MINNESOTA COUNTY BIOLOGICAL SURVEY
Department of Natural Resources
Division of Fish and Wildlife
Section of Ecological Services
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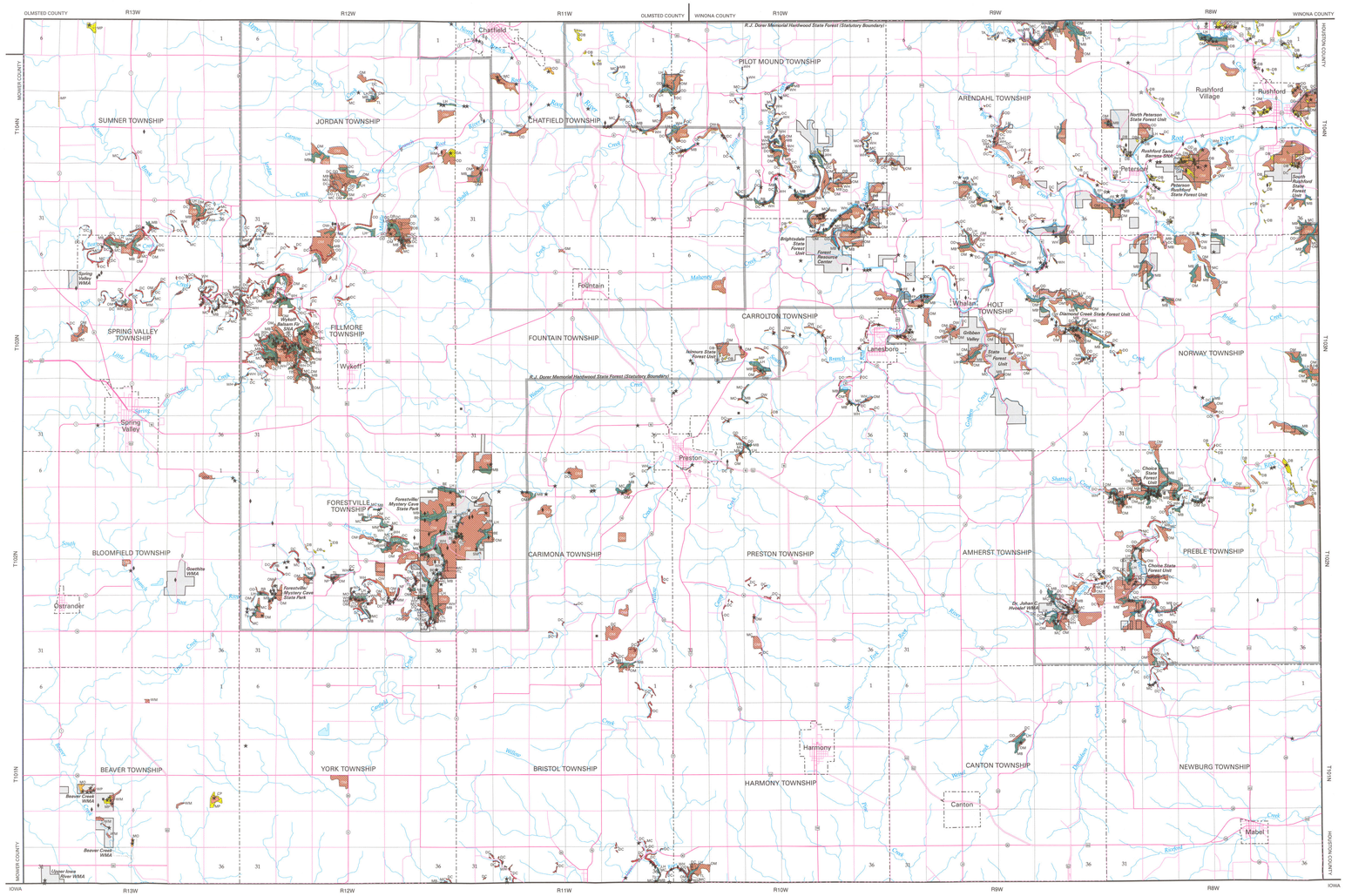
Minnesota County Biological Survey Map Series No. 15 (1997)
Fillmore County, Minnesota

NATURAL COMMUNITIES AND RARE SPECIES OF FILLMORE COUNTY, MINNESOTA

by the
Minnesota County Biological Survey[1]



UPLAND FORESTS

DECIDUOUS FOREST

OAK **Oak Forest - mesic subtype** - dry-mesic to mesic forests on outwash, colluvium, thick loess, or glacial till; present on lower portions of south- to west-facing slopes, on upper portions of north- to east-facing slopes, and on broad ridge crests or rolling upland plains; canopy dominated by one or more oak species, including red oak (*Quercus rubra*), white oak (*Quercus alba*), and northern pin oak (*Quercus ellipsoidalis*), with colonies of big-toothed aspen (*Populus grandidentata*); common canopy and subcanopy associates are shagbark hickory (*Carya ovata*) (absent in western Fillmore County), black cherry (*Prunus serotina*), ironwood (*Ostrya virginiana*), butternut (*Juglans cinerea*), black walnut (*Juglans nigra*), bitternut hickory (*Carya cordiformis*), hackberry (*Celtis occidentalis*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), basswood (*Tilia americana*), and sugar maple (*Acer saccharum*); ground layer dominated by summer-blooming species such as pointed-leaved tick-trefoil (*Desmodium glutinosum*), wild geranium (*Geranium maculatum*), and white snakeroot (*Eupatorium rugosum*). Approximate total area: 9,650 acres.

OSO **Oak Forest - dry subtype** - dry forests on thin loess on outwash sand terraces and on very steep, upper portions of south- to west-facing slopes, narrow ridge crests, cliff edges, and bedrock bench terraces; canopy dominated by one or more oak species, including bur oak (*Quercus macrocarpa*), white oak, northern pin oak, and black oak (*Quercus velutina*); common canopy and subcanopy associates include paper birch (*Betula papyrifera*) and quaking aspen (*Populus tremuloides*); ground layer dominated by summer-blooming species such as elm-leaved goldenrod (*Solidago ulmifolia*) and woodland sunflower (*Helianthus strumosus*); also abundant are shining bedstraw (*Galium concinnum*), hog-peanut (*Amphicarpaea bracteata*), and Pennsylvania sedge (*Carex pensylvanica*). Approximate total area: 1,060 acres.

MB **Maple-Basswood Forest** - mesic to wet-mesic forests on alluvium, colluvium, or loess; usually on lower, north- to east-facing slopes and channeled alluvial plains of small valleys; in southeastern Fillmore County present on slopes of bluffs along the Root River; canopy dominated by sugar maple, basswood, and red oak; canopy and subcanopy associates include ironwood, black walnut, bitternut hickory, black ash (*Fraxinus nigra*), slippery elm, and American elm; characteristic shrubs include leatherwood (*Dirca palustris*), bladdernut (*Staphylea trifolia*), beaked hazelnut (*Corylus cornuta*), and round-leaved dogwood (*Cornus rugosa*); ground layer dominated by spring-blooming species such as spring beauty (*Claytonia virginica*), toothwort (*Dentaria laciniata*), and Dutchman's breeches (*Dicentra cucullaria*); ground often bare by mid-summer. Approximate total area: 2,170 acres.

EH **Lowland Hardwood Forest** - wet-mesic forests present above normal flood levels on channeled alluvial plains in small to medium-sized valleys; canopy dominated by any combination of sugar maple, basswood, bur oak, black ash, black walnut, slippery elm, American elm, green ash (*Fraxinus pennsylvanica*), hackberry, cottonwood (*Populus deltoides*), and willows (*Salix* spp.); early in year ground layer contains spring-blooming species such as false rue-anemone (*Isopyrum biternatum*), but becomes dominated later in season by cleavers (*Galium aparine*) and wood nettle (*Laportea canadensis*). Approximate total area: 1,400 acres.

MIXED CONIFEROUS-DECIDUOUS FOREST

WH **White Pine-Hardwood Forest** - dry to mesic forests on steep slopes, usually associated with cliffs and bedrock outcrops, or on outwash sand terraces; canopy dominated by white pine (*Pinus strobus*); canopy associates on dry to dry-mesic sites are northern pin oak, black oak, red oak, and bur oak; canopy associates on mesic sites are sugar maple and basswood; white pine is often the only species that distinguishes this community type from oak or maple-basswood forests. Approximate total area: 430 acres.

BP **Northern Hardwood-Conifer Forest** - mesic to wet-mesic forests on very steep north-facing bluffs, usually associated with cliffs, talus slopes, and bedrock outcrops; canopy includes any combination of balsam fir (*Abies balsamea*) (absent in eastern Fillmore County), white pine, and yellow birch (*Betula alleghaniensis*); often associated with rich maple-basswood forests and contain species restricted to cool, moist slopes; shrub layer includes Canada yew (*Taxus canadensis*), high-bush cranberry (*Viburnum trilobum*), and mountain maple (*Acer spicatum*); ground layer includes such species as rose twisted-stalk (*Streptopus roseus*), nodding wild onion (*Allium cernuum*), dwarf scouring-rush (*Equisetum scirpoides*), and, rarely, bunchberry (*Cornus canadensis*). Approximate total area: 20 acres.

WOODLANDS / SAVANNAS

DECIDUOUS WOODLAND

DW **Oak Woodland-Brushland** - dry woodlands on thin loess on very steep, upper portions of south- to west-facing slopes with exposed bedrock and on narrow ridge crests; tree canopy cover <70%; canopy dominated by oak species, including bur oak, white oak, northern pin oak, and black oak, often as open-grown trees; common canopy associates are paper birch, quaking aspen, and red cedar (*Juniperus virginiana*); subcanopy generally absent; shrub layer often dense [>50% cover] and dominated by prickly ash (*Zanthoxylum americanum*), American hazelnut (*Corylus americana*), gray dogwood (*Cornus foemina* ssp. *racemosa*), and smooth sumac (*Rhus glabra*); ground layer similar to that of oak forest - dry subtype but with scattered prairie openings. Approximate total area: 460 acres.

DECIDUOUS SAVANNA

DO **Dry Oak Savanna** - subtype not differentiated - dry savannas or oak groves on rocky colluvium on south-facing bluffs or on thin loess over bedrock on ridge crests; canopy cover <70%, dominated by open-grown bur oak, northern pin oak, and white oak; subcanopy usually absent; shrub layer cover <30%; common graminoids are little bluestem (*Schizachyrium scoparium*), Pennsylvania sedge, big bluestem (*Andropogon gerardii*), and side-oats grama (*Bouteloua curtipendula*); common forbs and shrubs include alumroot (*Heuchera richardsonii*), purple milkwort (*Polygala sanguinea*), wood-betony (*Pedicularis canadensis*), and leadplant (*Amorpha canescens*). Approximate total area: 30 acres.

DN **Dry Oak Savanna - barrens subtype** - dry savannas on outwash sand terraces; tree canopy cover <70%, dominated by black oak, northern pin oak, and bur oak; subcanopy usually absent; shrub layer cover <30%; ground layer dominated by graminoids and forbs typical of dry prairie - barrens subtype; jack pine barrens, and oak woodland-brushland. Approximate total area: 50 acres.

MO **Mesic Oak Savanna** - dry-mesic to wet-mesic savannas or oak groves on alluvial sand and gravel deposited by glacial outwash; canopy cover <70%, dominated by bur oak with northern pin oak and quaking aspen; subcanopy patchy: shrub cover <30%, with thickets of wild plum (*Prunus americana*), quaking aspen, and occasionally spiraea (*Spiraea alba*); ground layer in depressions and swales with blue-joint grass (*Calamagrostis canadensis*) and prairie cordgrass (*Spartina pectinata*); well-drained areas with little bluestem, Indian grass (*Sorghastrum nutans*), and big bluestem; forb species a combination of those typical of wet meadows and dry prairies. Approximate total area: 20 acres.

CONIFEROUS SAVANNA

JB **Jack Pine Barrens** - dry savannas on outwash sand terraces; tree canopy cover 10-70%, with jack pine (*Pinus banksiana*), black oak, northern pin oak, big-toothed aspen, and white oak; ground layer includes bracken fern (*Pteridium aquilinum*), Pennsylvania sedge, pipsissewa (*Chimaphila umbellata*), blueberry (*Vaccinium angustifolium*), and bearberry (*Arctostaphylos uva-ursi*). Approximate total area: 10 acres.

PRAIRIES

UPLAND PRAIRIE

OA **Dry Prairie - barrens subtype** - dry prairies on outwash sand terraces; common graminoids are little bluestem, Indian grass, side-oats grama, Junegrass (*Koeleria macrantha*), big bluestem, and Schweinitz's nut-sedge (*Cyperus schweinitzii*); common forbs are goat's-rue (*Tephrosia virginiana*), wild lupine (*Lupinus perennis*), horsemint (*Monarda punctata*), and hairy puccoon (*Lithospermum carolinense*). Approximate total area: 60 acres.

DB **Dry Prairie - bedrock bluff subtype** - dry prairies on colluvium and loess over bedrock on steep south- to west-facing bluff slopes; exposed bedrock common; common graminoids are little bluestem, big bluestem, Indian grass, side-oats grama, porcupine grass (*Stipa spartea*), prairie dropseed (*Sporobolus heterolepis*), and plains muhly (*Muhlenbergia cuspidata*); common forbs are silky aster (*Aster sericeus*) and gray goldenrod (*Solidago nemoralis*); leadplant (*Amorpha canescens*) is a common shrub. Approximate total area: 370 acres.

MRP **Mesic Prairie** - mesic prairies on rolling glacial till plains; dominant graminoids include big bluestem, Indian grass, and blue-joint grass; forb species include compass-plant (*Silphium laciniatum*), tuberous Indian-plantain (*Arnoglossum plantagineum*), and white wild indigo (*Baptisia alba*). Approximate total area: 90 acres.

FORESTED WETLANDS

FLOODPLAIN FOREST

FF **Floodplain Forest** - lowland forests on broad, seasonally flooded alluvial plains along the Root River; canopy dominated by any combination of silver maple (*Acer saccharinum*), box-elder (*Acer negundo*), bur oak, black walnut, green ash, hackberry, American elm, and slippery elm, with occasional stands of willow and cottonwood. Approximate total area: 250 acres.

HARDWOOD SWAMP FOREST

BK **Black Ash Swamp - seepage subtype** - wet forests on saturated organic soil in groundwater seepage areas in upland ravines, on bedrock bench terraces, and on alluvial plains; in low wet areas canopy is dominated by black ash; on mounds and slopes canopy includes American elm, slippery elm, sugar maple, basswood, and bur oak; in shady areas ground layer contains skunk cabbage (*Symplocarpus foetidus*), wood-reedgrass (*Cinna arundinacea*), crooked aster (*Aster prenanthoides*), and, rarely, false mermaid (*Floerkea proserpinacoides*); in sunny areas ground layer has plants typical of wet meadows, including marsh-marigold (*Caltha palustris*), marsh milkweed (*Asclepias incarnata*), fowl manna grass (*Glyceria striata*), and, rarely, Loesel's twayblade (*Liparis loeselii*). Approximate total area: 20 acres.

OPEN WETLANDS

WET MEADOW / FEN

CP **Calcareous Seepage Fen** - open wetlands on organic soil on gentle slopes in areas saturated by calcareous groundwater seeping from glacial till and gravel; dominated by tussock sedge (*Carex stricta*), prairie sedge (*Carex prairea*), and wiregrass (*Carex lasiocarpa*); characteristic shrubs include bog birch (*Betula glandulifera*) and sage-leaved willow (*Salix candida*); forbs include swamp saxifrage (*Saxifraga pensylvanica*), cowbane (*Oxypolis rigidior*), and valerian (*Valeriana edulis*). Approximate total area: 20 acres.

WP **Wet Prairie** - wet prairies on poorly drained mineral soil in swales on glacial till; dominated by swards of prairie cordgrass, usually mixed with areas containing species typical of wet meadows and mesic prairies, including tussock sedge, water sedge (*Carex aquatilis*), wooly sedge (*Carex lanuginosa*), blue-joint grass, and big Bluestem; other species include eastern marsh-bellflower (*Campanula aparinoides*), Culver's root (*Veronicastrum virginicum*), and golden ragwort (*Senecio aureus*). Approximate total area: 10 acres.

SM **Seepage Meadow** - open wetlands on organic soil in areas saturated by groundwater discharge into alluvial depressions and old stream channels or onto bench terraces; shallow pools common; vegetation similar to that of wet prairies but dominated by tussock sedge, lake sedge (*Carex lacustris*), and blue-joint grass; sometimes present are smooth-sheathed sedge (*Carex laevivaginata*), boneset (*Eupatorium perfoliatum*), swamp lousewort (*Pedicularis lanceolata*), northern marsh fern (*Thelypteris palustris*), and, rarely, wild rice (*Zizania aquatilis*). Approximate total area: 30 acres.

WM **Wet Meadow** - open wetlands on poorly drained mineral soil, sand, and gravel in alluvial or eolian depressions at bases of stream terraces or along spring-fed swales on glacial till plains; shallow pools common; vegetation similar to that of seepage meadows and wet prairies, often with one or more distinct zones dominated by different species, including blue-joint grass, hairy-fruited sedge (*Carex trichocarpa*), tussock sedge, Buxbaum's sedge (*Carex buxbaumii*), prairie cordgrass, lake sedge, bristly sedge (*Carex comosa*), and broad-leaved cattail (*Typha latifolia*). Approximate total area: 110 acres.

BEDROCK AND BEACH COMMUNITIES

RB **River Beach** - sand or gravel beaches along banks and islands of the Root River; maintained by fluctuating water levels and scouring floods; common species include blue monkey-flower (*Mimulus ringens*), tall coneflower (*Rudbeckia laciniata*), and sandbar willow (*Salix exigua*). Approximate total area: 30 acres.

MCI **Moist Cliff** - moist to wet communities on shaded north- to east-facing limestone, dolomite, or sandstone cliffs (including surrounding talus and steep colluvium); mosses and foliose lichens common; vascular plants include jeweled shooting star (*Dodecatheon amethystinum*), Mackay's brittle fern (*Cystopteris tenuis*), slender cliff-brake (*Cryptogramma stelleri*), and species typical of adjacent mesic forests, such as miterwort (*Mitella diphylla*). Approximate total area: 380 acres.

MMI **Moist Cliff - maderate subtype** - moist to wet communities on north-facing limestone cliffs in western Fillmore County; restricted to areas continuously cooled by air and water draining from upland sinkholes through ice-filled caves and fissures behind the rock face; often heavily moss-covered, with liverworts and lichens common; vascular plants similar to those of moist cliffs; cool microhabitat supports relict populations of rare land snail and plant species that were more widespread in the region during the Pleistocene epoch when the climate was cooler; among the plants are Leedy's roseroot (*Sedum integrifolium* ssp. *leedyi*) and rock whitlow-grass (*Draba arabisans*). Approximate total area: 40 acres.

DCC **Dry Cliff** - dry communities on exposed south- to southwest-facing limestone, dolomite, or sandstone cliffs (including adjacent talus and steep colluvium); crustose lichens common; vascular plants sparse but include smooth cliff-brake (*Pellaea glabella*), columbine (*Aquilegia canadensis*), harebell (*Campanula rotundifolia*), and cliff goldenrod (*Solidago sciaphila*); often associated with dry prairies. Approximate total area: 1,290 acres.

TS **Talus Slope** - dry to wet-mesic communities on accumulations of rock fragments and soil at bases of limestone or dolomite cliffs or on very steep slopes; often sparsely vegetated or covered with mosses, ferns, and pale touch-me-not (*Impatiens pallida*); species on north-facing talus slopes are similar to those of northern hardwood-conifer forests. Approximate total area: 10 acres.

TL **Talus Slope - algific subtype** - wet to mesic communities on thin soil over talus (see above); restricted to areas cooled by air draining from upland sinkholes through ice-filled caves and fissures within the bedrock; generally on very steep, north-facing slopes; persistently cool talus slopes associated with Galena bedrock formations in western Fillmore County suggest relict populations of rare land snail and plant species that were more widespread in the region during the Pleistocene epoch when the climate was cooler; among the plants are Iowa golden saxifrage (*Chrysosplenium iowense*), tall lungwort (*Mertensia paniculata*), alder buckthorn (*Rhamnus alnifolia*), and balsam fir; algific talus slopes associated with Prairie du Chien formations in eastern Fillmore County do not have cold air flow throughout summer and lack the aforementioned species; algific talus slopes are usually associated with northern hardwood-conifer forests. Approximate total area: 60 acres.

RARE SPECIES AND ANIMAL AGGREGATIONS

Locations of rare plants, rare animals, and selected animal aggregations are maintained in the Natural Heritage Information System[7]. The following rare species and animal aggregations have been found in Fillmore County. Mapped locations include both historical records and Minnesota County Biological Survey field results. Most Minnesota County Biological Survey plant and animal surveys were done from 1993 to 1996. Most rare species are protected under the provisions of the Federal Endangered Species Act or the Minnesota Endangered Species Statute and associated Rules[8]. An asterisk (*) indicates that no recent observation (1970-1996) of that species has been confirmed. A dagger (†) indicates that the species has been documented in the county but its exact location is unknown.

★ Plants, federally- or state-listed

Moschatel	(*Adoxa moschatellina*)
Nodding wild onion	(*Allium cernuum*)
Sea-beach needlegrass	(*Aristida tuberculosa*)
Tuberous Indian-plantain	(*Arnoglossum plantagineum*)
Clasping milkweed	(*Asclepias amplexicaulis*)
Sullivant's milkweed	(*Asclepias sullivantii*)
Ebony spleenwort	(*Asplenium platyneuron*)
Short's aster	(*Aster shortii*)
White wild indigo	(*Baptisia alba*)
Plains wild indigo	(*Baptisia bracteata* var. *leucophaea*)
Sweet-smelling Indian-plantain	(*Cacalia suaveolens*)
Yellow-fruited sedge	(*Carex annectens*)
Carey's sedge	(*Carex careyana*)
James' sedge	(*Carex jamesii*)
Smooth-sheathed sedge	(*Carex laevivaginata*)
Spreading sedge	(*Carex laxiculmis*)
Wood's sedge	(*Carex woodii*)
Iowa golden saxifrage	(*Chrysosplenium iowense*)
Hill's thistle	(*Cirsium hillii*)
Small white lady's-slipper	(*Cypripedium candidum*)
Stemless tick-trefoil	(*Desmodium mudiflorum*)
American beakgrain	(*Diarrhena obovata*)
Squirrel-corn	(*Dicentra canadensis*)
Narrow-leaved spleenwort	(*Diplazium pycnocarpon*)
Rock whitlow-grass	(*Draba arabisans*)
Goldie's fern	(*Dryopteris goldiana*)
Rattlesnake-master	(*Eryngium yuccifolium*)
Wahoo-leaved	(*Euonymus europaea*)
Wild hazelnut	(*Hamamelis virginiana*)
Golden-seal	(*Hydrastis canadensis*)
Purple rocket	(*Iodanthus pinnatifidus*)
Twinleaf	(*Jeffersonia diphylla*)
Butternut	(*Juglans cinerea*)
Narrow-leaved pinweed	(*Lechea tenuifolia*)
Three-flowered melic	(*Melica nitens*)
Rock sandwort	(*Minuartia dawsonensis*)
Glade mallow	(*Napaea dioica*)
Clustered broomrape	(*Orobanche fasciculata*)
One-flowered broomrape	(*Orobanche uniflora*)
American ginseng	(*Panax quinquefolius*)
Canadian forked chickweed	(*Paronychia canadensis*)
Wild quinine	(*Parthenium integrifolium*)
Purple cliff-brake	(*Pellaea atropurpurea*)
Broad beech-fern	(*Phegopteris hexagonoptera*)
Western prairie fringed orchid [9] †	(*Platanthera praeclara*)
Wolf's bluegrass	(*Poa wolfii*)
Prairie-parsley *	(*Polytaenia nuttallii*)
Slender-leaved scurf pea	(*Pseudalsine tenuifolia*)
Beaked snakeroot	(*Sanicula trifoliata*)
Leedy's roseroot	(*Sedum integrifolium* ssp. *leedyi*)
Snowy campion	(*Silene nivea*)
Cliff goldenrod	(*Solidago sciaphila*)
Reniform sullivantia	(*Sullivantia sullivantii*)
Rough-seeded fameflower	(*Talinum rugospermum*)
Goat's-rue	(*Tephrosia virginiana*)
Snow trillium	(*Trillium nivale*)
Valerian	(*Valeriana edulis* var. *ciliata*)
Narrow-leaved vervain * †	(*Verbena simplex*)

☆ Plants, previously state-listed[7]

Illinois tick-trefoil	(*Desmodium illinoense*)
Canadian black snakeroot	(*Sanicula canadensis*)
Ohio spiderwort	(*Tradescantia ohiensis*)

♦ Animals, federally- or state-listed

Mammals

Prairie vole * †	(*Microtus ochrogaster*)
Northern myotis	(*Myotis septentrionalis*)
Eastern pipistrelle	(*Pipistrellus subflavus*)
Eastern spotted skunk * †	(*Spilogale putorius*)

Birds

Henslow's sparrow	(*Ammodramus henslowii*)
Red-shouldered hawk	(*Buteo lineatus*)
Cerulean warbler	(*Dendroica cerulea*)
Acadian flycatcher	(*Empidonax virescens*)
Bald eagle	(*Haliaeetus leucocephalus*)
Loggerhead shrike	(*Lanius ludovicianus*)
Louisiana waterthrush	(*Seiurus motacilla*)

Amphibians and Reptiles

Northern cricket frog †	(*Acris crepitans*)
Racer	(*Coluber constrictor*)
Timber rattlesnake	(*Crotalus horridus*)
Blanding's turtle	(*Emydoidea blandingii*)
Five-lined skink	(*Eumeces fasciatus*)
Gopher snake	(*Pituophis catenifer*)

Fish

Gravel chub	(*Erimystax x-punctata*)
Ozark minnow	(*Notropis nubilus*)

Mollusks

Minnesota pleistocene ambersnail	(*Novisuccinea n. sp. minnesota a*)
Iowa pleistocene ambersnail	(*Novisuccinea n. sp. minnesota b*)
Midwest glyphite	(*Vertigo hubrichti hubrichti*)
Variable pleistocene vertigo	(*Vertigo hubrichti variabilis n. subsp.*)

◊ Animals, previously state-listed[7]

Birds

Upland sandpiper	(*Bartramia longicauda*)

Amphibians and Reptiles

Fox snake	(*Elaphe vulpina*)
Milk snake	(*Lampropeltis triangulum*)
Pickerel frog	(*Rana palustris*)

Fish

American brook lamprey	(*Lampetra appendix*)
Black redhorse	(*Moxostoma duquesnei*)
Shovelnose sturgeon	(*Scaphirhynchus platorynchus*)

● Animal Aggregations

Bat concentration
Colonial waterbird nesting site

THE VEGETATION OF FILLMORE COUNTY AT THE TIME OF THE PUBLIC LAND SURVEY

This map shows the vegetation of Fillmore County as interpreted by Francis J. Marschner using Public Land Survey records from 1853-1854. The legend descriptions are slightly modified from Marschner's as appropriate for southeastern Minnesota. Extant natural community types[7] corresponding to Marschner's categories are listed in parentheses.

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Section numbering scheme within a township

HARDWOOD FOREST

Upland Deciduous Forest - bur oak, white oak, red oak, northern pin oak, elm, basswood, ash, maple, hornbeam, aspen, birch (Oak Forest, Maple-Basswood Forest, Lowland Hardwood Forest, White Pine-Hardwood Forest, Northern Hardwood-Conifer Forest, Black Ash Swamp).

River Bottom Forest - elm, ash, cottonwood, bowlider, silver maple, willow, aspen, hackberry (Floodplain Forest).

BRUSHLAND

Brush Prairie - grass and brush of oak and aspen (Oak Woodland-Brushland, Oak Savanna).

Oak Openings and Barrens - scattered trees and groves of oaks of scrubby form with some brush and thickets (Dry Oak Savanna, White Pine-Hardwood Forest, Northern Hardwood-Conifer Forest, Black Ash Swamp).

Aspen-Oak Land - aspen, generally dense, and small in most places, with scattered oaks and few elms, ash and basswood (Oak Forest, early successional stage).

GRASSLAND

Prairie - (Dry Prairie, Mesic Prairie).

Wet Prairies, Marshes and Sloughs - marsh-grasses, flags, rushes, wild rice; with willow in some places (Calcareous Seepage Fen, Wet Prairie, Seepage Meadow, Wet Meadow).

MISCELLANEOUS FEATURES[9]

- Section lines
- City and township lines
- Managed area statutory boundaries (WMA = State Wildlife Management Area) (SNA = State Scientific and Natural Area)
- Disturbed land in public ownership within statutory boundaries of managed areas
- Disturbed land in private ownership within statutory boundaries of managed areas
- Primary roads
- Secondary roads
- Other roads
- Railroads
- Rivers, streams, and ditches
- Lakes and Rivers - open water, sometimes with beds of submergent vegetation. Approximate total area: 540 acres.

MINNESOTA COUNTY BIOLOGICAL SURVEY

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FOOTNOTES

1. 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.
2. 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.
3. Natural communities were interpreted from 1:40,000 color infrared photography taken in April, 1981 (National High Altitude Photography Program, U.S.G.S., U.S. Department of the Interior), and from 1:15,840 color infrared photography taken in October, 1992 (Minnesota Department of Natural Resources, Division of Forestry, Forest Resources Center, Grand Rapids, Minnesota). Natural community boundaries were digitized at a scale of 1:24,000.
4. Acreage figures are approximate to the nearest ten acres.
5. Data are available from the Minnesota Natural Heritage Information System, Department of Natural Resources, St. Paul, Minnesota. Phone (612) 296-2835.
6. Endangered Species Act of 1973 (USC.A. 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. These species were listed under the provisions of the Minnesota Endangered Species Statute when the Minnesota County Biological Survey was conducted in the county. New information on their distribution and abundance has since resulted in their removal from the state list.
8. 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).
9. Civil division, transportation, water features, and managed area boundaries data were obtained from the Department of Natural Resources, St. Paul, Minnesota. Every effort was made to obtain current versions of these data, however, errors may exist on this map. Land ownership within managed areas is sometimes obscured by natural community map units.

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