



## **Rapid Ecological Assessment for Copper Falls State Park, Ashland County, WI**

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**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 Property Master Plan**

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**Wisconsin's Natural Heritage Inventory Program**

Bureau of Endangered Resources  
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**Primary Authors:** Christina Isenring and Rich Staffen

## Contributors

- Craig Anderson – botany, reviewing
- Julie Bleser – data management
- Ryan Brady – birds
- Brian Collins – birds
- Eric Epstein – community ecology, botany, birds, reviewing
- Kim Grveles – reviewing
- Chuck Heikkinen – birds
- Terrell Hyde – zoology data processing
- Christina Isenring – community ecology, data processing, inventory coordination
- Janeen Laatsch – botany data processing
- Ryan Magana – reviewing
- William A. Smith – zoology
- Rich Staffen – zoology data processing

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## Purpose and Objectives

This report is intended to be used in conjunction with other sources of information for developing a new master plan for Copper Falls State Park (CFSP). This assessment addresses issues specifically related to the conservation of biological diversity for this property.

The primary objectives of this project were to collect biological inventory information relevant to the development of a master plan for CFSP 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 CFSP 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 it is a scaled-down version in terms of both the time and effort expended when compared to similar projects conducted on much larger properties, such as State Forests. The information collected was the result of partial seasons of survey work during 2007 and 2008. There will undoubtedly be gaps in our knowledge of the biota of this property, especially for certain taxa groups; these groups have been identified by the DNR or others as representing either an opportunity or a need for future work.

## Methods

The Wisconsin Natural Heritage Inventory (NHI) program resides in the Wisconsin DNR’s Bureau of Endangered Resources and is part of an international network of NHI programs. The defining and unifying characteristic of this network is the use of a standard methodology for collecting, processing, and managing data on the occurrences of natural biological diversity. This network of data centers is currently coordinated by NatureServe, an international non-profit organization.

Natural Heritage Inventory programs focus on rare plant and animal species, natural communities, and other natural features, referred to as *elements* of biodiversity. Elements tracked by the Wisconsin NHI Program are listed on the Wisconsin NHI Working List. The Working List is the list of Endangered, Threatened, and Special Concern plants, animals, and all natural communities maintained by the Wisconsin DNR. This list changes over time as the populations of species change (both up and down) and as knowledge about species and natural community status and distribution increases. The most recent Working List for the State of Wisconsin is available through the WDNR Endangered Resources Program ([www.dnr.state.wi.us/org/land/er/wlist/](http://www.dnr.state.wi.us/org/land/er/wlist/)).

The Wisconsin NHI program uses a standard approach for biotic inventory work that supports master planning (Appendix A) that approach involves data collection and development, data analysis & interpretation, and information promulgation. Details of standardized NHI methodology can be found on the NatureServe Web site: [www.natureserve.org](http://www.natureserve.org).

Data for this report were compiled using existing NHI data as well as limited surveys conducted during the 2007 and 2008 field seasons.

## General Background Information

Copper Falls State Park is located two miles northeast of the town of Mellen in north central Ashland County. The park comprises ca. 3,342 acres and surrounds the Bad River. The Bad River, beginning at Caroline Lake, flows through CFSP where it drops 29 feet over basaltic lava into a steep gorge. The river then joins with the Tyler Forks branch of the Bad River to flow over basaltic lava in a series of falls and rapids totaling 70 feet (Schultz 1986).

### **Previous efforts**

Past surveys and inventory efforts have highlighted the ecological importance of CFSP and the Bad River 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 Bad River was assigned a score of four points on their five-point scale for conservation significance, meaning it possesses "excellent ecological qualities, is of adequate size to meet the needs of most of the critical components, and/or harbors natural communities or species of continental or Great Lakes regional significance." This category implies that restoration efforts would have a high likelihood of long-term success.

Copper Falls State Park and the Bad River were recognized by the Wisconsin Wildlife Action Plan (WDNR 2006b) as being within the globally significant Bad River Conservation Opportunity Area. 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 (WDNR 2006b).

The Nature Conservancy's *Superior Mixed Forest Ecoregion Plan* (2002) covers an area that encompasses much of northern Wisconsin, northern Minnesota, a small portion of Michigan's Upper Peninsula, and parts of southern Manitoba and southern Ontario. The plan resulted in a portfolio of terrestrial and aquatic "Conservation Areas" that represent viable natural community types, globally rare native species, and other selected features. Copper Falls State Park comprises a portion of the Chequamegon Bay Watershed Conservation Area, a 1,494,341 acre site that includes federal, state, tribal, industrial, local, and private ownerships. In addition, the Bad River is located within the Bad/White River and Kakagon Sloughs Aquatic Conservation Area.

The Bad River was designated an Exceptional Resource Water (ERW) (WDNR 2006c) by the Wisconsin DNR. Waters designated as an ERW are surface waters that provide outstanding recreational opportunities, support valuable fisheries, have unique hydrologic or geologic features, have unique environmental settings, and are not significantly impacted by human activities (2006c).

### **Special Designations**

Copper Falls State Natural Area, located within CFSP, was designated in 2003 and comprises 665 acres. The State Natural Area features a mature Northern Dry-mesic forest along the shores of the Bad River and on low terraces of the river. Along the steep west shore is a Northern Mesic Forest of sugar maple and hemlock.

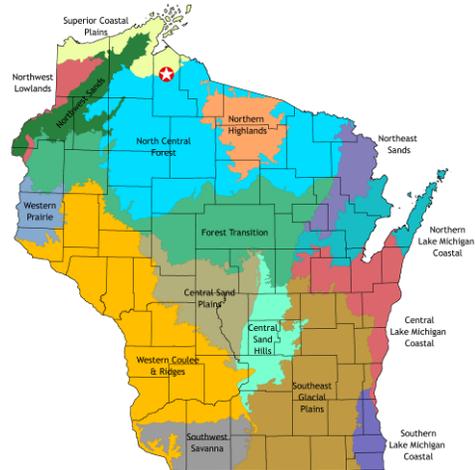
In addition to Copper Falls State Natural Area, 15 other State Natural Areas (SNAs) occur within Ashland County. The U.S. Forest Service owns 11 of the SNAs, The National Park Service owns two of the SNAs, and the WDNR jointly owns one SNA with the Nature Conservancy and one other SNA.

Other public lands in Ashland County include White River Wildlife Area, Devil's Creek Fishery Area, Hay Creek – Hoffman Lake Wildlife Area, the Flambeau River State Forest, Ashland County Forest, and the Chequamegon – Nicolet National Forest.

Directly to the north of CFSP is the Bad River Indian Reservation. The Bad River Indian Reservation comprises over 125,000 acres of forests, rivers, and lakes. The land is managed for the harvesting of fish and game species, timber, wild plants, and other non-timber forest products.

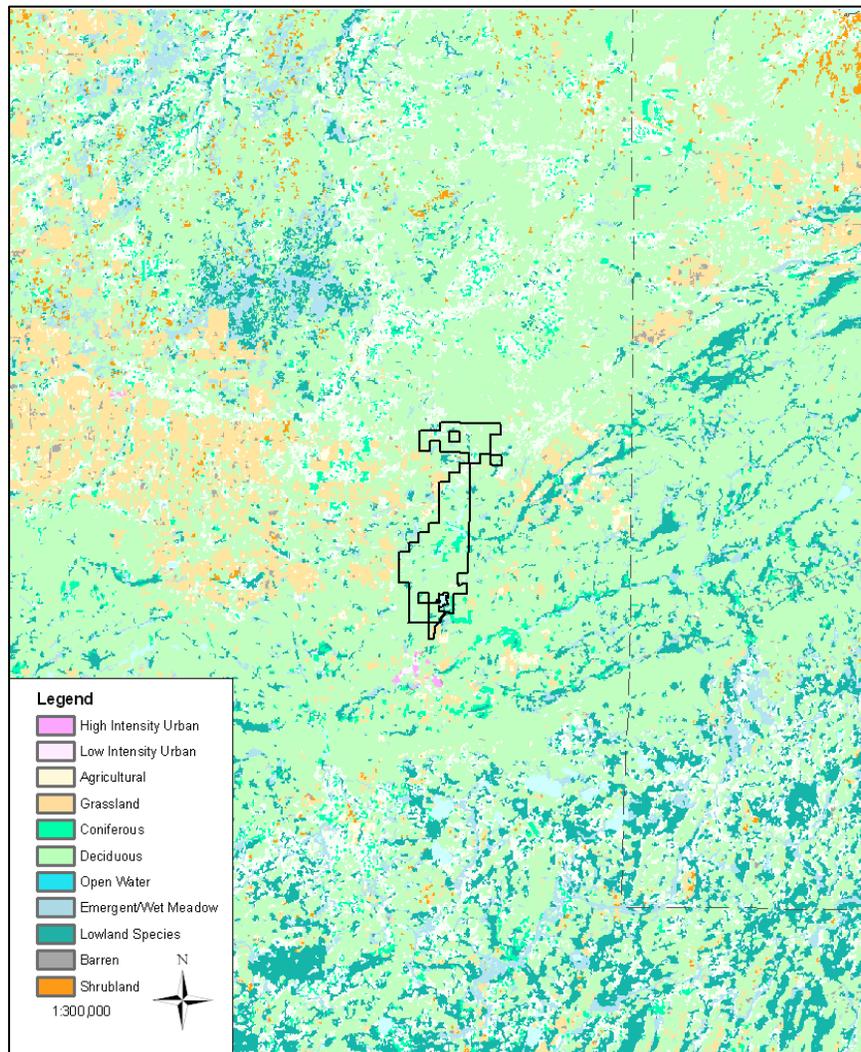
## Ecological Context

Copper Falls State Park is located on the Bad River Fault (Schultz 1986), the boundary between the Superior Coastal Plain and the North Central Forest Ecological Landscapes (Figure 1) (WDNR 2005). The land to the north, within the Superior Coastal Plain Ecological Landscape, is characterized by old fields, outside of the Bad River Indian Reservation, and second growth aspen and birch dominated forests within the Reservation. To the south, within the North Central Forest Ecological Landscape, the landscape is dominated by second-growth northern hardwood forests and forested and non-forested wetlands (Figure 2).



**Figure 1**  
Ecological Landscapes of Wisconsin. The red star shows the approximate location of Copper Falls State Park.

**Figure 2**  
Landscape for Copper Falls State Park from the Wisconsin DNR WISCLAND GIS coverage (WDNR 1993)



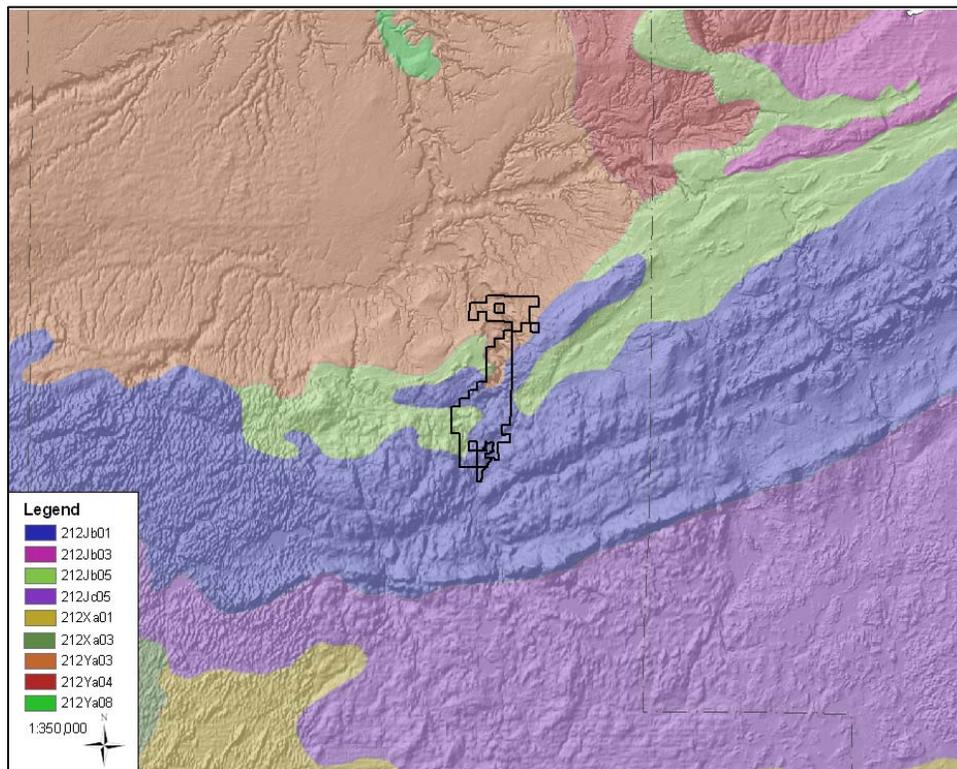
Copper Falls State Park encompasses parts of three Landtype Associations (LTA) (WDNR 2005). Figure 3 shows the distribution of LTAs on CFSP.

Located within the Superior Coastal Plain Ecological Landscape:

- 212Jb01 (Penokee/Gogebic Iron Range). The characteristic landform pattern is hilly bedrock-controlled moraine. Soils are predominantly well drained sandy loam over acid sandy loam till or igneous/metamorphic bedrock.

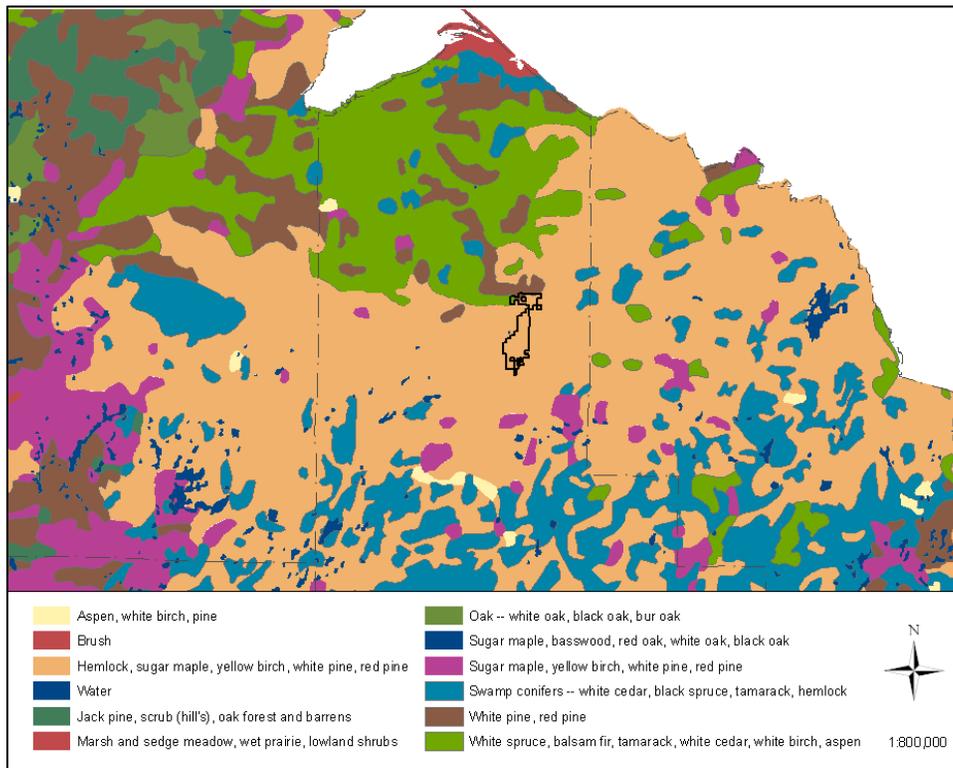
Located within the North Central Forest Ecological Landscape:

- 212Ya03 (Ashland Lake-Modified Till Plain). The characteristic landform pattern is undulating modified lacustrine moraine with deep v-shaped ravines. Soils are predominantly somewhat poorly drained clay over calcareous clay till or loamy lacustrine.
- 212Jb05 (Gurney/Ontonagon Spillway). The characteristic landform pattern is undulating outwash and lake plain with old beaches and dunes common. Soils are predominantly excessively drained loamy sand over outwash or loamy lacustrine.



**Figure 3**  
Landtype Associations for the area comprising Copper Falls State Park.

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 CFSP were conducted between 1861 and 1865. Finley's (1976) Original Vegetation Map described the area that now comprises CFSP as dominated by Northern Mesic Forest (hemlock, sugar maple, yellow birch, and red and white pine) (Figure 4). The northern part of CFSP begins a transition to Boreal Forest dominated by white spruce, balsam fir, tamarack, white cedar, white birch, and aspen and Northern Dry-mesic Forest dominated by red and white pines.



**Figure 4**  
Pre-European Settlement Vegetation for Copper Falls State Park. Data are from Finley (1976).

The Wisconsin Wildlife Action Plan (WDNR 2006b) and the Ecological Landscapes of Wisconsin Handbook (WDNR 2005) 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. There are 25 natural communities for which there are “Major” or “Important” opportunities in the North Central Forest Ecological Landscape; of these, the following eight natural communities are present on the CFSP:

- Boreal Forest\*
- Ephemeral Pond
- Northern Dry-mesic Forest
- Northern Hardwood Swamp\*
- Northern Mesic Forest
- Northern Sedge Meadow\*
- Northern Wet Forest\*
- Warmwater river\*

There are 30 natural communities for which there are “Major” or “Important” opportunities in the Superior Coastal Plain Ecological Landscape; of these, the following seven natural communities are present on the CFSP:

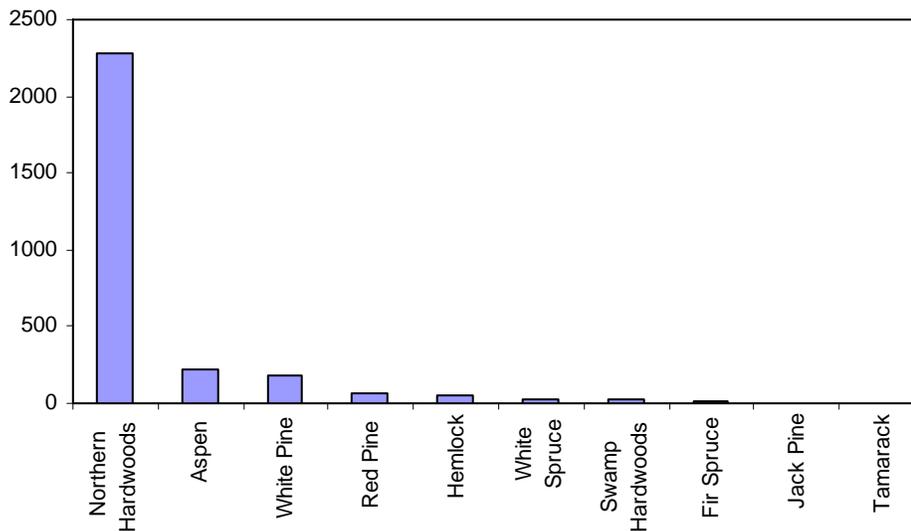
- Boreal Forest\*
- Ephemeral Pond
- Northern Dry-mesic Forest
- Northern Hardwood Swamp\*
- Northern Mesic Forest
- Northern Sedge Meadow\*
- Warmwater river\*

\*Natural communities for which element occurrences will not be mapped into the NHI Database due to not meeting standard mapping methodology (too small, too degraded, etc), but for which habitat on the property exists.

## Current Vegetation

The current vegetation for CFSP is diverse and highly dependent on topography. Along the Bad River's course it travels through steep clay banks and sand bluffs that support Boreal Forest, Northern Dry-mesic Forest, hemlock-white cedar forest, and spring seeps. A series of low terraces between the sharp meanders of the river have unique stands of lowland mesic forest dominated by sugar maple and basswood over a dense layer of ostrich fern as well as Northern Dry-mesic Forests of white and red pine with sugar maple, red maple, and big-tooth aspen as canopy associates. Northern Mesic Forests (northern hardwoods), varying in size and age class, are dominated by sugar maple, basswood, and white ash, with hemlock and yellow birch as canopy associates and characterize the majority of the upland habitat away from the Bad River corridor. Figure 5 highlights the dominance of the northern hardwood cover type at CFSP.

Ephemeral Ponds are scattered in depressions within the mesic forests. Other wetlands include areas dominated by sedge meadow vegetation, some with standing dead white cedar and black ash; forested wetlands dominated by black ash with white cedar, yellow birch, and hemlock as canopy associates, and Poor Fens dominated by leather-leaf and few-seeded sedge. South of Loon Lake is a unique wetland for the park, a small peatland with a closed-canopy Black Spruce Swamp dominated by black spruce and tamarack and an open Poor Fen characterized by few-seeded sedge over sphagnum moss. Murphy Lake, a small drainage lake has a receding shoreline with sedges and blue-joint grass.



**Figure 5**

Forested cover types for Copper Falls State Park. Data are from the Division of Forestry WISCFIRS (Wisconsin Forest Inventory & Reporting System) "Property Cover Type Acreage" report, downloaded August 27, 2008. Data are for acres of forest cover type within the property.

# Management Considerations and Opportunities for Biodiversity Conservation for Copper Falls State Park

## **Breeding Bird Diversity**

An impressive assemblage of rare breeding birds (11 NHI working list and SGCN species) is present throughout Copper Falls State Park where the intact, contiguous, mature northern hardwood and mixed coniferous/hardwood forest in the park and surrounding landscape provides excellent habitat for many uncommon area-sensitive species (Collins 2008). Limiting fragmentation associated with, but not limited to, clear-cutting, road building, or utility and pipeline development is important to the continued viability of these large blocks of forest and their associated bird species (WDNR 2006b). Maintaining vertical structural diversity within intact forest stands is important for conservative species that require a dense shrub layer for nesting (WDNR 2006b). Deer browse could pose a potential issue for these bird species if it results in the loss of a suitable shrub component (WDNR 2006b). Protecting the diversity of natural community types on the property is also vital to the preservation of its rich birdlife (64 species from breeding bird surveys). In addition, preserving the mature, closed canopy mixed forests with vernal pools and wetlands are very important to forest raptors.

## **Ephemeral Ponds**

Ephemeral Ponds are an important component of the biodiversity of CFSP. The North Central Forest Ecological Landscape is Wisconsin's most important Landscape for Ephemeral Ponds, which are key breeding areas for invertebrates and amphibians, support foraging birds and mammals, and may provide habitat for unusual assemblages of vascular and non-vascular plants (WDNR 2005). Ephemeral Ponds can remain as high quality habitat for numerous species if they remain embedded within forested habitats and if efforts are made to minimize or prevent negative impacts to hydrology by limiting road, ditch, or dike construction. The timing of management activities around ephemeral ponds can be critical. Ephemeral ponds can be difficult to identify in winter when tree marking often occurs, so additional provisions made to protect these areas during harvest activities can be important.

## **Forested Connections**

Connecting large forested blocks to one another and to forests in other Ecological Landscapes is an important management opportunity for forests in the North Central Forest Ecological Landscape (WDNR 2005). Copper Falls State Park provides an important forested connection between the upland bedrock-influenced forests of the Penokee Range and clay-influenced forests and wetlands of the Superior Coastal Plain Ecological Landscape including the Bad River Reservation. The property also provides opportunities for old-growth management adjacent to the Bad River and embedded within a surrounding matrix of younger age-class forest. This diversity of forest types and age classes will provide habitat for a broad range of both plant and animal species.

## **Bad River Corridor**

The Bad River is the longest and the main drainage stream for Ashland County (Sather and Threinen 1966). The river originates in Caroline Lake in the North Central Forest Ecological Landscape, and then flows north into Lake Superior through the Superior Coastal Plain Ecological Landscape. Within CFSP, the Bad River travels through steep clay banks and sand bluffs that support Boreal Forest, Northern Dry-mesic Forest, hemlock-white cedar forest, and spring seeps. A series of low terraces between the sharp meanders of the river have unique stands of mesic forest dominated by sugar maple and basswood over a dense layer of ostrich fern. The forested corridor of the river may also provide an important north-south corridor for migrating birds.

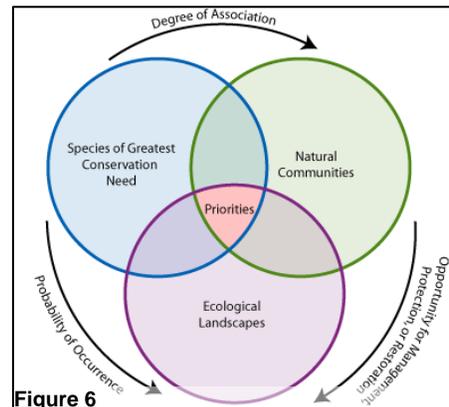
## Wisconsin Wildlife Action Plan

All of the vertebrate SGCN known from CFSP along with the natural communities they inhabit represent Ecological Priorities for both the North Central Forest and the Superior Coastal Plain Ecological Landscape Ecological Landscape (WDNR 2006b). Appendix B contains a matrix with the vertebrate SGCN and associated natural communities for the landscapes. Note that these Ecological Priorities include all of the natural communities that we have determined to provide the best opportunities for management on CFSP from an ecological / biodiversity perspective.

Several Ecological Priorities from the Wisconsin Wildlife Action Plan (WDNR 2006b) are present on CFSP. 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](http://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.

## Invasive Plants

Invasive plants don't appear to be well-established within CFSP, although many are present and adjacent properties are known to contain infestations as well. A program of inventory and control should be employed annually to detect and eradicate new populations in likely areas of establishment, such as high-use recreation areas and the Bad River corridor. Invasive plants currently known from the park include: garlic mustard, Japanese barberry, Tatarian honeysuckle, common buckthorn, crown vetch, bird's-foot trefoil, bouncing bet, spotted knapweed, common tansy, white sweet-clover, Deptford pink, European bellflower, and common burdock.



**Figure 6**  
Graphic illustrating the process used for identifying Ecological Priorities in the Wisconsin Wildlife Action Plan.

## Site-specific Opportunities for Biodiversity Conservation

Two 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 CFSP. These sites warrant high protection and/or restoration consideration during the development of the new property master plan. This report is meant to be considered along with other information when identifying opportunities for various management designations during the master planning process.

## Future Needs

This project was designed to provide a rapid assessment of the biodiversity values for CFSP. 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 CFSP.

- Continued invasives monitoring and control will be critical for CFSP. State parks and many other public lands throughout Wisconsin are facing major management problems because of serious infestations of highly invasive species such as garlic mustard, Eurasian buckthorns, and Eurasian honeysuckles. Some of these species are easily dispersed by humans and vehicles; others are spread by birds, mammals, insects, water, or wind.
- More survey work needs to be done on the mesic floodplain terraces that occur on the Bad River. This type is rare in Wisconsin and appears to be restricted to rivers that drain into Lake Superior.
- Monitoring of Black-throated Blue Warblers is needed because of this species limited range in Wisconsin and sensitivity to forest management practices.
- Monitoring of the gray wolf den site should be done in April as breeding adults are known to move den locations over time. The den site should be field checked to verify activity within 2 years of last known activity and results should be reported to the wolf biologist & Natural Heritage Inventory.

## Glossary

**Area Sensitive** – species that respond negatively to decreasing habitat patch size. Area-sensitive species exhibit an increase in either population density or probability of occurrence with increasing size of a habitat patch.

**Conservative species** – A subset of species that can be shown to be largely restricted, in distribution, to intact natural community remnants. These species serve to distinguish intact natural areas from developed landscapes, and comprise a large portion of the imperiled biodiversity.

**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 (modified from <http://whiteoak.natureserve.org/eodraft/index.htm>)

**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.

**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.

**natural community occurrence** - a place on the landscape that supports an example of a natural community that has been surveyed and evaluated by ecologists using standard NHI methodology and meets minimum criteria for condition, context, and size.

**“rare” natural community** - in this context the modifier can refer either to the relative scarcity of the community type itself, to the scarcity of a particular developmental stage, or to a specific attribute of the community occurrence.

**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** – species that have one brood per year.

## Species List

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

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### Plants

American starflower	<i>Trientalis borealis</i>
aspen	<i>Populus</i> sp
balsam fir	<i>Abies balsamea</i>
basswood	<i>Tilia americana</i>
big-tooth aspen	<i>Populus grandidentata</i>
bird's-foot trefoil	<i>Lotus corniculata</i>
black ash	<i>Fraxinus nigra</i>
black spruce	<i>Picea mariana</i>
blue-joint grass	<i>Calamagrostis canadensis</i>
bouncing bet	<i>Saponaria officinalis</i>
broad-leaved toothwort	<i>Cardamine diphylla</i>
bunchberry	<i>Cornus canadensis</i>
Canada yew	<i>Taxus canadensis</i>
cinnamon fern	<i>Osmunda cinnamomea</i>
common buckthorn	<i>Rhamnus cathartica</i>
common burdock	<i>Arctium minus</i>
common tansy	<i>Tanacetum vulgare</i>
crown vetch	<i>Coronilla varia</i>
Deptford pink	<i>Dianthus armeria</i>
Dutchman's breeches	<i>Dicentra cucullaria</i>
European bellflower	<i>Campanula rapunculoides</i>
few-seeded sedge	<i>Carex oligosperma</i>
garlic mustard	<i>Alliaria petiolata</i>
hairy Solomon's-seal	<i>Polygonatum pubescens</i>
hemlock	<i>Tsuga canadensis</i>
intermediate wood fern	<i>Dryopteris intermedia</i>
Japanese barberry	<i>Berberis thunbergii</i>
lady fern	<i>Athyrium filix-femina</i>
large-leaved aster	<i>Aster macrophyllus</i>
leather-leaf	<i>Chamaedaphne calyculata</i>
ostrich fern	<i>Matteuccia struthiopteris</i>
red pine	<i>Pinus resinosa</i>
sedges	<i>Carex</i> sp
shining club-moss	<i>Huperzia lucidula</i>
spotted knapweed	<i>Centaurea biebersteinii</i>
sugar maple	<i>Acer saccharum</i>
tamarack	<i>Larix laricina</i>
Tatarian honeysuckle	<i>Lonicera tatarica</i>
three-leaved gold-thread	<i>Coptis trifolia</i>
Torrey's bulrush	<i>Scirpus torreyi</i>
trembling aspen	<i>Populus tremuloides</i>
white ash	<i>Fraxinus americana</i>
white birch	<i>Betula papyrifera</i>
white cedar	<i>Thuja occidentalis</i>
white pine	<i>Pinus strobus</i>
white spruce	<i>Picea glauca</i>

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white sweet-clover	Melilotus alba
white trout-lily	Erythronium albidum
wild leek	Allium tricoccum
yellow birch	Betula alleghaniensis
yellow trout-lily	Erythronium americanum

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