



Rapid Ecological Assessment for the Lower Black and Trempealeau Rivers Planning Group

A Rapid Ecological Assessment Focusing on Rare Plants, Selected Rare Animals, and High-quality Natural Communities

Properties included in this report are:

Jackson County	LaCrosse County	Trempealeau County
Black River Savanna State Natural Area	Van Loon Bottoms State Natural Area	Borst Valley Sedge Meadow State Natural Area
North Bend Wildlife Area	Van Loon Floodplain Savanna State Natural Area	Borst Valley Wildlife Area
North Bend Wet Prairie State Natural Area	Van Loon Wildlife Area	Chimney Rock Oak Savanna State Natural Area
South Beaver Creek Wildlife Area		Chimney Rock Wildlife Area
		Hawkinson Creek Wet Prairie State Natural Area
		Lakes Coulee Wildlife Area
		Tamarack Creek Bog State Natural Area
		Tamarack Creek Wildlife Area

Wisconsin's Natural Heritage Inventory Program
 Bureau of Natural Heritage Conservation
 Department of Natural Resources
 P.O. Box 7921, Madison, WI 53707
 March 2016 PUB-NH-855 2016



Acknowledgments

We extend special thanks to Mark Rasmussen, Gary Wolf, Ron Lichtie, Anna Jahns, Scott Roepke, Daniel Hatleli, Armund Bartz, Kris Johansen, Tim Babros, Dan Dehmer, Cody Caulum, Gary Wolf and Scott Krultz for their assistance in compiling this report and assisting with property access and field surveys. We are also grateful for support from the Ecosystem Management Planning Team and Owen Boyle. Funding for this project was provided by the Wisconsin DNR Bureau of Wildlife Management.

Primary Authors: Richard Staffen

Contributors:

Julie Bleser – data management

Andy Clark – plant and natural community surveys

Jason Dare – herptile surveys

Kevin Doyle – data processing

Jason Granberg – invasive species information

Logan Huse – herptile surveys

Terrell Hyde – data processing

Ryan O'Connor – inventory coordination, data processing

Dr. Kurt Schmude – aquatic invertebrate surveys

Amy Staffen – data processing, report contributions, bird and natural community surveys

Richard Staffen – inventory coordination, data processing, bird and herptile surveys

Jay Watson – terrestrial invertebrate surveys

Dr. Erik Wild – herptile surveys

Paige Witek – data entry, report resources

WDNR Reviewers:

Armund Bartz (NHC)

Kevin Doyle (NHC)

Ryan O'Connor (NHC)

Shari Koslowski (NHC)

Amy Staffen (NHC)

Mark Rasmussen (WM)

Dan Hatleli (Fisheries)

Anna Jahns (WM)

Cover Photo: Dry-mesic Prairie at Van Loon Floodplain Savanna State Natural Area, by Richard Staffen.



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Lower Black and Trempealeau Rivers Planning Group at a Glance

Exceptional Characteristics of the Study Area

- **Large River and Associated Bottomland Habitats.** The lower Black River extending from the Black River State Forest in Jackson County through North Bend Bottoms and Van Loon Wildlife Areas down to its confluence with the Mississippi River holds continental importance as a riparian corridor that provides diverse wetland and aquatic communities. This riparian corridor offers important habitat for a number of rare species, including birds, bats, herptiles, aquatic invertebrates, and fish.
- **Prairie and Oak Savanna Conservation.** Globally rare natural communities: remnant prairie, oak savanna and barrens are found on sandy terraces within the bottomland complexes of North Bend and Van Loon Wildlife Areas. These prairies and savannas represent rare and restricted types and support uncommon features. Oak savanna restoration sites are found at Borst Valley and Chimney Rock Wildlife Areas. Restoration actions would improve habitat for many plants and animals that are specialists of Oak Opening and Oak Woodland communities.
- **Springs, Seeps, Aquatic Habitats and Associated Wetlands.** Coldwater streams and springs diversify the landscape of the LBTRPG and are associated with wetland complexes that combine to support several rare species. These areas are particularly important habitats for rare amphibians and reptiles. Additionally, several rare plants were found in association with wetland habitats, particularly at Tamarack Creek Wildlife Area. Virtually all of the LBTRPG properties have a river or stream flowing through them. As a result, wetlands and aquatic habitats figure prominently in the cover types of this property group.

Site Specific Opportunities for Biodiversity Conservation

Seven ecologically important sites, or “Primary Sites,” were identified at Lower Black and Trempealeau Rivers Planning Group. “Primary Sites” are typically delineated because they encompass the best examples of 1) rare and representative natural communities, 2) documented occurrences of rare species populations, and/or 3) opportunities for ecological restoration or connections. These sites warrant high protection and/or restoration consideration during the development of the property master plan.

- **Borst Valley Sedge Meadow State Natural Area and Oak Woodland (LBTRPG01).** A continuum, from high-quality Southern Sedge Meadow to oak savanna, is featured at this primary site. The Oak Woodland savanna type is state-imperiled and globally rare, and supports rare southern forest interior birds near the norther extent of their range.
- **Chimney Rock Oak Savanna State Natural Area (LBTRPG02).** This site represents an opportunity to restore the globally rare Oak Opening natural community. Large diameter red, white, and bur oaks dominate the canopy at the site with a lack invasive species.
- **Hawkinson Creek Sedge Meadow State Natural Area (LBTRPG03).** This State Natural Area harbors a small Wet Prairie inclusion, a globally rare natural community, within a larger Southern Sedge Meadow complex. The site has high restoration potential, although intensive management is needed as the meadow area is being encroached upon by trees and shrubs.

Lower Black and Trempealeau Rivers Planning Group at a Glance

Site Specific Opportunities for Biodiversity Conservation (continued)

- **North Bend Bottoms (LBTRPG04).** This large site encompasses two State Natural Areas (North Bend Wet Prairie and Black River Savanna) while also supporting mature Floodplain Forest, extensive floodplain savannas, and a large backwater complex. The large size and diversity of habitats supports a high number of rare species.
- **Tamarack Creek Bog State Natural Area (LBTRPG05).** The site has the largest Tamarack Bog in the Driftless Area, along with extensive areas of Southern Sedge Meadow and Shrub-carr. The willow dominated Shrub-carr supports a significant population of a state-Threatened bird species.
- **Van Loon Floodplain Savanna State Natural Area (LBTRPG06).** The site has several lakes identified by The Nature Conservancy as ‘Portfolio’ lakes that represent high-quality examples of each lake-type. There are good examples of globally rare Oak Barrens and prairie ecosystems represented at the site.
- **Van Loon Bottoms State Natural Area (LBTRPG07).** The site consists of an extensive, mature Floodplain Forest recognized, in part, as an Important Bird Area supporting numerous rare or declining birds. There are also rare fishes, aquatic invertebrates, reptiles, and plants found here.

Introduction

Purpose and Objectives

This report is intended to be used as a source of information for developing a new master plan for the Lower Black and Trempealeau Rivers Planning Group (LBTRPG; Map A). The regional ecological context for the LBTRPG is provided to assist in developing the Regional and Property Analysis that is part of the master plan. Properties included in this assessment are as follows:

Black River Savanna State Natural Area	North Bend Wet Prairie State Natural Area
Borst Valley Sedge Meadow State Natural Area	South Beaver Creek Wildlife Area
Borst Valley Wildlife Area	Tamarack Creek Bog State Natural Area
Chimney Rock Oak Savanna State Natural Area	Tamarack Creek Wildlife Area
Chimney Rock Wildlife Area	Van Loon Bottoms State Natural Area
Hawkinson Creek Wet Prairie State Natural Area	Van Loon Floodplain Savanna State Natural Area
Lakes Coulee Wildlife Area	Van Loon Wildlife Area
North Bend Wildlife Area	

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

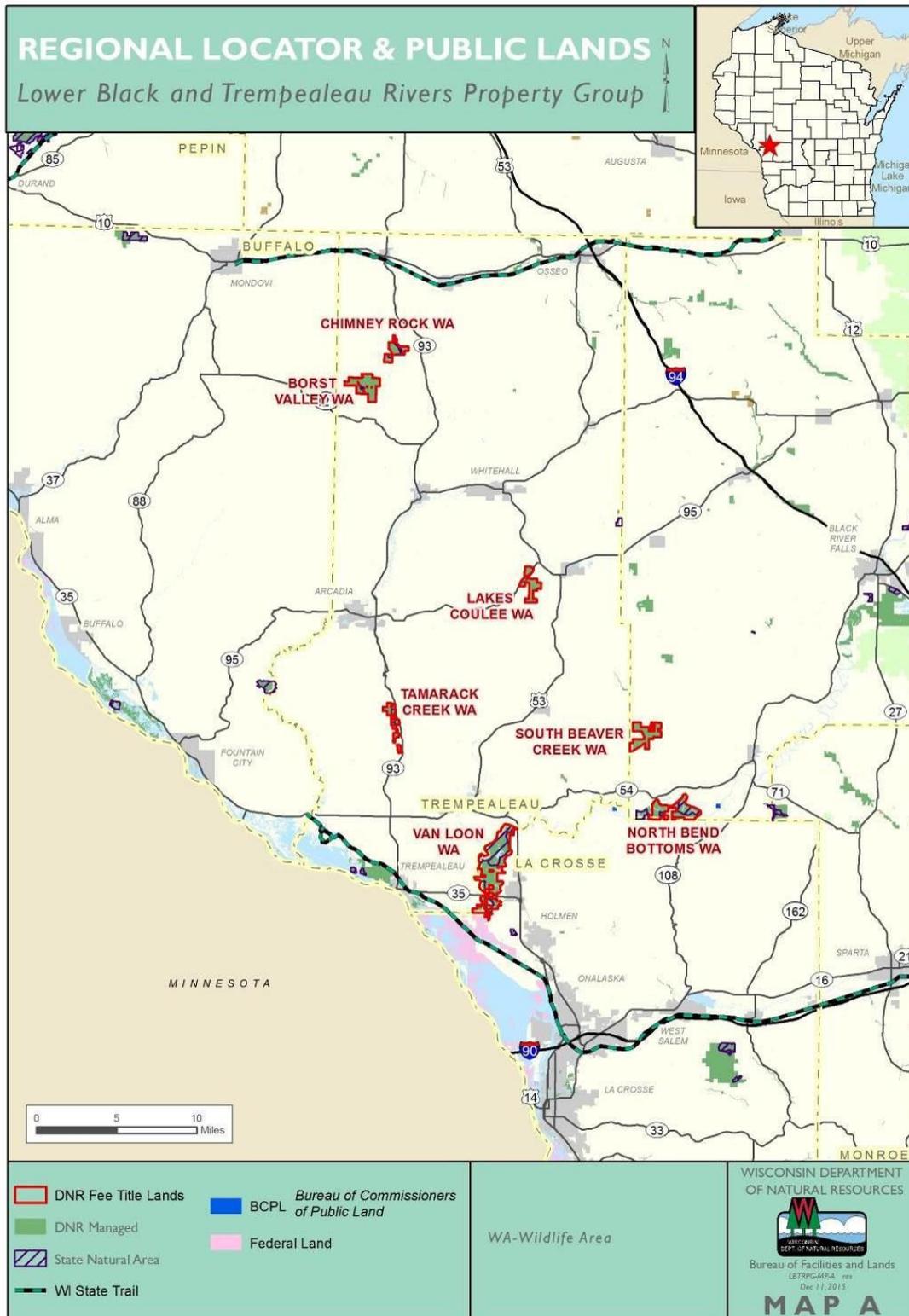
Survey efforts for the LBTRPG were limited to a “rapid ecological assessment” for 1) identifying and evaluating ecologically important areas, 2) documenting rare species occurrences, and 3) documenting occurrences of high quality natural communities. This report can serve as the “Biotic Inventory” document used for master planning although inventory efforts were reduced compared to similar projects conducted on much larger properties such as state forests. There will undoubtedly be gaps in our knowledge of the biota of this property, especially for certain taxa groups; these groups have been identified as representing either opportunities or needs for future work. Inventory data collected through this effort is a starting point for adaptive management of the LBTRPG and should be revisited as opportunity allows and updated when new information becomes available.

Overview of Methods

The Wisconsin Natural Heritage Inventory (NHI) program is part of the Wisconsin DNR’s Bureau of Natural Heritage Conservation 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 (WDNR 2014b) 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 website (*Wisconsin Natural Heritage Working List*).



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.

Existing NHI data are often the starting point for conducting a biotic inventory to support master planning. Prior to this project, NHI data for the LBTRPG were limited to: 1) the Statewide Natural Area Inventory, a county-by-county effort conducted by WDNR’s Bureau of Research and Endangered Resources between 1969 and 1984 that focused on natural communities but include some surveys for rare plants and animals and 2) taxa-specific surveys.

The most recent taxa-specific field surveys for the study area were conducted during 2015. Surveys were limited in scope and focused on documenting high quality natural communities, rare plants, breeding birds (forest, grassland, and marsh), forest raptors, aquatic and terrestrial invertebrates, bats, and herptiles (Table 1). The collective results from all of these surveys were used, along with other information, to identify ecologically important areas (Primary Sites) of the LBTRPG.

Survey locations were identified or guided by using recent aerial photos, USGS 7.5’ topographic maps, various Geographic Information System (GIS) sources, information from past survey efforts, discussions with property managers, and the expertise of several biologists familiar with the properties or with similar habitats in the region. Based on the location and ecological setting of properties within the LBTRPG, key inventory considerations included the identification of riparian forests, prairie remnants, oak savanna restoration opportunities, high-quality open wetlands, floodplain lakes, and the location of habitats that had the potential to support rare species. Private lands, including easements, surrounding the LBTRPG were not surveyed.

Scientific names for all species mentioned in the text are included in a list on page 48.

Table 1. Surveys at Lower Black and Trempealeau Rivers Planning Group

Description	Survey Site(s)	Year(s)	Surveying Group
Acoustical Bat Surveys	Van Loon WA	2010	Wisconsin DNR analyzed data from volunteer surveyor
Aquatic Invertebrates	All Properties	2015	Dr. Kurt Schmude
Breeding bird surveys (landbirds - passerines)	All Properties	2015	WDNR NHI staff
Forest Raptor surveys	North Bend Bottoms WA Van Loon WA	2015	WDNR NHI staff
Herptile surveys	All Properties	2014, 2015	WDNR NHI staff, Jason Dare, Logan Huse, Dr. Erik Wild
Natural community surveys	All Properties	2015	WDNR NHI staff
Rare plant surveys	All Properties	2015	WDNR NHI staff
Terrestrial Invertebrates	Tamarack Creek WA	2015	WDNR NHI staff

Background on Past Efforts

Various large-scale research and planning efforts have identified the LBTRPG as being ecologically significant. The following are examples of such projects and the significant features identified.

Important Bird Area

Van Loon Bottoms was identified as an Important Bird Area (IBA; WDNR 2007). Important Bird Areas are critical for the conservation and management of Wisconsin's birds. This IBA includes **North Bend Bottoms Wildlife Area (WA)** and **Van Loon WA**. Van Loon WA contains the third largest block of undisturbed Floodplain Forest habitat in Wisconsin. Van Loon Bottoms IBA provides habitat for numerous Floodplain Forest species and barrens birds also find important habitat here.

Wisconsin Wildlife Action Plan: Conservation Opportunity Area

Conservation Opportunity Areas (COA) are places in Wisconsin containing ecological features, natural communities, or Species of Greatest Conservation Need (SGCN) habitat for which Wisconsin has a unique responsibility for protection when viewed from the global, continental, upper Midwest, or state perspective. The Wisconsin Wildlife Action Plan (WAP; WDNR 2006b) identifies two COA's within which LBTRPG sites occur (see Appendix B for a map):

- **South Beaver Creek WA** lies within the Coulee Forests COA, which is identified as having continental significance for extensive prairie - savanna communities, cliffs, and wetlands including Dry Prairie, Dry-mesic Prairie, Oak Opening, Oak Woodland, Southern Dry Forest, and Southern Dry-mesic Forest.
- **North Bend Bottoms and Van Loon WA's** occurs within the Lower Black River COA, which harbors a large river corridor of continental significance.

Legacy Places

The Land Legacy Report (WDNR 2006a) was designed to identify Wisconsin's most important conservation and recreation needs for the next 50 years. **North Bend Bottoms WA** and **Van Loon WA** fall within the Black River Land Legacy Site, which is recognized for its biological diversity, outstanding scenic qualities, and value as wildlife habitat. Within the Black River Legacy Place, a protected corridor in the valley could link existing public lands, enhance the value of the corridor for migratory and dispersing wildlife, and provide additional opportunities for outdoor recreation.

The Nature Conservancy's Prairie-Forest Border Conservation Plan

The Nature Conservancy (2001) conservation plan for the Prairie-Forest Border Ecoregion identified important Ecologically Significant Areas and restoration areas that will ensure the long-term survival of all viable native species and ecological communities. Ecologically Significant Areas in the planning group are:

- **North Bend Bottoms and Van Loon WA's** lie within the larger "Black River-Meadow Valley-Bear Bluff" target site. This site is recognized as a Functional Site for its extensive forests, wetlands, and high numbers of rare or sensitive species.
- **Tamarack Creek Bog WA/SNA** is noted as a stand-alone Ecologically Significant Area in this conservation plan because it represents one of the few extant tamarack forests in this portion of the Prairie-Forest Border Ecoregion (The Nature Conservancy 2001).

Wetland Gem Designation

The "Van Loon Bottoms" Wetland Gem includes **Van Loon WA/Van Loon Bottoms SNA**. The site harbors a complex mosaic of bottomland habitat types, including Floodplain Forest, marsh, Shrub-carr, and low prairie that support diverse wetland plants and animals (Wisconsin Wetlands Association 2009).

International Wetland of Importance (Ramsar Wetland)

The Van Loon wetlands are part of the Upper Mississippi River (UMR) floodplain wetland designated as an International Wetland of Importance under the Ramsar Convention on Wetlands. Only 29 other wetlands in the U.S. are afforded this designation. The UMR is cited as possibly the most important remaining corridor of fish and wildlife habitat in the Midwest and a globally important bird area.

Special Management Designations

Wisconsin's Impaired Waters (303d)

Section 303(d) of the federal Clean Water Act requires states to develop a list of impaired waters ("303(d) list"). The identification and listing of waters as impaired is one step in a continual process of waterbody classification, assessment, and management, the ultimate goal of which is to protect, restore, and maintain the full potential of each waterbody to the maximum extent possible. Black River (which runs through **North Bend Bottoms** and **Van Loon WA's**) is listed as impaired water due to contaminated fish tissues and one or more pollutants (phosphorus, mercury, PCB's). Hawkinson Creek (running through **Chimney Rock WA**) is proposed for listing due to the degraded biological community from an unknown pollutant.

Forest Certification

Forest Certification is established on all DNR-managed lands, including state parks, wildlife and fishery areas, and natural areas. Certified forests are recognized by the Forest Stewardship Council and the Sustainable Forestry Initiative as being responsibly managed (WDNR 2009a). This certification emphasizes the state's commitment to responsibly managing and conserving its lands, supporting economic activities, protecting wildlife habitat, and providing recreational opportunities.

McGilvray ("Seven Bridges") Road and Truss Bridges

McGilvray Road and the over 100 year old truss bridges is a former vehicular road running through **Van Loon WA** that is on the Wisconsin State and National Registers of Historic Places. It is now a popular pedestrian path leading across the expansive backwaters of the lower Black River. The road is maintained by the Friends of the McGilvray Road and the Wisconsin Department of Natural Resources.

State Natural Areas

State Natural Areas (SNA) are places on the landscape that protect outstanding examples of native natural communities, significant geological formations, and archaeological sites. Designation confers a significant level of land protection through state statutes, administrative rules, and guidelines. Eight SNAs occur on the LBTRPG:

Black River Savanna is a 566-acre State Natural Area within North Bend Bottoms WA.

Borst Valley Sedge Meadow is a 21-acre State Natural Area within Borst Valley WA.

Chimney Rock Oak Savanna is a 30-acre State Natural Area within Chimney Rock WA.

Hawkinson Creek Wet Prairie is a 79-acre State Natural Area within Chimney Rock WA.

North Bend Wet Prairie is a 34-acre State Natural Area within North Bend Bottoms WA.

Tamarack Creek Bog is a 130-acre State Natural Area within Tamarack Creek WA.

Van Loon Floodplain Forest is a 317-acre State Natural Area within Van Loon WA.

Van Loon Floodplain Savanna is a 1,574-acre State Natural Area within Van Loon WA.

TNC Lakes Portfolio

In 2014, The Nature Conservancy identified a ‘portfolio’ of lakes for Wisconsin that represent high quality examples of each lake type (Blann and Wagner 2014). The project aims to support prioritization of strategies for protection, maintenance, and restoration of Wisconsin’s diversity of lake ecosystems. Several lakes within the property group were identified as Portfolio sites:

Lake Name	Property	Waterbody Identification Code
Goose Lake	Van Loon Bottoms WA	1677100
Van Loon Lake	Van Loon Bottoms WA	1677300
Unnamed	Van Loon Bottoms WA	5558044
Unnamed	Van Loon Bottoms WA	5558055
Unnamed	Van Loon Bottoms WA	1668800
Unnamed	North Bend Bottoms WA	5556657

Regional Ecological Context

Text largely reproduced from Ecological Landscapes of Wisconsin (WDNR 2015b).

Overview of Ecological Landscapes

The WDNR has mapped the state into areas of similar ecological potential and geography called Ecological Landscapes. The Ecological Landscapes are based on aggregations of smaller ecoregional units (Subsections) from a national system of delineated ecoregions known as the National Hierarchical Framework of Ecological Units (NHFEU) (Cleland et al. 1997). These ecoregional classification systems delineate landscapes of similar ecological pattern and potential for use by resource administrators, planners, and managers.

The LBTRPG falls completely within the **Western Coulee and Ridges Ecological Landscape**.

See Figure 1 for the study area in relation to Ecological Landscapes. *For more details on these Ecological Landscapes as they pertain to the LBTRPG, see the Regional Property Analysis for the Lower Black and Trempealeau Rivers Planning Group.*



Figure 1. Ecological Landscapes of Wisconsin and the study area.

Overview of Regional Natural Resources

Opportunities for sustaining natural communities in Ecological Landscapes were developed in 2005 by the Ecosystem Management Planning Team (EMPT; not published until 2007) and later focused on wildlife Species of Greatest Conservation Need and their habitat in the Wisconsin Wildlife Action Plan

(WDNR 2006b). The goal of sustaining natural communities is to manage for natural community types that 1) historically occurred in a given landscape and 2) have a high potential to maintain their characteristic composition, structure, and ecological function over a long period of time (e.g., 100 years). This list can help guide land and water management activities so that they are compatible with the local ecology of the Ecological Landscape while maintaining important components of ecological diversity and function. Based on EMPT's criteria, these are the most appropriate community types that could be considered for management activities within each Ecological Landscape.

There are "major" and "important" management opportunities for 36 natural communities in the **Western Coulees and Ridges Ecological Landscape**, 14 of which occur within the LBTRPG (Table 9; pg. 39).

There are also 68 animal SGCN and 26 rare plants significantly associated with the **Western Coulee and Ridges Ecological Landscape** (see Appendix E). This means that these species are (and/or historically were) highly associated with this Ecological Landscape, and that restoration of natural communities with which these species are associated would significantly improve their conditions.

Table 2. Number of SGCN or Rare Plants Significantly Associated with the Western Coulees and Ridges Ecological Landscape

20	Vertebrates
48	Invertebrates
26	Rare Plants
94	Total SGCN and Rare Plants

For more details on regional natural community management opportunities and rare species as they pertain to the LBTRPG, see the Regional and Property Analysis for the Lower Black and Trempealeau Rivers Planning Group.

Description of the Study Area

Location and Size

The Lower Black and Trempealeau Rivers Planning Group is located in Jackson, LaCrosse and Trempealeau Counties, and is made up of scattered properties totaling 10,003 acres. All acreages are based on fee simple ownership from DNR Facilities and Lands GIS records as of December 2015; acreage may not include easements, leases and some permanent water bodies.

Physical Environment

A brief summary of the geology, soils and hydrology of the LBTRPG is provided here. For more details, see the Regional and Property Analysis for the LBTRPG.

The entirety of the LBTRPG, lies within the Driftless Area of Wisconsin, which covers about 12,700 square miles in the southwestern and west-central part of the state (Figure 1). The region escaped glaciation in the most recent glacial epochs, although glacial meltwater from surrounding areas rushed through the valley bottoms. This unique combination of geological influences resulted in a dramatic terrain -- deeply dissected, v-shaped valleys and steep-sided, rocky bluffs.

The Driftless Area is characterized by an eroded plateau, with bedrock overlain by varying thicknesses of loess (wind-blown silt). As glacial rivers dried up during the fall and winter, silt in the river beds was exposed to wind. This is especially apparent in the Mississippi River Valley. Here, loess depths are deepest at or near the Mississippi (tens of feet thick) and become shallower as one moves east (Dott and Attig 2004). Dolomite, sandstone, and limestone are the dominant bedrock types, with lesser amounts of shale and gneiss. Outcrops of Paleozoic bedrock are common, especially on the bluffs that rise above the Wisconsin and Mississippi Rivers. The preponderance of Karst topography (layers of soluble bedrock dissolved by water) means that caves are common throughout the Driftless Area – about 60 have been identified (Dott and Attig 2004).

A number of LBTRPG sites (**Van Loon WA, North Bend Bottoms WA**) are strongly associated with the lowland/alluvial areas of the Black River and its tributaries, and are characterized by floodplains and terraces with predominately loams and silts over gravelly sandy outwash and silty alluvium. As you move north from the Black River floodplain, smaller valleys (**South Beaver Creek WA, Lakes Coulee WA, Tamarack Creek WA, Borst Valley WA**) are characterized by moderately well-drained to well-drained silt loams. Uplands are well drained silt loams and sandy loams. Sandstone dominates the region and often lies close to the surface, resulting in shallow soils.

The Driftless Area is characterized by a finely dissected network of interconnected streams and tributaries. Springs and spring seeps feed hundreds of cold- and cool-water streams, many of which harbor trout. Within the Western Coulee and Ridges Ecological Landscape alone, over 4,000 springs have been mapped (WDNR 2014a). The lack of direct, recent glacial influence on the region resulted in a marked absence of lakes and wetlands, other than those that occur locally along river floodplains. In many places, impoundments were installed on streams to create artificial lakes and wildlife habitat.

Water bodies are associated with each of the LBTRPG properties (Table 2), belying the importance of aquatic and wetland habitats in the early designation of these sites for fish and wildlife.

Table 3. Named Water Bodies of the Lower Black and Trempealeau Rivers Planning Group

WBIC = Waterbody Identification Code; ORW = Outstanding Resource Water; ERW = Exceptional Resource Water

Property Name	Waterbody Name	WBIC	ORW/ERW	Trout Stream
Borst Valley WA	Borst Valley Creek	1783100	no	Class III
Chimney Rock WA	Hawkinson Creek	1785500	no	no
Lakes Coulee WA	Lakes Coulee Creek	1799600	no	Class III
North Bend Bottoms WA	Black River	1676700	no	no
South Beaver Creek WA	South Fork Beaver Creek	1681000	no	no
Tamarack Creek WA	Tamarack Creek	1770300	no	Class III
Tamarack Creek WA	Holcomb Coulee Creek	1771600	no	no
Van Loon WA	Black River	1676700	no	no
Van Loon WA	Goose Lake	1677100	no	no
Van Loon WA	Shingle Creek	1769500	no	no
Van Loon WA	Van Loon Lake	1677300	no	no

Vegetation

Historical Vegetation

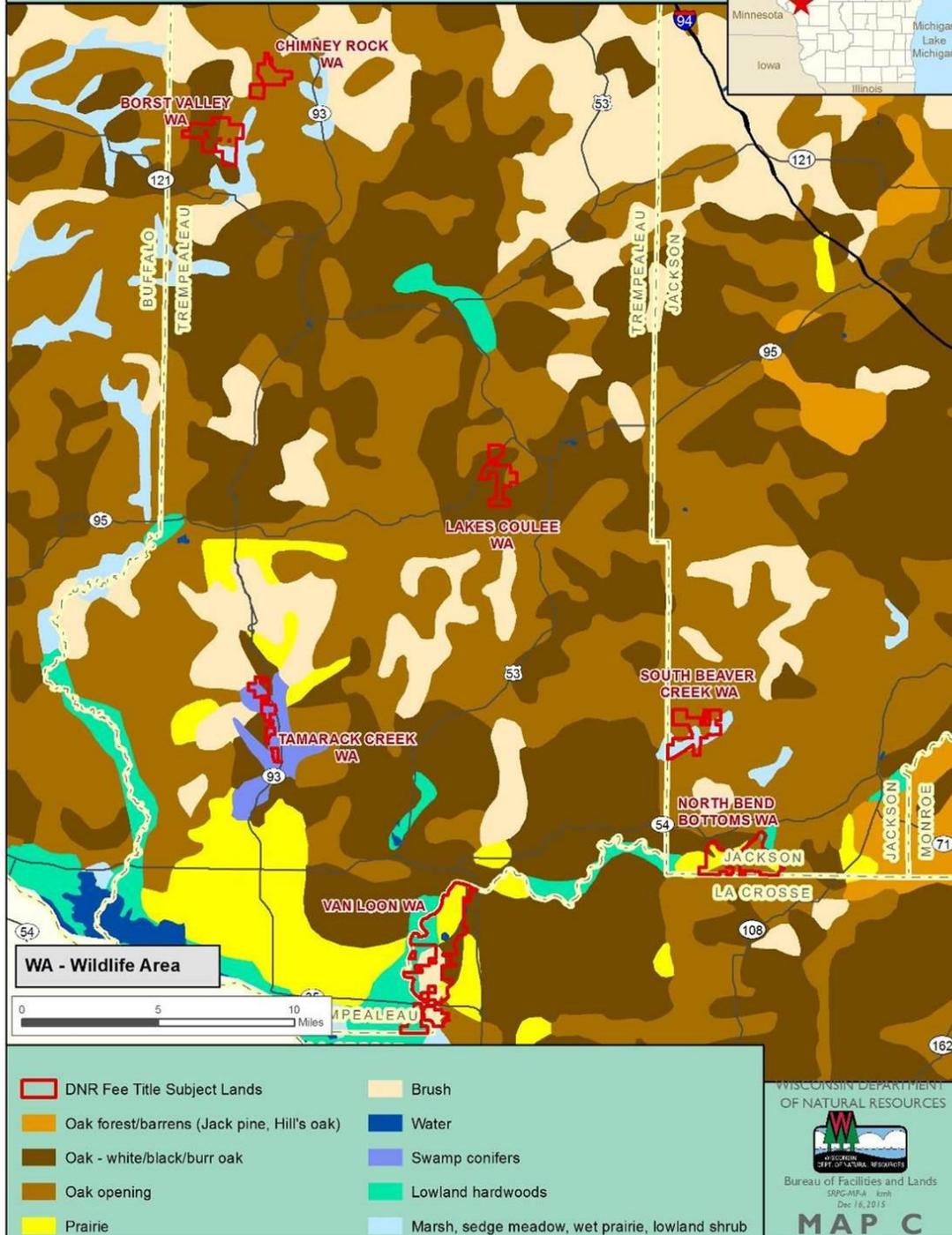
There is value in determining the nature of a site's vegetation before European settlement as well as its historical alterations and uses. The purpose of examining historical conditions is to identify ecosystem factors that formerly sustained species and communities that are now altered in number, size, or extent, or which have been changed functionally (for example, by constructing dams, or suppressing fires). Maintaining or restoring some lands to more closely resemble historic systems and including some structural or compositional components of the historic landscape within actively managed lands can help conserve important elements of biological diversity (WDNR 2015c).

The early vegetation of Wisconsin was mapped based on notes and maps from the original Public Land Surveys (Finley 1976) (Map C), which were conducted for the area comprising LBTRPG in 1846-1855. It's important to note that Public Land Surveys served to clearly establish a standardized grid for land ownership, not to describe early vegetation and natural communities. This data is most informative by looking for patterns at a landscape scale; property-specific details may or may not be entirely accurate. This reconstruction of historical vegetation shows most of the study area was a mosaic of prairie, wetland (marsh, sedge meadow, wet prairie), lowland hardwoods, swamp conifers, and oak-dominated uplands. The prairies were found on the floodplain terraces, while savannas typically would have been found on ridge tops and drier slopes, with oak forests on moister slopes. Marshes, wet prairies, sedge meadows, lowland hardwoods and swamp conifers would have occurred in areas with poorly drained soils, typically associated with streams and rivers.

Ecological processes that historically maintained these systems included frequent wildfire. The vegetation pattern and structure documented in 1846-55 is typical for fire-prone landscapes such as the LBTRPG, in which periodic wildfires historically burned in an irregular fashion depending on timing, weather conditions, fuel loading, and natural fire breaks to create a shifting heterogeneous vegetation matrix.

VEGETATION PRIOR TO EURO-AMERICAN SETTLEMENT (FINLEY 1976)

Lower Black and Trempealeau Rivers Property Group



Current Vegetation

Many of the factors that historically impacted vegetation continue to impact the study area today, and include but are not limited to geology, soils, hydrology, and climate. These factors are superseded in many areas, however, by more recent human influences on the land, particularly conversion of bluff tops and valley bottoms to agriculture, logging, installation of impoundments, fire suppression, and the introduction and spread of non-native invasive species. Using the 1998 Wiscland layer (WDNR 1993), 10 general land cover types dominate the LBTRPG landscape: agriculture, barrens (i.e., bare soil), upland forest, forested wetland/deciduous, forested wetland/coniferous, grassland, open water, upland shrub, and open-or-brushy wetland (Map D). Savannas were classified as grasslands, shrublands, or forest types.

This landscape-scale generalization of cover types described above helps us visualize the study area within a larger context. But which cover types and natural communities as defined by Wisconsin's Natural Heritage Inventory typify the properties within the study area for this report? The planning group is found within the Driftless Area, which is characterized by its steep sided valleys and ridges, high gradient headwater streams, and large rivers with extensive, complex floodplains and terraces. This landscape pattern holds true with LBTRPG properties, including the presence of water at all properties, either in the form of small, cool-water streams, or in the form of a large river (the Black River). Grass- or sedge-dominated wetlands (Southern Sedge Meadow, Wet Prairie) and brushy wetlands (Shrub-carr, Alder Thicket) create a buffer along the smaller creeks and streams. A unique wetland type (especially for the Driftless Area), Southern Tamarack Swamp (rich), is associated with a small stream at **Tamarack Creek WA**.

The Black River floodplain has highly variable microtopography and substrates, resulting in a commensurately diverse mosaic of habitat types. Vast expanses of Floodplain Forest create the dominant habitat matrix. Numerous sloughs and deeper depressions support Submergent and Emergent Marsh, while Southern Sedge Meadow, Shrub-carr and Alder Thicket occupy sites with less standing water. In areas where sandy deposits have created slightly higher terraces, one can also find Oak Barrens and Dry-mesic Prairie.

On the uplands that rise above the stream and river floodplains, surrogate grasslands and shrublands occupy lower, flatter areas, which grade to Oak Opening, Oak Woodland, Southern Dry Forest and Southern Dry-mesic Forest as one advances up and over bluffs and ridges.

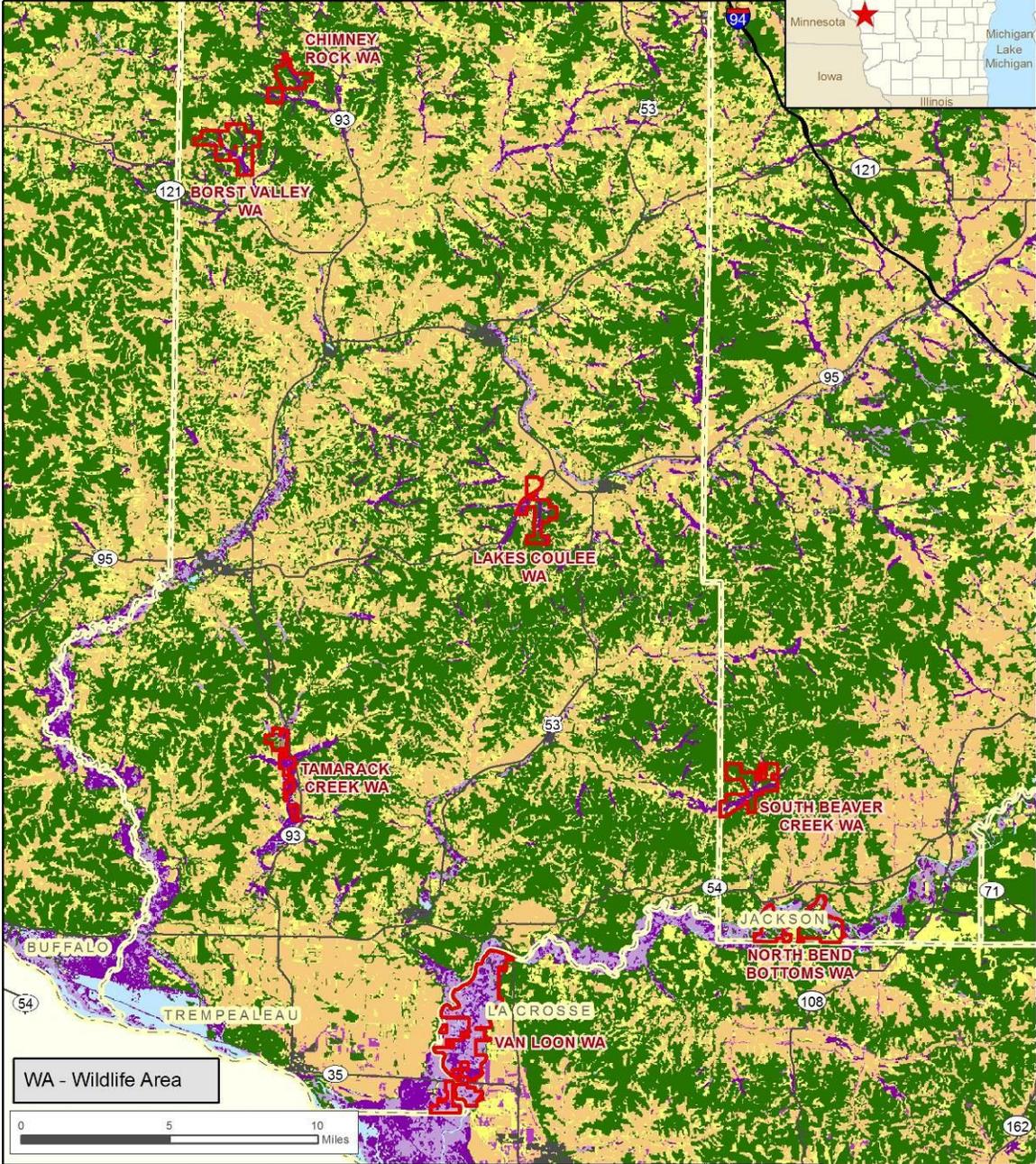
Detailed descriptions of the natural community types that figure prominently on LBTRPG are provided below.

Floodplain Forest

The large rivers of the Western Coulees and Ridges Ecological Landscape are notable for their extensive tracts of Floodplain Forest that support diverse plant and wildlife species. This holds true along the Black River at **Van Loon** and **North Bend Bottoms WAs**. The dominant trees of these Floodplain Forests are deciduous species adapted to periodic inundation, and include silver maple (*Acer saccharinum*), swamp white oak (*Quercus bicolor*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*). Due to nutrient-rich silty soil and abundant moisture, these trees grow quickly and can reach very large size: 24-30" dbh (diameter at breast height) specimens are not uncommon in mature stands. Trees with large crowns and cavities provide important habitat for numerous wildlife species. The shrub layer has sparse to moderate cover, with characteristic

LAND COVER

Lower Black and Trempealeau Rivers Property Group



WA - Wildlife Area



- | | | |
|-----------------------------|------------------------------|------------------------|
| DNR Fee Title Subject Lands | Forested wetland: deciduous | Upland Shrub |
| Agriculture | Forested wetland: coniferous | Golf Course |
| Barrens | Grassland | Developed |
| Upland forest | Open water | Open or brushy wetland |

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Bureau of Facilities and Lands
SRAG-MPA kmh
Dec 16, 2015

MAP D

species including prickly-ash (*Zanthoxylum americanum*), American elder (*Sambucus canadensis*), nannyberry (*Viburnum lentago*) and American black currant (*Ribes americanum*). Lianas (vines that hang from trees), such as poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), riverbank grape (*Vitis riparia*), moonseed vine (*Menispermum canadense*), wild yam (*Dioscorea villosa*), and common groundnut (*Apios americana*) are also an important component of Floodplain Forests. The ground layer is dominated by Canadian wood-nettle (*Laportea canadensis*), cut-leaved coneflower (*Rudbeckia laciniata*), ostrich fern (*Matteuccia struthiopteris*), woodland phlox (*Phlox divaricata*), and the non-native invasives reed canary grass (*Phalaris arundinacea*) and moneywort (*Lysimachia nummularia*).

Wisconsin DNR Forest Reconnaissance indicates that Van Loon Bottoms WA has 2,601 acres of “Bottomland Hardwoods” (correlates with Floodplain Forest), while North Bend Bottoms WA has 832 acres (WisFIRS accessed February 2016). Several narrow, small stands of Bottomland Hardwoods are also found along streams feeding into Borst Valley Creek at **Borst Valley WA**; these are of lower quality due to their fragmented and isolated nature. Three sites that harbor good- to excellent-quality Floodplain Forest were identified on the LBTRPG:

- **North Bend Bottoms Primary Site**
- **Van Loon Floodplain Savanna SNA and Primary Site**
- **Van Loon Bottoms SNA and Primary Site**

Southern Tamarack Swamp (rich)

Southern Tamarack Swamp (rich) is an uncommon and increasingly rare lowland coniferous forest that occurs south of the Tension Zone. An almost 200-acre stand of Southern Tamarack Swamp (rich) is found at **Tamarack Creek WA** (includes **Tamarack Creek Bog SNA Primary Site**). The dominant tree is Wisconsin’s only deciduous conifer, tamarack (*Larix laricina*). The dominant tree is Wisconsin’s only deciduous conifer, tamarack, however widespread mortality of large trees was noted, and the site currently has a relatively open canopy with scattered live trees. A dense shrub layer is encroaching upon the swamp with speckled alder (*Alnus incana*), bog birch (*Betula pumila*), red-osier dogwood (*Cornus stolonifera*), and poison sumac (*Toxicodendron vernix*) being common. In higher-quality areas where the peat mat is intact, the ground layer consists of lake sedge (*Carex lacustris*), water arum (*Calla palustris*), and broad-leaved cattails (*Typha latifolia*). In shrubbier, mucky areas, dominant ground layer species are blue-joint grass (*Calamagrostis canadensis*), wood nettle, orange jewelweed (*Impatiens capensis*), and the non-native invasive reed canary grass.



Southern Tamarack Swamp at Tamarack Creek WA. Photo by A. Clark.

Southern Sedge Meadow, Wet Prairie

Most open wetlands dominated by grasses or sedges (graminoids) in the study area were drained in the past, then plowed or grazed. As wetlands were destroyed or degraded, stream flow during rain events became flashier, resulting in deeply-incised stream banks (sometimes 10-15 feet high) and heavy deposition of sediment. Nutrient-laden runoff from proximal agricultural lands further contributed to the degradation of these wetlands. Wetlands that experienced such extensive disturbance are typically dominated by reed canary grass and/or lake sedge, and harbor a small number of forb generalists such as sawtooth sunflower (*Helianthus grosseserratus*), spotted Joe-Pye-weed (*Eupatorium maculatum*), giant goldenrod (*Solidago gigantea*), swamp aster (*Aster puniceus*), New England aster (*Aster novae-angliae*), orange jewelweed, and tall meadowrue (*Thalictrum dasycarpum*).

Project surveyors occasionally encountered less disturbed graminoid-dominated wetlands, most often in the form of Southern Sedge Meadow. Southern Sedge Meadow occurs on saturated soils (muck or peat), and is typically dominated by tussock sedge (*Carex stricta*) and blue-joint grass. Some sedges, especially the tussock sedge, form hummocks; these may be accentuated by grazing and frost action. Common sedge meadow associates are northern water-horehound (*Lycopus uniflorus*), panicled aster (*Aster lanceolatus* var. *simplex*), blue flag (*Iris virginica*), Canada goldenrod (*Solidago canadensis*), spotted Joe-Pye-weed, broad-leaved cat-tail, and swamp milkweed (*Asclepias incarnata*). Fair-quality examples of Southern Sedge Meadow are found at:

- **Tamarack Creek WA**
- **South Beaver Creek WA**
- **Borst Valley WA**

At **Hawkinson Wet Prairie SNA**, an exceptionally plant-rich wet prairie was located in 2007 but is seemingly converting to Alder Thicket with reed canary grass becoming dominant. In 2007, the site had an abundance of saw-toothed sagebrush (*Artemisia serrata*) and grasses including fringed brome (*Bromus ciliatus*), blue-joint grass, wild timothy (*Muhlenbergia racemosa*), and fowl manna grass (*Glyceria striata*). Diverse forbs included swamp milkweed, swamp thistle (*Cirsium muticum*), common boneset (*Eupatorium perfoliatum*), Michigan lily (*Lilium michiganense*), mountain mint (*Pycnanthemum virginianum*), swamp betony (*Pedicularis lanceolata*), and swamp saxifrage (*Saxifraga pensylvanica*).

Shrubby Wetlands (Shrub-carr, Alder Thicket)

Shrub-carr is a semi-open wetland community that occurs on saturated to seasonally-flooded soils, and is dominated by tall shrubs such as red-osier dogwood, white meadowsweet (*Spiraea alba*), and various willows (*Salix discolor*, *S. bebbiana*, and *S. exigua*). In the shrubby wetlands found at sites with the planning group, vegetation growing underneath the woody species is usually typical of Southern Sedge Meadow, most commonly reed canary grass, less commonly blue-joint grass, lake sedge, and tussock sedge.

Alder Thicket is a minerotrophic wetland community dominated by the tall shrub speckled alder. In the Driftless Area, it borders small, free-flowing streams. Soils are usually mucks, and spring seepages or spring runs may be present within or on the edges of the community. Whatever the physical setting, groundwater with some lateral movement is a characteristic hydrological attribute.

Although these two community types are well-represented on the LBTRPG, no good-quality occurrences were identified. Many occurrences, in fact, are a response to artificial drainage and fire suppression, two factors that are known to contribute to the expansion of shrub communities into open wetlands (Eggers and Reed 1997).

Emergent Marsh

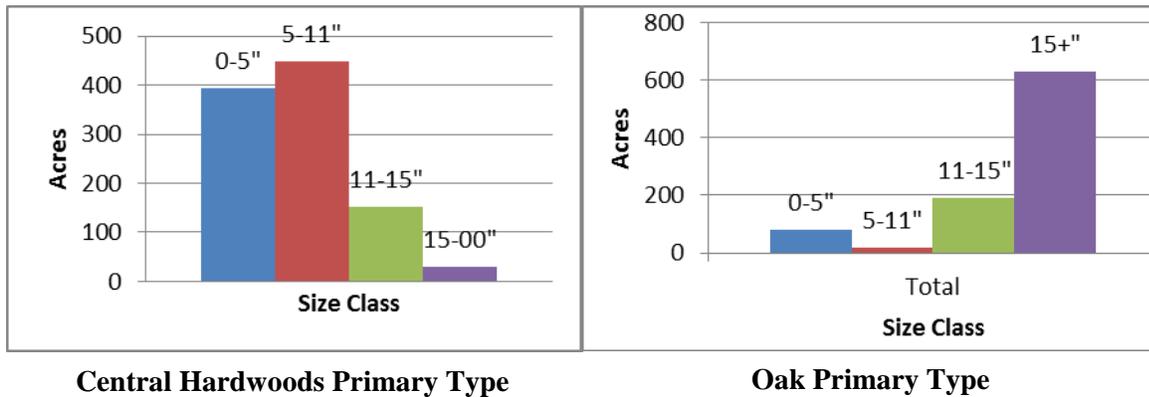
Emergent Marsh occurs within the lower portions of the Black River floodplain at **Van Loon WA** and, to a lesser extent, at **North Bend Bottoms WA**. Beds of Emergent Marsh are generally established in permanent standing water of less than two meters in depth. Many of the dominant plants, whose robust character allows them to emerge above the water, are colonial (or clonal). In places, variable floodplain morphology may produce distinct zonation of plant species, and may allow emergents to be replaced by plants with floating or submerged leaves. At **Van Loon WA**, Emergent Marsh occupies over 500 acres, and is dominated by arrowhead (*Sagittaria latifolia*), wild rice (*Zizania aquatic*), bur-reed (*Sparganium eurycarpum*) and river bulrush (*Bolboschoenus fluviatilis*).

Upland Forest

Southern Dry- and Dry-mesic Forests are common throughout the study area, and typically occur on south- and west-facing slopes of hills or on thin soiled hilltops and ridges; dry forests often occupy the upper, drier slopes while dry-mesic species occupy the lower slopes where slightly deeper soils and/or cooler, moister conditions prevail. Southern Dry Forest canopy dominants are white oak (*Quercus alba*), black oak (*Q. velutina*) and bur oak (*Q. macrocarpa*), with lesser amounts of big-tooth aspen (*Populus grandidentata*). Southern Dry-mesic Forest canopy dominants are red oak (*Quercus rubra*), white oak, shagbark hickory (*Carya ovata*), red maple (*Acer rubrum*), and American basswood (*Tilia americana*). Species such as prickly ash, Missouri gooseberry (*Ribes missouriensis*), and brambles (*Rubus* spp.) create a robust shrub layer in dry forests, but are much less pronounced in the dry-mesic forest where deeper shade reduces their growth. The ground layer of LBTRPG upland forests is typically of low diversity, and is dominated by habitat generalists such as wild geranium (*Geranium maculatum*), interrupted fern (*Osmunda claytoniana*), enchanter's nightshade (*Circaea lutetiana*), wild sarsaparilla (*Aralia nudicaulis*), Virginia creeper (*Parthenocissus quinquefolia*), common lady fern (*Athyrium filix-femina*), and white avens (*Geum canadense*).

Given that most of these forests have experienced extensive logging and management over time, it is also beneficial to examine age-class structures (Fig. 2). Stands that are typed as Central Hardwoods in WDNR WisFIRS are dominated by trees in the 0-5" and 5-11" size classes; younger forests can have a hodgepodge of red maple, American elm, green ash, aspen (*Populus tremuloides*), and box elder (*Acer negundo*) mixed with oaks. Stands where Oak is the primary type are dominated by large (15+") trees.

Figure 2. Size Class Distribution for Two Upland Forest Primary Types on LBTRPG properties
 Source: WisFIRS, accessed February 15, 2016



The absence of regular fire in these forests has resulted in a cascade of environmental, compositional, and structural changes: As the subcanopy and canopy become more closed, deeper shade, higher soil moisture, and cooler microclimate ensue, creating a positive feedback cycle that progressively favors mesophytic species and disfavors shade-intolerant, fire-adapted species (Nowacki and Abrams 2015). In many areas, evidence of sustained and often heavy past grazing is apparent in the dominance of shrubs such as prickly-ash and Missouri gooseberry and a low-diversity ground layer. Non-native invasive species such as non-native bush honeysuckle (*Lonicera* spp.), common buckthorn (*Rhamnus cathartica*) and garlic mustard (*Alliaria petiolata*) are also regularly found in these forests.

One good-quality example of Southern Dry-mesic Forest was identified on the LBTRPG:

- **Lakes Coulee WA** (105 acres; Fig. 3).

Small conifer plantations (red pine [*Pinus resinosa*], white pine [*Pinus strobus*], white spruce [*Picea glauca*]) also occur on all properties except **Tamarack Creek WA**. Also, small stands of aspen are present at all sites except **Chimney Rock WA**.

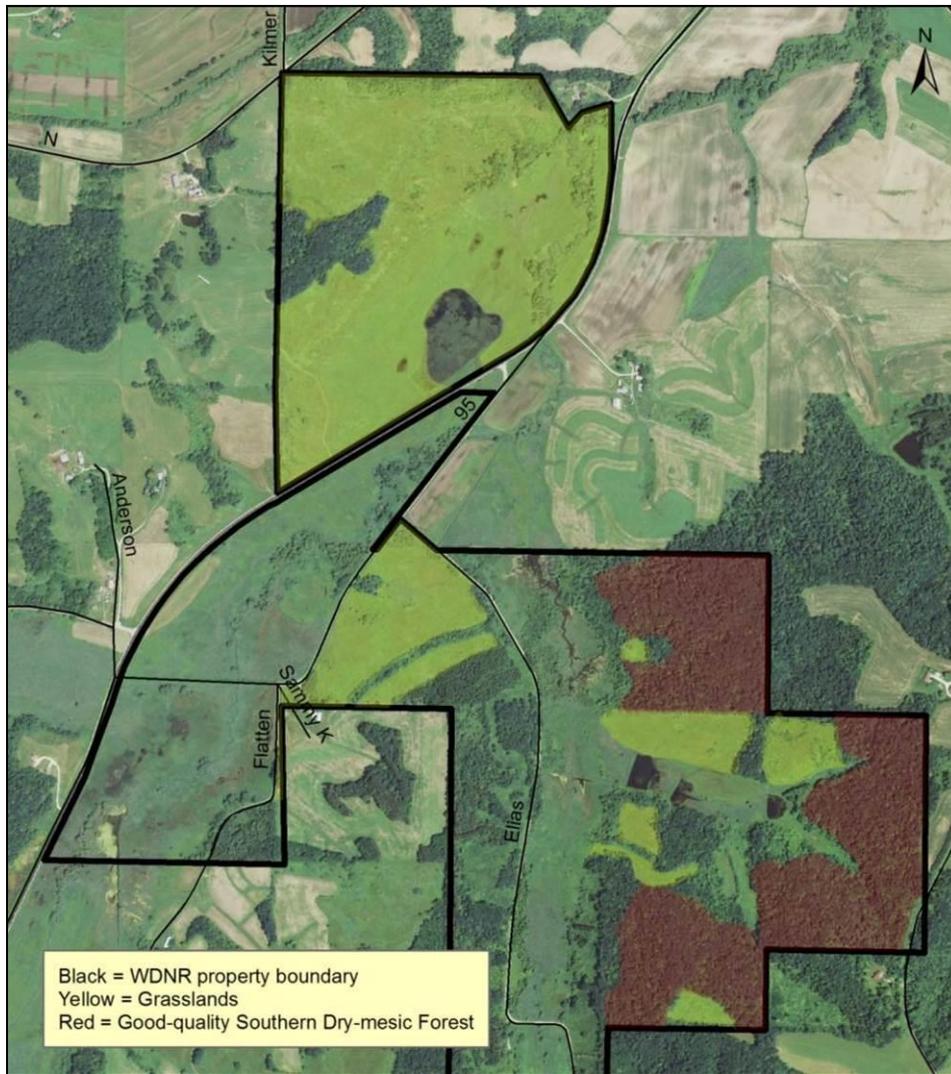


Figure 3. Grasslands and Good-quality Dry-mesic Forest of Lakes Coulee Wildlife Area

Grasslands

Lakes Coulee WA harbors approximately 180 acres of grassland habitat (Figure 3). These are “Surrogate Grasslands,” *i.e.*, they have the same basic structure as the original prairies that once covered parts of the state, but have been cleared, drained, plowed and/or heavily grazed and replanted with non-native cool-season grasses (especially smooth brome [*Bromus inermis*]) and native prairie plants. While they lack the elements of a remnant prairie ecosystem (intact soil structure, diverse soil microorganisms, diverse associated plants and animals, unimpaired nutrient cycling), they still provide important habitat for grassland species that key into structure rather than composition and processes, especially birds and small mammals. These grasslands are regularly managed with prescribed fire, and combine with grasslands and agricultural lands to create viable habitat for a broad suite of grassland bird species, including some that are rare. **Borst Valley WA** also has several small areas of non-native grasses as well as a 55-acre prairie planting.

At **Van Loon WA**, a 19-acre area of good-quality, remnant Dry-mesic Prairie is found on a floodplain terrace between the main and “New Channel” of the Black River. This unusual landscape setting

combines with sandy soils to provide opportunities for species that reflect a range of edaphic conditions, from sandy to dry-mesic to wet-mesic. Dominant species include big bluestem (*Andropogon gerardii*), prairie dropseed (*Sporobolus heterolepis*), green milkweed (*Asclepias viridiflora*), wild horsemint (*Monarda punctata*), Canada anemone (*Anemone canadensis*), culver's root (*Veronicastrum virginicum*), cream wild indigo (*Baptisia bracteata*), grass-leaved goldenrod (*Euthamia graminifolia*), pale-spiked lobelia (*Lobelia spicata*), leadplant (*Amorpha canescens*), mountain mint, wild rose (*Rosa acicularis*), flowering spurge (*Euphorbia corollata*), and prairie alum root (*Heuchera richardsonii*).

Oak Savanna (Oak Opening, Oak Woodland, Oak Barrens)

Wisconsin's oak savannas are fire-dependent communities with scattered oaks as the dominant canopy tree and a variety of species growing underneath and between them. Variable light conditions, fire frequency and intensity, soil type, and microclimate all work in concert to determine the composition of the oak savanna subcanopy and ground layer.

As defined by Curtis (1959), Oak Opening is an oak-dominated savanna community in which there is more than one tree per acre and less than 50% tree canopy coverage. They can occur over a variety of geological substrates on loamy soils that range from dry to wet-mesic. Historically, oak openings were abundant in Wisconsin, covering approximately 5.5 million acres (Curtis, 1959) south of the Tension Zone. Only about 75,000 acres (Hoffman, 2009) of this habitat type remain in Wisconsin; these are highly degraded, and are mostly being managed as oak forests. At **Chimney Rock Oak Savanna SNA**, there is a moderate- to good-quality, restorable Oak Opening with large diameter, open-grown red and white oak, and lesser amounts of bur oaks in the canopy. The shrub layer is sparse with some American hazelnut (*Corylus americana*) and common buckthorn present. The ground layer has savanna indicator species that include wild geranium, wood anemone (*Anemone quinquefolia*), rue anemone (*Anemonella thalictroides*), yellow lady's slipper orchid (*Cypripedium parviflorum* var. *pubescens*), New Jersey tea (*Ceanothus americanus*), Pennsylvania sedge (*Carex pensylvanica*), Canadian tick-trefoil (*Desmodium canadense*), prairie alumroot (*Heuchera richardsonii*), prairie violet (*Viola pedatifida*), showy goldenrod (*Solidago speciosa*), and fringed puccoon (*Lithospermum incisum*). Small areas of surrogate grassland with scattered open-grown bur oaks occur at **Lakes Coulee WA** as well, and could be managed as Oak Opening.

The Oak Woodland community occupies a position on the vegetation continuum that is intermediate between Oak Openings/Barrens and oak forests. Oak Woodland differs from other oak savanna types in: 1) the limb architecture of its trees, which have a more compact crown and more vertically-oriented limbs over a longer, narrower bole; and 2) greater canopy closure (50-95%). As compared to oak forests, Oak Woodlands have a far more open subcanopy and understory, with ground layer herbs holding a more prominent position in the community than tall shrubs and saplings. The dominant tree of the Oak Woodland is white oak, with lesser amounts of bur oak and black oak, and sometimes red oak, shagbark hickory, hackberry and black cherry. The diverse herb layer includes some members of the prairie, Oak Opening, and oak forest communities, but also features many grasses, sedges, legumes, composites and other forbs that are best adapted to the highly-filtered shade of the Oak Woodland. Important examples of Oak Woodland occur on the LBTRPG at **Borst Valley WA**.

Oak Barrens occur in patches interspersed with the larger Floodplain Forest matrix at **North Bend Bottoms** and **Van Loon WAs** on sandy floodplain terraces. These are sometimes referred to as "floodplain savannas", although we refer to them in this report as "Oak Barrens", as they most closely resemble that savanna type. At **North Bend Bottoms WA**, these savanna sites are characterized by scattered open-grown oaks (bur, Hill's, and swamp white) and eastern red-cedar (*Juniperus virginiana*). There are dense thickets of shrubs dominated by prickly-ash, and smooth sumac (*Rhus glabra*). The ground layer is dominated by Kentucky bluegrass (*Poa pratensis*) with big bluestem, white wild indigo

(*Baptisia alba*), and little bluestem (*Schizachyrium scoparium*) and other sand prairie species. Occasional wet pockets harbor prairie cord grass (*Spartina pectinata*) and fox sedge (*Carex vulpinoidea*). At **Van Loon WA**, the Oak Barrens are of lower quality and are smaller than those at **North Bend Bottoms WA**. These stands are dominated by large diameter, open-grown black oak with lesser amounts of bur oak, river birch, green ash and basswood. The shrub layer has up to 25% cover from black cherry (*Prunus serotina*), prickly-ash, and the non-native invasives common buckthorn and Eurasian bush honeysuckle (*Lonicera sp.*). A low-diversity ground layer includes Pennsylvania sedge, big bluestem, wild bergamot (*Monarda fistulosa*), harebell (*Campanula rotundifolia*), wild lupine (*Lupinus perennis*), spiderwort (*Tradescantia virginiana*), and the non-native invasive Kentucky bluegrass.



Oak Barrens with scattered eastern red cedar at North Bend WA. Photo by R. Staffen.

Rare Species and High-Quality Natural Communities of Lower Black and Trempealeau Rivers Planning Group

Rare species and high-quality natural communities have been documented at the Lower Black and Trempealeau Rivers Planning Group (LBTRPG) (Table 3). See Appendix C for a list of rare species and high-quality natural communities by property. See Appendix D for summary descriptions of rare species and natural communities. Bird occurrences refer only to breeding activity. It's important to note that other rare or declining species may be present on the LBTRGP, but escaped detection during surveys. Please refer to Appendix E for a complete list of SGCN that may occur within the Western Coulee and Ridges Ecological Landscape in natural communities of the LBTRGP.

Table 4. Documented rare species and high-quality natural communities of the Lower Black and Trempealeau River Planning Group.

For an explanation of state and global ranks, as well as state status, see Appendix F. State status, tracking status, and ranks are based on the working list published June 1, 2014. Species with a "W" in the "Tracked by NHI" column are on the Watch List (see Appendix F) and are not mapped in the NHI database. Various sources were used to determine the Watch List species and SGCN present and this may not be a complete list. *Species reported but not confirmed or did not meet criteria as an element occurrence.

Common Name	Scientific Name	Last Observed	State Rank	Global Rank	State Status	Federal Status	SGCN	Tracked by NHI
Aquatic Invertebrates								
A Brush-legged Mayfly	<i>Homoeoneuria ammophila</i>	1991	S2?	G4	SC/N		Y	Y
A Cleft-footed Minnow Mayfly	<i>Metretopus borealis</i>	2010	S1S2	G5	SC/N		Y	Y
A Predaceous Diving Beetle	<i>Dytiscus carolinus</i>	2015	S2S3	GNR	SC/N		Y	Y
A Riffle Beetle	<i>Stenelmis antennalis</i>	1992	S2S3	GNR	SC/N		Y	Y
A Small Square-gilled Mayfly	<i>Sparbarus nasutus</i>	2015	S1S3	G3G4	SC/N		Y	Y
A Water Scavenger Beetle	<i>Agabetes acuductus</i>	2015	S2S3	GNR	SC/N		Y	Y
A Water Scavenger Beetle	<i>Cymbiodyta blanchardi</i>	2015	S2S3	GNR	SC/N		Y	W
A Water Scavenger Beetle	<i>Helophorus orchymonti</i>	2015	S2S3	GNR	SC/N		Y	Y
Buckhorn	<i>Tritogonia verrucosa</i>	2012	S2	G4G5	THR		Y	Y
Butterfly	<i>Ellipsaria lineolata</i>	2004	S2	G4G5	END		Y	Y
Cyrano Darner	<i>Nasiaeshna pentacantha</i>	2015	S3S4	G5	SC/N		N	W
Elktoe	<i>Alasmidonta marginata</i>	2012	S3	G4	SC/P		Y	Y
Fox Small Square-gilled Mayfly	<i>Cercobrachys fox</i>	1992	S2S3	G3G4	SC/N		Y	Y
Ojibwe Small Square-gilled Mayfly	<i>Brachycercus ojibwe</i>	1992	S2S3	G3	SC/N		Y	Y
Pecatonica River Mayfly	<i>Acanthametropus pecatonica</i>	1992	S1	G2G4	END		Y	Y
Wisconsin Small Square-gilled Mayfly	<i>Cercobrachys lilliei</i>	1992	S1S2	G2	SC/N		Y	Y
Birds								
Acadian Flycatcher	<i>Empidonax virescens</i>	2015	S3B	G5	THR		Y	Y
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2014	S4B, S4N	G5	SC/P		Y	W
Bell's Vireo	<i>Vireo bellii</i>	2015	S2B	G5	THR		Y	Y
Bird Rookery	Bird Rookery	1983	SU	G5	SC			Y

Common Name	Scientific Name	Last Observed	State Rank	Global Rank	State Status	Federal Status	SGCN	Tracked by NHI
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	2015	S3S4B	G5	SC/M		Y	W
Blue-winged Teal	<i>Anas discors</i>	2015	S3S4B	G5	SC/P		Y	W
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	2015	S4B	G5	SC/M		Y	W
Bobolink	<i>Dolichonyx oryzivorus</i>	2015	S3S4B	G5	SC/M		Y	W
Brown Thrasher	<i>Toxostoma rufum</i>	2015	S3S4B	G5	SC/M		Y	W
Cerulean Warbler	<i>Setophaga cerulea</i>	1994	S2S3B	G4	THR		Y	Y
Common Nighthawk*	<i>Cordeiles minor</i>	2015	S2S3B	G5	SC/M		Y	Y
Eastern Meadowlark	<i>Sturnella magna</i>	2015	S3S4B	G5	SC/M		Y	W
Field Sparrow	<i>Spizella pusilla</i>	2015	S3S4B	G5	SC/M		Y	W
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	2015	S3S4B	G4	SC/M		Y	W
Great Egret	<i>Ardea alba</i>	1983	S2B	G5	THR		Y	Y
Henslow's Sparrow	<i>Ammodramus henslowii</i>	2015	S2S3B	G4	THR		Y	Y
Hooded Warbler	<i>Setophaga citrina</i>	2015	S2S3B	G5	THR		Y	Y
Lark Sparrow	<i>Chondestes grammacus</i>	2015	S3B	G5	SC/M		Y	Y
Least Flycatcher	<i>Empidonax minimus</i>	2015	S4B	G5	SC/M		Y	W
Prothonotary Warbler	<i>Protonotaria citrea</i>	2015	S3B	G5	SC/M		Y	Y
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	2015	S3B	G5	SC/M		Y	W
Red-shouldered Hawk	<i>Buteo lineatus</i>	2015	S3S4B,S IN	G5	THR		Y	Y
Veery	<i>Catharus fuscescens</i>	2015	S3S4B	G5	SC/M		Y	W
Vesper Sparrow	<i>Poocetes gramineus</i>	2015	S3S4B	G5	SC/M		Y	W
Western Meadowlark	<i>Sturnella neglecta</i>	1995	S2B	G5	SC/M		Y	Y
Willow Flycatcher	<i>Empidonax traillii</i>	2015	S4B	G5	SC/M		Y	W
Wood Thrush	<i>Hylocichla mustelina</i>	2015	S4B	G5	SC/M		Y	W
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	2015	S3B	G5	SC/M		Y	W
Yellow-breasted Chat	<i>Icteria virens</i>	2015	S2B	G5	SC/M		Y	Y
Fishes								
American Eel	<i>Anguilla rostrata</i>	1976	S2	G4	SC/N		Y	Y
Black Buffalo	<i>Ictiobus nigher</i>	2003	S2	G5	THR		Y	Y
Black Redhorse	<i>Moxostoma duquesnei</i>	1998	S1	G5	END		Y	Y
Blue Sucker	<i>Cycleptus elongatus</i>	1987	S2	G3G4	THR		Y	Y
Gilt Darter	<i>Percina evides</i>	2003	S2S3	G4	THR		Y	Y
Lake Sturgeon*	<i>Accipenser fulvescens</i>	2014	S3	G3G4	SC/H		Y	Y
Mud Darter	<i>Etheostoma asprigene</i>	2011	S3	G4	SC/N		Y	Y
Pallid Shiner	<i>Hybopsis amnis</i>	No Date	S1	G4	END		Y	Y
Pirate Perch	<i>Aphredoderus sayanus</i>	2011	S3	G5	SC/N		N	Y
Pugnose Minnow	<i>Opsopoeodus emiliae</i>	2001	S3	G5	SC/N		N	Y
River Redhorse	<i>Moxostoma carinatum</i>	2010	S2	G4	THR		Y	Y
Shoal Chub	<i>Macrhybopsis hyostoma</i>	1978	S2	G5	THR		Y	Y
Starhead Topminnow	<i>Fundulus dispar</i>	2011	S2	G4	END		Y	Y
Weed Shiner	<i>Notropis texanus</i>	2011	S3	G5	SC/N		N	Y

Common Name	Scientific Name	Last Observed	State Rank	Global Rank	State Status	Federal Status	SGCN	Tracked by NHI
Western Sand Darter	<i>Ammocrypta clara</i>	2010	S3	G3	SC/N		Y	Y
Herptiles								
American Bullfrog	<i>Lithobates catesbeianus</i>	2015	S3S4	G5	SC/H		N	N
Blanding's Turtle	<i>Emydoidea blandingii</i>	2015	S3S4	G4	SC/P		Y	Y
Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	2015	S3S4	G5	SC/H		N	W
Northern Leopard Frog	<i>Lithobates pipiens</i>	2015	S3S4	G5	SC/H		N	W
Pickereel Frog	<i>Lithobates palustris</i>	2015	S3?	G5	SC/H		Y	Y
Slender Glass Lizard	<i>Ophisaurus attenuatus</i>	2004	S1	G5	END		Y	Y
Smooth Softshell	<i>Apalone mutica</i>	2015	S3	G5	SC/H		Y	Y
Mammals								
Eastern Red Bat	<i>Lasiurus borealis</i>	2010	S3	G5	SC/N		Y	W
Hoary Bat	<i>Lasiurus cinereus</i>	2010	S3	G5	SC/N		Y	W
Least Weasel	<i>Mustela nivalis</i>	1966	SU	G5	SC/N		N	W
Prairie Deer Mouse	<i>Peromyscus maniculatus bairdii</i>	1966	S3S4	G5T5	SC/N		Y	W
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	2010	S2S4	G5	SC/N		Y	W
Terrestrial Invertebrates								
A Gall Wasp	<i>Antistrophus silphii</i>	2011	SNR	GNR	SC/N		Y	Y
Columbine Dusky Wing	<i>Erynnis lucilius</i>	No Date	S2S3	G4	SC/N		Y	Y
Eightfold Pinecone	<i>Strobilops affinis</i>	2010	S3	G4	SC/N		Y	Y
Gorgone Checkerspot*	<i>Chlosyne gorgone</i>	No Date	S3	G5	SC/N		N	Y
Gray Copper	<i>Lycaena dione</i>	1990	S2?	G5	SC/N		Y	Y
Juniper Hairstreak	<i>Callophrys gryneus</i>	2008	G5	S3	SC/N		N	Y
Ribbed Striate	<i>Striatura exigua</i>	2010	S2S3	G5	SC/N		N	Y
Natural Communities								
Alder Thicket	<i>Alder thicket</i>	2015	S4	G4	NA			Y
Dry-mesic Prairie	Dry-mesic prairie	2015	S2	G3	NA			Y
Emergent Marsh	<i>Emergent marsh</i>	2015	S4	G4	NA			Y
Floodplain Forest	<i>Floodplain forest</i>	2015	S3	G3?	NA			Y
Oak Barrens	Oak barrens	2015	S2	G2?	NA			Y
Oak Opening	Oak opening	2015	S1	G1	NA			Y
Riverine Lake/Pond	Riverine Lake/Pond	1981	SU	GNR	NA			Y
Shrub-carr	Shrub-carr	1976	S4	G5	NA			Y
Southern Dry-mesic Forest	Southern dry-mesic forest	2015	S3	G4	NA			Y
Southern Sedge Meadow	Southern sedge meadow	2015	S3	G4?	NA			Y
Stream--Fast, Hard, Cold	Stream--fast, hard, cold	1977	S4	GNR	NA			Y
Common Name	Scientific Name	Last Observed	State Rank	Global Rank	State Status	Federal Status	SGCN	Tracked by NHI
Stream--Fast, Hard, Warm	Stream--fast, hard, warm	1980	SU	GNR	NA			Y
Southern Tamarack Swamp (rich)	Southern Tamarack Swamp (rich)	2015	S3	G3	NA			Y
Wet Prairie	Wet prairie	2015	SU	G3	NA			Y

Plants								
Marsh Horsetail	<i>Equisetum palustre</i>	2015	S2	G5	SC			Y
Pale Green Orchid	<i>Platanthera flava</i> var. <i>herbiola</i>	2015	S2	G4?T4 Q	THR			Y
Prairie Parsley	<i>Polytaenia nuttallii</i>	2015	S2	G5	THR			Y
Short's Rock-cress	<i>Boechera dentata</i>	2015	S1S2	G5	SC			Y
Silky Prairie-clover	<i>Dalea villosa</i> var. <i>villosa</i>	2004	S2	G5T5	SC			Y
Snowy Campion	<i>Silene nivea</i>	2015	S3	G4?	SC			Y
Vasey's Pondweed	<i>Potamogeton vaseyi</i>	1956	S3	G4	SC			Y
Wolf's Bluegrass	<i>Poa wolfii</i>	1991	S1	G4	SC			Y

Management Considerations and Opportunities for Biodiversity Conservation

The Black River and Bottomland Habitats

The Black River (and associated riparian natural communities; Table 7) is one of the most important and biologically diverse river systems in Wisconsin, featuring one of the state's best populations of a threatened bird species, three rare mussel species, exceptional diversity of rare mayflies, and 11 rare fishes. The Black River and bottomlands is recognized as an aquatic COA of continental significance by the WDNR in their 2006 Wildlife Action Plan, by The Nature Conservancy in their 2001 conservation plan for the Prairie-Forest Border Ecoregion, and as an Important Bird Area (TNC 2001, WDNR 2006b, WDNR 2007).

Part of what makes the Black River unique is its relatively undisturbed geomorphology, with the lower portion (below the dam in Black River Falls) being free-flowing. While most streams in southern and western Wisconsin have been channelized, the Black River, the third longest river in the state, retains its natural meandering and braided character, allowing development of riffle-pool-run sequences, backwater sloughs, and seasonally recharged depressions such as potholes and oxbows. A diverse flora and fauna mirror the relatively unaltered state of the riparian corridor.

The Black River at **North Bend Bottoms** and **Van Loon WA's** provides a major opportunity to manage for a large and complex mosaic of riparian wetland habitat types including Floodplain Forest, Southern Sedge Meadow, and Emergent Marsh. The river and its backwater sloughs, oxbows and ponds also represent important natural communities with unique assemblages of aquatic plants. Together, these communities create vital habitat for rare and declining plants, birds, herptiles, bats, fishes, and aquatic invertebrates.

Bottomland Habitats

The Floodplain Forests of the lower Black River at **North Bend Bottoms** and **Van Loon WAs** along with connected parcels associated with the Upper Mississippi Wildlife and Fish Refuge offer a significant opportunity to manage a landscape mosaic of diverse bottomland habitats. The connection of bottomland forest, floodplain savannas and prairies to the wetlands, riverine lakes and ponds of the river valley bottoms represents an exceptional opportunity for landscape level management. This mosaic of diverse habitats meets the needs of many animal species that require a variety of habitat types for shelter, foraging, rearing their young, and hibernating. By providing this waterbody-to-wetland-to-upland continuum, the habitat needs for wildlife are maximized, and their safe movement from one habitat type to the next is ensured.

Birds

Van Loon and North Bend WAs provide the best opportunity for area-sensitive forest interior bird habitat in the entire planning group (Table 5), and are recognized as an Important Bird Area of statewide significance (WDNR 2007). The extensive corridor of mature Floodplain Forest at **Van Loon WA** combines with expansive wet meadows and backwater sloughs and ponds to attract high conservation priority bird species. These vast forested areas have previously been documented to support rare forest interior species. The north end of **Van Loon WA** has slightly drier areas where Oak Barrens and grasslands offer suitable habitat for SGCN shrub-birds. **North Bend Bottoms WA** also has large tracts of Floodplain Forest with nesting SGCN birds documented. Birds of conservation concern were also found utilizing the Oak Barrens within the floodplain.

Table 5. Forest Interior Birds of Conservation Concern of the LBTRPG

Common Name	Scientific Name	State Status
Acadian flycatcher	<i>Empidonax vireescens</i>	THR
cerulean warbler	<i>Dendroica cerulea</i>	THR
hooded warbler	<i>Wilsonia citrina</i>	THR
least flycatcher	<i>Empidonax minimus</i>	SC
prothonotary warbler	<i>Protonotaria citrea</i>	SC
red-shouldered hawk	<i>Buteo lineatus</i>	THR
yellow-billed cuckoo	<i>Coccyzus americanus</i>	SC
wood thrush	<i>Hylocichla mustelina</i>	SC
veery	<i>Catharus fuscescens</i>	SC

Herptiles

The Black River and associated bottomland habitats at **Van Loon WA** and **North Bend Bottoms WA** support some of the state’s rarest reptile species. **Van Loon WA** provides important wetland and aquatic habitat for basking, foraging, and overwintering of numerous rare or uncommon reptiles. A large, open sand bank was observed on the “New Channel” just upstream from Bridge #1 of McGilvray Road that appears to be an important turtle nesting site. Other riverine turtles were found along the main channel of the Black River at **Van Loon**.

Bats

An acoustic bat survey was performed along the lower Black River through **Van Loon WA** in 2010 (see Figure 4). The results of these surveys were consistent with the understanding that bats need water sources for drinking and foraging, and that long, narrow aquatic features like rivers are preferred over large open water bodies. Six of the seven species of Wisconsin's summer resident bats (excluding



Turtle nesting site along New Channel at Van Loon WA with numerous turtle tracks observed. Photo by R Staffen.

northern long-eared bat) were recorded along this stretch during surveys. Surveys along the Black River produced the exceptionally high number of individual bats similar to other large rivers in this ecological

landscape (Wisconsin, Chippewa, and Mississippi). It is assumed that **North Bend WA** would support similar species diversity and richness due to its proximity and similar habitat structure.

River systems have been found to produce greater diversity and species richness than lakes and ponds. This is likely because river systems have greater amounts of insects and are also utilized by bats as corridors for commuting and navigating. Forested areas in close proximity to water provide the best summer roosting habitat for bats. In addition, rivers support a habitat mosaic of forests, marshy sloughs, and shrub-swamps that different bat species require on the landscape. Protecting and managing riparian forests such as that at **Van Loon WA** would go a long way in conserving bat populations in the LBTRPG and the state.

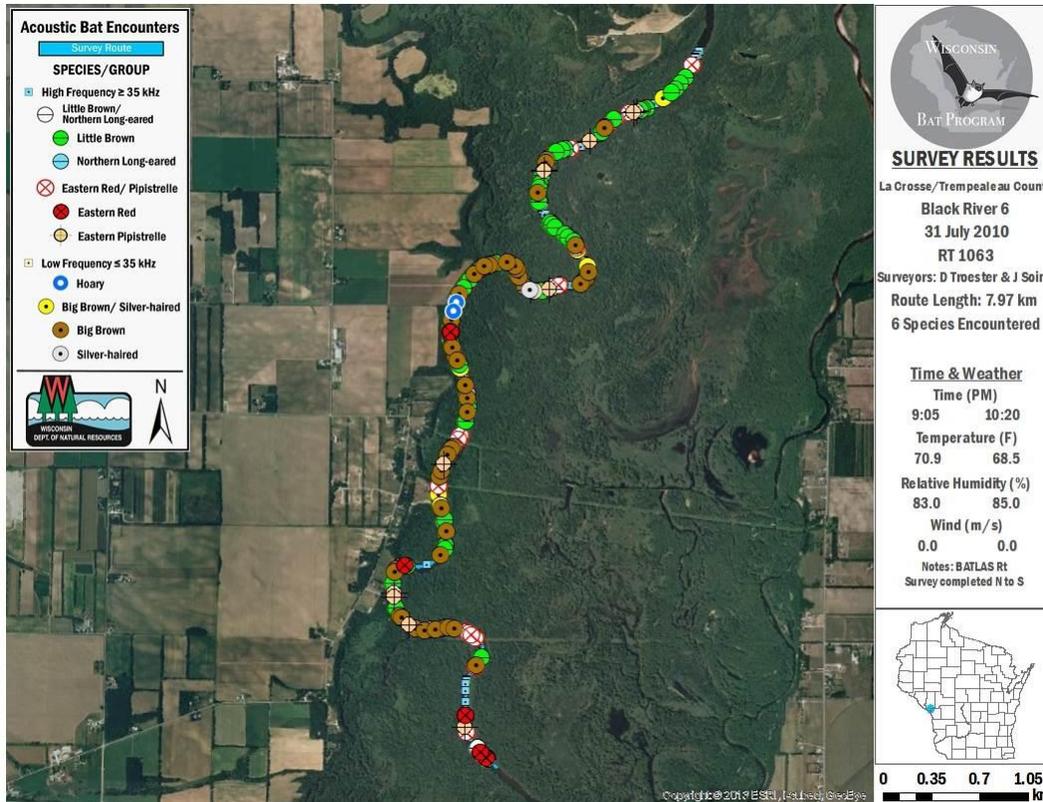


Figure 4: Results of Acoustic Bat Survey along Lower Black River

Aquatic Habitats

The lower Black River, totaling 62.4 miles from the Black River Falls dam downstream to its confluence with the Mississippi River, provides critically important aquatic habitat for a wide variety of fishes and aquatic invertebrates such as mussels, mayflies, dragonflies and damselflies. For this reason, the Lower Black River has been identified as an Aquatic Conservation Opportunity Area of continental significance. The Primary Sites identified at **Van Loon** and **North Bend Wildlife Areas** incorporate the Black River as an important feature due to the biodiversity it adds to those sites.

Fishes. The Black River has one of the most diverse warmwater fisheries in southern Wisconsin; at least 70 different species have been identified there, including 15 that are rare including eight that are state-listed (Hatleli pers. comm.; Table 6). Fisheries biologists conducted surveys of main channel fish species composition on the Lower Black River in 1987-88 and 2001-03. They documented increases in fish diversity from 46 species in 1987-88 to 69 species in 2001-03 and an increase in rare species from five to nine over these two survey periods (Hatleli pers. comm.).

The backwater areas (sloughs, oxbows, floodplain lakes/ponds) within these two properties are critical habitat for state-listed fish species.

Table 6. Rare Fishes of the Black River

Common Name	Scientific Name	Year of Last Observation	State Rank	State Status	SGCN
American Eel	<i>Anguilla rostrata</i>	1976	S2	SC/N	Y
Black Buffalo	<i>Ictiobus niger</i>	2003	S2	THR	Y
Black Redhorse	<i>Moxostoma duquesnei</i>	1988	S1	END	Y
Blue Sucker	<i>Cycleptus elongates</i>	1987	S2	THR	Y
Gilt Darter	<i>Percina evides</i>	2003	S2S3	THR	Y
Lake Sturgeon	<i>Acipenser fulvescens</i>	2014	S3	SC/H	Y
Mud Darter	<i>Etheostoma asprigene</i>	2011	S3	SC/N	Y
Pallid Shiner	<i>Hybopsis amnis</i>	No Date	S1	END	Y
Pirate Perch	<i>Aphredoderus sayanus</i>	2011	S3	SC/N	N
Pugnose Minnow	<i>Opsopoeodus emiliae</i>	2001	S3	SC/N	N
River Redhorse	<i>Moxostoma carinatum</i>	2010	S2	THR	Y
Shoal Chub	<i>Macrhybopsis hyostoma</i>	1978	S2	THR	Y
Starhead Topminnow	<i>Fundulus dispar</i>	2011	S2	END	Y
Weed Shiner	<i>Notropis texanus</i>	2011	S3	SC/N	N
Western Sand Darter	<i>Ammocrypta clara</i>	2010	S3	SC/N	Y

Mussels. Virtually all of Wisconsin's mussel species require fish to complete their life cycle, thus a diverse and healthy fish community ensures adequate mussel reproduction. The lower Black River is known to host 25 freshwater mussel species, including state endangered and threatened species (WDNR 2004). Species richness and diversity for the lower Black River is the third highest of major Wisconsin tributaries to the Mississippi River, close behind the lower Wisconsin River (29 species) and the lower Chippewa River (28 species) (WDNR 2004). There were three significant rock and gravel bars on the north side of the Black River on the east end of **North Bend WA**, though no major aggregations of mussels were found here (WDNR 2004). There are two mussel aggregations on the river stretches adjacent to **Van Loon WA**. One is found in the north half of the site just downriver from where the “New Channel” splits off from the main channel, and the other is on a major bend approximately one mile up from the State Highway 35 bridge crossing (WDNR 2004).

Mayflies. The lower Black River (LaCrosse and Trempealeau Counties) was one of the 25 sampling locations for a pioneering mayfly survey done from 1991-1993 by WDNR Research Scientist Richard Lillie (WDNR 1995). Surveyors found that the Black River hosts 36 mayfly species, and holds particular importance for seven rare mayfly species, one of which, is state endangered and only known from two other sites in the state, while three are considered very rare or imperiled globally (WDNR 1995). Most of these rare mayflies use sandy substrates of large, warm water streams. Aquatic invertebrate surveys were also performed in 2015 with one site producing an exuvium of the Special Concern small square-gilled mayfly (*Sparbarus nasutus*).

Snails. Aquatic invertebrate surveys in 2015 turned up a noteworthy collection from the Black River. Dr. Kurt Schmude collected a large adult snail in the family Viviparidae. Upon keying out the specimen it did not match any known Wisconsin species. A picture was sent to a snail expert in South Carolina who identified the specimen as the round mystery snail (*Viviparus intertextus*). The snail occurs in the Mississippi River drainage from Louisiana to Minnesota, but had never been recorded in Wisconsin until this point. It is believed to be a new state record and a new species to Wisconsin.

Coldwater Streams and Wetlands of the LBTRPG

Aside from the two properties associated with the Black River, all of the remaining LBTRPG properties have a creek or headwater stream flowing through them with extensive wetland communities associated with each of these riparian areas (Table 7). As a result, wetlands and aquatic habitats figure prominently in the habitat types of this property group. It is notable that six of the seven Primary Sites designated for this property group are wetlands or include some wetland communities, bespeaking the significant role they play in the larger landscape. Riparian corridors and associated wetlands offer important habitat for a number of species, including bats, herptiles, aquatic invertebrates, and birds.

Table 7. Wetlands of the Lower Black and Trempealeau Rivers Planning Group
Primary source: Wisconsin Wetlands Inventory & Natural Heritage Inventory Database

Property Name	Remnant Wetlands								Wet Meadow	Approximate Total Wetland Area (Acres)
	Alder Thicket	Emergent Marsh	Floodplain Forest	Riverine Lake/Pond	Shrub-carr	Southern Sedge Meadow	Tamarack Swamp (rich)	Wet Prairie		
Borst Valley WA						63			110	173
Chimney Rock WA						65		5		70
Lakes Coulee WA									298	298
North Bend Bottoms WA			769	13		102				884
South Beaver Creek WA	11					60			109	180
Tamarack Creek WA						189	194			383
Van Loon WA**		546	2623	x	x	x			313	3482
Total	11	546	3392	13	x	479	194	5	830	5470

x = Acreage not calculated

Riparian wetlands are common throughout the property group. They serve to slow the release of water during storms (thus minimizing flooding), filter nutrients and pollutants that are carried in runoff, and provide moisture banks during low water periods or droughts. Riparian wetlands also provide vital habitat to many animals, as well as natural corridors for their migration.

Forested wetlands comprise the majority of land cover on the LBTRPG. Open and brushy wetlands are also significant habitat types on the property group and include Alder Thicket, Southern Sedge Meadow, Shrub-carr, Wet Prairie, and Emergent Marsh. Although Floodplain Forest is the dominant natural community of the LBTRPG, the wetland landscape actually comprises a mosaic of intertwined wetland types where Alder Thicket, Shrub-carr, Wet Prairie, and Emergent Marsh intergrade with sedge meadow due to variations in topography, hydrology, soil type, and disturbance history. Their quality and extent is largely influenced by modification of local hydrology through damming of adjoining waterways and ditching/tiling of the wetlands. Run-off from croplands, residential areas, and eroding streambanks also has a negative impact on wetlands. Non-native invasives, especially reed canary grass, can also dominate and eventually supplant native wetland plants. Extensive areas of disturbed, reed canary grass-dominated wetlands occur throughout the property group, and are termed "wet meadows;" these may represent either remnant but severely degraded sedge meadows or anthropogenic sites where the original natural community was destroyed (Eggers and Reed 1997).

Herptiles and Wetlands. Amphibians are important indicators of wetland health and environmental conditions as their permeable skin makes them especially vulnerable to pollutants. They can make up a large portion of the vertebrate biomass in some ecosystems, and are important both as consumers of insects and other invertebrates and as prey in aquatic and terrestrial food webs (Burton and Likens 1975, Petranka and Murray 2001). Many amphibian species around the world are experiencing population declines (Alford and Richards 1999, Houlahan et al. 2000, Kiesecker et al. 2001). These declines are attributed to numerous factors, but habitat loss via destruction, fragmentation and alteration are likely to be the most serious culprits (WDNR 2001). In Wisconsin, more than 50% of our presettlement wetland acreage has been lost (WDNR 2001).

The properties making up the LBTRPG protect large wetlands associated with the Black and Trempealeau Rivers and their tributaries. These wetlands provide basking, foraging, and overwintering habitat for numerous rare or uncommon amphibians and reptiles. Frog and toad calling surveys in spring and summer 2015 within the planning group produced records of uncommon or declining amphibians.

Blanding's turtles are found in good numbers in wetlands throughout the planning group. This semi-aquatic turtle spends much of its life cycle in marshes along rivers, streams, and ponds but requires open, sandy habitat in close proximity to these areas for nesting. The loss or succession of open nesting habitats forces many turtles to nest in soft or sandy agricultural fields where they are more susceptible to getting crushed or clustered together in small upland sites where they are more prone to depredation by abundant meso-predators like common raccoons (*Procyon lotor*) and striped skunks (*Mephitis mephitis*).



Blanding's Turtle in wet meadow. Photo by R. Staffen

Oak Savanna and Prairie Conservation

Historically, Oak Openings were abundant in Wisconsin, covering approximately 5.5 million acres (Curtis 1959) south of the Tension Zone. Review of historical literature indicates that Oak Openings once supported an exceptionally diverse flora, about 25% of the entire native flora of Wisconsin (Leach and Givnish 1999). Of the about 75,000 acres (Hoffman 2009) of Oak Opening remaining in Wisconsin, many of these are highly degraded or have succeeded to closed-canopy oak forests. The few extant remnants are mostly on drier sites, with the mesic and wet-mesic Oak Openings almost totally destroyed by conversion to agricultural or residential uses and by the encroachment of other woody plants due to fire suppression. Oak Woodland once occupied approximately 1.4 million acres (Curtis 1959) in pre-widespread Euro-American settlement Wisconsin; today, it is extraordinarily rare – only about 140,000 acres remain in the state (Hoffman 2009). Most of these remnants are highly degraded and have converted to closed-canopy oak forest. Oak Barrens historically occupied approximately 1.8 million acres in Pre-European Settlement Wisconsin (Richard Henderson, pers. comm.), but is now reduced to approximately 95,000 acres (Hoffman 2009; includes both pine and oak barrens).

Opportunities exist on LBTRPG properties to restore Oak Openings, Oak Woodlands, and Oak Barrens, and to increase their connectivity. Such actions would also improve habitat for many plants and animals that are specialists of grassland, savanna, woodland, and barrens. Rare plant species already known on or near the property group that may recover or increase in number with prairie and savanna restoration include prairie parsley (*Polytaenia nuttallii*, threatened), silky prairie-clover (*Dalea villosa* var. *villosa*, special concern), clustered poppy-mallow (*Callirhoe triangulata*, special concern) and woolly milkweed (*Asclepias lanuginosa*, threatened). Prairies, barrens and oak savannas are all critically important habitats for many reptiles including many that are rare (see "Herptiles" section below). Restoration of Oak Woodland/Southern Dry Forest with dense leaf litter on well-drained soils could also benefit rare small mammals such as the woodland vole (*Microtus pinetorum*, special concern). A number of bird species also will benefit from oak savanna restoration, including SGCN such as red-headed woodpecker, black-billed cuckoo, common nighthawk (*Cordeiles minor*), field sparrow, brown thrasher (*Toxostoma rufum*), and upland game birds such as northern bobwhite (*Colinus virginianus*) and wild turkey (*Meleagris gallopavo*).

Typical oak savanna restorations in Wisconsin require aggressive and intensive management for a period of 15 or more years. This reflects the highly degraded state of most sites, and the time and effort required to effectively restore system structure and function. Be aware that limited short-term efforts could result in merely a structural restoration with no ecosystem functionality and may be considered wasteful. Also bear in mind that many former oak savannas are now closed-canopy forests that provide critical habitat for numerous bird species. Ecological restoration that converts closed-canopy forests to oak savanna may benefit some savanna specialist species at the expense of other species. As with all ecological restoration opportunities, sufficient resources must be available to ensure success of the project before the difficult decision of limiting habitat for some species in favor of other species is made.

While most oak savannas in southern Wisconsin are by nature highly degraded, several oak savanna sites of various types (Oak Opening, Oak Woodland, Oak Barrens) were identified in the LBTRPG that show good restoration potential:

- **Chimney Rock Oak Savanna SNA Primary Site**
- **Borst Valley Sedge Meadow State Natural Area and Oak Woodland Primary Site**
- **North Bend Bottoms Primary Site (particularly Black River Savanna SNA)**
- **Van Loon Floodplain Savanna State Natural Area Primary Site**



Oak Barrens at North Bend Wildlife Area. Photo by Andy Clark.

Prairie once occupied approximately 2.1 million acres in Wisconsin. Now, approximately 2,000 acres remain – less than 0.1% (Leach and Givnish 1999). Of these, only those prairies that occurred at the wet and dry ends of the soil spectrum survived. Virtually all deep-soil Mesic Prairies were converted to agricultural or residential uses. The surviving remnants are highly degraded due to fire suppression, overgrazing, invasion of woody species, invasive species and, in the case of Wet Prairies, ditching, and tiling. Virtually all of the upland deep-soil prairies of the LBTRPG were plowed in the past for farm land.

A number of rare prairie plants are known on or near the LBTRPG, thus protection and restoration of remnant prairies are essential for their conservation (Table 8).

Table 8. Rare Plants of the LBTRPG Associated with Prairies and Savannas

Common Name	Latin Name	State Status	Prairie Types
Clustered Poppy-mallow	<i>Callirhoe triangulata</i>	SC	Sand Terrace Prairies
Woolly Milkweed	<i>Asclepias lanuginosa</i>	THR	Dry or Sand Prairie
Prairie Parsley	<i>Polytaenia nuttallii</i>	THR	Prairie and Savannas
Silky Prairie-clover	<i>Dalea villosa</i> var. <i>villosa</i>	SC	Dry, Sandy River Terraces

Remnant Dry-mesic Prairie is found at one site on the LBTRPG:

- **Van Loon Floodplain Savanna State Natural Area Primary Site**

A fair example of remnant Wet Prairie is found at:

- **Hawkinson Creek Sedge Meadow State Natural Area Primary Site**

While these remnants are small and of low- to moderate-quality, they are important for protecting relicts of exceptionally rare community types as well as for providing a venue for citizen engagement through volunteer-led land management.

Herptiles and Prairie Conservation. Prairies, barrens and oak savannas are all critically important habitats for snakes and lizards, including some that are rare or declining. By providing a continuum of

these management-dependant natural communities, the habitat needs for numerous wildlife species are maximized, and their safe movement from one location to the next is ensured. These connections enable access to critical areas for basking and thermoregulation, overwintering, staging, nesting, and foraging. Management aimed at retaining or restoring open qualities of prairies, barrens, and savannas by controlling brush and invasive species would benefit many reptile species. Maintaining open grassland, barrens and savanna habitats for herptiles will also benefit many bird, small mammal, and invertebrate species that rely on these habitat types as well.

Sand-loving species like eastern hog-nosed snake (*Heterodon platirhinos*; special concern) and slender glass lizard (*Ophisaurus attenuatus*; endangered) are known from the open upland sandy barrens in these townships. The sandy barrens in the floodplain were also found to be utilized by nesting turtle species and thus serve a critical function. Surprisingly, few mammal burrows or runways were observed in the barrens and may be limiting use by predators like snakes. Unfortunately, these sandy habitats are also favorite areas for illegal off-road vehicles and these activities need to be closely monitored at this site.

Wildlife Action Plan Implementation and the LBTRPG

Conservation Opportunity Areas

Conservation Opportunity Areas (COAs) are places in Wisconsin that contain ecological features, natural communities, or SGCN habitat that present the greatest likelihood of successfully implementing conservation actions when viewed from the global, continental, upper Midwest, or state perspective. Several LBTRPG properties fall within COAs (see also the map in Appendix B):

South Beaver Creek WA lies within the Coulee Forests COA, which is identified as having continental significance for extensive prairie - savanna communities, cliffs, and wetlands including Dry Prairie, Dry-mesic Prairie, Oak Opening, Oak Woodland, Southern Dry Forest, and Southern Dry-mesic Forest.

North Bend Bottoms and Van Loon WA's occurs within the Lower Black River COA, which harbors a large river corridor of continental significance.

The Wisconsin Wildlife Action Plan identifies Ecological Priorities in each Ecological Landscape. Ecological Priorities are the natural communities in each Ecological Landscape that are most important to the SGCN. **Appendix E** highlights the Ecological Priorities for SGCN at LBTRPG properties. Note that these ecological priorities include all of the SGCNs that may possibly occur on the LBTRPG within the existing natural communities, not just those species detected during surveys. This intersection of SGCN with priority natural communities in the Western Coulees and Ridges Ecological Landscape represents the best opportunities for management at the LBTRPG properties from an ecological/biodiversity perspective.

Priority Conservation Actions

The Wildlife Action Plan also describes Priority Conservation Actions that make effective use of limited resources and address multiple species with each action. Implementing these actions and avoiding activities that may preclude successful implementation of these actions in the future would greatly benefit the SGCN at LBTRPG. Priority Conservation Actions identified in the Wisconsin Wildlife Action Plan (WDNR 2008) for the **Western Coulees and Ridges Ecological Landscape** that apply to LBTRPG include:

- Focus management and restoration efforts in the sandstone-influenced Conservation Opportunity Areas to emphasize dry oak savanna, oak woodland and sand prairie communities with smaller

embedded patches containing oak forest, pine relicts, dry prairie, open shrubby barrens, closed canopy oak forest, and rock outcrops.

- Protect the ecological river corridor gradients from lowlands to uplands, along with protection of the floodplain corridor. This will enlarge the amount of habitat available, allow for the movement of species upslope and downslope as environmental conditions change over time, provide migratory bird stopover habitat, and provide suitable habitat for species that require large areas or are dependent upon a mosaic of interconnected habitats, including a full range of seral stages, for their long-term survival.
- Maintain and connect large blocks of older floodplain forest to provide habitat for the large number of SGCN that utilize this habitat while addressing the regeneration difficulties associated with dense stands of reed canary grass.
- Create financial incentives similar to the Wisconsin Forest Landowner Grant Program (WFLGP) to address the differential market values between oak savanna restoration and oak forest management, reforestation of old fields to reduce fragmentation, or prescribed burning in and around prairie and savanna managed areas.
- Restore oak openings and woodlands and expand and enhance dry prairie and shrub habitats on public lands in appropriate Conservation Opportunity Areas through fire, ground layer enhancement, and timber management.
- Develop educational tools and demonstration/training areas that promote prescribed fire and other prairie and savanna management practices.
- Identify additional sites containing high quality or restorable oak barrens, oak savannas and woodlands.
- Develop a practical “toolkit” for maintaining structural and compositional characteristics of oak savanna ecosystems.
- Develop bluffland zoning that recognizes the critical importance of maintaining dry prairies, oak savanna restoration opportunities, connecting habitat corridors, migratory bird stopover sites, and forested habitat that is essential for long-term maintenance of viable SGCN populations.
- Partner with prairie/savanna/forest restoration groups to manage and protect habitats to effectively keep SGCNs on the landscape.
- Manage the sand and gravel-influenced floodplain forest of the Lower Chippewa and Lower Black Rivers for floodplain savanna conditions to help the recovery of eastern massasauga rattlesnake.
- Manage appropriate native sand prairie and sand prairie restoration sites for nesting ornate box (*Terrapene ornata ornata*) and Blanding’s turtles.
- Conduct inventories to better delineate cerulean warbler populations on public and private lands.
- Monitor long-term population status and trends for eastern massasauga rattlesnake.
- Conduct research on the interspecies competition between increasing “channel” shiners and the greatly decreasing pallid shiner (*Hybopsis amnis*).
- Initiate long-term monitoring and protection of wood turtle nest sites.
- Protect and restore appropriate natural stream habitat with focus on accommodating the habitat needs of wood turtle.

Opportunities for SGCN and Natural Community Conservation

The Wisconsin Wildlife Action Plan (WAP; WDNR 2015a) also identifies 36 natural communities for which there are “high” or “moderate” opportunities for protection, restoration, or management in the **Western Coulee and Ridges Ecological Landscape**. Of these, 14 are present at the LBTRPG (Table 9).

Table 9. Natural Communities with High or Moderate Management Opportunities in the Western Coulee and Ridges Ecological Landscape that Occur in the LBTRPG (WDNR 2015a)

High ¹ Opportunity	Moderate Opportunity
Coldwater Streams	Alder Thicket
Coolwater Streams	Southern Sedge Meadow
Dry-mesic Prairie	Southern Tamarack Swamp (rich)
Emergent Marsh	
Floodplain Forest	
Oak Barrens	
Oak Opening	
Oak Woodland	
Shrub Carr	
Southern Dry-mesic Forest	
Warmwater Rivers	

¹ High = A major opportunity for sustaining the natural community in the Ecological Landscape exists, either because many significant occurrences of the natural community have been recorded in the landscape or restoration activities in areas of historical occurrence are likely to be successful maintaining the community's composition, structure, and ecological function over a long period of time. Moderate = Although the natural community does not occur extensively or commonly in the Ecological Landscape, one to several significant occurrences do occur and are important in sustaining the community in the state. In some cases, important opportunities may exist because the natural community may be restricted to just one or a few Ecological Landscapes within the state and should be considered for management there because of limited geographic distribution and a lack of better opportunities elsewhere.

Wisconsin’s Statewide Forest Strategy and the LBTRPG

Wisconsin’s Statewide Forest Assessment (WDNR 2010b) was based on Wisconsin’s Forest Sustainability Framework (Wisconsin Council on Forestry 2008) and was designed to assess the current state of Wisconsin’s public and private forests and analyze the sustainability of our forested ecosystems. Wisconsin’s Statewide Forest Strategy (WDNR 2010c) contains a collection of strategies and actions designed to address the management and landscape priorities identified in the Statewide Forest Assessment. The strategies are broad guides intended to focus the actions of the forestry community. These documents include topics related to biological diversity in Wisconsin’s forests, and provide information useful for department master planning and management activities. Several Statewide Forest Strategies are particularly pertinent to the LBTRPG planning efforts in regard to opportunities to maintain or enhance biological diversity (Table 9, WDNR 2010b).

Table 10. Selection of Wisconsin Statewide Forest Strategies Relevant to the LBTRPG.

Strategy Number	Strategy
5	Pursue the conservation and protection of large, unfragmented blocks of forest lands
13	Increase forest structure and diversity.
14	Encourage the use of disturbance mechanisms to maintain diverse forest communities.
15	Maintain appropriate forest types for the ecological landscape while protecting forest health and function.
19	Adapt forest management practices to sustainably manage forests with locally high deer populations.
22	Strive to prevent infestations of invasive species before they arrive.
23	Work to detect new (invasive species) infestations early and respond rapidly to minimize impacts to forests.
24	Control and manage existing (invasive species) infestations.
25	Rehabilitate, restore, or adapt native forest habitats and ecosystems.

Non-Native Invasive Species

Non-native invasive species thrive in newly disturbed areas but also may invade and compromise high-quality natural areas. They establish quickly, tolerate a wide range of conditions, are easily dispersed, and are relatively free of the diseases, predators, and competitors that kept their populations in check in their native range. Non-native invasive plants can out-compete and even kill native plants by monopolizing light, water, and nutrients, and by altering soil chemistry and mycorrhizal relationships. In situations where non-native invasive plants become dominant, they may even alter ecological processes by limiting use of prescribed fire, by modifying hydrology, and by limiting tree regeneration and ultimately impacting forest composition (WDNR In preparation). In addition to the threats to native communities and native species diversity, non-native invasive species negatively impact forestry (by reducing tree regeneration, growth and longevity), recreation, agriculture, and human health (by causing skin rashes and increasing incidence of tick-borne diseases). For example, in bottomland forests, dense

patches of reed canary grass can prevent regeneration of trees and a minor infestation can become dense if the canopy is opened beyond 80% cover (WDNR In preparation). Gorchoff and Trisler (2003) note non-native invasive plants and animals can also have negative impacts on fish and wildlife species by long-term displacement of native food sources (e.g., for white-tailed deer [*Odocoileus virginianus*] and turkey), diminishing habitat for ground-nesting birds (e.g., ovenbirds [*Seiurus aurocapillus*] and woodcock [*Scolopax minor*]) (Miller and Jordan 2011, Loss et al. 2012) and altering aquatic macroinvertebrate communities in streams, thereby impacting fish that feed on them (McNeish et al. 2012).

The frequent usage of the LBTRPG for recreation has contributed to the introduction and spread of non-native invasive species throughout the properties. Parking areas, trails, and other high-use areas are typical entry points for non-native invasive species that are introduced by visitors' footwear, clothing, vehicle tires, boats, and recreational equipment. Once established, these invasives may continue to spread along natural corridors (e.g., waterways) and along human-made corridors (e.g. trails and roads). They even have the potential to invade remote natural areas via vectors such as wind, water, and wildlife. Non-native invasive species may also be spread inadvertently through management activities such as timber operations and roadside mowing, especially if Best Management Practices aren't followed.

Non-native invasive species that are widespread at LBTRPG and pose the greatest immediate threat to native species diversity, rare species habitats, or high-quality natural communities are listed in Table 11. See Table 12 for invasive species that are currently not known at LBTRPG, but could appear there.

When resources for complete control of widespread invasives are lacking, containment (i.e., limiting further spread) should be considered as an alternative action. Prevention of spread is, in fact, the most cost-effective means of dealing with invasive species. Forest inventory and management operations should take care to follow Best Management Practices related to non-native invasive species to avoid further spread. Roads, trails, access points for fishing, and other high-use areas are typical entry points for invasive species that are introduced by visitors' footwear, clothing, vehicle tires, boats, and recreational equipment. Once established, these invasives may continue to spread along natural corridors (e.g., streams) and along recreational corridors (e.g. hunting/fishing walking trails). Invasive species may also be spread inadvertently through management activities such as timber operations (especially trenching for planting pine seedlings), roadside mowing, and right-of-way maintenance. All management activities should follow the Best Management Practices developed by the Wisconsin Council on Forestry (WDNR 2009). Furthermore, early detection and rapid control of new and/or small infestations should be considered for higher prioritization in any invasive species management strategy (Boos et al. 2010).

Table 11. Non-native Invasive Species currently known at the Lower Black and Trempealeau Rivers Planning Group. Property abbreviations: BVWA = Borst Valley Wildlife Area, CRWA = Chimney Rock Wildlife Area, LCWA = Lakes Coulee Wildlife Area, NBWA = North Bend Wildlife Area, SBCWA = South Beaver Creek WA, TCWA = Tamarack Creek Wildlife Area, VLWA = Van Loon Wildlife Area. Chapter NR 40 classification codes for LBTRPG counties in superscript: P = Prohibited, R = Restricted, PR = Proposed Restricted.

Common Name	Scientific Name	Upland Habitats		Wetland Habitats		Aquatic	Sites Where Present
		Open	Wooded	Open	Wooded		
Plants							
autumn olive ^R	<i>Eleagnus umbellata</i>	x					NBWA
black locust	<i>Robinia pseudoacacia</i>	x	x				BVWA
burdock	<i>Arctium minus</i>	x	x				LCWA, CRWA
common buckthorn ^R	<i>Rhamnus cathartica</i>		x		x		VLWA, LCWA, BVWA, CRWA, TCWA
common forget-me-not	<i>Myosotis scorpioides</i>			x	x		VLWA
creeping Charlie	<i>Glechoma hederacea</i>				x		VLWA, NBWA
dame's rocket	<i>Hesperis matronalis</i>		x		x		VLWA
Eurasian bush honeysuckle ^R	<i>Lonicera sp. (e.g., L. tatarica, L. x bella)</i>	x	x		x		VLWA, LCWA, NBWA
garlic mustard	<i>Alliaria petiolata</i>		x		x		VLWA, LCWA
Japanese barberry ^R	<i>Berberis thunbergii</i>		x				LCWA, BVWA
Kentucky bluegrass ^{NR}	<i>Poa pratensis</i>	x					VLWA, CRWA, NBWA
leafy spurge	<i>Euphorbia esula</i>	x					VLWA
moneywort	<i>Lysimachia nummularia</i>				x		VLWA, NBWA, NBWA
motherwort	<i>Leonurus cardiaca</i>	x	x				LCWA
narrow-leaf cat-tail	<i>Typha angustifolia</i>			x			BVWA
Phragmites*	<i>Phragmites australis</i>			x			TCWA, NBWA
reed canary grass ^{NR}	<i>Phalaris arundinacea</i>	x		x	x		VLWA, LCWA, BVWA, CRWA, SBCWA, TCWA, NBWA
scotch pine ^{NR}	<i>Pinus sylvestris</i>	x	x				BVWA
smooth brome ^{NR}	<i>Bromus inermis</i>	x					LCWA, CRWA
white sweet clover	<i>Melilotus alba</i>	x					VLWA
Animals							
banded mystery snail						x	In or near VLWA (Black River)
rusty crayfish ^R	<i>Orconectes rusticus</i>					x	In or near VLWA (Black River)

Table 12. Non-native invasives to watch for in the Lower Black and Trempealeau Rivers Planning Group
 Chapter NR 40 classification codes for LBTRPG counties in superscript: NA = Not Applicable, P = Prohibited, R = Restricted, PR = Proposed Restricted.

Common Name	Scientific Name	Upland Habitats		Wetland Habitats		Aquatic	Comments
		Open	Wooded	Open	Wooded		
Plants							
Amur maple ^R	<i>Acer ginnala</i>						La Crosse Co.
black swallow-wort*	<i>Vincetoxicum nigrum</i>	x	x				SW WI
butter-and-eggs ^{NA}	<i>Lotus corniculatus</i>	x					Widespread
curly-leaf pondweed ^R	<i>Potamogeton crispus</i>					x	La Crosse, Trempealeau Cos.
dame's rocket ^R	<i>Hesperis matronalis</i>	x	x	x	x		Widespread
common teasel ^R	<i>Dipsacus sylvestris</i>	x					La Crosse Co.
cut-leaved teasel ^R	<i>Dipsacus laciniatus</i>	x					Monroe Co.
Eurasian water-milfoil ^R	<i>Myriophyllum spicatum</i>					x	La Crosse, Trempealeau Cos.
glossy buckthorn ^R	<i>Frangula alnus</i>			x	x		Jackson Co.
hemp nettle ^R	<i>Galeopsis tetrahit</i>	x	x		x		Jackson Co.
Japanese knotweed ^R	<i>Polygonum cuspidatum</i>	x		x	x		La Crosse, Trempealeau, Cos.
leafy spurge ^R	<i>Euphorbia esula</i>	x					Trempealeau Co.
poison hemlock**	<i>Conium maculatum</i>	x	x	x	x		Scattered pop'ns in Jackson Co.
purple loosestrife ^R	<i>Lythrum salicaria</i>			x			La Crosse, Trempealeau, Jackson Cos.
Siberian peashrub ^R	<i>Caragana arborescens</i>		x				La Crosse Co.
spotted knapweed ^R	<i>Centaurea biebersteinii</i>	x					La Crosse, Trempealeau, Jackson Cos.
wild parsnip ^R	<i>Pastinaca sativa</i>	x					La Crosse, Trempealeau Cos.
Animals							
European earthworms	Families of <i>Acanthodrilida</i> , <i>Lumbricidae</i> , <i>Megascoelididae</i>	x	x				
faucet snail ^P	<i>Bithynia tentaculata</i>					x	La Crosse Co.
silver carp ^P	<i>Hypophthalmichthys molitrix</i>					x	La Crosse Co.
zebra mussel ^R	<i>Dreissena polymorpha</i>					x	La Crosse Co.

Game Species

The following information was provided by WDNR wildlife managers

The properties in the LBTRPG are managed as State Wildlife Areas or Public Hunting Grounds. All of the properties within the planning group are open for hunting and trapping and provide habitat for a diverse assemblage of game species.

The wetlands within the group contain high quality breeding and stopover habitat for waterfowl. Open wetlands within the group contain moderate densities of nesting mallards and blue-winged teal (*Anas discors*) as well as high quality wood duck brood cover. The Floodplain Forests and associated sloughs contain very high densities of breeding wood ducks and lesser numbers of mallards and blue-winged teal. Lesser game species associated with the herbaceous wetlands include nesting Wilson's snipe (*Gallinago delicata*), sora (*Porzana carolina*) and Virginia rail (*Rallus limicola*). Furbearers utilizing these wetlands include beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), otter (*Lontra canadensis*), and mink (*Neovison vison*).

The forests, woodlands and savannas within this property group provide habitat for white-tailed deer, bear and wild turkey as well as eastern gray squirrel (*Sciurus carolinensis*), ruffed grouse (*Bonasa umbellus*) and American woodcock (*Scolopax minor*). Furbearers utilizing these woodlands include bobcats (*Lynx rufus*), fishers (*Martes pennanti*), and raccoons. The fragmented nature of this landscape naturally leads to high densities of wild turkey and white-tailed deer. Current forest cover contains pockets of aspen as well as an abundance of older oak, hickory, walnut and other mast trees. Management activities for these game species will continue to emphasize the regeneration of important mast trees and young forest in the landscape.

Upland and wet grasslands within the property complex also support populations of stocked ring-necked pheasant (*Phasianus colchicus*) [except **Van Loon WA**], cottontail rabbit (*Sylvilagus floridanus*) and mourning doves (*Zenaida macroura*). Furbearers utilizing these grasslands include coyotes (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*) and red fox (*Vulpes vulpes*). Over time the matrix of lands surrounding these publicly managed properties have seen large decreases in grassland cover. The grasslands found on state lands will continue to be maintained to provide habitat for game species.

Primary Sites: Site-specific Opportunities for Biodiversity Conservation

Seven ecologically important sites, or “Primary Sites,” were identified within the LBTRPG (Table 13 and Map A). Primary Sites are delineated because they generally encompass the best examples of 1) rare and representative natural communities, 2) documented occurrences of rare species populations, and/or 3) opportunities for ecological restoration or connections. These sites warrant high protection and/or restoration consideration during the development of the 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.

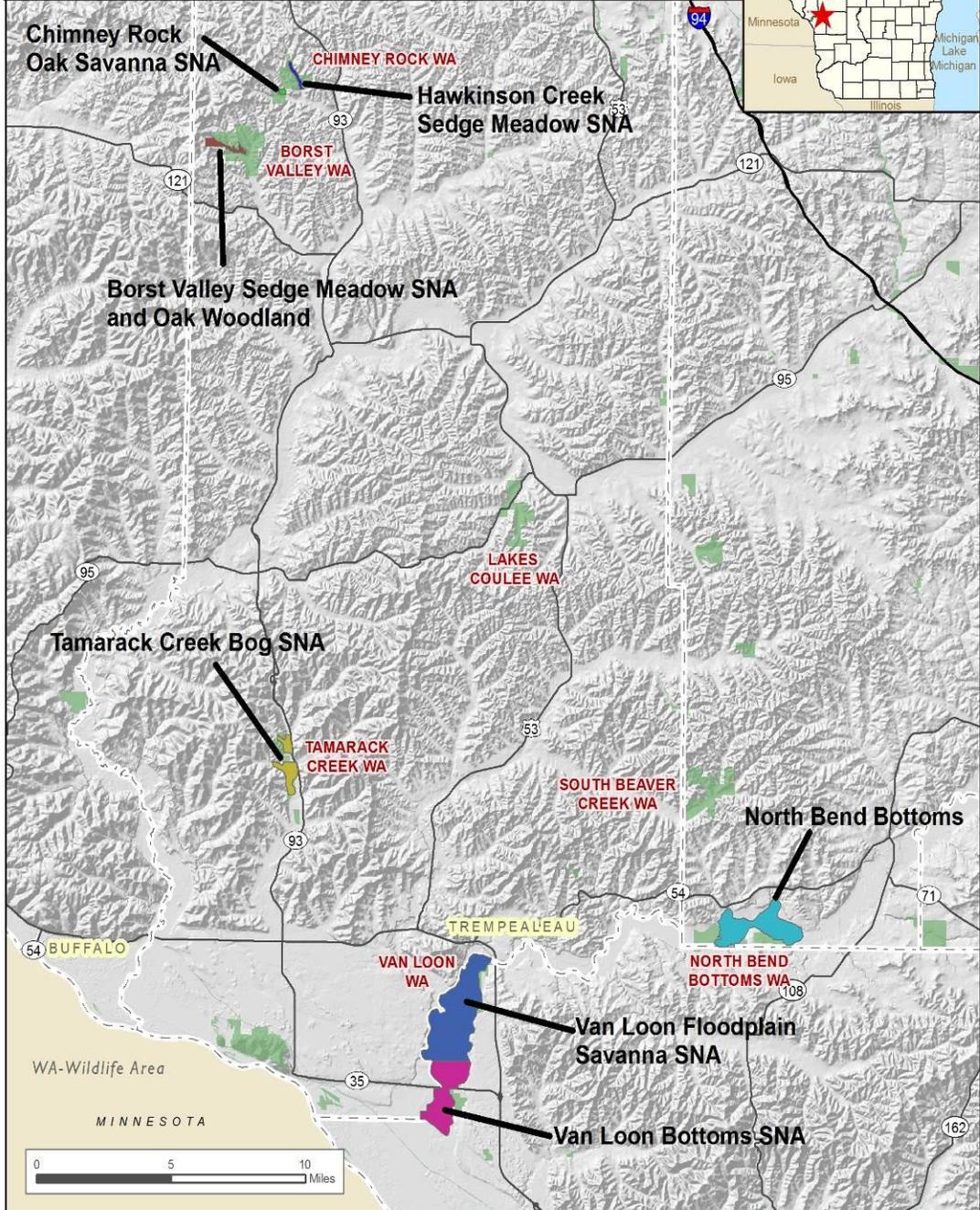
A complete description of the Primary Sites can be found in Appendix G. Information provided in the summary paragraphs includes location information, a site map, a brief summary of the natural features present, the site’s ecological significance, and management considerations. Appendix H lists the rare species and high-quality natural communities currently known from these Primary Sites in the LBTRPG.

Table 13. Lower Black and Trempealeau Rivers Planning Group Primary Sites.

Code	Name
LBTRPG01	Borst Valley Sedge Meadow State Natural Area and Oak Woodland
LBTRPG02	Chimney Rock Oak Savanna State Natural Area
LBTRPG03	Hawkinson Creek Sedge Meadow State Natural Area
LBTRPG04	North Bend Bottoms
LBTRPG05	Tamarack Creek Bog State Natural Area
LBTRPG06	Van Loon Floodplain Savanna State Natural Area
LBTRPG07	Van Loon Bottoms State Natural Area

PRIMARY SITES

Lower Black and Trempealeau Rivers Property Group



- Borst Valley Sedge Meadow SNA and Oak Woodland
- Chimney Rock Oak Savanna SNA
- Hawkinson Creek Sedge Meadow SNA
- Tamarack Creek Bog SNA
- Van Loon Bottoms SNA
- Van Loon Floodplain Savanna SNA
- North Bend Bottoms

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

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MAP A

Future Needs

This project was designed to provide a rapid assessment of the biodiversity values for the Lower Black and Trempealeau Rivers Planning Group. 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 of the LBTRPG.

- A comprehensive invasive species inventory is needed, along with development of an invasive species management plan. This plan should include a monitoring strategy for detecting and rapidly responding to new invasive threats.
- Additional surveys for terrestrial invertebrates in open uplands and wetlands would be beneficial. Though some surveys were conducted, they were relatively small in scope and time. Efforts should especially focus on butterflies and moths, grasshoppers, and beetles.
- Small mammal surveys are recommended throughout the planning group where dry prairie and sandy surrogate grasslands, oak woodland/savanna, and sedge meadows are present that could support uncommon prairie small mammals. Possible sites include **Tamarack Creek WA** where previous surveys occurred in the mid-1960's and found several special concern species, as well as oak forests and grasslands at **Borst Valley WA, Chimney Rock WA, and Lakes Coulee WA**.
- Continued survey effort for Blanchard's cricket frogs (*Acris blanchardii*) and eastern massasauga rattlesnake are recommended.
- The Wet Prairie at **Chimney Rock WA** should be revisited to determine its extent and assess its viability and potential for restoration.
- Surveys targeting yellow-crowned night-heron (*Nyctanassa violacea*) at **Van Loon Bottoms SNA** should be considered, as only anecdotal information exists of their presence here. They are an extremely rare species in the state and would be a noteworthy record.
- Large river turtle inventory and monitoring should be a priority and could include an effort to verify the presence of the false map turtle along the lower Black River, work to assess the abundance and distribution of smooth softshell turtles, and monitor of wood turtle populations from the Mississippi River to the the Black River Falls dam.

Glossary

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 - the basic building blocks of the Natural Heritage Inventory. They include natural communities, rare plants, rare animals, and other selected features such as colonial bird rookeries, bat hibernacula, and mussel beds. In short, an element is any biological or ecological entity upon which we wish to gather information for conservation purposes.

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.

Graminoid - grasses and grasslike plants such as sedges and rushes.

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.

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 2006a).

Species List

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

Common Name	Scientific Name
Plants	
American basswood	<i>Tilia americana</i>
American black currant	<i>Ribes americanum</i>
American elder	<i>Sambucus canadensis</i>
American elm	<i>Ulmus americana</i>
American hazelnut	<i>Corylus americana</i>
Amur maple	<i>Acer ginnala</i>
Arrowhead	<i>Sagittaria latifolia</i>
Aspen	<i>Populus tremuloides</i>
Autumn-olive	<i>Eleagnus umbellata</i>
Bebb willow	<i>Salix bebbiana</i>
Big bluestem	<i>Andropogon gerardii</i>
Big-toothed aspen	<i>Populus grandidentata</i>
Black cherry	<i>Prunus serotina</i>
Black locust	<i>Robinia pseudoacacia</i>
Black oak	<i>Quercus velutina</i>
Black swallow-wort	<i>Vincetoxicum nigrum</i>
Blue flag	<i>Iris virginica</i>
Blue-joint grass	<i>Calamagrostis canadensis</i>
Bog birch	<i>Betula pumila</i>
Box elder	<i>Acer negundo</i>
Brambles	<i>Rubus spp.</i>
Broad-leaved cattail	<i>Typha latifolia</i>
Bur oak	<i>Quercus macrocarpa</i>
Burdock	<i>Arctium minus</i>
Bur-reed	<i>Sparganium eurycarpum</i>
Bush honeysuckle	<i>Lonicera spp.</i>
Butter-and-eggs	<i>Lotus corniculatus</i>
Canada anemone	<i>Anemone canadensis</i>
Canada goldenrod	<i>Solidago canadensis</i>
Canadian tick-trefoil	<i>Desmodium canadense</i>
Canadian wood-nettle	<i>Laportea canadensis</i>
Clustered poppy-mallow	<i>Callirhoe triangulata</i>
Common boneset	<i>Eupatorium perfoliatum</i>
Common buckthorn	<i>Rhamnus cathartica</i>
Common forget-me-not	<i>Myosotis scorpioides</i>
Common lady fern	<i>Athyrium filix-femina</i>
Common teasel	<i>Dipsacus sylvestris</i>
Cream wild indigo	<i>Baptisia bracteata</i>
Creeping Charlie	<i>Glechoma hederacea</i>
Culver's root	<i>Veronicastrum virginicum</i>
Curly-leaf pondweed	<i>Potamogeton crispus</i>
Cut-leaved coneflower	<i>Rudbeckia laciniata</i>

Common Name	Scientific Name
Cut-leaved teasel	<i>Dipsacus laciniatus</i>
Dame's rocket	<i>Hesperis matronalis</i>
Eastern red-cedar	<i>Juniperus virginiana</i>
Enchanter's nightshade	<i>Circaea lutetiana</i>
Eurasian bush honeysuckle	<i>Lonicera sp.</i>
Eurasian water-milfoil	<i>Myriophyllum spicatum</i>
Flowering spurge	<i>Euphorbia corollata</i>
Fowl manna grass	<i>Glyceria striata</i>
Fox sedge	<i>Carex vulpinoidea</i>
Fringed brome	<i>Bromus ciliates</i>
Fringed puccoon	<i>Lithospermum incisum</i>
Garlic mustard	<i>Alliaria petiolata</i>
Giant goldenrod	<i>Solidago gigantea</i>
Glossy buckthorn	<i>Frangula alnus</i>
Grass-leaved goldenrod	<i>Euthamia graminifolia</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Green milkweed	<i>Asclepias viridiflora</i>
Harebell	<i>Campanula rotundifolia</i>
Hemp nettle	<i>Galeopsis tetrahit</i>
Hill's oak	<i>Quercus ellipsoidalis</i>
Interrupted fern	<i>Osmunda claytoniana</i>
Japanese barberry	<i>Berberis thunbergii</i>
Japanese knotweed	<i>Polygonum cuspidatum</i>
Kentucky bluegrass	<i>Poa pratensis</i>
Lake sedge	<i>Carex lacustris</i>
Leadplant	<i>Amorpha canescens</i>
Leafy spurge	<i>Euphorbia esula</i>
Little bluestem	<i>Schizachyrium scoparium</i>
Marsh horsetail	<i>Equisetum palustre</i>
Michigan lily	<i>Lilium michiganense</i>
Missouri gooseberry	<i>Ribes missouriensis</i>
Moneywort	<i>Lysimachia nummularia</i>
Moonseed vine	<i>Menispermum canadense</i>
Motherwort	<i>Leonurus cardiaca</i>
Mountain mint	<i>Pycnanthemum virginianum</i>
Nannyberry	<i>Viburnum lentago</i>
Narrow-leaf cat-tail	<i>Typha angustifolia</i>
Narrowleaf willow	<i>Salix exigua</i>
New England aster	<i>Aster novae-angliae</i>
New Jersey tea	<i>Ceanothus americanus</i>
Northern water-horehound	<i>Lycopus uniflorus</i>
Orange jewelweed	<i>Impatiens capensis</i>
Ostrich fern	<i>Matteuccia struthiopteris</i>
Pale green orchid	<i>Platanthera flava</i> var. <i>herbiola</i>
Pale-spiked lobelia	<i>Lobelia spicata</i>
Panicled aster	<i>Aster lanceolatus</i> var. <i>simplex</i>
Pennsylvania sedge	<i>Carex pennsylvanica</i>
Phragmites	<i>Phragmites australis</i>

Common Name	Scientific Name
Poison hemlock	<i>Conium maculatum</i>
Poison ivy	<i>Toxicodendron radicans</i>
Poison sumac	<i>Toxicodendron vernix</i>
Prairie alum root	<i>Heuchera richardsonii</i>
Prairie cord grass	<i>Spartina pectinata</i>
Prairie dropseed	<i>Sporobolus heterolepis</i>
Prairie parsley	<i>Polytaenia nuttallii</i>
Prairie violet	<i>Viola pedatifida</i>
Prickly-ash	<i>Zanthoxylum americanum</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Pussy willow	<i>Salix discolor</i>
Red maple	<i>Acer rubrum</i>
Red oak	<i>Quercus rubra</i>
Red pine	<i>Pinus resinosa</i>
Red-osier dogwood	<i>Cornus stolonifera</i>
Reed canary grass	<i>Phalaris arundinacea</i>
River birch	<i>Betula nigra</i>
River bulrush	<i>Bolboschoenus fluviatilis</i>
Riverbank grape	<i>Vitis riparia</i>
Rue anemone	<i>Anemonella thalictroides</i>
Sawtooth sunflower	<i>Helianthus grosseserratus</i>
Saw-toothed sagebrush	<i>Artemisia serrata</i>
Scotch pine	<i>Pinus sylvestris</i>
Shagbark hickory	<i>Carya ovata</i>
Short's Rock-cress	<i>Boechera dentata</i>
Showy goldenrod	<i>Solidago speciose</i>
Siberian peashrub	<i>Caragana arborescens</i>
Silky prairie-clover	<i>Dalea villosa var. villosa</i>
Silver maple	<i>Acer saccharinum</i>
Smooth brome	<i>Bromus inermis</i>
Smooth sumac	<i>Rhus glabra</i>
Snowy campion	<i>Silene nivea</i>
Speckled alder	<i>Alnus incana</i>
Spiderwort	<i>Tradescantia virginiana</i>
Spotted Joe-Pye-weed	<i>Eupatorium maculatum</i>
Spotted knapweed	<i>Centaurea biebersteinii</i>
Swamp aster	<i>Aster puniceus</i>
Swamp betony	<i>Pedicularis lanceolata</i>
Swamp milkweed	<i>Asclepias incarnata</i>
Swamp saxifrage	<i>Saxifraga pennsylvanica</i>
Swamp thistle	<i>Cirsium muticum</i>
Swamp white oak	<i>Quercus bicolor</i>
Tall meadowrue	<i>Thalictrum dasycarpum</i>
Tamarack	<i>Larix laricina</i>
Tussock sedge	<i>Carex stricta</i>
Vasey's pondweed	<i>Potamogeton vaseyi</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Water arum	<i>Calla palustris</i>

Common Name	Scientific Name
White avens	<i>Geum canadense</i>
White meadowsweet	<i>Spiraea alba</i>
White oak	<i>Quercus alba</i>
White pine	<i>Pinus strobus</i>
White spruce	<i>Picea glauca</i>
White sweet clover	<i>Melilotus alba</i>
White wild indigo	<i>Baptisma alba</i>
Wild bergamot	<i>Monarda fistulosa</i>
Wild geranium	<i>Geranium maculatum</i>
Wild horsemint	<i>Monarda punctate</i>
Wild lupine	<i>Lupinus perennis</i>
Wild parsnip	<i>Pastinaca sativa</i>
Wild rice	<i>Zizania aquatic</i>
Wild rose	<i>Rosa acicularis</i>
Wild sarsaparilla	<i>Aralia nudicaulis</i>
Wild timothy	<i>Muhlenbergia racemosa</i>
Wild yam	<i>Dioscorea villosa</i>
Wolf's bluegrass	<i>Poa wolfii</i>
Wood anemone	<i>Anemone quinquefolia</i>
Woodland phlox	<i>Phlox divaricata</i>
Woolly milkweed	<i>Asclepias lanuginosa</i>
Yellow lady's slipper orchid	<i>Cypripedium parviflorum</i> var. <i>pubescens</i>
Animals	
A Brush-legged Mayfly	<i>Homooneuria ammophila</i>
A Cleft-footed Minnow Mayfly	<i>Metretopus borealis</i>
A Gall Wasp	<i>Antistrophus silphii</i>
A Predaceous Diving Beetle	<i>Dytiscus carolinus</i>
A Riffle Beetle	<i>Stenelmis antennalis</i>
A Small Square-gilled Mayfly	<i>Sparbarus nasutus</i>
A Water Scavenger Beetle	<i>Agabetes acuductus</i>
A Water Scavenger Beetle	<i>Cymbiodyta blanchardi</i>
A Water Scavenger Beetle	<i>Helophorus orchymonti</i>
Acadian Flycatcher	<i>Empidonax virescens</i>
American Bullfrog	<i>Lithobates catesbeianus</i>
American Eel	<i>Anguilla rostrata</i>
American Mink	<i>Neovison vison</i>
American Woodcock	<i>Scolopax minor</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Bell's Vireo	<i>Vireo bellii</i>
Big Brown Bat	<i>Eptesicus fuscus</i>
Bird Rookery	<i>Bird Rookery</i>
Black Buffalo	<i>Ictiobus nigher</i>
Black Redhorse	<i>Moxostoma duquesnei</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
Blanding's Turtle	<i>Emydoidea blandingii</i>
Blue Sucker	<i>Cycleptus elongatus</i>

Common Name	Scientific Name
Blue-winged Teal	<i>Anas discors</i>
Blue-winged Warbler	<i>Vermivora cyanoptera</i>
Bobcat	<i>Lynx rufus</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Blanchard's Cricket Frog	<i>Acris blanchardii</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Buckhorn	<i>Tritogonia verrucosa</i>
Butterfly	<i>Ellipsaria lineolata</i>
Cerulean Warbler	<i>Dendroica cerulea</i>
Columbine Dusky Wing	<i>Erynnis lucilius</i>
Common Nighthawk	<i>Cordeiles minor</i>
Coyote	<i>Canis latrans</i>
Cyrano Darner	<i>Nasiaeschna pentacantha</i>
Eastern Cottontail Rabbit	<i>Sylvilagus floridanus</i>
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>
Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>
Eastern Massasauga	<i>Sistrurus catenatus catenatus</i>
Eastern Meadowlark	<i>Sturnella magna</i>
Eastern Pipistrelle	<i>Perimyotis subflavus</i>
Eastern Red Bat	<i>Lasiurus borealis</i>
Eightfold Pinecone	<i>Strobilops affinis</i>
Elktoe	<i>Alasmidonta marginata</i>
False Map Turtle	<i>Graptemys pseudogeographica</i>
Faucet Snail	<i>Bithynia tentaculata</i>
Field Sparrow	<i>Spizella pusilla</i>
Fisher	<i>Martes pennanti</i>
Fox Small Square-gilled Mayfly	<i>Cercobrachys fox</i>
Gilt Darter	<i>Percina evides</i>
Golden-winged Warbler	<i>Vermivora chrysoptera</i>
Gorgone Checkerspot	<i>Chlosyne gorgone</i>
Gray Copper	<i>Lycaena dione</i>
Gray Fox	<i>Urocyon cinereoargenteus</i>
Great Egret	<i>Ardea alba</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>
Hoary Bat	<i>Lasiurus cinereus</i>
Hooded Warbler	<i>Setophaga citrina</i>
Juniper Hairstreak	<i>Callophrys gryneus</i>
Lake Sturgeon	<i>Accipenser fulvescens</i>
Lark Sparrow	<i>Chondestes grammacus</i>
Least Flycatcher	<i>Empidonax minimus</i>
Least Weasel	<i>Mustela nivalis</i>
Little Brown Bat	<i>Myotis lucifugus</i>
Mourning Doves	<i>Zenaida macroura</i>
Mud Darter	<i>Etheostoma asprigene</i>
Muskrat	<i>Ondatra zibethicus</i>
North American Beaver	<i>Castor canadensis</i>
North American River Otter	<i>Lontra canadensis</i>

Common Name	Scientific Name
Northern Bobwhite	<i>Colinus virginianus</i>
Northern Leopard Frog	<i>Lithobates pipiens</i>
Northern Map Turtle	<i>Graptemys geographica</i>
Ojibwe Small Square-gilled Mayfly	<i>Brachycercus ojibwe</i>
Ornate Box Turtle	<i>Terrapene ornata ornata</i>
Ovenbird	<i>Seiurus aurocapillus</i>
Painted Turtle	<i>Chrysemys picta</i>
Pallid Shiner	<i>Hybopsis amnis</i>
Pecatonica River Mayfly	<i>Acanthametropus pecatonica</i>
Pickerel Frog	<i>Lithobates palustris</i>
Pirate Perch	<i>Aphredoderus sayanus</i>
Prairie Deer Mouse	<i>Peromyscus maniculatus bairdii</i>
Prothonotary Warbler	<i>Protonotaria citrea</i>
Pugnose Minnow	<i>Opsopoeodus emiliae</i>
Raccoon	<i>Procyon lotor</i>
Red fox	<i>Vulpes vulpes</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>
Ribbed Striate	<i>Striatura exigua</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
River Redhorse	<i>Moxostoma carinatum</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Rusty Crayfish	<i>Orconectes rusticus</i>
Shoal Chub	<i>Macrhybopsis hyostoma</i>
Silver Carp	<i>Hypophthalmichthys molitrix</i>
Silver-haired Bat	<i>Lasionycteris noctivagans</i>
Slender Glass Lizard	<i>Ophisaurus attenuatus</i>
Smooth Softshell	<i>Apalone mutica</i>
Sora	<i>Porzana carolina</i>
Starhead Topminnow	<i>Fundulus dispar</i>
Striped Skunk	<i>Mephitis mephitis</i>
Veery	<i>Catharus fuscescens</i>
Vesper Sparrow	<i>Pooecetes gramineus</i>
Virginia Rail	<i>Rallus limicola</i>
Weed Shiner	<i>Notropis texanus</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Western Sand Darter	<i>Ammocrypta clara</i>
White-tailed Deer	<i>Odocoileus virginianus</i>
Wild Turkey	<i>Meleagris gallopavo</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Wisconsin Small Square-gilled Mayfly	<i>Cercobrachys lillieii</i>
Wood Thrush	<i>Hylocichla mustelina</i>
Wood Turtle	<i>Glyptemys insculpta</i>
Woodland Vole	<i>Microtus pinetorum</i>
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>

Common Name	Scientific Name
Yellow-crowned Night-heron	<i>Nyctanassa violacea</i>
Zebra Mussel	<i>Dreissena polymorpha</i>

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Additional Resources

Numerous online resources are available for learning more about the rare species, natural communities, and ecological concepts contained within this report. These are just a few of the resources that we recommend.

WDNR Natural Heritage Conservation Webpages for Animals, Plants, and Communities

Information for plants, animals, and natural communities on the Wisconsin Working List, as well as Species of Greatest Conservation Need from the Wisconsin Wildlife Action Plan. For reptiles and amphibians, information for more common species is also provided here. At this time, the level of detail available varies among species; some have detailed factsheets while others have only a short paragraph or a map. These pages will continue to evolve as more information becomes available and are the Bureau of Natural Heritage Conservation's main source of information for species and communities. dnr.wi.gov keyword "*biodiversity*"

Wisconsin Natural Heritage Inventory Working List

The Wisconsin Natural Heritage Working List contains species known or suspected to be rare in the state and natural communities native to Wisconsin. It includes species legally designated as "Endangered" or "Threatened" as well as species in the advisory "Special Concern" category. This Web page offers a printable pdf file and a key to the Working List for use in conjunction with the information provided in #1 above. dnr.wi.gov keyword "*working list*"

Ecological Landscapes of Wisconsin Handbook

Wisconsin's 16 Ecological Landscapes have unique combinations of physical and biological characteristics such as climate, geology, soils, water, or vegetation. This handbook will contain a chapter for each of these landscapes with detailed information about their ecology, socioeconomics, and ecological management opportunities. An additional introductory chapter will compare the 16 landscapes in numerous ways, discuss Wisconsin's ecology on the statewide scale, and introduce important concepts related to ecosystem management in the state. The full handbook is in development as of this writing, and chapters will be made available online as they are published. Currently, a set of Web pages provide brief Ecological Landscape descriptions, numerous maps, and other useful information, including management opportunities for natural communities and Species of Greatest Conservation Need. dnr.wi.gov keyword "*landscapes*"

The Wisconsin Wildlife Action Plan

This plan is the result of a statewide effort to identify native Wisconsin animal species of greatest conservation need. The plan also presents priority conservation actions to protect the species and their habitats. The plan itself is available online, and there are several online tools to explore the data within the plan. The Web pages are closely integrated with the pages provided in items #1 and #3 above. The Wildlife Action Plan Web pages are quite numerous, so we recommend the following links as good starting points for accessing the information. the plan itself: dnr.wi.gov keyword "*wildlife action plan*" explore Wildlife Action Plan data by County: dnr.wi.gov/topic/WildlifeHabitat/county.asp Wildlife Action Plan Implementation: dnr.wi.gov keyword "*wap implementation*"

Wisconsin's Biodiversity as a Management Issue - A Report to Department of Natural Resources Managers

This now out-of-print report presents a department strategy for conserving biological diversity. It provides department employees with an overview of the issues associated with biodiversity and provides a common point of reference for incorporating the conservation of biodiversity into our management framework. The concepts presented in the report are closely related to the material provided in this report, as well as the other resources listed in this section. dnr.wi.gov/files/PDF/pubs/rs/rs0915.pdf

Wisconsin's Statewide Forest Strategy

Wisconsin's Statewide Forest Strategy is a collection of many strategies and actions designed to address major issues and priority topics over the next five to ten years. It provides a long-term, comprehensive, coordinated approach for investing resources to address the management and landscape priorities identified in the Statewide Forest Assessment. Several of the strategies contain issues related to biodiversity and ecosystem management.

dnr.wi.gov keyword "forest strategy"

2010 Wisconsin's Statewide Forest Assessment

The goal of this project was to assess the "state of affairs" of Wisconsin's public and private forests and analyze the sustainability of our forested ecosystems. The Statewide Forest Assessment helps to explain trends, identify issues, and present an updated view of the status of forests in Wisconsin. The first chapter deals with biological diversity in Wisconsin's forests, and the major conclusions from this assessment were used to develop the strategies in # 6 above. dnr.wi.gov keyword "forest assessment"

Oak Savanna State Natural Area Management Guide (Oak Opening, Oak Woodland, Oak Barrens). Chapter 100.60 of WDNR State Natural Areas Handbook.

This management guide contains the Wisconsin Department of Natural Resources' format for addressing actions on State Natural Areas where the primary feature is oak savanna (more specifically, Oak Opening, Oak Woodland and Oak Barrens). The guide was developed in consultation with Department of Natural Resources savanna management specialists and property managers, and further supported by an analysis of peer-reviewed literature, and leads the reader through the process of developing a detailed management plan. An overview of management techniques is provided, along with pertinent regulations.

Species Guidance Documents.

Species guidance documents are peer-reviewed publications with comprehensive information for rare species tracked by the Natural Heritage Inventory or identified in the Wisconsin Wildlife Action Plan as a Species of Greatest Conservation Need (SGCN). They contain identification, life history, management guidelines, screening guidance and avoidance measures and are intended for a wide variety of users, including resource managers, private landowners, contractors, students and the general public.

dnr.wi.gov keyword "species guidance"

Appendix A

Natural Heritage Inventory Overview and General Methodology

This biotic inventory and analysis was conducted by the Wisconsin Natural Heritage Inventory (NHI) program. The Wisconsin 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 standardized methods for collecting, processing, and managing data for rare species, natural communities, and certain other natural features (e.g., bird rookeries). NatureServe, an international non-profit organization, coordinates the network. This appendix provides a general overview of the methodology we use for these projects. Please see the NatureServe Web site for more detailed information about standard methods used by the Heritage Network (www.NatureServe.org) for locating, documenting, and ranking rare species and natural community occurrences.

General Process Used when Conducting Biotic Inventories for Master Planning

The Wisconsin NHI Program typically uses a “coarse filter-fine filter” approach to conducting biotic inventory projects for master planning. This approach begins with a broad assessment of the natural communities and aquatic features present, along with their relative quality and condition. The area's landforms, soils, topography, hydrology, current land uses, and the surrounding matrix are also evaluated using Geographic Information Systems (GIS) and other electronic and hardcopy data sources. Data that describe conditions for the area prior to Euro-American settlement are often used during this step and at other times to further understand the ecological capabilities of the area. Often, we consult with local managers, biologists, or others familiar with the ecology of the area when preparing for an inventory project. The goals for this step are to identify the important ecological attributes and biological processes present, as well as to focus our inventory efforts.

The level of survey intensity varies based on the size and ecological complexity of the property or group of properties, as well as the resources available. For larger properties such as state forests, biotic inventory efforts typically take more than one year. Ideally, taxa surveys are conducted following a coarse-filter analysis that sometimes include extensive natural community surveys. There is often time for “mop-up work” during the year following the completion of the main survey effort, whereby additional surveys are conducted for areas that could not be reached the first year or for which new information has become available. For smaller properties, a “Rapid Ecological Assessment” often takes the place of a full-scale biotic inventory. The level of effort for these projects varies based on the needs of the study area, although surveys are almost always completed during one field season. Coarse filter work for rapid assessments is often done based on GIS data, aerial photos, data acquired from previous efforts, and information from property managers and others knowledgeable about the area.

Taxa-specific surveys can be costly and intensive and sometimes must be completed during a very narrow period of time. For example, bird surveys must be completed within an approximately one-month time window. For this and several other reasons, ***our surveys cannot locate every rare species occurrence within a given area.*** Therefore, it is important to use resources as efficiently as possible, making every effort to identify the major habitats present in the study area from the start. This approach concentrates inventory efforts on those sites most likely to contain target species to maximize efficient use of resources. Communication among biologists during the field season can help identify new areas of interest or additional priorities for surveys. The goal is to locate species populations with the highest conservation value whenever possible.

After all of the data are collected, occurrences of rare species, high-quality natural communities, and certain other features are documented, synthesized, and incorporated into the NHI Database. The NHI program refers to this process as “mapping” the data and uses a tabular and spatial database application designed specifically for the Heritage Network. Other secondary databases are also used by the Wisconsin NHI Program for storing additional species and community information such as species lists, GPS waypoints, photos, and other site documentation.

Once the data mapping and syntheses are completed, the NHI Program evaluates data from the various department biologists, contractors, and other surveyors. This information is examined along with many other sources of spatial and tabular information including topographic maps, various types of aerial photography, digital soil and wetland maps, hydrological data, forest reconnaissance data, and land cover data. Typically, GPS waypoints and other spatial information from the various surveys are superimposed onto these maps for evaluation by NHI biologists.

In addition to locating important rare species populations and high-quality natural community occurrences, the major products culminating from all of this work are the “Primary Sites.” These areas contain relatively undisturbed, high-quality, natural communities; provide important habitat for rare species; offer opportunities for restoration; could provide important ecological connections; or some combination of the above factors. The sites are meant to highlight, based on our evaluation, the best areas for conserving biological diversity for the study area. They often include important rare species populations, High Conservation Value Forests, or other ecologically important areas.

The final report describes the Primary Sites, as well as rare or otherwise notable species, and other ecological opportunities for conserving or enhancing the biological diversity of the study area. The report is intended for use by department master planning teams and others and strives to describe these opportunities at different scales, including a broad, landscape context that can be used to facilitate ecosystem management.

Select Tools Used for Conducting Inventory

The following are descriptions of standard tools used by the NHI Program for conducting biotic inventories. Some of these may be modified, dropped, or repeated as appropriate to the project.

File Compilation: Involves obtaining existing records of natural communities, rare plants and animals, and aquatic features for the study area and surrounding lands and waters from the NHI Database. Other databases with potentially useful information may also be queried, such as: forest reconnaissance data; the DNR Surface Water Resources series for summaries of the physical, chemical, and biological characteristics of lakes and streams (statewide, by county); the Milwaukee Public Museum's statewide Herp Atlas; the Wisconsin Breeding Bird Atlas; other NHI “atlas” and site databases; museum/herbarium collections for various target taxa; soil surveys; geological surveys; and the department’s fish distribution database.

Additional data sources are sought out as warranted by the location and character of the site, and the purpose of the project. Manual files maintained within the Bureau of Endangered Resources, including the State Natural Area files, often contain information on a variety of subjects relevant to the inventory of natural features for an area.

Literature Review: Field biologists involved with a given project consult basic references on the natural history and ecology of the area, as well as any documented rare species. This sometimes broadens and/or sharpens the focus of the inventory efforts.

Target Elements: Lists of target elements including natural communities, rare plants and animals, and aquatic features are developed for the study area. Field inventory is then scheduled for the times when these elements are most identifiable or active. Inventory methods follow accepted scientific standards for each taxon.

Compilation of Maps and Other Spatial Data: USGS 7.5 minute topographic quadrangles, most often in digital form, serve along with aerial photos as the base maps for field survey and often yield useful clues regarding access, extent of area to be surveyed, developments, and the presence and location of special features. These are used in conjunction with numerous GIS layers, which are now a basic resource tool for the efficient and comprehensive planning of surveys and the analysis of their results.

WDNR wetland maps consist of aerial photographs upon which all wetlands down to a scale of 2 or 5 acres have been delineated. Each wetland polygon is classified based on characteristics of vegetation, soils, and water depth. These polygons have been digitized for most counties, and the resulting GIS layers can be superimposed onto other maps.

Ecoregion GIS layers are useful for comprehensive projects covering large geographic areas such as counties, national and state forests, and major watersheds. These maps integrate basic ecological information on climate, landforms, geology, soils, and vegetation. Ecological Landscapes provide the broad framework most often used in Wisconsin; however smaller units, including Landtype Associations, can be very helpful for evaluating ecoregions at finer scales.

Aerial photographs: These provide information on a study area not available from maps, paper files, or computer printouts. Examination of both current and historical photos, taken over a period of decades, can be especially useful in revealing changes in the environment over time. The Wisconsin NHI Program uses several different types of both color and black and white air photos. Typically, these are in digital format, although paired photos in print format can be valuable for stereoscopic viewing. High-resolution satellite imagery is often cost-prohibitive but is available for some portions of the state and is desirable for certain applications.

Original Land Survey Records: The surveyors who laid out the rectilinear Town-Range-Section grid across the state in the mid-nineteenth century recorded trees by species and size at all section corners and along section lines. Their notes also included general impressions of vegetation, soil fertility, and topography, and note aquatic features, wetlands, and recent disturbances such as windthrow and fire. As these surveys typically occurred prior to extensive settlement of the state by Europeans, they constitute a valuable record of conditions prior to extensive modification of the landscape by European technologies and settlement patterns. The tree data are available in GIS format as raw points or interpreted polygons, and the notes themselves can provide helpful clues regarding the study area's potential ecological capabilities.

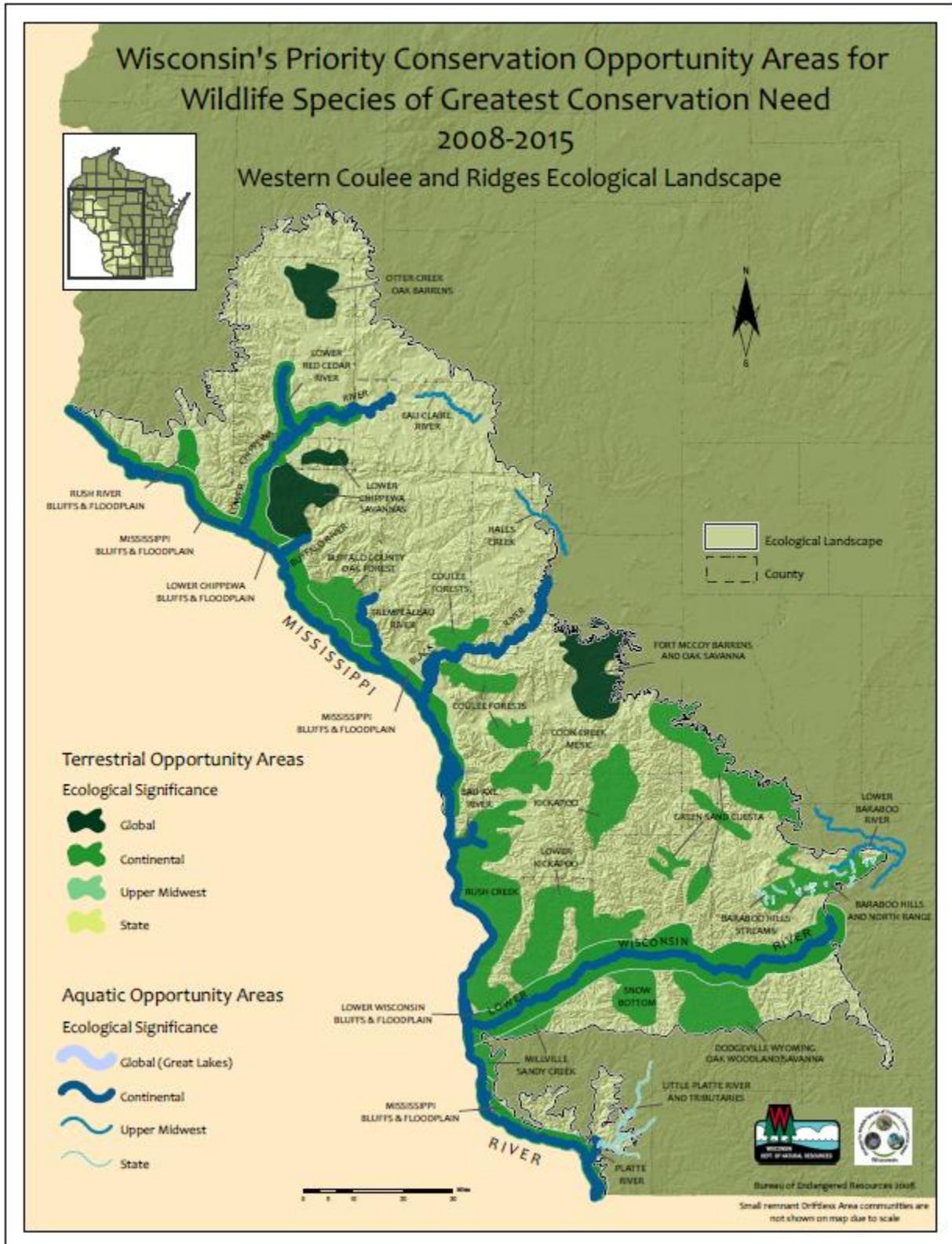
Interviews: Interviews with scientists, naturalists, land managers or others knowledgeable about the area to be surveyed often yield invaluable information.

Global Positioning Systems (GPS): Small, portable GPS units are now a routine piece of field equipment used for virtually all NHI survey work. Collecting coordinates (waypoints) facilitates mapping and makes it easy to quickly communicate specific locations among biologists. Often waypoints are paired with photos and/or other information and stored in a waypoint tracking database.

Aerial Reconnaissance: Fly-overs are desirable for large sites, and for small sites where contextual issues are especially important. When possible, this should be done both before and after ground level work. Flights are scheduled for those times when significant features of the study area are most easily identified

and differentiated. They are also useful for observing the general lay of the land, vegetation patterns and patch sizes, aquatic features, infrastructure, and disturbances within and around the site

Appendix B



Appendix F

Wisconsin Natural Heritage Working List Explanation

The Wisconsin Natural Heritage Working List contains species known or suspected to be rare in the state and natural communities native to Wisconsin. It includes species legally designated as "Endangered" or "Threatened" as well as species in the advisory "Special Concern" category. Most of the species and natural communities on the list are actively tracked and we encourage data submissions on these species. This list is meant to be dynamic - it is updated as often as new information regarding the biological status of species becomes available. See the Endangered Resources Program web site for the most recent Natural Heritage Inventory Working List (<http://dnr.wi.gov/topic/NHI/WList.html>).

Key

Scientific Name: Scientific name used by the Wisconsin Natural Heritage Inventory Program.

Common Name: Standard, contrived, or agreed upon common names.

Global Rank: Global element rank. See the rank definitions below.

State Rank: State element rank. See the rank definitions below.

US Status: Federal protection status in Wisconsin, designated by the Office of Endangered Species, U.S. Fish and Wildlife Service through the U.S. Endangered Species Act. LE = listed endangered; LT = listed threatened; XN = non-essential experimental population(s); LT,PD = listed threatened, proposed for de-listing; C = candidate for future listing.

WI Status: Protection category designated by the Wisconsin DNR. END = endangered; THR = threatened; SC = Special Concern.

WDNR and federal regulations regarding Special Concern species range from full protection to no protection. The current categories and their respective level of protection are SC/P = fully protected; SC/N = no laws regulating use, possession, or harvesting; SC/H = take regulated by establishment of open closed seasons; SC/FL = federally protected as endangered or threatened, but not so designated by WDNR; SC/M = fully protected by federal and state laws under the Migratory Bird Act.

Special Concern species are those species about which some problem of abundance or distribution is suspected but not yet proved. The main purpose of this category is to focus attention on certain species before they become threatened or endangered.

Global & State Element Rank Definitions

Global Element Ranks:

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single state or physiographic region) or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4 = Apparently globally secure, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH = Of historical occurrence throughout its range, i.e., formerly part of the established biota, with the expectation that it may be rediscovered.

GU = Possibly in peril range-wide, but their status is uncertain. More information is needed.

GX = Believed to be extinct throughout its range (e.g. Passenger pigeon) with virtually no likelihood that it will be rediscovered.

G? = Not ranked.

Species with a questionable taxonomic assignment are given a "Q" after the global rank.

Subspecies and varieties are given subranks composed of the letter "T" plus a number or letter. The definition of the second character of the subrank parallels that of the full global rank. (Examples: a rare subspecies of a rare species is ranked G1T1; a rare subspecies of a common species is ranked G5T1.)

State Element Ranks

S1 = Critically imperiled in Wisconsin because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from the state.

S2 = Imperiled in Wisconsin because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3 = Rare or uncommon in Wisconsin (21 to 100 occurrences).

S4 = Apparently secure in Wisconsin, with many occurrences.

S5 = Demonstrably secure in Wisconsin and essentially ineradicable under present conditions.

SA = Accidental (occurring only once or a few times) or casual (occurring more regularly although not every year); a few of these species (typically long-distance migrants such as some birds and butterflies) may have even bred on one or more of the occasions when they were recorded.

SE = An exotic established in the state; may be native elsewhere in North America.

SH = Of historical occurrence in Wisconsin, perhaps having not been verified in the past 20 years, and suspected to be still extant. Naturally, an element would become SH without such a 20-year delay if the only known occurrence were destroyed or if it had been extensively and unsuccessfully looked for.

SN = Regularly occurring, usually migratory and typically non-breeding species for which no significant or effective habitat conservation measures can be taken in Wisconsin. This category includes migratory birds and bats that pass through twice a year or, may remain in the winter (or, in a few cases, the summer) along with certain lepidoptera which regularly migrate to Wisconsin where they reproduce, but then completely die out every year with no return migration. Species in this category are so widely and unreliably distributed during migration or in winter that no small set of sites could be set aside with the hope of significantly furthering their conservation.

SZ = Not of significant conservation concern in Wisconsin, invariably because there are no definable occurrences in the state, although the taxon is native and appears regularly in the state. An SZ rank will generally be used for long-distance migrants whose occurrence during their migrations are too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped, and protected. Typically, the SZ rank applies to a non-breeding population.

SR = Reported from Wisconsin, but without persuasive documentation which would provide a basis for either accepting or rejecting the report. Some of these are very recent discoveries for which the program hasn't yet received first-hand information; others are old, obscure reports that are hard to dismiss because the habitat is now destroyed.

SRF = Reported falsely (in error) from Wisconsin but this error is persisting in the literature.

SU = Possibly in peril in the state, but their status is uncertain. More information is needed.

SX = Apparently extirpated from the state.

State Ranking of Long-Distance Migrant Animals:

Ranking long distance aerial migrant animals presents special problems relating to the fact that their non-breeding status (rank) may be quite different from their breeding status, if any, in Wisconsin. In other words, the conservation needs of these taxa may vary between seasons. In order to present a less ambiguous picture of a migrant's status, it is necessary to specify whether the rank refers to the breeding (B) or non-breeding (N) status of the taxon in question. (e.g. S2B, S5N).

APPENDIX G

Primary Sites within the Lower Black and Trempealeau Rivers Planning Group

Seven ecologically important sites were identified on the Lower Black and Trempealeau Rivers Planning Group (LBTRPG). These “Primary Sites” were delineated because they generally encompass the best examples of 1) rare and representative natural communities, 2) documented occurrences of rare species populations, and/or 3) opportunities for ecological restoration or connections. These sites warrant high protection and/or restoration consideration during the development of the 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.

Information provided in the summary paragraphs includes location information, a site map, a brief summary of the natural features present, important plant and animal species¹, the site’s ecological significance, and management considerations. For a table of rare species and natural communities associated with each Primary Site, please see Appendix H.

Primary Sites

	Page
LBTRPG01. Borst Valley Sedge Meadow State Natural Area and Oak Woodland	
LBTRPG02. Chimney Rock Oak Savanna State Natural Area	
LBTRPG03. Hawkinson Creek Sedge Meadow State Natural Area	
LBTRPG04. North Bend Bottoms	
LBTRPG05. Tamarack Creek Bog State Natural Area	
LBTRPG06. Van Loon Floodplain Savanna State Natural Area	
LBTRPG07. Van Loon Bottoms State Natural Area	

¹ A list of species referred to by common name is found at the end of this appendix.

LBTRPG01. BORST VALLEY SEDGE MEADOW STATE NATURAL AREA AND OAK WOODLAND

Location

Property:	Borst Valley Wildlife Area
Counties:	Trempealeau
Landtype Association:	222Lb07. Trempealeau Sandstone Hills.
Approximate Size:	164 acres
Ownership:	WDNR

Description of Site

The site encompasses a swath of good-quality Southern Sedge Meadow within Sunshine Valley along an unnamed tributary to Borst Valley Creek. On both sides of the meadow is oak dominated forest. The forest overlooking the meadow along County Highway V is in an active state of oak savanna restoration with the effects of a recent prescribed fire being noticeable during summer surveys. The site extends to the north and west along a forested ridge and ends at the property boundary to the west at a good-sized patch of upland oak forest that extends onto private property.

The Southern Sedge Meadow has numerous seeps running to a small headwater stream lined with speckled alder (*Alnus incana*) that help to maintain this community and increase the site diversity. Sedge species are abundant and include lake (*Carex lacustris*), water (*C. aquatilis*), fringed (*C. crinita*), inland (*C. interior*), and tussock sedge (*C. stricta*). Other species present are bulblet water-hemlock (*Cicuta bulbifera*), crested wood fern (*Dryopteris cristata*), cinnamon willow-herb (*Epilobium coloratum*), boneset (*Eupatorium perfoliatum*), bottled gentian (*Gentiana andrewsii*), fowl manna grass (*Glyceria striata*), orange jewelweed (*Impatiens capensis*), marsh vetchling (*Lathyrus palustris*), swamp candles (*Lysimachia terrestris*), sensitive fern (*Onoclea sensibilis*), marsh cinquefoil (*Comarum palustre*), prairie cord grass (*Spartina pectinata*), marsh fern (*Thelypteris palustris*), and culver's root (*Veronicastrum virginicum*).

The Southern Dry-mesic Forest grades from more open oak savanna where management is occurring to a closed canopy Oak Woodland. The managed oak savanna has a moderately closed canopy of 12 – 20” dbh (diameter at breast height) red oak (*Quercus rubra*), white oak (*Q. alba*), and aspen (*Populus tremuloides*) where dappled sunlight reaches the groundlayer. The shrub layer consists of hop-hornbeam (*Ostrya virginiana*), the non-native invasive common buckthorn (*Rhamnus cathartica*) (mostly dead), prickly ash (*Zanthoxylum americanum*), and brambles (*Rubus* spp.). An Oak Woodland occurs at the western end of the property on a steep slope with full-canopied, large diameter (15-20” + dbh) red and white oak.

Significance of Site

Outside of the much larger bottomland forests along the Black River, the oak woodland at this site supports the best assemblage of forest interior birds in the planning group. There is several bird Species of Greatest Conservation Need (SGCN) found breeding at the site.

The plant diversity of Southern Sedge Meadow is good considering it occurs within the Driftless Area where sedge meadows are relatively uncommon. For this reason it was designated as a State Natural Area in 2010.

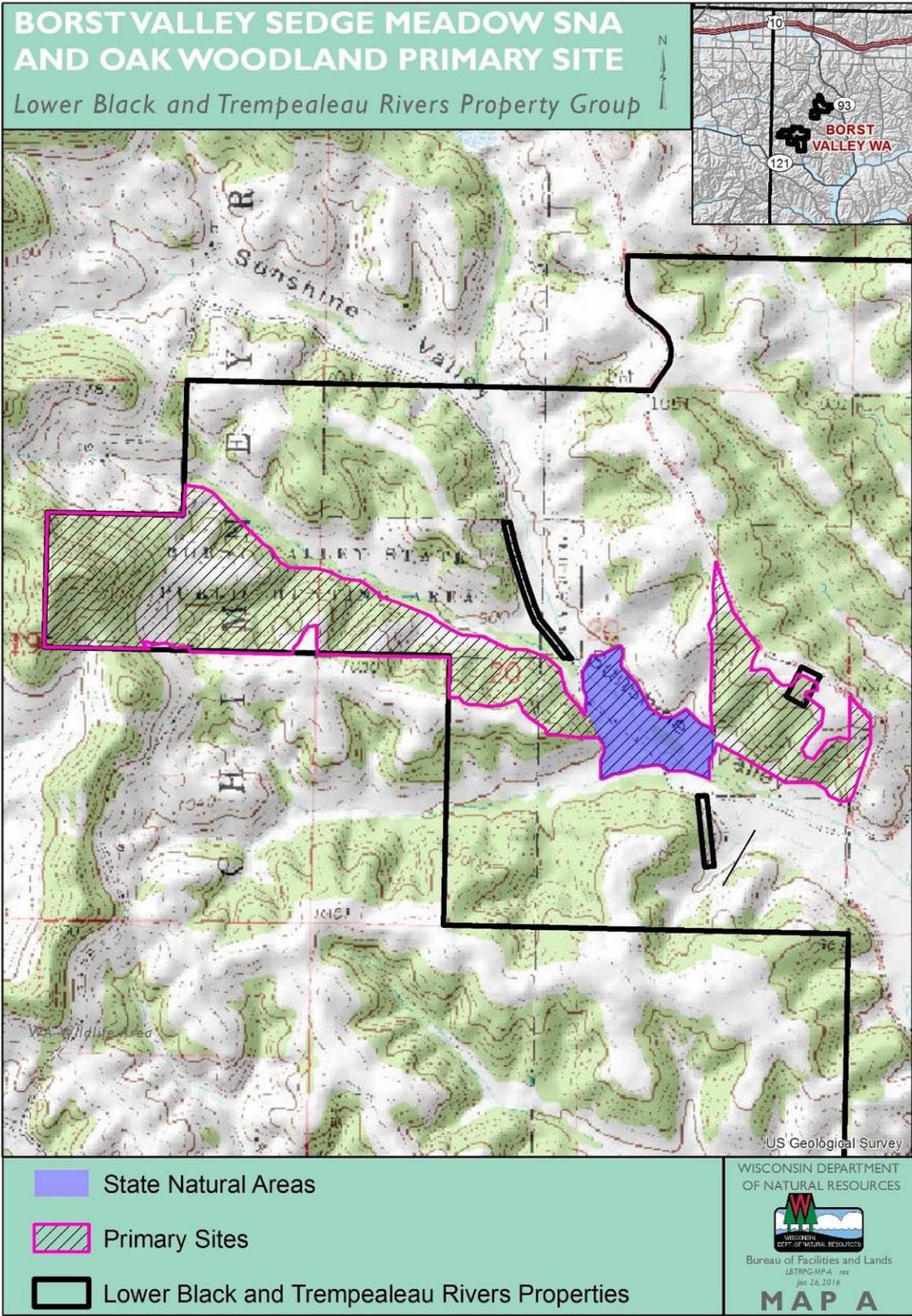
Oak savannas are critically imperiled natural communities in Wisconsin. Identifying, protecting, and managing remnant savanna sites are critical.

Management Considerations

Control of manageable patches of brush in the sedge meadow, especially the non-native invasive common buckthorn, through hand-cutting or prescribed fire is a priority for this area. Another non-native invasive, reed canary grass (*Phalaris arundinacea*), is common at this site and poses a serious threat to the sedge meadow community, but is very difficult to control. It is recommended that the site be evaluated based on agricultural history, hydrological alteration, landscape context, and invasion pattern to facilitate development of a comprehensive restoration plan that would address not just reed canary grass control but also rapid re-establishment of desirable native vegetation and long-term monitoring.

The oak savanna portion of the Primary Site is currently undergoing restoration. Continued burning and brushing in the oak savanna would continue to favor the fire-adapted oaks and allow additional sunlight to reach the ground layer. Controlling buckthorn and other non-native invasive shrubs, monitoring for spread of invasive plants into the site, and establishment of diverse native ground layer species will be critical to success of this management. Other portions of the site, or areas nearby, had small manageable populations of black locust (*Robinia pseudoacacia*) and Japanese barberry (*Berberis thunbergii*) that should be monitored or eradicated.

The western portion of this site currently contains habitat for two state threatened forest interior birds. Retaining the current conditions of larger diameter trees with a mostly closed canopy will provide continued habitat for these rare birds.



LBTRPG01. Borst Valley Sedge Meadow SNA and Oak Woodland Primary Site.

LBTRPG02. CHIMNEY ROCK OAK SAVANNA STATE NATURAL AREA

Location

Property:	Chimney Rock Wildlife Area
County:	Trempealeau County
Landtype Association:	222Lb07. Trempealeau Sandstone Hills.
Approximate Size:	30 acres
Ownership:	WDNR

Description of Site

This Primary Site occurs within Chimney Rock Wildlife Area and is located on the north side of Hawkinson Valley with steep south- and east-facing slopes bordered by Hermanson and Hawkinson Valley Roads. The site contains a moderate- to good-quality, restorable Oak Opening with large diameter, open grown red and white oak, and lesser amounts of bur oaks (*Quercus macrocarpa*) in the canopy. The shrub layer is sparse with some American hazelnut (*Corylus americana*) and common buckthorn present. The ground layer has savanna indicator species that include spotted geranium (*Geranium maculatum*), wood anemone (*Anemone quinquefolia*), rue anemone (*Thalictrum thalictroides*), yellow lady's-slipper orchid (*Cypripedium parviflorum* var. *pubescens*), New Jersey tea (*Ceanothus americanus*), Pennsylvania sedge (*Carex pensylvanica*), Canadian tick-trefoil (*Desmodium canadense*), prairie alumroot (*Heuchera richardsonii*), prairie violet (*Viola pedatifida*), showy goldenrod (*Solidago speciosa*), and fringed puccoon (*Lithospermum incisum*).

Significance of Site

The site represents an excellent restoration opportunity for the globally rare and critically imperiled Oak Opening plant community. Identifying, protecting, and managing remnant savanna sites are critical in restoring this exceptionally rare ecosystem. Very few invasives, outside of common buckthorn, were noted at the site, speaking to the quality of the plant community. The site was designated as a State Natural Area in 2010.

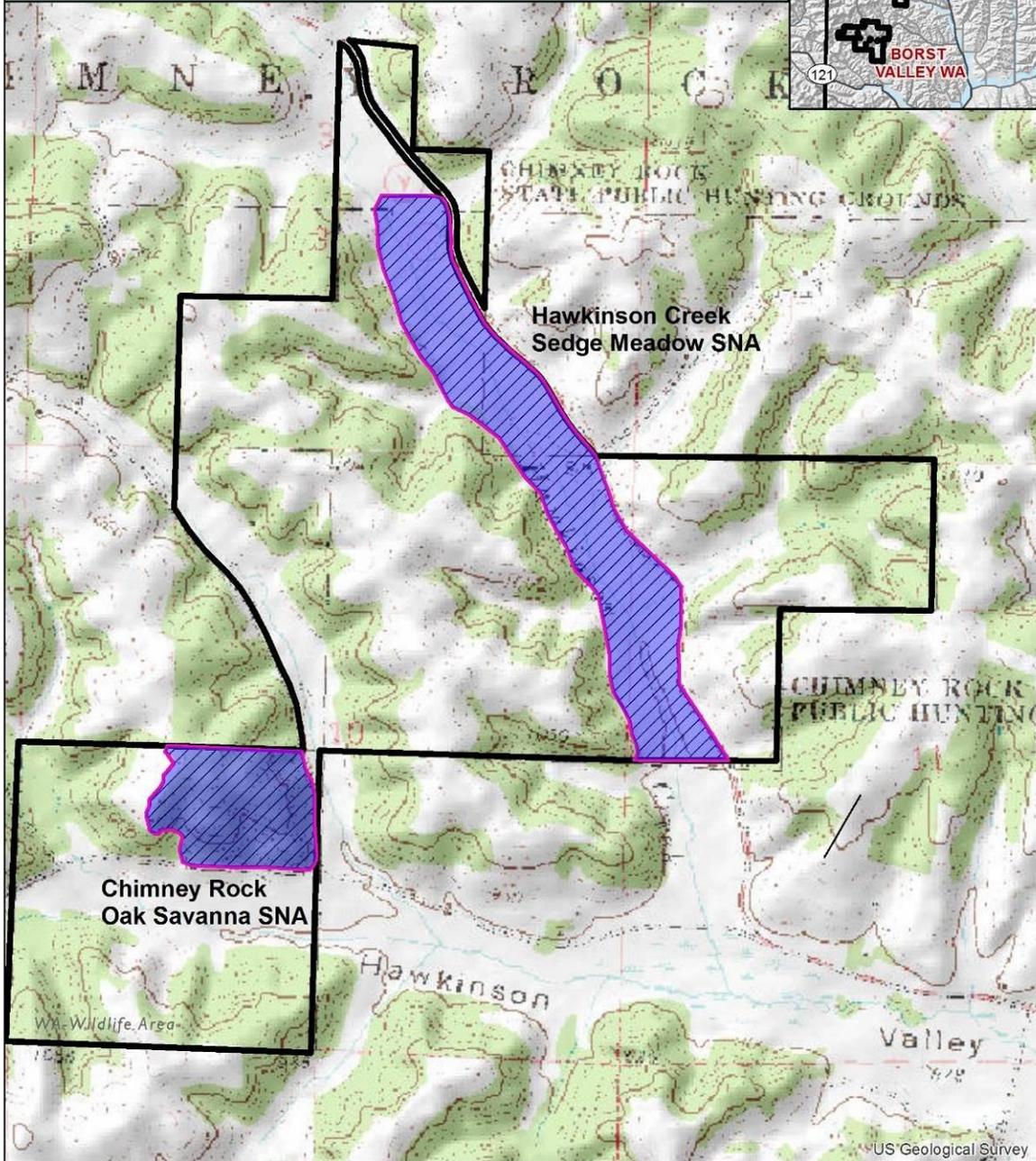
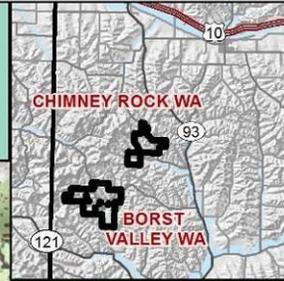
There are two rare terrestrial snails known from the site. Two SGCN birds were noted at the site and both are considered part of the forest interior bird guild, signifying a shift in the structure of the site from a more open savanna to a more closed canopy stand.

Management Considerations

Much of the canopy is becoming closed since the site was first documented and designated a State Natural Area in 2007, pushing it more towards a Southern Dry-mesic Forest stand. Thinning of mesophytic canopy and understory trees (basswood [*Tilia americana*], black cherry [*Prunus serotina*], red maple [*Acer rubrum*], and box-elder [*Acer negundo*]) is needed to allow more sunlight to reach the groundlayer. In addition, a prescribed burn program would help facilitate the restoration of the savanna and control invasive shrubs encroaching upon the site. Common buckthorn was noted in 2015 as the dominant shrub at the site and needs hand-cutting and treating prior to burning.

CHIMNEY ROCK WILDLIFE AREA PRIMARY SITES

Lower Black and Trempealeau Rivers Property Group



 State Natural Areas

 Primary Sites

 Lower Black and Trempealeau Rivers Properties

US Geological Survey
WISCONSIN DEPARTMENT OF NATURAL RESOURCES



Bureau of Facilities and Lands
LBTRPG-MP-4 rev
Jan 26, 2016

MAP A

LBTRPG02 & LBTRPG03. Chimney Rock Oak Savanna SNA Primary Site and Hawkinson Creek Sedge Meadow SNA Primary Site

LBTRPG03. HAWKINSON CREEK SEDGE MEADOW STATE NATURAL AREA

Location

Property:	Chimney Rock Wildlife Area
County:	Trempealeau
Landtype Association:	222Lb07. Trempealeau Sandstone Hills.
Approximate Size:	79 acres
Ownership:	WDNR

Description of Site

This Primary Site is centered along Hawkinson Creek as it runs through the long linear bottoms that support a degraded, but fairly extensive (79-acre) Alder Thicket with patches of shrubby Southern Sedge Meadow. Wet Prairie indicator species are found in pockets or openings in the tall shrub community. The hydrology appears to be intact as there are numerous seeps and rivulets throughout this wetland complex. The site is situated within a classic Driftless Area topography with formerly cutover slopes of oak forest beginning to mature and croplands on the ridges.

The Alder Thicket has a canopy/subcanopy cover from box elder and speckled alder, white meadowsweet (*Spiraea alba*), and meadow willow (*Salix petiolaris*) in the shrub layer. The dominant herbaceous cover includes reed canary grass, skunk cabbage (*Symplocarpus foetidus*), and orange jewelweed (*Impatiens capensis*). The Southern Sedge Meadow occurs on edges of the Alder Thicket and is dominated by reed canary grass, with lake sedge, tussock sedge, blue-joint grass (*Calamagrostis canadensis*), great angelica (*Angelica atropurpurea*), and broad-leaved cattails (*Typha latifolia*).

An exceptionally species-rich wet prairie was located in 2007 but is seemingly converting to Alder Thicket with reed canary grass becoming dominant. In 2007 the site had an abundance of saw-toothed sagebrush (*Artemisia serrata*) and grasses including fringed brome (*Bromus ciliatus*), blue-joint grass, Canada wild rye (*Elymus canadensis*), wild timothy (*Muhlenbergia racemosa*), and fowl manna grass. Forbs present were Canada anemone (*Anemone canadensis*), swamp milkweed (*Asclepias incarnata*), shining aster (*Symphyotrichum firmum*), swamp thistle (*Cirsium muticum*), common boneset, pale-spiked lobelia (*Lobelia spicata*), Michigan lily (*Lilium michiganense*), orange jewelweed (*Impatiens capensis*), prairie alumroot, northern bedstraw (*Galium boreale*), wild four-o'clock (*Mirabilis nyctaginea*), mountain mint (*Pycnanthemum virginianum*), swamp betony (*Pedicularis lanceolata*), and swamp saxifrage (*Micranthes pensylvanica*).

Significance of Site

While this site has probably suffered from past grazing, the size of the wetland complex is favorable, especially for the Driftless Area. In 2007, a small Wet Prairie was located that intergrades with the sedge meadow at the site but was not relocated during 2015 surveys. However, diagnostic species persist at the site like Michigan lily and golden alexanders (*Zizia aurea*) and if the Wet Prairie persists in the wetland, it adds great importance to the site. Prairies once dominated the Midwestern landscape, but now rank among the most threatened habitats in the world. Before European settlement, Wisconsin harbored approximately 2.1 million acres of prairie (Curtis 1959). Wet Prairie is now very rare, totaling less than 1,000 acres statewide (WDNR 2015b). Losses have occurred due to wetland drainage for conversion to

agriculture or outright destruction. To the extent feasible, protection and management efforts should be extended wherever Wet Prairie occurrences are identified.

Management Considerations

Small openings with conservative prairie vegetation are present but require intensive management to halt the shift from remnant Wet Prairie to Alder Thicket. The site is likely degraded from past land usage (grazing, maybe haying). Control of invading trees and brush at the site is of immediate concern for this rare prairie community. Reed canary grass, Canada goldenrod (*Solidago canadensis*), and broad-leaved cattail are also beginning to infiltrate the site, and are threatening the long-term viability of this wetland complex.

Hawkinson Creek is proposed for listing as an Impaired Waterway due to the degraded biological community from an unknown pollutant. Sedimentation of the creek and adjoining wetlands has led to a silty, muck-bottom stream that was nearly impossible to wade or navigate during inventory work. Very low diversity was found here during macroinvertebrate surveys, as only three taxa were taken from this stream. The major highway running alongside the site likely contributes to disrupted hydrology and pollutant inputs.

LBTRPG04. NORTH BEND BOTTOMS

Location

Property:	North Bend Bottoms Wildlife Area
County:	Jackson
Landtype Association:	222Lb05. Boone Valleys and Hills.
Approximate Size:	1,587 acres
Ownership:	WDNR (1,495 acres) and private (92 acres)

Description of Site

The North Bend Bottoms Primary Site consists of several habitat types within the sandy floodplain on the south side of the Black River. The dominant community is an extensive patch of mature Floodplain Forest with substantial pockets of Oak Barrens and smaller wetland inclusions of Southern Sedge Meadow, Emergent Marsh, and Alder Thicket. County Highway VV bisects the site and provides river access via a boat landing. The remainder of the site is remote and fairly inaccessible with the exception of some forest roads on the southeast side of the site.

The Floodplain Forest has high canopy cover with some large diameter trees (24" dbh), primarily silver maple (*Acer saccharinum*) with swamp white oak (*Quercus bicolor*), and river birch (*Betula nigra*). The subcanopy has similar tree species along with some green ash (*Fraxinus pennsylvanica*) and American elm (*Ulmus americana*). The sapling layer is sparse with occasional thickets of prickly-ash. There is a dense ground layer cover, dominated by wood nettle (*Laportea canadensis*), bristly buttercup (*Ranunculus hispidus*), and the non-native invasives reed canary grass and moneywort (*Lysimachia nummularia*). Patches of Oak Barrens are interspersed among the Floodplain Forest on floodplain terraces and are characterized by scattered open-grown oaks (bur, Hill's, and swamp white) and eastern red-cedar (*Juniperus virginiana*). There are dense thickets of shrubs dominated by prickly-ash and smooth sumac (*Rhus glabra*). The ground layer is dominated by Kentucky bluegrass (*Poa pratensis*) with big bluestem (*Andropogon gerardii*), white wild indigo (*Baptisia lactea*), and little bluestem (*Schizachyrium scoparium*) and other sand prairie species. Occasional wet pockets harbor prairie cord grass (*Spartina pectinata*) and fox sedge (*Carex vulpinoidea*).

A matrix of open wetlands that includes Southern Sedge Meadow, Alder Thicket, Wet Prairie, and Emergent Marsh is present in the southwest portion of the site where it is found on both sides of County Highway VV. The Southern Sedge Meadow occurs in a low area on the edge of a floodplain adjacent to the adjoining upland. The Alder Thicket occurs in the central portion of the meadow. The sedge meadow is dominated by lake sedge with some tussock sedge, wool-grass (*Scirpus cyperinus*), and broad-leaved cattail. The sedge meadow is relatively small but of good quality, with reed canary grass being uncommon. A small population of the state threatened pale green orchid (*Platanthera flava*) was located during surveys in this sedge meadow where it transitions to Floodplain Forest. The Alder Thicket is also good-quality but has more reed canary grass and moneywort. The Emergent Marsh is located in a secondary channel of the Black River and is controlled by water level fluctuations of the river. The marsh consists of broad-leaved arrowhead (*Sagittaria latifolia*), needle spike-rush (*Eleocharis acicularis*), wool-grass, and rice cut grass (*Leersia oryzoides*).

Significance of Site

Perhaps the most compelling qualities of the North Bend Bottoms Primary Site is its mix of large Floodplain Forest, backwater channels, lakes, and wetlands including Wet Prairies, along with the many low terrace oak barrens. For this reason, The Nature Conservancy (2001) identified North Bend Bottoms as part of its Black River-Meadow Valley-Bear Bluff target site for its extensive forests, wetlands, and high numbers of rare or sensitive species. The Oak Barrens that occur at the site are both globally and state imperiled due restricted range, few occurrences, and severe threats. Both the barrens and portions of the Floodplain Forest of the site are recognized through the designation of the Black River Savanna State Natural Area.

The aquatic resources at the site have been recognized for their importance with the lower Black River corridor being identified as a Conservation Opportunity Area (COA) of continental significance (WDNR 2006). The Nature Conservancy identified one lake on the east end of the site (WBIC 5556657) as a 'Portfolio' lake because it represents a high-quality example of that lake type (Blann and Wagner 2014). Numerous rare mussels and fishes are known from this stretch of the main channel of the Black River, while backwater areas and Riverine Lake/Ponds harbor rare aquatic insects and an exceptional diversity of rare fishes.

North Bend Bottoms is included within the Van Loon Bottoms Important Bird Area that encompasses the last 15 miles of the lower Black River. The Oak Barrens supports numerous SGCN birds taking advantage of open sand and shrubs.

The Primary Site with its open, sandy soils associated with the Oak Barrens, in close proximity to the Black River and its associated backwaters make for attractive nesting sites for turtle species. Several predated turtle nests were seen in June at the site. More surveys are needed in these sandy barrens for other SGCN reptiles.

Management Considerations

The Oak Barrens at this site are in need of prescribed fire and/or brushing as eastern red-cedar and shrubs are encroaching upon the openness of the site. Leaving some scattered small to medium-sized red-cedars would be beneficial for the special concern juniper hairstreak butterfly (*Callophrys gryneus*) that is known from the site and depends on red-cedar as its larval host plant. Similarly, retaining some shrubs or thickets would be beneficial to the numerous SGCN grassland birds noted above that require a light cover of upland shrubs for nesting. A general rule of thumb would be to retain no more than 30% shrub cover in these areas to maintain these species (Sample & Mossman 1997). As the shrub or canopy advances beyond this point, some of these species begin to be lost and are replaced by common, more open canopy forest bird species. Allowing fire to determine the extent of the shrub component, along with brushing as needed may be an appropriate management strategy for the accessible barrens areas.

The Floodplain Forest is extensive and exemplary due to the presence of mature trees, extensive contiguous forest, and high biological diversity, including many rare species. This site provides critical habitat for rare plants and animals, and management activities should promote a mature, diverse, and unfragmented Floodplain Forest. If forest management is desired, management to promote the swamp white oak component would benefit both game and non-game wildlife. Black River Savanna State Natural Area comprises only a portion of the Primary Site, and is considered an important ecological reference area for Floodplain Forest. Due to the relatively uniform quality of the forest throughout the Primary Site and similar conditions recognized as the Half Moon Bottoms Floodplain Forest Primary Site on the adjacent fishery area, consideration may be made for expansion of the State Natural Area.

There is a strong need to control some of the wetland invasive species found at the site like reed canary grass and common reed grass (*Phragmites australis*) that threaten the quality of the meadows, marshes,

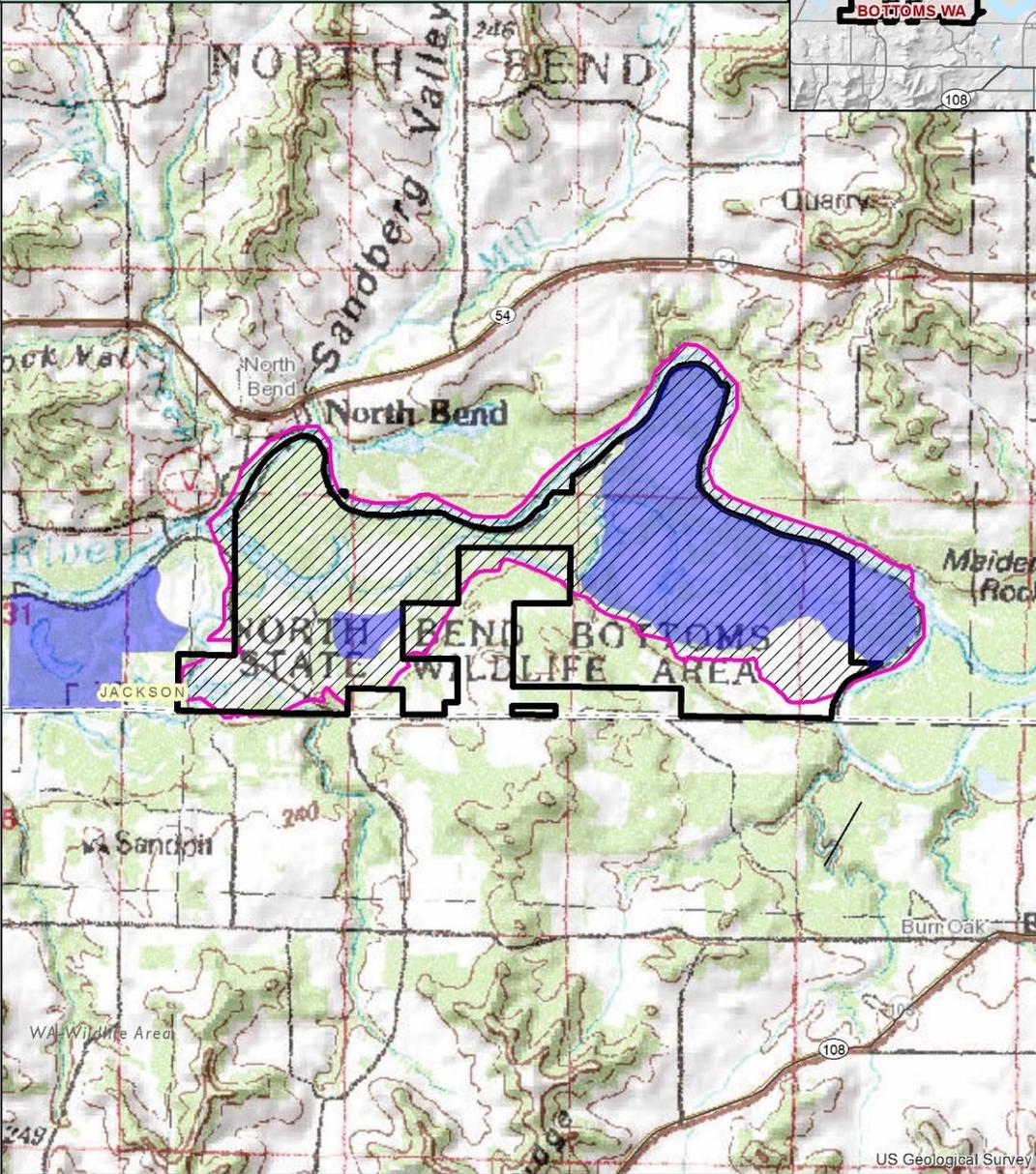
and Floodplain Forest. In bottomland forests, dense patches of reed canary grass can prevent regeneration of trees, and a minor infestation can become dense if the canopy is opened beyond 80% cover (WDNR In preparation). Restoring the meadows and Wet Prairie with prescribed fire will help to enhance these areas. Invasive shrubs such as Eurasian honeysuckle (*Lonicera sp.*) are in low density in the Floodplain Forest, making them a priority for removal before they become more prevalent. Additionally, there is a small sand prairie on a knoll overlooking County Highway VV where black locust was found encroaching upon the prairie. Controlling these species will protect the viability of the site.



North Bend Oak Barrens on a Sandy Terrace of the Black River. Photo by R. Staffen.

NORTH BEND BOTTOMS PRIMARY SITE

Lower Black and Trempealeau Rivers Property Group



- State Natural Areas
- Lower Black and Trempealeau Rivers Properties
- Primary Sites

WISCONSIN DEPARTMENT OF NATURAL RESOURCES



Bureau of Facilities and Lands
LBTRPG-MPA 100
Jan 25, 2014

MAP A

LBTRPG04. North Bend Bottoms Primary Site.

LBTRPG05. TAMARACK CREEK BOG STATE NATURAL AREA

Location

Property:	Tamarack Creek Wildlife Area
County:	Trempealeau
Landtype Association:	222Lc13. Rountree Ridges, Tunnel City Hills, and Valleys-North
Approximate Size:	450 acres
Ownership:	WDNR (310 acres) and private (140 acres)

Description of Site

The Primary Site occurs in a typical Driftless Area valley bottom along Tamarack Creek. The site is primarily an open Southern Tamarack Swamp (rich) with scattered live trees present and widespread tree mortality observed. Areas with intact quaking peat mat are dominated by lake sedge and broad-leaved cattails, while areas with mucky, partially decomposed peat are dominated by reed canary grass. In some areas, tamarack swamp appears to be converting to Alder Thicket. Southern Sedge Meadow occurs around the edges of the tamarack swamp with reed canary grass on the outer edges and a few patches of common reed grass present. Much of the site is bordered by county and state roads with the sedge meadow, patches of disturbed forest and some extensive restored upland prairie areas extending onto private property in places.

Two patches of Southern Tamarack Swamp (rich) exist along the creek. The northern patch has smaller tamaracks (to 12" dbh) while the southern patch has larger trees (12-24" dbh) that dominate the canopy. A dense shrub layer is encroaching upon the swamp with speckled alder, bog birch (*Betula pumila*), red-osier dogwood (*Cornus sericea*), and poison sumac (*Toxicodendron vernix*) being common. In higher-quality areas, the ground layer consists of lake sedge, water arum (*Calla palustris*), and broad-leaved cattails, while shrubbier, mucky areas have blue-joint grass, reed canary grass, wood nettle, and orange jewelweed.

The good-quality Southern Sedge Meadow occurs in patches and is closely associated with the tamarack swamp and Alder Thicket. Sedges dominate the ground layer and include lake, tussock, and marsh sedge (*Carex sartwellii*). Red-osier dogwood, speckled alder, and willows (*Salix* spp.) occur in patches -- more densely on the north end of the site. Reed canary grass dominates much of the former meadow areas on the south, but is uncommon in the high-quality areas. Phragmites (*Phragmites australis*) has invaded on the edges, especially on the north end and east side of the Wildlife Area.

Significance of Site

The site represents one of the largest tamarack swamps in the Driftless Area, and is one of the most southwesterly locations for tamarack in the Midwest. Notably, many more 'northerly' Wisconsin bog species are also found here. The majority of the site is recognized as a State Natural Area (SNA) and was designated as such in 1968. Tamarack Creek Bog SNA is noted as a stand-alone Ecologically Significant Area in the Nature Conservancy's Prairie-Forest Border Ecoregional plan because it represents one of the few extant tamarack forests in this portion of the state (TNC 2001). Additional high-quality areas exist outside of the State Natural SNA area proper and could be considered for inclusion within the SNA boundary.

The tamarack swamp and sedge meadow at the site support numerous rare species, both plants and animals. Small mammal surveys to assess the current status of these and other rare species represent a future need for the site. Rare lepidoptera have been noted previously from the site and a rare wasp was also discovered at the site on a cup plant (*Silphium perfoliatum*) in 2011. The species forms large terminal stem galls on cup plant and prairie rosinweed (*Silphium integrifolium*).

The wetland complex supports an impressive number of SGCN bird species with the most significant being a robust population of one state threatened species. At a minimum, 10 pairs of individuals were located in the shrubby meadow and fringes of the tamarack swamp and Alder Thicket at the site. It is likely that more exist at the site. Associated SGCN birds were also noted in the wetland.

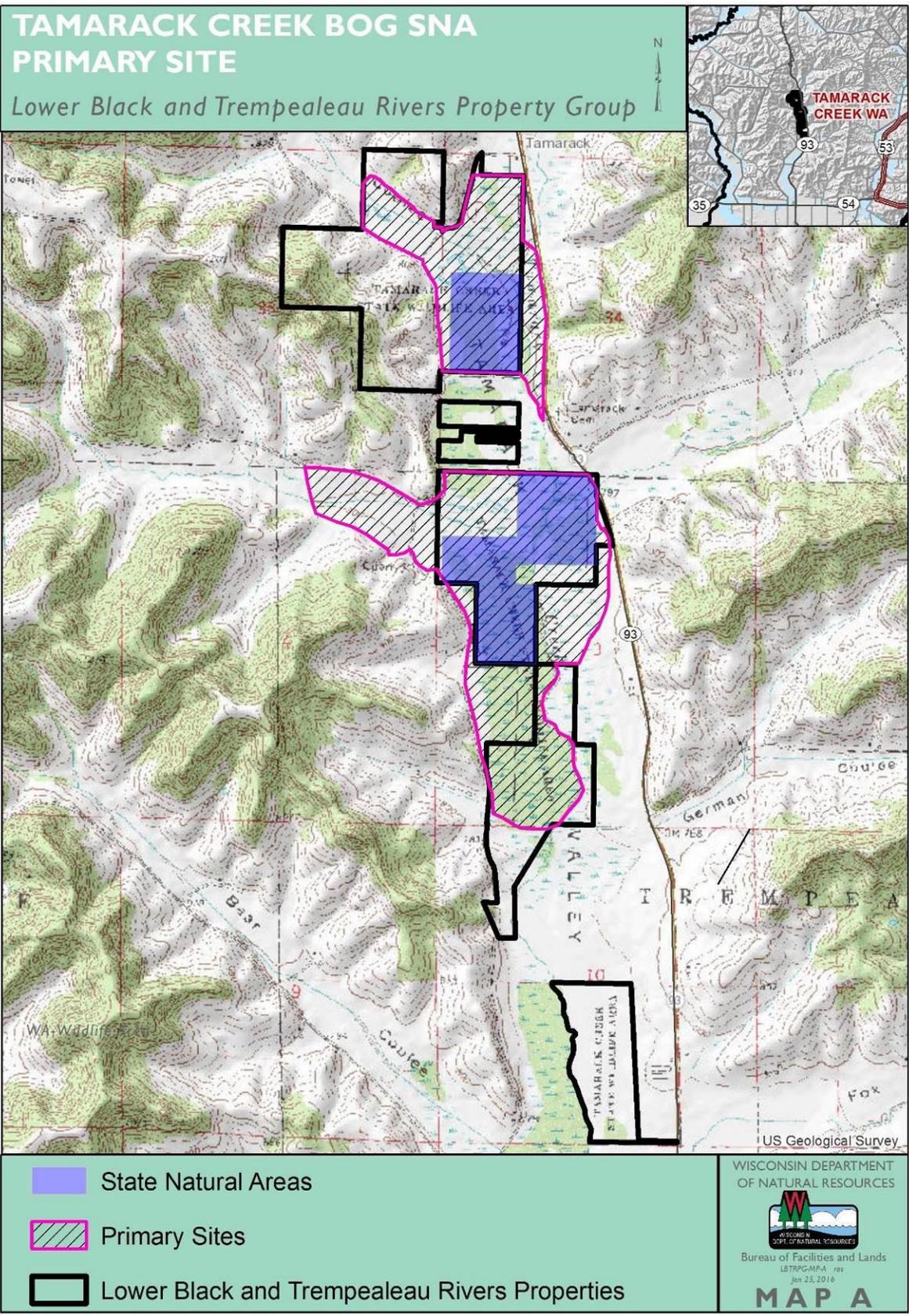


Shrubby sedge meadow with thickets of willow. Photo by Richard Staffen.

Management Considerations

Protecting the hydrology of Tamarack Creek is a critical component of maintaining these sensitive wetland sites. The swamp has been disturbed by cultivation for crops, grazing, ditching and pond excavation. Managing the site to retain and restore the tamarack swamp and sedge meadow wetland complex would in turn better protect the watershed. Of high importance would be control of encroaching Phragmites and reducing the amount of reed canary grass within and around the Primary Site. Additionally, the uplands not included in the Primary Site at one time supported good numbers of nesting birds but are now too brushy and overgrown to support this grassland species. Leaving thickets of brush within a larger grassland community would likely enable the species to move back into these habitats.

Tamarack appears to be dying in large numbers, with portions of the site converting to Alder Thicket. Anecdotal accounts suggest past fires in the 1960s-1980s may have helped promote tamarack, which requires high light levels. Prescribed fire should be considered in appropriate portions of the site to promote and maintain tamarack. Fire would also help maintain sedge meadow and adjacent upland prairie grass plantings, some of which have heavily converted to shrubs. Any clearing and burning should also balance the need to maintain habitat for Bell's vireo at the site level.



LBTRPG05. Tamarack Creek Bog State Natural Area Primary Site.

LBTRPG06. VAN LOON FLOODPLAIN SAVANNA STATE NATURAL AREA

Location

Property:	Van Loon Wildlife Area
County:	LaCrosse
Landtype Association:	222Lc08. Mississippi River Valley Train-North. 222Lb05. Boone Valleys and Hills.
Approximate Size:	2,999 acres
Approximate Ownership:	WDNR (2,782 acres) and private (217 acres)

Description of Site

Van Loon Floodplain Savanna State Natural Area Primary Site is located on the north half of the Wildlife Area in the floodplain of the Black River. There is a diverse mix of plant communities represented within the site, including Floodplain Forest, Oak Barrens, Sand Prairie, Emergent Marsh, and Riverine Lake/Pond. The north end of the site is managed as a large floodplain savanna (Oak Barrens) where burning and brushing are occurring. There are sand deposits with openings in the canopy where prairie grasses and forbs are common, along with ‘scrub’ oaks (*Quercus* spp.). As you move southward, some of the openings become larger and include diverse prairies. Shrubby barrens and eventually closed-canopy Floodplain Forest surround these prairie openings. Along the river is a long swath of mature Floodplain Forest that transitions to extensive Emergent Marsh and wet meadow in the interior of the site. Within these open wetlands are several Riverine Lakes/Ponds with the largest being Van Loon Lake.

The floodplain savanna on the north end of the property is located on sand and gravel deposits from the Black River and has partial canopy cover (50%) dominated by large diameter, open-grown black oak (*Quercus velutina*) with lesser amounts of bur oak, river birch, green ash and basswood. There are numerous sloughs and backwater channels found throughout. The shrub layer has black cherry, common buckthorn, prickly ash, and Eurasian honeysuckle. The ground layer consists of Pennsylvania sedge, big bluestem, Kentucky bluegrass, wild bergamot (*Monarda fistulosa*), daisy fleabane (*Erigeron annuus*), harebell (*Campanula rotundifolia*), wild lupine (*Lupinus perennis*), common spiderwort (*Tradescantia ohioensis*), and other prairie plants within small scattered openings. A much larger and diverse Dry-mesic Prairie is located on a floodplain terrace between the main and New Channel (aka East Channel) of the Black River. Here, scattered bur and black oaks give way to gray dogwood (*Cornus racemosa*), black cherry, scrub oaks, and then an extensive patch of prairie. There are dense patches of warm-season grasses, including prairie dropseed (*Sporobolus heterolepis*), green milkweed (*Asclepias viridiflora*), wild horsemint (*Monarda punctata*), Canada anemone, culver’s root, cream wild indigo (*Baptisia leucophaea*), grass-leaved goldenrod (*Euthamia graminifolia*), pale-spiked lobelia, leadplant (*Amorpha canescens*), mountain mint, wild rose (*Rosa acicularis*), flowering spurge (*Euphorbia corollata*), and alum root.

A large patch of mature, closed-canopy Floodplain Forest is located along the Black River and extends southward to the confluence with the Mississippi River. Located within this vast bottomland forest are open wetlands with extensive areas of primarily reed canary meadow, but others that are permanently wet with Emergent Marsh. These marshes are associated with good-quality Riverine Lakes/Ponds and consist

of various combinations of needle spike-rush, arrowhead (*Sagittaria sp.*), wild rice (*Zizania sp.*), river bulrush (*Bolboschoenus fluviatilis*), smartweed (*Persicaria sp.*), and duckweed (*Lemna sp.*).

Significance of Site

Oak Barrens and prairies are scattered throughout the northern portion of the site and represent imperiled natural communities both at the state and national level. Some of these areas may represent a unique natural community type that is identified as floodplain savannas. These savannas are found on floodplain terraces and have an open tree canopy dominated by large diameter bur oak or swamp white oak (Natureserve 2015). This habitat type is listed as being Critically Imperiled globally because across its very restricted range of Wisconsin, Illinois, and Missouri, most stands of this type have been destroyed or converted to closed-canopy forests (Natureserve 2015). Further research is needed in Wisconsin before formal designation as a natural community in the Wisconsin Natural Heritage Inventory system can occur. Identifying, protecting, and managing remnant prairie, barrens and savanna sites are critical.

Many of the Riverine Lake/Ponds at the site were recognized by the Nature Conservancy as high-quality examples worthy of prioritization for protection, maintenance, and restoration (Blann and Wagner 2014). Numerous rare aquatic elements (mussels, backwater and main channel fishes, and aquatic invertebrates) are present at the site. Nearly half of the site is designated as a State Natural Area for these reasons.



Prairie opening at Van Loon Floodplain Savanna State Natural Area Primary Site. Photo by R. Staffen

Management Considerations

The oak savanna portion of the Primary Site is currently undergoing restoration. Prescribed burning will be an important tool in the success of this restoration. By creating a gradual transition from open prairie to closed canopy forest, the oak savanna will limit negative impacts associated with habitat edge, and will reduce detrimental shading on the small prairie. Controlling understory brush and monitoring for spread of invasive plants into the site will be critical to success of this management.

Curtis (1959) noted that historically, fires starting in the uplands adjacent to floodplains may have swept across the floodplain creating newly exposed ground that could be invaded by swamp white oak. Because floodplain savannas are rare at state and global levels, more research is needed to determine the historic disturbance regimes that allowed the forest canopy to remain partially open, as well as the impacts of current management on all species that occupy this habitat.

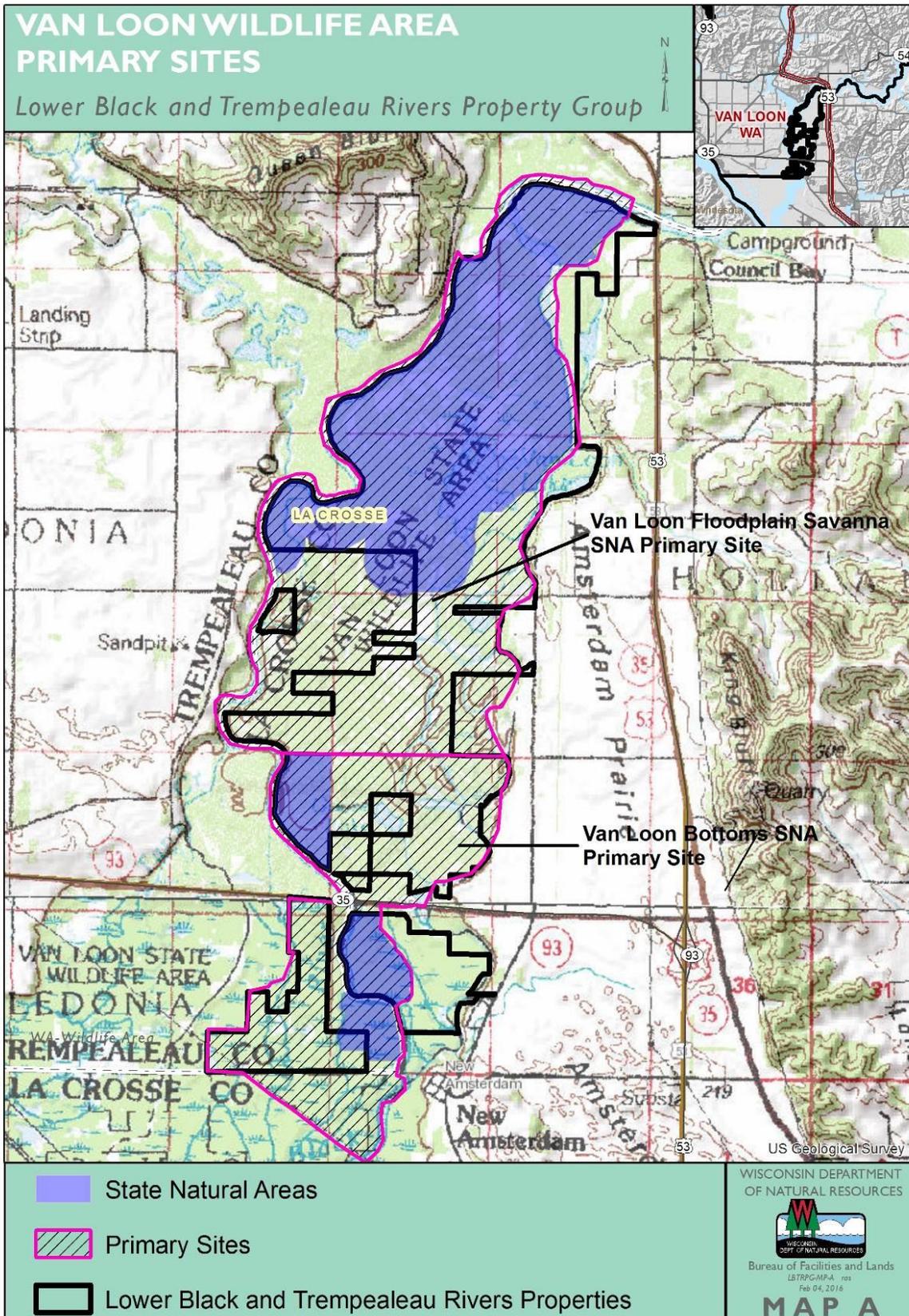
Currently, invasive species are largely absent in the prairie areas, but those noted within the surrounding floodplain savanna and forest of the site with potential to expand into the prairies are Eurasian honeysuckle and common buckthorn. Efforts to prevent the spread of reed canary grass should continue. Where the canopy has been opened up (including areas of active timber management) this species can dominate and simplify the herbaceous layer and inhibit the germination or growth of tree seedlings. The reed canary grass-dominated could alter forest composition, structure, and suitability for nesting birds. Garlic mustard (*Alliaria petiolata*) is present in small amounts in the Floodplain Forest.

Management should also continue to retain large habitat patches of older forest with high canopy closure for area-sensitive forest interior birds (Mossman and Hoffman 1989, Jones and Robertson 2001, Wood et al. 2006). Red-shouldered hawks will utilize wetland openings for hunting amphibians, reptiles, and small mammals when they occur within large patches of mature forests that limit inter-specific competitors like great-horned owl (*Bubo virginianus*) and red-tailed hawks (*Buteo jamaicensis*) from moving in.

Protecting and maintaining the openness of the turtle nesting sand cliff sites throughout the property will aid in the viability of the rare and more common turtles found at the site. The loss of suitable, open turtle nesting sites is a primary threat to all riverine turtles (WDNR 2006b). When sites have become overgrown or developed, turtles are forced to nest in less optimal sites like along roadsides, where they are much more prone to being run over, or are clustered in small sites where they are easy prey for nest predators like striped skunks (*Mephitis mephitis*) and raccoons (*Procyon lotor*) (WDNR 2016).

VAN LOON WILDLIFE AREA PRIMARY SITES

Lower Black and Trempealeau Rivers Property Group



LBTRPG06 & LBTRPG07. Van Loon Primary Sites.

LBTRPG07. Van Loon Bottoms State Natural Area

Location

Property:	Van Loon Wildlife Area
County:	LaCrosse
Landtype Association:	222Lc08. Mississippi River Valley Train-North.
Approximate Size:	1,493 acres
Approximate Ownership:	WDNR (1,210 acres) and private (283 acres)

Description of Site

The site is largely made up of good- to high-quality Floodplain Forest on both sides of the main channel of the Black River. Open wetlands of Emergent Marsh, shrub swamp, Riverine Lakes/Ponds and sloughs dot the forest habitat. State Highway 35 bisects the site along with a powerline corridor forming the southern boundary of the Primary Site. The Van Loon Floodplain Forest State Natural Area spans both sides of the highway and makes up 317 acres of the site.

The closed canopy Floodplain Forest is largely composed of mature silver maple (up to 30" dbh), large diameter swamp white oak (to 24" dbh) with some green ash. The subcanopy and sapling layer has a similar composition. The shrub layer is sparse with patches of prickly-ash along with elderberry (*Sambucus canadensis*). The herbaceous layer has dense wood-nettle and reed canary grass with cut-leaved coneflower (*Rudbeckia laciniata*), moneywort, ostrich fern (*Matteuccia struthiopteris*), and blue phlox (*Phlox divaricata*). Topographical variation throughout the bottoms enables the forested area to support a diverse array of species including those that require higher sandy terraces like swamp white oak and blue phlox. Swamp white oak also appears to be reproducing well, and there is a good distribution of size and age classes for most tree species represented here.

The scattered open wetlands at the site vary from wet meadows dominated by reed canary grass to good-quality marshes dominated by broad-leaved sedges and bulrush with scattered willows and dogwoods and with little to no known invasive reed canary grass or broad-leaved cattail. The Emergent Marsh has broad-leaved arrowhead, wild rice, and bur-reed (*Sparganium* sp.). Some of the best wetlands and Riverine Pond/Lake are associated with Goose Lake and on the very southwest portion of the site associated with Shingle Creek and along the powerline corridor.

Significance of Site

The Primary Site falls within the Van Loon Bottoms Important Bird Area that encompasses the last 15 miles of the lower Black River. Resident birds noted during 2015 surveys include numerous SGCN birds.

The site is extensive and exemplary due to the presence of mature trees, extensive contiguous forest, and high biological diversity, including numerous rare species associated with the warmwater river and bottomlands. The Black River running through the site, has been designated as an Aquatic Conservation Opportunity Area of continental significance (WDNR 2006). Van Loon Floodplain Forest State Natural Area makes up a portion of the site, with the remaining Floodplain Forest in similarly good condition.

Other rarities found utilizing the Primary Site include bats, aquatic invertebrates, fishes, herptiles, and plants. The site had high bat diversity and richness. The lower Black River and its backwaters are known

as a hotspot for aquatic invertebrates and fishes. Uncommon aquatic species known in this stretch include an incredible diversity of rare mayflies (seven species), three rare mussels (one endangered, one threatened, one special concern), 10 rare fishes including two state endangered and three state threatened. Several rare riverine turtles utilize the main and side channels of the Black River. Rare plants are known from the site.

Management Considerations

This site provides critical habitat for numerous rare plants and animals, and management activities should promote a mature, diverse, and unfragmented Floodplain Forest. The Primary Site boundary was determined by the boundaries of the higher-quality Floodplain Forest, as determined by on-the-ground surveys and WDNR WisFIRS data. Van Loon Floodplain Forest State Natural Area comprises only a small part of the Primary Site, and is considered an important ecological reference area for Floodplain Forest. It is managed passively, allowing nature to determine the ecological characteristics of the site. Due to the relatively uniform quality of the forest throughout the Primary Site, consideration may be made for expansion of the State Natural Area.

Reed canary grass and moneywort are common herbs here, with reed canary grass having taken over some areas. In bottomland forests, dense patches of reed canary grass can prevent regeneration of trees, and a minor infestation can become dense if the canopy is opened beyond 80% cover (WDNR In preparation). Additional invasives noted in low numbers at the site are common buckthorn and Bell's honeysuckle (*Lonicera x bella*). Given the apparent limited extent of these invaders, and the potential for them to devastate the future biodiversity of the site, monitoring and control of these species represents a high-impact action.

The lowland forests of Van Loon Bottoms State Natural Area Primary Site are vulnerable to the effects of emerald ash borer (*Agrilus planipennis*), as the site is located within a state and federal quarantine area and green ash (*Fraxinus pennsylvanica*) is common in the canopy and subcanopy here. Large-scale loss of ash in this area, whether through EAB-caused mortality or harvesting, could cause a cascade of negative impacts. Degradation of diverse, high-quality forests and loss of forest cover could further lead to diminishment of important habitat for rare plants and animals (especially forest interior birds), elevated water tables, and infestation of disturbance-loving invasives such as reed canary grass (WDNR 2010b). It is important to note that removal of all ash as a stopgap measure against EAB is not recommended (WDNR 2010a).

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