



Rapid Ecological Assessment for the Columbia County Planning Group

A Summary of Biodiversity Values Focusing on Rare Plants, Selected Rare Animals, and High-quality Natural Communities in Preparation for the Development of a New Master Plan

Properties included in this assessment are:

French Creek Fen State Natural Area	Paradise Marsh Wildlife Area
French Creek Wildlife Area	Peter Helland Wildlife Area
Grassy Lake State Natural Area	Pine Island Savanna State Natural Area
Grassy Lake Wildlife Area	Pine Island Wildlife Area
Hinkson Creek Fishery Area	Rocky Run Fishery Area
Jennings Creek Wildlife Area	Rocky Run Oak Savanna State Natural Area
Lodi Marsh State Natural Area	Rowan Creek Fishery Area
Lodi Marsh Wildlife Area	Springvale Wet Meadow State Natural Area
Lodi Spring Creek Fishery Area	Swan Lake Wildlife Area
Mud Lake Wildlife Area – Columbia County	

December 2011 Third Version

Wisconsin's Natural Heritage Inventory Program

Bureau of Endangered Resources
Department of Natural Resources
P.O. Box 7921, Madison, WI 53707

PUBL ER-819 2010

Primary Author: Christina Isenring

Contributors

- Craig Anderson – botany
- Jeff Baughman – birds
- Cathy Bleser – inventory
- Julie Bleser – data management
- Brian Collins – birds
- Barb Duerkson – birds
- Drew Feldkirchner – report contributor
- Bob Hay – herptiles
- Kathy Kirk – terrestrial invertebrates
- Jeff Lorch – herptiles
- Mark Martin – bat surveys
- Jeremy Martinson – birds
- Julia Martinson – birds
- Ryan O'Connor – botany data processing
- Margaret Sarafiny – bat surveys
- Scott Sauer – invertebrates
- Kurt Schmude – aquatic invertebrates
- William A. Smith – zoology
- Rich Staffen – zoology data processing
- Paul White – bat surveys

Cover photo taken by Christina Isenring within the Swan Lake Tamaracks Primary Site.

Table of Contents

Purpose and Objectives.....	4
Methods	4
General Background Information	5
Ecological Context.....	10
Vegetation.....	13
Rare Species and High Quality Natural Communities of the Columbia County Planning Group.	16
Management Considerations and Opportunities for Biodiversity Conservation for the Columbia County Planning Group	19
Primary Sites: Opportunities for Biodiversity Conservation	24
Future Needs	41
Glossary	43
Species List.....	44
Reference List.....	48

Appendices

- A. Natural Heritage Inventory Methods Overview
- B. Documented rare species and high-quality natural communities for the Columbia County Planning Group listed by property
- C. Summary Descriptions for Species and Natural Communities Documented on the Columbia County Planning Group
- D. Global and State Element Rank Definitions
- E. Species of Greatest Conservation Need (SGCN) for the Columbia County Planning Group

Purpose and Objectives

This report addresses issues specifically related to the conservation of biological diversity and is intended to be used in conjunction with other sources of information for developing a new master plan for the Columbia County Planning Group (CCPG), comprised of the following state-managed properties:

- French Creek Fen State Natural Area
- French Creek Wildlife Area
- Grassy Lake State Natural Area
- Grassy Lake Wildlife Area
- Hinkson Creek Fishery Area
- Jennings Creek Wildlife Area
- Lodi Marsh State Natural Area
- Lodi Marsh Wildlife Area
- Lodi Spring Creek Fishery Area
- Mud Lake Wildlife Area – Columbia County
- Paradise Marsh Wildlife Area
- Peter Helland Wildlife Area
- Pine Island Savanna State Natural Area
- Pine Island Wildlife Area
- Rocky Run Fishery Area
- Rocky Run Oak Savanna State Natural Area
- Rowan Creek Fishery Area
- Springvale Wet Meadow State Natural Area
- Swan Lake Wildlife Area

The primary objectives of this assessment were to collect biological inventory information relevant to the development of a master plan for the CCPG and to analyze, synthesize and interpret this information for use by the master planning team. This effort focused on assessing areas of potential habitat for rare species and identifying natural community management opportunities.

Survey efforts for the CCPG were limited to a “rapid assessment” for 1) identifying and evaluating ecologically important areas, 2) documenting rare species occurrences, and 3) documenting occurrences of high quality natural communities. This report can serve as the “Biotic Inventory” document used for master planning, although both the time and effort expended were less than similar projects. The information collected was the result of survey work primarily done in 2009. There will undoubtedly be gaps in our knowledge of the biota of this property, especially for certain taxa groups; some of these have been identified in the future needs section.

Methods

The Wisconsin Natural Heritage Inventory (NHI) program is part of the Wisconsin DNR’s Bureau of Endangered Resources and a member of an international network of natural heritage programs representing all 50 states, as well as portions of Canada, Latin America, and the Caribbean. These programs share certain standardized methods for collecting, processing, and managing data for rare species and natural communities. NatureServe, an international non-profit organization (see www.NatureServe.org for more information), coordinates the network.

Natural heritage programs track certain *elements* of biological diversity: rare plants, rare animals, high-quality examples of natural communities, and other selected natural features. The NHI Working List contains the elements tracked in Wisconsin; they include Endangered, Threatened, and Special Concern plants and animals, as well as the natural community types recognized by NHI. The NHI Working List is periodically updated to reflect new information about the rarity and distribution of the state's plants, animals, and natural communities. The most recent Working List is available from the Wisconsin DNR Web site (<http://www.dnr.wi.gov/org/land/er/wlist/>).

The Wisconsin NHI program uses standard methods for biotic inventory to support master planning (Appendix A). Our general approach involves collecting relevant background information, planning and conducting surveys, compiling and analyzing data, mapping rare species and high quality natural community locations into the NHI database, identifying ecologically important areas, and providing interpretation of the findings through reports and other means.

Scientific names for all species mentioned in the text are included in a list toward the end of the document (see page 50).

General Background Information

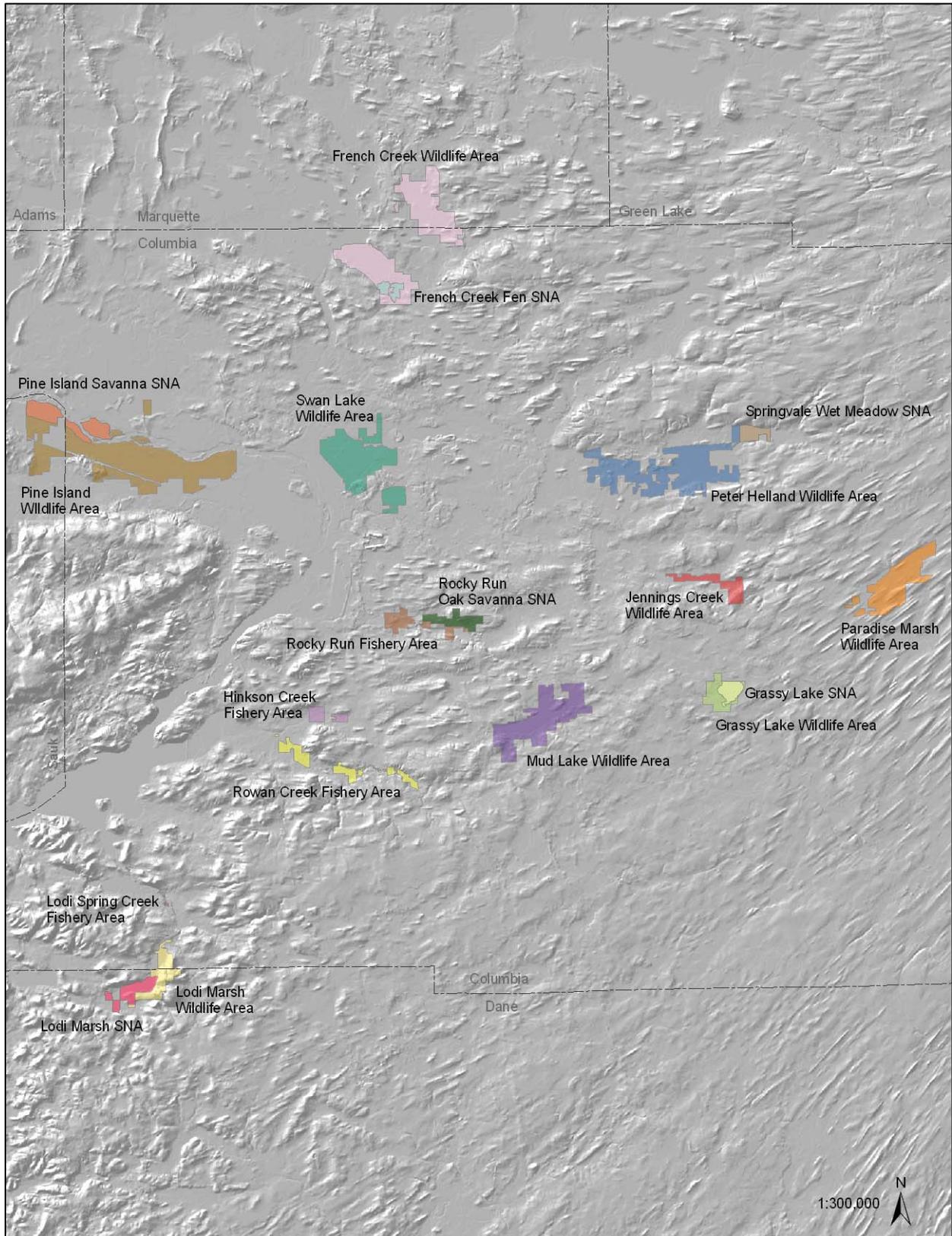
The Columbia County Planning Group is located in Columbia County, eastern Dane County, eastern Sauk County, and southern Marquette County and comprises ca. 22,370 acres (Figure 1).

Properties included within the CCPG are:

- **French Creek Wildlife Area** (3,450 acres) – is located in Columbia and Marquette Counties, about six miles northeast of the city of Portage and encompasses parts of French Creek and Dates Millpond. **French Creek Fen State Natural Area** is within the property.
- **Grassy Lake Wildlife Area** (695 acres) – is located in Columbia County, about three miles southeast of the village of Rio and contains **Grassy Lake State Natural Area** and portions of Grassy Lake.
- **Hinkson Creek Fishery Area** (220 acres) – is located in Columbia County, about 1.5 miles northwest of the village of Poynette along Hinkson Creek.
- **Jennings Creek Wildlife Area** (530 acres) – is located in Columbia County, about three miles northeast of the village of Rio along Jennings Creek.
- **Lodi Marsh Wildlife Area** (1,088 acres) – is located on the Columbia and Dane County border, just south of the city of Lodi along Spring Creek. **Lodi Marsh State Natural Area** is within the property.
- **Lodi Spring Creek Fishery Area** (32 acres) – is located in Columbia County, just north of the city of Lodi along Spring Creek
- **Mud Lake Wildlife Area** – Columbia County (2,262 acres) – is located in Columbia County, about two miles southwest of the village of Rio and encompasses most of Mud Lake.
- **Paradise Marsh Wildlife Area** (1,590 acres) – is located in Columbia County, about two miles northeast of the village of Doylestown along Beaver Creek.
- **Peter Helland Wildlife Area** (3,432 acres) – is located in Columbia County, about two miles east of the village of Pardeeville along North Branch Duck Creek. Within the property is **Springvale Wet Meadow State Natural Area**.
- **Pine Island Wildlife Area** (5,165 acres) – is located in Columbia and Sauk counties, just west of the city of Portage along the Baraboo and Wisconsin rivers. **Pine Island Savanna State Natural Area** is located within the property.

- **Rocky Run Fishery Area** (734 acres) – is located in Columbia County, about three miles southwest of the village of Wycocena along Rocky Run. Within the property is **Rocky Run Oak Savanna State Natural Area**.
- **Rowan Creek Fishery Area** (650 acres) – is located in Columbia County, both east and west of the village of Poynette and along Rowan Creek.
- **Swan Lake Wildlife Area** (2,335 acres) – is located in Columbia County, about one mile east of the city of Portage and encompasses parts of the Fox River and Swan Lake

Figure 1
Location of properties within the Columbia County Planning Group



Previous efforts

Land Legacy Report

Past surveys and inventory efforts have highlighted the ecological importance of the CCPG including the Land Legacy Report (WDNR 2006a) which was designed to identify Wisconsin's most important conservation and recreation needs for the next 50 years.

- The Arlington Prairie "Legacy Place," encompassing Grassy Lake and Mud Lake Wildlife Areas, was assigned a score of two points on a five-point scale for conservation significance, meaning it possesses "good ecological qualities, may be of adequate size to meet the needs of some of the critical components, and/or harbors natural communities or species of state or ecological landscape significance." This category implies that restoration efforts are likely needed and would have a good chance of success.
- The Middle Wisconsin "Legacy Place," encompassing Pine Island Wildlife Area, was assigned a score of five points on a five-point scale for conservation significance, meaning it possesses "outstanding ecological qualities, is of adequate size to meet the needs of critical components, and/or harbors natural communities or species of global or continental significance." This category implies that restoration efforts, if needed, would have a high likelihood of long-term success.

Fox River Headwaters Significant Ecological Sites

Ecologically significant sites within the Fox River headwaters were recognized at French Creek Wildlife Area and Swan Lake Wildlife Area (WDNR 2002).

- French Creek Wildlife Area was determined to be a site of statewide significance and contain excellent examples of natural communities and rare plants or animals, which are believed to be among the best remaining examples in the study area. This site is also large enough to support the resources of significance without major restoration efforts and is buffered by compatible land uses in the surrounding landscape.
- Swan Lake Wildlife Area was determined to be of regional significance and contain good or excellent examples of communities or rare plants or animals. This site may be somewhat compromised by human disturbance, incompatible surrounding land uses, or small size. A lack of adequate information may have prevented this site from being determined to be more significant within this study.

Wisconsin Wildlife Action Plan Conservation Opportunity Areas

The area encompassing the CCPG was recognized by the Wisconsin Wildlife Action Plan (WDNR 2006b) as having three Conservation Opportunity Areas (COA). Conservation Opportunity Areas are places in Wisconsin that contain ecological features, natural communities, or Species of Greatest Conservation Need habitat for which Wisconsin has a unique responsibility for protecting when viewed from the global, continental, upper Midwest, or state perspective.

- The Puckaway and Grand River Marsh COA, of Upper Midwest significance because it contains large wetlands embedded with upland natural communities, contains French Creek Wildlife Area.
- Wisconsin River (Dells to Lake Wisconsin) and Lower Baraboo River COA, containing Pine Island Wildlife Area, is of Upper Midwest significance because of its medium-sized rivers and streams.
- Pine Island COA, of statewide significance because of its floodplain forest natural communities, contains Pine Island Wildlife Area and Swan Lake Wildlife Areas.
- Also, Peter Helland Wildlife Area, Grassy Lake Wildlife Area, Lodi Marsh Wildlife Area, and Mud Lake Wildlife Area are listed as unmapped "high quality wetland communities of statewide significance" under the Southeast Glacial plains Ecological Landscape.

Important Bird Areas

Important Bird Areas (IBA) are critical sites for the conservation and management of Wisconsin's birds. Two IBAs have been recognized within the CCPG (WDNR 2007).

- The Leopold Reserve-Pine Island IBA harbors most of the breeding bird species representative of the floodplain and adjacent uplands within the surrounding landscape. The *Strategic Vision for Bird Conservation on the Leopold-Pine Island Important Bird Area* (Mossman et al. 2009) proposes a conservation vision based on results of bird survey efforts conducted between 2001 and 2006.
- The Northern Empire Prairie Wetlands IBA, a 5,800 acre site in which Mud Lake Wildlife Area and Grassy Lake State Natural Area and Wildlife Area are included, is known for its importance to both grassland and wetland birds.

Priority Landscape for Grassland Birds

The sedge meadows, Dry-mesic Prairie remnants, marshes, and Surrogate grasslands of Dane and Columbia counties were recognized by the WDNR as a Priority Landscape for Grassland Bird Management because of the opportunity for savanna restoration and prairie and Surrogate grassland expansion (Sample and Mossman 1997). Pine Island grasslands were also recognized as a Priority Landscape for Grassland Bird Management because of the restoration potential for Sand Prairie, savanna, and river barrens (Sample and Mossman 1997).

Forest Certification

All DNR-managed lands, including state parks, wildlife areas, and natural areas, are recognized by the Forest Stewardship Council and the Sustainable Forestry Initiative as being responsibly managed (WDNR 2009). This certification emphasizes the state's commitment to responsibly managing and conserving forestlands, supporting economic activities, protecting wildlife habitat, and providing recreational opportunities.

Ice Age National Scenic Trail

A segment of the Ice Age National Scenic Trail, a 1,000 mile long footpath, crosses Lodi Marsh Wildlife Area (www.nps.gov/iatr).

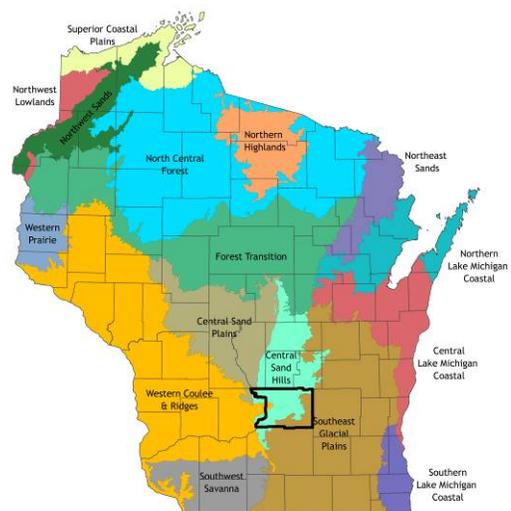


Figure 2
The Ecological Landscapes of Wisconsin. Columbia County is highlighted to show the location of the CCPG

Ecological Context

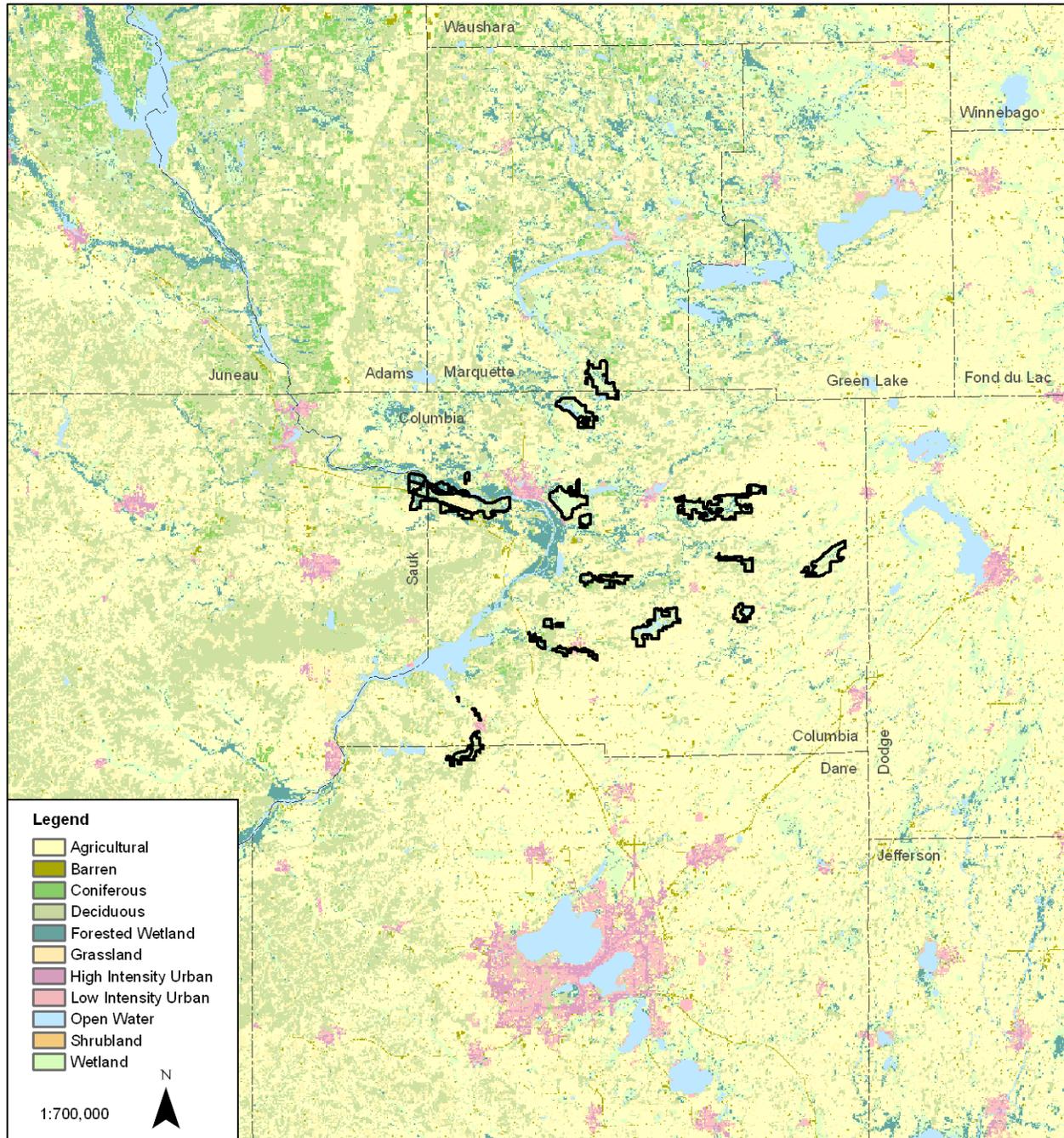
The CCPG is located mostly in the Central Sand Hills Ecological Landscape, with Paradise Marsh Wildlife Area in the Southeast Glacial Plains Ecological Landscape (Figure 2) (www.dnr.state.wi.us/landscapes). The Central Sands Hills Ecological Landscape is an area characterized by a series of glacial moraines that were later partially covered by glacial outwash on the eastern edge of what was once Glacial Lake Wisconsin. Extensive wetlands in outwash areas and the headwaters of coldwater streams that originate in glacial moraines are common. The Southeast Glacial Plains Ecological Landscape is characterized by landforms made up of glacial till plains and moraines.

The CCPG is located within eight Landtype Associations (LTA):

- 222Kb06 (Lewiston Basin). The characteristic landform pattern is lake plain with outwash plains and hummocky moraines.
- 222Kb07 (Portage Floodplain). The characteristic landform pattern is floodplain with poorly drained and somewhat poorly drained sandy and silty soils.
- 222Kd01 (Rio Moraines). The characteristic landform pattern is rolling till plain with scattered drumlins, bedrock knolls, and swamps. Soils are predominantly well drained loam over calcareous sand loam, loamy sand till, silty and sandy lacustrine, or bedrock.
- 222Kd03 (Poynette Hills). The characteristic landform pattern is hilly hummocky moraine with bedrock knolls and scattered swamps. Soils are predominantly well drained loam and sand over calcareous loamy sand, sandy loam till, sandy outwash, or sandstone.
- 222Kd04 (Pardeeville Plains). The characteristic landform pattern is undulating outwash plain with swamps and scattered morainic knolls. Soils are predominantly well drained loam and sand over calcareous gravelly sand outwash.
- 222Kd08 (French Creek Moraines). The characteristic landform pattern is rolling hummocky moraine with bedrock knolls and scattered swamps. Soils are predominantly well drained loam and sand over calcareous loamy sand and sandy loam till, sandy outwash, or sandstone.
- 222Kd09 (Roxbury Hills). The characteristic landform pattern is hilly eroded moraine with nearly level to undulating valley floors. Soils are predominantly well drained silt and loam over sandstone or dolomite calcareous sandy loam till, or calcareous gravelly sandy outwash.
- 222Ke12 (Beaver Dam Drumlins). The characteristic landform pattern is rolling till plain with drumlins and scattered muck deposits. Soils are predominantly well drained silt over calcareous sandy loam till.

The CCPG lies at a transition between an agricultural dominated landscape with large population centers to the south and east and a sparsely populated landscape with a high amount of forest cover to the west and north (Figure 3).

Figure 3
 Generalized 1992 Landcover for the Columbia County Planning Group area from the Wisconsin DNR WISCLAND GIS coverage
 (WDNR 1993)



There are 33 natural communities for which there are “Major” or “Important” opportunities for protection or restoration in the Central Sand Hills Ecological Landscape; of these, the following nineteen natural communities are present on the CCPG (natural communities with an asterisk are not represented by element occurrences in the NHI database because they don’t currently meet Element Occurrence criteria and/or represent restoration opportunities):

- Calcareous Fen
- Coldwater Streams*
- Coolwater Streams*
- Emergent Marsh
- Floodplain Forest
- Impoundments / Reservoirs*
- Oak Barrens*
- Sand Prairie*
- Shrub-carr
- Southern Dry-mesic Prairie
- Southern Sedge Meadow
- Southern Tamarack Swamp (rich)
- Surrogate grassland*
- Warmwater Rivers*
- Warmwater Streams*
- Wet Prairie
- Wet-mesic Prairie

There are 34 natural communities for which there are “Major” or “Important” opportunities in the Southeast Glacial Plains Ecological Landscape; of these, the following six natural communities are present on the CCPG (not all natural communities are represented by element occurrences in the NHI database because they are currently a restoration opportunity):

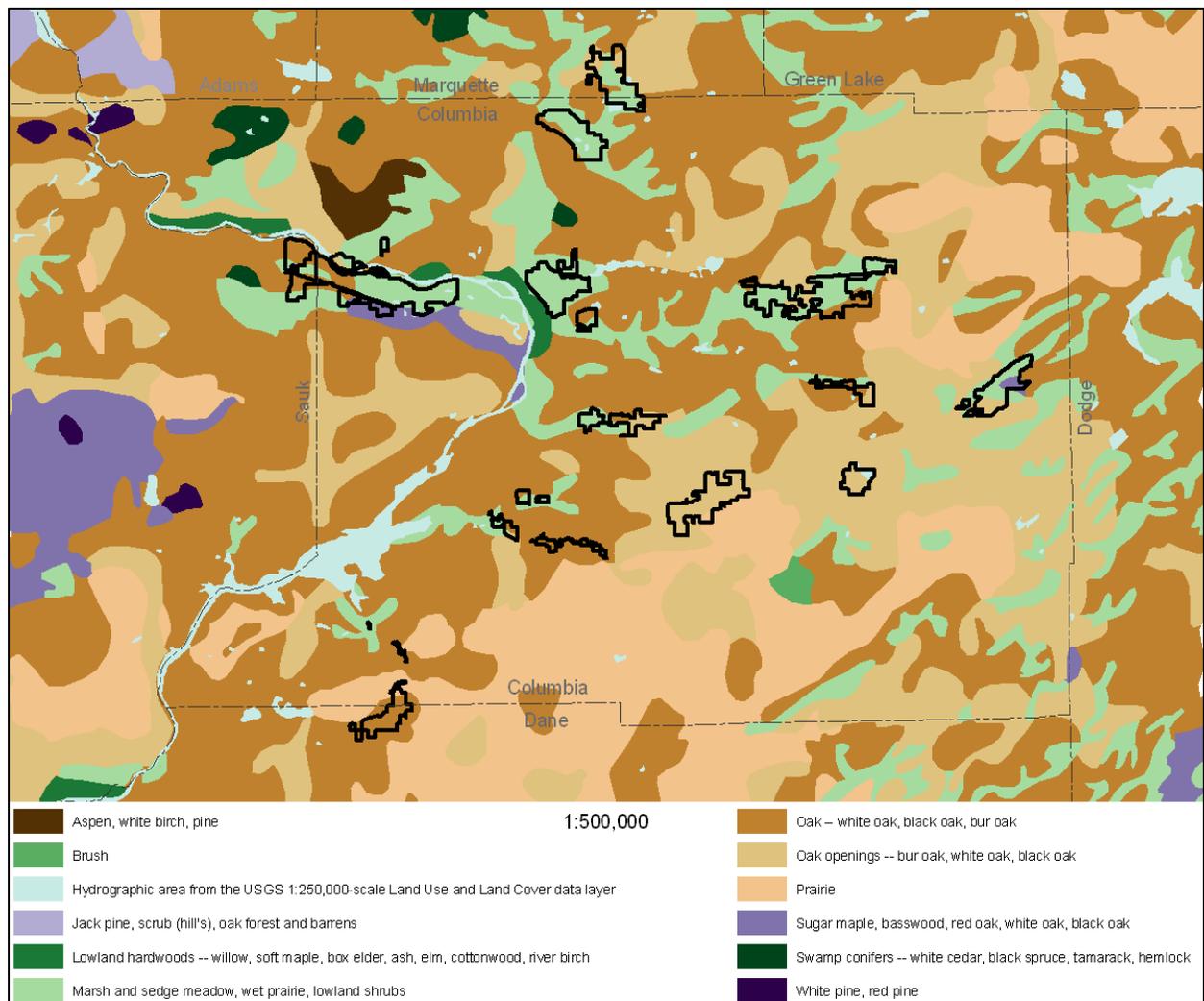
- Emergent Marsh*
- Emergent Marsh – Wild Rice*
- Impoundments/Reservoirs*
- Submergent Marsh*
- Surrogate grasslands*
- Warmwater streams*

Vegetation

Historic Vegetation

Data from the original Public Land Surveys are often used to infer vegetation cover types for Wisconsin prior to widespread European Settlement. Public Land Surveys for the area comprising the CCPG were conducted between 1832 and 1855. Finley's (1976) Original Vegetation Map described the majority of the area that now comprises the CCPG as marsh, sedge meadow, Wet Prairie, and lowland shrubs (Figure 4). Oak Openings and oak forests, both with bur, black, and white oak (*Quercus alba*), were the next most common type described. Also present on the properties were forests of sugar maple (*Acer saccharum*), basswood (*Tilia americana*), red oak (*Quercus rubra*), white oak, and black oak (*Quercus velutina*); prairies; and lowland hardwoods.

Figure 4
Pre-European Settlement Vegetation for the Columbia County Planning Group. Data are from Finley (1976).



Current Vegetation

The current vegetation for the CCPG is a mosaic of wetland natural communities with upland natural communities providing important habitat connections. The wetland natural communities on the CCPG include: Calcareous Fens, Southern Sedge Meadow, Wet and Wet-mesic Prairies, Emergent Marsh, Submergent Aquatic, Shrub-carr, and Southern Tamarack Swamp (rich). The upland natural communities on the CCPG include: Oak Opening, Southern Dry-mesic Forest, and Surrogate grassland. Open water, including coldwater and warmwater streams, lakes, and impoundments, are common on the properties.

Calcareous Fens on the CCPG are typically small areas of gently sloping mounds with springs. Characteristic plant species include fen star sedge (*Carex sterilis*), shrubby cinquefoil (*Pentaphylloides floribunda*), edible valerian (*Valeriana edulis*), swamp thistle (*Cirsium muticum*), sage-leaved willow (*Salix candida*), narrow-leaved cottongrass, swamp thistle, marsh fern (*Thelypteris palustris*), and tussock sedge (*Carex stricta*). Glossy buckthorn (*Rhamnus frangula*) is present, but not common.

Southern Sedge Meadows of the CCPG are influenced by calcium-rich groundwater and have species characteristic of Calcareous Fens within them. They are generally high quality, with large areas of few to no invasive species. Characteristic species include tussock sedge, woolly sedge, blue-joint grass (*Calamagrostis canadensis*), spotted Joe-pye weed (*Eupatorium maculatum*), blue flag (*Iris virginica*), and swamp milkweed (*Asclepias incarnata*). Reed canary grass (*Phalaris arundinacea*) is present and sometimes dominant within degraded Southern Sedge Meadows.

Within Southern Sedge Meadows and Calcareous Fens, small areas of Wet to Wet-mesic Prairie can be found. Species characteristic of these areas include prairie cordgrass (*Spartina pectinata*), big blue-stem, blue-joint grass, prairie blazing-star (*Liatris pycnostachya*), and saw-tooth sunflower (*Helianthus grosseserratus*).

This matrix of open wetland types typically grades into, and mixes with, Shrub-carr. Shrub-carr of the CCPG is characterized by red osier dogwood (*Cornus stolonifera*), meadow-sweet, willows (*Salix sp*), and bog birch (*Betula pumila*).

In some areas of the CCPG, a loose canopy composed of tamaracks (*Larix laricina*) occurs over the Shrub-carr or the open wetland types. In other areas, the Southern Tamarack Swamp (rich) is more defined, with a broken to closed canopy over a tall shrub layer of poison sumac (*Toxicodendron vernix*), speckled alder (*Alnus incana*), or bog birch, with an herbaceous layer of Southern Sedge Meadow species.

Emergent Marshes of the CCPG are typically dominated by the invasive narrow-leaved cat-tail (*Typha angustifolia*), but can also include common bur-reed (*Sparganium eurycarpum*), common reed grass (*Phragmites australis*), soft-stem bulrush (*Schoenoplectus tabernaemontani*), pickerel-weed (*Pontederia cordata*), and wild rice (*Zizania sp*). Many of these wetlands are associated with structures such as dikes, ditches, or impoundments. Submergent Aquatics, typically occurring in deeper water than emergents, include coon's-tail (*Ceratophyllum demersum*), common bladderwort (*Utricularia vulgaris*), pondweeds (*Potamogeton sp*), water-shield (*Brasenia schreberi*), water-milfoil (*Myriophyllum sp*), and water-marigold (*Megalodonta beckii*). The invasive curly pondweed (*Potamogeton crispus*) is dominant in some deep water marshes.

Southern Dry-mesic Forests of the CCPG are red and white oak-dominated with red maple (*Acer rubrum*), black cherry (*Prunus serotina*), and shagbark hickory (*Carya ovata*). In the best examples of this type, trees are typically 10-15 inches diameter at breast height (dbh), with some up to 25". The shrub layer is moderately dense with prickly ash (*Zanthoxylum americanum*), common buckthorn (*Rhamnus*

cathartica), brambles (*Rubus sp*), and honeysuckle (*Lonicera sp*). The herbaceous layer has pointed tick-trefoil (*Desmodium glutinosum*), jack-in-the-pulpit (*Arisaema triphyllum*), broad-leaf enchanter's-nightshade (*Circaea lutetiana*), Virginia creeper (*Parthenocissus quinquefolia*), lady fern (*Athyrium filix-femina*), hog-peanut (*Amphicarpaea bracteata*), and the invasives garlic mustard (*Alliaria petiolata*) and Japanese hedge-parsley (*Torilis japonica*). Ponds, including some that are ephemeral, are present in some Southern Dry-mesic Forests of the CCPG.

Oak Openings, Oak Woodland, and Oak Barrens (all types of savanna) of the CCPG vary from floodplain savannas to restored Oak Openings. Oak Openings described as floodplain savannas are found at Pine Island Wildlife Area and consist of open grown swamp white oak (*Quercus bicolor*) over prairie grasses and forbs. Oak Openings that have had some restoration management are typically open grown bur oak (*Quercus macrocarpa*) over restored Dry-mesic Prairie. There are numerous small Oak Openings and areas of Oak Woodland that are in need of restoration and are typically composed of bur oak over shrubs, including brambles and common buckthorn; invasive herbaceous species, including common burdock (*Arctium minus*), smooth brome (*Bromus erectus*), Canada thistle (*Cirsium arvense*), and wild parsnip (*Pastinaca sativa*); and remnant prairie species, including big blue-stem, June grass (*Bromus tectorum*), and common spiderwort (*Tradescantia ohioensis*). Oak Barrens are rare on the CCPG, but are generally black oak dominated with a dense cover of Pennsylvania sedge (*Carex pensylvanica*). Other species present include lead-plant (*Amorpha canescens*), black-eyed Susan (*Rudbeckia hirta*), round-headed bush-clover (*Lespedeza capitata*), and June grass.

Floodplain Forests are found along the streams and rivers of the CCPG. These areas are typically small and may be mixed with Southern Sedge Meadow. Characteristic species include silver maple (*Acer saccharinum*), river birch (*Betula nigra*), and green ash (*Fraxinus pennsylvanica*). Along some of the streams are wet-mesic forests with a canopy of basswood, green ash, red maple, and swamp white oak. The shrub layer is open. The ground flora is a mix of rich, mesic species [bloodroot (*Sanguinaria canadensis*), wild leek (*Allium tricoccum*), red baneberry (*Actaea rubra*), Canadian wood-nettle (*Laportea canadensis*), and sharp-lobed hepatica (*Anemone acutiloba*)] and species more typical of a floodplain [reed canary grass, moneywort (*Lysimachia nummularia*), cut-leaved coneflower (*Rudbeckia laciniata*), and stinging nettle (*Urtica dioica*)]. Exposed soil is present where water was pooled in the spring. Springs emanate from these areas into streams.

Prairies of the CCPG are diverse and occur along the entire moisture gradient from wet to dry. Wet and Wet-mesic Prairies, described earlier, are often part of a large open wetland. Mesic Prairies, Dry-mesic Prairies, and Dry Prairies are generally described as having a mix of native prairie species and weedy or invasive species. These prairies, along with Surrogate grasslands, are typically part of a large upland area with oak savannas and Southern Dry-mesic Forests.

Numerous spring-fed coldwater and warmwater streams are present within the CCPG.

Also within the CCPG are small pine plantations and developed areas including paved and gravel roads, trails, and parking lots.

The Wisconsin Wildlife Action Plan (WDNR 2006b) and the Ecological Landscapes of Wisconsin Handbook (WDNR In Prep. a) identifies the best landscapes in the state for sustaining various natural communities and includes a table with opportunity ranks for each Ecological Landscape / Natural Community combination.

Rare Species and High Quality Natural Communities of the Columbia County Planning Group

Numerous rare species and high-quality examples of native communities have been documented within the CCPG. Table 1 shows the rare species and high-quality natural communities currently known from the CCPG. Appendix B shows the rare species and high-quality natural communities currently known from the CCPG listed by property. See Appendix C for summary descriptions for the species and natural communities that occur on the CCPG.

Table 1. Documented rare species and high-quality natural communities for the Columbia County Planning Group. For an explanation of state and global ranks, as well as state status, see Appendix D. State status is based on the NHI Working List published April 2009.

Common Name	Scientific Name	Last Observed Date	State Rank	Global Rank	State Status
Animals					
A Lepidostomatid Caddisfly	<i>Lepidostoma libum</i>	2009	S1?	G3G4	SC/N
A Predaceous Diving Beetle	<i>Hydroporus pseudovilis</i>	2009	S1S2	GNR	SC
A Water Scavenger Beetle	<i>Laccobius agilis</i>	2009	S2S2	GNR	SC
Abbreviated Underwing Moth	<i>Catocala abbreviatella</i>	2009	S3	G4	SC/N
Acadian Flycatcher	<i>Empidonax virescens</i>	2009	S3	G5	THR
American Bittern	<i>Botaurus lentiginosus</i>	2009	S3	G4	SC
American Bullfrog	<i>Lithobates catesbeianus</i>	2009	S3	G5	SC
American Woodcock	<i>Scolopax minor</i>	2009	--	G5	--
Arctic Shrew	<i>Sorex arcticus</i>	1998	S3S4	G5	SC/N
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2009	S4B,S2N	G5	SC/P
Banded Killifish	<i>Fundulus diaphanus</i>	1980	S3	G5	SC/N
Bell's Vireo	<i>Vireo bellii</i>	2009	S2B	G5	THR
Black Tern	<i>Chlidonias niger</i>	2009	S2	G4	SC
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	2009	--	G5	--
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	2009	S2	G5	SC
Blanding's Turtle	<i>Emydoidea blandingii</i>	2009	S3	G4	THR
Blue-winged Teal	<i>Anas discors</i>	2009	--	G5	--
Blue-winged Warbler	<i>Vermivora pinus</i>	2009	--	G5	--
Bobolink	<i>Dolichonyx oryzivorus</i>	2009	--	G5	--
Broad-winged Skipper	<i>Poanes viator</i>	1991	S3	G5	SC/N
Brown Thrasher	<i>Toxostoma rufum</i>	2005	--	G5	--
Cerulean Warbler	<i>Dendroica cerulea</i>	2009	S2S3	G4	THR
Common Moorhen	<i>Gallinula chloropus</i>	2009	S2	G5	SC
Dickcissel	<i>Spiza americana</i>	2005	S3	G5	SC
Dunlin	<i>Calidris alpina</i>	2009	--	G5	--
Eastern hog-nosed Snake	<i>Heterodon platirhinos</i>	2009	S3	G5	SC
Eastern Massasauga ³	<i>Sistrurus catenatus catenatus</i>	1927	S1	G3G4	END
Eastern Meadowlark	<i>Sturnella magna</i>	2009	--	G5	--
Eastern Pipistrelle Bat	<i>Pipistrellus subflavus</i>	2009	S3S4	G5	SC
Eastern Red Bat	<i>Lasiurus borealis</i>	2009	--	G5	--
False Map Turtle	<i>Graptemys pseudogeographica</i>	1976	S4	G5	SC/H
Field Sparrow	<i>Spizella pusilla</i>	2009	--	G5	--
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	2009	--	G4	--

Common Name	Scientific Name	Last Observed Date	State Rank	Global Rank	State Status
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	2009	--	G5	--
Henslow's Sparrow	<i>Ammodramus henslowii</i>	2009	S3B	G4	THR
Hickory Hairstreak	<i>Satyrium caryaevorum</i>	1991	S2	G4	SC
Hoary Bat	<i>Lasiurus cinereus</i>	2009	--	G5	--
King Rail	<i>Rallus elegans</i>	2006	S1B	G4	SC/M
Lake Chubsucker	<i>Erimyzon sucetta</i>	1980	S3	G5	SC/N
Least Flycatcher	<i>Empidonax minimus</i>	2009	--	G5	--
Loggerhead Shrike	<i>Lanius ludovicianus</i>	1985	S1B	G4	END
Longear Sunfish	<i>Lepomis megalotis</i>	1925	S2	G5	THR
Mulberry Wing	<i>Poanes massasoit</i>	2009	S3	G4	SC/N
Northern Bobwhite	<i>Colinus virginianus</i>	2009	S3	G5	SC
Northern Harrier	<i>Circus cyaneus</i>	2009	--	G5	--
Northern Marbled Locust	<i>Spharagemon marmorata</i>	2009	--	G5	--
Ornate Box Turtle	<i>Terrapene ornata</i>	2009	S1	G5	END
Osprey	<i>Pandion haliaetus</i>	2005	S4	G5	THR
Pickerel Frog	<i>Lithobates palustris</i>	2009	S3S4	G5	SC/H
Pygmy Shrew	<i>Sorex hoyi</i>	1977	S3S4	G5	SC/N
Redfin Shiner	<i>Lythrurus umbratilis</i>	1925	S2	G5	THR
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	2005	--	G5	--
Red-necked Grebe	<i>Podiceps grisegena</i>	1997	S2	G5	END
Red-shouldered Hawk	<i>Buteo lineatus</i>	2005	S3S4B	G5	THR
Red-tailed Prairie Leafhopper	<i>Aflexia rubranura</i>	1963	S2	G2	END
Regal Fritillary	<i>Speyeria idalia</i>	2006	S1	G3	END
Silphium Borer Moth	<i>Papaipema silphii</i>	1995	S2	G3G4	END
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	2009	--	G5	--
Slender Glass Lizard	<i>Ophisaurus attenuatus</i>	2009	S1	G5	END
Smooth Softshell	<i>Apalone mutica</i>	1979	S3	G5	SC/H
Swamp Darner	<i>Epiaeschna heros</i>	2009	S1?	G5	SC/N
Veery	<i>Catharus fuscescens</i>	2009	--	G5	--
Vesper Sparrow	<i>Pooecetes gramineus</i>	2005	--	G5	--
Weed Shiner	<i>Notropis texanus</i>	1925	S3	G5	SC/N
Whip-poor-wil	<i>Caprimulgus vociferus</i>	2009	--	G5	--
Whitney's Underwing Moth	<i>Catocala whitneyi</i>	1997	S3	G3G4	SC/N
Willow Flycatcher	<i>Empidonax traillii</i>	2009	--	G5	--
Wood Thrush	<i>Hylocichla mustelina</i>	2009	--	G5	--
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	2009	S3B	G5	SC/M
Plants					
Brittle Prickly-pear	<i>Opuntia fragilis</i>	1987	S3	G4G5	THR
Buttonweed	<i>Diodia teres var. teres</i>	2009	S1	G5T5	SC
Common Bog Arrow-Grass	<i>Triglochin maritima</i>	1988	S3	G5	SC
Fire Pink	<i>Silene virginica</i>	2008	S1	G5	END
Flodman Thistle	<i>Cirsium flodmanii</i>	2007	S1	G5	SC
Georgia Bulrush	<i>Scirpus georgianus</i>	1960	SH	G5	SC
Hill's Thistle	<i>Cirsium hillii</i>	2006	S3	G3	THR
Lesser Fringed Gentian	<i>Gentianopsis procera</i>	1988	S3	G5	SC

Common Name	Scientific Name	Last Observed Date	State Rank	Global Rank	State Status
Livid Sedge	<i>Carex livida</i>	2009	S2	G5	SC
Prairie False-dandelion	<i>Microseris cuspidata</i>	2006	S2	G5	SC
Prairie Parsley	<i>Polytaenia nuttallii</i>	1974	S3	G5	THR
Showy Lady's slipper	<i>Cypripedium reginae</i>	1983	S3	G4	SC
Slender bulrush	<i>Scirpus heterochaetus</i>	1977	S1	G5	SC
Small White Lady's-slipper	<i>Cypripedium candidum</i>	2009	S3	G4	THR
Sticky False Asphodel	<i>Tofieldia glutinosa</i>	1988	S2S3	G4G5	THR
Sweet-scented Indian-plantain	<i>Cacalia suaveolens</i>	2009	S3	G4	SC
Tufted Bulrush	<i>Scirpus cespitosus</i>	1988	S2	G5	THR
Whip Nutrush	<i>Scleria triglomerata</i>	1993	S2S3	G5	SC
Woolly Milkweed	<i>Asclepias lanuginosa</i>	2004	S1	G4?	THR
Natural Communities					
Calcareous Fen		2009	S3	G3	NA
Emergent Marsh		2009	S4	G4	NA
Floodplain Forest		2009	S3	G3?	NA
Mesic Prairie		1977	S1	G2	NA
Moist Sandy Meadow		1986	SU	GNR	NA
Oak Opening		2009	S1	G1	NA
Shrub-carr		2009	S4	G5	NA
Southern Dry-mesic Forest		2009	S3	G4	NA
Southern Sedge Meadow		2009	S3	G4?	NA
Southern Tamarack Swamp (Rich)		2009	S3	G4	NA
Springs and Spring Runs, Hard		2009	S4	GNR	NA
Wet Prairie		2009	SU	G3	NA
Wet-mesic Prairie		2009	S2	G2	NA

Other notable Species

A new lichen, *Epiphloea byssina*, to Wisconsin was discovered in August of 2009 at Rocky Run Oak Savanna SNA (Bennett 2009). There are only a few records for this species in North America and the closest known locality is in central Minnesota. It was found growing on thin calcareous soil in an opening at the end of a southwest-facing bluff. This lichen grows on open clayey and calcareous soils, protecting the soil from erosion. It is very sensitive to disturbance and trampling, and takes years to grow. Its lifetime in an area is short because it cannot tolerate the overgrowth of vascular plants. Areas where it is found should be protected from trampling. This species will be reviewed for inclusion on the Wisconsin Natural Heritage Working List.

Paracladius sp. is a genus of midge that until recently was not known to occur in Wisconsin. Merritt et al. (2008) list only Wyoming and Montana, but Stroom et al. (in press) found it in Lake Superior along the Bayfield Peninsula. Larval specimens have also been collected by Mike Miller (WI DNR) in several streams throughout Wisconsin as part of biomonitoring projects. Two larvae were collected from the small spring seep along the north margin of Lodi Marsh. It is known to occur in springs and spring-fed streams, and cold lakes. This species is not currently on the NHI Working List, but will likely be added after the upcoming Working List revision (William Smith, pers. comm).

Management Considerations and Opportunities for Biodiversity Conservation for the Columbia County Planning Group

Rare reptiles and amphibians

Reptile and amphibian populations have declined significantly in Wisconsin over the last few decades, due in large part to habitat modification and fragmentation. Most species exhibit poor dispersal capabilities; hence there is an urgent need to protect sites where these species occur at population sizes large enough to remain viable (Lorch 2009). CCPG provides crucial prairie and savanna habitats presenting opportunities for the conservation of many threatened, endangered, and special concern herptile species. In particular, open wetlands on the CCPG are crucial for the conservation of one threatened herptile species due to an abundance of habitat and the presence of dispersal corridors between areas suitable for habitation. In addition, open, sandy soil habitats found on several properties on the CCPG provide suitable habitat for several critically imperiled reptiles in Wisconsin.

Threats to herptile populations of the CCPG include the succession of open habitat, invasive plant species resulting in habitat simplification, and egg predation from meso-predators.

Open Wetlands

The open wetlands of the CCPG are diverse and include Calcareous Fen, Emergent Marsh, Southern Sedge Meadow, Wet Prairie, and Wet-mesic Prairie. These wetland complexes can cover over 1,000 acres. The open wetlands of the CCPG occur within larger landscapes of prairie, Surrogate grassland, and oak dominated savannas and forests.

Many acres of these wetlands remain high quality because of their lack of invasive species and minimal impacts from draining. Still, numerous areas are heavily impacted by previous disturbances including ditching and grazing that has led to invasive species and shrub invasion. Invasive species impacting these areas include reed canary grass, common reed grass, narrow-leaved cat-tail, and purple loosestrife (*Lythrum salicaria*).

The mixed emergent wetlands and large size (>25 acres) make the open wetlands at French Creek Wildlife Area and Swan Lake Wildlife Area an important shorebird stopover site (Grveles et al. In Review). The open wetlands of the CCPG also provide habitat for breeding grassland birds, breeding marsh birds, rare reptiles and amphibians, and invertebrates.

Oak Savanna Restoration

Oak savannas, also known as Oak Openings, Oak Woodlands, and Oak Barrens, are critically imperiled globally because of their extreme rarity (WNHI 2009). Historically, oak savannas covered 5.5 million acres in Wisconsin. Today, because of clearing and plowing, overgrazing, and invasion by dense tree or shrub growth, intact examples now cover less than 500 acres. Although the Wisconsin Wildlife Action Plan (2006b) does not list the Central Sand Hills Ecological Landscape as the best place to restore oak savannas, it has been noted as a critical need (WDNR In Prep. a) in Wisconsin and important areas were identified, including Rocky Run Fishery Area, Lodi Marsh Wildlife Area, and Rowan Creek Fishery Area. Oak Openings and Oak Woodlands are noted as a major management opportunity in the Southeast Glacial Plains Ecological Landscape, although only one property from the CCPG is present within that landscape, Paradise Marsh Wildlife Area, and initial surveys don't indicate any large restoration opportunity.

Restoration and expansion of oak savanna remnants can enhance the habitat for numerous threatened and endangered species and SGCN currently known from the CCPG (Appendix E).



Oak Woodland restoration opportunity at Lodi Marsh SNA. Photo by Christina Isenring.

Grassland Birds

Grassland bird species are exhibiting one of the most significant declines of any suite of bird species in Wisconsin and across the Midwest (Herkert 1995). The major cause for this decline has been the alteration and loss of breeding habitat (Robbins et al. 1996). The CCPG presents opportunities for addressing several area sensitive bird species that require large grassland patches to provide for good nest success and persistence of viable populations. Promoting good nest success and the persistence of viable populations of area-sensitive grassland birds requires maintaining patch sizes of greater than 100 hectares (247 acres) (pers. comm. D. Sample). The context of the surrounding landscape should be assessed to determine whether larger areas of grass could be connected through appropriate management. Maintaining surrogate grasslands, removing brushy edges and fencerows, and connecting larger grassland areas would all benefit grassland birds. Additional consideration should be given to grasslands connected to open wetlands, as these area are utilized by unique suites of grassland birds.

Additional important grassland habitats on the CCPG include Southern Sedge Meadow, Wet Prairie, Calcareous Fen, and Emergent Marsh. Suitable open areas could also include pastures, hayfields (cut late summer), idle grasslands, prairie plantings, and even row crops which can be a suitable buffer when compared to woodlots or hedgerows.

Wisconsin Wildlife Action Plan

Numerous SGCN are known from the CCPG; they, along with the natural communities they inhabit, represent Ecological Priorities for the Southeast Glacial Plains and Central Sand Hills Ecological Landscapes (WDNR 2006b). Appendix B contains a matrix with the vertebrate SGCN and their associated natural communities for the Southeast Glacial Plains and Central Sand Hills Ecological Landscapes. Note that these Ecological Priorities include all of the natural communities that we have determined to provide the best opportunities for management on the CCPG from an ecological / biodiversity perspective.

Several Ecological Priorities from the Wisconsin Wildlife Action Plan (WDNR 2006b) are present on the CCPG. These priorities were developed using three primary sources of information: 1) the Ecological Opportunities previously described, 2) the degree of association that a given SGCN has for a given natural community, and 3) the probability that a given SGCN occurs in a given Ecological Landscape (see dnr.wi.gov/org/land/er/wwap/explore/tool.asp for more information) (Figure 5). These priorities highlight both the ecologically important natural communities and vertebrate animal species for a given landscape, along with their relationships to each other.

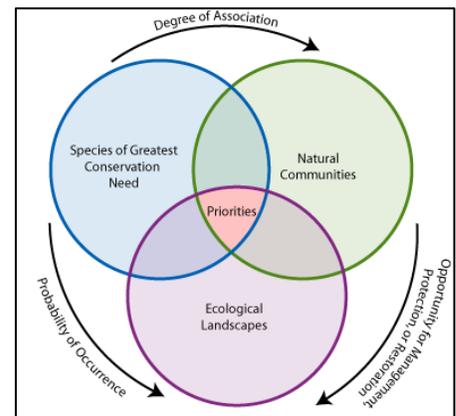


Figure 5
Graphic illustrating the process used for identifying Ecological Priorities in the Wisconsin Wildlife Action Plan.

Priority Conservation Actions identified in the Wisconsin Wildlife Action Plan (WDNR 2006b) for the CCPG include:

- Identify and restore oak barrens and oak forest on appropriate sites, such as old fields and pasture lands, to expand and connect existing stands.
- Manage oaks as a large-scale mosaic of patches along a successional gradient that includes oak forest, oak woodland, oak opening, and native or surrogate grassland.
- Work with private land owners to promote the creation of smaller savanna restorations that provide habitat for a special concern bird species.
- Preserve remaining relict old-growth oak forest patches.
- Develop cost-sharing incentives for private landowners to burn, remove invasive exotic species, and regenerate oak forests, oak woodlands, and oak openings.
- Preserve and manage wet-mesic prairie, wet prairie, calcareous fen, and southern tamarack swamp sites; restore degraded sites (emphasizing restoration of hydrology), and manage for area-sensitive species in a matrix of surrogate grasslands, sedge meadow, shrub-carr, and savanna habitats. Monitor restored sites to determine whether the restoration is maintaining sensitive species.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other oak barrens management practices.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of oak barrens ecosystems.
- Continue head starting program for an endangered herptile species at appropriate sites.
- Long-term monitoring of an endangered herptile species is needed to evaluate population status and track trends, especially in light of climate change.

High Conservation Value Forests

The Wisconsin DNR manages 1.5 million acres that is certified by the Forest Stewardship Council (FSC) and the Sustainable Forest Initiative. Forest certification requires forests to be managed using specified criteria for ecological, social, and economic sustainability. Principle 9 of the *Draft 7 FSC-US Forest Management Standard* concerns the maintenance of High Conservation Value Forests (HCVF). High Conservation Value Forests are defined as possessing one or more of the following High Conservation Values:

1. Contain globally, regionally, or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia), including rare, threatened, or endangered species and their habitats;
2. Globally, regionally, or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;
3. Are in or contain rare, threatened, or endangered ecosystems;
4. Provide basic services of nature in critical situations (e.g., watershed protection, erosion control);
5. Are fundamental to meeting basic needs of local communities (e.g., subsistence, health); or,
6. Are critical to local communities' traditional cultural identity (areas of cultural, ecological, economic, or religious significance identified in cooperation with such local communities).

Based on the current draft criteria for defining HCVFs (Forest Stewardship Council 2009) the best HCVF candidates on the CCPG are represented by the "Primary Sites" described below.

Invasive Species

Many invasive plants are present within the CCPG and some are well-established in disturbed areas. Documented invasive plants include Bell's honeysuckle (*Lonicera X bella*), black locust (*Robinia pseudoacacia*), common buckthorn, cow vetch (*Vicia cracca*), crown vetch (*Coronilla varia*), curly pondweed, Tatarian honeysuckle (*Lonicera tatarica*), bouncing-bet (*Saponaria officinalis*), Canada bluegrass (*Poa compressa*), common mullein (*Verbascum thapsus*), common reed grass, garlic mustard, glossy buckthorn, Japanese hedge parsley, leafy spurge (*Euphorbia esula var. esula*), narrow-leaf cat-tail, purple loosestrife, reed canary grass, spotted knapweed (*Centaurea biebersteinii*), and wild parsnip. Common dewberry (*Rubus flagellaris*), an aggressive native species, is present in significant numbers at Pine Island Wildlife Area and Hinkson Creek Wildlife Area.

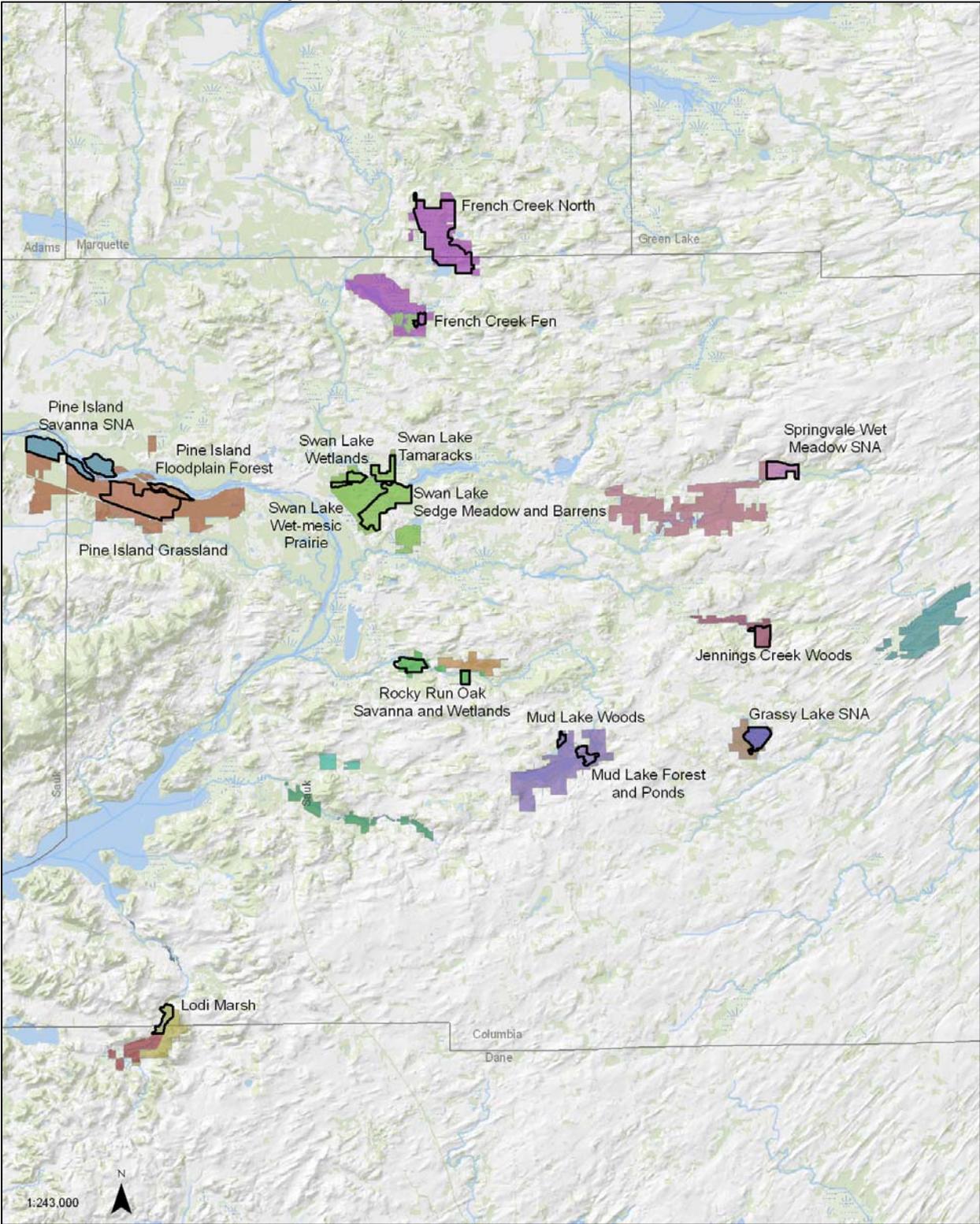
Primary Sites: Opportunities for Biodiversity Conservation

The following Primary Sites were delineated because they generally encompass the best examples of 1) both rare and representative natural communities and 2) rare species populations that have been documented to date within the CCPG. These sites warrant high protection and/or restoration consideration during the development of the master plan. All Primary Sites can be considered High Conservation Value Forests for the purpose of Forest Certification (WDNR 2009). This report is meant to be considered along with other information when identifying opportunities for various management designations during the master planning process. The site boundaries are illustrated on Figures 6 through 12.

Table 2. Primary Sites on the CCPG

Site ID	Site Name
CCPG01	French Creek North
CCPG02	French Creek Fen
CCPG03	Pine Island Savanna SNA
CCPG04	Pine Island Grassland
CCPG05	Pine Island Floodplain Forest
CCPG06	Swan Lake Wet-mesic Prairie
CCPG07	Swan Lake Wetlands
CCPG08	Swan Lake Tamaracks
CCPG09	Swan Lake Sedge Meadow and Barrens
CCPG10	Springvale Wet Prairie SNA
CCPG11	Jennings Creek Woods
CCPG12	Rocky Run Oak Savanna and Wetlands
CCPG13	Mud Lake Woods
CCPG14	Mud Lake Forest and Ponds
CCPG15	Grassy Lake SNA
CCPG16	Lodi Marsh

Figure 6
Location of Columbia County Planning Group Primary Sites



CCPG01. French Creek North – 1,389 acres

This site (Figure 7) is a large wetland complex with forested uplands and open old fields just north of Dates Millpond on the French Creek Wildlife Area. French Creek flows through the south end of the site.

The main feature of this site is a large wetland with Southern Sedge Meadow, Calcareous Fen, Southern Tamarack Swamp (rich), Shrub-carr, Emergent Marsh, and springs. Reed canary grass is present in small amounts along ditches and in a small impoundment pond.

The upland open fields are dry and grass dominated with sandy areas. Dominant species include smooth brome, Kentucky bluegrass (*Poa pratensis*), June grass, and little bluestem. This site also provides habitat for some endangered and special concern herptile and bird species. Forested areas include a small overgrown oak savanna, disturbed oak dominated woods, forested tree-lines, and pine plantations.

Management opportunities exist to promote habitat for herptiles. The site is used as a hibernaculum by endangered and special concern herptile species. However, in limited habitats, the presence of spotted knapweed can impact populations of these vulnerable species. The site also supports common snakes and turtles such as common garter snakes, northern water snakes, and snapping turtles. Opportunities are also present to restore small areas of oak savanna. Past management of this site has included flooding from the millpond, grazing, agriculture, and ditching.

This site, along with the French Creek Fen Primary Site was recognized as a site of statewide significance in *The Fox River Headwaters Ecosystem: An Ecological Assessment for Conservation Planning* (WDNR 2002). Generally, sites of this significance represent large, unfragmented areas with a varied complex of high quality natural communities and/or rare species populations. This site is part of the Puckaway and Grand River Marsh COA, an area of Upper Midwest significance because it contains large wetlands embedded with upland natural communities (WDNR 20006b).



French Creek North Primary Site. Photo by Christina Isenring.

CCPG02. French Creek Fen – 64 acres

This site contains the French Creek Fen SNA and adjacent wetlands with important transitions to forested uplands (Figure 7). The site encompasses a large complex of three Calcareous Fens that mix with Southern Sedge Meadows, Spring Runs, and, near the open water of French Creek and its impoundments, Emergent Marsh (including wild rice). One Spring Run originates in a disturbed field dominated by reed canary grass, with other wetland plants and is somewhat shaded by a small, mature white oak woodland with American starflower (*Trientalis borealis*) and early low blueberry. The woodland contains Ephemeral Ponds.

The site is important for threatened and special concern herptile and plant species. The small spring ponds may serve as hibernacula for snakes. Future survey needs include herptiles, rare plants, natural communities, and breeding birds.

Management considerations such as burning would help to maintain open habitats for herptile species. Areas surrounding the springs should be allowed to develop a closed canopy to provide a more shaded environment that can be better utilized by breeding amphibians.

This site, along with the French Creek North Primary Site was recognized as a site of statewide significance in *The Fox River Headwaters Ecosystem: An Ecological Assessment for Conservation Planning* (WDNR 2002). This site is part of the Puckaway and Grand River Marsh COA, an area of Upper Midwest significance because it contains large wetlands embedded with upland natural communities (WDNR 20006b).

CCPG03. Pine Island Savanna SNA – 798 acres

Situated along the Wisconsin River, Pine Island Savanna features a large floodplain savanna with several patches of sand prairie. An interior river island supports a floodplain savanna of scattered swamp white oak and an understory comprised of prairie grasses and forbs. Sandy ridges contain black oak and wet swales are vegetated with bottomland species such as silver maple, river birch, and green ash. Both red and white pine (*Pinus resinosa* and *P. strobus*, respectively) occur naturally on the island. Common savanna understory species include New England aster (*Aster novae-angliae*), false indigo (*Amorpha fruticosa*), prairie coreopsis (*Coreopsis palmata*), wild bergamot (*Monarda fistulosa*), black-eyed susan, Missouri goldenrod (*Solidago missouriensis*), and culver's-root (*Veronicastrum virginicum*). The site also provides habitat for threatened and special concern plants, herptiles and bird species.

CCPG04. Pine Island Grassland – 1,039 acres

This site (Figure 12), within the Pine Island Wildlife Area, is a large area of open grasslands and wetlands, Shrub-carr, Emergent Marsh, and scattered trees. The slight variations of topography and soils have resulted in a diverse landscape that supports numerous large populations of rare bird and herptile species.

Although areas of high quality natural communities are present within this site, the majority of the site is a restoration opportunity. Management considerations include maintaining and increasing the openness of the site while allowing pockets and small stands of shrubby habitats and early successional forest. These woody patches should not fragment the open grasslands and wetlands. Acoustical surveys indicate that good quality habitat for bats is present on this site and throughout the Pine Island Wildlife Area. Maintaining existing cover types (prairie, savanna, and wetland) can help to protect the six species of bats that were located during the spring and fall movement and summer residency periods. It also is recommended that when converting habitat to oak savannas that snags are left or created to create roosting habitat. This site is currently used for dog training and dog trials. It is highly recommended that

future management consider the important biological diversity, particularly to threatened and endangered species, this site offers.

This site, embedded within Pine Island Wildlife Area, has been recognized as an area of conservation significance in numerous reports:

- This site is included in the Middle Wisconsin “Legacy Place,” an area of high conservation significance (WDNR 2006a).
- The Leopold Reserve-Pine Island IBA is an area of conservation significance for the conservation and management of Wisconsin’s birds (WDNR 2007).
- Pine Island grasslands were recognized as a Priority Landscape for Grassland Bird Management (Sample and Mossman 1997).

CCPG05. Pine Island Floodplain Forest – 159 acres

This site (Figure 12), within the Pine Island Wildlife Area, is bordered to the north by the Wisconsin River and to the south by Levee Road. Floodplain Forest, dominated by silver maple, river birch, and green ash, comprises most of the site. Within this site are also oxbow lakes, Southern Sedge Meadows, and Dry-mesic Prairies.

Although no state-listed species were noted from this site, breeding birds include Song Sparrow, Eastern Wood-Pewee, Red-eyed Vireo, American Redstart, Ovenbird, House Wren, and Wood Thrush (Mossman et al. 2009).

Management opportunities include retaining forested habitat for bird species that may be using the larger blocks of Floodplain Forest on neighboring properties.

This site, embedded within Pine Island Wildlife Area, has been recognized as an area of conservation significance in numerous reports:

- This site is included in the Middle Wisconsin “Legacy Place,” an area of high conservation significance (WDNR 2006a).
- The Wisconsin Wildlife Action Plan recognized the Pine Island Conservation Opportunity Area as being of statewide significance because of its floodplain forest natural communities (WDNR 2006b).
- The Wisconsin Wildlife Action Plan recognized the Wisconsin River (Dells to Lake Wisconsin) and Lower Baraboo River COA as being of Upper Midwest significance because of its medium-sized rivers and streams (WDNR 2006b).
- The Leopold Reserve-Pine Island IBA is an area of conservation significance for the conservation and management of Wisconsin’s birds.

CCPG06. Swan Lake Wet-mesic Prairie – 46 acres

This site (Figure 9), within the Swan Lake Wildlife Area, consists of Wet-mesic Prairie, a globally imperiled natural community, within a large matrix of oak and aspen forests and high quality Southern Sedge Meadow. The Wet-mesic Prairie is dominated by tall grasses including big blue-stem and blue-joint grass with Indian grass (*Sorghastrum nutans*) and prairie cordgrass. Forbs consist of late goldenrod (*Solidago gigantea*), grass-leaved goldenrod (*Euthamia graminifolia*), swamp milkweed, prairie blazing-star, and white wild indigo (*Baptisia alba*).

Management opportunities at this site include using the surrounding matrix of open habitats to manage for sensitive species that utilize different vegetation types at different stages in their life cycles. Reed canary grass is limited to directly along the access road. This population should be controlled and monitored.

This site provides habitat for a threatened herptile species. Breeding bird surveys were not done on this site or the surrounding open wetlands and should be considered a high priority.

This site, along with the other Primary Sites at Swan Lake Wildlife Area, was recognized as a site of regional significance in *The Fox River Headwaters Ecosystem: An Ecological Assessment for Conservation Planning* (WDNR 2002). Generally, sites of this significance are smaller than the sites of statewide significance and have lower concentrations of rare species.

CCPG07. Swan Lake Wetlands – 94 acres

This site (Figure 9) consists of a Southern Sedge Meadow with occasional pockets of cat-tail marsh, common reed grass, and reed canary grass. With the exception of a few clumps of dogwood (*Cornus sp*) and willow, the site is open and free of woody growth. Much of the meadow is permanently flooded although wet-mesic areas are also present. Shallow ponds are scattered throughout the site and permanent ditches flank the road. To the north, the property borders the Fox River, a medium-sized, shallow, mud-bottomed, slow-flowing stream. This river is undoubtedly important in providing hibernating sites for turtles. Further upstream, the river connects to the Wisconsin River via the Portage Canal, providing a good dispersal corridor for aquatic species.

Management considerations include promoting habitat for rare and common turtles with ponds and ditches, and the river to provide hibernating and aquatic foraging areas and permanently saturated Southern Sedge Meadow to provide additional foraging grounds. Raised land such as the dike, former gravel road, and upland islands offer suitable nesting habitat. The vast area of prime habitat likely supports a viable population, and the Fox-Wisconsin River corridors allow for good genetic exchange with nearby populations.

This site, along with the other Primary Sites at Swan Lake Wildlife Area, was recognized as a site of regional significance in *The Fox River Headwaters Ecosystem: An Ecological Assessment for Conservation Planning* (WDNR 2002). Generally, sites of this significance are smaller than the sites of statewide significance and have lower concentrations of rare species.

CCPG08. Swan Lake Tamaracks – 205 acres

This site (Figure 9) contains a high quality Southern Tamarack Swamp (rich) and Southern Sedge Meadow on the north side of the Fox River within the Swan Lake Wildlife Area. Tamaracks in southern Wisconsin have been on the decline due to many factors including hydrologic manipulation, invasive species, drought, and difficulty with reproduction. This site harbors a healthy stand of mature tamarack over a dense shrub layer of poison sumac, bog birch, and willows, with a thick herbaceous layer of typical Southern Sedge Meadow species. Southern Sedge Meadow, with a lack of reed canary grass or purple loosestrife in the surveyed areas, dominates the majority of the site. Adjacent areas include Shrub-carr, an upland oak forest with a Spring Pond, and Emergent Marsh. Tamarack saplings are common on the gradient between the Southern Tamarack Swamp (rich) and the Southern Sedge Meadow.

Due to the difficulty accessing this site and its previous unknown quality, biotic inventory has been limited. Breeding bird, herptile, and more comprehensive rare plant and natural community surveys are recommended for this site. High quality habitat appears to be present on adjoining private lands and efforts should be made to survey these areas.



Swan Lake Tamaracks Primary Site. Photo by Christina Isenring.

Management opportunities exist to prevent soil erosion, protect water quality, and reduce habitat fragmentation and stand isolation in order to protect a natural community type that has been on a serious decline throughout the southern half of the state.

This site, along with the other Primary Sites at Swan Lake Wildlife Area, was recognized as a site of regional significance in *The Fox River Headwaters Ecosystem: An Ecological Assessment for Conservation Planning* (WDNR 2002). Generally, sites of this significance are smaller than the sites of statewide significance and have lower concentrations of rare species.

CCPG09. Swan Lake Sedge Meadow and Barrens – 702 acres

This site (Figure 9), within the Swan Lake Wildlife Area, provides landscape level opportunities to promote globally imperiled natural communities and a breeding population of a State Threatened species.

The majority of this site is a high quality Southern Sedge Meadow with Calcareous Fen components. This area is significant because of the size of the Southern Sedge Meadow and limited amount of invasive species.

At the north end of the site an island and peninsula dominated by aspen with Oak Barrens remnants is present. In the Oak Barrens, black oak dominates with white oak and red maple present in smaller

numbers. The understory is dominated by Pennsylvania sedge and bracken fern (*Pteridium aquilinum*). Characteristic forbs include bird's-foot violet (*Viola pedata*), columbine (*Aquilegia canadensis*), frostweed (*Helianthemum sp*), prairie alumroot (*Heuchera richardsonii*), bastard-toadflax (*Comandra umbellata*), prairie phlox (*Phlox pilosa*), wood-betony (*Pedicularis canadensis*), cynthia, and common spiderwort. Hazelnut (*Corylus sp*) and early low blueberry (*Vaccinium angustifolium*) are abundant in the shrub layer, and many areas are being invaded by common buckthorn. Several openings are present on the island and represent former agricultural fields and homesteads. Depending on the level of shading, these openings vary in quality from smooth brome and Kentucky bluegrass dominated fields to communities more closely resembling sand prairie. The areas of sand prairie contain such species as switchgrass, little blue-stem (*Schizachyrium scoparium*), June grass, numerous sedge species, frostweed, arrow-leaved violet (*Viola sagittata*), lyre-leaved rock-cress, Carolina puccoon (*Lithospermum caroliniense*), hoary puccoon (*Lithospermum canescens*), bastard-toadflax, dwarf dandelion (*Krigia biflora*), common spiderwort, and blue-eyed grass (*Sisyrinchium sp*).

At the south end of the property, Oak Barrens are also present, along with Oak Opening, and small areas of Dry Prairie. The terrain at this end of the property has numerous esker-like ridges with wet swales. The Oak Opening and Dry Prairie areas have bur oak 5-18 inch dbh with big blue-stem, cylindrical blazing-star (*Liatris cylindracea*), whorled milkweed (*Asclepias verticillata*), leadplant, side-oats grama (*Bouteloua curtipendula*), silky aster (*Aster sericeus*), prairie drop-seed (*Sporobolus heterolepis*), June grass, Kalm's brome (*Bromus kalmii*), and needle grass. Japanese hedge-parsley has invaded the shaded areas.

A large old field with sand prairie elements persists in the center of this site. This field has species that were likely planted during prairie restoration, as well as species more typical of sand prairies.

This site provides habitat for a threatened herptile species. Breeding bird surveys were not done here and should be considered a high priority for future research.



Swan Lake Sedge Meadow and Barrens Primary Site. Photo by Christina Isenring.

Management opportunities at this site include promoting a large amount of prairie, barrens, and sandy habitats that not only serve as important nesting sites but are also important for supporting viable populations of endangered and threatened herptile species. Opportunities exist to promote Oak Barrens and Oak Opening, both globally imperiled natural communities, through proper management. Field surveys indicate that this area has very potential for habitat for terrestrial invertebrates. Invasive species

threats to this site include clones of black locust invading the old field, Japanese hedge-parsley that is abundant in the woods at the south end of the property, and the spread of invasive species (common reed grass, reed canary grass, purple loosestrife, and glossy buckthorn) that are present along the access road and in neighboring wetlands. Residential development is increasing in this area, with houses along a portion of the eastern boundary of the site. Impacts of this include potential difficulty with conducting some restoration management practices (e.g., prescribed fire), the spread of invasive species, and runoff from lawns and impervious surfaces.

This site, along with the other Primary Sites at Swan Lake Wildlife Area, was recognized as a site of regional significance in *The Fox River Headwaters Ecosystem: An Ecological Assessment for Conservation Planning* (WDNR 2002). Generally, sites of this significance are smaller than the sites of statewide significance and have lower concentrations of rare species.

Although not typically reported in Rapid Ecological Assessment and Biotic Inventory reports, it should be noted that this site is also of archeological value (Site CO-0176 Wisconsin Historical Society). Both Early Woodland and Historic Euro-American cultural artifacts were located on site. An Early Woodland campsite with good potential for intact features was located here along with the ruins of a farm building erected in 1901.

CCPG10. Springvale Wet Meadow SNA – 271 acres

Situated along both banks of Duck Creek, Springvale Wet Prairie is an open wetland complex of Wet Prairie grading into sedge meadow and Calcareous Fen. The prairie contains a significant grass component including prairie cordgrass, big blue-stem, and blue-joint grass. A diversity of forbs is also present and includes species such as black-eyed susan, common mountain mint (*Pycnanthemum virginianum*), saw-tooth sunflower, rosinweed (*Silphium sp.*), marsh pea (*Lathyrus palustris*), and turtlehead (*Chelone glabra*). Tussock sedge dominates the sedge meadow with swamp milkweed and spotted Joe-pye weed. A mound located on the south creek bank supports many calcium-loving plants that are fen indicator species. They include grass-of-parnassus (*Parnassia glauca*), marsh bellflower (*Campanula aparinoides*), edible valerian, swamp lousewort (*Pedicularis lanceolata*), swamp thistle, and shrubby cinquefoil. Also present are two undisturbed Springs and Spring Runs. The site also provides habitat for special concern insect and plant species.

CCPG11. Jennings Creek Woods – 208 acres

This site (Figure 11), within Jennings Creek Wildlife Area, is a large block of upland forest that is contiguous with similar forest on private property. No biotic inventory surveys were done on this property because it was not included within the original group of properties. Upon further review of the landscape, this site was noted as a possible location for forest interior birds. Blowdown occurred on this site and salvage operations were being conducted in the summer of 2009. It is highly recommended that breeding bird, natural community, and rare plant surveys be conducted. It is also recommended that future management of the pine plantations and open field within the site promote forest interior bird habitat. Management opportunities may exist to restore the site to a closed canopy forest supporting forest interior birds.

CCPG12. Rocky Run Oak Savanna and Wetlands –290 acres

This site (Figure 8) is on the Rocky Run Fishery Area and includes Rocky Run Oak Savanna SNA and a wetland mosaic of Southern Sedge Meadow and Shrub-carr with Calcareous Fen elements. The site consists of diverse habitats supporting rare plants and many uncommon herptile species. There is an impoundment that includes varying densities of cat-tail and reed canary grass with uplands consisting of dry forests of oak, pine plantations, and open fields that are sandy. The eastern unit of this site consists of disturbed Sand Prairie, old field, pine plantations, and oak forest.

This site is one of only a handful in the state, offering suitable and sizable habitat for the recovery of a critically imperiled herptile species. Management opportunities should include providing new recovery sites for these species by limiting encroachment of brush and controlling spotted knapweed, which is dense in many places and can limit habitat availability.

CCPG13. Mud Lake Woods – 43 acres

This site (Figure 8), within Mud Lake Wildlife Area, consists of two blocks of forest that are dominated by white oak with black cherry, shagbark hickory, red oak, and red maple as canopy associates. The white oaks create a tall, sprawling, and closed canopy with large spaces in the subcanopy layer ideal for fly-catching or sallying birds, including two threatened species. Invasive plant species include common buckthorn and garlic mustard.

Biotic inventory on this site was limited to breeding bird surveys. It is suggested that a natural community and rare plant survey be done prior to determining management status. This site provides an opportunity to protect two populations of state threatened species through management that promotes large trees with semi-open canopy and potentially expanding the amount of forest cover.

This site is part of the Northern Empire Prairie Wetlands IBA, an area important for the conservation and management of grassland and wetland birds (WDNR 2007).

CCPG14. Mud Lake Forest and Ponds – 130 acres

This site (Figure 8), within the Mud Lake Wildlife Area, contains a large block of mature Southern Dry-mesic Forest dominated by white oak 15-25 inch dbh with red oak and shagbark hickory as canopy associates. The white oaks create a tall, sprawling, and closed canopy with large spaces in the subcanopy layer ideal for fly-catching and aerial-sallying birds, including two threatened species. The shrub layer is sparse, with evidence of common buckthorn having been removed. The ground flora is dominated by pointed tick-trefoil and the invasive Japanese hedge parsley. Other species include lady fern, hog-peanut, wild-coffee (*Triosteum perfoliatum*), spreading Jacob's-ladder (*Polemonium reptans*), and garlic mustard. Within this forest is a series of ponds that appear to be hydrologically connected to Mud Lake. The ponds have receding shorelines, with very little wetland vegetation on the edge. Vegetation within the ponds includes duckweeds (*Lemna sp*) and white water-lily (*Nymphaea odorata*).

Management opportunities include managing for forest interior birds that require large blocks of forest in an otherwise agricultural and urban landscape. Opportunities are also present to continue the invasive species control of common buckthorn and expand it to include Japanese hedge-parsley and garlic mustard. Additional inventory needed includes surveying the ponds for herptiles.

This site is part of the Northern Empire Prairie Wetlands IBA, an area important for the conservation and management of grassland and wetland birds (WDNR 2007).

CCPG15. Grassy Lake SNA – 277 acres

Situated within rolling morainal topography, Grassy Lake is a Shallow, Hard-water Seepage Lake that supports dense stands of emergent aquatic vegetation throughout its basin. Soft-stem bulrush is the dominant species with wool-grass (*Scirpus cyperinus*), common bur-reed, narrow-leaved bur-reed (*Sparganium emersum*), water horsetail (*Equisetum fluviatile*), and water dock (*Rumex altissimus*). Submerged aquatics include coon's-tail, common waterweed (*Elodea canadensis*), whorled water milfoil (*Myriophyllum verticillatum*), white water crowfoot (*Ranunculus aquatilis*), common arrowhead (*Sagittaria latifolia*), and northern bladderwort (*Utricularia intermedia*). The wetlands and surrounding uplands provide good habitat for a number of birds including sandhill crane, wood duck, **blue-winged**

teal, mallard, coot, pied-billed grebe, marsh wren, and an endangered species. A special concern plant is also known from the site.

CCPG16. Lodi Marsh – 159 acres

This site (Figure 10) includes the Lodi Marsh SNA and adjacent Southern Sedge Meadow, Emergent Marsh, and Shrub-carr within Lodi Marsh Wildlife Area. This wetland that has been recognized as one of the best in the state for *Papaipema* moth species. *Papaipema* moths are generally regarded as indicators of high-quality prairie and wetland habitat. Fourteen species of *Papaipema* moths were identified during a 1994 survey. The site also includes important habitats for other coldwater insect species including caddisflies and special concern beetles. The property also includes a population of a threatened herptile species likely to utilize this site.

Management opportunities include the existing management prescriptions being used within the SNA boundary, such as prescribed burning, to maintain the high level of biodiversity present.

This site was recognized in Wisconsin Wildlife Action plan as being an area of high quality wetland communities of statewide significance (WDNR 2006b).

Figure 7
Primary Sites on French Creek Wildlife Area within the Columbia County Planning Group.

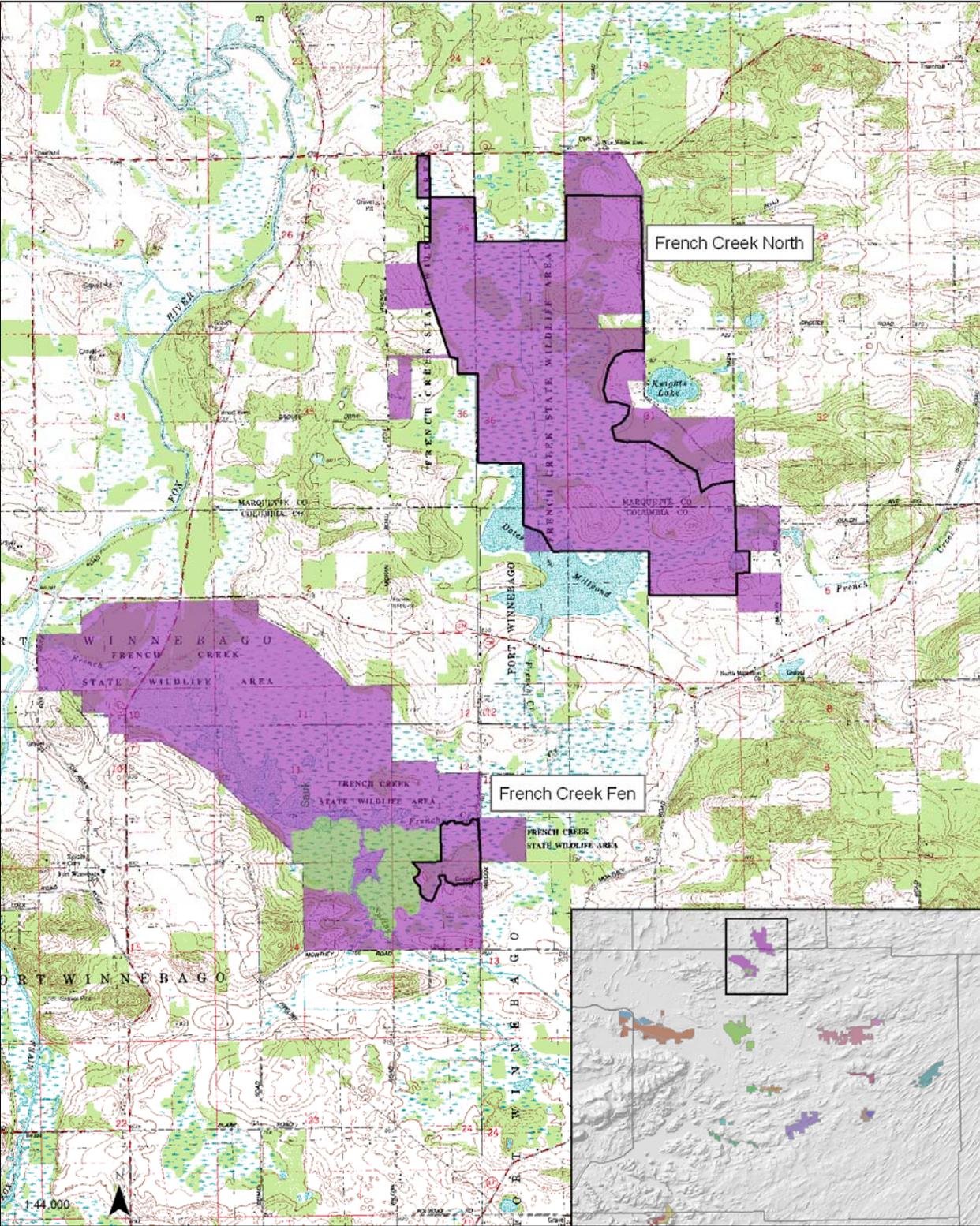


Figure 8
Primary Sites on Rocky Run Fishery Area and Mud Lake Wildlife Area within the Columbia County Planning Group.

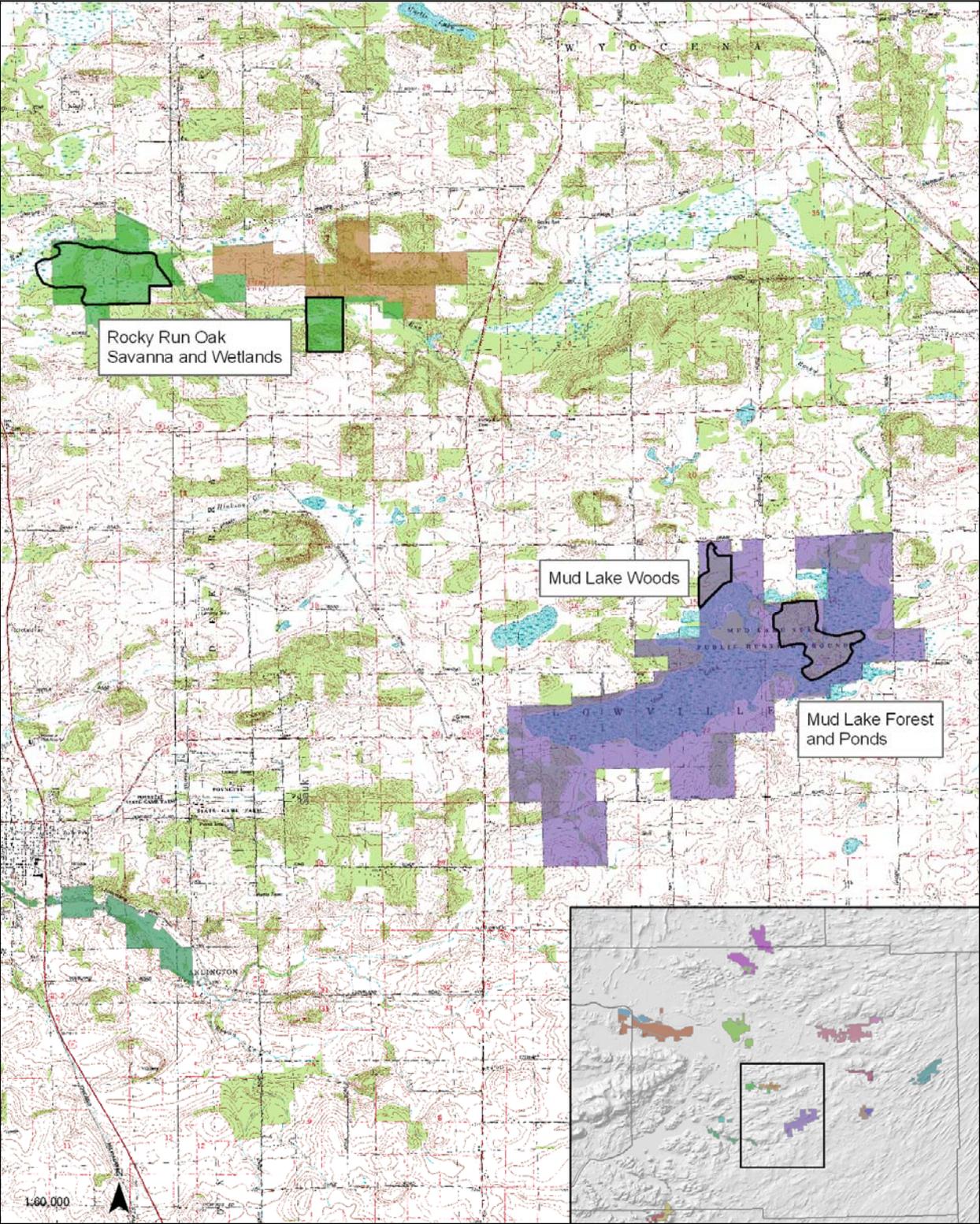


Figure 10
Primary Sites on Lodi Marsh Wildlife Area within the Columbia County Planning Group.

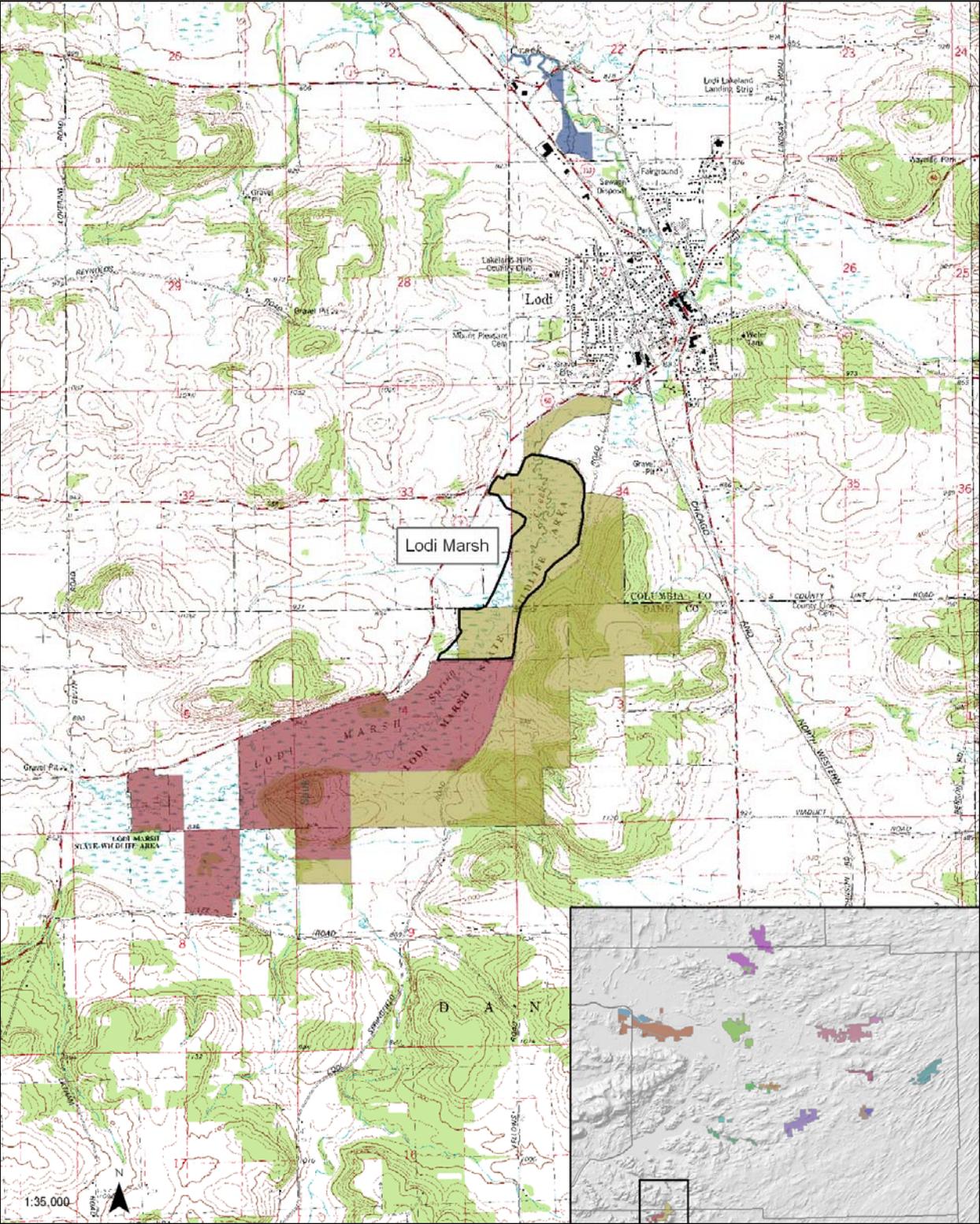


Figure 11
Primary Sites on Jennings Creek Fishery Area within the Columbia County Planning Group.

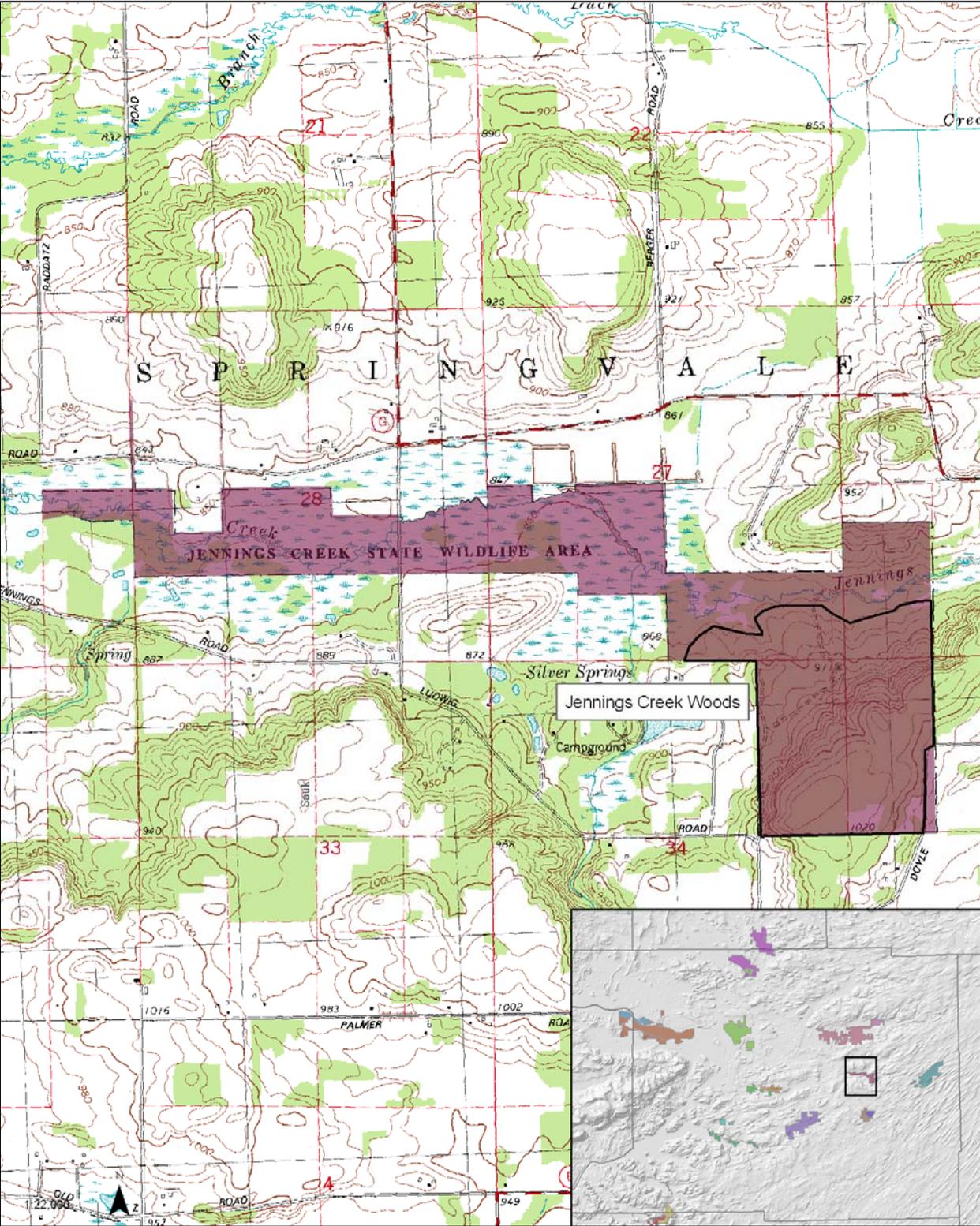
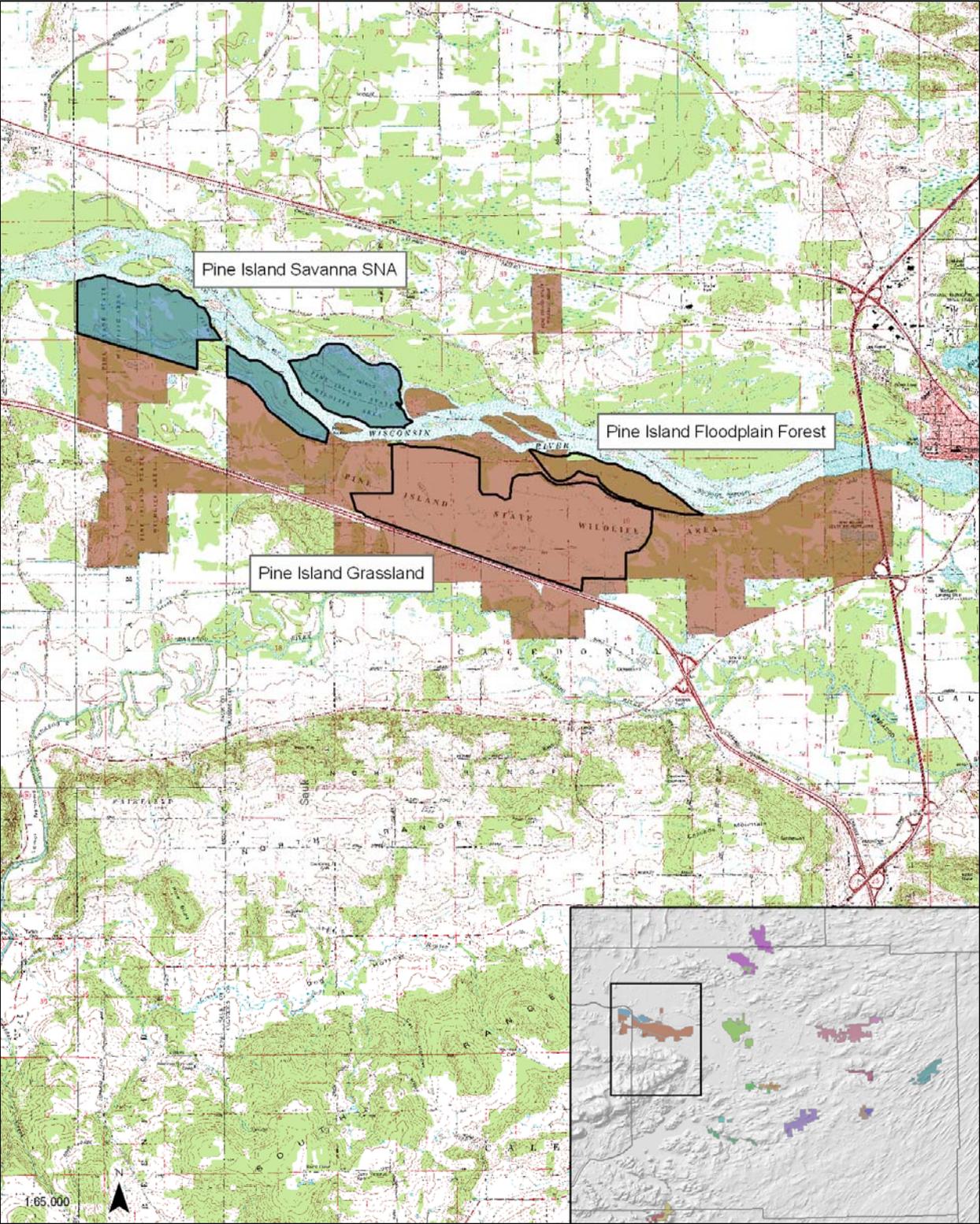


Figure 12
Primary Sites on Pine Island Wildlife Area within the Columbia County Planning Group.



Special Management Designations

State Natural Areas

State Natural Areas within the CCPG include: French Creek Fen SNA, Grassy Lake SNA, Lodi Marsh SNA, Pine Island Savanna SNA, Rocky Run Oak Savanna SNA, and Springvale Wet Meadow SNA. State Natural Areas are places on the landscape that protect high quality examples of natural communities, rare species populations, significant geological formations, and archeological sites.

Future Needs

This project was designed to provide a rapid assessment of the biodiversity values for the CCPG. Although the report should be considered adequate for master planning purposes, additional efforts could help to inform future adaptive management efforts, along with providing useful information regarding the natural communities and rare species contained in the CCPG.

- Invasives monitoring and control is essential to managing the biodiversity within the CCPG. Public lands throughout Wisconsin are facing major management problems because of serious infestations of highly invasive species. Some of these species are easily dispersed by humans and vehicles; others are spread by birds, mammals, insects, water, or wind.
- Establish permanent Breeding Bird Survey observation points designed to sample all major or otherwise significant habitats on the CCPG, and which can detect population trends over time.
- French Creek Wildlife Area is one of the few state-owned properties that have the potential to support a viable population of an endangered herptile species. Surveys should be done to determine if the species is present. Historical records of the endangered herptile on other properties within the CCPG should be reviewed to determine if the species is still extant.
- Surveys should be done for an endangered reptile at Pine Island Wildlife Area and Swan Lake Wildlife Area to determine if older records in the NHI database are still present. The federal guidance for ruling out the existence of a population suggests that if annual monitoring is done for 10 years following the 40 hours of survey effort per year, it may be reasonable to discontinue considering reptile from a management perspective.
- Breeding bird surveys are needed at several sites, including the grasslands at Mud Lake Wildlife Area, the open wetlands and tamarack swamp at Swan Lake Wildlife Area, the forested areas of Jennings Creek Fishery Area, and the French Creek Fen Primary Site.
- Aquatic macrophyte surveys are needed at Mud Lake Wildlife Area. Coarse level surveys suggest that there is a diverse Submergent Aquatic natural community present.
- Herptile surveys in the ponds within the Mud Lake Forest and Ponds Primary Site are needed.
- Additional rare plant and natural community surveys are needed at the Swan Lake Tamaracks Primary Site, French Creek Fen Primary Site, and Mud Lake Woods Primary Site.
- Mobile land-based acoustic bat surveys conducted at Pine Island Wildlife Area indicate that six of the eight bat species found in Wisconsin are located on the wildlife area during either the spring and fall movements or summer residency. It is still unknown to the extent the major river corridors in Wisconsin are used in both commuting and residents bats. More research is needed to fully explain the roles of wildlife areas along river corridors in bat conservation.
- Fall movement surveys at Mud Lake Wildlife Area indicate that bats are using the Emergent Aquatic natural community. There is limited research on the association of bats with this natural community and given that this water system highly fluctuates annually and seasonally, additional research is needed to make management recommendations. In addition, further acoustic bat surveys are needed

during all three bat movement periods as additional surveys may likely yield a different species complex.

- An endangered insect, previously documented at Lodi Marsh Wildlife Area, was not document during the 2009 surveys. Lodi Marsh Wildlife Area continues to support habitat for this species and future surveys are recommended.

Glossary

aerial-sallying – also known as “fly-catching.” A foraging technique used by birds to capture insects in flight, usually within a few meters of the take-off point.

Ecological Landscape - landscape units developed by the WDNR to provide an ecological framework to support natural resource management decisions. The boundaries of Wisconsin’s sixteen Ecological Landscapes correspond to ecoregional boundaries from the National Hierarchical Framework of Ecological Units, but sometimes combine subsections to produce a more manageable number of units.

element occurrence - an Element Occurrence (EO) is an area of land and/or water in which a rare species or natural community is, or was, present. An EO should have practical conservation value for the Element as evidenced by potential continued (or historic) presence and/or regular recurrence at a given location. For species, the EO often corresponds with the local population, but when appropriate may be a portion of a population (e.g., a single nest territory or long distance dispersers) or a group of nearby populations (e.g., metapopulation). For communities, the EO may represent a stand or patch of a natural community or a cluster of stands or patches of a natural community. Because they are defined on the basis of biological information, EOs may cross jurisdictional boundaries.

Forest Certification – a market-based, non-regulatory forest conservation tool designed to recognize and promote environmentally-responsible forestry and sustainability of forest resources. The certification process involves an evaluation of management planning and forestry practices by a third-party according to an agreed-upon set of standards (from <http://www.pinchot.org/project/59>). See <http://dnr.wi.gov/forestry/certification/> regarding certification of WDNR managed lands.

Landtype Association (LTA) - a level in the National Hierarchical Framework of Ecological Units (see next entry) representing an area of 10,000 – 300,000 acres. Similarities of landform, soil, and vegetation are the key factors in delineating LTAs.

macrophyte - A macroscopic plant, commonly used to describe aquatic plants, that is large enough to be visible to the naked eye.

natural community – an assemblage of plants and animals, in a particular place at a particular time, interacting with one another, the abiotic environment around them, and subject to primarily natural disturbance regimes. Those assemblages that are repeated across a landscape in an observable pattern constitute a community type. No two assemblages, however, are exactly alike.

representative - native plant species that would be expected to occur in native plant communities influenced primarily by natural disturbance regimes in a given landscape - e.g., see Curtis (1959).

SGCN (or “Species of Greatest Conservation Need”) – native wildlife species with low or declining populations that are most at risk of no longer being a viable part of Wisconsin’s fauna (from the “Wisconsin Wildlife Action Plan,” WDNR 2006b).

univoltine - referring to organisms having one brood per year.

Species List

The following is a list of species referred to by common name in the report text.

Common Name	Scientific Name
Animals	
Acadian Flycatcher	<i>Empidonax virescens</i>
American Bittern	<i>Botaurus lentiginosus</i>
American bullfrog	<i>Lithobates catesbeianus</i>
American Redstart	<i>Setophaga ruticilla</i>
Bell's Vireo	<i>Vireo bellii</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
Blanding's turtle	<i>Emydoidea blandingii</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Cerulean Warbler	<i>Dendroica cerulea</i>
common gartersnakes	<i>Thamnophis sirtalis</i>
Common Moorhen	<i>Gallinula chloropus</i>
Dickcissel	<i>Spiza americana</i>
Eastern hog-nosed snake	<i>Heterodon platirhinos</i>
Eastern massasauga	<i>Sistrurus catenatus catenatus</i>
Eastern Meadowlark	<i>Sturnella magna</i>
Eastern Wood-Pewee	<i>Contopus virens</i>
false map turtle	<i>Graptemys pseudogeographica</i>
Field Sparrow	<i>Spizella pusilla</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>
House Wren	<i>Troglodytes aedon</i>
Northern Bobwhite	<i>Colinus virginianus</i>
northern water snakes	<i>Nerodia sipedon</i>
ornate box turtle	<i>Terrapene ornata</i>
Ovenbird	<i>Seiurus aurocapillus</i>
pickerel frog	<i>Lithobates palustris</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Red-headed Woodpeckers	<i>Melanerpes erythrocephalus</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>
Regal Fritillaries	<i>Speyeria idalia</i>
slender glass lizard	<i>Ophisaurus attenuatus</i>
smooth softshell	<i>Apalone mutica</i>
snapping turtles	<i>Chelydra serpentina</i>
Plants	
American starflower	<i>Trientalis borealis</i>
basswood	<i>Tilia americana</i>
bastard-toadflax	<i>Comandra umbellata</i>
Bell's honeysuckle	<i>Lonicera X bella</i>

big blue-stem	<i>Andropogon gerardii</i>
bird's-foot violet	<i>Viola pedata</i>
black cherry	<i>Prunus serotina</i>
black locust	<i>Robinia pseudoacacia</i>
black oak	<i>Quercus velutina</i>
black-eyed Susan	<i>Rudbeckia hirta</i>
bloodroot	<i>Sanguinaria canadensis</i>
blue flag	<i>Iris virginica</i>
blue-eyed grass	<i>Sisyrinchium sp</i>
blue-joint grass	<i>Cxalamagrostis canadensis</i>
bog birch	<i>Betula pumila</i>
bouncing-bet	<i>Saponaria officinalis</i>
bracken fern	<i>Pteridium aquilinum</i>
brambles	<i>Rubus sp</i>
broad-leaf enchanter's- nightshade	<i>Circaea lutetiana</i>
bur oak	<i>Quercus macrocarpa</i>
Canada bluegrass	<i>Poa compressa</i>
Canada thistle	<i>Cirsium arvense</i>
Canadian wood-nettle	<i>Laportea canadensis</i>
Carolina puccoon	<i>Lithospermum caroliniense</i>
cat-tail	<i>Typha sp</i>
common arrowhead	<i>Sagittaria latifolia</i>
common bladderwort	<i>Utricularia vulgaris</i>
common buckthorn	<i>Rhamnus cathartica</i>
common burdock	<i>Arctium minus</i>
common bur-reed	<i>Sparganium eurycarpum</i>
common dewberry	<i>Rubus flagellaris</i>
common mountain mint	<i>Pycnanthemum virginicum</i>
common mullein	<i>Verbascum thapsus</i>
common reed grass	<i>Phragmites australis</i>
common spiderwort	<i>Tradescantia ohiensis</i>
common waterweed	<i>Elodea canadensis</i>
coon's-tail	<i>Ceratophyllum demersum</i>
cow vetch	<i>Vicia cracca</i>
crown vetch	<i>Coronilla varia</i>
curly pondweed	<i>Potamogeton crispus</i>
cut-leaved coneflower	<i>Rudbeckia laciniata</i>
cylindrical blazing-star	<i>Liatris cylindracea</i>
dogwood	<i>Cornus sp</i>
duckweeds	<i>Lemna sp</i>
dwarf dandelion	<i>Krigia biflora</i>
early low blueberry	<i>Vaccinium angustifolium</i>
edible valerian	<i>Valeriana edulis</i>
false indigo	<i>Amorpha fruticosa</i>
fen star sedge	<i>Carex sterilis</i>
frostweed	<i>Helianthemum sp</i>
garlic mustard	<i>Alliaria petiolata</i>
glossy buckthorn	<i>Rhamnus frangula</i>

Plants

grass-leaved goldenrod	<i>Euthamia graminifolia</i>
grass-of-parnassus	<i>Parnassia glauca</i>
green ash	<i>Fraxinus pennsylvanica</i>
hazelnut	<i>Corylus sp</i>
hoary puccoon	<i>Lithospermum canescens</i>
hog-peanut	<i>Amphicarpaea bracteata</i>
honeysuckle	<i>Lonicera sp</i>
Indian grass	<i>Sorghastrum nutans</i>
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>
Japanese hedge-parsley	<i>Torilis japonica</i>
June grass	<i>Bromus tectorum</i>
Kalm's brome	<i>Bromus kalmii</i>
Kentucky bluegrass	<i>Poa pratensis</i>
lady fern	<i>Athyrium filix-femina</i>
late goldenrod	<i>Solidago gigantea</i>
lead-plant	<i>Amorpha canescens</i>
leafy spurge	<i>Euphorbia esula var. esula</i>
little blue-stem	<i>Schizachyrium scoparium</i>
marsh bellflower	<i>Campanula aparinoides</i>
marsh fern	<i>Thelypteris palustris</i>
marsh pea	<i>Lathyrus palustris</i>
Missouri goldenrod	<i>Solidago missouriensis</i>
moneywort	<i>Lysimachia nummularia</i>
moonseed	<i>Menispermum canadense</i>
narrow-leaved bur-reed	<i>Sparganium emersum</i>
narrow-leaved cat-tail	<i>Typha angustifolia</i>
New England aster	<i>Aster novae-angliae</i>
northern bladderwort	<i>Utricularia intermedia</i>
Pennsylvania sedge	<i>Carex pennsylvanica</i>
pickerel-weed	<i>Pontederia cordata</i>
pointed tick-trefoil	<i>Desmodium glutinosum</i>
poison sumac	<i>Toxicodendron vernix</i>
pondweeds	<i>Potamogeton sp</i>
prairie alumroot	<i>Heuchera richardsonii</i>
prairie blazing-star	<i>Liatris pycnostachya</i>
prairie cordgrass	<i>Spartina pectinata</i>
prairie coreopsis	<i>Coreopsis palmata</i>
prairie drop-seed	<i>Sporobolus heterolepis</i>
prairie milkweed	<i>Asclepias birtella</i>
prairie phlox	<i>Phlox pilosa</i>
prickly ash	<i>Zanthoxylum americanum</i>
purple loosestrife	<i>Lythrum salicaria</i>
red baneberry	<i>Actaea rubra</i>
red maple	<i>Acer rubrum</i>
red oak	<i>Quercus rubra</i>
red osier dogwood	<i>Cornus stolonifera</i>
red pine	<i>Pinus resinosa</i>
reed canary grass	<i>Phalaris arundinacea</i>
river birch	<i>Betula nigra</i>

Plants

rosinweed	<i>Silphium</i> sp.
round-headed bush-clover	<i>Lespedeza capitata</i>
sage-leaved willow	<i>Salix candida</i>
saw-tooth sunflower	<i>Helianthus grosseserratus</i>
shagbark hickory	<i>Carya ovata</i>
sharp-lobed hepatica	<i>Anemone acutiloba</i>
shrubby cinquefoil	<i>Pentaphylloides floribunda</i>
side-oats grama	<i>Bouteloua curtipendula</i>
silky aster	<i>Aster sericeus</i>
silver maple	<i>Acer saccharinum</i>
smooth brome	<i>Bromus erectus</i>
soft-stem bulrush	<i>Schoenoplectus tabernaemontani</i>
speckled alder	<i>Alnus incana</i>
spotted Joe-Pye-weed	<i>Eupatorium maculatum</i>
spotted knapweed	<i>Centaurea biebersteinii</i>
spreading Jacob's-ladder	<i>Polemonium reptans</i>
stinging nettle	<i>Urtica dioica</i>
sugar maple	<i>Acer saccharum</i>
swamp lousewort	<i>Pedicularis lanceolata</i>
swamp milkweed	<i>Asclepias incarnata</i>
swamp thistle	<i>Cirsium muticum</i>
swamp white oak	<i>Quercus bicolor</i>
tamarack	<i>Larix laricina</i>
Tatarian honeysuckle	<i>Lonicera tatarica</i>
turtlehead	<i>Chelone glabra</i>
tussock sedge	<i>Carex stricta</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
water-marigold	<i>Megalodonta beckii</i>
water-milfoil	<i>Myriophyllum</i> sp
water-shield	<i>Brasenia schreberi</i>
water dock	<i>Rumex altissimus</i>
water horsetail	<i>Equisetum fluviatile</i>
white oak	<i>Quercus alba</i>
white pine	<i>Pinus strobus</i>
white water-lily	<i>Nymphaea odorata</i>
white water crowfoot	<i>Ranunculus aquatilis</i>
white wild indigo	<i>Baptisia alba</i>
whorled milkweed	<i>Asclepias verticillata</i>
whorled water milfoil	<i>Myriophyllum verticillatum</i>
wild bergamot	<i>Monarda fistulosa</i>
wild columbine	<i>Aquilegia canadensis</i>
wild leek	<i>Allium tricoccum</i>
wild parsnip	<i>Pastinaca sativa</i>
wild rice	<i>Zizania</i> sp
wild-coffee	<i>Triosteum perfoliatum</i>
willow	<i>Salix</i> sp
wood-betony	<i>Pedicularis canadensis</i>
wool-grass	<i>Scirpus cyperinus</i>

Reference List

- Bennett, James. *Epiphloea byssina* found in Wisconsin. 2009. Unpublished report.
- Curtis, J. T. 1959. *The Vegetation of Wisconsin*. University of Wisconsin Press, Madison, WI. 657 pp.
- Finley, R.W. 1976. *Original Vegetation Cover of Wisconsin*. Map compiled from General Land Office.
- Forest Stewardship Council. 2009. *Draft 7 FSC-US Forest Management Standard*. Minneapolis, MN.
- Grveles, K., S.W. Matteson, and S. Eichhorst. In review. *Protecting bird migration stopover habitat in the western Great Lakes: A conservation plan for Wisconsin*. Wisconsin Department of Natural Resources.
- Herkert, J.R. 1995. *An Analysis of Midwestern Breeding Bird Population Trends: 1966-1993*. *American Midland Naturalist* 134:41-50.
- Lorch, Jeff. *Herpetile Assessment for three sites in Columbia County (French Creek, Peter Hellend, and Swan Lake State Wildlife Areas)*. 2009. Unpublished report.
- Merritt, R. W., Cummins, K. W., and M. B. Berg. 2008. *An Introduction to the Aquatic Invertebrates of North America*, 4th ed. Kendall-Hunt Publishing Company, Dubuque, IA.
- Mossman, M.J., Y. Steele, and S. Swenson. 2009. *A Strategic Vision for Bird Conservation on the Leopold-Pine Island Important Bird Area*. Unpublished report. Aldo Leopold Foundation, Baraboo, WI.
- Robbins, S.D., D.W. Sample, P.W. Rasmussen, and M.J. Mossman. 1996. *The Breeding Bird Survey in Wisconsin: 1966-1991*. *Passenger Pigeon* 59:81-179
- Sample, David W., and Michael J. Mossman. 1997. *Managing habitat for grassland birds - a guide for Wisconsin*. Wisconsin Department of Natural Resources, Madison, WI, PUBL-SS-925-97. 154 pp. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/birds/wiscbird/index.htm> (Version 03JUN2002).
- Wisconsin Department of Natural Resources. In Prep. a. *DRAFT Ecological Landscapes of Wisconsin*. State of Wisconsin, Dept. of Nat. Resources, Handbook. 1805.1. Madison, WI.
- Wisconsin Department of Natural Resources. 2002. *The Fox River Headwaters Ecosystem: An Ecological Assessment for Conservation Planning*. Madison, WI.
- Wisconsin Department of Natural Resources. 2006a. *Wisconsin Land Legacy Report: an inventory of places critical in meeting Wisconsin's future conservation and recreation needs*. Madison, WI.
- Wisconsin Department of Natural Resources. 2006b. *Wisconsin Wildlife Action Plan*. Available at <http://dnr.wi.gov/org/land/er/wwap/plan/>.
- Wisconsin Department of Natural Resources. 2007. *Important Bird Areas of Wisconsin: Critical Sites for the Conservation and Management of Wisconsin's Birds*. Madison, WI.

Wisconsin Department of Natural Resources. 2009. DNR Land Certification. Available at:
<http://dnr.wi.gov/forestry/certification/dnrland.html>

Wisconsin Natural Heritage Inventory Working List. 2009. Wisconsin Natural Heritage Inventory Program, Bureau of Endangered Resources, Wisconsin DNR. Madison, WI. (See dnr.wi.gov/org/land/er/wlist for the most recent version of the list.)