## NATURAL COMMUNITIES AND RARE SPECIES OF CLAY COUNTY, MINNESOTA

Minnesota County Biological Survey

NATURAL COMMUNITIES Natural communities are groups of native plants and animals that interact with each other and their abiotic environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native species form recognizable units, such as an oak forest, a prairie, or a marsh, that tend to repeat over space and time. Natural communities are generally classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes. The natural community types and subtypes on this map are classified primarily by vegetation and major habitat features. The Minnesota County Biological Survey (MCBS) located areas of natural community is in Clay County in 1987-88 using aerial photo interpretation followed by field survey of selected sites, with some additional field work in 1994. The description and approximate acreage of each natural community type and subtype given below are based on the results of the Survey. Natural community survey efforts were focused on prairie and prairie-related types; forests, woodlands, and the properties of the survey is a survey of selected sites. and marshes received less thorough attention. White and light-gray areas on the map represent land where modern human activities such as farming, overgrazing, nonsustainable logging, draining, and residential and commercial development have destroyed or greatly altered the natural communities. Natural communities covered approximately 24,090 acres, or 3.6% of the land area of Clay County at the time of this survey. **UPLAND FORESTS** Dry Prairie - sand-gravel subtype - Dry to dry-mesic prairies on rolling glacial lake shoreline deposits Wet Prairie - seepage subtype - Wet prairies on organic-rich mineral soil formed in deposits associated with and on hilly collapsed glacial outwash. Typically dominated by some combination of the grasses big former shorelines of Glacial Lake Agassiz. Restricted to slightly sloping surfaces where groundwater seepage maintains high soil moisture levels but flooding is rare. Grasses dominate, but sedges are also a major component. Dominants and common associates typically include wet prairie species with the addition of **DECIDUOUS FOREST** bluestem, little bluestem, porcupine grass, prairie dropseed, side-oats grama, and june grass. Common graminoid associates are blue grama (Bouteloua gracilis), Wilcox's panic grass, needle-and-thread (Stipa MB Maple-Basswood Forest - Mesic forests on hilly glacial deposits with numerous kettle lakes. Canopy comata), plains muhly (Muhlenbergia cuspidata), sand reed grass (Calamovilfa longifolia), and thread-leaf several other associated species including marsh muhly grass (Muhlenbergia glomerata), fringed brome composition varies with slope and aspect, but dominant frees are generally sugar maple (Acer saccharum) sedge (Carex filifolia). Leadplant, prairie rose (Rosa arkansana), prairie willow (Salix humilis), and sand (Bromus ciliatus), tussock sedge (Carex stricta), prairie sedge (C. prairea), and inland sedge (C. interior)
Forb species diversity is high, and several distinctive species are usually present, such as swamp thistle asswood (Tilia americana), and oaks, principally red oak (Quercus rubra). Common canopy associates are cherry (Prunus pumila) are common low shrubs. Some of the more common typical forbs are, in addition to American elm (Ulmus americana), green ash (Fraxinus pennsylvanica), big-toothed aspen (Populus (Cirsium muticum), flat-topped aster (Aster umbellatus), and grass-of-parnassus (Parnassia glauca). Shrub species are the same as in wet prairies generally, but abundances are typically greater. Approximate total area: 450 acres. those listed above for the hill subtype, plaintain-leaved pussytoes (Antennaria plantaginifolia), wormwood grandidentata), and bur oak (Quercus macrocarpa). Ironwood (Ostrya virginiana) is the major subcanopy (Artemisia dracunculus), blanket-flower (Gaillardia aristata), skeleton-weed (Lygodesmia juncea), tree. The shrub layer is dominated by American hazelnut (Corylus americana), beaked hazelnut (C. cornuta), golden-aster (Heterotheca villosa), and plains paintbrush (Castilleja sessiliflora). chokecherry (Prunus virginiana), and sugar maple saplings. The herb layer is less diverse than in stands approximate total area: 1,980 acres. farther from the prairie margin. Common species are yellow and pale bellworts (Uvularia grandiflora and Wet Prairie - saline subtype - Level wet prairies on fine-textured loams formed in glacial lake sediments. Subject to temporary flooding, but water tables generally below the rooting zone for most of the growing U. sessilifolia, respectively), wild sarsaparilla (Aralia nudicaulis), pointed-leaved tick-trefoil (Desmodium Mesic Prairie - Wet-mesic to dry-mesic prairies on level to rolling glacial till and glacial lake sediments. glutinosum), and mountain rice-grass (Oryzopsis asperifolia). Round-lobed hepatica (Hepatica americana), blue cohosh (Caulophyllum thalictroides), American spikenard (Aralia racemosa), and early meadow-rue Dominants are some combination of the grasses big bluestem, Indian grass, and prairie dropseed. Common season. Elevated concentrations of salts (sulfates and carbonates of calcium and magnesium) in the rooting associated grasses are little bluestem, porcupine grass, Leiberg's panic grass (Panicum leibergii), and zone result in a distinctive vegetation, with bare, salt-encrusted patches often present. Major grasses are Thalictrum dioicum) are among the more habitat-specific species present. Approximate total area: 980 acres. mat muhly grass, northern reed grass, little bluestem, rough dropseed (Sporobolus asper), and switchgrass. switchgrass (Panicum virgatum). Leadplant is a common low shrub in mesic and dry-mesic conditions; fragrant false-indigo (Amorpha nana) replaces it in wet-mesic conditions. Wolfberry (Symphoricarpos Common associates are big bluestem, prairie cordgrass, wheatgrass, foxtail barley (Hordeum jubatum), and Oak Forest - dry subtype - Dry to dry-mesic forests on hilly glacial deposits, principally collapsed outwash. occidentalis) and prairie rose are other common low shrubs. Some of the more common typical forbs are clustered field sedge (Carex praegracilis). Several distinctive grasses are typically present, including saltgrass Canopy dominated by bur oak. Common canopy associates are green ash and American elm, with lesser (Distichlis stricta), alkali cordgrass (Spartina gracilis), Nuttall's alkali grass (Puccinellia nuttalliana), and plains bluegrass (Poa arida). Typically forb diversity is low, with heath aster (Aster ericoides) and western purple and white prairie clovers (Petalostemon purpureum and P. candidum, respectively), smooth rattlesnake amounts of basswood and trembling aspen (Populus tremuloides) and occasional black cherry (Prunus root (Prenanthes racemosa), prairie turnip (Psoralea esculenta), hoary puccoon (Lithospermum canescens), serotina). Shrub layer variably developed; American hazelnut dominates, with gray dogwood (Cornus northern bedstraw (Galium boreale), wood betony (Pedicularis canadensis), prairie larkspur (Delphinium ragweed (Ambrosia coronopifolia) abundant. Alkali plantain (Plantago eriopoda) and sea-blite (Suaeda foemina), chokecherry, and low juneberry (Amelanchier alnifolia) usually common. Important species in virescens), blazing stars (Liatris aspera and L. ligulistylis), heart-leaved alexanders (Zizia aptera), and; calceoliformis) are distinctive forbs. Approximate total area: 170 acres. the herb layer are wild sarsaparilla, yellow and pale bellworts, pointed-leaved tick-trefoil, hog peanut (Amphicarpaea bracteata), and Pennsylvania sedge (Carex pensylvanica). Approximate total area: 660 acres. lily (Lilium philadelphicum). Approximate total area: 4,570 acres. Wet Brush Prairie - Nearly level wet prairies on poorly drained sediments associated with glacial lake shorelines. The herbaceous layer is similar to that of wet prairie, but low-shrubs constitute 30-70% of the vegetative cover. Shrubs are mainly willows, including slender willow, pussy willow, and Bebb's willow, with red-osier dogwood also common. Approximate total area: 170 acres. Lowland Hardwood Forest - Mesic and wet-mesic forests along creeks and small rivers; lowest parts temporarily flooded during spring runoff. Canopy dominated by combinations of American elm, green ash, box elder (*Acer negundo*), and bur oak. Basswood and trembling aspen are less frequent associates; SHRUB WETLANDS peach-leaved willow (Salix amygdaloides) is typical along stream margins and abandoned channels. Map Wet Meadow - Open wetlands on very poorly drained mineral soil or shallow organic soil in glacial drainageways, closed depressions in hilly moraine, and broad low areas in the glacial lake basin. Seasonally units sometimes include forested sideslopes of small valleys. Bur oak is usually the dominant tree on drier Shrub Swamp - Wet, shrub-dominated communities on very poorly drained mineral soils or thin organic side slopes, especially south-facing ones. Approximate total area: 410 acres. soils in glacial drainageways, closed depressions in moraine, and broad low areas between glacial lake flooded, with persisting high water tables. Dominated by sedges, especially wooly sedge, Sartwell's sedge shorelines. Semipermanently flooded, or seasonally flooded with persisting high water tables. Shrub layer (Carex sartwellii), and slough sedge (C. atherodes), with grasses usually also important, especially prairie dominated by some combination of slender willow, pussy willow, Bebb's willow, and heart-leaved willow DECIDUOUS WOODLANDS / SAVANNAS Some typical forbs are swamp milkweed (Asclepias incarnata), common mint (Mentha arvensis), and swamp (V. trilobum), and swamp gooseberry (Ribes hirtellum) are among other typical shrub species. Small trees of smartweed (Polygonum coccineum). Shrubs may be common, mainly willows (slender, pussy, and Bebb's). **DECIDOUS WOODLAND** American elm, green ash, trembling aspen, and balsam poplar (P. balsamifera) are frequently present. Canopy height and cover depend upon recent fire history. Many of the grasses and sedges found in wet meadows and Aspen Woodland - Nearly level wet and wet-mesic woodlands in the Glacial Lake Agassiz interbeach zone. mixed emergent marshes also occur here, although much more sparsely. Among the more distinctive forbs are

Calcareous Seepage Fen - prairie subtype - Open wetlands on organic soil on slight slopes where upwelling ree canopy patchy, composed almost entirely of trembling aspen, with young trees predominating. Shrub jewel-weed (Impatiens capensis) and clearweed (Pilea fontana). Approximate total area: 1,150 acres. calcareous groundwater maintains saturated conditions but flooding is rare. Small, marly pools are a common layer dominated by willows (Salix spp.) and red-osier dogwood (Cornus stolonifera). Examples in this county feature. Mostly associated with glacial lake shorelines, but also on sides of glacial drainageways in hilly formed by post-settlement succession from wet brush-prairie. Prairie herbs are still present in more open **Shrub Swamp - seepage subtype -** Wet, shrub-dominated communities on organic soils on slight slopes where upwelling calcareous groundwater maintains saturated conditions but flooding is uncommon. On morainic areas. Dominated by grasses and sedges such as sterile sedge (Carex sterilis), prairie sedge, mat muhly places. Approximate total area: 160 acres. grass, marsh muhly grass, northern reed grass, and big bluestem. Some common associated graminoids sides of glacial drainageways in the morainic part of the county and below glacial lake shorelines. Often re tall cottongrass (*Ériophorum angustifolium*), wire-grass (*Carex lasiocarpa*), and tufted bulrush (*Scirpus* Oak Woodland-Brushland - Rolling to hilly dry-mesic woodlands on coarse textured soils formed in associated with calcareous seepage fens. Shrub layer dominated by some combination of bog birch, willows cespitosus), a diagnostic species. The forb component is diverse and includes most wet-prairie and meadow collapsed outwash. Tree canopy patchy, dominated by bur oak, with some green ash, American elm, black (mainly slender, pussy, Bebb's, and heart-leaved), and red-osier dogwood. Canopy height and cover of shrubs species as well as more distinctive species such as grass-of-parnassus (both Parnassia glauca and P. palustris), cherry, and trembling aspen. Shrub layer moderately dense, with the most common species being American depend upon recent fire history. Prairie sedge is common in the herbaceous layer, along with many typical false asphodel (Tofieldia glutinosa), Kalm's lobelia (Lobelia kalmii), and smallflower false foxglove (Agalinis hazelnut, chokecherry, gray dogwood, and smooth sumac (Rhus glabra). Prairie herbs common in more open species of seepage fens and wet meadows. Approximate total area: 1,720 acres. paupercula). Low shrubs are often common; bog birch (Betula glandulifera) and sage-leaved willow (Salix places. This type is mapped only as a component of dry prairie-woodland complexes (see below). candida) are most distinctive, but several other willows and red-osier dogwood are also typical. Approximate total area: 70 acres. **OPEN WETLANDS** Rich Fen - sedge subtype - Level wetlands on organic soil in large glacial meltwater channels within the Mesic Oak Savanna - Mesic savannas on undulating morainic deposits dotted with small lakes and wetlands. WET MEADOW / FEN morainic uplands. Seasonally flooded, with the water table remaining in the rooting zone for most of the ery patchy canopy dominated by bur oak, with some green ash, American elm, and trembling aspen. growing season. Dominated by wire-grass, water sedge (Carex aquatilis), and northern reed grass. Other avanna character is being obscured by successional development into woodland. Prairie species, big Wet Prairie - Nearly level prairies on mineral soil formed in glacial till, outwash, and glacial lake deposits. asses and sedges are generally the same as in calcareous seepage fens, but without sterile sedge or tufted bluestem (Andropogon gerardii) most conspicuously, are common in remaining openings. ypically located in shallow depressions where drainage is impeded, but flooding is only temporary and water pulrush. Patches of broad-leaved cattail (Typha latifolia) and common reed grass (Phragmites australis) are tables are below the rooting zone for most of the growing season. Dominated by graminoids, with grasses frequent. Forb diversity is generally low; marsh bellflower (Campanula aparinoides), tufted loosestrife more common than sedges. Major species are big bluestem, prairie cordgrass (Spartina pectinata), and (Lysimachia thyrsiflora), and northern bugleweed (Lycopus uniflorus) are common characteristic species. Low northern reed grass (Calamagrostis inexpansa). Common grass associates are mat muhly (Muhlenbergia **PRAIRIES** shrubs, primarily slender willow, are variably common. Brown mosses may be common, but Sphagnum richardsonis), switchgrass, wheatgrass (Agropyron trachycaulum), tufted hair grass (Deschampsia cespitosa), and sweet grass (Hierochloe odorata). Among the most common sedges are rigid sedge (Carex tetanica), and mosses (nutrient-poor fen indicators) are absent. Approximate total area: 30 acres. wooly sedge (C. lanuginosa). Forb species diversity is high in the moraine, lower in the lake plain. Among the more common typical species are New England aster (Aster novae-angliae), gayfeather (Liatris EMERGENT MARSH Dry Prairie - hill subtype - Dry to dry-mesic prairies on steep slopes in glacial till; slopes erosional (valley pycnostachya), white camas (Zigadenus elegans), golden alexanders (Zizia aurea), tall meadow rue (Thalictrum dasycarpum), Riddell's goldenrod (Solidago riddellii), and giant sunflower (Helianthus sideslopes) or depositional (hilly stagnation moraine) in origin. Typically dominated by some combination of the grasses big bluestem, little bluestem (Schizachyrium scoparium), porcupine grass (Stipa spartea), prairie dropseed (Sporobolus heterolepis), and side-oats grama (Bouteloua curtipendula). Common graminoid Mixed Emergent Marsh - Open, semipermanently flooded wetlands on mineral or shallow organic soils in glacial drainageways and closed depressions in the morainic parts of the county and in deeper depressions in the Glacial Lake Agassiz basin. Dominated by persistent emergent vegetation, primarily cattails (*Typha* spp.), hard-stemmed bulrush (*Scirpus acutus*), and common reed grass, often in a mosaic of single-species patches. giganteus). Shrubs are sometimes common, including pussy willow (Salix discolor), Bebb's willow bebbiana), slender willow (S. gracilis), meadowsweet (Spiraea alba), and red-osier dogwood. associates are Indian grass (Sorghastrum nutans), june grass (Koeleria macrantha), Wilcox's panic grass (Panicum wilcoxianum), and sun-loving sedge (Carex heliophila). Leadplant (Amorpha canescens) is a common low shrub. Some of the more common typical forbs are pasqueflower (Pulsatilla nuttalliana), dotted blazing star (Liatris punctata), purple coneflower (Echinacea angustifolia), and prairie milk vetch (Astragalus Common associates are slough sedge, lake sedge (Carex lacustris), beaked sedge (C. rostrata), water sedge, and spikerushes (*Eleocharis* spp.). Among the typical forbs are marsh marigold (*Caltha palustris*), water parsnip (*Sium suave*), and water-plantain (*Alisma triviale*). Approximate total area: 1,120 acres. adsurgens). Woody vegetation, including chokecherry, wild plum (Prunus americana), low juneberry, smooth sumac, bur oak, and black cherry, is often present in draws and on north-facing slopes. NATURAL COMMUNITY COMPLEXES<sup>5</sup> Approximate total area: 330 acres. Agassiz Beach Ridge Prairie Complex - Mosaics of level to gently undulating prairie and wetland in the nterbeach zone of the Agassiz Lacustrine Plain. Dry prairie - sand gravel subtype occupies the driest shoreline features. Other community types usually present include mesic prairie and wet prairie. Wet meadow and mixed emergent marsh may also be present. Approximate total area: 1,630 acres. RARE SPECIES AND ANIMAL AGGREGATIONS Prairie-Wetland Complex - Mosaics of mainly wet prairie and other open wetlands in the interbeach zone of the Agassiz Lacustrine Plain and in the gently undulating to gently rolling morainic eastern part of the county. Principal community types present are wet prairie, wet meadow, and mixed emergent marsh. Mesic prairie and shrub swamp may also occur. Approximate total area: 2,360 acres. Locations of rare plants, rare animals, and selected animal aggregations are maintained in the Natural Heritage Information System. The following rare species and animal aggregations have been found in Clay County. Mapped locations include both historical records and MCBS field results. Most MCBS plant and animal survey was done in 1987-88, with some additional survey in 1994 Dry Prairie-Woodland Complex - Mosaics of dry prairie and oak woodland and forest in hilly collapsed outwash in the eastern part of the county. Dry prairie - sand gravel subtype, oak woodland-brushland, and oak forest - dry subtype are the main constituent community types; mesic prairie is sometimes present. (plants) and 1995 (birds). Most rare species are protected under the provisions of the Federal Endangered Species Act or the linnesota Endangered Species Statute and associated Rules $^{\circ}$ , or were protected when the MCBS was conducted in the County $^{7}$ Approximate total area: 520 acres. An asterisk (\*) indicates that no recent observation (1970-present) of that species has been confirmed. A dagger (†) indicates that there are no precise (mappable) records of that species. ♦ Animals, federally- or state-listed ★ Plants, federally- or state-listed (Aristida purpurea var. longiseta) Prairie moonwort (Botrychium campestre) Plains reedgrass (Calamagrostis montanensis) (Perognathus flavescens) Plains pocket mouse MISCELLANEOUS FEATURES<sup>8</sup> Hall's sedge (Carex hallii) MINNESOTA COUNTY BIOLOGICAL SURVEY Blunt sedge (Carex obtusata) Northern singlespike sedge (Carex scirpoidea) Baird's sparrow (Ammodramus bairdii) Section lines Supervisor Carmen Converse Sterile sedge (Carex sterilis) (Ammodramus henslowii (Carex xerantica) (Anthus spragueii) ---- City and township lines (Calcarius ornatus) Wild parsley \* Robert Dana, Plant Ecologist and Lepidopterist (Cumopteris acaulis) Yellow rail (Coturnicops noveboracensis, — Managed area statutory boundaries Keith Wendt, Plant Ecologist Small white lady's-slipper Cypripedium candidum Loggerhead shrike (Lanius ludovicianus) (WMA = State Wildlife Management Area) Few-flowered spike-rush eocharis quinqueflora Marbled godwit (Limosa fedoa) (SNA = State Scientific and Natural Area) aillardia aristata) Wilson's phalarope † Phalaropus tricolor (WPA = Federal Waterfowl Production Area) Elmer Birney, Mammal Survey Supervisor Gentiana affinis) Northern gentian Burrowing owl entianella amarella ssp. acuta) Greater prairie-chicken (Tympanuchus cupido) Disturbed land within managed area boundaries Helianthus nuttallii ssp. rydbergii) Nuttall's sunflower ' Carolyn Ferrell Clustered broomrape Orobanche fasciculata) Louisiana broomrape robanche ludoviciana) Western hognose snake (Heterodon nasicus) Bonita Eliason, Bird Survey Supervisor

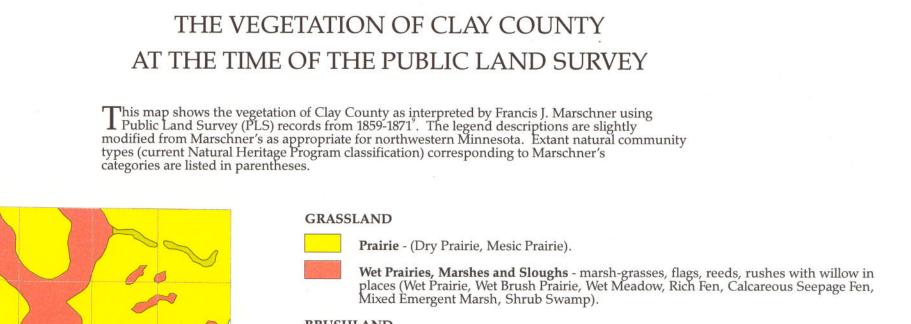
— Secondary roads

Rivers, streams, and ditches

Lakes and Rivers - open water, sometimes with beds of submergent

vegetation. Approximate total area: 4,780 acres.

---- Other roads



Animals, state-listed March 1984 - June 1996

Lake sturgeon

Assiniboia skipper

Powesheik skipper

**Butterflies** 

Brush Prairie - grass and brush of bur oak, hazel, and aspen (Oak Woodland-Brushland;

most surviving areas have succeeded to Oak Forest, or Aspen Woodland).

(Acipenser fulvescens)

(Hesperia dacotae)

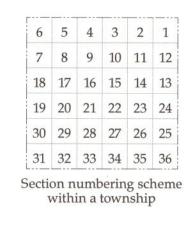
(Oarisma powesheik)

(Oeneis uhleri varuna)

(Hesperia comma assiniboia)

Oak Openings and Barrens - scattered trees and groves of bur oaks of scrubby form with some brush and thickets (Mesic Oak Savanna, Oak Woodland-Brushland; most surviving areas have succeeded to Oak Forest; PLS records document a small area of presettlement Maple-Basswood Forest within the area mapped by Marschner as Oak Openings and Barrens). HARDWOOD FOREST Big Woods - oaks (bur and red), elm, basswood, green ash, sugar maple, hornbeam, aspen, white birch, and wild cherry (Maple-Basswood Forest; examination of the PLS records indicates that all areas in Clay County mapped by Marschner as Big Woods should have been classified as Oak Openings and Barrens, although as mentioned above some Big Woods should have been mapped within the large area mapped as Oak

River Bottom Forest - elm, green ash, boxelder, bur oak, basswood, aspen, cottonwood, and willow (Lowland Hardwood Forest).





**FOOTNOTES** 1. Minnesota Natural Heritage Program. 1993. Minnesota's native vegetation: A key to natural communities, version 1.5. Minnesota Department of Natural Resources, St. Paul, Minnesota. 111 pp.

conditions as of the 1991 aerial photography.

John Moriarity, Herpetologist

Mary Miller, Data Manager Sharron Nelson, Data Manager B.J. Farley, Printing Coordinator

Al Epp, Computer Cartographer Tom Klein, Digitizer

Map Production Staff

2. The Minnesota County Biological Survey is a systematic survey of rare biological features. The goal of the Survey is to identify significant natural areas and to collect and interpret data on the distribution and ecology of rare plants, rare animals, and natural communities. 3. Natural community boundaries were delineated using 1:65,000 color infrared (CIR) aerial photography taken 22 April and 2 May 1982 (National Aeronautics and Space Administration, Ames Research Center) and 1:40,000 CIR aerial photography taken in April 1991 (National Aerial Photography Program, USGS, U.S. Department of the Interior). Photocopies of black and white aerial photographs obtained from the Clay County office of the Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture (various dates, scale approximately 1:7900) were also used. Natural community boundaries reflect

Various DNR regional and area staff assisted with field work and map review. The staff

ltural Stabilization and Conservation Service provided aerial imagery of selected sites. Richard Pemble, Moorhead State University, shared the results of the survey he did

aerial photography and stereo viewing equipment. The Clay County office of the

for the U.S. Fish and Wildlife Service of prairie and savanna remnants on Waterfowl Production Areas in Clay Co. We sincerely thank all of these individuals and agencies for

Acreage figures are approximate to the nearest ten acres. 5. Complexes are mapped where the patch size of the constituent community types is too small for mapping at the standard MCBS scale (1:24,000), or where available information is insufficient for confident mapping of boundaries within mosaics of types.

6. Endangered Species Act of 1973 (16 USCA 1531 et seq.); Minnesota Statutes, section 84.0895, and Minnesota Rules, Parts 6212.1800 to 6212.2300. Additional information on rare species is available in Minnesota's endangered flora and fauna, edited by B. Coffin and L. Pfannmuller, University of Minnesota Press, Minneapolis, 1988.

7. Data are available from the Minnesota Natural Heritage Information System, Department of Natural Resources, St. Paul, Minnesota. Phone (612) 296-2835. 8. Civil division, transportation, water features, and some managed area boundary data were obtained from the Department of Natural Resources, St. Paul, Minnesota. Waterfowl Production Area boundary data were obtained from the U.S. Fish and Wildlife Service. Land ownership within managed areas is sometimes obscured by natural community map units. Every effort was made to obtain current versions of these data; however, errors may

 Marschner, F. J. 1974. The original vegetation of Minnesota (map, scale 1:500,000).
 USDA Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota (redraft of the original 1930 edition). The Public Land Survey records include information about the trees that were marked as "witness" or "bearing" trees at the section, quarter-section, and meander corners: the kind of tree, diameter at breast height, distance from the corner, and compass direction. Also included are notes about features encountered along section lines and summary descriptions of each township.

Western prairie fringed

Drummond's campion

☆ Plants, state-listed March 1984 - June 1996

Hair-like beak-rush

Alkali cord-grass

Marsh arrow-grass

Colonial waterbird nesting sites

Prairie chicken booming grounds

False asphodel

(Platanthera praeclara)

Scleria verticillata)

(Silene drummondii)

(Spartina gracilis)

riglochin palustris)

Rhynchospora capillacea)

Minnesota County Biological Survey Map Series No. 12 (1997) Clay County, Minnesota