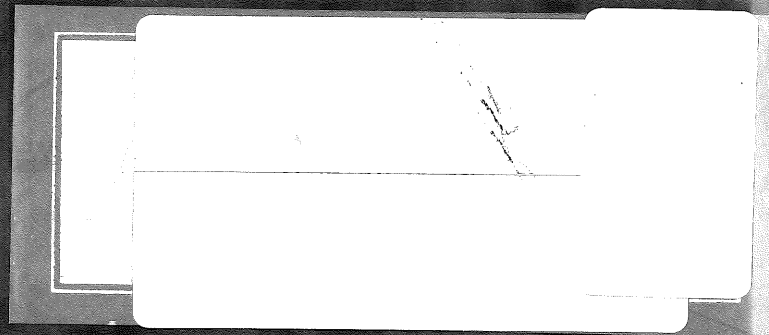


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MANAGEMENT PLAN
FOR
PRAIRIE BUSH CLOVER
SCIENTIFIC AND NATURAL AREAS

Portions of
SW 1/4 NE 1/4, and SE 1/4 NW 1/4, Section 17
Township 103 North, Range 35 West
Lakefield Quadrangle - 9XA
Belmont Township
Jackson County
Minnesota

Prepared by
The Scientific and Natural Area Program
Section of Fish and Wildlife
Minnesota Department of Natural Resources
March 1985

Approved by:

Director
Fish and Wildlife

Director
Parks and Recreation

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M36
1985

This SCIENTIFIC and NATURAL AREA was established to protect and perpetuate Minnesota's rare and unique natural resources for nature observation, education, and research.

Principal activities which are UNLAWFUL in the use of this area are listed below. Further information is available at Department of Natural Resources Offices.

- Collecting plants, animals, rocks, or fossils.
- Camping, picnicking, and swimming.
- Horses, dogs, and other pets.
- Snowmobiles and other motorized vehicles.
- Hunting, trapping, fishing, and boating.
- Entry into restricted areas and sanctuaries.

WALK GENTLY

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

T103N R35W

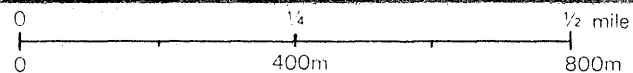
- ■ ■ SNA Boundary
- - - Kilen Woods State Park
- ▬▬▬ Paved Road
- ▬▬▬ Gravel Road
- - - Trail to SNA
- ★ Information Center

Contour Interval 10 feet

Aerial Photography 9/16/71
USDA 27063-179-137

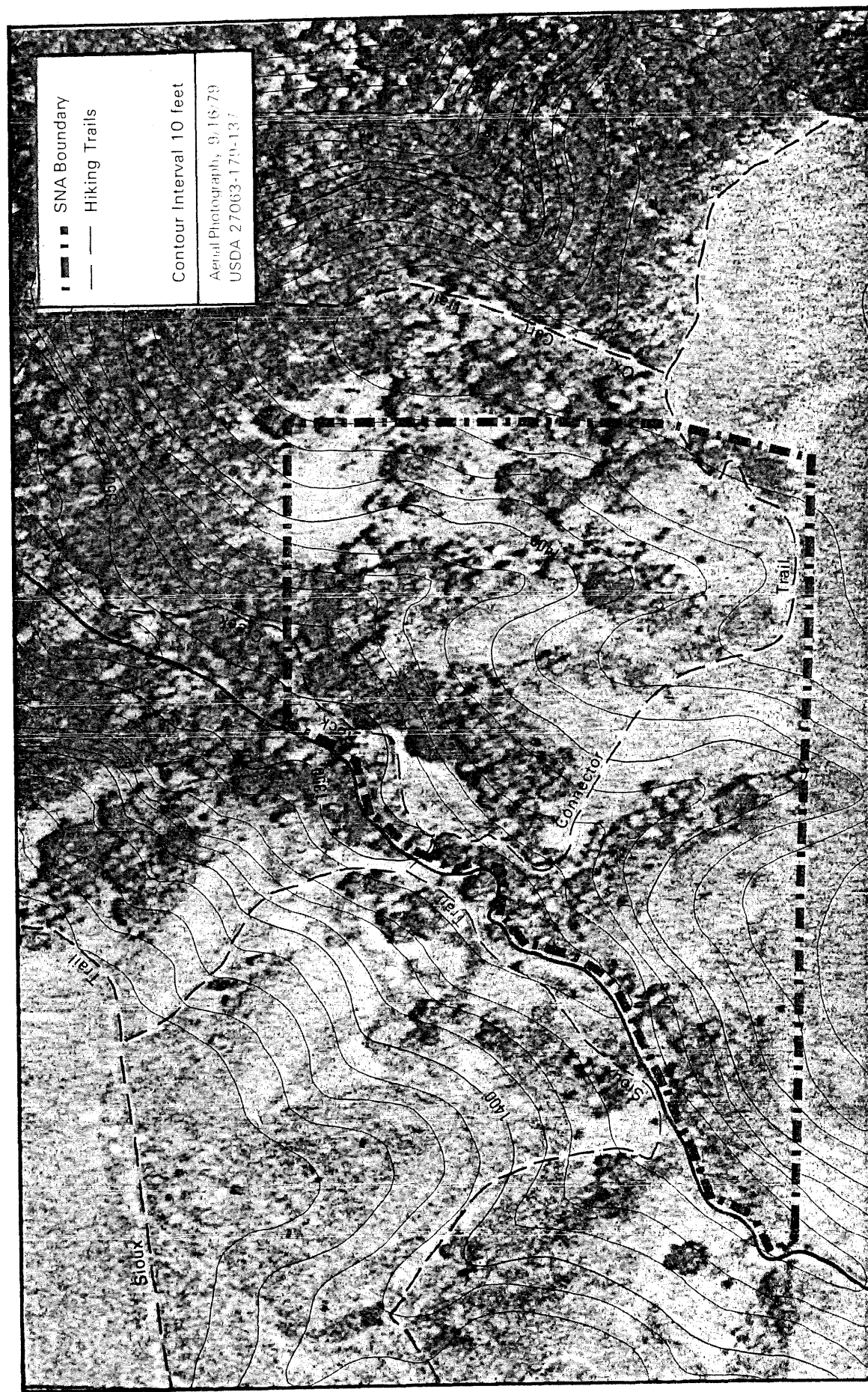
Campground

17-16



PRAIRIE BUSH CLOVER SNA

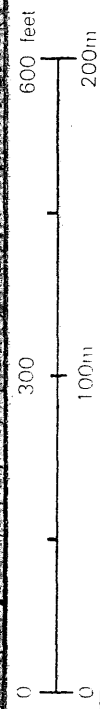
VICINITY



■ ■ ■ SNA Boundary
— — — Hiking Trails

Contour Interval 10 feet

Aerial Photography 9/18/79
USDA 27063-179-137



PRAIRIE BUSH CLOVER SNA

SITE

PREFACE

Scientific and Natural Areas are established to protect and perpetuate natural features which possess exceptional scientific or educational value. Nominated areas must substantially satisfy a set of rigorously drawn criteria to qualify for designation. Scientific and Natural Areas serve many purposes. They are places for the quiet appreciation and study of nature and serve as outdoor classrooms for teachers. They are areas against which the effectiveness of resources management techniques employed elsewhere can be evaluated. Scientists use scientific and Natural Areas as control areas when investigating natural processes or environmental contamination. And lastly, Scientific and Natural Areas protect the best and/or last remaining occurrences of a rare species or plant community.

However, land protection alone does not assure long term preservation of natural areas and their endangered species. Many natural areas will decline in quality if they are not properly managed. Management of vegetation, control of foreign species, and management of visitors are important concerns.

Comprehensive planning is the key to effective and successful management. In 1975 the Minnesota legislature passed the Outdoor Recreation Act (86A), establishing the Outdoor Recreation System. This act directed managing agencies to prepare master plans for units of the system. This document is part of a planning effort to satisfy the mandates of that act. The goal of this plan is to coordinate a strategy for stewardship that addresses biological management, obligations of ownership, and visitor management.

This plan was prepared by the Department of Natural Resources, Scientific and Natural Areas Program with the assistance of the Commissioner's Advisory Committee on Scientific and Natural Areas. It was based on a resource inventory prepared by the Scientific and Natural Areas Program and the Natural Heritage Program. Funding was provided by the Legislative Commission on Minnesota Resources.

SUMMARY OF MANAGEMENT PROGRAMS

General Management Considerations

Prairie Bush Clover SNA is a designated subunit of Kilen Woods State Park. This plan has been coordinated and is consistent with the goals and objectives identified in the 1980 Management Plan for Kilen Woods State Park. The park management plan will be amended to include management recommendations outlined in this subunit plan. The SNA program is responsible for securing development funds and overseeing implementation. Surveillance and enforcement will continue to be the responsibility of park staff.

Structures and Facilities

The existing park trail going through the SNA will be maintained for their present uses (hiking, snowmobiling, skiing). No additional trails will be developed. An informational/interpretive sign for the SNA will be posted at the entrance to the unit. Signing will conform to park design standards. The SNA unit will be included on future park maps and brochures. The corners of the SNA will be permanently marked in the field.

Vegetation Management

Prescribed burning will be a major management activity. Burn units are consistent with park management units. Objectives and constraints for fire management are presented.

Conservation of the prairie bush clover (Lespedeza leptostachya) population is a primary management objective for the SNA. There are two colonies within the SNA, one in each burn unit. An intensive monitoring program has been initiated for the L. leptostachya colony in Management Unit A, and a similar program will be implemented for the colony in Unit B. Monitoring plots will be posted. The SNA and surrounding area will be regularly searched for new colonies. All instances of herbicide drift from adjacent lands affecting the SNA will be recorded. To prevent hybridization with L. leptostachya all plants of Lespedeza capitata will be removed from the SNA. A seed bank for L. leptostachya will be established and maintained and a plant community monitoring system will be established in the L. leptostachya plots to identify species/community interactions.

Problem plant management includes suppressing and reversing woody encroachment, identifying threats and management needs for non-native grasses, and continuing control activities for Canada thistle.

Erosion

Gully development in the SNA could lead to accelerated erosion and direct loss of habitat within the L. leptostachya colony in Unit B. Erosion control will require a permanent structure to stop upstream-advance of headcuts, stabilization of nickpoints, and overstory removal in ravines to promote effective vegetation cover.

Additional Inventory Needs

The floral inventory will be completed. The fauna will be systematically surveyed with priority given to those species potentially playing a role in the life history of L. leptostachya.

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OVERVIEW

Description

Prairie Bush Clover Scientific and Natural Area (SNA) is located entirely within Kilen Woods State Park, Jackson Co., Minnesota. The park lies along the deep, narrow valley of the Des Moines River. Approximately 60% of the park is forested. Prairie is found on the ridgetops and steep side slopes. The hill prairies in the SNA are dominated by side oats gramma and little bluestem, and harbor the world's largest populations of Lespedeza leptostachya (prairie bush clover, a state endangered species). There is also a small calcareous fen on one of the prairie hillsides in the SNA. The prairie vegetation was subjected to years of grazing and herbicide use. Approximately 25 acres of prairie and woodland surrounding the two known colonies of L. leptostachya was designated a State Scientific and Natural Area in 1984.

Preservation Value

Prairie Bush Clover SNA lies within the Coteau des Prairies landscape region. The greater part of this region once consisted of rolling prairie. Now it is predominantly under cultivation. The SNA preserves a small sample of that original landscape.

Several significant natural features have been identified on the SNA by the DNR's Natural Heritage Program. The Natural Heritage Program maintains the most comprehensive data base on Minnesota's rare plant and animal species and biotic communities. These biological entities (species and communities) are known as elements and ranked according to their endangerment in the state. The element with the highest preservation value in the SNA is prairie bush clover (L. leptostachya). This species is ranked as endangered under the Minnesota Endangered Species Law (MS 97.488) and has been proposed for federal listing. The most significant natural community types in the SNA are the glacial till hill prairie type and a small calcareous fen. Past land use has altered these community types, however, both are fair in quality and improving under present management.

Prairie bush-clover (Lespedeza leptostachya)

Prairie Bush Clover SNA contains the world's largest of 23 known occurrences for L. leptostachya. It consists of approximately 4,000 plants in two separate colonies. The original range of this species was restricted to portions of southern Minnesota, northern Iowa, southern Wisconsin, and northern Illinois. Even within this limited range, it may never have been common. Agricultural conversion has reduced the prairie habitat of L. leptostachya to a very few remnants and brought the species to the verge of extinction. Preservation of several populations is necessary to preserve the genetic range of this species. It is thought to be primarily self fertilizing, and there does not appear to be much variability within a population. Most variability occurs between populations.

ORA Classification

The Prairie Bush Clover SNA fully meets the designation criteria for a Public Use Scientific and Natural Area as outlined in the Outdoor Recreation Act of 1975 (86A.05 Subd. 5). The preserve includes: (1) habitat supporting the following rare, endangered or restricted plant; Lespedeza leptostachya, and (2) an area large enough to permit effective research and educational functions and to preserve the inherent natural values of the site.

Management Philosophy

The most important management goal for Prairie Bush Clover SNA is the protection and perpetuation of the prairie bush clover. The large size and apparent vigor of this population makes it a prime candidate for intensive research. The major management problems are controlling woody encroachment and exotic plants, and identifying management requirements for the prairie bush clover. The critical endangerment of this species and the dynamic nature of the plant community necessitates direct application of habitat management (ie. fire, erosion control, etc.).

Section 1

GENERAL MANAGEMENT CONSIDERATIONS

A. Kilen Woods State Park

Prairie Bush Clover SNA is a secondary unit within Kilen Woods State Park as authorized by the Outdoor Recreation Act (86A.08). This plan will serve as the coordination document to guide SNA and Park's management of the site. It is consistent with goals and objectives identified in the Kilen Woods Management Plan, approved in 1980.

The Commissioner's Order designating Prairie Bush Clover SNA will make the following exceptions to SNA rules and regulations (NR 300-303):

1. Dogs and other pet animals will be permitted on the designated park trail only.
2. Snowmobiles and park maintenance vehicles will be permitted on the designated park trail only.
3. Berry and mushroom picking will be allowed according to State Park rules and regulations.

These exceptions to NR 300-303 are necessary to allow for existing and planned park recreational programs. There are no reasonable alternatives for rerouting these existing trail uses.

Park staff also identified the possible need to harvest native plant seed from within the SNA for park restoration projects. Proposals for seed collecting by parks for this purpose will be considered for those areas without Lespedeza leptostachya. Such projects will be submitted to the SNA program for review by SNA staff and the Commissioners Advisory Committee on Scientific and Natural Areas.

Action 1.1 Amend the Management Plan for Kilen Woods State Park to include management recommendations in this subunit plan for Prairie Bush Clover SNA/

B. Management Resources

The type of management that takes place in an SNA depends on both need and the availability of management resources. The SNA program is responsible for developing a management plan, securing development funds, and overseeing implementation. Based on this plan the SNA program will prepare annual work plans for this unit to schedule and coordinate management actions. The management plan for Kilen Woods State Park currently identifies several management actions which are also called for in the SNA management plan. These actions will continue to be implemented by Parks under the guidance of the SNA

plan. Other requests by SNA for assistance from Parks will be coordinated through regional parks staff. Additional management resource considerations are presented below:

1. Located within Kilen Woods State Park.

Prairie Bush Clover SNA (approx. 25 ac) is located entirely within Kilen Woods State Park (200 ac). The park has year round and seasonal staff, and equipment.

2. Distance from St. Paul and other DNR offices.

Prairie Bush Clover SNA is approximately 160 miles from the St. Paul based SNA staff, and 75 miles from DNR regional offices in New Ulm. The Area Wildlife Manager is stationed in Windom, 10 miles north of the park.

3. Proximity to University and College Campuses.

The closest state university campuses are in Marshall and Mankato (both approx. 80 miles away). There is also a 2 yr. community college in Worthington (35 mi), and an Area Vo-Tech school in Jackson (15 mi). The SNA program should be able to solicit some research attention from these and other educational institutions.

C. Surveillance and Enforcement

Inappropriate uses or overuse can damage natural conditions and the aesthetic appearance of natural areas. Because of the fragility of nature preserves, their continued protection and maintenance requires systematic surveillance and enforcement.

Enforcement will continue to be the responsibility of DNR park staff and the area conservation officer. Visitors to the park and SNA are encouraged to report any signs of problems or violations. Differences between SNA and Parks rules and regulations will be identified for the visitor at the informational sign (see Action 2.1).

Section 2

STRUCTURES AND FACILITIES

A. Trails

One park trail presently goes through the middle of the SNA (the Connector Trail) and another parallels the creek along the northwest boundary (the Rock Creek Trail). These are critical segments in both the park's summer and winter trail systems. A former trail on the western side of the SNA was abandoned when it was discovered that the trail cut through the center of a prairie bush clover colony.

The existing trails will be maintained along their present alignment and for their present uses (hiking, skiing, and snowmobiling on the Connector Trail). The Connector Trail also serves as a fire break between the two SNA management units. No further trail development will take place within the SNA.

B. Parking and Access

Ample parking space is available in the park. Visitors to the SNA are required to pay the standard state park entrance fees.

C. Signing and Interpretation

The purposes of signing and interpretation are to identify the SNA unit and provide basic visitor information. The only signing necessary for the SNA is an interpretive/entrance sign. Boundary signs are not necessary, but corners of the unit will be marked.

Action 2.1 Post interpretive/entrance sign

Considerations:

Location - post sign at the existing trail junction near the bridge (junction of Rock Creek trail, Connector trail, and Sioux trail). This appears to be the optimal site based on existing visitor flow patterns and use of the area.

Content - to include map of the SNA, description of its significance and special features, and identify special use restrictions not covered under existing park rules and regulations.

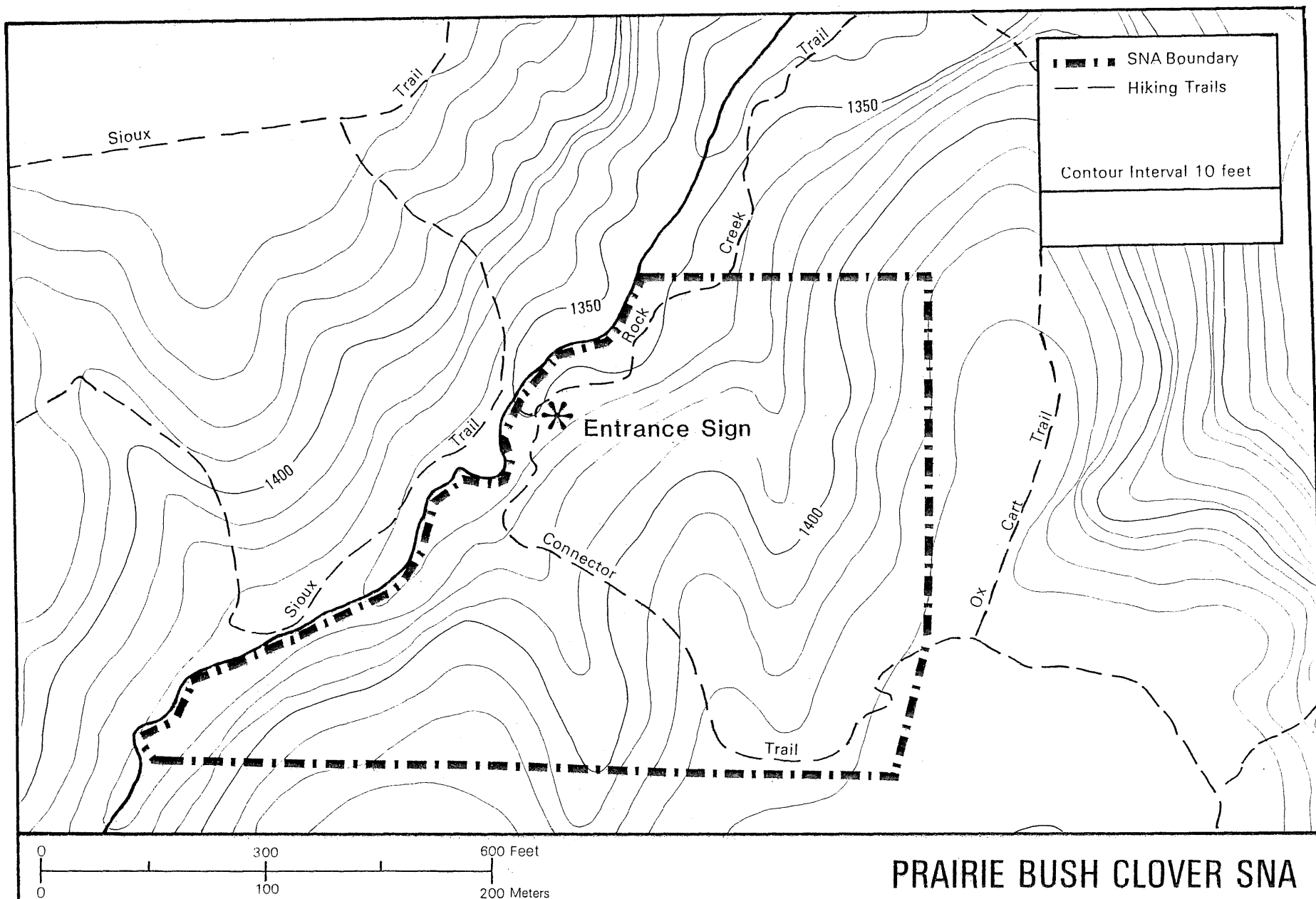
Coordination - to be coordinated with park manager, regional naturalist, and park design standards.

Action 2.2 Mark SNA unit corners

Considerations:

Purpose - to provide verifiable unit boundaries for consistency in management and enforcement.

Locations - a post or other marker is necessary at the NE corner, and the NW corner where the N boundary line meets the creek. It is not necessary to sign these corners with SNA signs.



MAP A - TRAILS AND SIGNS

SITE

Section 3

VEGETATION MANAGEMENT

A. Fire Management

Prescribed burning has been, and will continue to be a major management activity on this SNA. The primary goals of burning are to enhance native grassland vegetation, suppress encroachment of trees and shrubs, and reduce competition from undesirable problem species. The consensus among experts in Minnesota is that prairies naturally burned at intervals of one to 4 or 5 years and, except in severe drought, fires occurred in the dormant season. Fire in general will have a positive impact on the natural area and the Lespedeza leptostachya population. Specific fire effects on the vegetation will depend on fire intensity, fire frequency, timing of burn, and pre and post burn environmental conditions. Dormant season fires will be favored until additional information on the response of L. leptostachya to burning is available.

Action 3.1 Conduct a prescribed burn program

Considerations:

Objectives -

1. General
 - a. to produce unit to unit variation in vegetation structure (mulch, plant density, height etc.).
 - b. to coordinate SNA burn units with established park burn units.
 - c. to use dormant season fire to remove 70% or more of the 1 hour time lag fuels (fine fuels) in each unit at least once in 3 years.
2. Rare Plants
 - a. adjust management prescriptions to meet Lespedeza leptostachya management goals (see Rare Plant Management, pg 15).
3. Fen
 - a. to maintain or enhance fen areas to rank c or b. (see calcareous fen status sheet, Appendix).
4. Woody Encroachment
 - a. to restore and maintain tree and shrub coverage and size classes to pre 1938 levels (as per ASCS photo BIY-5-71, 1938 - see Problem species management, Woody species).

Constraints - two segments of the southern SNA boundary is adjacent pastureland. The rest is bordered by cropland. Grazing removes most fuels on the large western pasture eliminating control problems there. The boundary with the small ravine on the east may require a firebreak (i.e., blackline.) There have been no conflicts with smoke on earlier burns. Do not burn if fen is extremely dry and there is a threat of the peat burning.

Fire Units - (see map.) Coordinate with existing park fire management units.

Action 3.2 Record specific observations on prairie bush clover sites in burn report

Considerations:

Observations - site specific, to include pre and post burn fuel conditions, fire behavior, and phenologic condition of Lespedeza leptostachya, associated dominant species, and identified problem species.

B. Rare Plant Management

The conservation of rare species is a primary management objective for SNA's. Monitoring studies that contribute towards a complete understanding of the biology of rare species are the basis for conservation management. Successful management of a rare plant population implies the ability to manipulate the size and structure of that population. If monitoring is to contribute significantly to this ability, it must yield predictive understanding of population structure and functioning.

There are two large (>1,000 individuals) colonies of L. leptostachya in the SNA, one in each management unit. These colonies are prime candidates for intensive research due to:

- their large size relative to most other known occurrences
- the high level of management activity possible at this site
- the long-term protection status of this population

Former stresses on the L. leptostachya population were grazing and herbicide spraying for broad-leaved weeds (2,4,-D, 2,4,5-T). These have been eliminated. The present stresses requiring management attention are:

1. Competition
 - a. Encroachment by woody trees and shrubs eliminates existing plants and seedlings.
 - b. Exotic species (Bromus inermis, Poa pratensis) may displace plants and inhibit seedling establishment.
 - c. Succession towards warm season, native grasses has been suggested to result in a decline of both existing plants and new seedlings.
2. Hybridization
 - a. L. leptostachya hybridizes with Lespedeza capitata which occurs in the park but off the SNA. The population of L. leptostachya in the SNA is one of the few sites in Minnesota where hybridization has not occurred. This factor makes this population an especially important area for research on the species.
3. Erosion
 - a. Surrounding land-use change has resulted in accelerated erosion extending up to the base of the L. leptostachya colony in Management Unit B.
4. Herbicide
 - a. Herbicide drift from adjacent croplands may be an additional management problem. Minor boundary adjustments, as identified in the park management plan, would minimize this threat.

Potential habitat in both the SNA and surrounding area was searched in 1983 for additional colonies of L. leptostachya, but no new occurrences were found.

The primary management goal for this species is to maintain a large, stable population size. This will require information on age structure of the population, natural population dynamics, life history, and response to management techniques. Until this information is available, management of the prairie bush clover population will conform to the following guideline:

No management action or other environmental disturbance will be allowed to reduce the number of fertile (flowering) plants in a colony by more than 50% of it's pre-disturbance status, and must be followed by a recovery period to pre-existing levels.

Action 3.3 Continue L. leptostachya monitoring in Management Unit A

Considerations:

Scope - includes population census and actuarial study of individuals.

Data - census and actuarial data will provide data on life history, population dynamics, and response to management.

Action 3.4 Monitor L. leptostachya in Management Unit B

Considerations:

Design - to be compatible with monitoring system in Unit A.

Purpose - to allow both direct and comparative evaluation of population status and response to management.

Implementation - monitoring system will be established prior to cutting of woody encroachment (see Action 3.11).)

Action 3.5 Post research plots

Considerations:

Purpose - to protect the small (30m x 25m) research plots from inadvertant damage.

Posting - signs should tell visitors to stay out of the research plot. Signing should be low and only obvious to a visitor arriving upon a research plot. It should not attract or draw visitor use to the area.

Size - include a 3m buffer around research plots where possible.

Action 3.6 Regularly search suitable habitat for Lespedeza leptostachya

Considerations:

Purpose - to identify the occurrence of any new, or previously unrecorded populations.

Frequency - at least one systematic search every 5 years.

Action 3.7 Regularly record all instances of herbicide drift

Considerations:

Documentation - note date, area of impact, affected species and their condition.

Action 3.8 Regularly search and remove Lespedeza capitata from the SNA

Considerations:

Purpose - to prevent hybridization from occurring and keep this population pure.

Timing - conduct systematic search at least every three years. L. capitata is most conspicuous in late summer or fall.

Park restoration - discourage use of L. capitata in prairie restoration projects within the park.

Action 3.9 Establish and maintain a seed bank for L. leptostachya

Considerations:

Purpose - to insure against catastrophic loss in the population.

Implementation - solicit assistance from agencies and research institutions with established seed repositories.

C. Plant Community Monitoring

A system for documenting vegetation change is necessary to evaluate the effects of management activities, and vegetation response to other environmental variables. The greatest need at this SNA is for a monitoring project relating plant community interactions with L. leptostachya population dynamics and life history, and how both interact with management activities. The small ravine adjacent to the southern boundary of the SNA contains the best remaining example of the prairie community in the immediate area and could serve as a natural model for community studies. Protection of this remnant would provide better research and management opportunities in the SNA.

Action 3.10 Monitor the vegetation in L. leptostachya study area - Unit A

Considerations:

Scope - to monitor change in major habitat components, including dominant grasses and exotic species.

Design - methods and data to be compatible with L. leptostachya monitoring project.

Timing - initiate after field sampling and data management procedures for L. leptostachya project are well established.

D. Problem Plant Management

Several species and groups of species, have been identified as potential problem plants requiring special management attention.

These are:

- Woody species, including bur oak (Quercus macrocarpa), plum (Prunus americana), Hawthorne (Crataegus sp.), honeysuckle (Lonicera sp.), Green ash (Fraxinus americana), Grapevine (Vitis sp.)
- Non-native, cool season grasses, including smooth brome (Bromus inermis) and bluegrass (Poa pratensis)
- Canada thistle (Cirsium arvense)

The primary objectives of problem plant management are to arrest expansion, restore desirable vegetation, and determine the real threats these problem plants pose to the native vegetation.

Woody species

Present status

Tree and shrub encroachment into the prairie has occurred along forest edges and in the ravines. Aerial photography from 1938-1979 documents this change, which is further substantiated by comparisons to the General Land Office survey notes (circa 1850). The L. leptostachya colony in Management Unit B is now almost completely encircled by woody vegetation. The 1938 photos show only a few oak trees in this area. Encroachment includes increases in height and aerial coverage, and in filling of colonized area. Woody encroachment has also occurred in the fen.

Threat

Prairie species, including L. leptostachya, are generally not shade tolerant. Groundcover beneath the woody growth becomes progressively dominated by woodland plants, displacing grassland species. In the ravines this change results in greater susceptibility of surface soils to gullyng. Also the woody areas do not burn as well as the surrounding grasslands, hindering fire management.

Control capability

Initial reclamation of woody areas requires intensive management such as brushing, cutting, girdling, and pruning. Fire alone is not practical for converting these woody areas to grasslands while also trying to meet objectives for L. leptostachya management and erosion control. The burn prescription recommended (Action 3.1) is not optimal for controlling woody regrowth immediately following cutting or brushing. Recutting, brushing, or spot burning may be required until the grassland vegetation is firmly established.

 Action 3.11 Convert woody encroachment areas to grassland

Considerations:

Scope - restore to pre-1938 levels as shown in the 1938 aerial photos of the area. Further conversion should be based on additional stand/age analysis of the woody areas.

Priorities - (1) ravine along base of L. leptostachya colony in Management Unit B, (2) the rest of woody encroachment around the L. leptostachya colony in Management Unit B, (3) fen, (4) ravine on the east side of Management Unit A.

Precautions - in ravines remove woody vegetation over 2 or more seasons. Begin at top of ravine and move downslope as initial cut area stabilizes.

Records - Permanently record pre-treatment extent of woody vegetation with field markers and photographs.

Cool Season Exotic Grasses

Present Status

Bluegrass occurs throughout the SNA, both in the prairie and in the woody areas where there has not been complete canopy closure. It occurs within both L. leptostachya colonies. Smooth brome grass is most abundant along the southern boundary of the SNA, particularly along field edges and draws. Brome grass is present on the fringes of the L. leptostachya colony in Unit A, but not in Unit B.

Threat

Bluegrass, and especially brome, are highly competitive and capable of spreading by seeds and rhizomes. Both can displace native species and are persistent once established. They respond quickly to local disturbance and frequently dominate areas receiving field runoff. Direct or indirect interactions with L. leptostachya are unknown.

Control Capability

Best control is provided by late season burns (after May 15). Dormant season burns only minimally suppress these species directly, however they may shift some competitive advantage to native species, providing indirect control.

Action 3.12 Identify management needs for non-native grasses

Considerations:

Purpose - to identify the trends in exotic grass encroachment response to management, and threats to L. leptostachya (see also Action 3.10).

Trends - mark boundaries of two or more brome stands and record change over time.

Management Response - note phenologic condition of both species in burn report.

Canada ThistlePresent status

Canada thistle occurs in several scattered areas, primarily in Unit A. Current infestation levels are significantly less than earlier years as a result from control efforts, including herbicide spraying, burning and hand pulling. These control efforts have been largely effective. Only burning, cutting, and handpulling are presently required in the SNA.

Threat

Canada thistle may potentially displace native species. A greater threat is the impact of weed control methods on native vegetation and L. leptostachya (i.e., non-selective herbicides).

Control

Effective control is possible through spot treatment (i.e., cutting, pulling, spot burning with a flame thrower).

Action 3.13 Continue thistle control activities

Considerations:

Herbicides - herbicide use is not necessary at present infestation levels and generally is not permitted in SNAs.

Spot treatment - continue spot treatment to control patches of Canada thistle.

Prescribed burning - adapt burn unit prescriptions when necessary to control Canada thistles (i.e., after May 15) if spot treatment is not providing adequate controls and such burns would not conflict with other management objectives (see B. Rare Plant Management).

Section 4

EROSION

The most serious erosion in the SNA occurs in the ravine at the base of the L. leptostachya colony in Unit B. A three foot headcut is presently located approximately 75 feet downslope from the L. leptostachya site. In addition, there are at least 3 small gully nickpoints (1' drop) farther upslope in the ravine. Further gully development could lead to accelerated erosion within the L. leptostachya colony and loss of habitat.

Factors potentially contributing to gully initiation and development in the SNA are: increased runoff rates from upland farm/fields, past grazing, and the deterioration of the prairie sod due to woody encroachment (see Problem Species - Woody). A small seep occurs immediately upslope from the major headcut, keeping downslope soils saturated and hence susceptible to erosion processes.

Effective erosion control resources will require stabilizing both the channel gradient and channel headcuts. Well established vegetation perpetuates itself and thus represents a permanent type of control. However only rarely can vegetation alone stabilize headcuts or nickpoints. Engineering measures are nearly always required where channel changes take place. An effective engineering design must help establish and rehabilitate vegetation.

Measures taken outside the watershed can also aid revegetation processes in the gully. These include improvements 1) increase infiltration and decrease overland flow, and 2) spread instead of concentrate that flow.

Action 4.1 Control gully headcut

Considerations:

Structure - design will minimize structural measures and maximize vegetation rehabilitation. Analysis of the design must evaluate the probability and outcomes of a failure of the structure. Structure will be built primarily with hand labor. No major equipment is necessary. Gully gradient below the headcut is relatively level.

Overstory Removal - remove recent woody encroachment to reduce shading and invigorate sod development.

Drainage - a shallow tile may be necessary to dry surface soils approx. 100' upstream and downstream of structure.

Definitions - Headcuts and Nickpoints are locations of active erosion where channel changes take place. Headcutting extends the channel into ungullied headwater areas. Nickpoints signify longitudinal gradient changes; a gentler gradient is being extended toward headwaters by headcutting on the bed.

Action 4.2 Control gully nickpoints

Considerations:

Construction - smooth out gradient with hand tools. Natural revegetation is expected to stabilize the site.

Overstory Removal - remove recent woody encroachment and/or prune to promote grassy sod development.

Section 5

ADDITIONAL INVENTORY NEEDS

The flora inventory of Prairie Bush Clover SNA is not complete. In addition, no systematic inventory of the SNA's faunal groups has been done.

Action 5.1 Complete the floral inventory

Action 5.2 Systematically survey the fauna

Considerations:

Priorities - potential herbivores, seed predators, pests or pollinators of L. leptostachya should receive primary attention.

Section 6

EFFECT OF MANAGEMENT ON SIGNIFICANT RESOURCES

A. Prairie bush clover (Lespedeza leptostachya)

Prescribed burning (Action 3.1) is anticipated to have a positive impact on the L. leptostachya population. Burning will be done under dormant conditions to avoid direct damage to this species until further information provides support for greater flexibility in burn prescriptions. Monitoring activities will yield a predictive understanding of population structure and functioning, and response to management (Actions 3.2, 3.3, 3.4). Potential threats to the species will be investigated and controlled (Actions 3.7, 3.8, 3.12). Direct habitat manipulation projects include erosion control and conversion of areas encroached upon by woody species (Actions 3.11, 4.1, 4.2). These actions will benefit L. leptostachya by preserving existing colonies and restoring former habitat.

B. Calcareous Fen

There are no actions designed specifically for the fen. No rare species are known to occur in it. Prescribed burning (Action 3.1) will have a positive impact by reducing woody encroachment. Burning will not be done under conditions where the peat might be dry and burn.

Section 7

MANAGEMENT COSTS AND IMPLEMENTATION

Actions recommended in this plan have been separated into two categories: (1) administrative and (2) operational. The costs of administrative actions are difficult to itemize because they are included in an SNA staff member's salary.

Operational actions are on-site activities. These often have both capital and labor costs. Capital costs have been listed. Estimates of labor needs are provided where possible.

Administrative and operational actions are often funded out of different budget sources. This makes it difficult to present an implementation schedule that equates both types of actions. To accommodate budget planning, separate implementation schedules are outlined for each category.

It is important, however, to have a mechanism that does allow comparison between all actions in this plan and between actions from different plans. The system outlined below distinguishes between (a) actions needed to improve or maintain the integrity of a site's most important features called elements, (b) legal or moral obligations of ownership or land management by the Department, and (c) all other actions important for reasons other than above.

Group I Actions: Actions that prevent or reduce vulnerability of the element to destruction or serious degradation. That is, in the absence of these actions the preservation of the element is threatened on this site. Research, ecological survey and monitoring may be included here if, without such information, it is not known what actions are necessary to maintain the element.

Group II Actions: Actions necessary because they constitute an obligation of land management/ownership by the Department. These may be legal obligations, departmental requirements, or SNA program policies.

Group III Actions: Actions taken for all other reasons. For example, actions taken to provide for public use, acquire supplemental resource information, administrative coordination, etc.

The following chart illustrates the scheduling of actions described in the text, and the immediate and on-going capital costs of implementation. The scope of this plan covers a ten year period. The plan should be reviewed every five years to evaluate progress, reassess priorities, and refine management techniques. Actions listed under the category "Begin Immediately" need immediate attention. "Phase I" is the first five year period. "Phase II" is the second five year period. Implementation of many actions depend on availability of materials, equipment and labor. An action may be initiated sooner than scheduled if circumstances so dictate and earlier scheduled actions will not suffer as a result.

ADMINISTRATIVE ACTIONS		Stewardship Group	Begin Immediately	Phase I	Phase II	Comments
Action 1.1	Amend Park Management Plan	I		X		PR(1)
Action 3.9	Establish seed bank	III			X	Reprioritize if monitoring plots indicate need. - SNA(3)
OPERATIONAL ACTIONS						
Action 3.1	Conduct prescribed burn program	I	X			Continue existing program - PR (1)
Action 3.2	Record <u>L.L.*</u> site info on burn report	I	X			PR
Action 3.3	Continue <u>L.L.*</u> monitoring in Unit A	I	X			Continue existing program - NHP (2)
Action 3.4	Monitor <u>L.L.*</u> in Unit B	I		X		Establish prior to action 3.11 - NHP
Action 3.5	Post monitoring plots	I		\$ 50		SNA
Action 3.7	Record any instances of herbicide drift	I	X			Ongoing - PR
Action 3.8	Regularly search for and remove <u>Lespedeza capitata</u>	I		X		Ongoing - PR
Action 3.10	Monitor the vegetation in <u>L.L.*</u> study plot - Unit A	I		X		See action 3.3 - SNA
Action 3.11	Convert woody encroachment areas	I		X		See action 3.4 - PR

Action 3.12	Identify management needs for non-native grasses			X	Based on data from action 3.10 - SNA
Action 3.13	Control gully headcut	I	5000		See also 3.11 - SNA
Action 3.14	Control gully nickpoints	I	X		See also 3.11 - SNA
Action 2.1	Post Interpretive/entrance sign	II	300		SNA
Action 3.13	Continue thistle control	II	X		PR
Action 3.6	Regularly search for <u>L.L.*</u>	III		X	SNA
Action 5.1	Complete floral inventory	III	X		In progress - NHP
Action 5.2	Survey fauna		X		SNA

Labor: Work crews required for Actions 3.11, 3.13, 3.14
Inventory staff required for Actions 3.6, 5.2

* L.L. = Lespedeza leptostachya

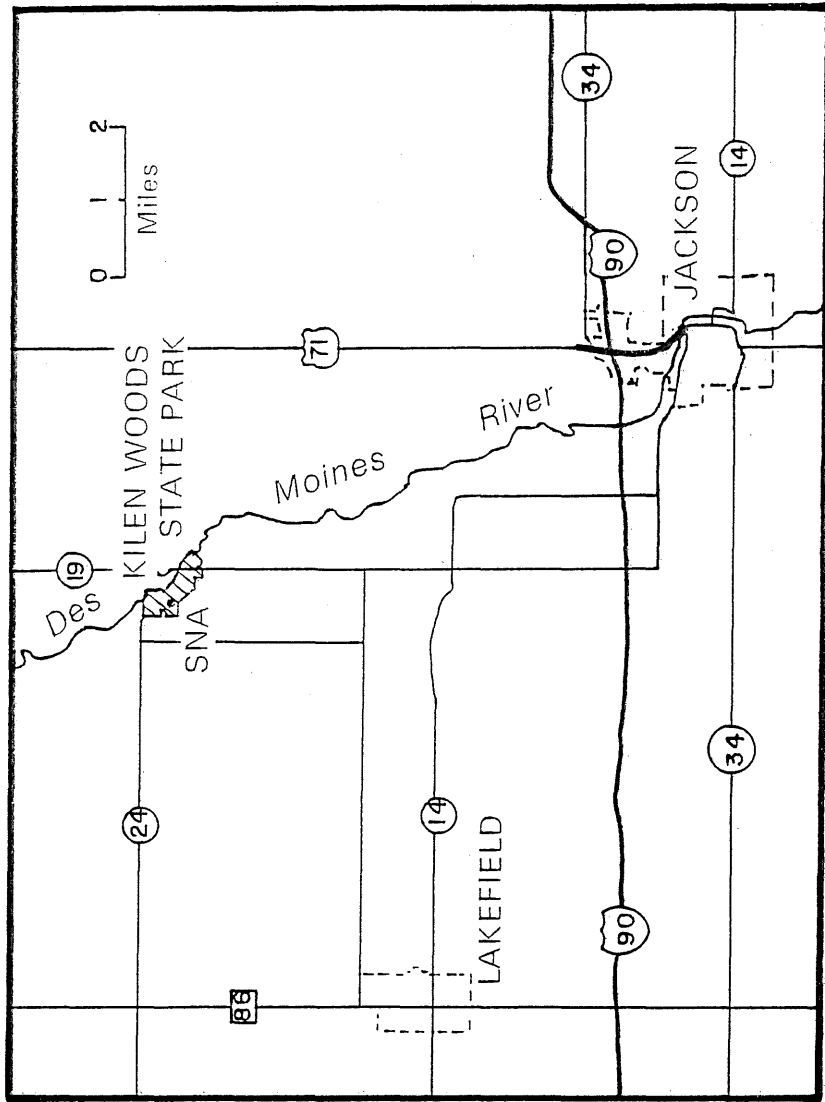
- (1) PR = Parks and Recreation primary responsibility.
- (2) NHP = Natural Heritage Program primary responsibility.
- (3) SNA = Scientific and Natural Area primary responsibility

Action 3.12	Identify management needs for non-native grasses			X	Based on data from action 3.10 - SNA
Action 2.1 ^{4.1}	Control gully headcut	I	5000		See also 3.11 - SNA
Action 3.1 ^{4.2}	Control gully nickpoints	I		X	See also 3.11 - SNA
Action 2.1	Post Interpretive/entrance sign	II	300		SNA
Action 2.2	<i>Mark SNA Unit Corners</i>	III			PR
Action 3.13	Continue thistle control	II		X	PR
Action 3.6	Regularly search for <u>L.L.*</u>	III		X	SNA
Action 5.1	Complete floral inventory	III		X	In progress - NHP
Action 5.2	Survey fauna			X	SNA

Labor: Work crews required for Actions 3.11, ~~4.1~~, ~~4.2~~
Inventory staff required for Actions 3.6, 5.2

* L.L. = Lespedeza leptostachya

- (1) PR = Parks and Recreation primary responsibility.
- (2) NHP = Natural Heritage Program primary responsibility.
- (3) SNA = Scientific and Natural Area primary responsibility



Appendix

PRAIRIE BUSH CLOVER SNA

RESOURCE INVENTORY

Present Vegetation

Glacial Till Hill Prairie - Status Sheet

Calcareous Fen - Status Sheet

Prairie Bush Clover - Status Sheet

PRESENT VEGETATION

Introduction

The Prairie Bush Clover SNA contains two natural community types that are considered ecologically sensitive, i.e., high quality occurrences of the community type in the state are now rare and are in jeopardy of being destroyed or degraded. These two communities are glacial till hill prairie and calcareous fen. The ecology and status of these communities within Minnesota are described in Appendix A and B respectively. Site specific descriptions follow.

Community Description

Glacial till hill prairie

Glacial till hill prairie of fair quality (Rank BC) is found on the SNA unit. The hill prairies occur on steep, rolling hills along the deep narrow alley cut by the Des Moines River. Prairie is found on the ridge tops and steep sided slopes. Where prairie meets forest, often along the ravines and lower bluff lines, there are narrow bands of oak savanna. The prairie vegetation was subjected to years of grazing and in some cases herbicide spraying prior to preservation. These disturbances have altered the original species composition and structure. However, with recent management, the prairie is returning to more natural conditions. Dry-mesic prairie vegetation characterizes the area. On the deeper soil sites Indian grass (Sorghastrum nutans) and big bluestem (Andropogon geroidi) dominate; on drier sites or where grazing has been heavy, little bluestem (Andropogon scoparius) and side oats grama (Bouteloua curtipendula) are the dominant plants. Forb diversity and density is generally low; the most common species include rigid goldenrod (Solidago rigida), alum root (Heuchera richardsonii), purple cone flower (Echinacea angustifolia), heath aster (Aster ericoides), prairie onion (Allium stellatum), purple prairie clover (Petalostemon purpureum) and yellow flax (Linum sulcatum). There are areas where thickets of shrubs, wild plum (Prunus americana), and wolfberry (Symphoricarpos occidentalis) occur as a result of past disturbance.

Calcareous Fen

A small (approximately 3 acre) calcareous fen occurs on one of the north-west-facing prairie slopes. This small area, where groundwater comes to the surface, has a build-up of peat soils. The fen has been somewhat disturbed in the past (Rank C) but still maintains a number of characteristic fen plants called calciphiles (plants adapted to wet, calcareous substrates). These include grass of parnassus (Parnassia glauca), swamp lousewort (Pedicularis lamceolata), Riddell's goldenrod (Solidago riddellii) and a fen sedge (Carex prairea). Wetland forbs and shrubs associated with these include great blue lobelia (Lobelia siphilitica), bitter cress (Cordamine pensylvanica), red-osier dogwood (Cornus stolonitara) and beaked willow (Salix bebbiana).

GLACIAL TILL HILL PRAIRIE
ELEMENT ABSTRACT

NATURAL COMMUNITY
ELEMENT NAME:

GLACIAL TILL HILL PRAIRIE

ELEMENT RANK:*

Threatened in the state

PLANT COMMUNITY
COVER TYPE:

Andropogon scoparius-Bouteloua curtipendula-
Stipa spartea

BASIS FOR
CONCERN:

Although glacial till hill prairies are still relatively common on the landscape, most of them have been severely degraded as a result of heavy grazing. Examples of glacial till hill prairies that reflect native presettlement conditions are rare.

DESCRIPTION AND
DISTRIBUTION:

This prairie natural community is found on somewhat deep, droughty soils formed in calcareous glacial till. They commonly occur on steep sided slopes along rivers, creeks, and deep drainageways. Soils typically have rocks and limestone fragments at the surface. Glacial till hill prairies are commonly found from south central to western Minnesota; similar prairies are found on irregular moraine areas in northwest Iowa and eastern South Dakota. These hill prairies may be quite small (< 5 acres) being separated by forested ravines, or they may occupy larger areas as part of continuous prairie. Large continuous hill prairies are common south of the Minnesota River along drainage channels of the Coteau des Prairies, and the Blue Earth Till Plain. Less common are the small hill prairies occurring as openings in otherwise forested slopes on the Alexandria Moraine and Olivia Till Plain.

Because of the extreme topographic variation of these sites, the vegetation assemblages are complex. In general, the vegetation is characterized by dry and dry-mesic prairie. Vegetation is dependent on degree of slope, position along slope, orientation of slope, and type of soil. Dry prairie, dominated by rid and short grasses, is commonly associated with inclusions of small gravelly pockets on steep hills and ridges. Characteristic dry prairie plants include blue grama (Bouteloua gracilis), hairy grama (B. hirsuta), lotus milkvetch (Astragalus lotiflorus), Indian paintbrush (Castilleja sessilifolia), gerardia (Gerardia aspera), stiffstem flax (Linum rigidum) and white beard tongue (Panstremon albidus). Many of these are western

prairie species having their origins on the Great Plains.

*Element ranks for natural community types are program-defined and do not represent an official federal or state status (e.g., no legal status exists).

Dry-mesic prairie, dominated by mid and tall grasses, is commonly found on the deeper, loamy soils of shallow slopes and drainage-ways. These sites, at least under undisturbed conditions, harbor a large number of mesic species. These include coreopsis (Coreopsis palmata), golden alexanders (Zizia aptera) downy phlox (Phlox pilosa), compass plant (Silphium laciniatum), wood betony (Pedicularis canadensis), ^{for} culvers root (Veronicastrum virginianum) and white lettuce (Prenanthes racemosa). A ~~releve~~ ^{of undisturbed glacial till hill prairie} ~~is shown in~~ ^{space} ~~appendix I.~~

CURRENT
STATUS:

Most of the large, continuous glacial till hill prairies in Minnesota have been degraded or destroyed by intensive grazing of the slopes and plowing of the hill crests. Where the soils are unsuitable for cropping - along steep slopes - grazing is a common practice. Moderate to heavy grazing alters the natural species composition (typically a shift from mesic to xeric native species), reduces native species diversity, and increases the presence of exotic species. Very few examples of glacial till hill prairie which reflect undisturbed, presettlement conditions are known.

REPRESENTATIVE
SITES:

Hole-in-the-Mountain Prairie, Lincoln Co.
Moulton Township Fill Prairie, Murray Co.

PREPARED BY:

^{Minn.}
Keith Wendt, ~~IN~~ Natural Heritage Program, 6/84

GLACIAL TILL HILL PRAIRIE - ELEMENT OCCURRENCE RANKING

Occurrences of glacial till hill prairie are ranked according to their degree of naturalness (i.e. how close they resemble presettlement conditions). Exemplary occurrences ranked B or higher are considered natural areas of statewide significance.

RANK A -- Prairie occurrences that are virtually undisturbed by man, or recovered to an extent where community structure and composition is intact and reflects presettlement conditions. Such areas occur where the soil has not been disturbed; they display a high native species diversity, a lack of exotic or weedy species and a presence of conservative species (those which typify and are relatively restricted to stable undisturbed conditions). Conservative species of the glacial till hill prairies tend to be mesic prairie species. Disturbance, notably by intensive grazing, often results in the elimination of such mesic species as downy phlox (Phlox pilosa), coreopsis (Coreopsis palmata), blazing star (Liatris aspera), golden alexanders (Zizia aurea), compass plant (Silphium laciniatum), and wood betony (Pedicularis canadensis). Rank A prairies are conspicuous because they contain these species and others which are the first to disappear with grazing. In general, Grade A prairies have a well established mesic prairie component on the deeper soils (clay loams) associated with lower and shallower slopes, and in the draws extending upslope.

RANK B -- These prairies are similar in species composition to Rank A sites, except some of the conservative species may be absent, or the complement of characteristic species may not be fully represented. These tracts typically have had a history of light-moderate disturbance from grazing. As a result the original proportions of prairie species may have shifted, typically an increase in dry prairie species over mesic species. However, the site still maintains a relatively natural character containing species that maintain themselves under light grazing but are reduced or eliminated with heavy grazing: lead plant (Arthropha canescens), prairie lily (Lilium philadelphicum), alum root (Heuchera richardsonii), white prairie clover (Petalostemum candidum) and showy milkweed (Asclepias speciosa). With removal of grazing, these sites will in time recover to more natural condition.

RANK C -- These sites are characterized by a species composition and structure that has been substantially altered from their presettlement character. A long history of moderate-heavy grazing activity is usually the major disturbance. The habitat has a low native species diversity reflecting the loss of conservative native species, an increase in weedy native species and invasion by exotic weeds. In general, the mesic tallgrass prairie species are reduced relative to the mid and shortgrass species. Side oats grama (Bouteloua curtipendula) and Little bluestem (Andropogon scoparius) typically dominate the habitat. The following native species, all favored by moderate grazing, often dramatically increase in population density: rigid goldenrod (Solidago rigida), prairie smoke (Ceanothus triflorus), wolfberry (Symphoricarpos occidentalis), and purple locoweed (Oxytropis lamberti). Purple prairie clover (Petalostemum purpureum), purple cone flower (Echinacea pallida) and dotted blazing star (Liatris punctata) also persist in moderately grazed habitat.

RANK D -- These are heavily disturbed sites where the natural prairie vegetative has been significantly altered. The vegetation is dominated by weedy species that are not part of the native prairie community. These sites have suffered from a long history of heavy grazing and often have been sprayed with herbicides. Characteristic weedy plants include bluegrass (Poa spp.), broom grass (Bromus inermis), quack grass (Agropyron repens), bindweed (Convolvulus sp.), sweet clover (Melilotus spp.) green needle grass (Stipa viridula) and western wheatgrass (Agropyron smithii).

CALCAREOUS FEN
ELEMENT ABSTRACT

NATURAL COMMUNITY

ELEMENT NAME: Calcareous Fen

ELEMENT RANK*: Threatened throughout range

PLANT COMMUNITY Potentilla fruticosa - Betula pumila - Salix candida (JA.OAO)
COVER TYPES: Carex sterilis - Andropogon gerardi - Muhlenbergia glomerata

BASIS FOR CONCERN: Calcareous fens are dependent upon very localized water chemistry and hydrologic conditions. They are characterized by a distinctive assemblage of plants adapted to wet, calcareous substrates. Many of these plants - called calcicoles - are rare in Minnesota. The calcareous fen community is very uncommon throughout its entire range; in Minnesota 21 occurrences are known, totaling less than 700 acres.

DESCRIPTION: The term "fen" has been used variously in describing wetlands. The term, as used here, largely follows the narrow definition of Curtis (1959): "...a plant community on a wet and springy site, with an internal flow of water rich in calcium and magnesium bicarbonates and sometimes calcium and magnesium sulfates as well". "Springy" is interpreted to indicate the presence of peat deposits, and "internal flow" indicates water supply from groundwater. Calcareous fens, which occur within the prairie formation of Minnesota, are considered distinct from the rich fens and poor fens which occur in the northern peatlands of the coniferous formation. Calcareous fens have an extremely high pH (7.0 to 8.2) and high mineral content (Ca^{2+} 90-160 mg/L), and are maintained solely by groundwater. Rich fens and poor fens have a significantly lower pH (5.0 to 7.0) and lower concentrations of minerals (Ca^{2+} 10-40 mg/L), and are maintained largely by surface water. The calcareous fens also show distinct differences from the northern fens in floristics and physiography.

Calcareous fens apparently only develop where discharges of calcium-magnesium-bicarbonate groundwater occur. This groundwater is typically discharged from dolomite bedrock and/or calcareous glacial deposits. Many calcareous fens are noticeably raised in the middle, exhibiting a convex profile - some even have an almost steep dome of peat. The extent of the build-up of peat (which in calcareous fens is a graminoid peat) reflects the height at which the rate of peat accumulation equals peat decomposition.

Conditions associated with calcareous peat soils - low oxygen availability and cold temperatures, determine the characteristic floristic composition and structure of the calcareous fen community. The poor growing conditions are reflected by the low productivity and short stature of the vegetation (van der Valk 1977). Minnesota fens may be dominated by herbaceous plants (sedges, grasses, and forbs) or by shrubs (Potentilla fruticosa, Betula pumila, and Salix candida). The floristic composition is characterized by calciphilic plant species which form a significant component of the fen flora (see Appendix A). Associated with the calcicoles are plant

* Element ranks for natural community types are program-defined and do not represent an official federal or state status (e.g., no legal status exists).

species of different floristic associations. These include species from the prairies (Andropogon gerardi, Liatris ligulistylis, Hypoxis hirsuta, Oxypolis rigidior, Pycnathemum virginianum and Phlox pilosa); from the acid bogs (Eriophorum angustifolium, Sarracinia purpurea, and Menyanthes trifoliata); and saline wetlands (Triglochin maritima, T. palustris).

In addition, Minnesota fens harbour a disproportionately high number of rare plant species (see Appendix B).

DISTRIBUTION: Calcareous fens are relic communities which occur infrequently throughout the glaciated region of North America (Figure 2). Fens have been reported to occur in: New York (1), Ohio (40), Indiana (7), Illinois (12+), Missouri (?), Wisconsin (45), Iowa (7), Michigan (10+), North Dakota (9+), and Minnesota (21). The number of fens reported may reflect the inclusion of wet alkaline prairies, calcareous seeps, marl flats and/or other sites floristically similar to calcareous fens. Calcareous fens may be quite small, often covering less than 10 acres.

In Minnesota, calcareous fens have a sporadic distribution throughout the prairie region of the state (Figure 1). Minnesota fens occur in three broad geomorphic areas, 1) at the base of terrace escarpments in the major river valleys of S. Minnesota, 2) sides of glacial hills in the moranic uplands of western Minnesota and 3) adjacent to Glacial Lake Agassiz beach ridges in NW Minnesota.

CURRENT STATUS: As of December 1983, twenty-one calcareous fens have been located in Minnesota; seven of these are in public ownership. The known calcareous fens vary widely in size and in natural area quality. A number of the known existing fens have been heavily degraded and have lost much of their original character. In general, impacted fens show a loss of the fen calcicoles and their replacement by weedy opportunists - both upland and lowland species. Calcareous fens are threatened by agricultural activities (draining, ditching, and filling), commercial development, and highway construction.

**NUMBER OF
OCCURRENCES:** 21 occurrences

REPRESENTATIVE Black Dog Fen SNA, Dakota Co.
SITES: Kilen Woods S.P. Fen, Jackson Co.
Pankratz Fen, Polk Co.
Clearbrook Fen, Clearwater Co.

LITERATURE CITED: Curtis, J.T. 1959. The Vegetation of Wisconsin.
University of Wisconsin Press, Madison. p. 361.

Van der Valk, A.G. 1976. Zonation, competitive development,
and standing crop of N.W. Iowa fen communities. Proc.
Iowa Acad. Sci. 83:51-54.

PREPARED BY: Keith Wendt, Plant Ecologist, Natural Heritage Program, 2/84

APPENDIX A

Calciphilic species found in Minnesota calcareous fens:

<u>Betula pumila</u>	Bog birch
<u>Potentilla fruticosa</u>	Shrubby cinquefoil
<u>Lobelia kalmia</u>	Kalm's lobelia
<u>Parnassia glauca</u>	Grass of Parnassus
<u>Solidago riddellii</u>	Riddell's goldenrod
<u>Triglochin maritima</u>	Arrow grass
<u>Gentiana procera</u>	Fringed gentian
<u>Utricularia intermedia</u>	Small bladderwort
<u>Liparis loeselli</u>	Yellow twayblade
<u>Pedicularis lanceolata</u>	Swamp lousewort
<u>Carex sterilis</u>	a sedge
<u>Carex prairea</u>	a sedge
<u>Muhlenbergia glomerata</u>	Fen muhly grass
<u>Cladium mariscoides</u>	Twig rush
<u>Rhynchospora capillacea</u>	Fen beak-rush
<u>Scleria verticillata</u>	Nut-rush
<u>Gerardia paupercula</u>	Pink gerardia

APPENDIX B

The following plant Elements* have been documented to occur in calcareous fen habitats in Minnesota:

<u>Carex sterilis</u>	a sedge	State threatened
<u>Cladium mariscoides</u>	Twig-rush	State special concern
<u>Scleria verticillata</u>	Nut-rush	State threatened
<u>Rhynchospora capillacea</u>	Fen beak-rush	State special concern
<u>Valerian edulis</u>	Valerian	State threatened
<u>Tofieldia glutinosa</u>	False asphodel	State special concern
<u>Eleocharis rostellata</u>	Beaked spike	State threatened
	rush	
<u>Triglochin palustris</u>	Arrow grass	State special concern
<u>Cypripedium candidum</u>	Small White	State special concern
	Lady's-Slipper	

*An Element is a natural feature of particular importance because it is rare or threatened on a national or statewide basis.

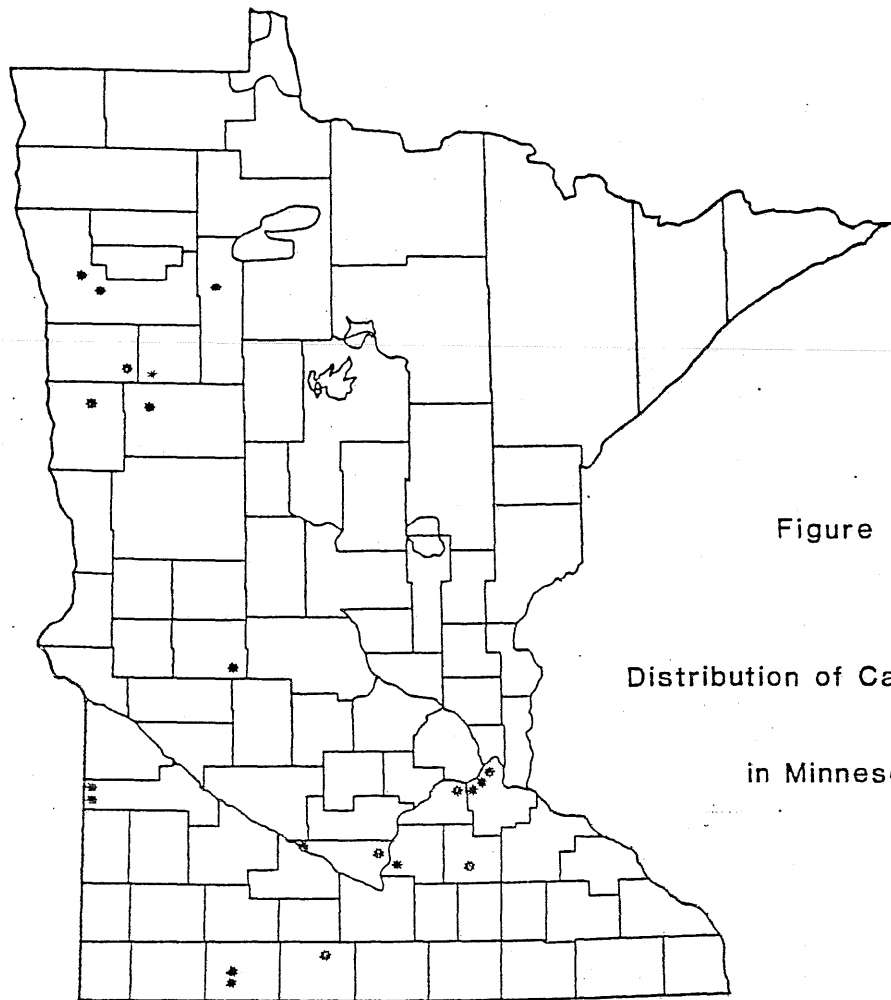


Figure 1

Distribution of Calcareous Fens

in Minnesota

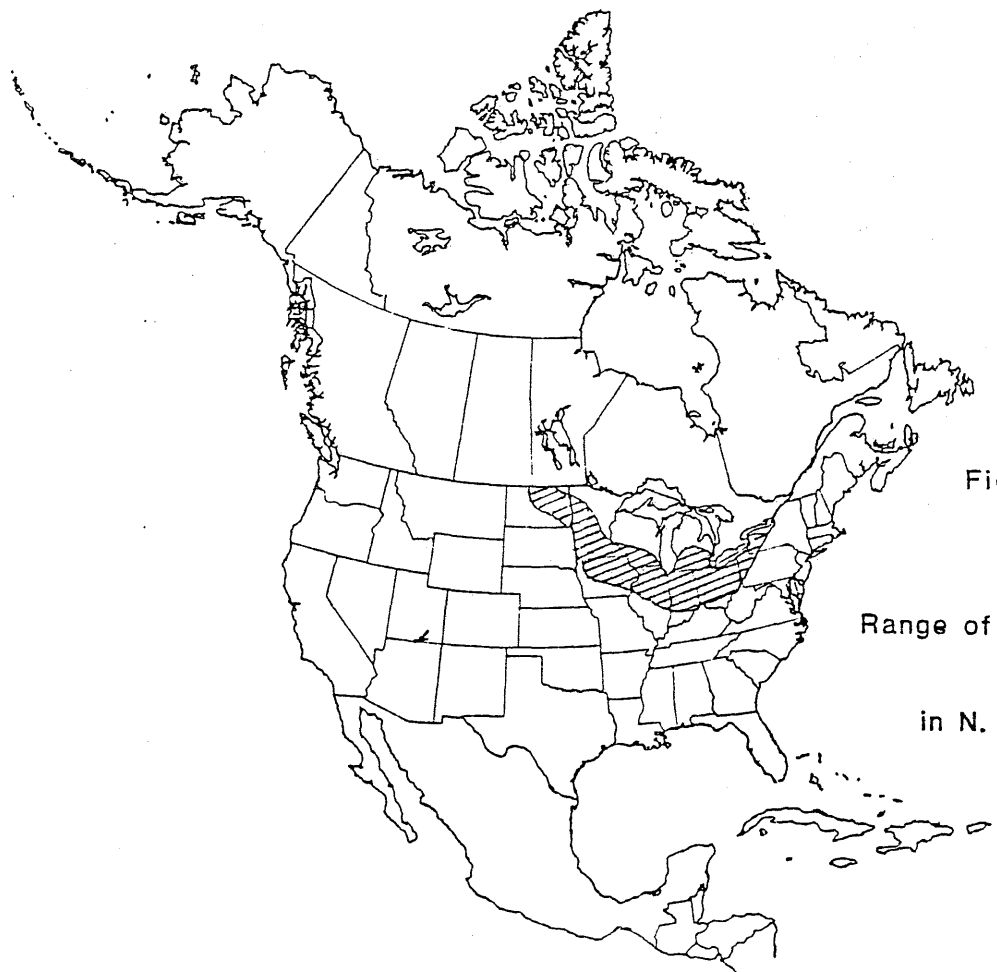


Figure 2

Range of Calcareous Fens

in N. America

ELEMENT OCCURRENCE RANKING - CALCAREOUS FENS

GRADE A

Fens which reflect native presettlement conditions - fens on undisturbed peat and maintaining natural plant species composition. Such areas have high native species diversity, a lack of exotic or native weedy species, dominance by fen sedges (i.e. Carex sterilis, C. prairea) and/or grasses (i.e. Muhlenbergia glomerata, M. richardsonii), and presence of calciphiles such as Gentiana procera, Lobelia kalmii, Parnassia glauca, Triglochin palustris, Scleria verticillata, and Rhynchospora capillacia which typify and are relatively restricted to calcareous fen communities.

GRADE B

Fens which have recently been lightly disturbed, or moderately disturbed in the past but have recovered to the extent where vegetation composition is relatively natural. Man-induced disturbances include light grazing or haying; water supply has not been significantly altered. Grade B fens still maintain a high native species diversity and characteristic fen species. However disturbance may have caused a shift in species composition favoring pioneer species or wetland species which tolerate or increase with disturbance; densities of certain fen species may be low. Disturbance may also result in the increase of woody species or invasion of weedy species in small areas of the fen. Grade B areas normally will return to Grade A condition with protection (removal of disturbance) and appropriate management.

GRADE C

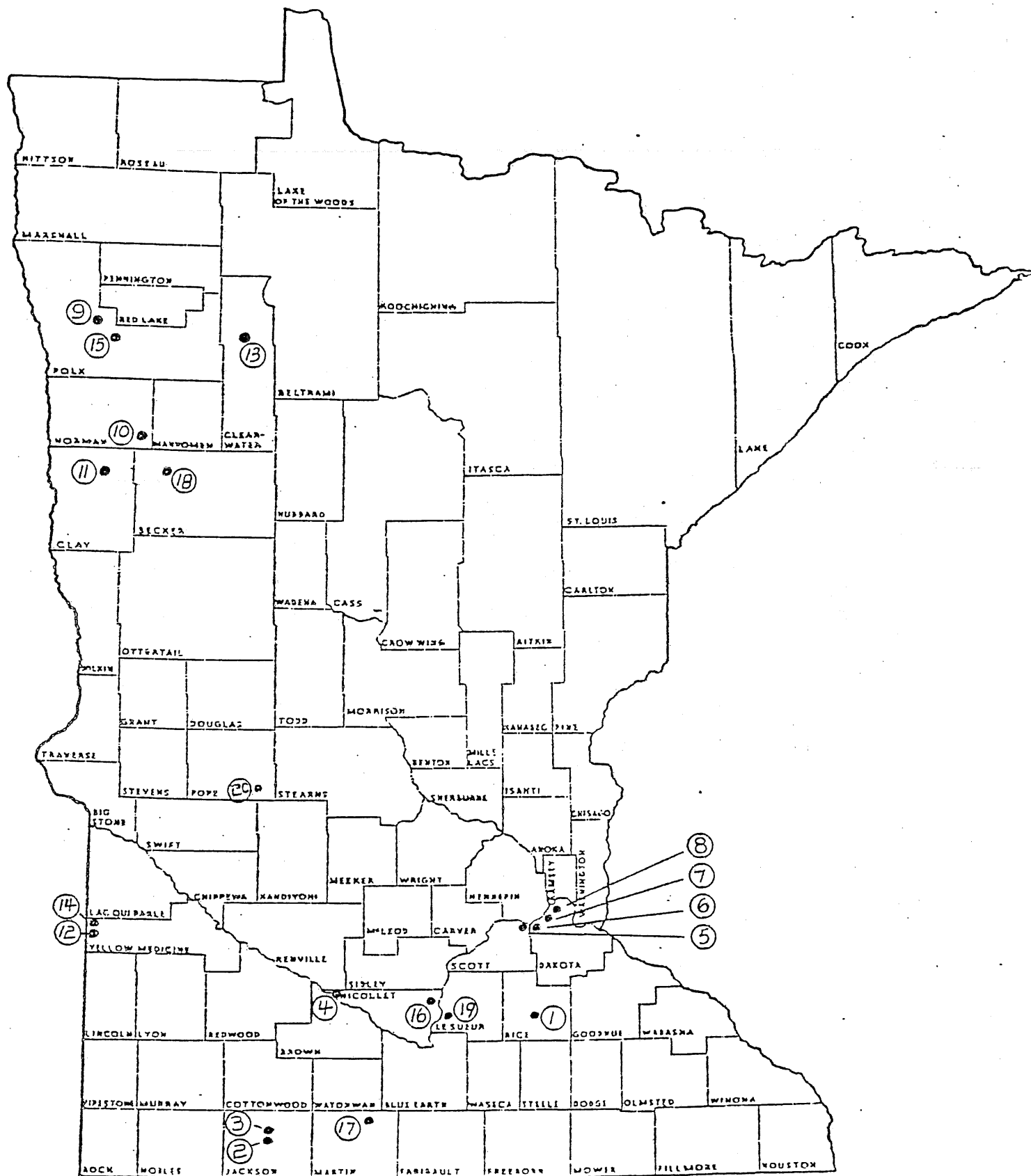
Disturbed fens, where the original species composition has been altered and no longer reflects natural conditions. The disturbed habitat is characterized by low species diversity and an absence of certain calcophiles which have been replaced by rank wetland species which are normally sparse and depauperate in undisturbed fens. Prevalent species which increase with disturbance include Solidago canadensis, Agrostis alba, Typha latifolia, Thalictrum dasycarpum, Phragmites communis, and Eupatorium spp.; woody species of Salix and Cornus also invade disturbed fen habitats. Disturbance may have been caused by partial drainage through ditching and/or tiling, heavy grazing or herbicide spraying. Disturbed fens still maintain some characteristic fen species and have some potential for recovery.

GRADE D

Degraded fens, where man-induced disturbance has significantly altered the original species composition. The dominant fen sedges and characteristic fen species have been replaced by weedy species such as Poa pratensis, dense monotypic stands of disturbance species such as Urtica dioica, Aster spp., and Solidago spp., and invasion by woody plants.

Grade D fens are most commonly associated with drainage and the resultant drying and oxidation of the peat surface. Most of the original community structure and composition has been destroyed, with little chance of recovery.

CALCAREOUS FEN ELEMENTS OCCURRENCES (EOs)



STATUS SHEET

ELEMENT NAME: Lespedeza leptostachya Engelm. (prairie bush-clover)

FEDERAL STATUS: Currently under review by the Department of the Interior for proposal as a threatened species under the Endangered Species Act of 1973 (Public Law 93-205, enacted December 28, 1973). Federal register 45(242):82480 December 15, 1980.

STATE STATUS: None

NATURAL HERITAGE PROGRAM STATUS: Endangered

BASIS FOR STATUS CLASSIFICATION: The original range of this species was restricted to portions of southern Minnesota, northern Iowa, southern Wisconsin and northern Illinois. Even within this limited range, it may have never been common. Since the advent of agriculture, the prairie habitat of Lespedeza leptostachya has been reduced to a very few remnants, and brought the species itself to the verge of extinction.

PREFERRED HABITAT: In all cases, this species inhabits native prairies (Fassett 1939, Fox 1945, Gambil 1953, Isely 1955), with possibly a preference for dry prairies (Rossa and Eilers 1978). In Minnesota, it appears to prefer mesic to dry-mesic sites. The drier sites may be dominated by Stipa spartea (porcupine-grass) and Sporobolus heterolepis (northern drop-seed), and often occur on gravelly or rocky soils. The more mesic sites are usually dominated by Sorghastrum nutans (indian grass) and Andropogon gerardi (big bluestem) and often occur on deep, black loam.

DISTRIBUTION: Lespedeza leptostachya is endemic to the Upper Midwest (see map), and is considered rare wherever it occurs (Read 1976; Roosa and Eilers 1978; Paulson 1976).

OCCURRENCES IN MINNESOTA: The first reports of this species in Minnesota were by T.J. Hale from southeastern Minnesota, and by J. Leiberg from southwestern Minnesota, where he described it as being "common" in Rock County (Upham 1884). Unfortunately, neither of these records are verifiable, and the authenticity of the claims cannot be determined. The species was next reported from the southern part of the Minnesota Valley (MacMillan 1892), but again, no evidence is available to document the claim.

The first record of this species from Minnesota that is actually documented by a voucher specimen was reported by E.P. Sheldon (1896). The specimen was collected on a dry, sandy hillside near Gull Lake, in Cass County (Sheldon 1896). The site has never been relocated, and the current status of population is unknown.

Recent field work has resulted in the discovery of occurrences in Goodhue, Cottonwood, Renville and Jackson Counties. One of the two occurrences in Jackson County contains more than 2,000 plants, and is the largest extant population currently known.

OCCURRENCES IN
MANAGED AREAS:

A small but apparently viable population occurs in Mcknight Prairie in Goodhue County, which is owned and managed by Carlton College in Northfield. A very small colony occurs at the Jeffers petroglyph site in Cottonwood County. This site is managed by the Minnesota Historical Society for the petroglyph features, and not for the perpetuation of the prairie plant community. Two large and vigorous populations occur in Kilen Woods State park in Jackson County, and are the focus of management efforts of park personnel.

THREATS
TO SPECIES:

Known Threats: A population of 30 to 35 plants in Goodhue County is believed to have been recently destroyed or seriously damaged by grazing cattle. The population at Jeffers Petroglyph may have suffered from a July 1980 burn, which caught the plants at the beginning of their reproductive cycle. The plants resprouted in August, and will probably recover with only the loss of one years seed crop.

Potential Threats: The population near Morton in Renville County occurs in an area of granite outcrops owned by the Cold Spring Granite Company. If the company quarries the granite, it could destroy the entire populations of Lespedeza leptostachya. One of the two sites in Jackson County is privately owned, and faces the potential threat of residential development. The other site in Jackson County is currently protected, but until recently was routinely sprayed with herbicides. Although the Lespedeza survived the spraying, it remains to be seen what long term affect the spraying will have on the survival of the plant community.

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DISTRIBUTION OF
Lespedeza leptostachya Engelm.
(Prairie Bush Clover)

