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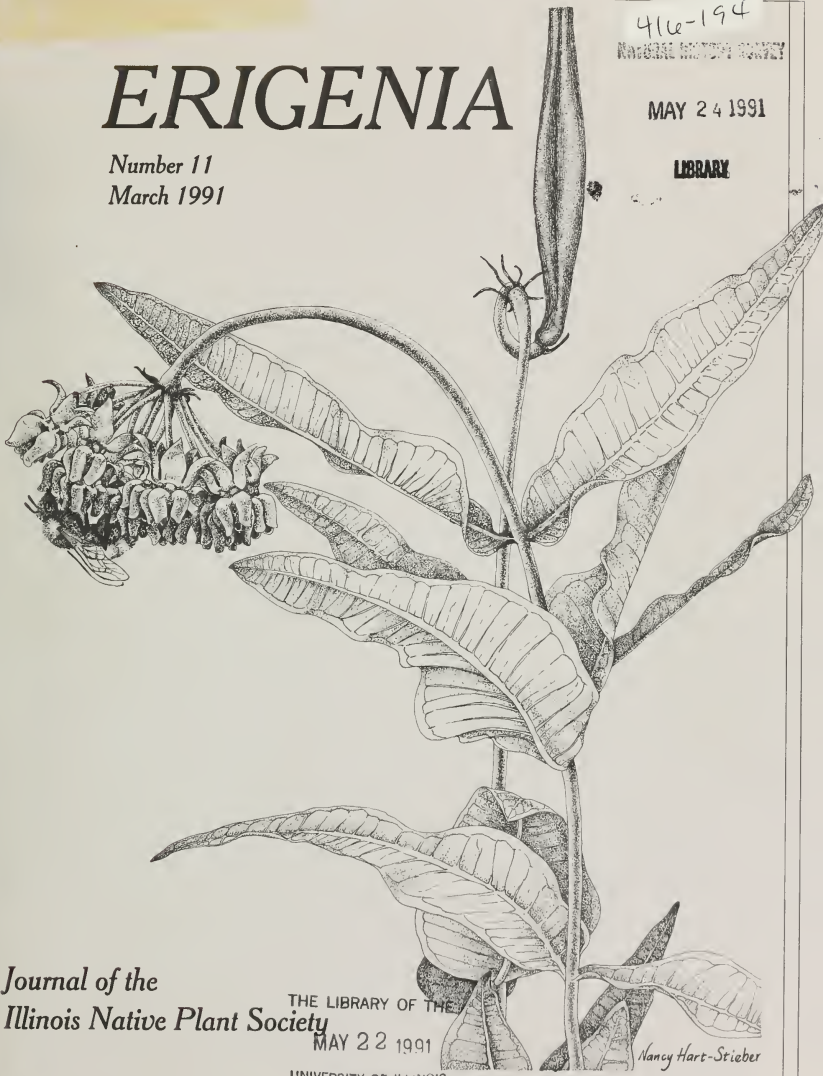

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For Society membership information, write to: **E.L. Shimp, U.S.D.A. Forest Service, Shawnee National Forest, 901 S. Commercial Street, Harrisburg, IL 62946**
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Cover: *Asclepias meadii* Torrey (Mead's milkweed), a federally threatened plant, occurs in only four locations in Illinois.

The Vascular Flora of Langham Island, Kankakee County, Illinois[1]

John E. Schwegman

Illinois Department of Conservation
Springfield, Illinois 62701-1787

Langham Island is located in the Kankakee River at the village of Altorf, five miles northwest of Kankakee, Illinois. This 10-hectare island has long been noted for the variety of rare plants inhabiting it. Chief among these is the Kankakee Mallow (*Iliamna remota*), which is native only to this island. Early herbarium sheets indicate that the island was visited by botanists as early as 1872, however no complete vascular flora list has been compiled for the area. This paper presents such a list.

The first written record I have found of the island was made by a government land surveyor on April 7, 1834. He described it as a "beautiful timbered island that does not overflow" and called it Langham's Island (Page 98, volume 356, Public Land Survey field notes). At this time the south shore of the river was "high level rich prairie" and the north shore was timbered. Tree species listed for the area are "burr oak, white oak and hickory".

In 1834 the north shore of the river, to which the island is closest, was part of a large timbered grove which contained a major Potawotomie Indian village. Several tracts in this grove (Rock Grove) were deeded to the Indians by the Treaty of Tippecanoe. A large tract just east of the island was granted to an Indian named Joseph Laughton, son of Wais-Ke-Shaw. Since histories of the county list no Langhams among the earliest settlers, the island may have been named for Joseph Laughton and the surveyor and the authors of the treaty spelled his name differently. However, it is also possible that the surveyor named the island for a Mr. Langham who was Surveyor General of Illinois at the time. In any event, there is no evidence that Joseph Laughton ever controlled the island. The Indians were forced to cede their lands and move to Iowa in 1836 (Beckwith 1884).

Land near Langham Island was settled rapidly following the departure of the Indians. A dam was built between the island and the north shore in 1858 to provide water power for a mill that was constructed on the shore. The village of Altorf was settled at this time. The mill deteriorated before 1890, but the end of the dam and an apparent borrow area are still evident on the island.

E. J. Hill began visiting the island and collecting the unusual plants he found there in 1872. He does not describe the conditions on the island at that time, but refers to some of his visits in his letters found in Kibbe (1953). His herbarium labels describe the habitat for most of his collections as "gravelly island", "dry banks", and "gravelly bank of island". By 1912, and continuing at least until 1916, Sherff (1946) noted that the more elevated flat portion of the island was cleared and cultivated as a cornfield. He described the remaining woodland as "open woods" and "rocky grassy slopes". When Sherff returned in 1945, the field had been abandoned. Since that time the island has remained undisturbed and the field has succeeded to a brush and small-tree stage.

Langham Island became part of Kankakee River State Park in the early 1940s, and was dedicated as an Illinois Nature Preserve in 1966. Management of the island to benefit the Kankakee Mallow, under a recovery plan for that species (Schwegman 1984), began in 1983. Management has included prescribed fire and chemical control of exotic shrubs.

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[1]**Editor's Note: Due to editorial errors, this article, which previously appeared in Erigenia 10, is being reprinted in its entirety. Further citations of Mr. Schwegman's article should cite Erigenia 11.**

Langham Island consisted only of a flat-topped 5.4-hectare bedrock upland when first surveyed and platted in 1868. Since that time, a 4.6-hectare low alluvial area has accreted to the southeastern (upstream) end. The island is located at the upstream end of the "gorge" of the Kankakee River at a point where the river is swift, shallow and rocky. It is nearest the northern shore.

The present study area consists of this entire 10-hectare island and the aquatic habitats immediately bordering it. The natural communities present in the study area include dry upland forest on the southwest slopes, mesic upland forest on the northeast slopes, floodplain forest, late successional old field, bedrock outcrops, river banks, swift river and quiet river. The river-bank community is impacted frequently by ice-floe scouring as well as flooding.

The island is 700 meters long and a maximum of 195 meters wide. Its linear dimension tends southeast to northwest. The river elevation is approximately 170 meters above sea level, while the old field interior of the island is at an elevation of 177 meters. The highest elevation is 581 feet. The northeast side of the island has more gentle 4 to 7 percent slopes than the 18 to 30 percent slopes of the southwest side.

The soil of the flat upland is Rockton Loam, which is developed in 50 to 60 centimeters of stratified sands and silts over dolomite bedrock. The northeast slopes are Ritchey Loam, which is 25 to 60 centimeters thick on bedrock, while the steeper southwest slopes contain Sogn Loam. Sogn has less than 25 centemeters of loamy material over bedrock. This soil is gravelly with some very large cobbles in some areas. Two areas of bedrock outcrop also occur on the southwest slopes. The lower southeast end of the island has medium-textured alluvium on lower areas while the higher elevations contain Onarga Fine Sandy Loam.

Dominant plants of the late succession stage old field are Canada Bluegrass (*Poa compressa*), White Sweet Clover (*Melilotus alba*), and Goldenrod (*Solidago canadensis*). Slippery Elm (*Ulmus rubra*) and Hawthorn (*Crataegus crus-galli*) are the principal invaders of the field along with the introduced shrub, Amur Honeysuckle (*Lonicera maackii*). Mesic forests on the northeast slope are of Red Oak (*Quercus rubra*), with an understory of Bladdernut (*Staphylea trifolia*). The drier forests of the south slope are of Burr Oak (*Quercus macrocarpa*) and Blue Ash (*Fraxinus quadrangulata*), with a shrub layer of Poison Ivy (*Toxicodendron radicans*). Amur Honeysuckle and many other shrub and tree species are also common here. The lowland forests are of Green Ash (*Fraxinus pennsylvanica*), Hackberry (*Celtis occidentalis*) and American Elm (*Ulmus americana*). Cottonwood (*Populus deltoides*) is a common tree along the north shore. Swift water areas support Sago Pondweed (*Potamogeton pectinatus*) and Eelgrass (*Vallisneria americana*), while quiet waters are usually dominated by Water Weed (*Elodea canadensis*) and Curly Pondweed (*Potamogeton crispus*).Common shoreline herbs are Water Willow (*Justicia americana*) and Rose Mallow (*Hibiscus laevis*).

Among the more notable plants known from Langham Island is the Kankakee Mallow, which was first collected there by E. J. Hill on June 29, 1872. It remains abundant there today, and so far as is known, is native only to this island. The Corn Salads (*Valerianella intermedia* and *V. umbilicata*) are annuals occupying the banks and interior fields. While the latter species was abundant during this study, the former was last collected by Swink on July 2, 1966 (SIU). The Leafy Prairie Clover (*Dalea foliosa*) was first discovered on the island on August 27, 1872 by E. J. Hill. He found it growing on "gravelly banks". Realizing he had discovered a little known species, he returned July 28, 1873 to collect more. In a letter to Harry Patterson dated November 29, 1873, Hill, referring to the leafy prairie clover, writes: "In fact I found but five plants after thorough search. Four of these I dug up, sending two of the roots to Dr. (Asa) Gray, to cultivate, fearing I might exterminate; the other was left". This species has not been seen on the island since. Seeds of the Leafy Prairie Clover from Will County, Illinois were sowed along the south banks of the island in 1986 in hopes of re-establishing a population there. Buffalo Clover (*Trifolium reflexum*) was collected on the island June 13, 1884 (ILL), and the Violet (*Viola viarum*) was also collected here May 16, 1884 (ILL), both by Hill. Neither was found during the present study.

Among the unexpected species I encountered was Veiny Skullcap (*Scutellaria nervosa*), a single

specimen of which was found on a dry ledge on the south slopes. This species was later found to be common locally on the nearby north shores of the river. A few Missouri Violets (*Viola missouriensis*) were found in low woods near the south end of the island, and a single Swamp Candle (*Lysimachia terrestris*) was found on the north shore. Sedge (*Carex hitchcockiana*) and Wild Leek (*Allium burdickii*) were found in a bit of mesic forest near the old dam.

The following annotated checklist includes 315 taxa and was compiled during the 1985 growing season. It also includes a few taxa observed in 1986 and several species collected by others in prior years but apparently now extinct on the island. The taxonomy follows Mohlenbrock (1986) as to species and family names and family sequence. The genera and species are alphabetically arranged within the families. Species preceded by an asterisk (*) are alien species. Vouchers were collected and deposited at the Illinois State Museum (ISM) for the more notable species encountered.

Equisetaceae

Equisetum arvense. Common Horsetail. Local along north shore.
Equisetum hyemale. Scouring Rush. Local on moist shores.

Ophioglossaceae

Botrychium virginianum. Rattlesnake Fern. Local in mesic forest.

Aspleniaceae

Asplenium platyneuron. Ebony Spleenwort. Rare in upland forest.

Potamogetonaceae

**Potamogeton crispus*. Curly Pondweed. Common in quiet water along north shore.
Potamogeton nodosus. Pondweed. Local along north shore.
Potamogeton pectinatus. Sago Pondweed. Common in swift and quiet water.

Hydrocharitaceae

Elodea canadensis. Waterweed. Common in quiet water.
Vallisneria americana. Eelgrass. Common in swift and quiet water.

Poaceae

Andropogon gerardii. Big Bluestem. Rare on south slope.
**Agrostis alba*. Redtop. Local on moist south shore.
**Bromus inermis*. Smooth Brome. Local on dry open south slopes.
Cinna arundinacea. Stout Wood Reed. Local in upland woods.
Echinochloa crus galli. Barnyard Grass. Rare on south shore.
Elymus villosus. Slender Wild Rye. Common on forested slopes.
Elymus virginicus. Virginia Wild Rye. Local in woods.
Eragrostis frankii. Love Grass. Local on moist open river banks.
Eragrostis hypnoides. Pony Grass. Local on moist sandy shores.
**Eragrostis pilosa*. Love Grass. Common on moist shores on north side.
Festuca obtusa. Nodding Fescue. Common in mesic forest.
**Festuca pratensis*. Tall Fescue. Rare on open south slope.
Leersia virginica. White Grass. Local in alluvial forest.
Muhlenbergia bushii. Muhly. Local in alluvial forest.
Muhlenbergia frondosa. Muhly. Local in moist forest.
Muhlenbergia schreberi. Nimble Will. Rare in forest.
Panicum capillare. Witch Grass. Local on open banks.
Panicum dichotomiflorum. Fall Panicum. Local on moist shores.
Panicum virgatum. Switchgrass. Rare on the open south bank.
Phalaris arundinacea. Reed Canary Grass. Common along shores.
**Poa compressa*. Canada Bluegrass. Common in interior old field.
Poa sylvestris. Woodland Bluegrass. Common in mesic forest.
**Setaria faberi*. Giant Foxtail. Rare on open south slopes.
**Setaria lutescens*. Yellow Foxtail. Rare in interior fields.
Spartina pectinata. Cordgrass. Local on moist south banks.
Sphenopholis obtusata. Wedge Grass. Local in woods.

Cyperaceae

Carex blanda. Woodland Sedge. Common in woods.
Carex cephalophora. Sedge. Local on dry slopes.
Carex davisii. Sedge. Local on south slope.
Carex gravida. Sedge. Local in upland woods.
Carex hitchcockiana. Hitchcock's Sedge. Local in woods at old dam site.
Carex jamesii. James's Sedge. Rare in mesic forest.
Carex normalis. Sedge. Local in old field.
Carex pensylvanica. Penn Sedge. Local on dry open south slope.
Carex sparganioides. Sedge. Rare in woods.
Carex stricta. Clumped Sedge. Rare along south shore.
Carex vulpinoidea. Fox Sedge. Local along south shore.
Cyperus aristatus. Galingale. Rare along north shore.
Cyperus erythrorhizos. Galingale. Common on north shore.
Eleocharis elliptica. Spike Rush. Local along north shore.
Scirpus americanus. Three-square Bulrush. Local on shore near north end.
Scirpus micranthus. Small Bulrush. Rare along north shore.

Araceae

Arisaema dracontium. Green Dragon. Local in alluvial woods.

Lemnaceae

Lemna minor. Common Duckweed. Local in quiet water around island.

Commelinaceae

Tradescantia ohiensis. Ohio Spiderwort. Local in fields.

Liliaceae

Allium burdickii. Wild Leek. Rare in woods by old mill dam.
Allium canadense. Wild Onion. Common in woods.
Allium cernuum. Nodding Onion. Local in old field and on dry slopes.
**Asparagus officinalis*. Asparagus. Local in woods and on banks.
Camassia scilloides. Wild Hyacinth. Common on south slopes.
**Hemerocallis fulva*. Day Lily. Rare along north shore.
Polygonatum commutatum. Solomon's Seal. Local in woods.
Smilacina stellata. False Solomon's Seal. Reported by Payton in 1973.
Trillium recurvatum. Wake Robin. Local in dry woods on south slope.
Trillium sessile. Sessile Wake Robin. Common in mesic and moist woods.

Smilacaceae

Smilax ecirrata. Carrion Flower. Local in woods.
Smilax lasioneuron. Carrion Flower. Local in woods.
Smilax hispida. Bristly Greenbrier. Local in mesic woods.

Dioscoreaceae

Dioscorea villosa. Wild Yam. One large population in dry woods.

Iridaceae

**Belamcanda chinensis*. Blackberry Lily. Rare on south slope.
**Iris X germanica*. Bearded Iris. One population in old field.
Iris shrevei. Wild Blue Iris. Local along shore.

Salicaceae

Populus deltoides. Cottonwood. Local along north shore.
Salix exigua. Sandbar Willow. Rare on south banks.

Juglandaceae

Carya cordiformis. Bitternut Hickory. Rare in woods.
Carya ovata. Shagbark Hickory. Rare in woods.
Juglans nigra. Black Walnut. Local in low woods.

Fagaceae

Quercus alba. White Oak. Local in woods.
Quercus bicolor. Swamp White Oak. Local in low woods.
Quercus macrocarpa. Burr Oak. Common on south side.
Quercus prinoides var. *acuminata*. Yellow Chestnut Oak. Local on south side.
Quercus rubra. Northern Red Oak. Local in woods.

Ulmaceae

Celtis occidentalis. Hackberry. Local in low woods.
Ulmus americana. American Elm. Local along north shore.

Ulmus rubra. Slippery Elm. Local in upland woods and fields.

Urticaceae

Boehmeria cylindrica. False Nettle. Local in moist soil.
Laportea canadensis. Stinging Nettle. Rare on moist banks.

Parietaria pensylvanica. Pellitory. Rare in woods.
Pilea pumila. Clearweed. Local along north shore.
Urtica dioica. Stinging Nettle. Local along north shore.

Aristolochiaceae

Asarum canadense. Wild Ginger. Common in mesic woods.

Polygonaceae

Polygonum amphibium. Water Smartweed. Rare along north shore.
**Polygonum aviculare*. Knotweed. Local on dry south banks.
Polygonum lapathifolium. Nodding Smartweed. Local along north shore.
Polygonum pensylvanicum. Common Smartweed. Local on shores.
**Polygonum persicaria*. Lady's Thumb. Local on north shore.
Polygonum punctatum. Smartweed. Local on north shore.
Polygonum scandens. False Buckwheat. Local in woods and on open banks.
Rumex crispus. Curly Dock. Local on river banks.
Rumex verticillatus. Water Dock. Local along shore.

Chenopodiaceae

Chenopodium album. Lamb's Quarters. Local in fields and on banks.
Chenopodium gigantospermum. Maple-leaved Goosefoot. Rare on dry banks.
Chenopodium standleyanum. Goosefoot. Common in woods.

Amaranthaceae

Amaranthus rudis. Water Hemp. Local on moist shores.

Nyctaginaceae

Mirabilis nyctaginea. Wild Four-o'clock. Local on dry banks.

Portulacaceae

Claytonia virginica. Spring Beauty. Local in woods.

Caryophyllaceae

Cerastium arvense. Field Mouse-eared Chickweed. Local on dry south bank.
Silene antirrhina. Sleepy Catchfly. Rare on an uprooted stump.
**Silene cucubalus*. Bladder Catchfly. Rare on dry south banks.
Silene stellata. Starry Campion. Local in dry woods.

Ceratophyllaceae

Ceratophyllum demersum. Coontail. Local in quiet water around island.

Ranunculaceae

Anemone virginiana. Tall Anemone. Local in woods and on banks.
Clematis pitcheri. Leatherflower. Common on dry open banks.
Ranunculus abortivus. Small-flowered Crowfoot. Local in all communities.
Ranunculus micranthus. Small-flowered Buttercup. Local in woods.
Ranunculus septentrionalis. Swamp Buttercup. Local in moist areas.
Thalictrum revolutum. Waxy Meadow Rue. Local in moist woods.

Berberidaceae

**Berberis vulgaris*. Common Barberry. Rare on south slopes.
Podophyllum peltatum. Mayapple. Rare near old mill site.

Menispermaceae

Menispermum canadense. Canada Moonseed. Rare on moist banks.

Papaveraceae

Corydalis micrantha. Slender Corydalis. Rare on dry south banks.
Dicentra cucullaria. Dutchman's Breeches. Common in north slope woods.

Brassicaceae

Arabis laevigata. Smooth Rock Cress. Local in woods.
Arabis shortii. Rock Cress. Common in low areas all around the island.
**Brassica nigra*. Black Mustard. Common on dry open banks.
Dentaria laciniata. Toothwort. Common in slope woods.
Descurainia pinnata. Tansy Mustard. Rare on limestone ledges.
Iodanthus pinnatifidus. Purple Rocket. Local in low woods.

**Lepidium campestre*. Field Peppergrass. Local on river banks.
**Lepidium densiflorum*. Peppergrass. Local on dry south slopes.
**Rorippa sylvestris*. Creeping Yellow Cress. Common on river banks.

Crassulaceae

**Sedum sarmentosum*. Yellow Stonecrop. Rare on rocks on south bank.
Sedum ternatum. Three-leaved Stonecrop. Very local on south banks.

Grossulariaceae

Ribes missouriense. Missouri Gooseberry. Common in all communities.

Rosaceae

Agrimonia parviflora. Agrimony. Local in level upland woods.
Agrimonia pubescens. Soft Agrimony. Local in upland woods.
Crataegus crus-galli. Cock-Spur Thorn. Local in fields and woods.
Crataegus mollis. Red Haw. Common in alluvial forest.
Geum canadense. White Avens. Common in woods.
Geum laciniatum. Rough Avens. Rare on moist shores.
Geum vernum. Spring Avens. Local in alluvial woods.
Malus ioensis. Iowa Crabapple. Local in fields and woods.
**Potentilla recta*. Sulphur Cinquefoil. Rare in old field.
Prunus americana. Wild Plum. Local on dry south banks.
Prunus serotina. Wild Black Cherry. Local in fields and woods.
Prunus virginiana. Choke Cherry. Common in upland woods.
Rosa carolina. Pasture Rose. Local on dry south banks.
**Rosa multiflora*. Multiflora Rose. Common in woods and fields.
Rosa setigera. Prairie Rose. Rare in successional forest.
Rosa suffulta. Sunshine Rose. Rare on dry south banks.
Rubus occidentalis. Blackberry. Local in fields and woods.

Mimosaceae

Desmanthus illinoensis. Illinois Mimosa. Local on dry banks.

Caesalpiniaceae

Cassia marilandica. Maryland Senna. Local on south slopes.
Cercis canadensis. Redbud. Common in fields and woods.
Gleditsia triacanthos. Honey Locust. Rare in woods and fields.

Fabaceae

Amorpha fruticosa. False Indigo. Local along shores.
Amphicarpa bracteata. Hog Peanut. Local in moist woods.
Apios americana. Ground Nut. Rare on moist north banks.
Dalea foliosa. Leafy Prairie Clover. Formerly on dry banks, reintroduced in 1987.
**Medicago lupulina*. Black Medic. Rare on dry south

banks.
Trifolium reflexum. Buffalo Clover. Formerly in dry open woods.

Oxalidaceae
Oxalis dillenii. Yellow Wood Sorrel. Local on dry banks.
Oxalis stricta. Yellow Wood Sorrel. Local on dry banks.

Rutaceae
Ptelea trifoliata. Wafer Ash. Local along north bank.
Xanthoxylum americanum. Prickly Ash. Local in woods.

Simaroubaceae
**Ailanthus altissima*. Tree-of-heaven. Local in field.

Euphorbiaceae
Acalypha rhomboidea. Three-seeded Mercury. Local on moist shores.
Acalypha virginica. Three-seeded Mercury. Local on river banks.
Chamaesyce humistrata. Milk Spurge. Local on dry banks.
Chamaesyce maculata. Nodding Spurge. Local on dry banks.
Poinsettia dentata. Wild Poinsettia. Dry gravel around burned logs.

Limnanthaceae
Floerkea proserpinacoides. False Mermaid. Common in low and mesic woods.

Anacardiaceae
Rhus glabra. Smooth Sumac. Local in fields.
Toxicodendron radicans. Poison Ivy. Common in woods.

Staphyleaceae
Staphylea trifolia. Bladdernut. Common in north slope woods.

Aceraceae
Acer negundo. Box Elder. Local in low alluvial woods.
Acer saccharinum. Silver Maple. Local along shore at north end.

Rhamnaceae
**Rhamnus cathartica*. Common Buckthorn. Rare in open woods.

Vitaceae
Parthenocissus quinquefolia. Virginia Creeper. Local in slope woods.
Vitis riparia. Riverbank Grape. Local in low woods.

Tiliaceae
Tilia americana. Basswood. Local along upper south banks.

Malvaceae
Hibiscus laevis. Halberd-leaved Rose Mallow. Local along shores.
Iliamna remota. Kankakee Mallow. Local in dry woods and fields on south side.

Hypericaceae
Hypericum sphaerocarpum. Round-fruited St. John's Wort. Common on open south banks.

Violaceae
Viola missouriensis. Missouri Violet. Rare in low woods.
Viola pratincola. Smooth Violet. Local in afforested upland.
Viola pubescens. Downy Yellow Violet. Local in wet woods.
Viola sororia. Woolly Blue Violet. Local in mesic woods.
Viola viarum. Violet. Collected from dry banks in 1884.

Elaeagnaceae
**Elaeagnus umbellata*. Autumn Olive. Rare in open field.

Lythraceae
**Lythrum salicaria*. Purple Loosestrife. Rare as seedlings along north shore.

Onagraceae
Ludwigia palustris. Marsh Purslane. Local on moist shores.

Oenothera biennis. Biennial Evening Primrose. Local on dry banks.

Apiaceae
Chaerophyllum procumbens. Wild Chervil. Local in woods.
Cryptotaenia canadensis. Honewort. Local in moist woods.
**Daucus carota*. Queen Anne's Lace. Local in fields.
Osmorhiza longistylis. Anise-root. Local in moist to mesic woods.
Perideridia americana. Common on dry south slopes.
Sanicula canadensis. Canadian Black Snakeroot. Common in moist woods.
Sanicula gregaria. Common Snakeroot. Local in mesic woods.
**Torilis japonica*. Hedge Parsley. Local in fields.
Zizia aurea. Golden Alexanders. Local along south banks.

Cornaceae
Cornus racemosa. Gray Dogwood. Common in woods by old dam.
Cornus stolonifera. Red Osier Dogwood. Local on river banks.

Primulaceae
Androsace occidentalis. Rare in open sandy old field.
Lysimachia ciliata. Fringed Loosestrife. Rare along the north bank.
**Lysimachia nummularia*. Moneywort. Local in moist woods.
Lysimachia terrestris. Swamp Candles. Rare (one plant) along north shore.

Oleaceae

Fraxinus pennsylvanica. Green Ash. Local in woods and fields.
Fraxinus quadrangulata. Blue Ash. Local on south slopes.

Apocynaceae

Apocynum cannabinum. Dogbane. Local in fields.
**Vinca minor*. Periwinkle. Rare in woods near old dam.

Asclepiadaceae

Asclepias incarnata. Swamp Milkweed. Local along shores.
Asclepias syriaca. Common Milkweed. Rare on low open shore.

Convolvulaceae

Calystegia sepium. American Bindweed. Common on low north banks.
Ipomoea pandurata. Wild Sweet Potato. Local on north banks.

Polemoniaceae

Phlox divaricata. Wild Sweet William. Local in woods.

Hydrophyllaceae

Ellisia nyctelea. Aunt Lucy. Local on dry wooded slopes.
Hydrophyllum appendiculatum. Great Waterleaf. Local in mesic woods.
Hydrophyllum virginianum. Virginia Waterleaf. Local in slope forest.

Boraginaceae

**Cynoglossum officinale*. Hound's Tongue. Rare in field.
Mertensia virginica. Virginia Bluebells. Rare in low woods at west end.
Onosmodium hispidissimum. Marbleseed. Rare at east end of field.

Verbenaceae

Phyla lanceolata. Fog Fruit. Common on moist shores.
Verbena hastata. Blue Vervain. Local on moist banks.
Verbena simplex. Narrow-leaved Vervain. Rare on dry rocky banks.
Verbena urticifolia. White Vervain. Local on dry banks.

Lamiaceae

Agastache nepetoides. Yellow Giant Hyssop. Local on banks and in woods.
**Glechoma hederacea*. Ground Ivy. Local in low moist woods.
**Leonurus cardiaca*. Motherwort. Local in fields.
Lycopus americanus. Common Water Horehound. Rare on banks at west end.
**Mentha x piperita*. Peppermint. Rare on south bank.
Monarda fistulosa. Bee Balm. Local in fields and on dry banks.
Physostegia speciosa. False Dragonhead. Rare on north banks.
Scutellaria lateriflora. Mad Dog Skullcap. Local along south bank.
Scutellaria nervosa. Veiny Skullcap. Rare (one plant) on limestone outcrop.
Stachys tenuifolia. Smooth Hedge Nettle. Local along moist north banks.
Teucrium canadense. American Germander. Local on dry banks and in woods.

Solanaceae

Physalis heterophylla. Ground Cherry. Rare on south banks.
Solanum carolinense. Horse-nettle. Local on dry banks.
**Solanum dulcamara*. Bittersweet Nightshade. Rare near shore at west end.
Solanum ptycanthum. Black Nightshade. Local on banks.

Scrophulariaceae

Agalinis tenuifolia. Slender False Foxglove. Common along shores.
Dasistoma macrophylla. Mullein Foxglove. Common in fields.
Leucospora multifida. Rare on sandy banks.
Mimulus ringens. Monkey-flower. Local on moist banks.
Penstemon digitalis. Foxglove Beardstongue. Common on banks and in woods.
Scrophularia marilandica. Late Figwort. Local on dry banks.
**Verbascum thapsus*. Woolly Mullein. Local in fields and on slopes.

Acanthaceae

Justicia americana. Water Willow. Common in shallow water along shores.
Ruellia humilis. Wild Petunia. Local on dry banks.
Ruellia strepens. Smooth Wild Petunia. Local in woods.

Plantaginaceae

**Plantago major*. Common Plantain. Local in disturbed areas.
Plantago rugelii. Rugel's Plantain. Local on dry banks.

Rubiaceae

Cephalanthus occidentalis. Buttonbush. Rare along south shore.
Galium aparine. Goose Grass. Common in woods.
Galium circaezans. Bedstraw. Local in woods.

Caprifoliaceae

**Lonicera maackii*. Amur Honeysuckle. Common throughout island.
Lonicera prolifera. Grape Honeysuckle. Local on south slopes.
**Lonicera tatarica*. Tartarian Honeysuckle. Local in fields and woods.
Symphoricarpos orbiculatus. Coralberry. Rare at edge of field.
Viburnum prunifolium. Black Haw. Local in woods.

Valerianaceae

Valerianella intermedia. Corn Salad. Rare, last collected in 1966.
Valerianella umbilicata. Corn Salad. Common in fields and on dry banks.

Campanulaceae

Lobelia cardinalis. Cardinal Flower. Rare on north shore.
Lobelia siphilitica. Great Blue Lobelia. Local along shores.
Triodanis perfoliata. Venus's Looking Glass. Rare in disturbed field.

Asteraceae

Achillea millefolium. Yarrow. Local in the field.
Ambrosia artemisiifolia. Common Ragweed. Common in disturbed sites.
Ambrosia trifida. Giant Ragweed. Rare in moist soil at south end.
Artemisia biennis. Biennial Wormwood. Rare on dry south bank.
Aster drummondii. Drummond's Aster. Rare in mesic forest.
Aster novae-angliae. New England Aster. Rare on dry south banks.
Aster ontarionis. Ontario Aster. Local in alluvial and upland woods.
Aster pilosus. Hairy Aster. Local on dry banks on south side.
Aster shortii. Short's Aster. Common in dry woods on south side.
Aster vimineus. Aster. Local on north side.
Bidens bipinnata. Spanish Needles. Rare in upland woods.
Bidens cernua. Nodding Bur Marigold. Common along shores.
Bidens connata. Swamp Beggar-ticks. Local along shores.
Bidens frondosa. Common Beggar-ticks. Common on north shore.
Bidens vulgata. Tall Beggar-ticks. Rare on south banks.
Brickellia eupatorioides. False Boneset. Local in field.
**Cirsium arvense*. Canada Thistle. Rare on dry banks.
Cirsium discolor. Field Thistle. Local in field.
Conyza canadensis. Muletail. Rare on dry banks.
Eclipta prostrata. Yerba de Tajo. Rare along south shore.
Erigeron annuus. Daisy Fleabane. Local in fields.
Erigeron philadelphicus. Marsh Fleabane. Local on moist banks.
Erigeron strigosus. Daisy Fleabane. Local in dry fields and banks.
Eupatorium altissimum. Tall Boneset. Local in old field.
Eupatorium maculatum. Spotted Joe-Pye-Weed. Local on moist banks.
Eupatorium rugosum. White Snakeroot. Common in woods.
Eupatorium serotinum. Late Boneset. Local on dry south banks.
Helenium autumnale. Autumn Sneezeweed. Local along moist banks.
Helianthus divaricatus. Woodland Sunflower. Rare in dry woods.
Helianthus strumosus. Pale-leaved Sunflower. Rare on dry banks.
Heliopsis helianthoides. False Sunflower. Local on dry open south banks.
Lactuca floridana. Wild Blue Lettuce. Common in mesic woods.
**Lactuca serriola*. Prickly Lettuce. Local in field.
Prenanthes crepidinea. Great White Lettuce. Rare on south wooded slope.
Ratibida pinnata. Gray Coneflower. Local in field and on south banks.
Rudbeckia laciniata. Golden Glow. Common in moist woods.
Senecio aureus. Golden Ragwort. Rare in old field.
Silphium perfoliatum. Cup Plant. Local on north banks.
Solidago canadensis. Tall Goldenrod. Local on dry banks and in field.
Solidago gigantea. Late Goldenrod. Local in moist woods.
**Sonchus asper*. Spiny Sow Thistle. Local on south banks.
**Taraxacum officinale*. Dandelion. Local in disturbed sites.
**Tragopogon dubius*. Goat's Beard. Local on south bank.
Verbesina alternifolia. Yellow Ironweed. Common in alluvial forest.
Verbesina helianthoides. Yellow Crownbeard. Local on south banks.
Vernonia gigantea. Tall Ironweed. Local in moist ground.
Vernonia missurica. Missouri Ironweed. Local in field and on south bank.
Xanthium strumarium. Cocklebur. Local on river banks.

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New Records for Illinois Vascular Plants

John E. Schwegman

Illinois Department of Conservation
Springfield, Illinois 62701-1787

ABSTRACT

Lysimachia × *producta* (Gray) Fern., *Mirabilis hirsuta* (Pursh) MacM., *Carex heliophila* Mack., and the hybrid *Lespedeza leptostachya* Engelm. × *L. capitata* Michx. are reported as natives of Illinois for the first time. Significant distributional records for 21 additional taxa are also reported.

INTRODUCTION

Field work, associated with developing and implementing a native plant conservation program at the Department of Conservation during the 1980s, has led to the discovery of several occurrence and distributional records for Illinois vascular plants. This paper reports some of the more notable of these finds. A voucher specimen has been deposited in the Herbarium of the Illinois State Museum (ISM) in support of each record reported here.

TAXA NEW TO ILLINOIS

Lysimachia* × *producta (Gray) Fern. is a fertile hybrid derived from *L. terrestris* (L.) BSP. and *L. quadrifolia* L.. Gleason and Cronquist (1963) give its range as Maine to North Carolina west to Wisconsin and Kentucky. Collection data: a large colony growing on top of the high bank of the Ohio River at the mouth of Cane Creek, one mile southeast of Saline Landing, Hardin County, July 3, 1988, Schwegman #3195.

Carex heliophila Mack. is a western sedge of coarse soil prairies that is known from Indiana west to the Great Plains. It resembles *C. pensylvanica* Lam. but has larger perigynia and fewer spikes. In spite of its attribution to Illinois by Gleason and Cronquist (1963) and Fernald (1950) as *C. pensylvanica* Lam. var. *digyna* Boeckl., it is not listed for the state by Mohlenbrock (1986). Collection data: in a sand hill prairie adjacent to the north side of Hanover Bluff Nature Preserve, Jo Daviess County, May 26, 1985, Schwegman *s.n.*

Mirabilis hirsuta (Pursh) MacM. is listed by Mohlenbrock (1986) as a rare adventive in Illinois from the western states. Gleason and Cronquist (1963) list it as native from Wisconsin and Missouri westward. Hartley (1966) reports it from upland prairies in LaCrosse and Trempealeau Counties adjacent to the Mississippi River in Wisconsin. Randy Nyboer and I discovered this species growing in a sand hill prairie in JoDaviess County. At this location it grows in a relatively undisturbed prairie opening surrounded by forest on bluffs adjacent to the Mississippi River. It seems very unlikely that it is adventive at this site and we consider it native here. We later discovered it growing in disturbed sand prairie in the nearby Savanna Army Depot. Collection data: sand hill prairie just north of Hanover Bluff Nature Preserve, Jo Daviess County, July 27, 1983, Nyboer & Schwegman *s.n.*, and disturbed sand prairie in the wildlife management area at the north end of Savanna Army Depot, Jo Daviess County, August 10, 1989, Nyboer & Schwegman *s.n.*

Lespedeza leptostachya Engelm. × ***L. capitata*** Michx. is an apparently unnamed hybrid. While not mentioned in the manuals at hand, it has been reported from Iowa by Clewell (1966). Although *Lespedezas* readily hybridize, this hybrid would be expected to be rare because of the rarity of its first parent. At any rate, Mohlenbrock (1986) does not list it from Illinois. A few plants of this taxon were brought to my attention by Tim Keller in a dry upland prairie northwest of Franklin Grove in Lee County. The site supports good populations of both presumed parent species. The specimens most nearly resemble *L. leptostachya* as regards the shape and distribution of flower heads, but the leaves and the overall plant are larger in all respects than *L.*

leptostachya, and the leaves are densely sericeous. Collection data: dry prairie at Nachusa Grassland Preserve, northwest of Franklin Grove, Lee County, August 13, 1987, Schwegman *s.n.*

NEW DISTRIBUTION RECORDS

Agalinis fasciculata (Ell.) Raf. was found growing in mesic sand prairie in Mason County over 100 miles north of its most northerly previous record in the state. Collection data: mesic sand paririe, Matanzas Prairie Nature Preserve north of Bath, Mason County, September 23, 1987, Schwegman *s.n.*

Cacalia suaveolens L. is a seldom collected species of moist open habitats in Illinois. Collection data: moist soil at the south side of the mouth of a hollow adjacent to the Ohio River 3/4 mile north of Finneyville, Hardin County, July 3, 1988, Schwegman *s.n.*

Carex bromoides Schk., a sedge of seepage areas and near springs, has not been previously reported from the Wabash drainage of Illinois. Collection data: in a seep spring in the northwest corner of Red Hills State Park, Lawrence County, May 20, 1987, Fink & Schwegman *s.n.*

Carex laxiculmis Schwein. is a species of mesic forests in deep ravines. Collection data: along a spring branch in forests at the southeast edge of the old Siloam Village at Siloam Springs State Park, Brown County, June 1, 1984, Schwegman #3184; and on a north-facing forested slope along Lusk Creek about 1 mile northeast of Manson Ford, Pope County, May 29, 1988, Schwegman *s.n.* The latter record is the first for southeastern Illinois. It grows here with an notable assemblage of plants, including *C. careyana* Dewey, *Cimicifuga rubifolia* Kearney, *Oxalis illinoensis* Schwegman and *Dryopteris goldiana* (Hook.) Gray.

Carex oligosperma Michx. is a northern bog sedge that has not been previously reported from McHenry County. Collection data: south edge of the Leatherleaf Bog Nature Preserve, Moraine Hills State Park, McHenry County, July 14, 1988, Schwegman #3196.

Carex prasina Wahl. has previously been reported in Illinois only from the edges of seeps and along spring branches in forested ravines in western Illinois. Todd Fink and I encountered it in similar habitats in southeastern Illinois. Collection data: around seep springs in the northwest corner of Red Hills State Park, Lawrence County, May 20, 1987, Fink & Schwegman *s.n.*

Cyperus grayioides Mohl. has previously only been reported as far north in the Mississippi Valley as Carroll County, Illinois. This report extends its known range to the north. Collection data: large dune in west-central part of Savanna Army Depot, Jo Daviess County, June 27, 1984, Nyboer & Schwegman #3186.

Diervilla lonicera Mill. is a northeastern species that is reported here from west-central Illinois for the first time. Collection data: on top of a sandstone boulder along Little Tennessee Creek northwest of Mt. Sterling, Brown County, June 15, 1988, Lindsay & Schwegman *s.n.*

Gaillardia pulchella Foug. was found growing in gravelly soil of an unmown portion of a cemetery within the Wabash Valley of Lawrence County. Although generally considered an introduced species this far north and east, the possibility exists that it is a remnant of the original flora of old Allison Prairie, the presettlement limits of which include the cemetery. Allison Prairie was one of the largest prairies in southeastern Illinois and was situated on a gravel terrace at the junction of the Wabash and Embarrass rivers. Another cemetery within this former prairie's limits west of Russellville, supports a fine growth of *Buchloe dactyloides* (Nutt.) Engelm., which could also be a western floral element of this prairie. Collection data: Otterburn Cemetery southeast of the Lawrenceville and Vincennes Airport, Lawrence County, June 29, 1988, Schwegman *s.n.*

Heterotheca latifolia Buckl. is a species of dry open sandy soil. Collection data: disturbed weedy area near a railroad at the west edge of Cahokia, St.Clair County, September 2, 1987, Schwegman *s.n.*

Hypericum adpressum Bart. is a species of open, moist, sandy situations, that has rarely been collected in the state. This is the first report of it from central Illinois. Collection data: moist sandy soil at the edge of a county road, Shick Shack Nature

Preserve south of Bluff Springs, Cass County, June 25, 1985, Schwegman *s.n.*

Lespedeza* × *simulata Mack. & Bush is a seldom collected taxon reputed to be a hybrid of *L. capitata* Michx. and *L. virginica* (L.) Britt. The specimen reported here should help to confirm this hybrid origin, as I found it growing with a mixed stand of the presumed parent species. This collection sheet includes specimens of both apparent parents and *L.* × *simulata*. Collection data: on the north shoulder of Wilderness Road at Castle Rock State Park, Ogle County, August 26, 1982, Schwegman #3153.

Opuntia fragilis (Nutt.) Haw. was reported from Jo Daviess County, Illinois by Gleason (1910). However, efforts to confirm the continued existence of this cactus in Illinois were hampered by the inclusion of Gleason's collecting locality within the Savanna Army Depot in 1917. In 1984 Randy Nyboer and I received permission to search for this species within the Depot grounds. We were rewarded with the discovery of a large, healthy population of the fragile prickly pear. Collection data: heavily grazed sand prairie in the east-central part of the Savanna Army Depot, Jo Daviess County, June 27, 1984, Nyboer & Schwegman #3198.

Oryzopsis racemosa (J. E. Smith) Ricker. is recorded from scattered counties in northern Illinois, but this is the first record from Bureau County. Collection data: north-facing, forested slopes of the large ravine at Miller-Anderson Woods Nature Preserve, Bureau County, September 8, 1988, Schwegman *s.n.*

Poa nemoralis L. is an adventive species that has rarely been reported from Illinois. While conducting an environmental impact analysis of a ravine in Lake Forest, Randy Heidorn and I found it to be quite common at the upper edge of ravines and in adjacent level disturbed forest. Collection data: in and adjacent to forested ravines, Lake Forest, Lake County, May 16, 1985, Heidorn and Schwegman *s.n.*

Poa wolfii Scribn. is a bluegrass of forests that has rarely been seen in Illinois in the 20th century. I discovered it in western Illinois, where it grows in dry open forest about 1/3 of the way up southwest-facing ridges. It is a slender, fragile species that disappears rapidly after flowering except for a tuft of sterile leaves. It is best found in early June and is probably more common in western Illinois than past collecting records would indicate. Collection data: southeast of the old Siloam Village, Siloam Springs State Park, Brown County, June 16, 1984, Schwegman #3185.

Polanisia jamesii (T.& G.) Iltis was reported as locally common in some Illinois sand areas by Gleason (1910). However, it has rarely been collected in recent decades. Collection data: common in heavily grazed sandy blowouts at Savanna Army Depot, Jo Daviess County, June 27, 1984, Schwegman #3184 and August 10, 1989, Nyboer & Schwegman *s.n.*

Polygonum arifolium L. var. ***pubescens*** (Keller) Fern. is an extremely rare taxon in Illinois. Todd Fink and I found a healthy population of it in Lawrence County. Collection data: in seep springs and along spring branches in the northwest corner of Red Hills State Park, Lawrence County, May 20, 1987, Fink & Schwegman *s.n.*

Rubus alumnus Bailey is a strikingly beautiful, upright blackberry with exceptionally broad petals and abundant, glandular pubescence in the inflorescence. Mohlenbrock (1986) reports it in Illinois only from Jackson and Wabash Counties. Swink and Wilhelm (1979) include all previous reports of this species group in the Chicago area under *R. pensylvanicus* Poir. The distinctive leaves and flowers seem to separate clearly the specimen at hand from *R. pensylvanicus*. Collection data: edge of woods near the west end of Iroquois County Conservation Area, Iroquois County, June 2, 1983, Schwegman *s.n.*

Salvia azurea Michx. & Lam. var. ***grandiflora*** Benth. has been found in scattered locations in Illinois. This is its first report from northwestern Illinois. Collection data: pastured sand prairie at Savanna Army Depot, Jo Daviess County, August 11, 1989, Nyboer & Schwegman *s.n.*

Valeriana pauciflora Michx. is an eastern forest species reaching the western limits of its distribution in Illinois. A Scott County collection was previously the most westerly. The colony reported here now extends its range west of the Illinois River. Collection data: mesic, forested, north-facing slopes

along McKee Creek at Wilson Ford (mouth of Rattlesnake Den Hollow), Pike County, May 23, 1985, Schwegman *s.n.*

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Illinois' Native Snowberry

Dick Young

Kane County Environmental Department
Geneva, Illinois 60134

Until recently, the only colony of Snowberry (*Symphoricarpos albus* (L.) Blake) indigenous to Illinois was believed to occur at Mooseheart Ravine in Kane County. We now know of a second colony of about 150 plants growing in a similar habitat on the St. Peter sandstone bluffs along the Fox River north of Wedron, Illinois. Here I describe the colony at the Mooseheart Ravine, an interesting and lovely place with creviced, 15 to 20 foot Niagaran Dolomite walls, carved by the clear, rippling water of Mill Creek. Mill Creek drains from the northwest into the Fox River just south of Batavia. In most places along this quarter-mile-long ravine and valley, steep banks of silty clay loam rise another 15 to 20 feet above the bedrock. A number of unusual and fascinating plant communities occur along Mill Creek in this area, ranging from rich wetlands and mesic woods to hillside savanna and open prairie.

Lacy, pale-green Bulblet Ferns (*Cystopteris bulbifera*(L.) Bernh.) inhabit gravel bars and mossy boulder pockets near the water's edge, and wiry, dark-stemmed clusters of Purple Cliff Brake (*Pellaea glabella* Mett.) cling to the rock wall crevices, draping themselves in open cascades of dusky green, revolute leaves. Here and there small ledges and niches support Chickweed (*Cerastium arvense* L. var. *villosum* (Muhl.) Hollick & Britt.), Wild Columbine (*Aquilegia canadensis* L.), and a few wisps of Blue Grass (*Poa compressa* L.). From above, stringers of Virginia Creeper (*Parthenocissus quinquefolia* (L.) Planch.) and Black Raspberry (*Rubus occidentalis* L.) hang down the rock face, and above that a panoply of sprawling shrubs and canopy trees lean out over the edge, seeking the light of the open valley. At the top of the bluff, on the north bank just west of an old railroad bridge, is a prairie opening, and along the steep southerly slope extending into woodland is the small colony of Snowberry. There are 35 to 50 plants here appearing vigorous, except for the serious threat of Amur Honeysuckle (*Lonicera maackii* Maxim.), which is suppressing many fine, nearby plants.

Besides the Honeysuckle, there is a wide assortment of native associates present (see Table 1). Both the prairie and the woodland species mix wonderfully with this open colony of Snowberry, creating a wonderfully rich habitat.

Our native Snowberry is a charming, compact little shrub less than 30 inches tall, with fine, twiggy branchlets and shredding, light gray bark. The blue-green, wavy-toothed, elliptic-ovate leaves turn a vibrant orange and yellow fall color. In June, inconspicuous light-pink flowers are produced which are campanulate in form. The pea-sized, glistening white berry clusters are remarkably showy from mid-September to early December after the leaves have fallen. This plant would serve equally well both on a woodland border and as a facer shrub in many landscaping situations.

Several popular landscape and garden manuals show little enthusiasm for the Snowberries, and justifiably so when we see the scraggly performance of the larger garden import, *Symphoricarpos albus* (L.) Blake var. *laevigatus* (Fern.) Blake. This plant comes from the West Coast and occasionally escapes around the Midwest. Variety *laevigatus* often grows to a lanky, arching, five feet in height and while its berries are larger than our native Snowberry, its leaves have no fall color, turning instead a muddy green after a heavy frost. Hence, much like the Old World Honeysuckles (*Lonicera* spp.) and Buckthorns (*Rhamnus* spp.), this introduced Snowberry declares its inappropriateness as an ill-adapted and unbalanced intruder into the ecological systems of the Midwest.

Our Snowberry was first collected in 1977, and it was reported in Plants of the Chicago Region (Swink and Wilhelm 1979). Although this species is not

listed as endangered or threatened in Illinois (Sheviak 1981), it is decidedly rare here in Illinois and has been formally recommended for listing as state endangered or threatened (Marlin Bowles, personal communication). Gleason says of our native species, "Dry or rocky soil Que. to Alaska, and s. to Pa., W. Va., Mich. and Minn. (Including var. *pauciflorus* Robbins) (*S. racemosus*, Gray, B & B)".

Swink and Wilhelm (1979) note a Racine County, Wisconsin, specimen cited by Wade and Wade (1940), and I have seen a number of colonies along Lake Michigan bluffs south of Milwaukee, Wisconsin. These Wisconsin plants closely resemble our own little Mooseheart plants in both form and habit. Plants, of course, do not recognize state borders, and it may well be that there are no great genetic differences between the Wisconsin and Illinois populations. Nonetheless, I am convinced that Illinois' own delightful little Snowberry is well worth the effort needed to preserve it *in situ* for numerous reasons, such as maintenance of native plant biodiversity, evolutionary potential at the edge of the species' range, and many more. Kane County currently has the disquieting distinction of the being the fastest-growing county in Illinois, and like too many other places, there are many parcels of land that need protection before they are irretrievably lost. Fortunately for our Mooseheart Snowberry, there is no money needed for this particular cause, just a willingness to cut brush, and a better understanding of sound ecological management.

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Table 1. Native plant species found in association with Snowberry colony at Mooseheart Ravine, along Mill Creek,
Kane County, Illinois.

Scientific Name	Common Name
Allium tricoccum Ait.	Wild Leek
Amelanchier humilis Wieg.	Low Shadblow
Andropogon gerardi Vitm.	Big Bluestem Grass
Aralia nudicaulis L.	Wild Sarsaparilla
Aster shortii Lindl.	Short's Aster
Carex laxiflora Lam.	Wood Sedge
Desmodium canadense (L.) DC.	Showy Tick Trefoil
Dirca palustris L.	Leatherwood
Elymus villosus Muhl.	Silky Wild Rye
Galium triflorum Michx.	Sweet-scented Bedstraw
Hystrix patula Moench	Bottlebrush Grass
Lonicera prolifera (Kirchn.) Rehd.	Yellow Honeysuckle
Monarda fistulosa L.	Wild Bergamot
Ostrya virginiana (Mill.) K. Koch	Ironwood, Hop Hornbeam
Parthenocissus quinquefolia (L.) Planch.	Virginia Creeper
Polymnia canadensis L.	Leafcup
Quercus alba L.	White Oak
Quercus muhlenbergii Engelm.	Chinquapin Oak
Quercus rubra L.	Red Oak
Ranunculus fascicularis Muhl.	Early Buttercup
Rhus radicans L.	Poison Ivy
Silene stellata (L.) Ait.f.	Starry Campion
Silphium terebinthinaceum Jacq.	Prairie Dock
Smilacina racemosa (L.) Desf.	Feathery False Solomon's Seal
Smilax tamnoides L. var. *hispida* (Muhl.) Fern.	Bristly Green Brier
Solidago flexicaulis L.	Broad-leaved Goldenrod
Solidago ulmifolia Muhl.	Elm-leaved Goldenrod
Tilia americana L.	Basswood, American Linden
Ulmus americana L.	American Elm
Viburnum prunifolium L.	Black Haw
Zizia aptera (Gray) Fern.	Heart-leaved Meadow Parsnip

Forest Glen's Savanna Project

Ken Konsis and Doris Westfall

Forest Glen Chapter
Illinois Native Plant Society
Westville, Illinois 61883

Recently the Forest Glen Chapter of INPS embarked on a new project, a savanna restoration. Forest Glen is an 18000-acre county preserve governed by the Vermilion County Conservation District. One of the reasons behind this endeavor was to educate the public on what may be Illinois' rarest landscape. The problem confronting us is: what does a savanna in east-central Illinois look like?

Our project area consists of 20 acres of advanced secondary succession. The tract borders the 40 acre Doris L. Westfall Prairie Restoration Area in Forest Glen Preserve near Westville, Illinois.

Presently, the savanna site includes 3 old fence rows with large trees present, a small wildlife food plot of native prairie species, a few acres of tall fescue grass (*Festuca pratensis*), a row of autumn olive trees (*Elaeagnus umbellata*), a double row of yellow poplar (*Liriodendron tulipifera*), and sweet gum trees (*Liquidambar styraciflua*) that border the park entrance road, and a small wetland. Today, several management decisions would be more carefully chosen than they were 20 years ago. For instance, tall fescue grass would not have been planted for an erosion control grass. Switch grass (*Panicum virgatum*) would have been planted instead. The autumn olive trees were planted when this tree was accepted as the great savior for restoring wildlife habitat. Now, it is being considered for inclusion on the state's "banned" list of troublesome exotic plant species. The bordering rows of yellow poplar and sweet gum remain justified to enhance the park's entrance, with their pyramidal shape and contrasting fall coloration. District administrators will not justify their removal for this savanna project. A fire lane will be used when burning the savanna.

This area was chosen for at least 3 reasons:

1. PUBLIC VISIBILITY - Everyone entering the park would pass by the savanna project.
2. EXISTING SPECIES - Several oak trees and prairie species are already present.
3. LOCATION - Situated directly east of the Doris L. Westfall Prairie Restoration Area, the savanna should be naturally seeded by the prevailing west winds.

Several problem species exist besides the ones earlier mentioned. They are: multiflora rose, *Rosa multiflora*; tall bush clover, *Lespedeza thunbergii*; silky bush clover, *Lespedeza cuneata*; wild black cherry, *Prunus serotina*; Queen Anne's lace, *Daucus carota*; timothy, *Phleum pratense*; honey locust, *Gleditsia triacanthos*; and hawkweed, *Hieracium* spp.

A rough plan of action was developed and consists of the following:

1. Inventory all existing plant species.
2. Visit a prime black-soil savanna.
3. Section off the area into "working blocks".
4. Determine what species should occur in a savanna for east-central Illinois that are presently found in our project area.
5. Begin management by "bush hog" mowing.
6. Cut larger trees with a chain saw, and chemically treat the stumps.
7. Plow and disk existing block of tall fescue grass.
8. Seed barren areas with prairie species.
9. Possibly transplant larger oak trees, using a Vermeer tree spade.
10. Eventually, use fire as a management tool.

It is our opinion that fire should not be used in the initial management stages because of its detrimental effects toward the young woody savanna species we are trying to save.

A partial list of some of the significant plant species found in this inventory is listed below. Nomenclature follow Mohlenbrock (1986).

TREES

Acer negundo
Acer saccharum
Asimina triloba
Carya ovata
Celtis occidentalis
Cercis canadensis
Cornus florida
Crataegus mollis
Gleditsia triacanthos
Juglans nigra
Juniperus virginiana
Liriodendron tulipifera
Liquidambar styraciflua
Malus ioensis
Prunus americana
Prunus angustifolia
Prunus serotina
Quercus imbricaria
Quercus macrocarpa
Quercus rubra
Rhus glabra
Sassafras albidum
Ulmus rubra

SHRUBS AND BRAMBLES

Cornus drummondii
Cornus racemosa
Corylus americana
Rosa multiflora
Rosa sp.
Rubus allegheniensis
Rubus flagellaris
Rubus occidentalis
Sambucus canadensis

VINES

Celastrus scandens
Menispermum canadense
Parthenocissus quinquefolia
Toxicodendron radicans
Vitis spp.

HERBACEOUS

(Savanna species)
Andropogon gerardii
Asclepias verticillata
Baptisia leucantha
Cassia fasciculata
Coreopsis palmata
Fragaria virginiana
Helianthus grosseserratus
Helianthus mollis
Liatris pycnostachya
Monarda fistulosa
Panicum virgatum
Pycnanthemum tenuifolium
Rudbeckia hirta
Schizachyrium scoparium

(Native but non-savanna)
Aster pilosus
Cystopteris protrusa
Desmodium cuspidatum var. *longifolium*
Desmodium paniculatum
Lysimachia ciliata
Polygonatum commutatum
Solidago altissima
Solidago juncea
Tradescantia subaspera
Verbesina alternifolia
Vernonia missurica

(Eliminate if possible)
Achillea millefolium
Ambrosia trifida
Bromus inermis
Bromus commutatus
Daucus carota
Festuca pratensis
Melilotus alba
Melilotus officinalis
Pastinaca sativa
Phleum pratense
Setaria faberi
Trifolium pratense

CONCLUSION

Hopefully, a few years from now our savanna project will be an accurate representation of a naturally-occurring savanna of east-cental Illinois. Plans also include an interpretive trail. To date, we have inventoried the existing plant species and have visited the Iroquois County Conservation Area several times. Even though the Iroquois area is a sand savanna, we now understand better the make-up of a managed savanna.

ACKNOWLEDGMENTS

We would like to thank Dr. Kenneth Robertson and John Taft of the Illinois Natural History Survey for their help in identifying some of our plant species found in the initial inventory.

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Woody Understory of Baber Woods, Edgar County, Illinois

Jacqueline M. Landes and John E. Ebinger

Botany Department
Eastern Illinois University
Charleston, Illinois 61920

ABSTRACT

The woody understory of Baber Woods Nature Preserve, Edgar County, Illinois, was surveyed in closed and open canopy areas. Data were analyzed for age/height relationships, and the density, frequency, relative density, relative frequency, and importance value were determined for each species. Under the closed canopy seedlings and saplings of slippery elm and sugar maple account for an importance value of 153.7 (out of 200) and a total of 8,478 stems/ha. In open canopy situation these same species dominated, accounting for an importance value of 188.6 with 6,900 stems/ha. If this trend continues, Baber Woods will soon become a sugar maple dominated forest.

INTRODUCTION

Baber Woods Nature Preserve, situated on the northern edge of the Shelbyville Moraine, the terminal moraine of Wisconsin glaciation, is a 16 ha woodlot located 8 km NE of Westfield, Edgar County, Illinois (NW1/4 Sec 18, T12N, R13W). In 1835 the Baber family purchased a section of this woods and by 1894 had obtained the entire area. The woods was acquired by the Nature Conservancy in 1969 and is a dedicated Illinois Nature Preserve. Originally the woodlot was a source of wood for fence-rails, timber, and firewood, but most of the woods were left undisturbed except for a 1 ha lot in the SW corner of the timber that provided space for two cabins. This natural area has a gently rolling topography ranging from 229-242 m above mean sea level, is well-drained except for several small depressions, and contains three small ravines that are dry except immediately after a moderate rain.

White oak savanna dominated the Baber Woods area in presettlement time, and with the exclusion of fire developed into a closed oak-hickory forest (Ebinger and McClain, in press). In the past 35 years sugar maple (*Acer saccharum* Marsh.) has undergone an explosive increase in importance in this woods. In an inventory of the woody overstory by McClain and Ebinger (1968) sugar maple had an importance value (IV) of 35.7, averaging 66.5 stems/ha (10 cm dbh and above), while in a more recent survey (Newman and Ebinger 1985) the IV of sugar maple had increased to 51.9, with an average of 100.1 stems/ha. These results suggest that sugar maple is replacing oak and hickory as the dominant forest species in Baber Woods, and probably in many central Illinois forests (Ebinger 1986). Furthermore, Runkle (1984) has found that this aggressive species is a very significant part of treefall gaps since it is abundant in many woods as small saplings, and so, is present in most gaps at the time of their formation. It grows fairly rapidly, even in fairly small gaps, due to its ability to grow and form good root systems at low light levels (Logan 1965). The present study was undertaken to determine the present composition and structure of the woody understory in this woods, since management techniques may soon be used to try and increase oak and hickory reproduction.

METHODS AND MATERIALS

Nine 100-m transects were randomly located under the closed canopy throughout the woods, and twenty 25-m transects were located where gaps had occurred in the canopy. Along each transect, continuous 1-m^2 quadrats were placed, and all woody plants with a height of more than 40 cm and a dbh of less than 10 cm were removed. A basal cross section was removed from each specimen and affixed with a label containing the specimen number. The species name, height, and quadrat location were

recorded for each specimen. Diameter and ring number were later recorded for each specimen. Also, the density (stems/ha), frequency, relative density, relative frequency, and importance value were determined for each species (McIntosh 1957, Boggess 1964).

Transects in the closed canopy area of the woods were located so as not to cross any open canopy areas, while in the open canopy areas transects were placed where gaps had occurred in the overstory. Nomenclature follows Mohlenbrock (1986).

RESULTS AND DISCUSSION

A total of nine woody understory species were recorded in the plots. Three of these, *Acer saccharum*, *Ulmus rubra* Muhl. (slippery elm), and *Asimina triloba* (L.) Dunal (pawpaw), were found to have high enough numbers to constitute individual analysis by species. The other six species are identified hereafter as "other" since they do not constitute a significant part of the understory. These species are *Carya cordiformis* (Wang.) K. Koch (bitternut hickory), *Carpinus caroliniana* Walt. (blue beech), *Corylus americana* Walt. (hazelnut), *Morus rubra* L. (red mulberry), Prunus serotina Ehrh. (wild black cherry), and *Fraxinus americana* L. (white ash).

Ulmus rubra was the most common understory species in the closed canopy areas of Baber Woods with an IV of 97.8 (Table 1) and a density of 5,856 (stems/ha) (Table 1). It decreased to second in importance (IV of 94.0) in open canopy areas, averaging 3,620 stems/ha. *Acer saccharum* was also extremely common in both the closed and open canopy areas. Under the closed canopy this species averaged 2,622 stems/ha and had an IV of 55.9, while under open canopy situations it increased to first in importance (IV of 94.6) and averaged 3,280 stems/ha. *Asimina triloba* was relatively important in the closed canopy with an IV of 35.2, declining to 3.8 under an open canopy. The "other" species under the closed canopy had IV's of 11.1, which dropped to 7.6 under the open canopy.

Although the density of sugar maple increases in open canopy areas, there is an overall decrease in density of all species from the closed canopy (11,289 stems/ha) to the open canopy (7,280 stems/ha) (Table 1). An analysis of growth-ring widths indicates that the canopy gaps occurred between 10-25 years ago. The high gap-phase-replacement-potential of sugar maple is probably responsible for this overall decrease in density since the large, fast growing individuals would probably outcompete small individuals and less aggressive species.

An age/height comparison was calculated for all species combined in both the open and closed canopy areas. As expected, the understory woody species growing in the open canopy areas were found to be consistently taller than their closed canopy counterparts of the same age (Fig. 1). Sugar maple, when analyzed separately, has the greatest increase in height, and, theoretically, the greatest growth occurred after a gap opened in the canopy. The ring width of sugar maple specimens taken from the same gap, showed an increase in ring width at approximately the same time in all specimens. These results indicate that sugar maple is a very aggressive species in treefall gap situations. Slippery elm, in contrast, has a low gap-phase-replacement-potential and is easily crowded out by sugar maple.

Although Baber Woods still contains many large oak and hickory trees, the present study indicates that they are not reproducing. No oak seedlings (greater than 40 cm in height) or saplings were found in the transects, and, of the hickory species present, only bitternut hickory was recorded in the transects, and only in very low numbers. The present data also suggest that sugar maple is an aggressive species that will replace the oaks and hickories as the veteran trees die. If this trend continues, Baber Woods will become a sugar maple forest within 40 to 50 years. In contrast, slippery elm, which has potential canopy status and is certainly dominant in the understory, is prevented from realizing its full height potential due to Dutch elm disease and its low gap-phase-replacement-potential.

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Table 1. Density (stems/ha), frequency, and relative values for the woody understory species of the closed and open canopy areas of Baber Woods Nature Preserve, Edgar County, Illinois.

Species	Stems/ha	Freq. (%)	Rel. Den.	Rel. Freq.	IV
Closed Canopy					
Ulmus rubra	5856	30.6	51.9	45.9	97.8
Acer saccharum	2622	21.7	23.2	32.7	55.9
Asimina triloba	2311	9.7	20.5	14.7	35.2
Other species	500	---	4.4	6.7	11.1
Totals	11,289	---	100.0	100.0	200.0
Open Canopy					
Acer saccharum	3280	27.4	45.1	49.5	94.6
Ulmus rubra	3620	24.6	49.7	44.3	94.0
Asimina triloba	120	1.2	1.6	2.2	3.8
Other species	260	---	3.6	4.0	7.6
Totals	7280	---	100.0	100.0	200.0

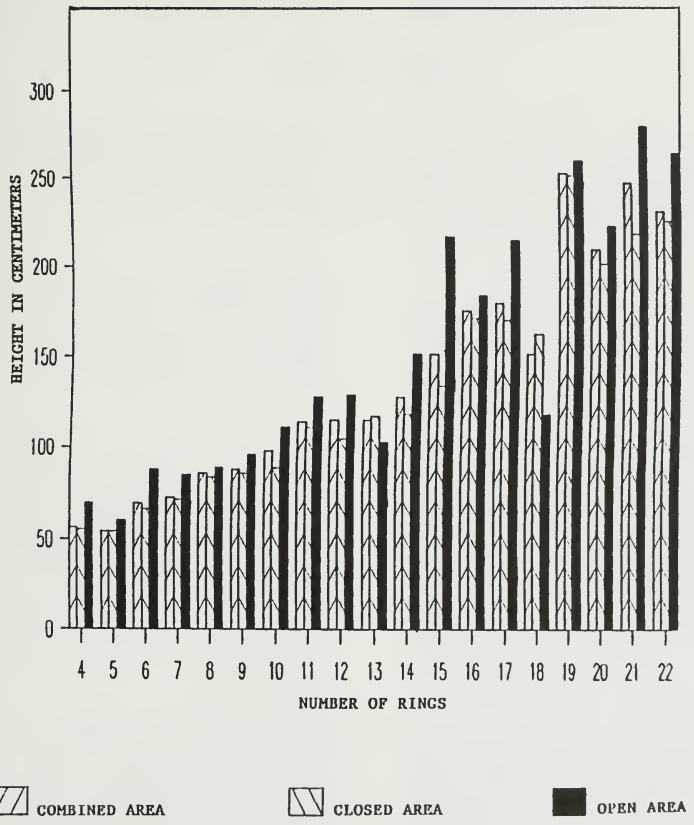

Figure 1. Age/height comparison of all woody understory species in open and closed canopy areas at Baber Woods Nature Preserve, Edgar County, Illinois.

Vegetation of Wolf Creek State Park, Shelby County, Illinois

Shaun A. Newell, Lucinda L. Horton, and John E. Ebinger

Botany Department
Eastern Illinois University
Charleston, Illinois 61920

ABSTRACT

The woody overstory of four forest types was surveyed at Wolf Creek State Park, Shelby County, Illinois. These included: a successional upland forest (592 stems/ha and a basal area of 15.41 m^2/ha), an immature second growth upland forest (426 stems/ha and a basal area of 22.21 m^2/ha), a mature second growth upland forest (292 stems/ha and a basal area of 26.39 m^2/ha), and a mature second growth ravine forest (362 stems/ha and a basal area of 23.29 m^2/ha).

INTRODUCTION

Wolf Creek State Park is located about 8 miles northwest of Windsor, Shelby County, Illinois in the Kaskaskia River Basin (parts of Sections 6, 7, 17, 18, 19 T12N R5E and Sections 24, 25 T12N R4E). The park, 791 ha in size with Lake Shelbyville surrounding it on three sides, is located in the Grand Prairie Division (Schwegman 1973) about 5 miles north of the Shelbyville Moraine, the terminal moraine of Wisconsin glaciation. Most of the park is flat to gently sloping uplands with a few steep, wooded slopes at the margin of the lake. Before being purchased for a park in 1968, most of the flat uplands were cultivated or grazed. Most of this formerly cultivated land is presently in the perennial herb stage of succession, while most of the sloping ground is covered with immature to relatively mature second growth forest. The present study was undertaken to determine the composition of the forest types that currently exist in the park.

MATERIALS AND METHODS

All forest areas studied were divided into quadrats 25 m on a side, with a total of eight contiguous quadrats in each area, and the number, diameter at breast height (dbh), and species of all living trees above 10 cm dbh were recorded for each quadrat. Importance values (IV) were then calculated for each species in each of the areas sampled. Determination of the IV follows the procedure developed by McIntosh (1957), and later Boggess (1964), in which the IV is the sum of the relative density and relative dominance. Also, determined for each species is the density (#/ha) in broad diameter classes and the basal area (m^2/ha). In each of the quadrats, a 0.01 ha circular plot was located randomly in which saplings (2.5-10.0 cm dbh) were recorded as to their species and density (stems/ha). Nomenclature follows Mohlenbrock (1986).

RESULTS AND DISCUSSION

Mainly due to part human activities, most central Illinois forests have been destroyed or extensively modified. As a result, few forested areas, except heavily degraded ones, occur within the boundary of Wolf Creek State Park. During the present study, examples of each the common forest types in the park were surveyed. For each of the four forest types, the common canopy tree species are listed in Tables 1 through 4 along with their densities (stems/ha) in broad diameter classes, basal area (m^2/ha), relative values, importance values, and average diameters.

Successional Upland Forest: This relatively common forest type occurs on areas that were probably abandoned pastures or abandoned cultivated fields before the land was purchased for a park. In this forest type, the average number of individuals per ha is 592, while the basal area averages 15.41 m^2/ha (Table 1). *Ulmus americana* L. (American elm) is the dominant species with numerous individuals in the sapling and 1-2 dm diameter class, an average of 208 stems/ha, a basal area of 4.14 m^2/ha, and an IV

of 61.7. *Juglans nigra* L. (black walnut) and *Gleditsia triacanthos* L. (honey locust) are also common components, both of which have numerous individuals in the sapling and lower diameter classes. Black walnut also has the highest basal area (4.35 m^2/ha) and the largest average diameter (20.3 cm). Numerous other successional tree species are also present, with *Prunus serotina* Ehrh. (black cherry), *Acer negundo* L. (box elder), *Crataegus mollis* (T. & G.) Scheele (red haw), and *Celtis occidentalis* L. (hackberry) being relatively common in the sapling and lowest diameter class. Species in the "others" category of Table 1 include *Carya ovata* (Mill.) K. Koch (shagbark hickory), *Diospyros virginiana* L. (persimmon), *Morus rubra* L. (red mulberry), *Sassafras albidum* (Nutt.) Nees (sassafras), *Ulmus rubra* Muhl. (slippery elm), and *Malus ioensis* (Wood) Britt. (Iowa crabapple).

Immature Second Growth Upland Forest: This forest type, located on the flat uplands, is the most common forest type. Before the land was purchased for a park, this forest type was heavily grazed. The average number of individuals per ha is 426, while the basal area averages 22.21 m^2/ha (Table 2). Shagbark hickory is the dominant species, being common in the lower diameter classes with 166 individuals per ha, an IV of 61.1, and the highest relative density. *Quercus alba* L. (white oak) is second in IV (42.3), and is represented in all diameter classes. Other common forest components include *Quercus velutina* Lam. (black oak) and *Q. imbricaria* Michx. (shingle oak), both of which have numerous individuals in the larger diameter classes. Black oak has the highest basal area (5.90 m^2/ha) and the largest average diameter (33.8 cm). *Fraxinus americana* L. (white ash), though not common in the overstory (IV of 7.0), is well represented in the sapling layer. Other woody species present are not common components of the overstory having IV's of 5.0 or less. Species in the "others" category of Table 2 include black cherry, slippery elm, sassafras, red mulberry, hackberry, and *Ostrya virginiana* (Mill.) K. Koch (hop hornbeam). In this woodlot the oaks and hickories are not common in the sapling layer. In contrast, white ash, slippery elm, American elm, sassafras, black cherry, and hop hornbeam dominate the woody understory. In the future, some of these latter species will probably increase in importance.

Mature Second Growth Upland Forest: Only one small 6 ha woodlot of this forest type was found in the park. It had been lightly grazed in the past, but has not been subjected to logging for more than 40 years. In this woodlot, the average number of individuals per ha is 292, while the basal area is the highest of the forests studied (26.39 m^2/ha) (Table 3). White oak is the dominant species, averaging 130 individuals per ha, with an IV of 122.1, a basal area of 20.49 m^2/ha, and the most individuals in the 30-40 and 40+ dm diameter classes. *Acer saccharum* Marsh. (sugar maple), which is second in IV (23.3), is represented only in the sapling and smallest diameter class (10-20 dm). Other common forest components include two hickory species. *Carya glabra* (Mill.) Sweet (pignut hickory) is second in basal area (3.12 m^2/ha), has an IV of 20.7, and mostly occurs in the larger diameter classes; while shagbark hickory ranks fourth in IV (10.1), with most of the individuals in the 10-20 dm diameter class. The other tree species encountered are not common components of this forest, and, except for black walnut, are found mostly in the 10-20 dm diameter class. The species in the "others" category of Table 3 include hackberry, Iowa crabapple, and *Carya cordiformis* (Wang.) K. Koch (bitternut hickory).

White oak and pignut hickory are not well represented in the sapling layer. In contrast, sugar maple, white ash, black cherry, slippery elm, and shagbark hickory dominate the understory. In the future, sugar maple will most likely become the dominant species of both the overstory and understory as the veteran oaks and hickories die. Its high gap-phase-replacement potential will insure its continued dominance in the forest (Ebinger 1986).

Mature Second Growth Ravine Forest: This forest type is found in a relatively narrow ravine next to the mature second growth upland forest. In this forest the average number of individuals per ha is 362, while the basal area averages 23.29 m^2/ha (Table 4). White oak is the dominant species in this forest type (IV of 62.7) followed by sugar maple and *Quercus rubra* L. (red oak), with IV's of 53.4 and 46.9, respectively. Both oak species are common in the higher diameter classes, have few saplings present, and average diameters in excess of 36 cm. Sugar maple, in contrast, averages 375 saplings per ha, is common only in the lower diameter classes, and has an average diameter of 13.6 cm. The other

tree species are relatively minor components in the woodlot, with only pignut hickory (IV of 14.0) and shagbark hickory (IV of 11.5) having importance valves greater than 10. The species in the "others" category of Table 4 include American elm, bitternut hickory, and *Cercis canadensis* L. (redbud).

The oaks and hickories are poorly represented in the understory of this ravine. In contrast, sugar maple, American elm, and black cherry account for nearly 90% of the individuals in the sapling category. Based on the number of individuals of sugar maple in the smaller diameter classes, it is very likely that this species will soon dominate the woodlot.

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Table 1. Diameter classes, basal areas, relative values, importance values, and average diameters of the woody species in a successional upland forest at Wolf Creek State Park, Shelby County, Illinois.

Species	Saplings Ind/ha	Diameter Class (dm) stems/ha 1-2	2-3	3-4	4+	Total	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	IV	Av. Diam. cm
Ulmus americana	250	180	28	-	-	208	4.14	35.0	26.7	61.7	15.3
Juglans nigra	150	60	52	8	-	120	4.35	20.2	28.2	48.4	20.3
Gleditsia triacanthos	25	48	28	4	4	84	2.99	14.2	19.4	33.6	19.8
Prunus serotina	25	20	8	4	-	32	1.12	5.4	7.3	12.7	20.2
Acer negundo	-	24	8	-	-	32	0.68	5.4	4.4	9.8	15.9
Quercus velutina	-	16	4	4	-	24	0.72	4.1	4.7	8.8	18.2
Crataegus mollis	100	32	-	-	-	32	0.37	5.4	2.4	7.8	12.0
Celtis occidentalis	25	20	4	-	-	24	0.47	4.1	3.1	7.2	15.5
Others (6 species)	175	36	-	-	-	36	0.57	6.2	3.8	10.0	-
Totals	750	436	132	20	4	592	15.41	100.0	100.0	200.0	

Table 2. Diameter classes, basal areas, relative values, importance values, and average diameters of the woody species in an immature second growth upland forest at Wolf Creek State Park, Shelby County, Illinois.

Species	Saplings Ind/ha	Diameter Class (dm) stems/ha 1-2	2-3	3-4	4+	Total	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	IV	Av. Diam. cm
Carya ovata	13	102	58	6	-	166	4.90	39.0	22.1	61.1	18.6
Quercus alba	-	18	38	24	2	82	5.13	19.2	23.1	42.3	26.9
Quercus velutina	-	-	10	46	8	64	5.90	15.0	26.6	41.6	33.8
Quercus imbricaria	-	-	56	20	2	78	4.87	18.3	21.9	40.2	27.7
Fraxinus americana	400	6	4	-	4	14	0.83	3.3	3.7	7.0	24.5
Carya tomentosa	13	10	2	2	-	14	0.38	3.3	1.7	5.0	17.2
Ulmus americana	63	4	2	-	-	6	0.17	1.4	0.8	2.2	18.6
Acer saccharum	13	2	-	-	-	2	0.03	0.5	0.1	0.6	13.3
Others (6 species)	577	-	-	-	-	-	-	-	-	-	-
Totals	1079	142	170	98	16	426	22.21	100.0	100.0	200.0	

Table 3. Diameter classes, basal areas, relative values, importance values, and average diameters of the woody species in mature second growth upland forest at Wolf Creek State Park, Shelby County, Illinois.

Species	Saplings Ind/ha	Diameter Class (dm) stems/ha 1-2	2-3	3-4	4+	Total	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	IV	Av. Diam. cm
Quercus alba	-	2	12	30	86	130	20.49	44.5	77.6	122.1	43.8
Acer saccharum	263	60	-	-	-	60	0.74	20.5	2.8	23.3	12.4
Carya glabra	-	4	2	10	10	26	3.12	8.9	11.8	20.7	37.4
Carya ovata	63	20	2	2	-	24	0.49	8.2	1.9	10.1	14.9
Juglans nigra	-	-	2	4	2	8	0.91	2.7	3.4	6.1	36.9
Ulmus rubra	88	14	-	-	-	14	0.15	4.8	0.6	5.4	11.4
Fraxinus americana	113	12	-	-	-	12	0.15	4.1	0.6	4.7	12.6
Carya tomentosa	13	2	4	-	-	6	0.17	2.1	0.6	2.7	18.9
Prunus serotina	250	6	-	-	-	6	0.06	2.1	0.2	2.3	11.1
Others (3 species)	25	6	-	-	-	6	0.11	2.1	0.5	2.6	-
Totals	815	126	22	46	98	292	26.39	100.0	100.0	200.0	

Table 4. Diameter classes, basal areas, relative values, importance values, and average diameters of the woody species in a mature second growth ravine forest at Wolf Creek State Park, Shelby County, Illinois.

Species	Saplings Ind/ha	Diameter Class (dm) stems/ha 1-2	2-3	3-4	4+	Total	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	IV	Av. Diam. cm
Quercus alba	-	6	18	30	30	84	9.19	23.2	39.5	62.7	36.2
Acer saccharum	375	146	10	-	-	156	2.42	43.0	10.4	53.4	13.6
Quercus rubra	13	-	4	12	32	48	7.82	13.3	33.6	46.9	44.3
Carya glabra	13	-	4	8	6	18	2.10	5.0	9.0	14.0	37.8
Carya ovata	-	14	8	4	-	26	1.01	7.2	4.3	11.5	20.9
Prunus serotina	75	12	-	-	-	12	0.19	3.3	0.8	4.1	14.1
Fraxinus americana	25	10	-	-	-	10	0.18	2.8	0.8	3.6	14.9
Others (3 species)	101	4	2	2	-	8	0.38	2.2	1.6	3.8	-
Totals	602	192	46	56	68	362	23.29	100.0	100.0	200.0	

Rarely Seen Endangered Plants, Rediscoveries, and Species New to Illinois

Marlin L. Bowles[1], John B. Taft, Eric F. Ulaszek, Mary Kay Solecki[2], David M. Ketzner, Loy R. Phillippe, Ann Dennis, Philip J. Burton[3], and Kenneth R. Robertson

Illinois Natural History Survey
607 E. Peabody Drive
Champaign, IL 61820

[1] The Morton Arboretum, Lisle, IL 60532
[2] Current address: Illinois Nature Preserves Commission, P.O. Box 497, Sidney, IL 61877
[3] Current address: University of British Columbia, 270-2357 Main Mall, Vancouver, B.C. V6T 1W5

INTRODUCTION

About 17% of the vascular plant species native to Illinois are officially listed as state-threatened or endangered. The original 1980 list (Sheviak 1981) included 312 endangered and 52 threatened species of vascular plants; the current list, revised in 1990 (Illinois Endangered Species Protection Board 1990), includes 296 endangered and 60 threatened species. Some species were included in these lists, based on historical herbarium records, but living populations were not known to occur in Illinois or were known from only one or a few locations. During 1987 and 1988, the authors undertook a project to review the status and to locate populations of 137 of these extremely rare species. In 1987, our emphasis was on locating species for which no extant populations were known. In 1988, our efforts concentrated on species not found during 1987 and on species for which only a few extant populations were known. Fieldwork focused on those species considered most likely to be extant or to be most critical on state and national levels. The results were submitted as unpublished reports to the Illinois Endangered Species Protection Board (Bowles *et al.* 1988, Bowles *et al.* 1989). Because those reports are not readily accessible, the information they contain is presented here.

METHODS

Locations where the 137 selected species had been collected or observed historically were obtained from herbarium data compiled by the Natural Land Institute in 1977 during preparation of the original list of endangered and threatened species. Files compiled by the Illinois Natural Areas Inventory during 1975-1978 and maintained since by the Illinois Department of Conservation Natural Heritage Division were also consulted extensively, as were personal contacts and notebooks of original collectors. We used this information to direct field searches. Because some location information is vague, especially for older records, we could not always determine exact historical locations, and field searches often required additional time and knowledge of local habitat and species ecology. In the course of these studies, we found it necessary to investigate the taxonomy and nomenclature of several species.

For each species in this report, we list two categories of distribution records: 1) the Illinois counties for which voucher specimens are known to exist (Known specimens), and 2) other Illinois counties where the species has been reported to occur, but for which we could not confirm the existence of specimens (Other reports). The second category includes cases in which we could find no record of herbarium deposition or private possession for specimens cited in the literature. Specimens recorded in herbarium holdings but not found in the cabinets are included in the first category and noted "specimen missing". For some species we list a third category of distribution records: 3) counties for which all reported occurrences of the species have been found to be in error (Erroneous reports). We note in each case whether the error is due to misidentification of specimens or to errors in published distribution maps. We have attempted to account for all counties indicated on distribution maps in Endangered and Threatened Plants (Sheviak

1981), Distribution of Illinois Vascular Plants (Mohlenbrock and Ladd 1978), and Vascular Plants of Illinois (Jones and Fuller 1955).

For all species, we report the county and year of the last known Illinois collection prior to the publication of Endangered and Threatened Plants (Sheviak 1981). Full citations for any subsequent collections or documented sightings are included in discussions of current population status. When recent collections represent new county records, these are noted as "new" in the distribution entries.

Nomenclature follows that used by Sheviak (1981) and the Illinois Endangered Species Protection Board (1990). Synonyms are noted when this nomenclature differs from that used in Kartesz and Kartesz (1980). Nomenclature used in Mohlenbrock (1986) is noted when it differs from both of these. These synonyms are indicated by K&K and RHM, respectively.

Abbreviations for herbaria cited are: DEK (Northern Illinois University), DOC (Illinois Department of Conservation), F (Field Museum of Natural History), GH (Gray Herbarium of Harvard University), ILL (University of Illinois at Urbana/Champaign), ILLS (Illinois Natural History Survey), ISM (Illinois State Museum), MOR (Morton Arboretum), NY (New York Botanical Garden), SIU (Southern Illinois University at Carbondale), and MWI (Western Illinois University).

RESULTS

In the course of this study, we found or received documented reports of extant populations of 57 species; 71 of the species included in the search were not found (Table 1). Of those not found, 49 may still occur and should be looked for in subsequent years, but the remaining 22 appear to be extirpated from Illinois. Dry conditions during parts of 1987 and the drought of 1988 may well have kept some species from appearing. While conducting fieldwork for this and other projects, 3 species new to Illinois were discovered and are included here since they have been added to the list of endangered species.

In seven cases, we found all Illinois specimens of the species in question to have been incorrectly identified; these specimens are now annotated as species which are not threatened or endangered in Illinois. One of the species included in this report, *Valerianella intermedia*, is no longer considered valid, but is accepted as synonymous with *Valerianella umbilicata*, which remains listed as endangered in Illinois. Some controversy surrounds another species included here, *Aristida necopina*. Issues of both identification and taxonomic distinction will have to be resolved before we can determine if it now occurs, or ever did occur, in Illinois.

Adoxa moschatellina L.
Known specimens: Jo Daviess
Other reports: none
Last historic collection: 1937 Jo Daviess

This species is known historically in Illinois from one locality in Jo Daviess Co. It was discovered on a mesic floodplain terrace in 1983 (Sorensen, Bowles, and Nyboer 8375, DEK) in the general vicinity of the original collections.

Amorpha nitens Boynton
Known specimens: Pope
Other reports: none
Last historic collection: 1923 Pope

This species was presumed to be extirpated from Illinois following unsuccessful searches in 1987 of the original collection locality and of another Pope Co. site where it had been reported to occur. In 1988, one population of about 100 plants was found in Pope Co. (Taft 504-507, 511, 524, ILLS).

Apios priceana B.L. Robinson
Known specimens: Union
Other reports: none
Last historic collection: 1941 Union

There is only one valid Illinois collection of this species (Fuller 664, ILLS, ILL, ISM, 1941). The other collection ascribed to this taxon (Winterringer 2492, ISM, ILL, 1949) is a misidentification (M. Woods pers. comm.), and the occurrence reported by Biotic Consultants (1976) is apparently in error (R.H. Mohlenbrock pers. comm.). The original collection location cannot be precisely determined, but repeated searches have been made of suitable habitat in the vicinity. The plant has not been found, but the possibility remains that it could have been overlooked.

Table 1. Summary of search results for species included in this report.

Column designations:

1 - Species found new to Illinois
2 - Species found in recent searches (since 1981).
3 - Species not found in recent searches, but which may still occur in Illinois.
4 - Species not found in recent searches and presumed extirpated from Illinois.
5 - Species no longer considered valid, or with Illinois occurrence based on misidentification.

	1	2	3	4	5
Adoxa moschatellina		X			
Amorpha nitens		X			
Apios priceana			X		
Aralia hispida			X		
Aristida necopina					X*
Asclepias ovalifolia		X			
Bacopa acuminata				X	
Baptisia tinctoria				X	
Bartonia paniculata			X		
Bidens beckii			X		
Botrychium simplex			X		
Carex atherodes		X			
Carex aurea		X			
Carex austrina		X			
Carex canescens var. disjuncta	X				
Carex chordorrhiza		X			
Carex cumulata				X	
Carex decomposita		X			
Carex disperma		X			
Carex echinata	X				
Carex garberi		X			
Carex intumescens		X			
Carex nigromarginata			X		
Carex oxylepis		X			
Carex pallescens			X		
Carex plantaginea				X	
Carex rostrata		X			
Carex striatula			X		
Carex tonsa		X			
Carex willdenowii		X			
Carex woodii		X			
Chimaphila maculata			X		
Chimaphila umbellata		X			
Cinna latifolia				X	
Conioselinum chinense		X			
Corydalis aurea		X			
Corydalis sempervirens		X			
Cynosciadium digitatum			X		
Cypripedium acaule			X		
Daucus pusillus				X	
Eleocharis equisetoides				X	
Eleocharis olivacea			X		
Eleocharis parvula			X		
Equisetum palustre				X	
Equisetum sylvaticum	X				
Eriophorum viridi-carinatum			X		
Euphorbia spathulata			X		
Fuirena scirpoides				X	
Gaultheria procumbens			X		
Geranium bicknellii			X		
Geum rivale				X	
Glyceria arkansana			X		
Glyceria borealis			X		
Glyceria canadensis				X	
Gnaphalium macounii				X	
Habenaria hookeri				X	
Hackelia americana			X		
Helianthus giganteus			X		
Heteranthera reniformis			X		
Hymenoxys acaulis var. glabra				X	
Hypericum boreale					X
Hypericum densiflorum			X		
Juncus vaseyi			X		
Justicia ovata			X		
Lactuca ludoviciana			X		
Lathyrus maritimus			X		
Lipocarpha maculata			X		
Lycopodium inundatum			X		
Medeola virginiana			X		
Melampyrum lineare			X		
Panicum boreale			X		
Panicum columbianum			X		
Panicum hians					X
Panicum longifolium			X		
Panicum nitidum			X		
Panicum ravenelii			X		
Panicum stipitatum			X		
Paspalum bushii			X		

Table 1 continued on next page

Table 1 continued.

	1	2	3	4	5
Paspalum dissectum		X			
Paspalum lentiferum				X	
Phacelia gilioides			X		
Phlox carolina					
ssp. angusta				X	
Phlox pilosa					
ssp. sangamonensis		X			
Physostegia intermedia					X
Plantago heterophylla				X	
Poa wolfii		X			
Polygonum bicorne		X			
Potamogeton gramineus		X			
Potamogeton praelongus			X		
Potamogeton pulcher			X		
Potamogeton robbinsii		X			
Potamogeton strictifolius			X		
Potamogeton vaseyi				X	
Potentilla millegrana			X		
Ptilimnium nuttallii		X			
Puccinellia pallida		X			
Pycnanthemum albescens			X		
Pyrola americana			X		
Pyrola secunda					X
Ranunculus ambigens				X	
Ranunculus cymbalaria		X			
Rhamnus alnifolia		X			
Rhynchospora globularis			X		
Rhynchospora macrostachya					X
Rorippa truncata			X		
Rumex hastatulus			X		
Salix serissima			X		
Salix syrticola		X			

	1	2	3	4	5
Scheuchzeria palustris			X		
Schizachne purpurascens		X			
Scirpus hattorianus			X		
Scirpus microcarpus				X	
Scirpus pedicellatus				X	
Scirpus purshianus			X		
Scirpus smithii			X		
Scirpus torreyi			X		
Scirpus verecundus			X		
Scleria reticularis			X		
Shepherdia canadensis			X		
Sisyrinchium montanum		X			
Solidago arguta			X		
Solidago remota					X
Sorbus americana		X			
Sparganium americanum		X			
Sphaeralcea angusta			X		
Spiranthes lucida			X		
Spiranthes romanzoffiana			X		
Stachys clingmanii					X
Thismia americana			X		
Tradescantia bracteata		X			
Triadenum virginicum			X		
Trillium cernuum			X		
Trillium cuneatum		X			
Vaccinium stamineum			X		
Valerianella intermedia					X
Valerianella umbilicata		X			
Veronica americana		X			
Viola incognita		X			
Viola viarum		X			
Woodwardia virginica				X	

*Taxonomic issues remain unresolved.

Aralia hispida Ventenat
Known specimens: Cook, Lake
Other reports: none
Last historic collection: 1942 Lake

This plant has not been rediscovered despite an extensive survey of the Lake Co. collection vicinity (Sheviak and Haney 1973). Although it is possible that *Aralia hispida* might appear under prescribed burning of suitable sites in Cook Co., this has not yet occurred. This species has probably been extirpated from Illinois.

Aristida necopina Shinners [K&K: *A. glauca* (Nees) Walpers]
Known specimens: Lee
Other reports: none
Last historic collection: 1935 Lee

The only Illinois record for this species is the type collection. The site, described as sandy ridges near ponds in Lee Co., has not been relocated. Shinners (1954) described *A. necopina*, distinguishing it from *A. longespica* Poiret var. *geniculata* (Rafinesque) Fernald. He considered the distinction between *A. intermedia* Scribner and Ball and *A. longespica* var. *geniculata* made in earlier treatments (e.g. Fernald 1950, Gleason 1952) to be invalid and accepted only the latter name, an interpretation supported by Gould (1975). Steyermark (1963), on the other hand, retained the earlier treatment of *A. longespica* var. *geniculata* and *A. intermedia*, and placed *A. necopina* in synonymy with *A. intermedia*. Kartesz and Kartesz (1980) followed Shinners' treatment of these taxa, except that they recognized *A. necopina* as *A. glauca* (Nees) Walpers. Mohlenbrock (1973, 1986) was alone in recognizing three taxa: *A. intermedia*, *A. longespica* var. *geniculata*, and *A. necopina* (as *A. glauca* in 1986).

A. glauca is a perennial of the *A. purpurea* complex (Hitchcock 1950, Gould 1975), while *A. necopina*, regardless of taxonomic status, is an annual of the *A. longespica* complex. There is no evidence that *A. glauca* or any other member of the *A. purpurea* complex occurs in Illinois. We reject the placement of *A. necopina* in synonymy with *A. glauca*, and defer judgment on both the taxonomic validity of *A. necopina* and its occurrence in Illinois until further work has been done on the *A. longespica* complex. If it is found, as Shinners suggested, that *A. necopina* is the valid name for much of the material we now consider to be *A. intermedia*, *A. necopina* would still be rare in Illinois, though possibly not threatened or endangered.

Asclepias ovalifolia Decaisne
Known specimens: Cook, Kendall, Lake, McHenry
Other reports: Kankakee
Last historic collection: 1935 Kendall

This species was recently rediscovered in mesic prairie in Cook Co. (Packard photograph, MOR, 1987), where it had last been collected in 1877.

Bacopa acuminata (Walter) B.L. Robinson [K&K: *Mecardonia acuminata* (Walter) Small]
Known specimens: Wabash
Other reports: none
Last historic collection: 1965 Wabash

This species is known from three Wabash Co. collections, all from one roadside ditch. It was not found during the 1987 search of that site and may have been adventive there.

Baptisia tinctoria (L.) R. Brown
Known specimens: 'North Illinois', believed to be Cook
Other reports: none
Erroneous reports: Marion (misidentification)
Last historic collection: no date Cook

The only valid records of this species are pre-1900 collections from the Chicago region. The original collection sites could not be identified from the vague descriptions given, but potential habitat in the general vicinity was searched. The species was not found and probably no longer occurs in Illinois.

Bartonia paniculata (Michaux) Muhlenberg
Known specimens: Pope
Other reports: none
Erroneous reports: Johnson
Last historic collection: 1967 Pope

A search was not conducted in 1988 for this annual-biennial species due to severe effects of drought. However, the Pope Co. collection site is still intact, and this species may still occur in Illinois.

Bidens beckii Torrey [K&K: *Megalodonta beckii* (Torrey ex Sprengel) Greene]
Known specimens: Cook, Lake
Other reports: none
Erroneous reports: St. Clair (map error)
Last historic collection: 1966 Lake

During 1987 and 1988 this aquatic species could

not be found at the only site where it has been collected in this century. However, it was discovered in 1990 in a second Lake Co. site (Wilhelm 18422 MOR), and it may remain extant in other glacial lakes in Lake Co.

Botrychium simplex E. Hitchcock
Known specimens: Cook, Lee, Winnebago
Other reports: none
Last historic collection: 1975 Cook

Although this species was not relocated in 1988 searches of sites where it had previously been collected, it is opportunistic in successional habitats and could recur in northern Illinois.

Carex atherodes Sprengel
Known specimens: Champaign, Menard, Ogle, Richland, Winnebago (new: Du Page, Grundy, Kane, Lake, McHenry, Shelby, Will)
Other reports: Cook, Hancock, St. Clair
Erroneous reports: Stark (misidentification)
Last historic collection: 1954, Ogle and Winnebago

Prior to 1981, the only historic collection sites thought possibly to support populations of this sedge were in Winnebago and Ogle counties (Sheviak 1981). Since then, it has been rediscovered at one of the Winnebago Co. sites, and found at new locations in Du Page, Grundy, Kane, Lake, McHenry, Shelby, and Will counties, with thirty-six or more populations now known (Bowles 1988). This species has nevertheless been recommended for retention on the State list with 'threatened' status because of continued impacts to its wetland habitat.

Carex aurea Nuttall
Known specimens: Cook, Lake, Menard (new: Kane)
Other reports: none
Last historic collection: 1944 Lake

In 1987, this species was found in a search of beach swales bordering Lake Michigan (Lake Co.: Bowles 676, MOR) in the general vicinity where it had been last collected. It was also collected in 1987 from along Lake Michigan in Cook Co. (Evert 11895 MOR), and subsequently from a calcareous fen in Kane Co. (Young *s.n.*, MOR, 1988).

Carex austrina (Small) Mackenzie
Known specimens: Macon, Perry (specimen missing: Jackson)
Other reports: Monroe
Last historic collection: 1958 Perry

In 1988, this sedge was found (Ulaszek 1347, ILLS) at the Perry Co. site where it had been collected previously. This site is a degraded prairie remnant in an abandoned railroad right-of-way and will probably be converted to cropland in the near future. The specimen for the original Perry Co. collection is missing from the SIU herbarium. This species was not found at one of the two Jackson Co. sites where it has been recorded, and the specimen from that site could not be relocated at SIU for verification. The specimen from the other Jackson Co. site was found to be *C. muhlenbergii* Willdenow var. *enervis* Boott. *C. austrina* is often considered a variety of *C. muhlenbergii* Willdenow (Gleason, 1952). Examination of Illinois collections of *C. muhlenbergii* may reveal specimens of *C. austrina* which have been overlooked.

Carex canescens L. var. ***disjuncta*** Fernald
Known specimens: Lake
Other reports: none
Erroneous reports: La Salle (misidentification)
Last historic collection: 1948 Lake

In 1988, this sedge was discovered in a Lake Co. bog (Taft and Solecki 2322, 2323, ILLS). This species closely resembles *Carex brunnescens* (Persoon) Poiret, another sedge recently reported from Illinois (Taft and Solecki 1987). During this study, two 1948 Lake Co. collections originally identified as *C. brunnescens* (Evers 10338, 10342, ILLS) were determined to be *C. canescens* var. *disjuncta*.

Carex chordorrhiza L.f.
Known specimens: Lake, McHenry
Other reports: none
Last historic collection: 1905 Lake

This species was considered extirpated from Illinois until 1988, when it was rediscovered from a sphagnum bog in Lake Co. (Wilhelm 16295, MOR).

Carex cumulata (Bailey) Fernald
Known specimens: Kankakee
Other reports: none
Last historic collection: 1940 Kankakee

This sedge is represented in Illinois by a single Kankakee Co. collection for which there is no specific location data. It was not found in potential habitat in the general area of the original collection and is probably extirpated from the state.

Carex decomposita Muhlenberg
Known specimens: Union
Other reports: Gallatin, Johnson, Pulaski
Last historic collection: 1969 Union

In 1988, this species was found at one site in Union Co. (Phillippe 13200, ILLS). Although its normal habit is to form clumps on decaying logs, several of the plants found were growing on a roadside embankment. No search was made for the populations reported from Gallatin, Johnson, or Pulaski counties.

Carex disperma Dewey
Known specimens: Kane, Lake
Other reports: none
Last historic collection: 1952 Lake

This sedge was known from two bogs in Lake Co. and from "low ground" in Kane Co. This sedge was rediscovered in a Lake Co. bog in 1988 (Solecki and Taft 2324, 2325, ILLS).

Carex echinata Murray
Known specimens: (new: Winnebago)
Other reports: Lake
Last historic collection: new to Illinois

This sedge was not verified from Illinois until recently, when it was collected from a sedge meadow in Winnebago Co. (Jones and Bowles 762, MOR, 1988, identified by A.A. Reznicek). One earlier record from Lake Co. (Steyermark 63741, F, 1942) was mapped for Illinois (Reznicek and Ball 1980). However, this specimen has abnormally small perigynia and may be introgressant. Location descriptions for earlier Vasey collections of this species are too vague to substantiate that they were made in Illinois (A.A. Reznicek pers. comm.).

Carex garberi Fernald
Known specimens: Cook, Lake
Other reports: none
Last historic collection: 1960 Lake

This species is known from calcareous beach swales near Lake Michigan. It has been re-collected in both Cook (Sorensen 8232, DEK, 1982) and Lake (Bowles 675, MOR, 1987) counties.

Carex intumescens Rudge
Known specimens: Adams, Alexander, Cook, Johnson, Massac, Menard
Other reports: Hancock, Peoria
Erroneous reports: Jersey, Livingston, St. Clair (misidentifications)
Last historic collection: 1971 Alexander

This species was found at two new locations, both in the vicinity of a previous Johnson Co. collection site (Ketzner 1092, ILLS, 1987; Ketzner 1166, ILLS, 1988). No visits were made to collection sites in other counties.

Carex nigromarginata Schweinitz
Known specimens: (specimen missing: Pope)
Other reports: Jackson, Wabash
Last historic collection: (1966 Pope)

A field search of the only site where this species is known to have been collected in Illinois was unsuccessful. However, severe drought had produced poor conditions for observing many sedges, and it is not unlikely that this species was overlooked. The voucher specimen for this Pope Co. collection could not be located at SIU. Sites in Jackson and Wabash counties where this species has been reported to occur were not searched.

Carex oxylepis Torrey & Hooker
Known specimens: Hardin, Johnson
Other reports: Union
Last historic collection: 1969 Johnson

A new Johnson Co. location for this species was discovered in 1988 just a few miles from the original station (Ketzner 1165, ILLS). No search was conducted at the Union and Hardin county sites, nor at the original Johnson Co. site.

Carex pallescens L.
Known specimens: Fulton, Hancock
Other reports: none
Last historic collection: 1958 Fulton

This species is known from only one collection made during the last 100 years. No precise location information is available for that collection, and no search was made for this species. *Carex pallescens* resembles several more common *Carex* species and may be overlooked in Illinois. Suitable habitat includes dry, open woods, a habitat type that is still available in parts of Illinois.

Carex plantaginea Lamarck
Known specimens: Cook, Jackson
Other reports: none
Last historic collection: 1953 Jackson

This species has not been collected in Cook Co.

since 1896, and its habitat there has almost certainly been destroyed by urban growth. The Jackson Co. collection has vague location information. No populations have been found in recent years, and this species has probably been extirpated from the state.

Carex rostrata Stokes
Known specimens: Cook, Du Page, Henry, McHenry, Randolph, Winnebago (new: Lake)
Erroneous reports: Hancock, Henderson (misidentifications)
Last historic collection: 1978 Du Page

In 1981, the only historic collection sites thought to support populations of this sedge were those in Du Page, Henderson, and Winnebago counties. More recently, it has been found at new locations in Du Page, McHenry, and Winnebago counties, and collected for the first time in Lake Co. (Bowles 1988). Although ten or more populations are now known, this species is still considered to be endangered in Illinois because of continuing impacts to its wetland environment.

Carex striatula Michaux
Known specimens: Hardin, Jackson, Pope, Union
Other reports: none
Erroneous reports: Calhoun (misidentification)
Last historic collection: 1976 Jackson

This species was not found at the three previous collection locations searched in 1988. One Jackson Co. locality is intact, and *Carex striatula* may still occur there, but the other Jackson Co. locality has been destroyed. The northwest Union Co. site is intact, but the reported occurrence there is probably based on an identification error (R. H. Mohlenbrock pers. comm.). Sites in Hardin, Pope, and northeast Union counties were not checked. There is some doubt that the specimens at SIU ascribed to this taxon have been correctly identified, and additional herbarium work is needed to determine if this taxon has ever been collected in Illinois.

Carex tonsa (Fernald) Bicknell
Known specimens: Carroll, Pope (new: Lake)
Other reports: none
Last historic collection: 1966 Pope

In 1988, this species was re-collected in Carroll Co. (Bowles 711, MOR) and collected for the first time in Lake Co. (Bowles 735, MOR). At both locations it occurs in dry sand prairies, a habitat it occupies in the driftless area (Hartley 1966). It was not found at the location in Pope Co. where it was previously collected.

Carex willdenowii Schkuhr
Known specimens: Gallatin (new: Pope, Union)
Other reports:
Last historic collection: 1985 Gallatin

A 1985 Gallatin Co. collection (Parker 1985) is the first record of this species in Illinois. Four additional populations were found during 1988. It was collected from a dry upland forest in Union Co. (Phillippe 13263, ILLS) and was abundant at three sites in Pope Co. (Phillippe 13203, 13211, 13243, ILLS). This sedge strongly resembles *C. jamesii* Schweinitz, and a review of southern Illinois collections of *C. jamesii* may reveal additional collections of *C. willdenowii*.

Carex woodii Dewey
Known specimens: Cook, Kankakee, Will, Winnebago (new: Jo Daviess)
Other reports: Lake
Erroneous reports: St. Clair (misidentification)
Last historic collection: 1980 Cook

This species was recently discovered in Jo Daviess Co. (Schwegman *s.n.*, DOC, 1988). It has also been reported recently from two Lake Co. sites, but no collections were made (Bowles 1987).

Chimaphila maculata (L.) Pursh
Known specimens: Cook
Other reports: Pope
Last historic collection: 1981 Cook

This species was not found in recent searches at the Cook Co. location where it had been collected in 1981, nor at the Pope Co. location where a single individual was sighted in 1974. Undisturbed habitat exists at both sites, and the species could still occur at either of them.

Chimaphila umbellata (L.) Barton
Known specimens: Winnebago
Other reports: Lake, McHenry
Last historic collection: 1945 Winnebago

This species still occurs at the original Winnebago Co. collection site (P. Burton and V. Nuzzo pers. comm.) and was collected from a second Winnebago Co. site in 1987 (Bowles, Burton, and Nuzzo 674, MOR). All Illinois collections of this species are ssp. *cisatlantica* (Blake) Hulten.

Cinna latifolia (Treviranus) Grisebach
Known specimens: Kane, Lake
Other reports: Cook, DeKalb, Winnebago
Last historic collection: 1909 Lake

Location information is vague for the Kane and Lake Co. collection sites, and no populations have been found in recent years. This species is probably extirpated from Illinois.

Conioselinum chinense (L.) Britton, Sterns & Poggenberg
Known specimens: Cook, Kane
Other reports: none
Last historic collection: 1959 Kane

The single population of Hemlock Parsley known to exist in Illinois occurs in a Kane Co. forested fen. Habitat at that site has been affected by highway construction since it was last collected there. Although it was not found during searches conducted in 1988, apparently at least one plant remains at that site (K. Dritz pers. comm.).

Corydalis aurea Willdenow
Known specimens: La Salle, Ogle, Pike
Other reports: Cook, Ford, Hancock, Henderson, Kankakee, Mason, Menard, Union, Winnebago
Erroneous reports: Adams, Champaign, Peoria (misidentifications)
Last historic collection: 1981 Pike

Golden Corydalis is represented in Illinois primarily by pre-1900 records. Verified post-1900 records are from LaSalle, Ogle, and Pike counties. In 1981, a collection was made from an adventive population in Pike Co., but this biennial has not reappeared at that site in subsequent years. It was not found in a 1988 search of intact natural habitat in Ogle Co. However, in 1989, a population of this species was found at a La Salle Co. site where it had previously been known to occur (Jones *s.n.*, MOR).

Corydalis sempervirens (L.) Persoon
Known specimens: Cook, LaSalle, Ogle, Stephenson, Winnebago
Other reports: none
Last historic collection: 1974 Cook

In 1986, this annual was collected from a St. Peter's sandstone cliff in Ogle Co. (McKnight 4959, ILLS) where a small number of individuals occurred in two adjacent populations. No plants were found in 1988, possibly due to drought conditions, but in 1989, fourteen vegetative plants tentatively identified as this species were found at the site. This population is threatened by a locally increasing population of garlic mustard [*Alliaria petiolata* (Bieberstein) Cavara and Grande], an introduced biennial weed.

Cynosciadium digitatum DeCandolle
Known specimens: Jackson
Other reports: none
Last historic collection: 1969 Jackson

This species is known from a single collection for which precise location data are not available. Only a portion of the large area referred to in the collection site description was searched in 1988. Although this species was not found, suitable habitat still remains there.

Cypripedium acaule Aiton
Known specimens: Cook, Lake, McHenry, Ogle
Other reports: none
Erroneous reports: Lee (map error)
Last historic collection: 1972 McHenry

This orchid was not found in the McHenry Co. forested fen where it was collected in 1972 and observed again in 1977 during the Illinois Natural Areas Inventory. This site remains intact, as do sites in Lake and Ogle counties where this species was collected in the 1960's; it is likely that this species still occurs in Illinois.

Daucus pusillus Michaux
Known specimens: Perry (specimen missing: Jackson)
Other reports: none
Last historic collection: (1954 Jackson)

The Jackson and Perry Co. localities were searched in 1987 and in 1988, although the Perry Co. collection site could not be precisely determined. *Daucus pusillus*, an annual, was not present either year. Only one plant was originally noted at the Jackson Co. locality (R.H. Mohlenbrock pers. comm.), and the specimen (Mohlenbrock 3003, SIU, 1954) cannot be located. This species is almost certainly adventive in Illinois.

Eleocharis equisetoides (Elliott) Torrey
Known specimens: Cook
Other reports: none
Erroneous reports: Lake (misidentification)
Last historic collection: 1890 Cook

The only recent record of this species (Lake Co.:

Myers 2533, MWI, 1964) was based on a misidentification. It has not been relocated at the original 1890 collection site in Cook Co., which has been highly modified. The species is probably extirpated from the state.

Eleocharis olivacea Torrey
Known specimens: Cook, Lake
Other reports: Mason
Erroneous reports: Henderson (map error)
Last historic collection: 1976 Lake

In 1988, this species was found (Bowles 839, MOR) at the Lake Co. site where it had been previously collected. At that site, plants are restricted to a few calcareous beach swales.

Eleocharis parvula (Roemer & Schultes) Link
Known specimens: Coles, Effingham
Other reports: none
Last historic collection: 1978 Effingham

This species is known in Illinois from three sites in Coles and Effingham counties. One of the Coles Co. collection sites, the margin of an artificial pond, was searched in 1988, but no plants were found. The other two collection sites, also artificial pond margins, were not searched. This species may be adventive in Illinois.

Equisetum palustre L.
Known specimens: Peoria, Tazewell, Woodford
Other reports: none
Erroneous reports: Kankakee (misidentification)
Last historic collection: 1953 Tazewell

All historic collection sites for this species in Illinois have been disturbed. This horsetail was not found in recent searches of suitable habitat near the original collection sites, and it is probably extirpated from the state.

Equisetum sylvaticum L.
Known specimens: (new: Ogle)
Other reports: none
Last historic collection: new to Illinois

In 1988, this horsetail was discovered new to Illinois from Ogle County (Jones 144, MOR). The plants occur along the bottom and slopes of a small north-facing side ravine developed in St. Peter's sandstone.

Eriophorum viridi-carinatum (Engelmann) Fernald
Known specimens: Lake, Rock Island
Other reports: Henry, Winnebago
Erroneous reports: DuPage (misidentification)
Last historic collection: 1929 Lake

Since 1900, there have been only three reports of this species in Illinois: a 1929 collection from Lake Co., and sightings in Winnebago (Fell 1953) and Henry (Dobbs 1963) counties. Although no recent collections exist for this species, and it was not relocated in 1987 or 1988, it still may occur in the extensive habitat remaining in these counties.

Euphorbia spathulata Lamarck
Known specimens: Monroe
Other reports: none
Last historic collection: 1950 Monroe

A single individual of this western annual species was found recently in Monroe Co. (Taft photograph, ILLS, 1987) at the only Illinois location where this species is known to occur.

Fuirena scirpoides Michaux
Known specimens: (specimen missing: Hamilton)
Other reports: none
Last historic collection: (1970 Hamilton)

In Illinois, this species is known only from an artificial lakeshore in Hamilton Co. where it was collected in 1970. The collector was unable to relocate the population shortly after making the original collection, and the entire population may have been collected (N. Tracy pers. comm.). The species was probably adventive at that site, and was not found during this study. The specimen is missing from the herbarium where it was originally deposited.

Gaultheria procumbens L.
Known specimens: Cook
Other reports: Lake, La Salle, Ogle
Erroneous reports: Peoria
Last historic collection: 1943 Cook

In 1983, this species was collected at a new location in Cook Co. (Evert 6448, MOR). It was not found, however, in searches of other historic collection sites conducted during this study.

Geranium bicknellii Britton
Known specimens: Cook, DuPage, Lake
Other reports: none
Last historic collection: 1974 Cook

Although the Northern cranesbill was observed as recently as 1967 in Lake Co. and 1974 in Cook

Co., it was not found in 1987 and 1988 searches. Since this species tends to appear after fire (Swink and Wilhelm 1979), populations may still occur in seed banks.

Geum rivale L.
Known specimens: Kane
Other reports: McHenry, Winnebago
Last historic collection: 1949 Kane

The most recent collection site for this plant has been highly modified by freeway construction. Numerous searches for this species in remaining suitable habitat have been unsuccessful, and it is probably extirpated from Illinois.

Glyceria arkansana Fernald
Known specimens: Union
Other reports: none
Last historic collection: 1957 Union

In 1988, this species was found in Union Co. (Phillippe 13196-B, ILLS) in the general vicinity of a previous collection site. *G. arkansana* is difficult to distinguish from *G. septentrionalis* Hitchcock in the field. Since they occur together here, it was difficult to estimate population size and extent of *G. arkansana*.

Glyceria borealis (Nash) Batchelder
Known specimens: Cook, Stephenson (specimen missing: Lake)
Other reports: Jo Daviess
Erroneous reports: St. Clair (misidentification)
Last historic collection: 1959 Cook

There have been only three Illinois collections of this species since 1946. Previous collection sites were searched unsuccessfully during 1987 and 1988. However, potential habitat still occurs at sites in Lake and Jo Daviess counties, and this species may remain extant in these areas.

Glyceria canadensis (Michaux) Trinius
Known specimens: Cook
Other reports: Peoria, Tazewell
Last historic collection: 1943 Cook

There is no specific location information for the Illinois collections of this species. It was not found during an extensive survey of suitable habitats in northeastern Illinois during 1988 (Bowles 1988), nor in searches of reported locations in Tazewell Co. It is unlikely that it remains extant in Illinois.

Gnaphalium macounii Greene [K&K: *G. viscosum* HBK.]
Known specimens: none
Other reports: Clark
Last historic collection: 1932 Clark

This biennial species is known in Illinois from a single 1932 report. It has not been relocated in extensive searches of the original collection site, and is presumed to be extirpated from the state.

Habenaria hookeri Torrey [K&K: *Platanthera hookeri* (Torrey ex Gray) Lindley]
Known specimens: Cook, Hancock, Lake
Other reports: none
Last historic collection: 1943 Cook

This species has been collected only once since 1900, at a site that has since been highly modified. It has not been found in suitable habitat elsewhere and is probably extirpated from Illinois.

Hackelia americana (Gray) Fernald [K&K: *H. deflexa* (Wahlenberg) Opiz var. *americana* (Gray) Fernald & I.M. Johnston]
Known specimens: Carroll, Jo Daviess, Winnebago
Other reports: none
Erroneous reports: Lake (misidentification)
Last historic collection: 1965 Carroll

In 1988, this stickseed was collected in Carroll Co. from ledges along the base of west-facing limestone bluffs of the Mississippi River (Bowles and Nyboer 838, MOR). This species occupies similar habitat in other sections of the driftless area (Hartley 1966).

Helianthus giganteus L.
Known specimens: Cook, Kane, Kankakee, Tazewell, Winnebago
Other reports: McLean
Last historic collection: 1951 Winnebago

In 1987, this species was found in graminoid fen habitat in Cook Co. (Nuzzo and Karnes 501, MOR) and was rediscovered in a Winnebago Co. sedge meadow (Bowles 681, MOR).

Heteranthera reniformis Ruiz & Pavon
Known specimens: Lawrence, Wabash, St. Clair (new: Pope)
Other reports: Alexander, Pope, Union
Last historic collection: 1952 Lawrence

This species was noted at a Pope Co. site during the Illinois Natural Areas Inventory. In 1988, it was

found to still occur at that site as a single large colony bordering the pool of a spring in a grazed pasture (Taft 520, ILLS). This species was not found at the Lawrence Co. collection site where suitable habitat remains, nor in a search of the site reported in Union Co. where conditions may no longer be suitable due to rising water levels. The Alexander Co. record may be based on a misidentification, and that collection site that was not examined during this study.

Hymenoxys acaulis (Pursh) Parker var. ***glabra*** (Gray) Parker
Known specimens: Will
Other reports: Kankakee, Tazewell
Last historic collection: 1947 Will

The last known Illinois population of this species was destroyed in Will Co. in 1981. Searches of remaining suitable habitat and reported collection sites have been unsuccessful. A recovery plan has been initiated involving native material from cultivation and material from an out-of-state source.

Hypericum boreale (Britton) Bicknell
Known specimens: none
Other reports: Cook, Iroquois
Erroneous reports: Pope (misidentification)
Last historic collection: none

The only Illinois specimen ascribed to this species was a misidentified collection of *H. mutilum*. The only other specific record for this species is from a field study of a Cook Co. site (Armstrong 1963), but no specimens to substantiate this report have been found. Since the similar *H. mutilum* occurs at that site and was not recorded in the 1963 study, it is probable that this report was also based on a misidentification.

Hypericum densiflorum Pursh
Known specimens: Massac
Other reports: Alexander
Erroneous reports: Jackson (misidentification)
Last historic collection: 1950 Massac

Searches for this species in Alexander, Jackson, and Massac counties were unsuccessful. The Jackson Co. report is apparently based on a misidentification of *H. denticulatum* Walter (R.H. Mohlenbrock pers. comm.). Only one Illinois specimen of this species still exists (Bailey and Swayne *s.n.*, SIU, 1950, Massac Co.). Since *Hypericum densiflorum* and *H. lobocarpum* Gattinger (formerly *H. densiflorum* Pursh var. *lobocarpum* (Gattinger) Svenson) are difficult to distinguish when fruits are not present, identity of this non-fruiting specimen has not been confirmed. Further herbarium work is needed to verify the presence of *H. densiflorum* in Illinois.

Juncus vaseyi Engelmann
Known specimens: Cook, Winnebago
Other reports: McHenry
Last historic collection: 1947 Winnebago

In 1987 this species was rediscovered (Bowles 690, MOR) at the sedge meadow site in Winnebago Co. where it had last been collected in Illinois.

Justicia ovata (Walter) Lindau
Known specimens: Alexander, Pulaski
Other reports: Massac
Last historic collection: 1951 Pulaski

Extensive areas of suitable habitat in Pulaski Co. have been explored, but this species was only found at a single station (Ketzner 1198, ILLS, 1988). No precise location information is available for the Alexander Co. collection site.

Lactuca ludoviciana (Nuttall) Riddell
Known specimens: Macon, McHenry, Stark
Other reports: Calhoun, Carroll, Clay, Cook, De Kalb, Hancock, Kankakee, Lake, Logan, Macoupin, Monroe, Stephenson
Erroneous reports: Boone, Winnebago (misidentification)
Last historic collection: 1939 Macon

This species has been reported from seventeen counties in Illinois, but several reports and collections are based on misidentifications. Efforts to relocate this species in 1987 and 1988 were unsuccessful. It was not found on limestone ledges in Monroe Co., where it was reported (Ozment 1967), nor was it found at reported locations in Clay and Stark counties. The relatively high number of former records and the widespread existence of potential habitat suggest that the plant may remain extant in Illinois.

Lathyrus maritimus (L.) Bigelow [K&K: *L. japonicus* Willdenow]
Known specimens: Cook, Henry, Lake
Other reports: none
Last historic collection: 1968 Lake

Modern collections of the beach pea are known

primarily from beach habitat in Lake Co., where it was last observed in 1977 during the Illinois Natural Areas Inventory. The species has not been found during extensive recent surveys, and erosion from high lake levels has severely affected its habitat. It is conceivable that it persists, or that it will reappear by seed dispersal from adjacent Wisconsin populations.

Lipocarpha maculata (Michaux) Torrey
Known specimens: Cass
Other reports: none
Last historic collection: 1963 Cass

Nine collections of this sedge were made by R.T. Rexroat between 1957 and 1963, all from the margins of sand ponds in Cass Co. This species has not been reported in Illinois since. Although several sites were searched without success in 1987 and 1988, suitable habitat remains and this species, an annual, may again appear in the state.

Lycopodium inundatum L.
Known specimens: Cook, Ogle (new: Lee)
Other reports: none
Last historic collection: 1965 Ogle

This club moss was not found at the only recent collection locality. However, in 1987 it was collected in the swale of a Lee Co. sand prairie (Burton and Rogers 835, ILLS).

Medeola virginiana L.
Known specimens: Cook, LaSalle
Other reports: Hancock
Last historic collection: 1939 Cook

Indian cucumber-root was observed in mesic sand forest in Cook Co. during the Illinois Natural Areas Inventory. It remains extant at that site (Bowles pers. obs.).

Melampyrum lineare Desrousseaux
Known specimens: Cook
Other reports: none
Last historic collection: 1952 Cook

Cow wheat is known from three Cook Co. collections. It was observed at the site of the last of these collections during the Illinois Natural Areas Inventory, but it was not found in a search of that site in 1988. Suitable habitat remains intact at that locality, and the plant may still occur there.

Panicum boreale Nash [K&K: *Dichanthelium boreale* (Nash) Freckmann]
Known specimens: Lake (new: Cook)
Other reports: Cook, St. Clair
Last historic collection: 1944 Lake

In 1988, this species was collected (Bowles, Nuzzo, and Dritz 854, MOR) at a Cook Co. site where it had been previously reported (Armstrong 1963). It occurs at that site in a sand pit under successional woody vegetation. No search was made of sand savanna habitat at the Lake Co. site where this grass was originally collected and may still occur.

Panicum columbianum Scribner [K&K: *Dichanthelium sabulorum* (Lamarck) Gould & Clark var. *thinium* (A.S. Hitchcock & Chase) Gould & Clark; RHM: *D. columbianum* (Scribner) Freckmann]
Known specimens: La Salle, Ogle (specimen missing: Kankakee)
Other reports: Du Page
Last historic collection: 1945 Kankakee

In 1987 this species was found (Bowles 672, MOR) on dry sandstone ledges in La Salle Co. where collections had been made in the early 1900's.

Panicum hians Elliott
Known specimens: none
Other reports: none
Erroneous reports: Alexander (misidentification)
Last historic collection: none

The single herbarium specimen representing this species in Illinois (Alexander Co.: Mohlenbrock 13004, SIU, 1968) was annotated as *P. verrucosum* Muhlenberg during this study. *P. hians* apparently does not occur in Illinois.

Panicum longifolium Torrey
Known specimens: (specimen missing: Monroe)
Other reports: none
Erroneous reports: Edgar (misidentification)
Last historic collection: (1962 Monroe)

This grass is known in Illinois only from a wooded ravine in Monroe Co., where it was collected in 1962 (Ozment 12794, SIU). In 1988, ravines and adjoining hill prairie in the vicinity of the original collection site were searched without success. It is possible that the grass was present only in a vegetative state due to drought and may have gone unnoticed. Since this specimen is missing from the SIU herbarium, the species identification cannot be verified.

Panicum nitidum Lamarck [K&K: *Dichanthelium acuminatum* (Swartz) Gould & Clark; RHM: *D. nitidum* (Lamarck) Mohlenbrock]
Known specimens: (specimen missing: Jackson)
Other reports: Pope, Wabash
Last historic collection: (1967 Wabash)

This species was not found at reported collection locations in Wabash and Jackson Co. A reported Pope Co. location for this species appears to be based on a misidentification. Since no voucher specimen exists for the Wabash Co. location and the voucher specimen for Jackson Co. is missing from the SIU herbarium, it can not be verified that this species ever occurred in Illinois.

Panicum ravenelii Scribner and Merrill [K&K: *Dichanthelium ravenelii* (Scribner and Merrill) Gould]
Known specimens: Hardin, Union
Other reports: Pope
Last historic collection: 1968 Hardin, Union

This species was found during 1988 in Hardin Co. (Phillippe 13333, ILLS). Only three plants were present adjacent to small rock outcroppings in an open area beneath a powerline. No plants were found at the Union Co. location reported for this species, but suitable habitat remains there.

Panicum stipitatum Nash
Known specimens: Johnson
Other reports: none
Erroneous reports: Pulaski (misidentification)
Last historic collection: 1964 Johnson

This species is known in Illinois only from a single Johnson Co. collection (Mohlenbrock 12634, SIU, 1964). The specimen is immature and cannot be positivcly ascribed to *P. stipitatum*. A single plant matching this collection was observed during a 1987 search of the original collection site, but no specimen was collected.

Paspalum bushii Nash [K&K: *P. setaceum* Michaux var. *stramineum* (Nash) D. Banks]
Known specimens: Jackson, Mason, Schuyler (new: Lee, Madison)
Other reports: Cass, Union
Last historic collection: 1963 Jackson

There have been four recent collections of this species in Illinois: from Lee (Burton and Rogers 829, ILLS, 1987), Madison (Taft 468, ILLS, 1987), and Mason (Phillippe 13425, ILLS, 1988; Moran 1360, ILLS, 1981) counties. Reported localities in Jackson and Union counties were not searched, but the habitat is intact. This species intergrades with the more common *Paspalum ciliatifolium* Michaux and is considered by some authors to be a variety of that species (Gleason 1952). A survey of the *P. ciliatifolium* complex in Illinois herbaria may reveal that *P. bushii* is more common than formerly believed.

Paspalum dissectum L.
Known specimens: Perry, Pulaski, St. Clair (new: Williamson)
Other reports: Johnson
Erroneous reports: Edwards, Jackson, Lawrence (misidentifications)
Last historic collection: 1893 Perry

The species was found in Williamson Co. in 1985 (Ulaszek 1204, ILLS), and recollected there in 1987 (Ulaszek 1325, ILLS). The population at that site, an artificial pond, appears to be adventive, but it may have originated from native populations in nearby bottomland swamps.

Paspalum lentiferum Lamarck [K&K: *P. praecox* Walter]
Known specimens: Pulaski
Other reports: none
Erroneous reports: Massac (misidentification)
Last historic collection: 1961 Pulaski

This species is known in Illinois from a single Pulaski Co. roadside location. This site has been highly modified, and searches there were unsuccessful. The species appears to have been adventive there and probably no longer occurs in Illinois. The Massac Co. report is based on a misidentification of *Paspalum laeve* Michaux var. *circulare* (Nash) Fernald.

Phacelia gilioides Brand
Known specimens: Calhoun
Other reports: St. Clair
Erroneous reports: Jersey (map error)
Last historic collection: 1968 Calhoun

The Calhoun Co. location was searched extensively in 1987 and 1988, but this plant was not found. Drought may have prevented its development during both years. Under more favorable conditions, *Phacelia gilioides* may reappear at this intact hill prairie site. The St. Clair Co. location was not searched.

Phlox carolina L. ssp. *angusta* Wherry
Known specimens: Macoupin
Other reports: Jefferson
Last historic collection: 1956 Macoupin

A reported Jefferson Co. location for this species (Wherry 1955) was searched in 1988, but no *Phlox* species were found. The habitat in that area is disturbed and probably now unsuitable. The Macoupin Co. location is not precisely described. However, the general area was extensively searched and no *Phlox* species were found. The single known Illinois specimen of this taxon (Macoupin Co.: Winterringer 13446, ISM, 1956), annotated by D.A. Levin, is very similar to *P. glaberrima* L. ssp. *interior* (Wherry) Wherry and field recognition would be difficult. It is possible that a review of *P. glaberrima* herbarium specimens not examined by Levin would reveal additional collections of *P. carolina* from Illinois. In his key to the genus, Mohlenbrock (1986) distinguishes *P. carolina* on the basis of characters which fit *P. carolina* ssp. *carolina*, but not *P. carolina* ssp. *angusta*.

Phlox pilosa L. ssp. *sangamonensis* Levin & Smith
Known specimens: Champaign, Piatt
Other reports: none
Last historic collection: 1953 Champaign

In 1987, this species was rediscovered in a degraded prairie remnant in Champaign Co. (Solecki *s.n.*, ILLS).

Physostegia intermedia (Nuttall) Engelmann & Gray
Known specimens: none
Other reports: Adams
Erroneous reports: Henderson (misidentification)
Last historic collection: none

No valid Illinois specimens of this species are known to exist. The pre-1900 Henderson Co. specimen originally ascribed to this species appears to have been mislabeled (Cantino 1982). Mohlenbrock (1963) reports this species for an Adams Co. station, but does not cite a specimen.

Plantago heterophylla Nuttall
Known specimens: Pulaski, Union
Other reports: none
Last historic collection: 1958 Pulaski

Precise location information is lacking for the only two Illinois collections of this species. Searches conducted of the general vicinity at both locations were without success. Populations at both sites, one described as occurring in a field of corn stubble, may have been adventive. It is likely that this species no longer occurs in Illinois.

Poa wolfii Scribner
Known specimens: Fulton, Henderson, Peoria (new: Adams, Brown)
Other reports: Cook
Last historic collection: 1888 'Illinois'

This species has recently been discovered in Brown (Schwegman 3179, ISM, 1984; Shildneck 15262, ISM, 1986) and Adams (Taft 458, ILLS, 1987) counties, having been known previously only from pre-1900 collections in Fulton, Henderson, and Peoria counties.

Polygonum bicorne Rafinesque
Known specimens: Alexander, Kendall, Randolph, St. Clair, Union (new: Gallatin, Jackson, Madison, Monroe, Wayne)
Other reports: none
Erroneous reports: Macon (map error)
Last historic collection: 1974 Kendall

During 1988, populations were found at four sites in Alexander Co. (Phillippe 13523, 13524, 13525, 13527, ILLS), and at two sites in Union Co. (Phillippe 13528, 13529, 13535-A, 13535-B, ILLS). It was also found for the first time at two sites in Gallatin Co. (Phillippe 13536-A, 13536-B, ILLS), and at one site in Wayne Co. (Ulaszek 1359, ILLS). During 1989, populations were found in Monroe Co. (Brooks and Phillippe 13796, ILLS), St. Clair Co. (Morris, Perino, Ulaszek, and Phillippe 13811, ILLS; Phillippe and Ulaszek 1390, ILLS), at two sites in Madison Co. (Morris, Ulaszek, and Phillippe 13812, 13813, ILLS), and at two sites in Jackson Co. (Morris 76, 81, ILLS). Collection locations in Kendall and Randolph counties were not searched. All of the populations of this annual were found in open wetlands. Several plants were in depressions along the edges of cultivated fields. It appears that *P. bicorne* is actually not rare, but rather that it is frequently overlooked due to its general similarity to the more common *P. pensylvanicum* L. *P. bicorne* has been treated as synonymous with *P. pensylvanicum* by Kartesz and Kartesz (1980). However, Gleason's (1952) treatment of these taxa as distinct species appears to be the correct one, although Gleason refers to this taxon as *P. longistylum* Small.

Potamogeton gramineus L.
Known specimens: Cook, Lake (new: McHenry)
Other reports: Kankakee, Lawrence, McHenry, Wabash
Last historic collection: 1975 Cook

In 1987, this pondweed was found at a new location in Lake Co. (Schlomer *s.n.*, MOR) and collected for the first time in McHenry Co. (Wilhelm and Bowles 15517, MOR).

Potamogeton praelongus Wulfen
Known specimens: Cook, Lake, McHenry
Other reports: none
Last historic collection: 1932 Lake

Only five historic collections of this aquatic species are known, and these are restricted to glacial lakes in three northeastern Illinois counties. One former collection site was searched in 1987 and 1988, but the plant was not found. However, it is possible that this species persists in this and other northeastern Illinois glacial lakes.

Potamogeton pulcher Tuckerman
Known specimens: Jackson, Kane
Other reports: Mason, Menard, St. Clair
Last historic collection: 1980 Kane

This species was collected fairly recently in Kane Co. (Young *s.n.*, 1980, MOR) and probably still occurs there. Part of the Jackson Co. collection site was searched in 1988, but this species was not found.

Potamogeton robbinsii Oakes
Known specimens: Cook, Lake (new: McHenry)
Other reports: none
Last historic collection: 1975 Cook

In 1987 this aquatic species was rediscovered at the 1975 collection site in Cook Co. (Bowles and Apfelbaum 692, MOR, 1987) and collected for the first time in McHenry Co. (Wilhelm and Bowles 15518, MOR).

Potamogeton strictifolius A. Bennett
Known specimens: Cook, Lake
Other reports: none
Last historic collection: 1966 Lake

Although this species could not be re-located during 1987 or 1988, the two collection sites remain intact and could still support populations.

Potamogeton vaseyi J.W. Robbins
Known specimens: McHenry
Other reports: none
Erroneous reports: Grundy, Henry, Will (misidentifications)
Last historic collection: no date McHenry

The only valid Illinois specimen of this species is the original pre- 1900 McHenry Co. collection by Vasey. Other collections, including several fairly recent ones, were misidentified. The precise location of the original collection site is unknown and could not be searched.

Potentilla millegrana Engelmann [K&K: *P. rivalis* Nuttall]
Known specimens: St. Clair, Union
Other reports: Johnson
Last historic collection: 1971 Union

The Union Co. site where this species was last collected has been flooded and no longer provides suitable habitat. The St. Clair Co. collections were all made prior to 1900, some from disturbed urban sites. These sites were not searched, but suitable habitat may remain in the vicinity and this species may still be present.

Ptilimnium nuttallii (DeCandolle) Britton
Known specimens: Jackson, Randolph, Union
Other reports: Pulaski, St. Clair
Last historic collection: 1954 Randolph

In 1987 this species was collected (Ketzner 1085, ILLS) at the Randolph Co. location where it had been reported in 1954.

Puccinellia pallida (Torrey) Clausen [K&K: *Torreyochloa pallida* (Torrey) Church]
Known specimens: Union
Other reports: none
Last historic collection: 1969 Union

This species is known in Illinois only from one vicinity in Union Co. This area was searched in 1988, and plants were found at two locations (Phillippe 13197, 13267, ILLS). This species is locally common, growing in shallow water between *Decodon* thickets and adjacent forested areas.

Pycnanthemum albescens Torrey & Gray
Known specimens: Union
Other reports: none
Erroneous reports: Jackson (misidentification)
Last historic collection: 1973 Union

In Illinois, white mountain mint is known from a single collection. An extensive search was made of the collection site and the surrounding area. Although *Pycnanthemum albescens* was not found, other as yet unsearched habitat for this species exists nearby. Recent prescribed burning at and in the vicinity of that site may result in the reappearance of this species.

Pyrola americana Sweet
Known specimens: Ogle
Other reports: none
Last historic collection: 1946 Ogle

In 1946, this species was collected twice from a St. Peter's sandstone ravine in Ogle Co., but precise location information is lacking. Attempts to find it in 1987 and 1988 were unsuccessful. Since the vegetatively similar *P. elliptica* Nuttall is common in this area, non-flowering individuals of *P. americana* may have been overlooked. However, all of the flowering *Pyrola* observed during 1988 was *P. elliptica*.

Pyrola secunda L. [K&K: *Orthilia secunda* (L.) House]
Known specimens: no locality given
Other reports: none
Erroneous reports: Winnebago (misidentification)
Last historic collection: no date (pre-1900) Cook?

The inclusion of this species in the Illinois flora is based on three specimens. Two Winnebago Co. collections are vegetative and cannot be conclusively identified. It is likely, however, that they are misidentifications of *Pyrola elliptica* Nuttall, which is present at the site where these collections were made. The third specimen is a pre-1900 collection without date or locality information. The identity of this specimen cannot be confirmed because the inflorescence has been lost. *Pyrola secunda* may never have occurred in Illinois.

Ranunculus ambigens S. Watson
Known specimens: Fulton, Hancock, St. Clair, Wabash
Other reports: none
Erroneous reports: Jackson (misidentification)
Last historic collection: 1891 Wabash

This species was not found during the 1987 search of the Jackson Co. collection site, but the similar *Ranunculus laxicaulis* (Torrey and Gray) Darby was present. Subsequent re-examination of the original specimen from this site revealed that it had been misidentified (T. Duncan pers. comm.). All other Illinois collections were made prior to 1900. It appears unlikely that this species still occurs in Illinois.

Ranunculus cymbalaria Pursh
Known specimens: Cook, Du Page, Kane (new: Lake)
Other reports: McHenry
Last historic collection: 1940 Cook

In 1986 this wetland species was collected in Lake Co. (Dritz 457, MOR) where it had not previously been known to occur. The population, located along an interstate highway, appears to be adventive, but it may have originated from a natural population.

Rhamnus alnifolia L'Heritier
Known specimens: Adams, Boone, Kane, Kendall, Lake, McHenry, Peoria, Tazewell
Other reports: Richland
Last historic collection: 1971 Peoria

In 1988, this buckthorn was collected in Kendall Co. (Bowles, Wilhelm, and Dritz 812, MOR) from a spring-run margin of a graminoid fen.

Rhynchospora globularis (Chapman) Small
Known specimens: Cook
Other reports: Kankakee
Last historic collection: 1940 Cook

This species is known only from reports of pre-1900 collections in Kankakee Co. and a single 1940 Cook Co. collection. Precise locational information is not available, but habitat in the vicinity of the original collection sites was searched during 1987 and 1988. No plants were found, but since suitable habitat remains at these sites and populations are known to occur at nearby locations in Indiana, this species may still occur in Illinois.

Rhynchospora macrostachya Torrey
Known specimens: none
Other reports: Cook
Erroneous reports: Pulaski (misidentification)
Last historic collection: none

There are no specimens substantiating the occurrence of this sedge in Illinois. The single specimen originally ascribed to this species (Mohlenbrock 5542, SIU) is immature and cannot be positively identified, but resembles *R. corniculata*

(Lamarck) Gray more than *R. macrostachya*. The Pulaski Co. site where this specimen was collected was searched in 1987 and only *R. corniculata* was found. The Cook Co. station is based on a 1947 sight record (F. Swink pers. comm.)

Rorippa truncata (Jepson) R. Stuckey
Known specimens: St. Clair (specimen missing: Jackson)
Other reports: Alexander, Madison
Erroneous reports: Cass (misidentification)
Last historic collection: 1976 Jackson

This species was not found in a search of locations in St. Clair, Madison, and Alexander counties where it has been reported to occur in bottomlands of the Mississippi River. The Jackson Co. lakeshore site was also searched unsuccessfully. It appears that the latter record may be based on a misidentification, but the herbarium specimen could not be located at SIU. A St. Clair Co. specimen deposited at NY was examined by R.L. Stuckey and cited as *R. truncata* in his monograph on *Rorippa* (Stuckey 1972). His description of the distribution of this species suggests that if it occurs in Illinois today, it would be in the bottomlands of the Mississippi River near or below its confluence with the Missouri.

Rumex hastatulus Baldwin
Known specimens: Madison, St. Clair
Other reports: none
Erroneous reports: Grundy (misidentification)
Last historic collection: 1960 St. Clair

The historical collection locations for this species are not precisely described. There is extensive suitable habitat in the general vicinity of the Madison Co. sites, but searches there were unsuccessful. Searches in 1987 and in 1988 of the St. Clair Co. area where this species was last collected were also unsuccessful. Access was denied to nearby areas of suitable habitat along the Mississippi River where this species may persist.

Salix serissima (Bailey) Fernald
Known specimens: Cook, Lake, McHenry
Other reports: none
Last historic collection: 1959 Lake

Although this willow was not found in recent searches of the forested bogs where it was previously collected, extensive habitat remains at two sites, and it is likely that it persists.

Salix syrticola Fernald [K&K: *S. cordata* Michaux]
Known specimens: Cook, Lake
Other reports: none
Last historic collection: 1968 Lake

Although dune willow was formerly characteristic of the lakeshore dunes of Cook and Lake counties (Swink and Wilhelm 1979), its habitat is being reduced by lakeshore erosion. The species appears now to be very rare in Illinois. It was recently collected at a lakeshore dune in Lake Co. (Bowles and Dritz 781, MOR, 1988).

Scheuchzeria palustris L.
Known specimens: Lake, McHenry
Other reports: Fulton, Menard
Last historic collection: 1952 Lake

This species is known only from a single modern record, a 1952 collection from Lake Co. The plant was not found during an extensive survey of the collection vicinity (Sheviak and Haney 1973) and it has not been observed during more recent surveys. All Illinois specimens of this species are var. *americana* Fernald.

Schizachne purpurascens (Torrey) Swallen
Known specimens: Jo Daviess
Other reports: none
Last historic collection: 1937 Jo Daviess

This grass is known in Illinois from a single location in Jo Daviess Co. where it occurs on wooded limestone bluffs and ravine slopes. It was found again at that site in 1987 (Heim *s.n.*, MOR).

Scirpus hattorianus Makino
Known specimens: Cook, Kankakee
Other reports: Carroll
Last historic collection: 1973 Kankakee

Suitable habitat apparently remains in the Kankakee Co. area where this species was last collected; although it has not been relocated, it may still occur there. No search was made of the Cook Co. location, where it was collected in 1906.

Scirpus microcarpus Presl
Known specimens: Lake
Other reports: none
Last historic collection: 1909 Lake

This species was collected several times prior to 1910 in one locality of Lake Co., but has not been reported since in spite of extensive botanical

collecting in the area. Although much of its original habitat remains undisturbed, it appears likely that this species has been extirpated from Illinois.

Scirpus pedicellatus Fernald
Known specimens: Cook
Other reports: Pope
Last historic collection: no date Cook

One of the two Cook Co. sites where this rush is known to have occurred has been destroyed, and the other has undergone ecological changes since the time of collection. Search of the latter site was unsuccessful, and it appears unlikely that this species persists there. No search was made at the reported Pope Co. location. Some authors question the taxonomic validity of this species (*e.g.*, Swink and Wilhelm 1979).

Scirpus purshianus Fernald
Known specimens: Lawrence, Mason, Menard, Pope
Other reports: Hancock
Erroneous reports: Cass (misidentification)
Last historic collection: 1967 Mason

This sedge was not found in a 1988 search of the Lawrence Co. location where it was collected in 1952, but this species may still occur there. *Scirpus purshianus* is also represented by Mason Co. collections made during 1967 and misidentified as *S. smithii* Gray. One of the Mason Co. sites has been destroyed, and other sites which may have provided suitable habitat when this species was last collected have since undergone successional changes.

Scirpus smithii Gray
Known specimens: Cass, Mason, Peoria
Other reports: Coles, Richland
Erroneous reports: Marion, Menard (misidentifications)
Last historic collection: 1969 Cass

The only modern Illinois collections of this species now considered valid are from Cass Co., since several collections made since 1900 have subsequently been annotated as *S. purshianus* Fernald. The 1861 collection from Mason Co. lacks specific location information. In 1989 a limited and unsuccessful search was made of the Cass Co. collection vicinity.

Scirpus torreyi Olney
Known specimens: Lee, St. Clair
Other reports: Winnebago
Erroneous reports: Marshall (misidentification)
Last historic collection: 1959 Lee

Although this species was not found during 1987 or 1988 searches, apparently suitable habitat remains in Lee and Winnebago counties and it may persist there. It occurs in northwestern Indiana, and may also be present in extensive habitat remaining in adjacent Iroquois Co., Illinois.

Scirpus verecundus Fernald
Known specimens: Alexander
Other reports: Union
Last historic collection: 1974 Alexander

The Alexander Co. locality where this species was found previously (Mohlenbrock *s.n.*, SIU) is intact and was searched in 1988 and 1989, but *Scirpus verecundus* was not found. Discrepancies between habitat characteristics at this site and at locations where this species is known to occur in Missouri and Arkansas suggest that the recorded collection location may be inaccurate. R.H. Mohlenbrock (pers. comm.) reports observing, but not collecting, *S. verecundus* in a Union Co. ravine in 1974. That site was searched in 1989 but without success.

Scleria reticularis Michaux
Known specimens: Cass, Lee
Other reports: none
Last historic collection: 1969 Cass, Lee

The netted nut-rush was reported in Illinois based on several collections made in Cass and Lee counties between 1956 and 1969. Although it was not found during searches in the vicinity of the Cass Co. collection sites in either 1987 or 1988, extensive suitable habitat occurs in this area, and it may have been overlooked. This species occurs in northwestern Indiana and could occur in similar habitat in adjacent Illinois. There is some doubt about the taxonomic status of *Scleria reticularis*. Godfrey and Wooten (1979) placed *S. muhlenbergii* Steudel into synonymy with *S. reticularis*, while Core treated them as separate species in his 1936 monograph. An examination of herbarium specimens labeled as *S. reticularis* at MOR, ISM, and ILLS showed that under Core's treatment, most would be ascribed to *S. muhlenbergii*, a species which has not been reported previously from Illinois. One specimen (Cass: Rexroat 3438, ISM, 1956) was annotated as *S. reticularis* by Core, but subsequent examination suggests that it too should be ascribed

to *S. muhlenbergii* (A. Koelling pers. comm.).

Shepherdia canadensis (L.) Nuttall
Known specimens: Cook, Lake
Other reports: none
Last historic collection: 1976 Lake

This species has not been reported since its 1976 collection. Although it may still occur at several of the Cook and Lake Co. sites where it was previously collected, it is severely endangered by shoreline erosion and succession in its lake-bluff habitat.[1]

Sisyrinchium montanum Greene
Known specimens: Cook, Du Page, Lake
Other reports: Kankakee, Winnebago
Last historic collection: 1974 Lake

This species was collected in 1983 and 1986 at a single Cook Co. location (Balaban *s.n.*, MOR, 1983; Packard and Balaban *s.n.*, MOR, 1986), and has since been reported from at least two other Cook Co. locations. No search was made at other previous collection locations.

Solidago arguta Aiton
Known specimens: Union
Other reports: Jackson
Erroneous reports: LaSalle (misidentification)
Last historic collection: 1958 Union

This species was not found in a search of the Union Co. location where it was previously collected. All collections from this site have subsequently been annotated *S. strigosa* Small or *S. boottii* Hooker, taxa which are included within the concept of *S. arguta* accepted by the Illinois Endangered Species Protection Board (1989). The single known La Salle Co. specimen appears to have been misidentified. *S. arguta* has been reported from a dry woods community in Jackson Co. (Heineke 1978), but that site was not searched during this study.

Solidago remota (Greene) Friesner
Known specimens: none
Other reports: Cook, Lake
Erroneous reports: Kankakee, Pike (misidentifications)
Last historic collection: none

It appears that there are no valid Illinois specimens of this species, and there is, in addition, some doubt about its taxonomic validity. Reports from Illinois are based on citations in Jones and Fuller (1955), on misidentified specimens, or on unvouchered reports by the Illinois Natural Areas Inventory. Swink and Wilhelm (1979) and Sieren (1981) consider local reports of this taxon to be based on misidentifications of *Solidago gymnospermoides* (Greene) Fernald (= *Euthamia gymnospermoides* Greene), a species which is fairly widespread in Illinois.

Sorbus americana Marshall
Known specimens: Cook, Ogle
Other reports: none
Erroneous reports: Lake (misidentification)
Last historic collection: 1972 Ogle

Mountain ash is currently known from a single Ogle Co. site, and was found to still occur there in 1988 (Bowles and Nyboer 737, MOR). This population consists of several trees growing on a north-facing St. Peter's sandstone ledge.

Sparganium americanum Nuttall
Known specimens: Fulton, Kane, Lee, Pike, Stephenson (new: Winnebago)
Other reports: Cook, Du Page, Knox, McHenry, Union, Winnebago
Last historic collection: 1980 Stephenson

This aquatic species was found in Winnebago Co. in 1987 (Bowles 680, MOR). Habitat at the 1980 Stephenson Co. collection site has been destroyed, but another 1980 collection site in Kane Co. remains intact. No search was made of other previous collection locations, most of which cannot be precisely identified.

Sphaeralcea angusta (Gray) Fernald [K&K: *Sidopsis hispida* (Pursh) Rydberg]
Known specimens: Grundy, La Salle, Rock Island, St. Clair, Will
Other reports: none

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[1]**Editor's Note: After submission of this manuscript, John Schwegman reported the discovery of 3 populations of *Shepherdia canadensis* from Lake Co., IL during a shoreline study by boat. Specimens are currently retained at the Illinois Dept. of Conservation, Springfield, IL.**

Last historic collection: 1974 Will

The globe mallow is possibly adventive at several of the Illinois locations where it has been collected. However, a 1972 Grundy Co. collection is from a disturbed natural habitat that may represent a native population. Several reported Grundy Co. sites were searched in 1988 without finding this species, but drought conditions may have caused dormancy or prevented development of flowering plants. Another reported site in Grundy Co. has been destroyed by construction activity.

Spiranthes lucida (H.H. Eaton) Ames
Known specimens: Cook, Lake, Woodford
Other reports: Hancock, Will
Last historic collection: 1973 Cook

This orchid was not found at the restored prairie in Cook Co. where it was most recently collected nor was it found at the Woodford Co. collection site, which has been significantly altered by flooding of the Illinois River. However, this species is known to occur in successional habitats and may still occur in northern Illinois.

Spiranthes romanzoffiana Chamisso
Known specimens: Coles, Cook, McHenry
Other reports: Peoria
Last historic collection: 1977 McHenry

Since 1947, this species has been collected only from a single McHenry Co. sphagnum bog. It was not found in a 1988 search of that site, but the habitat remains intact and it may persist there.

Stachys clingmanii Small
Known specimens: none
Other reports: none
Erroneous reports: Alexander, Hardin, Henry, Massac, Pulaski, St. Clair (misidentifications)
Last historic collection: none

All Illinois specimens ascribed to this species were misidentified, with most subsequently annotated as *S. tenuifolia* Willdenow or *S. aspera* Michaux. Nelson (1981) considers this to be a species of the Blue Ridge Mountains.

Thismia americana N.E. Pfeiffer
Known specimens: Cook
Other reports: none
Last historic collection: 1912 Cook

Until recently, this saprophyte had been reported from only one site, a moist sand prairie which has since been destroyed. However, correspondence from the collector indicates that the species also occurred at locations some distance from the original site (Mohlenbrock 1985). Numerous attempts to find it in similar habitats have been unsuccessful, but since this species is small and inconspicuous, the possibility remains that it has been overlooked in these searches.

Tradescantia bracteata Small
Known specimens: Adams, Greene, Hancock, Henry, Jersey, Mason, Menard, St. Clair (new: Madison, McDonough)
Other reports: Madison, Morgan, Peoria, Winnebago
Last historic collection: 1969 Hancock

This spiderwort has been collected several times in recent years. It was recorded in McDonough Co. for the first time in 1984 (Henry 4276, MWI), and was subsequently collected in Madison (Solecki *s.n.*, ILLS, 1985), Greene (Solecki *s.n.*, ILLS, 1987), and Menard (Solecki *s.n.*, ILLS, 1987) counties.

Triadenum virginicum (L.) Rafinesque
Known specimens: Lake
Other reports: Will
Last historic collection: 1972 Lake

This species is known in Illinois from a single Lake Co. collection. Repeated searches for it at the collection site, a peaty sand prairie near Lake Michigan, have failed. However, since the very similar *T. fraseri* (Spach) Gleason is common at this site, *T. virginicum* may have been overlooked. *T. virginicum* still occurs in similar habitats in northwestern Indiana.

Trillium cernuum L.
Known specimens: Cook, McHenry
Other reports: none
Last historic collection: 1929 Cook

The only post-1900 Illinois report of nodding trillium is a historic site observation in Cook Co. (R. Kral pers. comm.). This area is one of the few remaining potential habitats for this species in Illinois, but it was not found there in a 1988 search. However, this trillium still occurs in northeastern Indiana, and it may remain extant in Illinois. All Illinois collections of this species are var. *macranthum* Eames & Wiegand.

Trillium cuneatum Rafinesque

Known specimens: Union
Other reports: none
Erroneous reports: Jackson (map error)
Last historic collection: 1960 Union

This trillium is known in Illinois from a single Union Co. collection. It was observed but not collected at that site in 1987 (J. Schwegman pers. comm.).

Vaccinium stamineum L.
Known specimens: Pope
Other reports: none
Last historic collection: 1962 Pope

In a search of the original collection locality for this species, only the somewhat similar *V. arboreum* Marshall was found. A report of *V. stamineum* from another Pope Co. location (J. Graber pers. comm.) needs further investigation, since a partial search of that site in 1987 also revealed only *V. arboreum*. Reports of *V. stamineum* based on vegetative material should be regarded as questionable until flowering material is available.

Valerianella intermedia Dyal
Known specimens: Kankakee
Other reports: La Salle, Will
Erroneous reports: Fayette, Monroe, Union (misidentifications of *V. radiata* (L.) Dufresne)
Last historic collection: 1966 Kankakee

Valerianella intermedia is no longer recognized as a valid species. It is now considered a morphological form of *V. umbilicata* (Sullivant) Wood and has been placed in synonymy with that species (Eggers Ware 1983). Specimens from Kankakee Co. formerly referred to this taxon are now considered to be *V. umbilicata*.

Valerianella umbilicata (Sullivant) Wood
Known specimens: Kankakee, La Salle, Will
Other reports: none
Erroneous reports: (see *V. intermedia*)
Last historic collection: 1949 La Salle (1966 Kankakee as *V. intermedia*)

This species was rediscovered in Kankakee Co. in 1985 (Schwegman *s.n.*, DOC). No search was made of this or other previous collection locations during this study.

Veronica americana (Rafinesque) Schweinitz
Known specimens: Kane, La Salle, Peoria, Tazewell
Other reports: Du Page, Kendall, Vermilion
Last historic collection: 1957 Tazewell

This species was collected recently (Bowles 686, MOR, 1987) at a LaSalle Co. location where it had been previously known to occur. No search was made at other reported locations.

Viola incognita Brainerd
Known specimens: Cook, Jo Daviess, Kane
Other reports: McHenry (new: Lake)
Erroneous reports: De Kalb (specimen from cultivated source)
Last historic collection: 1958 Jo Daviess

This species was collected in 1981 at a new location in Cook Co. (Evert 2573, MOR), and in 1985 it was reportedly collected for the first time in Lake Co. (Snydacker 53, pers. comm.). It was not found during searches of other historic collection sites conducted in the course of this study.

Viola viarum Pollard
Known specimens: Adams
Other reports: Peoria
Erroneous reports: Kankakee (misidentification)
Last historic collection: 1970 Adams

This species was collected in Adams Co. in 1984 (Henry 4740, WMI) at an abandoned home site near the Mississippi River. It had been collected at the same location in 1970 and 1982. Additional work is needed to determine if natural populations occur in the vicinity of this station.

Woodwardia virginica (L.) J.E. Smith
Known specimens: Lake
Other reports: none
Last historic collection: 1947 Lake

This species is known from sphagnum bog habitat at a single Lake Co. site, where it was collected as late as 1947. That locality has now been seriously altered by drainage. The species has not been found in recent searches of the site, and it is presumed to be extirpated from the state.

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Some Aspects of the Status and Ecology of Seven Rare Wetland Plant Species in the Chicago Region of Northeastern Illinois

Marlin L. Bowles

The Morton Arboretum
Lisle, IL 60532

ABSTRACT

This report examines the Illinois status of seven endangered (E) or threatened (T) wetland plant species considered for listing status changes by the Illinois Endangered Species Protection Board in 1987. During 1988, populations of *Carex atherodes* (E), *C. crawei* (E), *C. rostrata* (E), *Cladium mariscoides* (T), *Eleocharis rostellata* (T), *Galium labradoricum* (T), and *Triglochin palustris* (E) were studied in order to collect voucher specimens, quantify population characteristics, and determine levels of protection and endangerment. These species were found to be obligate wetland species with a wide range of population and associated plant community characteristics. The overall number of known extant populations was increased by more than 200% from 34 to 108, with half of the new records for the sedge *Carex atherodes*; 88% of all populations are now represented by voucher specimens, and 75% of all populations were sampled. A high potential for population loss was found; almost half of the sites examined were endangered or threatened by development or by ecological problems. The number of extant populations was quantified in terms of an Effective Number (N^-), which assesses the viability of sites and populations in terms of developmental and ecological threats. Resultant status changes made by the Illinois Endangered Species Protection Board include endangered to threatened for *Carex atherodes* and *Carex crawei*, and delisting from threatened for *Cladium mariscoides*. Based on recent population decline, lack of new populations, and low population numbers, two additional wetland species (*Rhynchospora alba* and *Tofieldia glutinosa*) would appear to qualify for status changes from threatened to endangered.

INTRODUCTION AND PROBLEM

Northeastern Illinois wetlands are highly modified and reduced examples of a once extensive habitat. These remnants still support a unique set of plants and animals, including 69 endangered or threatened Illinois plant species (Bell 1981). Such habitats and their associated species are susceptible to various and subtle ecological changes, and are under severe impact nationally from intensified agriculture and urban land use (Andelin 1984). As a result of increasing development in northeastern Illinois, the listing status of endangered and threatened wetland plant species in this region appears to be in need of review and update.

In 1987, based on a literature and herbarium search, and personal communication, status changes for 71 endangered and threatened (Sheviak 1981) plant taxa were proposed (Bowles 1987) to the Illinois Endangered Species Protection Board. Included in this group were seven species (Table 1) thought to be more abundant than formerly known (Schennum 1980, 1981; Bowles 1987, but which are obligate wetland plants (Wilhelm 1988) in the Chicago region of northeastern Illinois. These species were deferred from status changes because it was felt that available data and voucher specimens were not yet adequate to justify new listings, and that additional field data were needed to help support listing decisions.

The Morton Arboretum was contracted to survey the status of these seven species in northeastern Illinois during the 1988 growing season. Objectives were to 1) document the existence of populations by collecting voucher specimens, 2) estimate plant abundance and size of populations, 3) assess levels

of protection and endangerment for habitats and populations of these species, and 4) develop listing recommendations for these species. An important objective in developing listing recommendations was to develop a method for quantifying habitat and population viability in relation to total numbers of populations. This paper presents a summary of the original report (Bowles 1988) to the Illinois Endangered Species Protection Board.

METHODS

All known Illinois stations for these seven species were determined from the endangered and threatened plant registry cards compiled by the original endangered species project (Sheviak 1981) and updated by the Morton Arboretum (Bowles 1987). During 1988, an attempt was made to visit each site from which populations of these species were reported, and to search for new populations in likely habitats. Procedures included collection of voucher specimens, characterization of natural plant communities (*sensu* White 1978), listing frequent plant associates (*sensu* Swink and Wilhelm 1979), and quantifying population sizes, abundance, and reproductive status of the species in question. Nomenclature follows Swink and Wilhelm (1979).

Populations of *Triglochin palustris* were quantified from continuous adjacent square-meter quadrats along transects; all other species were sampled with square meter quadrats at 5-meter intervals along linear transects through the plant populations. When species occurred in discrete habitats, the sizes of areas occupied by the populations were estimated, based on their length and width. Frequency of each species was determined by presence per 1/4 square meter within each sample quadrat.

Reproductive status was quantified for five species. The numbers of flowering or fruiting culms (individual plants may have multiple culms) were determined per square meter for *Carex atherodes*, *C. rostrata*, and *Cladium mariscoides*, and per single 1/4 square meter in each quadrat for *Carex crawei*; the number of reproductive plants per square meter was determined for *Triglochin palustris*.

A quantitative index was used to aid assessment of the population status of each species. The Effective Number ($N^{\sim}$) of populations of each species was determined in relation to levels or categories of protection and endangerment of each population. In calculating $N^{\sim}$, the current protection status (X_i) of each population was assigned to one of three levels: 1) preserved = dedicated Illinois Nature Preserve, 2) protected = in public or private ownership and recognized as a natural area, or 3) unprotected in public or private ownership. Threats of population endangerment (Y_i) were assigned similar scores: 1) stable = under no apparent threats, 2) threatened = with potential for significant population decline from impact by development, drainage, succession, or exotic species, or 3) endangered = with more immediate potential for population loss by similar conditions. These scores were combined into the Effective Number of Populations ($N^{\sim}$) by the formula:

$$N^{\sim} = \text{the sum of } 2/(X_i+Y_i) \text{ over all values of } X_i \text{ and } Y_i,$$

which are the respective protection and endangerment status scores for each site at which the species is extant. For example, the $N^{\sim}$ for stable populations within four dedicated nature preserves would be $2/(1+1) \times 4 = 4.0$; while the $N^{\sim}$ for four unprotected, endangered populations would be $2/(3+3) \times 4 = 1.333$, an effective number of just over one population.

When making listing recommendations, $N^{\sim}$ provides a more realistic index of the number of viable extant populations. Comparison among species of their $N^{\sim}$:N ratios (where N = actual number of sites) represents an expression of their relative levels or threats of endangerment; species with smaller ratios have greater potential for population decline. $N^{\sim}$:N ratios for the above example are 4.0/4.0 = 1, and 1.33/4.0 = 0.325 for protected and unprotected species populations, respectively.

In order to make listing recommendations using $N^{\sim}$ values, they were applied to the listing criteria used by the original endangered species project (Sheviak 1981), which recommended endangered status for plant species occurring in no more than six localities and likely of becoming extirpated in the near future; threatened species were considered likely to become endangered in the near future. In comparison, the

Illinois Natural Heritage Program state element ranking S1 (5 or fewer occurrences, limited numbers, or vulnerability) is similar to endangered status, while the S2 ranking (6-20 occurrences, limited numbers, or vulnerability) is similar to threatened status.

County voucher specimens are housed currently at the Morton Arboretum (MOR), County duplicates will be sent either to the Illinois State Museum (ISM) or the Illinois Natural History Survey (ILLS). All populations were mapped on copies of 7.5' USGS topographic maps; these maps are maintained in the project files.

RESULTS AND DISCUSSION

Numbers of populations

As a result of this and previous studies (*i.e.* Schennum 1980, 1981; Sheviak 1981; Bowles 1987), 108 extant populations were documented from 72 northern Illinois stations (Table 2) for the seven plant species in question. However, in all cases, the effective number ($N^{\sim}$) of populations for each species was reduced, with values ranging 33-43% less than actual numbers (Table 2). These new records represent an increase of over 200% from the 34 populations known prior to 1981. Ninety-six of the populations were vouchered by specimens, while 83 were sampled for population data (Tables 3 through 9). These discoveries are a product of increased botanical inventories in the Chicago region of Illinois, especially as a result of natural area and wetland preservation and management actions. Also, unusually dry field conditions in 1988 facilitated inventories and discoveries in sites that are normally inundated and difficult to traverse during the growing season. However, these conditions enhanced early senescence of *Carex crawei*, limiting data collection and discoveries of new populations. Similarly, dry panne conditions at Illinois Beach, Lake Co., may have prevented rediscovery of *Triglochin palustris*.

Almost fifty percent of the new records were for the sedge *Carex atherodes*, which is now known to occur in at least 36 stations (with $N^{\sim}$= 20.63) in eight counties (Table 2, Figure 1), an increase from only two historic county records. This plant also is known from a single Shelby County station in central Illinois that was not included in the study. *Carex atherodes* flowers infrequently, but the presence of pubescence on outer leaves and leaf sheaths (Swink and Wilhelm 1979) allows simple field identification of sterile plants, and has facilitated new population discoveries.

The remaining six species all had at least two or more new records (Table 2, Figure 1). *Carex crawei* populations now are known from 15 stations ($N^{\sim}$= 10.23) in six counties; the ten new extant populations included several rediscoveries of historic occurrences. *Carex rostrata* records increased from a single 1981 record in northeastern Illinois to ten populations ($N^{\sim}$= 7.23) in four counties (several reports were found to have been based on misidentification of *Carex vesicaria* var. *monile*). *Cladium mariscoides* was recorded from five new sites, an increase to 14 known extant populations ($N^{\sim}$= 9.23) in three counties. *Eleocharis rostellata* records increased from five stations in three counties to ten extant populations ($N^{\sim}$= 6.56) in four counties. Six new *Galium labradoricum* stations were recorded, with 17 populations ($N^{\sim}$= 10.40) now known extant in three counties. Puff (1977) also indicated a central Illinois record for this bedstraw that could not be mapped on a county basis; the population probably was in Marshall, Peoria, or Tazewell Co., and has not been relocated. *Triglochin palustris* records were increased from four to six known extant populations ($N^{\sim}$= 4.00) in three counties.

Population characteristics

Carex atherodes (Table 3) - As in Iowa (van der Valk and Davis 1979) and Manitoba, (Welling *et al.* 1988), this sedge was found to occupy (and sometimes dominate) zones above the deeper portions of glacial pot-hole marshes, or the borders of floodplain marshes. In Illinois, populations range in area from 10 m^2 to 2700 m^2 (mean = 832.27 m^2). The plant is usually abundant (mean = 79% frequency); it may form monotypic stands or colonies, and can persist in disturbed wetlands. It often occurs with the more frequent *Carex lacustris*. Other common associates in marshes include *Acorus calamus*, *Calamagrostis canadensis*, *Carex haydenii*, *Carex lanuginosa*, *Carex sartwellii*, *Lysimachia thyrsiflora*, *Polygonum amphibium* var. *stipulaceum*, *Polygonum coccineum*, *Sagittaria latifolia*, *Scirpus acutus*, *Scirpus validus* var.

creber, *Sparganium eurycarpum*, *Typha latifolia*, and *Typha angustifolia*. *Carex atherodes* also occurs rarely in sedge meadows, associating with *Calamagrostis canadensis*, *Carex stricta*, *Dryopteris thelypteris* var. *pubescens*, *Galium labradoricum*, and the introduced *Lythrum salicaria*, or in fens with *Calamagrostis canadensis*, *Carex stricta*, *Eupatorium maculatum*, and *Solidago gigantea*.

This is a relatively large perennial sedge; it reproduces vegetatively by rhizomes, and contributes seed bank propagules that germinate during drawdowns (van der Valk and Davis 1979, van der Valk 1981). As a result, annual sexual reproduction probably is unimportant for short-term population maintenance, and was not observed in 32% of the sampled populations. However, flowering culm production reached 8.9 culms/m^2 in some sites, and averaged 1.7 culms/m^2 over 25 populations, suggesting that Illinois populations are contributing to a seed bank.

Carex crawei (Table 4) - This sedge occupies calcareous prairies as well as wetland panne and fen habitats. It reaches its greatest abundance in pannes bordering the foredunes of Lake Michigan, where the plants are abundant (up to 88% frequency) in an extensive habitat. Here, associates include *Carex garberi*, *Eleocharis compressa*, *Juncus balticus* var. *littoralis*, and *Potentilla anserina*. This sedge occupies wet-mesic dolomite prairie in the Des Plaines River Valley, in association with *Deschampsia caespitosa* var. *glauca*, *Eleocharis compressa*, and *Poa compressa*. These populations also may be extensive, especially in disturbance patches, with up to 96% frequencies. *Carex crawei* occurs rarely in mesic prairies, where associates include *Habenaria leucophaea*, *Liatris pycnostachya*, *Panicum virgatum*, *Silphium terebinthinaceum*, and *Solidago riddellii*. In this habitat, it occurs in small to large (75 m^2 - 1300 m^2) colonies, often within disturbance patches, where frequencies may reach 100%. This sedge also is reported from marl flat borders of graminoid fens (G. Wilhelm pers. comm.), but no population data were collected during this study.

Carex crawei is a small, stoloniferous perennial (Fernald 1950) sedge, apparently forming large colonies by this process. Fruiting culms are evidently always present and often abundant (mean = 56 culms/m^2), with extremely high densities (over 200/m^2) in disturbance patches. However, the role of seed production or seed banks in population maintenance is not well known.

Carex rostrata (Table 5) - This is a northern sedge of low nutrient peatlands and lakeshores with relatively stable water levels (Keddy 1983, Lieffers 1984). In Illinois, var. *utriculata* is a rare component of marshes bordering pot-holes, floodplains, sedge meadows, and calcareous floating mats. Most populations are small (1000 m^2 or less in size); however, this sedge is usually very abundant (mean = 83.2% frequency) within populations. Associates are similar in all habitats and include *Acorus calamus*, *Calamagrostis canadensis*, *Carex stricta*, *Carex lacustris*, *Lythrum salicaria* (introduced), *Phragmites communis* var. *berlandieri*, *Polygonum amphibium* var. *stipulaceum*, *Polygonum coccineum*, *Sagittaria latifolia*, *Scirpus fluviatilis*, and *Sparganium eurycarpum*.

As with *Carex atherodes*, *C. rostrata* is a large rhizomatous perennial sedge; its individual shoots live 1-2 years before flowering (Gorham and Somers 1973, Bernard 1976). This species colonizes after fluctuating water levels, or fires, with germination from a seed bank, or after seed dispersal (van Der Valk and Davis 1978, Lieffers 1984, DeBenedetti and Parsons 1984). Flowering/fruiting culms occurred in all Illinois populations sampled (mean = 4.0 culms/m^2), evidently contributing to seed banks.

Cladium mariscoides (Table 6) - The twig-rush is a northern and eastern species of minerotrophic fens and marl flats (Bernard *et al.* 1985) and intermediate exposures along calcareous lakeshores (Keddy 1983). It is an obligate calcareous wetland species in Illinois, occurring in pannes along Lake Michigan, and in calcareous seeps (often association with the marl flats of graminoid fens). It is a dominant (White 1978) and very abundant species of pannes, reaching 100% frequency in extensive linear patterns along beach swales. Associates in this habitat include *Carex buxbaumii*, *Dryopteris thelypteris* var. *pubescens*, *Eriophorum angustifolium*, *Hypericum virginicum* var. *fraseri*, *Juncus balticus* var. *littoralis*, *Lythrum alatum*, *Polygonum amphibium* var. *stipulaceum*, *Scirpus americanus*, and *Triglochin maritima*. *Cladium mariscoides* is a characteristic species of calcareous seeps (White 1978), where it is usually less abundant than in pannes, but may reach

high frequencies locally. In this habitat, frequent associates include *Carex sterilis*, *Dryopteris thelypteris* var. *pubescens*, *Eleocharis rostellata*, *Lysimachia quadriflora*, *Muhlenbergia glomerata*, *Potentilla fruticosa*, *Silphium terebinthinaceum*, *Solidago ohioensis*, *Solidago uliginosa*, *Scirpus acutus*, *Scirpus americanus*, *Scirpus validus* var. *creber*, and *Triglochin maritima*.

Cladium mariscoides is a stoloniferous perennial; populations are maintained through vegetative reproduction (Bernard *et al.* 1985), while seed production contributes to colonization of early successional habitats (Seischab and Bernard 1985). Seed production appears to be high in Illinois populations (mean = 4.2 fruiting culms/m^2); however, these sites are usually stable, and seedling establishment may be important only in disturbed sites.

Eleocharis rostellata (Table 7) - This spike-rush occupies Atlantic coast salt marshes, minerotrophic fens, and nutrient-poor marl flats (Glaser 1983, Seischab *et al.* 1985). In Illinois it is characteristic of calcareous seeps (White 1978), where it is a very abundant (mean = 80.2% frequency) species. Typical associates include *Carex sterilis*, *Cladium mariscoides*, *Eupatorium perfoliatum*, *Lysimachia quadriflora*, *Potentilla fruticosa*, *Scirpus acutus*, *Scirpus validus* var. *creber*, *Solidago ohioensis*, and *Solidago uliginosa*.

Eleocharis rostellata forms tussocks and spreads vegetatively by rooting and proliferating from the tips of sterile culms (Fernald 1950). As in *Cladium mariscoides*, this spike-rush maintains stable populations by vegetative reproduction but colonizes successional marl flats (Seischab and Bernard 1985). Such colonization occurs either by seed dispersal or tip layering of the 1-meter long culms, with seed production indicative of more stressful environments (Seischab and Bernard 1985). Most Illinois populations are typified by layering culms, and apparently occupy more stable habitats.

Galium labradoricum (Table 8) - The northern bedstraw is a rhizomatous (Fernald 1950) diploid species of circumneutral soils (Puff 1977). In Illinois, it is now restricted to three closely related wetland communities in three extreme northeastern counties. Frequencies in these habitats rarely exceed 50%, and plants often are restricted to narrow zones within communities. It occurs locally in calcareous portions of sedge meadows with *Aster puniceus*, *Bromus ciliatus*, *Calamagrostis canadensis*, *Carex stricta*, *Dryopteris thelypteris* var. *pubescens*, *Eupatorium maculatum*, *Galium trifidum*, *Lathyrus palustris*, *Lycopus americanus*, *Lysimachia quadriflora*, *Pycnanthemum virginianum*, *Salix candida*, and *Solidago uliginosa*. It is usually infrequent in calcareous floating mats, associating with *Betula pumila*, *Campanula aparinoides*, *Carex lasiocarpa*, *Carex buxbaumii*, *Dryopteris thelypteris* var. *pubescens*, *Eupatorium maculatum*, *Menyanthes trifoliata* var. *minor*, *Potentilla fruticosa*, *Salix candida*, *Salix pedicellaris* var. *hypoglauca*, *Scirpus americanus*, *Solidago uliginosa*, and *Triglochin maritima*. It occurs rarely in bogs, but was frequent (51% frequency) in one extensive graminoid bog community, associating with *Betula pumila*, *Decodon verticillatus*, *Dryopteris thelypteris* var. *pubescens*, *Drosera intermedia*, *Galium trifidum*, *Lathyrus palustris*, *Liparis loeselii*, *Potentilla palustris*, *Salix candida*, *Salix pedicellaris* var. *hypoglauca*, *Scirpus acutus*, *Sphagnum* sp., and *Vaccinium macrocarpon*.

Triglochin palustris (Table 9) - Although reported from Lake Co. pannes along Lake Michigan, during this study the slender bog arrow grass was found only in calcareous seeps, where it is a characteristic plant (White 1978). In this habitat, it is infrequent to abundant (mean = 42% frequency) in usually small (mean = 12.7 m^2) areas of open spring runs. Most associates are more typical of adjacent calcareous seep vegetation, and include *Carex hystricina*, *Carex viridula*, *Deschampsia caespitosa* var. *glauca*, *Eleocharis elliptica*, *Equisetum arvense*, *Juncus brachycephalus*, *Parnassia glauca*, *Potentilla fruticosa*, *Rhynchospora capillacea*, *Scirpus acutus*, *Solidago ohioensis*, and *Tofieldia glutinosa*. This perennial spreads vegetatively by bulb-bearing stolons (Fernald 1950), with reproductive plants reaching densities of over 14 stems/m^2.

STATUS AND LISTING RECOMMENDATIONS

Wetland status

By 1981, 62% of the remaining high-quality examples of northeastern Illinois wetlands were threatened with modification or destruction (Bell 1981). During the 1980's these impacts have

continued and are now escalating in the rapidly developing Chicago region of Illinois. Wetlands receive some protection from development through Army Corps of Engineers and Environmental Protection Agency regulations. However, total watershed protection is not provided, and the majority of permit applications are not denied. The amended Illinois Endangered Species Protection Act now requires agency consultation on permit applications involving state-listed species, but agreements are not binding.

Among the 72 sites examined during this study, only 23 (32%) are dedicated Illinois Nature Preserves, while 19 sites remain totally unprotected from development (Table 2). In addition, over half (54.2%) of all sites examined (including at least seven Nature Preserves) are either threatened or endangered with drainage, development, succession due to fire protection, or invasion by exotic species such as *Lythrum salicaria*, *Phalaris arundinacea*,or *Rhamnus frangula*, . Also, threats to wetland sites often can impact suites of endangered or threatened species. Over one-third of all sites examined supported two or more of the seven species studied here, in addition to other listed species that were not studied. For example, alteration of a Kendall Co. graminoid fen resulted in apparent loss of the co-occurring species *Eleocharis rostellata* and *Triglochin palustris*, along with the state-listed *Mimulus glabratus* var. *fremontii*.

The management and protection needs of endangered or threatened obligate wetland species should be considered when developing listing-criteria for these species. Populations that occur in habitats with poor protection and management, or with development and ecological threats, have lowered viability, requiring protection of a relatively greater number of habitats to insure species survival. Under these conditions, calculation of an effective number of populations (N^-) provides quantitative support in assigning species to an appropriate current listing status category. When N^- is used association with qualitative evaluations, it can provide a more useful and defendable assessment of species-listing status.

Population status and listing recommendations

In response to original listing status recommendations (Bowles 1987), and the additional information provided in the initial status report on the seven wetland species (Bowles 1988), the Illinois Endangered Species Protection Board updated the Illinois list of endangered and threatened plant species in 1989 (Illinois Endangered Species Protection Board 1989). The Board also made subsequent listing changes for several species considered in this paper. These new listings are summarized below and in Table 2; county distribution maps are provided in Figure 1.

Carex atherodes - Although at least 36 populations of this sedge are now known, the effective number of populations is $N^- = 20.63$, with the lowest N^-:N ratio among species reviewed here. Six sites are dedicated Nature Preserves, and 20 of the 36 known stations are threatened or endangered by destruction, woody plant succession, or invasion by the exotics *Lythrum salicaria*, *Phalaris arundinacea*, and *Rhamnus frangula*. At least ten Chicago region stations have been proposed for development; as a result, N^- could drop below 20.0 in the near future. Because of the high number of known populations, the Illinois Endangered Species Protection Board removed this species from listing as endangered. It was retained as threatened because of the inordinately high number of populations under ecological or developmental threats.

Carex crawei - Only five of the known 15 populations of this sedge are protected as Nature Preserves, and six populations are threatened or endangered from woody succession, drainage, flooding, or development. As a result, the effective number of populations is $N^- = 10.23$. Although it remains somewhat widespread, this small plant is rare and often found only in small colonies. The pannes and dolomite prairies supporting larger populations of this sedge are restricted to Lake Co., and the Des Plaines River Valley of DuPage, Kankakee, and Will counties, respectively. This sedge was removed from listing as endangered because of the increase in number of known populations and large sizes of some populations. However, it was retained as a threatened species because of its overall rarity, lack of site protection, and ecological threats to many populations.

Carex rostrata - Variety *utriculata* is restricted to four counties in northeastern Illinois, where populations are usually small, and occur in a single natural

community. Extant records for this sedge were increased from one to ten populations and nine of the Illinois stations are protected. However, the effective number of populations is $N^- = 7.23$ because of widespread ecological threats such as from purple loosestrife, drainage, and fire protection. Although the number of known populations was increased, the Illinois Endangered Species Protection Board maintained listing of this species as endangered because of its usual small population size, restriction to a single community type, and ecological threats.

Cladium mariscoides - This sedge is restricted to three extreme northeastern Illinois counties, with fifteen known extant records. The majority of populations are protected and stable, and an extensive community dominant population occurs in pannes along Lake Michigan. The effective number of populations was reduced to $N^- = 9.23$ because of threats to some populations. The Illinois Endangered Species Protection Board removed this species from listing as threatened because of the high number and large size of protected populations.

Eleocharis rostellata - Although only three of the ten Illinois populations are within dedicated Nature Preserves, most appear stable, and the effective number of populations is $N^- = 6.56$. Because of the large number of apparently stable populations, this species was maintained by the Illinois Endangered Species Protection Board as threatened. However, most populations are small and restricted to a fragile habitat dependent upon proper management and stable, pollution-free, minerotrophic, ground water. As a result, effective or actual population sizes could be easily reduced in the near future, and the status of this species should be monitored frequently. For example, a population at an unmanaged Kendall Co. station was lost since 1977 after successional changes.

Galium labradoricum - This bedstraw is restricted to a specific micro-habitat in only three Illinois counties. Although more than 80% of the 17 populations are protected, the effective number is low ($N^- = 10.4$) because over 70% of the stations are threatened or endangered with impacts that could result in population loss. Habitat invasion by *Lythrum salicaria* is a major problem, while invasion by *Rhamnus frangula* is a threat to disturbed or unmanaged sites. As a result, this species was retained as a threatened species.

Triglochin palustris - Five of the six known stations ($N^- = 4.0$) for this species are either protected or are in relatively stable condition. However, the total area of spring-run habitat occupied by this species is extremely small and very fragile, and population maintenance appears dependent upon a continuous supply of unpolluted minerotrophic groundwater. One unmanaged Kendall Co. population was recently lost after successional changes. As a result, this species was retained as state endangered.

Additional recommended status changes

Two additional species were recommended for listing changes from threatened to endangered because of their obligate wetland status, lack of newly reported populations, recent apparent loss of populations, and relatively low effective population numbers (Bowles 1988). Although the Illinois Endangered Species Protection Board (1989) retained these species as threatened, it is recommended that their status be reviewed frequently to determine if population loss or decline is occurring.

Rhynchospora alba - This obligate wetland species (Wilhelm 1988) occurs in sphagnum bogs, graminoid fens, and pannes, with seven modern stations ($N^- = 4.73$) known from three Illinois counties (Sheviak 1981) and no new records. One site record (Thornton-Lansing Woods Nature Preserve, Cook Co.) is not represented by a voucher specimen, and a second site (Cedar Lake Bog Nature Preserve, Lake Co.) has declined in natural quality and may no longer maintain this species.

Tofieldia glutinosa - The false asphodel is an obligate wetland species (Wilhelm 1988) of fens and pannes in four counties (Sheviak 1981). It is extant at seven stations ($N^- = 5.50$) in Illinois, and no new populations have been reported. It has not been relocated at Braidwood Sand Prairie Nature Preserve, Will Co., nor at the South Elgin Sedge Meadow, Kane Co. station, which has been degraded by peat mining, drainage, and invasion by *Lythrum salicaria*.

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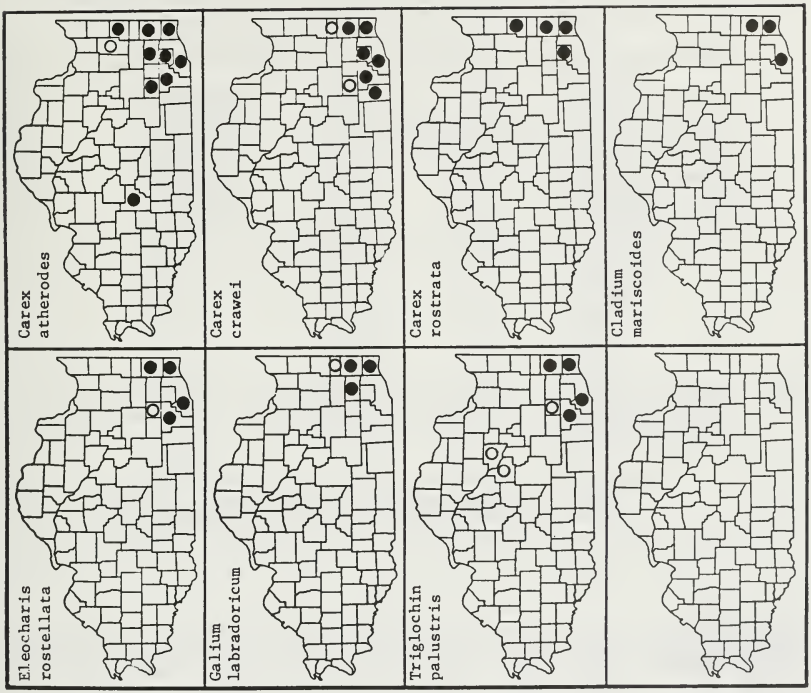

Figure 1. Illinois distributions of seven wetland plant species.
Closed circle = population(s) extant
Open circle = population(s) presumed extirpated

Table 1. Original listing status prior to field study for seven wetland plant species of the Chicago region of northeastern Illinois.

SPECIES AND VARIETY	ORIGINAL STATUS
Carex atherodes Spreng.	Endangered
Carex crawei Dew.	Endangered
Carex rostrata Stokes var. *utriculata* (Boott) Bailey	Endangered
Cladium mariscoides (Muhl.) Torr.	Threatened
Eleocharis rostellata Torr.	Threatened
Galium labradoricum Wieg.	Threatened
Triglochin palustris L.	Endangered

Table 2. Summary of current status and threats, known extant records (N) in 1981 (Sheviak 1981), effective numbers of populations (N^{-}), and current and recommended listing status for seven wetland species proposed for status changes.

CATEGORY	*Carex atherodes*	*Carex crawei*	*Carex rostrata*	*Cladium mariscoides*	*Eleocharis rostellata*	*Galium labradoricum*	*Triglochin palustris*	[TOTAL]	(%)
Extant records (1981)	0	5	1	9	5	9	4	[33]	(30)
Populations (1988)									
Preserved populations	6	5	5	4	3	9	2	[34]	(31)
Protected populations	17	8	4	7	6	5	3	[50]	(46)
Unprotected populations	13	2	1	3	1	3	1	[24]	(22)
Stable populations	16	9	6	7	4	5	3	[50]	(46)
Threatened populations	11	3	3	5	6	6	2	[36]	(33)
Endangered populations	9	3	1	2	0	6	1	[22]	(20)
Confirmed by voucher (1988)	33	12	10	12	9	14	6	[96]	(88)
Sampled in 1988	25	9	9	10	9	14	6	[82]	(75)
Total extant populations (1988)	36	15	10	14	10	17	6	[108]	
Effective numbers of populations (N^{-})	20.63	10.23	7.23	9.23	6.56	10.40	4.00		
Ratio of N^{-}:N	0.57	0.68	0.72	0.66	0.66	0.61	0.67		
Original listing (Sheviak 1981)	Endangered	Endangered	Endangered	Threatened	Threatened	Threatened	Endangered		
Final listing (Endangered Species Protection Board)	Threatened	Threatened	Endangered	Delisted	Threatened	Threatened	Endangered		

Table 3. Area, frequency, and density for 25 *Carex atherodes* populations. Frequency is based on presence per 1/4 m^2 (within m^2 quadrats), and flowering culm density is based on m^2 quadrats; all data were collected at 5-meter intervals along linear transects through *C. atherodes* populations. No. of m^2 plots and standard deviations are given in parentheses.

County/area	Population area & No. m^2 plots	Frequency per 1/4m^2	Culm density per m^2 (+-sd)
DuPage/#1	2500 m^2 (21)	83.3%	4.9/m^2 (5.3)
DuPage/#2	525 m^2 (10)	100%	2.3/m^2 (3.6)
DuPage/#3	260 m^2 (5)	100%	0.0/m^2
DuPage/#4	25 m^2 (5)	25%	0.0/m^2
DuPage/#5	2000 m^2 (24)	45.8%	0.0/m^2
DuPage/#6	30 m^2 (6)	45.8%	5.0/m^2 (4.5)
DuPage/#7	1600 m^2 (8)	100%	0.4/m^2 (0.5)
DuPage/#8	364 m^2 (5)	100%	5.6/m^2 (4.3)
Grundy/#1	500 m^2 (6)	95.5%	1.2/m^2 (2.3)
Kane/#1	2000 m^2 (10)	97.7%	2.8/m^2 (4.4)
Lake/#1	300 m^2 (10)	45%	0.4/m^2 (1.0)
Lake/#2	400 m^2 (10)	92.5%	0.5/m^2 (0.7)
Lake/#3	190 m^2 (5)	70%	2.2/m^2 (3.3)
Lake/#4	2000 m^2 (20)	70%	2.2/m^2 (3.3)
Lake/#5	2700 m^2 (18)	55.5%	0.0/m^2
Lake/#6	300m^2 (12)	81.25%	0.7/m^2 (1.6)
Lake/#7	2500 m^2 (13)	90.4%	0.4/m^2 (1.1)
Lake/#8	10 m^2 (3)	100%	0.0/m^2
Lake/#9	300 m^2 (6)	96.4%	8.9/m^2 (5.9)
Lake/#10	500 m^2 (5)	45%	0.0/m^2
Lake/#11	500 m^2 (10)	52.2%	2.2/m^2 (3.9)
McHenry/#1	150 m^2 (5)	100%	1.6/m^2 (1.4)
McHenry/#2	400 m^2 (5)	92%	0.0/m^2
McHenry/#3	15 m^2 (4)	100%	2.0/m^2 (4.0)
Winnebago/#1	750 m^2 (10)	100%	0.0/m^2
Column means	832.7 m^2	79.3%	1.7/m^2
Standard deviations	(900.30)	(24.0)	(2.0)

Table 4. Area, frequency, and density for 10 *Carex crawei* populations. Frequency is based on presence per 1/4 m^2 (within m^2 quadrats), and flowering culm density is based on single 1/4 m^2 quadrats within each m^2 quadrat. All data were collected at 5-m intervals along linear transects through *C. crawei* populations. No. of plots and standard deviations are given in parentheses.

County/area	Population area & No. m^2 plots	Frequency per 1/4m^2	Density per 1/4m^2 (+-sd)
Cook/#1	1300 m^2 (15)	65%	5.5 (10.1)
DuPage/#1	1000 m^2 (10)	53%	16.2 (16.8)
DuPage/#2	500 m^2 (4)	100%	50.2 (38.2)
DuPage/#3	1250 m^2 (3)	100%	6.3 (6.7)
DuPage/#4	75 m^2 (2)	88%	21.5 (13.4)
Lake/#1	1000 m^2 (6)	88%	7.8 (7.4)
Lake/#2	125,000 m^2 (19)	77.6%	7.3 (8.1)
Will/#1	10,000 m^2 (6)	96%	15.2 (30.9)
Will/#2	1000 m^2 (5)	65%	6.4 (8.6)
Will/#3	700 m^2 (6)	63%	3.2 (3.6)
Column means	14,182.5 m^2,	79.6%	14.0
Standard deviations	(39,044.9)	(17.2)	(14.0)

Table 5. Area, frequency, and density for 9 *Carex rostrata* populations. Frequency is based on presence per 1/4 m^2 (within m^2 quadrats), and flowering culm density is based on m^2 quadrats. All data were collected at 5-m intervals along linear transects through *C. rostrata* populations. No. of m^2 plots and standard deviations are given in parentheses.

County/area	Population area & No. m^2 plots	Frequency per 1/4m^2	Culm density per m^2 (+-sd)
DuPage/#1	500 m^2 (8)	88.95%	2.4/m^2 (2.8)
DuPage/#2	100 m^2 (5)	100%	1.5/m^2 (1.1)
Lake/#1	1000 m^2 (8)	75%	8.15/m^2 (9.9)
Lake/#2	25 m^2 (7)	100%	10.1/m^2 (6.0)
McHenry/#1	15 m^2 (4)	100%	4.25/m^2 (2.5)
McHenry/#2	10 m^2 (4)	75%	1.75/m^2 (2.9)
McHenry/#3	5000 m^2 (10)	90%	2.7/m^2 (2.2)
McHenry/#4	1000 m^2 (11)	100%	4.3/m^2 (2.0)
McHenry/#5	1000 m^2 (15)	20%	0.5/m^2 (1.4)
Column means	961.1 m^2	83.2%	4.0/m^2
Standard deviations	(1579.1)	(25.9)	(3.2)

Table 6. Sample size, frequency, and density for 11 *Cladium mariscoides* populations. Frequency is based on presence per 1/4 m^2 (within m^2 quadrats), and flowering culm density is based in m^2 quadrats. All data were collected at 5-meter intervals along linear transects through *C. mariscoides* populations. No. of m^2 plots and standard deviations are given in parentheses.

County/area	Transect length & No. m^2 plots	Frequency per 1/4m^2	Culm density per m^2 (+-sd)
Cook/#1	110 m (22)	59%	2.8/m^2 (4.3)
Lake/#1	50 m (10)	80%	4.1/m^2 (3.7)
Lake/#2	75 m (15)	100%	7.5/m^2 (5.5)
Lake/#3	50 m (10)	50%	2.7/m^2 (5.8)
Lake/#4	50 m (10)	20%	0.8/m^2 (1.9)
Lake/#5	50 m (10)	80%	7.5/m^2 (9.3)
McHenry/#1	50 m (10)	50%	6.0/m^2 (11.4)
McHenry/#2	75 m (13)	85%	11.6/m^2 (15.8)
McHenry/#3	10 m (3)	100%	1.3/m^2 (0.6)
McHenry/#4	50 m (11)	50%	1.3/m^2 (2.2)
McHenry/#5	50 m (11)	55%	1.7/M^2 (2.4)
Column means	56.3 m	66.3%	4.2/m^2
Standard deviations	(24.50)	(24.7)	(3.4)

Table 7. Sample size and frequency for 8 *Eleocharis rostellata* populations. Frequency is based on presence per 1/4 m^2 (within m^2 quadrats); all data were collected at 5-meter intervals along linear transects through *E. rostellata* populations. Standard deviations are given in parentheses.

County/area	Transect length	No. of m^2 plots	Frequency per 1/4 m^2
Cook/#1	110 m	10	87.5%
Lake/#1	50 m	10	77.5%
Lake/#2	10 m	4	70%
Lake/#3	5 m	2	87.5%
McHenry/#1	75 m	15	60%
McHenry/#2	50 m	10	87.5
McHenry/#3	50 m	40	90%
Will/#1	25 m	5	85%
Column means	46.9 m		80.2%
Standard deviations	(34.6)		(10.4)

Table 8. Sample size and frequency for 14 *Galium labradoricum* populations. Frequency is based on presence per 1/4 m^2 (within m^2 quadrats); all data were collected at 5-meter intervals along linear transects through *G. labradoricum* populations. Standard deviations are given in parentheses.

County/area	Transect length	No. of m^2 plots	Frequency per 1/4 m^2
Kane/#1	50 m	10	42.5%
Lake/#1	50 m	10	50%
Lake/#2	75 m	15	35%
Lake/#3	75 m	15	23%
Lake/#4	50 m	10	47.5%
Lake/#5	50 m	10	55%
Lake/#6	100 m	20	24%
Lake/#7	25 m	5	10%
Lake/#8	100 m	20	22.5%
McHenry/#1	50 m	10	10%
McHenry/#2	125 m	27	51%
McHenry/#3	150 m	32	37.5%
McHenry/#4	75 m	15	28.3%
McHenry/#5	50 m	10	27.5%
Column means	73.2 m		33.1%
Standard deviations	(34.6)		(14.7)

Table 9. Area, frequency, and density for 6 *Triglochin palustris* populations. Frequency is based on presence per 1/4 m^2 (within m^2 quadrats) and density is based on m^2 quadrats; all data were collected at 5-meter intervals along linear transects through *T. palustris* populations. No. of plots and standard deviations are given in parentheses.

County/area	Population area (No. m^2 plots)	Frequency per 1/4 m^2	Stem density per m^2 (+-sd)
Cook/#1	6 m^2 (6)	25%	7.0/m^2 (15.1)
McHenry/#1	7 m^2 (7)	71.4%	14.4/m^2 (17.1)
McHenry/#2	38 m^2 (38)	26.3%	7.0/m^2 (15.1)
McHenry/#3	4 m^2 (4)	37.5%	4.5/m^2 (3.8)
McHenry/#4	8 m^2 (8)	65.6%	12.4/m^2 (13.2)
Will/#1	13 m^2 (8)	26.9%	3.15/m^2 (3.4)
Column means	12.7 m^2	42.0%	7.0/m^2
Standard deviations	(12.8)	(21.1)	5.3

Book Reviews

Kirt, R.R. 1989. Prairie Plants of Northern Illinois: Identification and Ecology. Stipes Publ. Co., Champaign, IL. Price: $7.00 (paperback).

This paper bound booklet is written as a beginners identification guide to 63 important northern Illinois prairie plants. However, Kirt has gone beyond this to share ecological information and bits of prairie lore that every student of prairie should know. There are illustrated explanations of milkweed pollination and discussions of the composite, legume and grass families. The family accounts cover nitrogen fixing root nodules in legumes and growth form and structure of grasses.

Of the 63 plants covered, 11 are grasses, 1 is a sedge, and the others are forbs. Each species is illustrated with a reasonably good line drawing by Henrietta Tweedie or Roberta Simonds. After notation of the size, flowering date, flower color, and preferred moisture level, non-technical information is provided to aid in identification. This is followed by species specific "ecological notes" which include items such as the response of a species to disturbance, its indicator value in evaluating the quality of a prairie, its vulnerability to grazing, and its food value to wildlife.

Another helpful feature is a flowering date chart which shows at a glance which species are apt to be flowering on a given date. A glossary and list of selected references is also included.

All in all, it is one of the best beginners guides to prairie plants that I have come across.--*John E. Schwegman, Botany Program Manager, Illinois Department of Conservation, Springfield, IL 62701.*

Young, D. 1986. Wild Plants and Natural Areas of Kane County. Illustrated by Nan Mortensen. Kane County Environmental Department, 719 S. Batavia Ave., Geneva, IL 60134. 250 pp. Price: $10.00 (paperback).

If you find Swink and Wilhelm's Plants of the Chicago Region difficult to use because of the technical language and lack of illustrations, and you like Peterson and McKenny's A Field Guide to Wildflowers but find it doesn't cover our area thoroughly enough, then here is just the book for you.

Dick Young has taken the over 1200 plants that grow in Kane County, had them illustrated by Nan Mortensen, and arranged them according to the color of their flowers (like Peterson and McKenny). Voila! Here is a book easy enough for a beginner to use and complete enough for an experienced botanist to find useful.

For each species illustrated, the entry begins with the common name followed by a number (1-10) referring to its value in relation to all other plants, based on the comparative contribution it makes to the richness and stability of the community in which it lives. The Latin name comes next, followed by frequency, habitat, a brief description, and bloom dates.

Plants are grouped first as: Ferns and Fern Allies, Trees and Shrubs, Vines, Aquatics, Sedges, Grasses, Rushes, then flowers according to their flower color. Within each color designation, the plants are grouped according to flower type, beginning with the monocots (lilies, orchids, etc.) and proceeding taxonomically to the composites.

The first 167 pages of the book (including the 7 page introduction) contain all the drawings and plant descriptions. The rest of the book (pp. 168-231) contains a location map and description for each of 37 natural areas in the county. For each area the size, location, natural-areas-rating-evaluation number, community type, and preliminary species list are given. The last 17 pages are an index with both Latin and common names and a chart to help determine the identity of plants in fruit or berry.

There are no complicated keys or technical words to confuse the beginner, just illustrations (a picture is worth a 1000 words) and brief descriptions. The book is small and designed to take into the field. It can tell you where to find the natural areas in Kane

County and help you identify the plants you find in them. And of course it is useful throughout the whole Chicago area as well.

There are many things I like about this book: its completeness for our area, its illustrations, including silhouettes of the trees, as well as their leaves and flowers; its inclusion of grasses, sedges, and rushes; and its message to protect our native plants and their dwindling habitats.

The only criticism I have of this book pertains to the map (p.168) of natural areas. If each natural area was coded with a number instead of being represented by a star, it would not be necessary to look up coordinates to determine the locations of these slides. I use Wild Plants and Natural Areas of Kane County as a textbook for all my wildflower classes at the College of DuPage.--*Patricia K. Armstrong, Prairie Sun Consultants, 612 Staunton Road, Naperville, IL 60565.*

Guidelines for manuscripts submitted to Erigenia for publication

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ERIGENIA *Contents* *March 1991*

1
The Vascular Flora of Langham Island, Kankakee County, Illinois
John E. Schwegman

9
New Records for Illinois Vascular Plants
John E. Schwegman

13
Illinois' Native Snowberry
Dick Young

16
Forest Glen's Savanna Project
Ken Konsis and Doris Westfall

18
Woody Understory of Baber Woods, Edgar County, Illinois
Jacqueline M. Landes and John E. Ebinger

22
Vegetation of Wolf Creek State Park, Shelby County, Illinois
Shaun A. Newell, Lucinda L. Horton, and John E. Ebinger

27
Rarely Seen Endangered Plants, Rediscoveries, and Species New to Illinois
Marlin L. Bowles, John B. Taft, Eric F. Ulaszek, Mary Kay Solecki, David M. Ketzner, Loy R. Phillippe, Ann Dennis, Philip J. Burton, and Kenneth R. Robertson

52
Some Aspects of the Status and Ecology of Seven Rare Wetland Plant Species in the Chicago Region of Northeastern Illinois
Marlin L. Bowles

67
Book Reviews