smaller hunter numbers and an extremely poor harvest. Hunting pressure for the opening weekend of the first season (antlered deer only) was estimated at 45 hunters/day. Mid-week hunting was estimated at 5 hunters/day. Second season (either sex) hunting pressure was estimated at 20 hunters/day during the weekends and <5 hunters/day during the week. Refuge staff and "local experts" attributed poor hunting results to a number of possible causes, including:

- Disturbance of Refuge deer herd by large numbers of pheasant hunters. This theory was supported by a generally larger deer harvest on private lands adjacent to the Refuge.
- Low hunter efficiency. Staff noted many hunters new to the Refuge lacked knowledge of the site and a coordinated hunting strategy. These groups appeared to disrupt deer movements without corresponding hunting success.
- Interest in deer bow and muzzeloading, squirrel and cottontail hunting was thin.

9. Fishing

Nothing to report.

10. Trapping

Nothing to report.

11. Wildlife Observation

Refuge Ranger Shelly Sentyrz participated as FWS representative in the development of the Iowa Watchable Wildlife Guide. IDNR wildlife biologist coordinated development with Jim and Steve Dinsmore. The guide is due for publication in late 95 or early 1996.

A small group of volunteers and Refuge staff participated in Christmas and Migratory Bird Counts.

12. Other Wildlife Oriented Recreation

Nothing to report.

13. Camping

Nothing to report.

14. Picnicking

Nothing to report.

15. Off-Road Vehicles

Nothing to report.

16. Other Non-Wildlife Oriented Recreation

Nothing to report.

17. Law Enforcement

Both Project Leader Birger and ROS Petersen attended Law Enforcement Refresher at Camp Dodge, Iowa in late March. WNT staff has established good relations with IDNR enforcement, Jasper County Sheriff's officers and Prairie City officers.

No major problems were encountered during hunting season; three "Notice of Violations" were written.

18. Cooperating Association

In November, ORP Aplin and Friends of Walnut Creek President, Penny Thomsen travelled to La Crosse, Wisconsin to meet with other Regional public use staff to discuss the formation and operation of cooperating associations. Region 3 Chief of Information, Recreation and Education, Tom Worthington coordinated the two day briefing.

Armed with this information, Aplin and Thomsen returned to WNT to continue research into options for managing and staffing a book/gift store in the Prairie Learning Center.

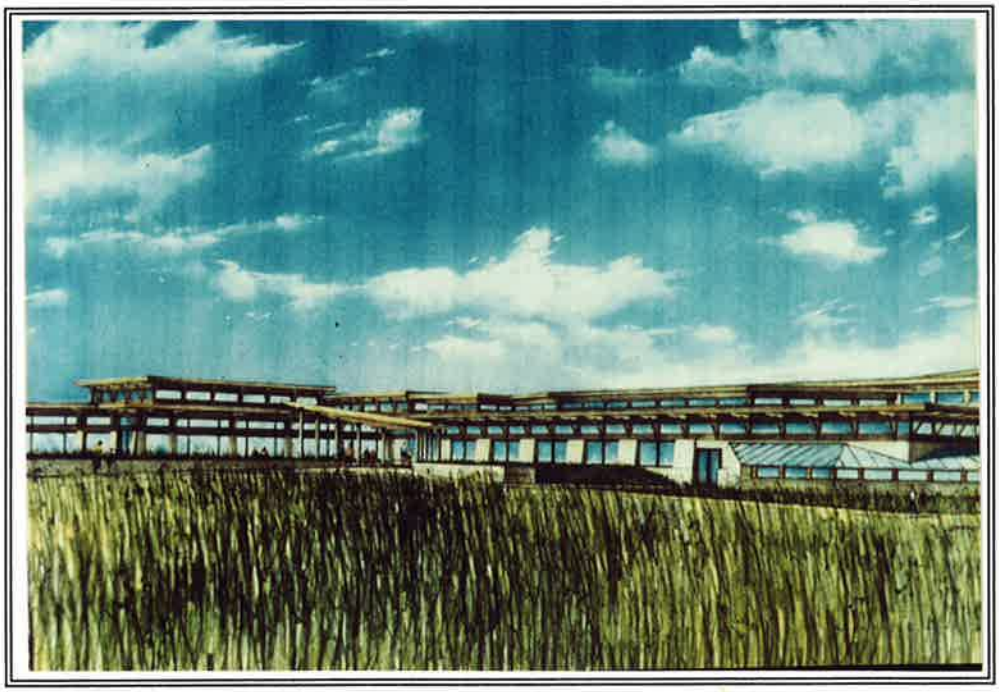
19. Concessions

Nothing to report.

I. EQUIPMENT AND FACILITIES

1. New Construction

Taylor Ball General Contractors began work on the long anticipated Prairie Learning Center in December. The Center will enclose 42,000 square feet and is expected to open August 10, 1996. Tree removal and gully stabilization began on the Refuge in November.



Taylor Ball of Iowa, a Des Moines firm, received the $12.5 million contract in October for the construction of the Prairie Learning Center and other facilities.

2. Rehabilitation

Nothing to report.

3. Major Maintenance

Staff repaired the brick walkway at the rear of the Interim Office during 1994. The bricks had been set into a sand base which had not settled, creating an uneven surface. In addition, because the original work did not allow for rain water runoff, the brick work had nearly washed away.

Contractors repaired the roof on the Interim Office. The roof had previously leaked in several places whenever it rained, making for several soggy staff members. Prior attempts to seal the roof had provided only temporary relief.

Several abandoned wells on the Refuge were located and sealed.

4. Equipment Utilization and Replacement

During 1994, the Refuge acquired the following pieces of equipment:

Shop Equipment - Stihl Blower with vacuum attachment, tool chests and miscellaneous wrenches and assorted hand tools

Restoration Equipment - Ford 9030 Bidirectional Tractor, Alamo Front Flail Mower, 6" Cyclone Seed Separator, Knight Mfg. 102 cu. ft. Mixer with belt conveyor, Crippen 29B Clipper Seed Separator w/screens and feed box, Marliss 15' Coulter Caddy, Bush Hog 42" Mower for ATV, and Weigh-Tronix 10,000 lb. 72 x 36 Scale with Ramp

Law Enforcement/Fire Equipment - Homak Home Security Gun Safe, FWS-11 Fire Weather Plus Station and Roller & Spool assemblies were added to present fire equipment

Vehicle Equipment/Motorized Equipment - Stellar Air Compressor System and Omaha Standard Badger Body with Ventura Service Crane was installed on the 1993 Chevrolet 4 wheel drive, 1 ton dually.

5. Communications Systems

WNT purchased two Challenger Plus remote radios which were installed in Refuge vehicles. The additional radios will support general refuge communications in addition to the fire and law enforcement programs.

6. Computer Systems

Refuge Management Information Systems (RMIS) - A Windows-based prototype of the national RMIS software was installed in late December. The new format allows point-and-click maneuvering, several layout styles and one-page monthly report printouts. Refuge staff found the prototype software to be easy to install and utilize.

Geographic Information Systems (GIS) - GIS was fully functional at WNT in 1994. The GIS software Eppl-7 was used daily in the planning and analysis of Refuge activities.

Refuge staff standardized the size of the 72 original computer map files created during the master planning process and created 20 new Eppl-7 files.

Additional computer hardware was acquired to increase the applications of WNT GIS. A Canon BJC 820 color bubblejet printer was received in February to enhance Eppl-7 map output. The printer is capable of 11"x 17" reproductions in millions of colors.

An Altek Datatab Liteline digitizing tablet was purchased in March. The tablet allowed Refuge staff to convert data from hard copy maps to computer files. Entities on paper maps can now be traced on the tablet and recorded by the Eppl-7 software program. Information recorded through the digitizing process is saved as a map file that can be viewed, analyzed, manipulated and printed.

Metadata (descriptive files) were created for 93 WNT computer map files in October. These files describe the topic, the size, the location, the scale, the date of creation and the format of each Eppl-7 file. Metadata were saved in R-base 3.1 and are available through both the Regional Office and Refuge staff.

GIS output increased greatly with the acquisition of the digitizing tablet and color printer. Main tasks included:

- Areas where planting, prescribed burns, mowing and spot spraying took place were digitized from paper maps into computer map files. The computer maps illustrating areas of management were created for calendar years 1992-94.
- The newly-constructed computer map files of management techniques were combined for analysis. For example, Refuge staff merged the 1992-94 files to locate all areas on WNT burned in the last three years. Acreages were calculated and a new map was printed.

- In another query of management techniques, a particular location on the Refuge was chosen and all management practices that took place on the site from 1992-94 were printed out in chronological order.
- An R-base 4.5 database was created by Refuge staff in order to link textual and graphical information on specific WNT sites. Management areas in the computer map files were assigned unique numbers. These numbers were then entered in R-base 4.5 and linked to textual information about the sites. Although completion of the project is not expected until March 1995, database operations such as key word searches, cross-referenced sorting, linking and statistical calculations have already augmented GIS queries and analyses.
- Map files of Refuge ownership and county roads were combined and altered to create a map of proposed Refuge road closings. The map was color-coded by priority of closings and labeled with road usage rates. Copies of the map were distributed at a meeting with the Jasper County Board of Supervisors in October.
- Computer map files of soils, hydrology and native vegetation provided a matrix for digitized overlays of three hypothetical bison/elk enclosures. The enclosure sites were compared in total acres, amount and types of native vegetation and perimeter measurements for fencing.
- Hard copy color maps illustrating pre-settlement vegetation were printed for use in presentations to historical societies around central Iowa. The maps were used in conjunction with a poster of the GIS map of current vegetation.
- Analyses of location and acreage counts for prairie production plots were developed using computer map files. Once locations and sizes were decided, the areas were digitized into the 1994 management GIS file. Notes on the plots were entered in R-base 4.5.
- Wooded areas near the construction site were inventoried and analyzed to identify potential locations for tree removal. Several hypothetical situations were illustrated with both color-coded printed maps and numerical data.
- WNT GIS files of soils, land use, elevations and hydrology were copied for use by a graduate student of Iowa State University's landscape architecture program. The student used the Eppl-7 files to create a running computer model of soil erosion on the Refuge. The model software, also used by the Iowa DNR and SCS offices, illustrated changes in soil erosion as prairie vegetation replaced current WNT land cover over time. The results of the modeling were clearly represented in images and numerical data--as restoration work continues, soil erosion on the Refuge will dramatically decrease.

7. Energy Conservation

Nothing to report.

8. Other

Nothing to report.

J. OTHER ITEMS

1. Cooperative Programs

During the winter of 1994, Iowa Heritage Foundation, Living History Farms (LHF) and Polk County Conservation Board (PCCB) staff members met to discuss the role prairies played in Iowa's cultural history and how prairies could be used to enhance the visitor experience at LHF. The potential for expanding and improving prairie sites on Living History Farms was also discussed. LHF's needs and limitations were explored and several possible prairie restoration sites were identified. A follow-up meeting was held June 24 with Iowa Private Lands Coordinator James Munson, WNT Public Use Specialist Aplin, LHF Director Tom Morain, LHF grounds maintenance staff, representatives from Iowa Natural Heritage Foundation and the Polk County Conservation Board. A partnership arrangement and series of recommendations were developed.

The project will be occur in two phases. The first phase, completed in 1994, included the reconstruction of three sites totalling 15 acres. The second phase will expand prairie by approximately ten acres using prairie seed harvested from phase one sites. Harvest of phase one sites could begin within three to five years of initial planting.

A reconstruction plan was drafted for all sites by PCCB Land Manager Lown and WNT staff. Plans will include site preparation requirements, seed mix recommendations, planting instructions and maintenance requirements. These plans were reviewed and approved by all partners. The Service formalized these plans through a Partners for Wildlife Agreement.

In late August and September, LHF staff applied herbicide to planting areas at rates defined by the management plan. In October, WNT Operations Staff transported seeding equipment to LHF to plant seed on prepared soil. The management plan calls for the mowing of all phase one plantings through the 1996 growing season to maximize light penetration to prairie seedlings and reduce weed competition.

2. Other Economic Uses

Nothing to report.

3. Items of Interest

Nothing to report.

4. Credits

ORP Aplin - Sections A; H 1-16, 18, 19; L and selected photographs.

Project Leader Birger - Introduction, Sections C; D 1, 3, 4, 6; E 1-3, 5, 7, 8; and J. Birger also did the final editing.

Biologist Drobney - Sections D 2, 5; F 1-3, 5-9, 11, 12, 16; and G.

Administrative Technician Dykstra - Sections B; E 6; H 17; and I 4. Dykstra was also responsible for final typing, layout, proofreading and production.

ROS Olawsky - Sections F 4, 10, 13, 14, 15; I 1-3, 5, 7 and 8.

Ranger Sentyrz - E 4; I 6 and prepared all maps.

Those named above are responsible for all that is found of value, errors of fact or interpretation are Birger's alone.

K. FEEDBACK

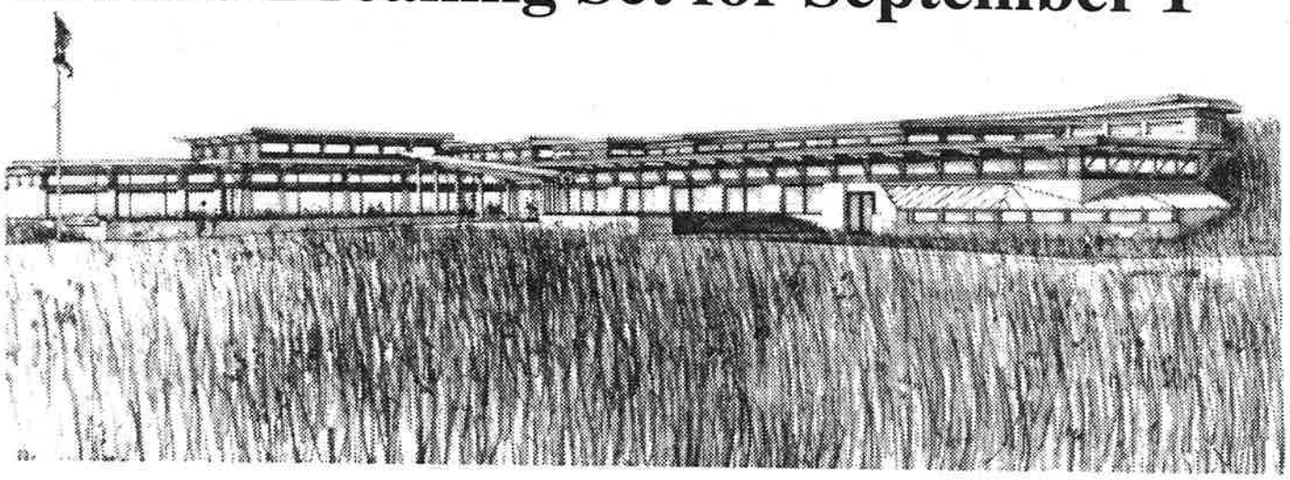
Our experience has proven that selecting, contracting and supervising the "Creative Disciplines" (i.e. exhibit designers and audio-visual producers) within the mechanisms of government is cumbersome, frustrating and at times, an impossible process. The FAR and other bureaucratic requirements make managing these contracts to provide quality, with-in budget, and on time products as easy as repairing a watch with a ball-peen hammer.

PRAIRIE WIND

Newsletter of the
Friends of Walnut Creek National Wildlife Refuge
Prairie Learning Center

Volume 1, Number 2a **Fall 1994**

Ground Breaking Set for September 1



Architect's sketch of the 42,000 square foot Visitor Center/ Administrative Building.

Ground breaking ceremonies will be held Thursday, September 1, 1994 at 1:30 p.m. to celebrate the start of facilities construction at the Walnut Creek National Wildlife Refuge-Prairie Learning Center. U.S. Fish and Wildlife Service Director Mollie Beattie will be the keynote speaker. The public is invited to attend.

The ceremony will take place at the site of the new Visitor Center complex. The 'Earth-Connected' structure will be home to environmental education, research, and administrative functions. An exhibit gallery equipped with hands-on interpretive exhibits and audiovisual programs will also be housed within the building.

Other facilities to be completed in time for an early 1996 grand opening include maintenance buildings and overnight quarters. Walking trails, bison and elk fences, environmental education structures, and an entrance road will also be constructed.

Director Beattie is expected to address the importance of re-establishing over 7000 acres of tallgrass prairie and oak savanna. In addition to its commitment to preserving the biodiversity of the Midwest, Walnut Creek represents significant contributions to environmental education and the new field of restoration ecology.

The program will include music and other special events.

Directions: From Des Moines, take Highway 163 east through Prairie City to the intersection of Highways 117 and S6G. Turn right on S6G, travel 2 miles south to South 96th Avenue West (gravel road). Go 2 miles west and turn left on West 119th Street South. Travel south and look for signs directing you to the ground breaking site. Call the Refuge at (515) 994-2415 for more information.

U.S. Fish andWildlife Director Mollie Beattie

Feed and Seed III

The third annual A.C. Morris Prairie Seed Harvest will take place on Saturday, September 17. The event is co-sponsored by the Friends of WNT and the Jasper County Conservation Board. Festivities begin at 4:00 p.m. with a pot-luck supper, music, and games at the Mariposa Recreation Area located north of Newton.

At 5:30 p.m. participants will take the short walk or car ride to the 25 acre A.C. Morris Prairie to harvest ripe seeds of prairie flowers and grasses.

Prairie "experts" will be on hand to train kids and adults in the fine art of harvesting prairie. Seed collected will be used for prairie reconstruction at Walnut Creek.

Mariposa Recreation Area is located approximately 7 miles north of Newton, just off Highway T12. Collectors should bring a dish to pass and their own table settings to the potluck. Bring garden gloves, hand shears and paper grocery bags to the prairie. For more information call Shelly Sentyrz or Dave Aplin at (515) 994-2415.

Seed Harvesters Needed

Great growing conditions have contributed to a bumper crop of prairie seed crucial to reconstruction work at Walnut Creek. Volunteers are being recruited to gather prairie seeds throughout central Iowa! Refuge Biologist Pauline Drobney has targeted 65 species for hand collection.

Some species mature quickly and drop their seed before mechanical harvest begins. Others occur in small numbers or in areas difficult to mechanically harvested. Hand collection of these species are important to Walnut Creeks effort to preserve Iowa's biodiversity.

This year teams of seed harvesters will be based in the following areas:

- **Walnut Creek NRW,**
- **Grinnell/Kellogg,**
- **Polk County,**
- **So. Jasper/Marion Counties**

Harvest teams will be trained by Walnut Creek staff and no experience or special skills are required to participate. Collection dates and times will be scheduled by a team leader. Most work will occur evenings and weekends, and 'part time' collectors are welcome. Other individual or group seed harvests can be arranged throughout the 38 county Walnut Creek "local ecotype" area.

Before harvesting any seed, contact the Refuge to assure that permission to harvest has been given and that plant stock originated within the Walnut Creek collection area. To find out more contact Shelly Sentyrz at (515) 994-2415.

Stewardship Workshops

Learn restoration techniques from the Walnut Creek staff on Wednesday evenings in September. Join the Prairie and Savanna Stewards from 6:30 p.m. until dusk on September 7, 14, 21, and 28. Sessions will focus on various aspects prairie and savanna management.

Activities will include; brush removal, seed harvest, and seed processing. Please call Shelly Sentyrz or Pauline Drobney at (515) 994-2415 for more information or to R.S.V.P.

Bring garden gloves and clippers to the first session September 7 at Refuge Headquarters.

Planting Update

Over 600 Refuge acres were planted with native prairie species by Refuge staff and volunteers this year. All seed originated from plants within the 38 county collection area. Nearly 800 total acres have been planted. Using "local ecotype" seeds collected from nearby prairie and savanna remnants guarantees that the unique qualities of individual species will be preserved.

Friends of Walnut Creek National
Wildlife Refuge-Prairie Learning Center
P.O. Box 399
Prairie City, IA 50228

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PRAIRIE WIND

Newsletter of the

Friends of Walnut Creek National Wildlife Refuge-Prairie Learning Center

Volume 1, Number 1 **Spring 1994**

Refuge Friends Group a Reality!

Supporters of America's largest prairie and savanna reconstruction project are happy to announce the formation of the **Friends of Walnut Creek National Wildlife Refuge-Prairie Learning Center**. The founders of the Friends group include individuals and representatives from civic and conservation organizations.

The group was established to:

- Increase public awareness and appreciation of the Refuge,
- Encourage public participation in prairie restoration and preservation,
- Promote public use and enjoyment of the Refuge.

Formation of the Friends group began in November 1993. Meetings held over the winter resulted in the election of a board of directors as well as the completion and submission of Articles of Incorporation, bylaws, and an Internal Revenue Service application for 501(c)(3) non-profit status. A membership drivedrive and fund-raising activities are being planned for 1994. Contact Dave Aplin at (515) 994-2415 for information and upcoming Friends Group events.

Tom Cady

Tom Cady, 1993 Volunteer of the Year

For over three years, Tom Cady's versatility and dedication have made him a valued member of the Walnut Creek family. During that time, Tom has travelled from his home in Washington, Iowa to help collect, process, plant, and propagate thousands of prairie seeds. In 1993, Tom logged 520 volunteer hours. During 1993 Tom assumed even greater responsibilities as he shared his knowledge and enthusiasm for prairie with visitors and volunteers at stewardship events and public programs.

In addition to an excellent backround in plant biology, Tom has a keen interest in Iowa's history. These days you are likely to find Tom researching the original distribution of Iowa's prairie plants and animals in libraries, courthouses, or at the Iowa Historical Society. This information helps Refuge staff refine the goals of prairie restoration.

The Friends of Walnut Creek are proud to join the Refuge staff in acknowledging Tom Cady as the 1993 Refuge Volunteer of the Year.

Sow your Oats Day III

Celebrate spring's arrival at the third annual Sow Your Wild Oats Festival on Saturday, May 21. The event takes place at Refuge Headquarters from 10:00 AM to 3:00 PM. Walnut Creek Friends group members, the Refuge staff, and prairie enthusiasts from across Iowa will welcome spring with prairie seeding demonstrations, plant and wildlife seminars, and kids activities. There will be music, food and fun. Plan to spend the day! For more information, or to volunteer to help out, call Dave Aplin or Shelly Sentyrz at (515) 994-2415.

All ages can scatter seeds for tomorrow's prairie at Sow Your Wild Oats III.

Facilities Planning Nears Completion

U.S. Fish and Wildlife Service staff are working with architects, landscape architects and exhibit specialists to design visitor and staff facilities for the Walnut Creek Refuge. Planning for these facilities; including a visitor center/administrative building, maintenance and storage facilities, overnight quarters, roads and interpretive trails; is nearing completion. A ground breaking ceremony will be held in August with construction to begin this fall.

Upcoming Events

for more information call (515) 994-2415

May 14, Saturday
Spring Bird Count
Meet at Refuge Headquarters
7:30 AM to 1:00 PM
Join experienced birders from area Audubon groups and Refuge staff to locate and identify bird species on the Refuge. Bring binoculars, bird guides, and appropriate outdoor clothing.

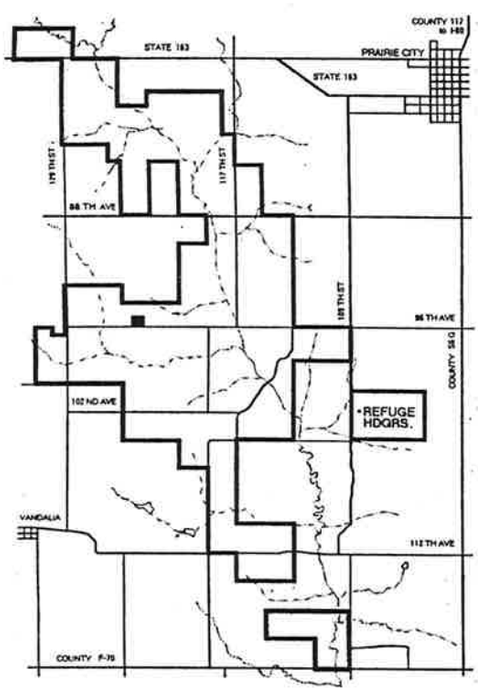
May 21, Saturday
Sow Your Wild Oats III
Refuge Headquarters
10:00 AM to 3:00 PM
Our annual celebration of spring. Includes prairie seeding, music, seminars and kids activities.

June 18, Saturday
Weed and Seed Volunteer Day
Meet at Refuge Headquarters
9:00 AM to 3:00 PM
Help the landscape reconstruction effort by removing non-native weeds from prairie plantings and hand seeding prairie species.

June 20-24
Walnut Creek Environmental Education Workshop
Teachers and youth leaders are invited to participate in a free week long introduction to prairie and the new Walnut Creek Education Curriculum. Contact Dave Aplin or Shelly Sentyrz at (515) 994-2415 for more information.

August
Prairie Learning Center Ground Breaking Ceremony
On the horizon: date and location to be arranged.

Learn who's who on the prairie at the Walnut Creek environmental education workshop June 20 - 24.



Walnut Creek National Wildlife Refuge-Prairie Learning

The Refuge was established by the U. S. Congress in September 1990. The U.S. Fish and Wildlife Service, Department of the Interior, is authorized to purchase 8,654 acres for inclusion in the Refuge. Today, the Service manages approximately 5,000 acres.

Walnut Creek is unique among America's 491 National Wildlife Refuges as the first and most ambitious attempt at landscape scale ecosystem recovery.

The Refuge is located near Prairie City in Jasper County, 20 miles east of Des Moines on Highway 163.

Friends of Walnut Creek National
Wildlife Refuge-Prairie Learning Center
P.O. Box 399
Prairie City, IA 50228

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Special Regulations

Below are specific regulations which apply to hunting on the Refuge. These **do not** include all applicable regulations. Direct additional questions to a Refuge Officer.

* Hunting of species not listed on this brochure is prohibited on the Refuge. Hunting of listed species is permitted only within the dates of this brochure.

* Refuge access is from one half-hour before sunrise to one half-hour hour after sunset.

* Trapping of fur-bearing animals is prohibited on the Refuge.

* The construction of permanent stands or ladders is not permitted. Portable stands must be removed from the Refuge at the end of the day's hunt.

NOTE: Beginning with the 1995 hunting season, all hunters on the Refuge will be required to wear a solid blaze orange coat/vest and hat.

Hunter Ethics

* Respect the rights and property of Refuge tenant farmers, neighbors, and other Refuge users.

* Do not block accesses or drive in fields.

* Do not litter.

Refuge Hunting Seasons 1994-1995

Upland Game Birds

Cock Pheasant	Oct. 29 - Jan. 10
Quail	Oct. 29 - Jan. 10
Gray Partridge	Oct. 8 - Jan. 10

White Tail Deer

Bow	Oct. 1 - Dec. 2
	Dec. 19 - Jan. 10
Muzzleloader	Oct. 15 - Oct. 23
	Dec. 19 - Jan. 10
Shotgun	Dec. 3 - Dec. 7
	Dec. 10 - Dec. 18

Other

Squirrel	Oct. 1 - Jan. 10
Cottontail Rabbit	Oct. 1 - Jan. 10

See State of Iowa hunting regulations for shooting hours, approved weapons, bag limits, license prices, and other information. Call the Iowa DNR at (515) 281-5145.

NOTE: All hunting on the Refuge ends January 10, 1995.

Report all accidents and injuries to Refuge Headquarters: P.O. Box 399, West 109th Street South, Prairie City, IA 50228. (515) 994-2415.

Walnut Creek
National Wildlife Refuge

1994

Map and Hunting Regulations

United States Department of the Interior
Fish and Wildlife Service

Walnut Creek National Wildlife Refuge
U.S. Fish and Wildlife Service
P.O. Box 399
Prairie City, IA 50228

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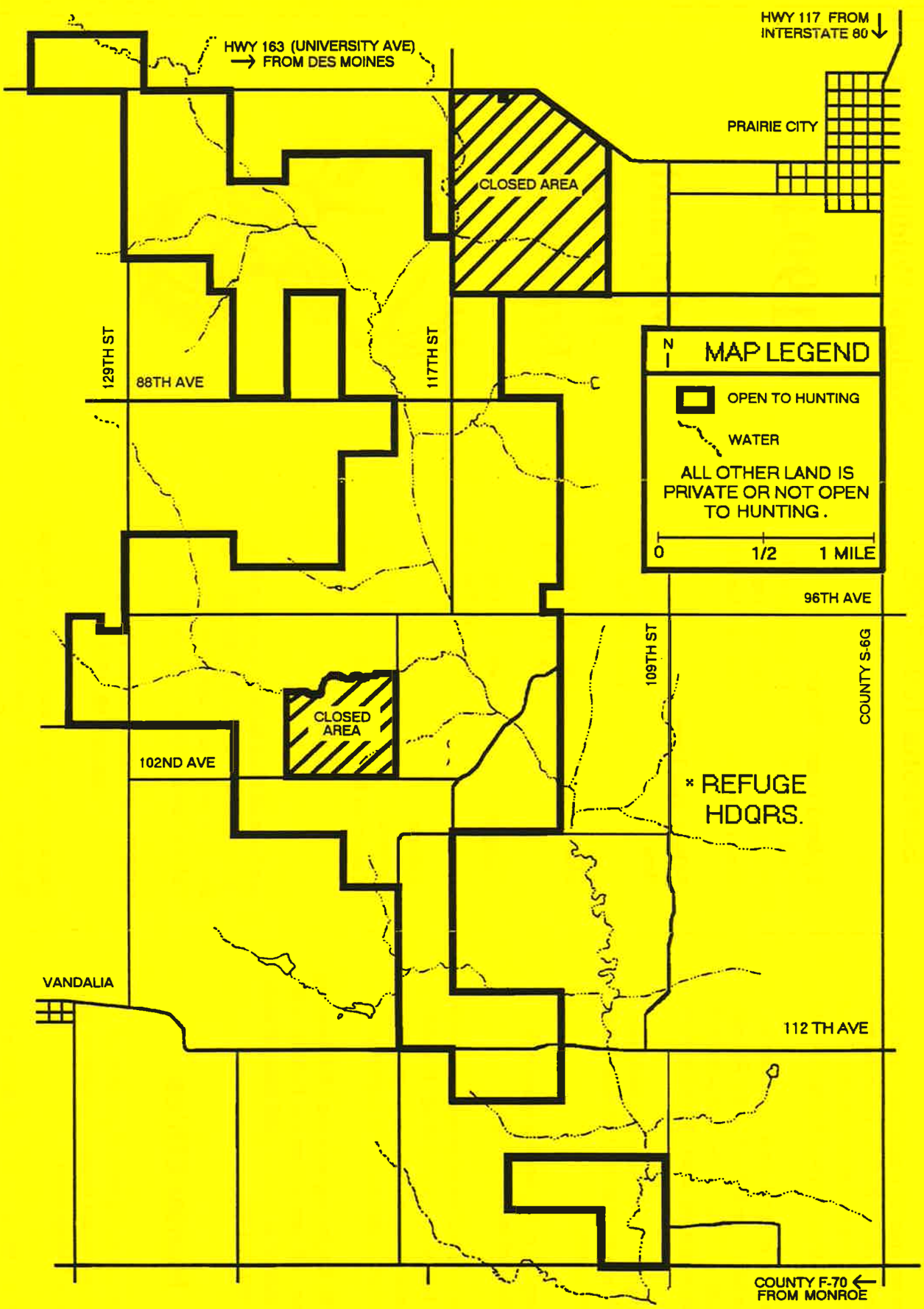
HWY 163 (UNIVERSITY AVE)
FROM DES MOINES
HWY 117 FROM
INTERSTATE 80
PRAIRIE CITY
CLOSED AREA
129TH ST
88TH AVE
117TH ST
N
MAP LEGEND
OPEN TO HUNTING
WATER
ALL OTHER LAND IS
PRIVATE OR NOT OPEN
TO HUNTING.
0
1/2
1 MILE
96TH AVE
109TH ST
COUNTY S-6G
CLOSED
AREA
102ND AVE
* REFUGE
HDQRS.
VANDALIA
112 TH AVE
COUNTY F-70
FROM MONROE

Iowa's native landscape...

was much different than what we see today. These rolling hills were once carpeted with prairie grasses, native flowers, and a scattering of big oaks.

Early explorers described these savanna landscapes as park-like in appearance. The trees grew apart from one another allowing their branches to spread wide.

While most woody plants died in the natural fires that maintained the prairie, mature bur oaks were protected by thick, corky bark. Plants adapted to the periodic fires and the filtered shade under the oaks, and produced a distinct plant and animal community.

Without periodic natural fire underbrush grew up among the oaks and hickories, choking out many of the grasses and flowers. New trees grew straight up before branching out. This prevented sunlight from reaching the ground, changing the plant community which, in turn, changed the animal community.

Oak savanna provided needed habitat for certain wildlife; these included passenger pigeons, fox squirrels, bluebirds, wild turkeys, and elk. Some of these, like the passenger pigeons, are gone forever, but others will return after restoration. Today, oak savanna is even more rare in the midwest than tallgrass prairie.

Walnut Creek
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Prairie Learning Center
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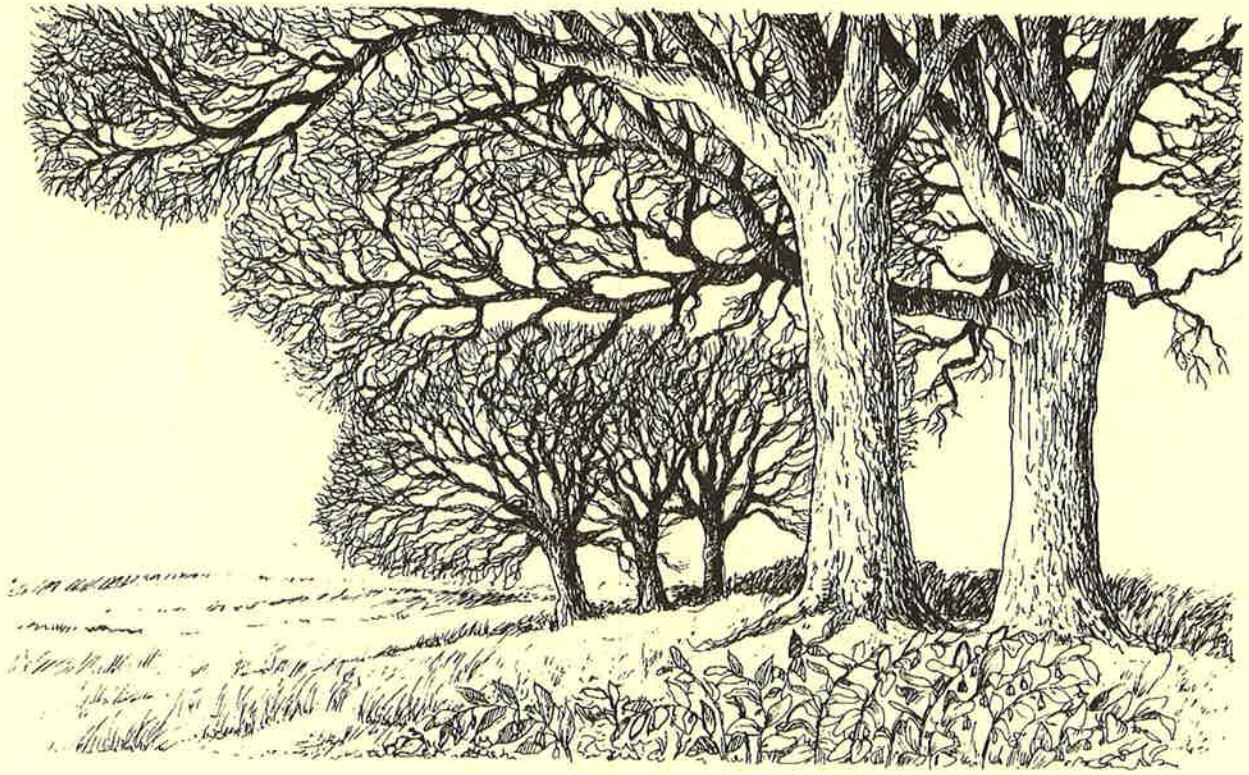
Prairie City, Iowa 50228
515/994-2415

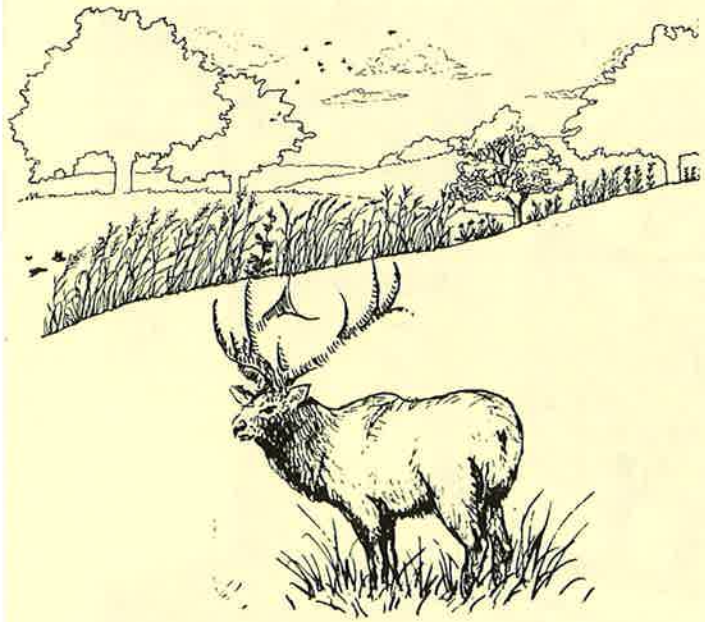
SAVANNA RESTORATION

Walnut Creek
National Wildlife Refuge
Prairie Learning Center



Savanna Restoration

Walnut Creek National Wildlife Refuge contains several savanna remnants and restoration has begun. Non-savanna trees which have grown up between the oaks and hickories are being removed and the underbrush is being cleared. Sunlight is returning to these dark areas. Fire will be carefully reintroduced to stimulate the growth of native plants and keep woody underbrush out. In the short run it may look like a mess, but over time the savanna will look like the original landscape the first settlers saw.



"Isn't this just a 'timber'?"

Silver maple, box elder, locust, hackberry and other shade tolerant trees grow fast and tall. They grow straight up seeking sun in the crowns or top levels. Often referred to as a woodlot or a "timber", these are second growth trees, not the original vegetation which was cleared for settlement.

The animals and birds that depend on second growth or brushy timber are "**generalists** ". They can use a wide variety of habitat and adapt to small woodlots and agricultural areas easily.

Whitetail deer, grey squirrels, cottontail rabbits, raccoons, and some woodland birds are more abundant today because they can make use of the landscape that developed following settlement.

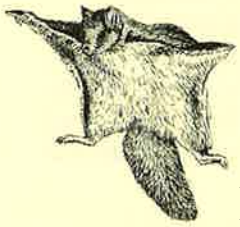
"How is a savanna different from a timber?"

Big mature bur oaks and hickories, which are spaced wide apart, allow a lot of sunlight to get to the ground. Grasses and flowers underneath provide habitat for different animals and birds. These are "**specialists** ", like elk, fox squirrels, shrikes, bats, and red-headed woodpeckers.

Some scientists believe the tendency of fox squirrels and woodpeckers to bury acorns is one way savannas were maintained.

"But aren't you destroying a lot of good wildlife habitat?"

While it's true that some low quality brushy habitat is being removed, a much rarer habitat is being reconstructed. Small timbers and fence rows are not uncommon in the area. The wildlife that needs this habitat type are abundant while many of the savanna-dependent species are uncommon.



One of the goals of the Walnut Creek National Wildlife Refuge is to increase biological diversity by restoring the variety of habitat that was once found on this site. The restoration process may look like demolition, but is really just a change from one plant and animal community to another.

The temporary mess will be replaced over time by a community of plants and animals not seen here since the 1840s.