Bayfield Regional Conservancy's

Strategic Conservation Plan for Douglas County, Wisconsin 2010

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I. Bayfield Regional Conservancy Strategic Conservation Planning

Bayfield Regional Conservancy (BRC) is a membership-based non-profit, regional land trust serving the counties of Ashland, Bayfield, Douglas and Sawyer Counties, Wisconsin. Founded in 1996, BRC works with private landowners on a voluntary basis to protect the natural areas, forests and farms, and wild and scenic lands in their service area. Over the past fourteen years, BRC has been building a strong reputation within the region as a leader in conservation and as of May 2010 had successfully conserved approximately 2,500 acres at 22 sites through conservation easements, acquisitions, and partnerships. As BRC continues to grow and evolve as an organization, it is imperative that resources are used effectively and efficiently to ensure continued high quality conservation into the future. Increasing population and development pressure has increased the need to proactively conserve areas of high conservation value. To meet these challenges, BRC has committed to the development of a comprehensive Strategic Conservation Plan Program for each of the counties within their service area. In 2009, the first of these plans, *Strategic Conservation Plan for Bayfield County, Wisconsin*, was completed. The present plan, *Strategic Conservation Plan for Douglas County, Wisconsin* represents BRC's second installment in their continuing strategic conservation planning efforts.

The primary objectives of the present Strategic Conservation Plan are:

1. Summarize the current physiographic and socioeconomic settings of Douglas County;
2. Compile and document fundamental data sets representing elements from various conservation themes that address BRC's mission;
3. Delineate Landscape Conservation Areas (LCAs);
4. Conduct a series of conservation analyses in a Geographic Information System (GIS); and
5. Identify parcels that constitute Priority Conservation Areas (PCAs) within Douglas County.

The Bayfield Regional Conservancy will use this Strategic Conservation Plan as another tool to guide a pro-active land protection program targeting Priority Conservation Areas in their service area. Nevertheless, BRC will continue to consider parcels that were not classified as PCAs by the plan for future protection initiatives based on more detailed project-specific factors.

II. Douglas County – An Overview

Introduction

Douglas County is located at the western end of Wisconsin's Lake Superior Basin. Douglas County was founded in 1854 when it was separated from the larger historical county of La Pointe (later to become present day Ashland and Bayfield Counties). The county is bordered by Bayfield, Washburn, and Burnett Counties in Wisconsin, and Pine, Carlton, and St. Louis Counties in Minnesota. Although the current population of Douglas County is ranked 32nd (of 72) in the state (U.S. Census Bureau 2009), it is the fourth largest county in area (1,342 square miles). The 22 municipalities within Douglas County include one city, five villages, and 16 unincorporated towns (Figure 1). The City of Superior is the County Seat and the county's largest population center. Superior, together with the city of Duluth, Minnesota, form the Twin Ports metropolitan area which has a population estimated at approximately 130,000 (U.S. Census Bureau 2008a, 2008b).

Although natural and cultural resources worthy of conservation and preservation exist within the City of Superior, the city's urban and industrial character preclude the consideration of landscape scale protection activities. Therefore, resources of conservation value within the City of Superior are not analyzed in the present Strategic Conservation Plan.

Physiographic Setting

Douglas County is divided into two geographical provinces that delineate distinct topographic landscapes. The development of both landscapes was heavily influenced by the powerful glacial forces that shaped the physiographic environment of the Lake Superior Basin during the Late Wisconsin Glaciation. The Lake Superior Lowlands in the northern third of the county were formed by the deposition of Glacial Lake Duluth sediments approximately 9,500 years ago (Dott and Attig 2004). Although topography in this area is generally level, steep slopes with highly erosive, clay soils occur along the flanks of rivers and streams, and the bluffs overlooking Lake Superior.

The Superior escarpment (i.e., Douglas Copper Range) is a notable geological feature that divides the Lake Superior Lowlands from the Northern Highlands to the south (Figure 2). The Northern Highlands encompass approximately 70 percent of the county. Northern Highlands' topography generally is characterized by very hilly, rolling uplands. The hummocky landscape is rich with lakes and wetlands which formed from the rock debris and melting ice that accumulated along the margin of the Laurentide Ice Sheet ice sheet during one of its last advances approximately 13,000 years ago (Dott and Attig 2004). Elevation in Douglas County ranges from a minimum of 602 feet above sea level (asl) along the shore of Lake Superior to a maximum of 1,369 feet asl at Summit Hill (Figure 2).

Hydrology

Like much of northern Wisconsin, Douglas County has abundant surface waters that provide a variety of valuable ecological services. Over 1,705 miles of rivers and streams flow across Douglas County. In addition, 431 lakes covering 15,170 acres are scattered across the county. At 831.5 acres, Whitefish Lake is the largest lake in the county. A fairly large number of lakes and flowages are concentrated in the southeastern quadrant of the county (Figure 2).

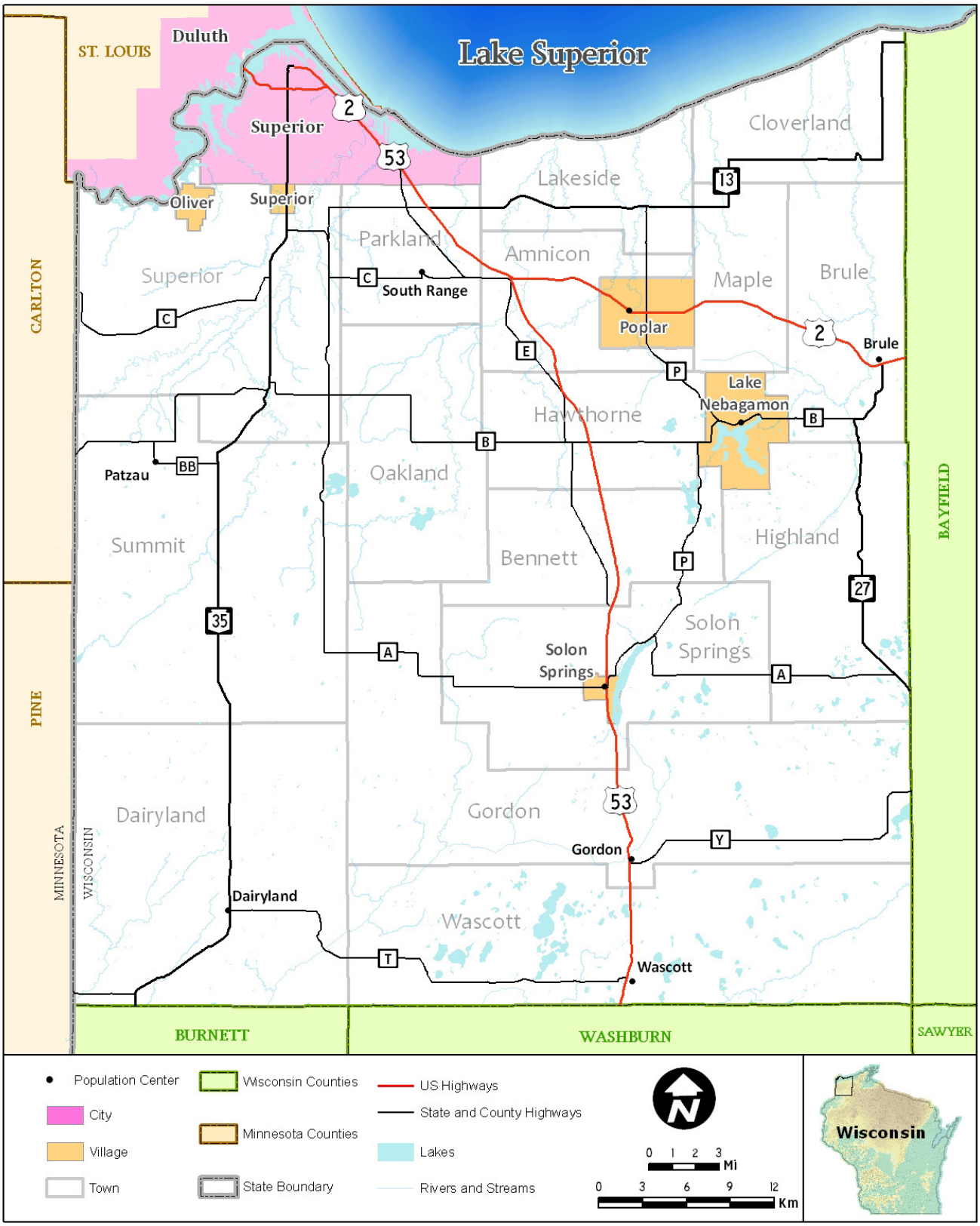


Figure 1. Political Boundaries and Major Roads of Douglas County, Wisconsin.

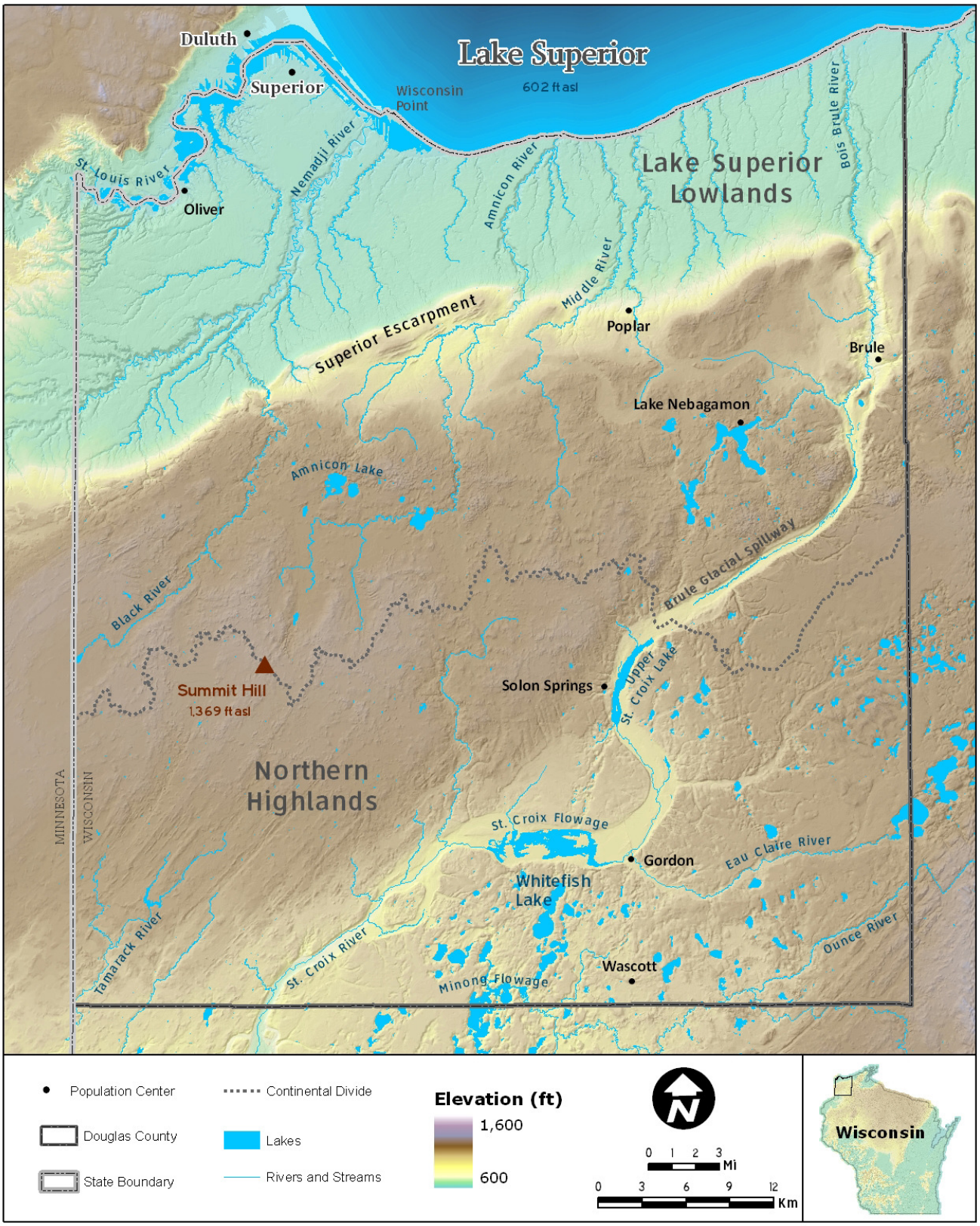


Figure 2. Physiography and Hydrology Douglas County, Wisconsin.

The Continental Divide that separates the St. Lawrence River (e.g., Lake Superior Basin) and Mississippi River (e.g., St. Croix River Basin) drainage systems passes through the middle of Douglas County (Figure 2). Approximately 53 % of Douglas County's land surface area is drained into rivers, streams and connecting lakes that flow directly into Lake Superior, whereas roughly 23 % of the area drains into to St. Croix River and its tributaries (e.g., Tamarack and Eau Claire Rivers). Land-locked lakes, wetlands and undrained lowlands account for the remaining 24 %.

From Wisconsin Point east to the Bayfield County line, Douglas County has over 20 miles of coastal shoreline along Lake Superior, the world's largest freshwater lake (Figure 2). Shoreline types along this stretch of Lake Superior primarily are comprised of extensive sand and gravel beaches and steep eroding clay bluffs. In addition, wetland shoreline types occupy areas where several perennial streams flow into the lake.

Ecological Landscape Units

Four ecological landscapes that have unique combinations of ecological attributes such as climate, geology, water, soils, or vegetation occur within Douglas County (Figure 3; Appendix A; WDNR 2009b). However, three ecological landscapes predominate and comprise 99 % of Douglas County (i.e., Superior Coastal Plain, Northwest Sands, and Northwest Lowlands).

Within Douglas County, these ecological landscapes are further subdivided into 16 land type associations (Figure 3). Land type associations provide a finer scale description of regions within the broader ecological landscapes. These areas differ in their levels of biological productivity, habitat suitability for wildlife, abundance and distribution of species, and other ways that affect land use practices and management.

Regardless of scale, each ecological landscape unit has important features and natural communities and specific threats that may compromise these unique and important systems (Appendix A). Natural features and communities occurring within Douglas County include the Lake Superior shoreline, boreal and northern forests, pine and sand barrens, grasslands, lakes, ponds and rivers, wetland, bog, and peatland complexes.

Population and Demographics

Since its founding, Douglas County has experienced periods of population growth and decline. From 1850 – 1880 the county's population remained relatively low; however, with the introduction of railroads, development of mining and timber operations, and the establishment of the port at Duluth-Superior, Douglas County witnessed a rapid and sustained increase in population from 1880 – 1920. Nevertheless, the population of the county as a whole has been in a gradual decline since the 1920s (WDWD 2008).

Based on current data from the Wisconsin Department of Administration, rural Douglas County has an estimated population of 17,348 residents (WDOA 2009). The average population density for rural Douglas County is relatively low (13.4 residents/mile^2), with over a third of the municipalities displaying population densities below the mean for the county (WDOA 2009). Based on population data collected over the last decade, Douglas County ranks as one of the slowest growing counties in the state (WDWD 2008).

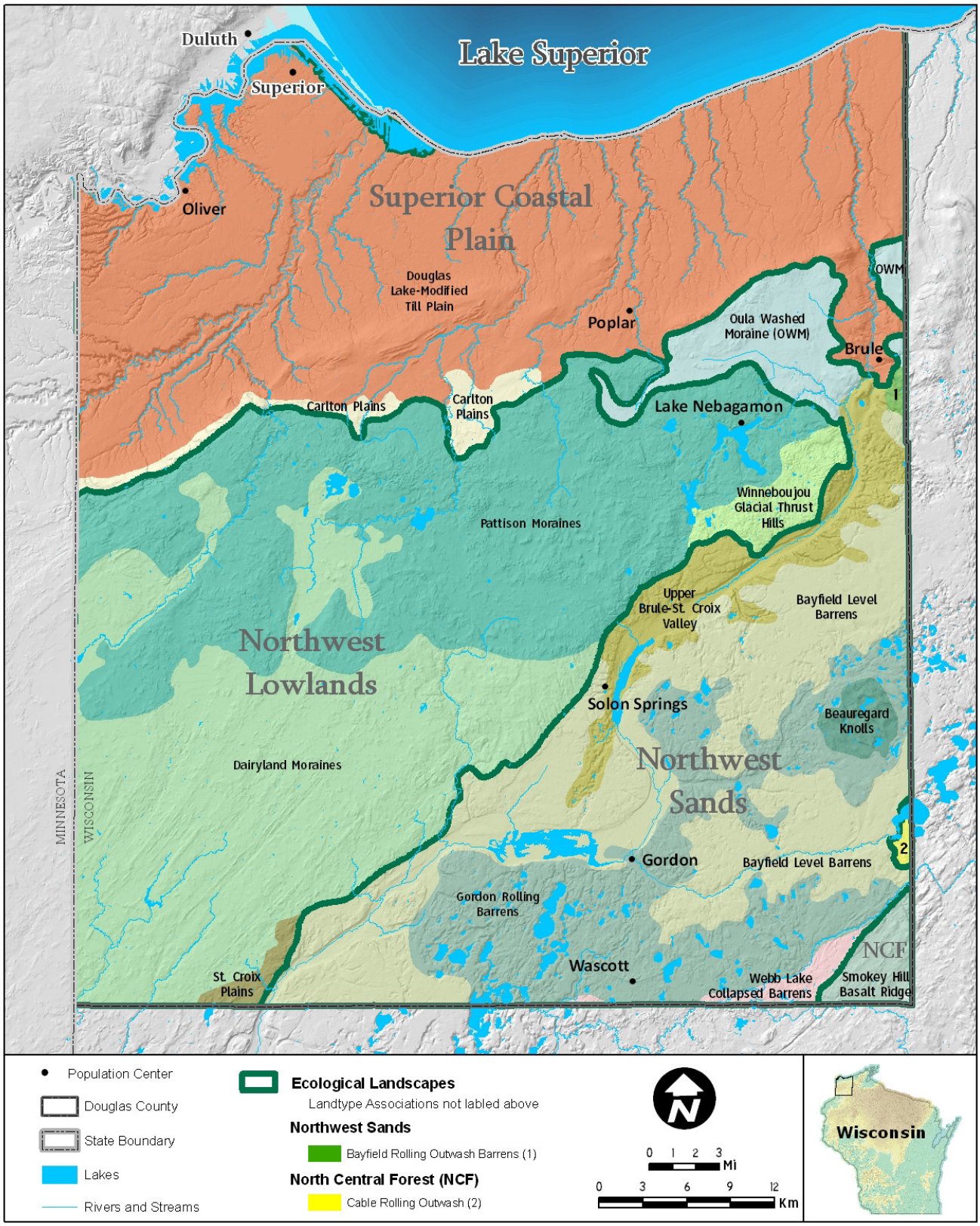


Figure 3. Ecological Landscapes and Landtype Associations of Douglas County, Wisconsin.

Population changes are not consistent among municipal units; in general, populations in villages and towns are increasing while the population of the City of Superior is decreasing. In rural Douglas County, the population has been gradually increasing since 1970 (WDOA 2009). Rural villages and towns adjacent to the City of Superior (e.g., Oliver) and along the corridors of U.S. Highways 2 and 53 (e.g., Poplar and Solon Springs) have experienced the largest population increases (Figure 1). In certain municipalities, population increases have been attributed to the conversion of seasonal lakefront homes into permanent year-round residences (e.g., Lake Nebagamon and Wascott). The relatively higher growth rates in rural areas show a clear trend of new residents moving to the county's rivers and lakes (Douglas County 2009). Not surprisingly, population projections generated by the Wisconsin Department of Administration for the years 2010 – 2030 predict strong growth in rural towns of southern and eastern Douglas County where the majority of desirable lakefront and recreational properties are located (e.g., Minong Flowage and Upper St. Croix Lake; WDOA 2008, Douglas County 2009).

Overall, Douglas County is experiencing population trends and demographic changes similar to those in other counties in northern Wisconsin. In general the county's population is becoming older due to a stable population of elderly residents (75 yrs +), an influx of middle-aged (35 – 54 yrs) professionals with few or no children, retirees of the baby-boomer generation (55 – 74 yrs) seeking a serene setting to reside, and a departure of young people (25 – 34 yrs) seeking employment and educational opportunities elsewhere (WDWD 2008; Douglas County 2009).

Workforce and Economics

The workforce and economy of rural Douglas County relies heavily on natural resource-related leisure and hospitality industries (WDWD 2008). Most of the local economic activity occurs near the cities and towns that are located along U.S. Highway 2 and 53. Per capita median household income and average annual income are well below state and national averages. Seasonal or part-time service industry jobs typically are entry level positions that offer low wages and promote high turnover. Demographic predictions estimate that by 2030, people 55 and older will make up 42 % of Douglas County's labor force aged population (WDWD 2008). Many in this demographic will be at or nearing retirement and in actuality contribute little to the county's potential workforce. The demographic changes due to the emigration of young adults (16 yrs +) and the resultant aging of the workforce population has serious implications for future economic growth and expansion within Douglas County.

Land Use

Land use history has modified the landscape of Douglas County over time and continues to be an influence. Current land uses in Douglas County include forestry, agriculture, residential, commercial, manufacturing, outdoor recreation and wildlife conservation. Land use patterns in Douglas County are closely linked to the county's natural resource base and land ownership. Understanding the interactions of natural communities and the history of past, present and future human development is a necessary step toward moving forward with the identification of conservation opportunities and planning efforts.

History

Many of the current land uses are the product of several influential events that occurred during Euro-American settlement and development of the region. The first and probably most significant change to the natural environment of Douglas County occurred from 1880- 1925 with

the clearcutting of nearly all the merchantable timber (Douglas County 2009). Landowners and timber companies across the region were discouraged from replanting when the remaining trees that had escaped destruction by fire, succumbed to disease. The once vast forests of white pine, beech and hardwoods were soon replaced by thick stands of aggressive, sprouting maples and pioneer species like aspen and white birch. In many areas fires were started in the slash after forests were cleared to create "stump pastures" for farming. The excessive drying of the exposed soils impaired the re-establishment of sensitive species like hemlock (NCSSF 2007).

As the logging era drew to a close, timber companies and private land agencies were eager to sell their holdings. Thousands of settlers arrived and attempted to convert their newly acquired "cutover" lands into productive farms. Unfortunately, many farms become tax delinquent in the 1930s and 1940s due to the relatively weak local market, short growing season, and generally unproductive, sandy soils. As a result, tax forfeited lands came under public ownership and are the basis of northern Wisconsin's current county, state and national forest system (Douglas County 2009).

Rural Douglas County (excluding the City of Superior) encompasses an area of approximately 1,259 square miles. Although the majority of lands are held in private ownership, a substantial portion (43 %) is held in public trust and managed by public agencies (Douglas County 2009).

Public Lands

Today public lands account for approximately 348,200 acres of the land in rural Douglas County (Figure 4). The majority of public lands are owned by the county, with the state, local municipalities, and the federal government owning the remainder in diminishing order (Table 1). Public lands are primarily managed for timber, recreational access and use, conservation of unique, scenic, or rare natural sites, as well as the preservation of critical wildlife habitat areas.

Table 1. Areal Contribution of Public Lands in Rural Douglas County.

Public Lands	Area (acres)	Percentage of Rural Douglas County
Federal	1,592	0.2
State	55,492	6.9
County	281,289	34.9
Municipality	9,827	1.2
Total	348,200	43.2

Source: Douglas County 2009.

Federal lands in Douglas County are limited to the St. Croix National Scenic Riverway (NSR) administered by the National Park Service (NPS). The Upper St. Croix River and its primary tributary, the Namekagon River, were among the first wild and scenic rivers designated by Congress in 1968. In addition, the St. Croix NSR is one of only two specially designated riverway management areas in the nation. Lands within the boundary of the St. Croix NSR boundary are a mix of public and private parcels which the NPS, working collaboratively with other landowners, manages for the continued enhancement, protection and preservation of the river and the adjacent cultural, natural and wildlife habitat resources. When practicable, the NPS acquires lands or conservation easements within the NSR for continued protection.

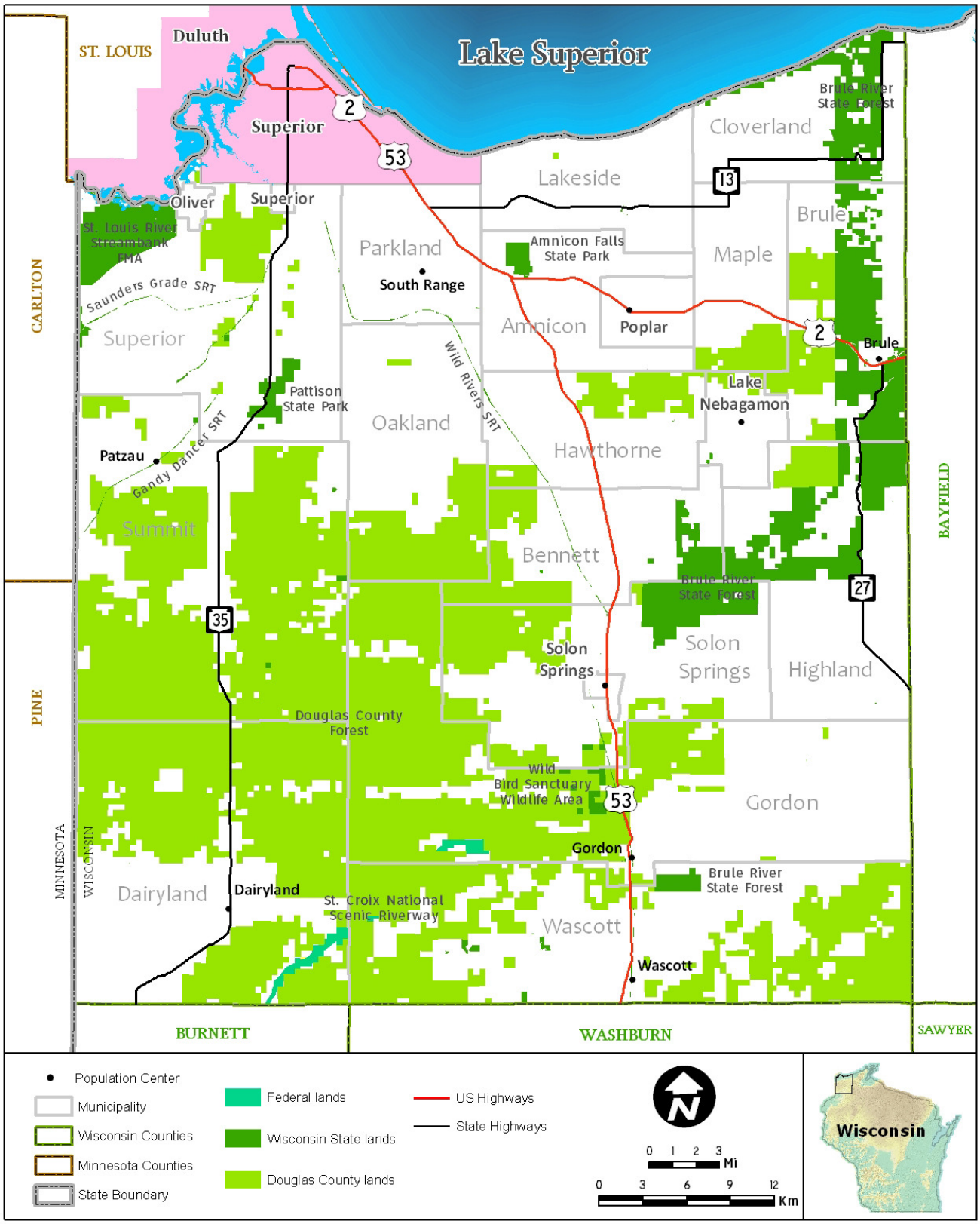


Figure 4. Public Lands of Douglas County, Wisconsin.

State lands in Douglas County include the Brule River State Forest (SF), Pattison and Amnicon Falls State Parks (SP), the St. Louis River Streambank Fish Management Area (FMA), the Saunders Grade, Gandy Dancer, and Wild Rivers State Recreational Trails (SRT), and portions of the Douglas County Bird Sanctuary Wildlife Area (WA). In general, state-owned lands are assembled in fairly contiguous blocks with the exception of several scattered parcels targeting specific management objectives (e.g., FMAs). Long-term management goals for the Brule River SF include consolidating lands within the forest's boundary by acquiring private parcels when they are available (WDNR 2003).

Douglas County is by far the largest public land holder in the county (Table 1). The bulk of county-owned lands occupy the majority of the southwestern quadrant of the county (Figure 4). County-owned lands include the Douglas County Forest, the Douglas County Bird Sanctuary Wildlife Area, and numerous parks, campgrounds, boat landings, public access sites, and multi-use trail networks. Encompassing over 267,000 acres, the Douglas County Forest is the largest county forest system in Wisconsin.

Private Lands

Land use patterns of private lands within Douglas County are used for a variety of purposes. The predominant land uses include forestry, agricultural, residential, commercial and manufacturing (Table 2).

Table 2. Areal Contribution of Selected Private Land Uses in Rural Douglas County.

Private Land Uses	Area (acres)	Percentage of Rural Douglas County
Forestry	219,138	27.2
Agricultural	53,571	6.6
Residential	35,179	4.4
Commercial	3,156	0.4
Manufacturing	263	< 0.1

Source: Douglas County 2009.

Forestry Use

Managing lands for the extraction of forest products is undoubtedly the largest single land use in Douglas County. Over a quarter of the county's private lands are assessed as forest use (Table 2). Industrial forests are managed for production of forest crops and account for approximately 13.5 % (109,125 acres) of private forestlands. The majority of these forestlands are enrolled in the Managed Forest Law (MFL) or Forest Crop Law (FCL) programs and are open to the public for hunting, fishing, cross-country skiing, and hiking. Although, lands assessed as forestry use have only declined slightly over the last 30 years (5.1 %), industrial forestlands may be threatened in the future by further partitioning and development (Douglas County 2009). Management of the resulting forest parcels would probably be less uniform and wildlife habitat quality might be reduced due to forest fragmentation. In addition, traditional public use and access would likely be terminated.

Agricultural Use

Although agricultural lands remain the second largest land use in Douglas County, acreage dedicated to agriculture declined steadily over the last 30 years (45.4 %) due to conversion to residential or forestry land uses (Douglas County 2009). In the state of Wisconsin, Douglas County has never ranked high in the total value of its agricultural products (68th of 72).The county is dominated by relatively poor, sandy soils, and what exists of the county's prime farmland soils are located north of the escarpment on the Lake Superior clay plain. Nevertheless, the county's cranberries (13th of 72) and aquaculture (16th of 72) are prominent commodities that contribute notably to Wisconsin's total agricultural output (Douglas County 2009).

Residential Use

Over the last 30 years, population growth has been rapid in rural areas with a considerable urban to rural population shift (Douglas County 2009). The 1990s and early 2000s witnessed an escalation in seasonal/recreational house construction on prime lakefront properties throughout the county and subdivided forest lots near the south shore of Lake Superior. Residential use acreage increased by approximately 24 % in unincorporated towns of Douglas County since 1978 (Douglas County 2009). The towns of Amnicon, Superior and Gordon have experienced the most growth of residential use acreage in rural Douglas County.

Housing density is greatest within incorporated villages and adjacent to the county's many lakes. Overall, housing density remains relatively low in the unincorporated towns in comparison to incorporated villages (6.2 versus 119.7 housing units per square mile, respectively). However, the number of housing units has increased over 40 % in the unincorporated towns of Amnicon, Hawthorne, and Oakland during the last 30 years (Douglas County 2009). Also, the urban to suburban/rural population shift is exemplified by the substantial housing density increase (nearly 65 %) in the Village of Oliver.

Projections for the years 2010 – 2030 predict increased housing densities and residential use acreage to continue in suburban municipalities adjacent to Superior (e.g., Oliver) and in areas with abundant forested and lakeshore properties (e.g., Amnicon, Lake Nebagamon, and Wascott; WDOA 2008; Douglas County 2009).

Commercial and Manufacturing Use

Commercial and manufacturing properties typically are linked to economic and population change. Commercial use in rural Douglas County includes the many small retail establishments selling merchandise or services at established sites along the major roads and highways (e.g., U.S. Highways 2 and 53 and State Highway 35) and in unincorporated town communities (i.e., Brule, Gordon, and Wascott). Over the last 30 years, commercial use acreage has remained stable while the number of assessed parcels has increased over 28 % (Douglas County 2009). Seasonal and recreational development appears to be a driver in the maintenance and expansion of commercial use in rural Douglas County.

Properties assessed as manufacturing use comprise a negligible contribution in terms of acreage in rural Douglas County (Table 2). Nevertheless, rural manufacturing activities provide important and necessary commodities for rural residents. Manufacturing use in rural Douglas County primarily is limited to extractive sites such as sand and gravel pits and the locations where these raw materials are stored.

II. Analysis

Selection Criteria

The mission of the Bayfield Regional Conservancy is "to protect natural lands, water, forest and farms, and places of scenic, historic, and spiritual value in the Bayfield Region". Projects that embody these expressed aspirations serve to realize the Conservancy's overall vision for the area. Such large-scale ambitions for the service area are worthy and must be refined into practical and manageable landscape and priority areas that exemplify these priorities. Identifying and prioritizing areas with high conservation value helps establish a pro-active approach to conservation activities and allows BRC to operate more efficiently by aiding in future evaluation of potential projects.

The BRC mission statement and the priorities it sets forth were the basis for the creation of the project and, by virtue, priority area selection criteria. Criteria add organization, uniformity, and transparency in the assessment and prioritization of conservation value across the entire landscape. Selection criteria addressed four broad conservation themes found in the BRC mission statement: natural resources, water quality, working lands, and community heritage.

1) *Natural Resources* (NR) selection criteria were used to identify lands and surface waters that contribute to the region's overall terrestrial and aquatic floral and faunal diversity as well as its unique natural beauty. Specific criterion include lands that satisfy at least one of the following:
   a) contain or buffer species that are endangered, threatened, rare, of special concern, of special economic interest, or otherwise of high importance or unique value
   b) contain or buffer natural communities that are rare, of special concern, or otherwise of high importance or unique value
   c) contain or buffer relatively natural wildlife habitat, exemplary or critical ecosystems, or natural features such as wetlands, unique soils, wildlife migration routes, migratory waterfowl wintering areas, streams/lakes supporting natural fisheries populations, or exceptional natural communities
   d) provide connection to other open protected or open space lands and is important for movement of wildlife between habitats or through developed corridors so that natural areas do not become isolated islands
   e) are part of a conservation or management plan

2) *Water Quality (WQ)* selection criteria were used to identify lands and hydrologic features that contribute to the water quality and overall health of Lake Superior water resources. Specific criterion include lands and waters that satisfy at least one of the following:
   a) contain, border, or affect the integrity of important hydrologic features necessary for protecting water supply, water quality, or for providing natural flood control such as wetlands, flood plains, waterways, riparian corridors, aquifer recharge areas, lakes or shorelines
   b) are part of a conservation or management plan

3) *Working Lands (WL)* selection criteria were used to identify agriculture or forestry lands that contribute to the region's overall rural character and economy. Specific criterion include lands that satisfy at least one of the following:
   a) contain agriculture or forestry use such as property designated as prime agricultural land or as an agricultural preservation district
   b) contain natural features of educational or scientific value including land used, or likely to be used, for the demonstration of sustainable agriculture, horticulture, or silviculture practices or for education in methods of good land stewardship
   c) are part of a conservation or comprehensive land use plan, local zoning ordinance or regulation, or local resolution

4) *Community Heritage (CH)* selection criteria were used to identify lands that provide quality low-impact/passive outdoor recreational and educational opportunities (i.e., greenspaces) and the conservation of scenic viewsheds, cultural and historical resources, and spiritually significant sites within the region. Specific criterion include lands that satisfy at least one of the following:
   a) are determined to be of special and/or significant value including scenic, historic or spiritual
   b) are, or have the potential to be part of a community, regional, state, or national hiking trail or greenway or contribute to the scenic and passive recreational attributes of such a trail or greenway by its proximity
   c) share a boundary with, or are in proximity to, a state or county forest, national or state park or riverway, nature preserve, or other public preserve, or provide access to public land or public waters
   d) have scenic attributes visible from parks, roadways, public foot trails, streams used by the public for recreation, or public use areas within state or national parks, or county or state forests, or are situated such that development would obstruct or diminish scenic views from public use areas, interfere with views across already protected open space or diminish the visual integrity of the community
   e) are farms significant for scenic beauty or historic resources
   f) have recognized historic, archaeological, or cultural value, especially lands included in, or adjacent to, designated historic properties, and necessary for the protection of the resources, including lands providing a buffer for properties of historical, archaeological, or cultural value
   g) contain unique or outstanding physiographic characteristics such as geologic landforms, caves, waterfalls, cliffs, etc.
   h) contain open space valuable to a community due to its proximity to developing areas or areas on which development appears imminent or due to its prominent role in how people perceive their community
   i) are part of a management, comprehensive land use, or local parks and recreation plan

Although these conservation themes are useful for compartmentalizing selection criteria, they are not mutually exclusive. Wetlands, for example, provide natural wildlife habitat (*NR*) and serve as filtration systems that contribute to the maintenance of high water quality (*WQ*); thus, conserving wetlands addresses both the natural resources theme and water quality theme, respectively.

FUNDAMENTAL DATA SETS

Fundamental data sets were identified and compiled from a variety of sources to represent selection criteria in a spatially explicit context (Table 3; Appendix B and C). Some data sets represented several selection criteria addressing different conservation themes. However, because a data set may address different themes and criteria, the compounding of multiple benefits generates higher conservation value. For instance, wild rice rivers and lakes provide important natural habitats for migratory waterfowl and other bird species. In addition, wild rice areas hold high cultural value; wild rice has been a vital component of Great Lakes Native American culture for hundreds of years, was a traditional staple for the voyageurs and early European explorers, and is harvested by hundreds of current residents for the nutritional, recreational and spiritual rewards the experience offers (GLIFWC 2006). Because the data set containing wild rice waters represents several criteria in different conservation themes, the natural resource (*NR* selection criteria a-e) and community heritage (*CH* selection criteria a, f and i) values of wild rice waters are additive.

Table 3. Fundamental Data Set Source Information and the Conservation Themes Addressed in the Present Analysis.

Data Layer	Reference Source	Spatial Data Source	YEAR	Natural Resources	Water Quality	Working Lands	Community Heritage
NHI Birds (17 species)	Natural Heritage Inventory	WDNR	2008	x			
NHI Fish (6 species)	Natural Heritage Inventory	WDNR	2008	x			
NHI Herpetafauna (3 species)	Natural Heritage Inventory	WDNR	2008	x			
NHI Insects (33 species)	Natural Heritage Inventory	WDNR	2008	x			
NHI Mammals (3 species)	Natural Heritage Inventory	WDNR	2008	x			
NHI Mollusks (4 species)	Natural Heritage Inventory	WDNR	2008	x			
NHI Plants (50 species)	Natural Heritage Inventory	WDNR	2008	x			
NHI Communities (21 communities)	Natural Heritage Inventory	WDNR	2008	x			
NHI Other Natural Features	Natural Heritage Inventory	WDNR	2008	x			
WDNR Aquatic Conservation Opportunities Areas	Wisconsin Wildlife Action Plan	WDNR	2009	x	x		
WDNR Terrestrial Conservation Opportunities Areas	Wisconsin Wildlife Action Plan	WDNR	2009	x			
WDNR Land Legacy Places	Wisconsin Land Legacy Report	GeoCosmos	2006	x			
WBCI Important Bird Areas	Wisconsin Bird Conservation Initiave	WDNR	2009	x			
WDNR State Natural Areas	Endagered Resources Program	WDNR	2008	x			
WDNR Critical Habitats	Surface Water Integrated Monitoring System	WDNR	2009	x			
WDNR Priority Wetlands	Surface Water Integrated Monitoring System	WDNR	2009	x	x		
WDNR Class I Trout Waters	Surface Water Integrated Monitoring System	WDNR	2009	x			
NHI Waters	Surface Water Integrated Monitoring System	WDNR	2009	x			
LSBF Fish Spawning Sites	Lake Superior Binational Forum Critical Habitat Committee	NRRI/GeoCosmos	2000/2009	x			
LSBF Important Habitat Sites	Lake Superior Binational Forum Critical Habitat Committee	NRRI/GeoCosmos	2000/2009	x			

Data Layer	Reference Source	Spatial Data Source	YEAR	Natural Resources	Water Quality	Working Lands	Community Heritage
LSBF Important Habitat Areas	Lake Superior Binational Forum Critical Habitat Committee	NRRI	2000	x			
GLCWC Coastal Wetlands	Great Lakes Coastal Wetlands Consortium	WDNR	2004	x	x		
USGS Forest Fragmentation - Connectivity	Causes of Forest Fragmentation	USGS	2004	x			
NRCS Wetland Indicator Soils	Wisconsin Wetland Indicator Soils	NRCS/WDNR	2005	x	x		
WDNR Priority Watershed	WDNR Priority Watershed Program	GeoCosmos	2009	x	x		
WDNR Quality Wetlands	Surface Water Integrated Monitoring System	WDNR	2009	x	x		
WDNR Wild Rice Waters	Surface Water Integrated Monitoring System	WDNR	2009	x			x
WDNR Muskellunge Waters	Surface Water Integrated Monitoring System	WDNR	2009	x			
WDNR Walleye Waters	Surface Water Integrated Monitoring System	WDNR	2009	x			
Perennial Rivers 150 m buffer	National Hydrography Dataset	USGS/GeoCosmos	2009	x	x		
Lakes less than 50 acres	Surface Water Integrated Monitoring System	WDNR	2009	x	x		
Public Lands 800 m buffer	Douglas County Land Conservation Department	DCLCD/GeoCosmos	2009	x			x
Other Conservation Lands 800 m buffer	Douglas County Land Conservation Department	DCLCD/GeoCosmos	2009	x			x
WDNR Outstanding & Exceptional Resource Waters	Surface Water Integrated Monitoring System	WDNR	2009		x		
WDNR Class III Wild Lakes 150 m buffer	Wild Lakes Program	WDNR/GeoCosmos	2006/2009		x		
WDNR Class III Wild Lakes Protected Shoreline 150 m buffer	Wild Lakes Program	WDNR/GeoCosmos	2006/2009		x		
Lake Superior Eroding Clay Bank Shoreline 100 m buffer	Northwest Regional Planning Commission	NRPC/GeoCosmos	2009		x		x
NED Slopes > 30 % slope	National Elevation Dataset	USGS	1998		x		
WDNR Highly Susceptible Soils to Ground Contamination	Groundwater Contamination Susceptibility Model	WDNR	2001		x		

Data Layer	Reference Source	Spatial Data Source	YEAR	Natural Resources	Water Quality	Working Lands	Community Heritage
Intermittent Rivers 30 m buffer	National Hydrography Dataset	USGS/GeoCosmos	2009		x		
NRCS Soils of statewide importance or prime farmlands	Soil Survey Geographic Database	NRCS	2005			x	
Douglas County Zoned Agriculture – Perennial Rivers 150 m buffer	Douglas County Land Conservation Department/National Hydrography Dataset	DCLCD/USGS/GeoCosmos	2009			x	
Douglas County Zoned Agriculture (A1) or Forestry (F1)	Douglas County Land Conservation Department	DCLCD	2009			x	
WDNR Forest Crop Law or Managed Forest Law Programs	Forestry Services Bureau	WDNR	2008			x	
National Wild and Scenic Rivers	Water Resources Division	NPS	2001				x
Notable Waterfalls and Cascades	National Hydrography Dataset/WDNR	USGS/GeoCosmos	2009				x
NPS North Country National Scenic Trail 400 m buffer	North Country Trial Assocition	NPS/GeoCosmos	2009				x
WDNR/Douglas County Cross-Country Ski Trail 400 m buffer	Northwest Regional Planning Commission/WDNR/NAIP 2006	NRPC/GeoCosmos	2009				x
Recognized Canoe Trails	National Hydrography Dataset/Svob 1998/Lowry and Taubman 1998	USGS/GeoCosmos	2009				x
Cultural and Historical Resources	Wisconsin Historical Society	GeoCosmos	2009				x
Historic Farm 800 m buffer	Wisconsin Historical Society	GeoCosmos	2009				x
Population Centers 800 m buffer	ESRI Data & Maps Populated Place Points	ESRI/GeoCosmos	2008				x
WDNR/Douglas County Multi-Use Trail 400 m buffer	Northwest Regional Planning Commission	NRPC/GeoCosmos	2009				x
Lake Superior Circle Tour Route 400 m buffer	Northwest Regional Planning Commission	NRPC/GeoCosmos	2009				x
Lake Superior Shoreline 200 m buffer	Northwest Regional Planning Commission	NRPC/GeoCosmos	2009				x
Prominent Hills and Ridges	National Elevation Dataset and USGS 24K DRGs	GeoCosmos	2009				x
Douglas Geologic Fault	Wisconsin Geologica Map Data	USGS	2004				x

LAND PRIORITIZATION MODELING

A three-step process was used to delineate landscapes, identify lands and prioritize parcels with significant conservation value (Figure 5). The first step involved creating practical and manageable landscape units, or Landscape Conservation Areas (LCA), defined by broad ecological similarities and shared conservation issues. The next step included analyzing fundamental data sets representing the four broad conservation themes to quantify the conservation value of areas within Douglas County. The last step entailed identifying specific Douglas County parcels that encompassed features and areas identified as having significant conservation value based on the results of the previous analysis.

Defining Landscape Conservation Areas

Douglas County was divided into seven LCAs based on general physiographic (i.e., landtype associations), ecological (i.e., ecoregions) and hydrologic (i.e., subwatershed) characteristics, as well as similarities in land use and conservation issues (Figure 6). The grouping of natural features and conservation topics through the creation of distinct LCAs allows for a focused discussion of the traits and issues regarding the diverse landscapes of Douglas County. Generally, LCAs tend to represent an aggregation of the elements of one or several of the broad conservation themes. For example, the Bois Brule Valley and St. Louis – Nemadji Rivers and Wetlands LCAs are characterized by abundant and significant natural resource elements and features that affect water quality, respectively; whereas the importance of working lands exemplify the South Shore Streams LCA. LCAs also are a useful unit for describing coarse filter conservation objectives that both precede and support decisions on whether to pursue smaller scale, site-specific conservation projects.

Conservation Value Analysis

Two different analytical approaches were used to identify areas with conservation value within Douglas County. An overlay analysis was performed to provide a simplified depiction of areas with overlapping conservation elements and themes, and a scored, or weighted, analysis was performed to provide a quantification of Conservation Value (CV) across the planning area.

Geographic Information System, Data Consistency and Preparation

We used ArcGIS™ 9.3 (Environmental Systems Research Institute, Inc.; Redlands, CA) and the Spatial Analyst extension to perform all spatial analyses and create all cartographic products. ArcMap was used to create, edit, modify, and review data sets and perform quality control/quality assurance tasks. In addition, ArcMap was used to create various data sets via heads-up digitizing using hard copy document or map sources as reference. ArcCatalog was used to organize and manage the many data sets created during the analytical process. ArcCatalog also was used to create metadata when necessary.

Before any analyses were performed, the data type, geographic coordinate system and projection were converted to define a minimum mapping unit (i.e., 30 meter^2) and maintain a consistent and aligned extent during the execution of analyses (i.e., Douglas

County). Vector data types (i.e., points, lines, or polygons) were converted to raster data types (i.e., cell-based) in most instances. In addition, the geographic coordinate systems and projections of all data sets were converted, when necessary, to NAD 1983 HARN (High Accuracy Reference Network) and Transverse Mercator, respectively. Raster data types are the preferred format for conducting landscape analyses using multiple and disparate data sets because some generalization is required to analyze features of different spatial dimensions (e.g., points are one-dimensional, lines are two-dimensional features without area, polygons are two-dimensional features with area) and accuracies (e.g., legal description, GPS, simplified boundary, etc.). The minimum mapping unit of 30 meter^2 (i.e., 0.007 acres) was chosen for its wide and standard use in raster data sets and acceptable size relative to the most diminutive parcels (i.e., < 1 % of parcels were < 0.007 acres).

Next, two distinct rasters were created for each fundamental data set for use in each of the analyses. Because the overlay analysis only requires simple binary information (i.e., the feature either exists at a particular location or does not), rasters for fundamental data sets were create to reflect presence (i.e., cell value = 1) or absence (i.e., cell value = 0). However, the scored analysis required that fundamental data sets carry different weights based on their relative conservation importance. Therefore, rasters with weighted cell values were created for each fundamental data set.

Land Prioritization Model

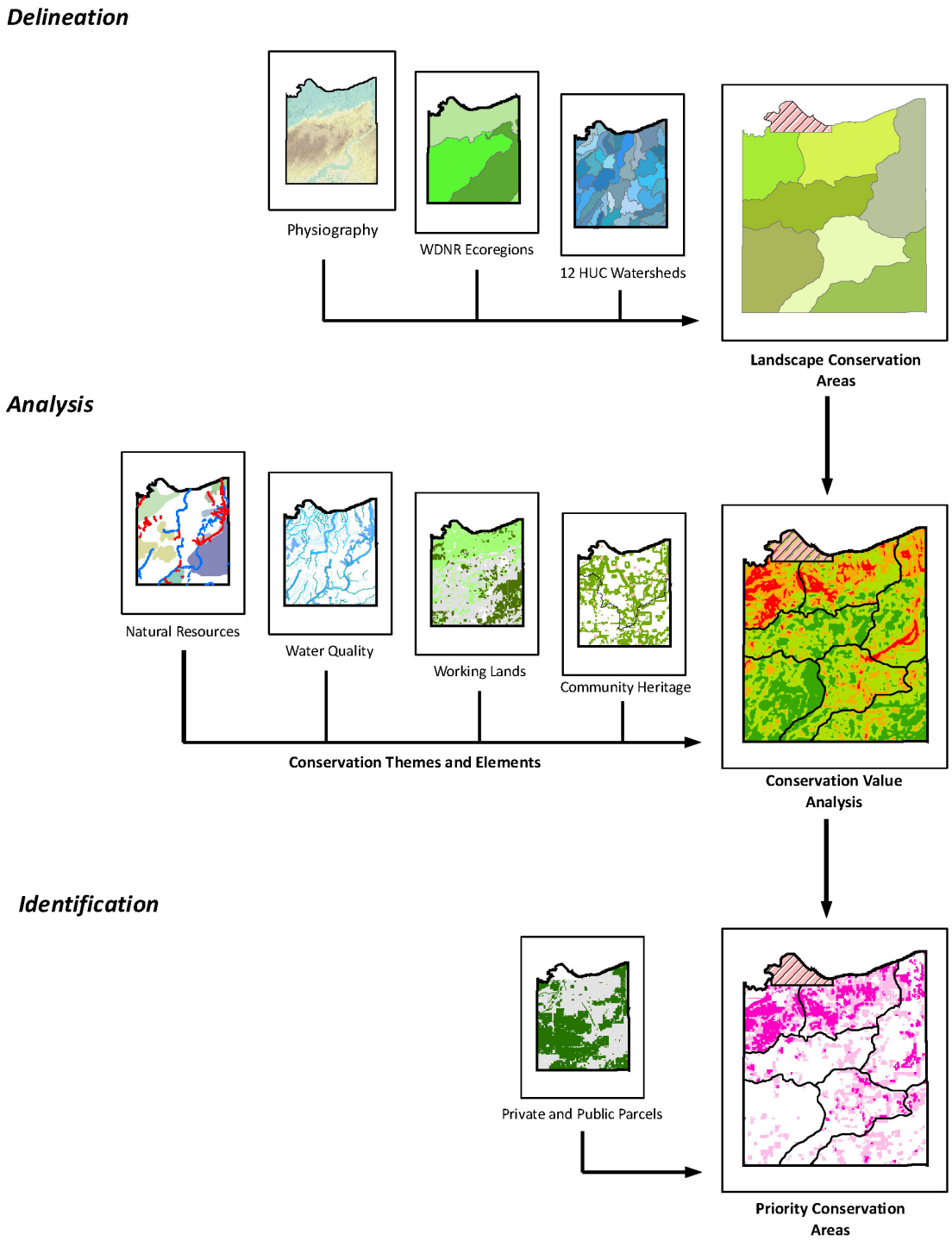


Figure 5. Schematic of Land Prioritization Modeling Process.

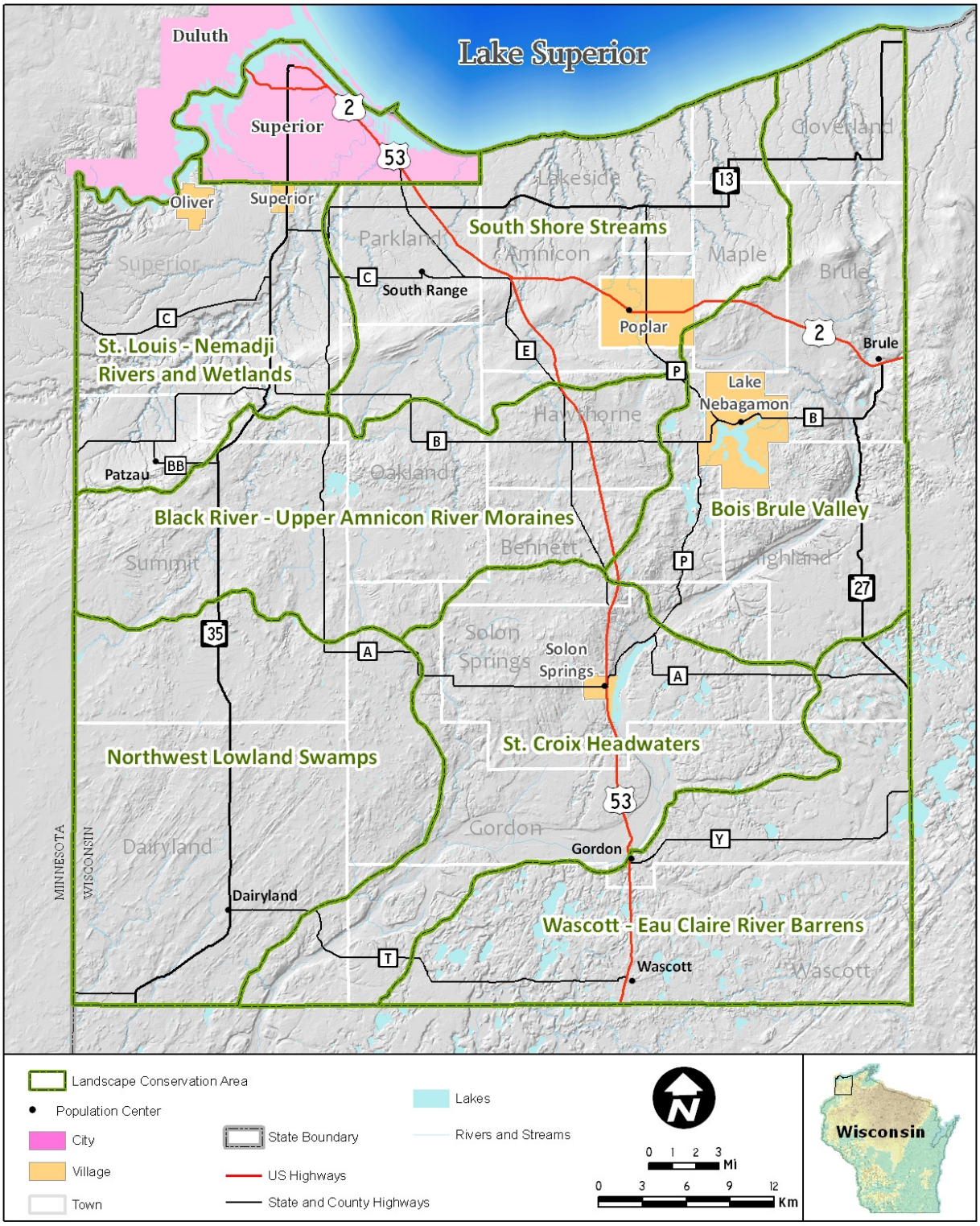


Figure 6. Landscape Conservation Areas Identified within Douglas County, Wisconsin.

Overlay Analysis

The overlay analysis displayed areas where multiple fundamental data sets (hereafter, conservation element/s) overlap. Besides identifying areas of overlap, the analysis is useful in determining the number of overlapping conservation elements. Although the overlap analysis is a useful visual tool for assessing areas with overlapping conservation value, it assumes rather simplistically that all elements have equal conservation value.

Conservation Element Overlay Analysis

Once the data sets were prepared as described above, the overlay analysis was performed in two parts. For the first part, the rasters representing the conservation elements that contributed to each conservation theme were analyzed using the cell statistic function in Spatial Analyst. The cell statistic function calculates a value for each raster cell based on the sum of the overlapping cell values of the multiple input rasters. Therefore, since each element overlay raster was composed of cells with the value 1 or 0, the cell values of the output theme overlay raster indicate the presence, absence and number of overlapping conservation elements.

Each conservation theme was represented by a different number of conservation elements with natural resources having the most and working lands the least (Table 4; Figures 7 - 10). The number and proportion of overlapping conservation elements for each theme also differed (Table 4). Areas with the highest overlap provide insight into locations with important conservation theme-specific value (Figures 7 - 10). In addition, the cell statistic function was used to analyze all conservation elements, to reveal areas with the highest cumulative overlap regardless of conservation theme (Figure 11).

Table 4. Descriptive Statistics of Conservation Themes and Conservation Elements for the Overlay Analysis.

Conservation Theme	Conservation Elements[1]	Overlap Range[2]	Proportion[3]
Natural Resources	161	0 – 22	13.7
Water Quality	15	0 – 8	53.3
Working Lands	4	0 – 4	100.0
Community Heritage	17	0 – 5	29.4

[1]Number of conservation elements representing the conservation theme.
[2]Range of overlapping conservation elements per conservation theme.
[3]Proportion of the highest number of overlapping elements in relation to the total number of elements per theme.

Conservation Theme Overlay Analysis

The second part of the overlay analysis involved simplifying the information generated during the conservation element overlay analysis. Cell values of each conservation theme overlay raster produced during the first part of the analysis were reclassified to a value of 1 (i.e., presence of one or more conservation elements) or 0 (i.e., absence of conservation elements). As with the previous analysis, the cell statistic function was used to analyze the reclassified conservation theme rasters. The final combined conservation theme overlay raster displays areas where one or more conservation themes overlap (Figure 12).

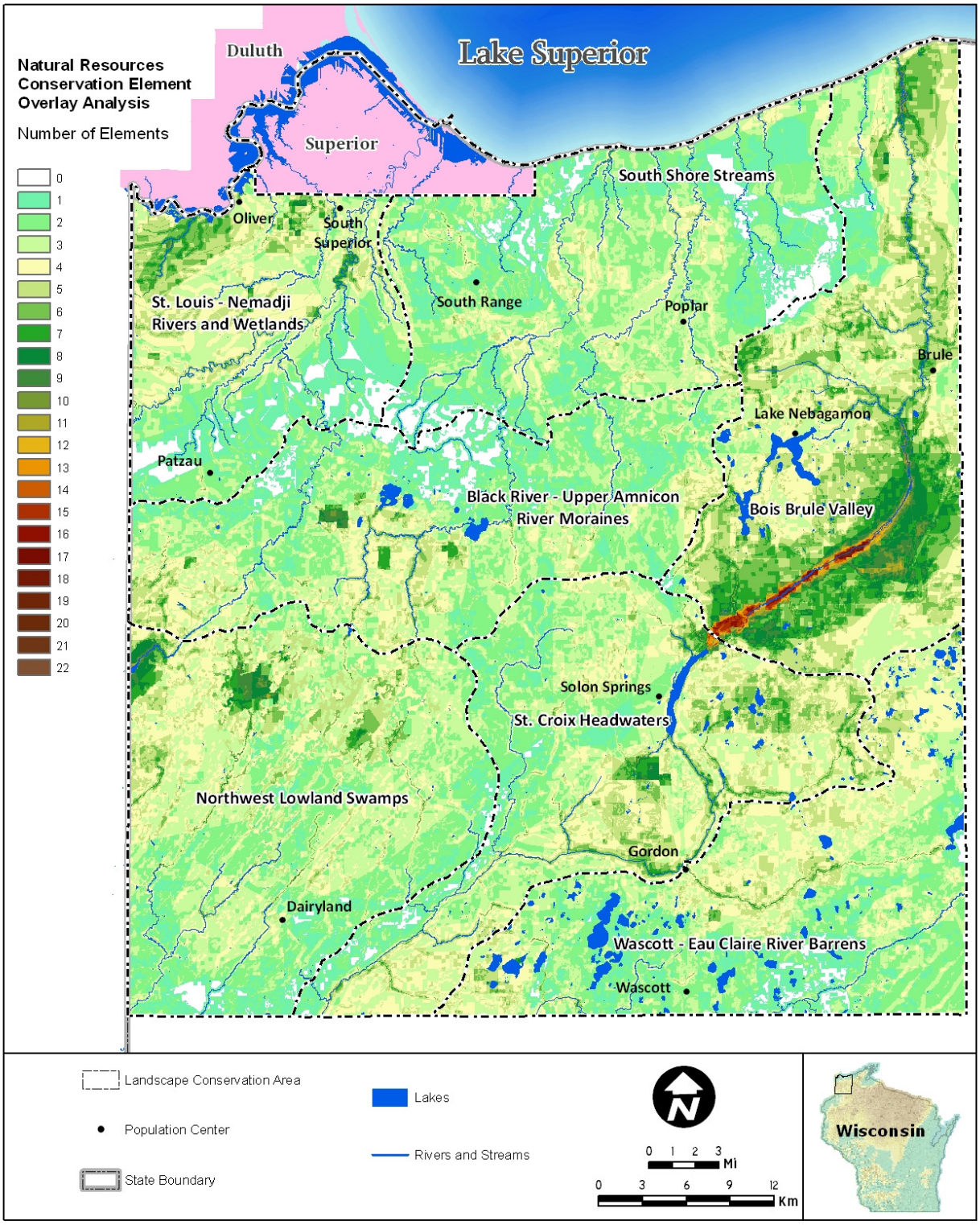


Figure 7. Natural Resources Conservation Elements Overlay Analysis.

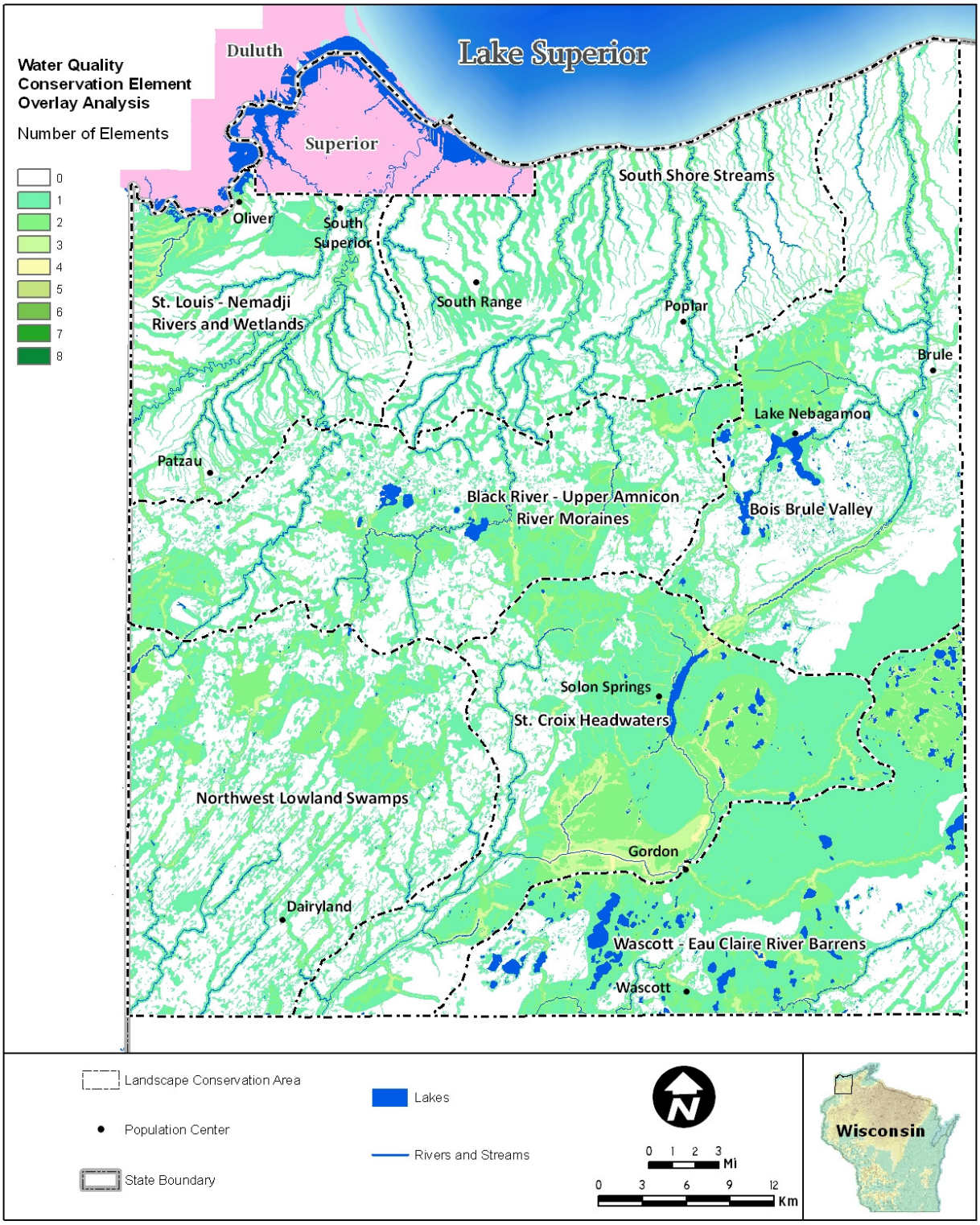


Figure 8. Water Quality Conservation Elements Overlay Analysis.

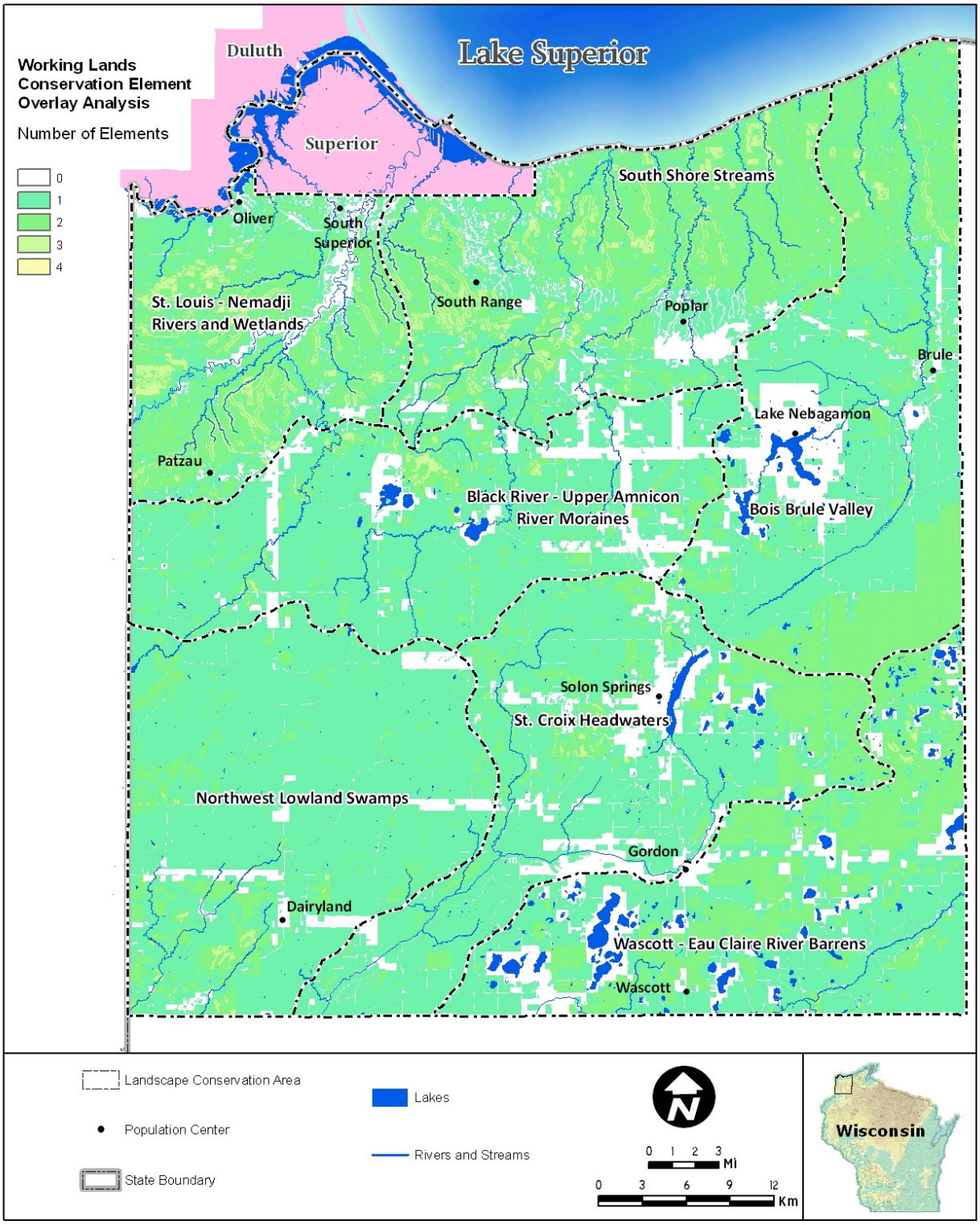


Figure 9. Working Lands Conservation Elements Overlay Analysis.

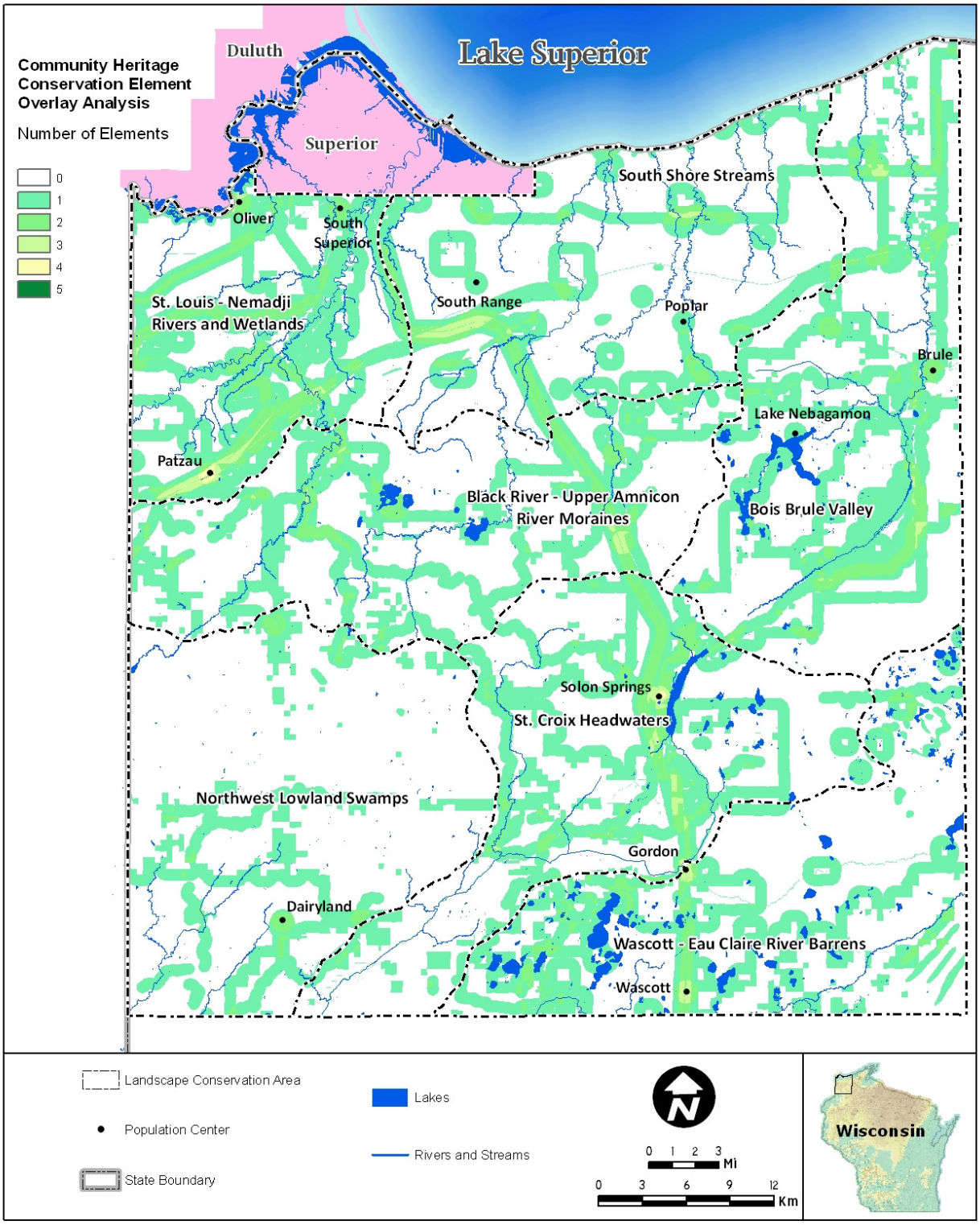


Figure 10. Community Heritage Conservation Elements Overlay Analysis.

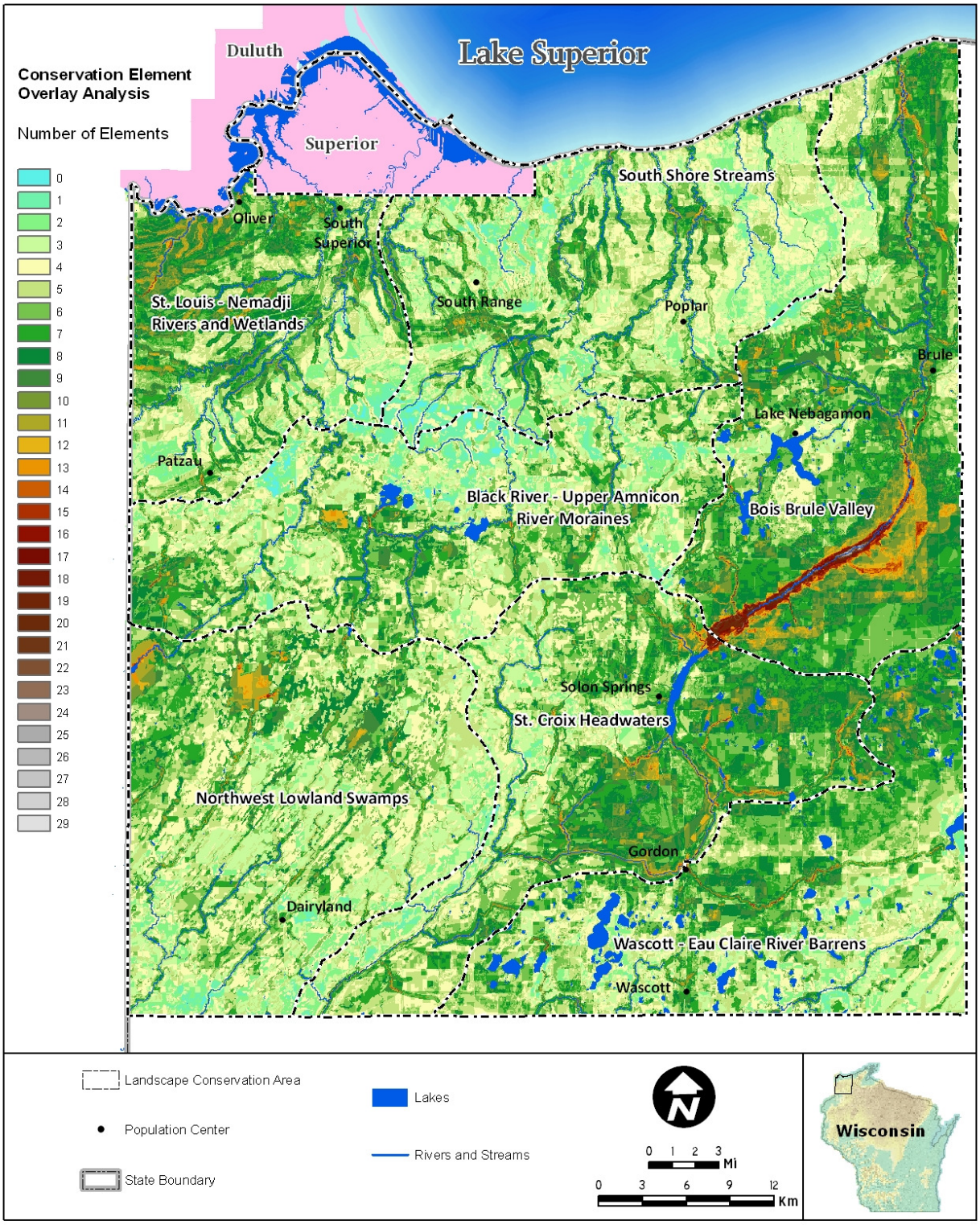


Figure 11. Cumulative Conservation Elements Overlay Analysis.

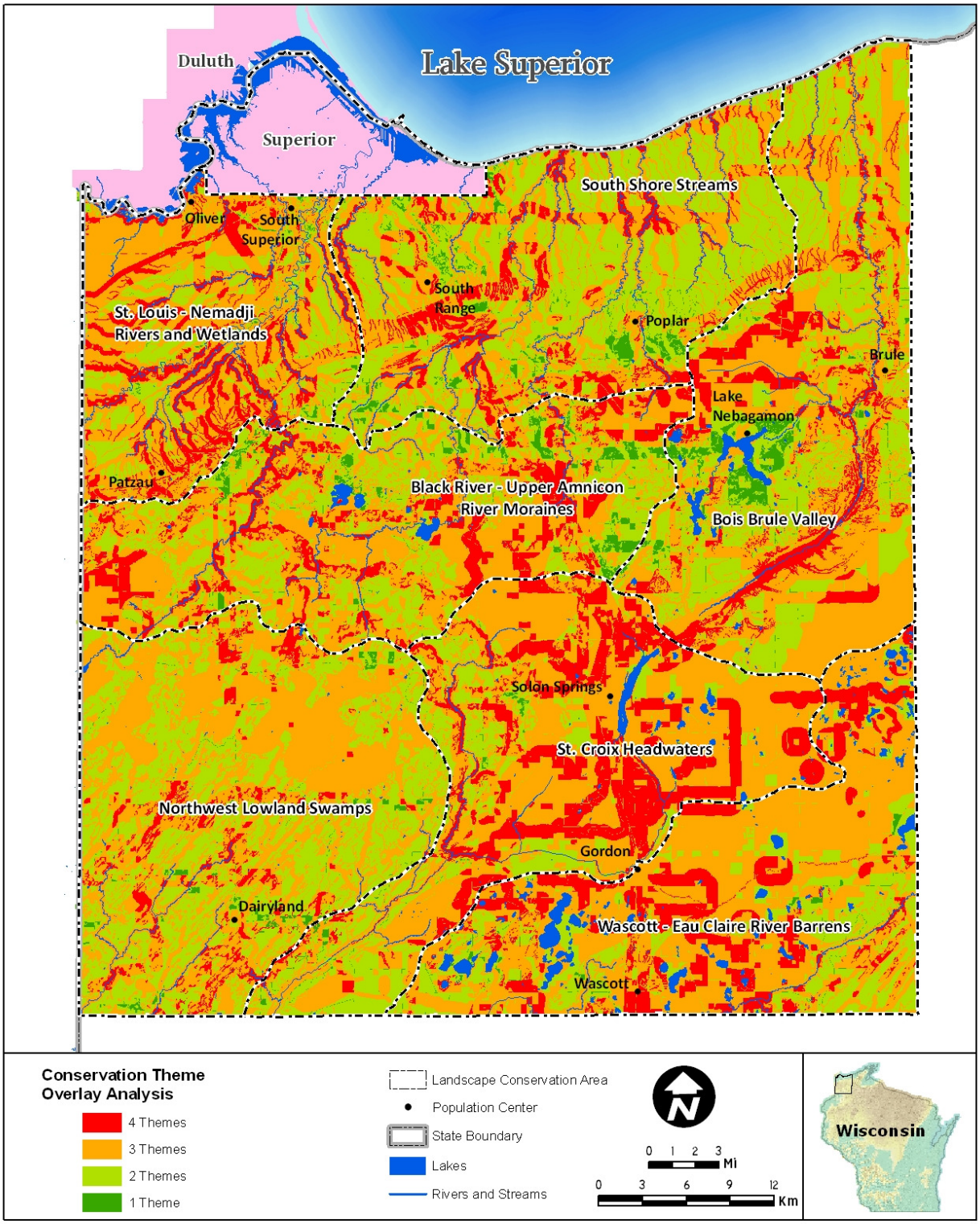


Figure 12. Conservation Themes Overlay Analysis.

Scored Analysis

The scored, or weighted, analysis was performed to fully account for the importance and contribution of each conservation element to its conservation theme. Although more subjective than the overlay analysis, one advantage of the scored analysis is that it provides a quantification of the conservation value of an area relative to the importance of different conservation elements. The basic assumptions for the scored analysis include:

1. Elements that contributed more conservation value and were deemed more important to a conservation theme were assigned a higher point value, or weight; and
2. All conservation themes were of equal importance.

The first step of this analysis was the creation of a scoring system in which each conservation element in each conservation theme was assigned a point value. Because each conservation theme initially was considered of equal importance, a multiplier was used to ensure that the total possible score for any theme was 100. Therefore, each conservation element had a point value that was multiplied by the appropriate multiplier to yield a weighted value (Tables 5 - 8).

Once the scoring system was developed, rasters with weighted cell values were created for each conservation element as described previously. Once again, the cell statistic function was used to analyze the element weighted rasters for each conservation theme. Because of the large disparities in elements per theme (Table 4), it was noted that relatively important elements (i.e., NHI species and communities) would contribute disproportionately low scores, and hence, weight, to the cumulative scored analysis. In addition, relatively coarse and extensive elements of less importance (i.e., Agricultural or Forestry Zoning) would contribute disproportionately high scores that would mask the role the majority of other elements might play in the conservation value of an area.

In an attempt to properly recognize the overall contribution each theme would make to the cumulative analysis, it was decided that areas with the highest scores would be represented as areas with the highest possible score (i.e., 100). No modification was necessary for the Working Lands weighted raster because large areas resulted with the highest possible score. Therefore, all initial scores of the Natural Resources, Water Quality, and Community Heritage weighted rasters were converted proportionally to 100. In other words, the modified scores (*quotient*) were the result of the original score (*dividend*) divided by the maximum score (*divisor*; Table 9) multiplied by 100. Additionally, the neighborhood statistics function was used to smooth the resulting rasters. The neighborhood statistic function computes an output raster in which the value at each location is a function (mean) of the input cells in some specified neighborhood of the location (0.25 miles). The resulting theme raster outputs depict the smoothed CV of the planning area by conservation theme (Figures 13 - 16).

Initially, all theme rasters were to be included in the cumulative analysis. Unfortunately, few elements represented the Working Lands theme (Table 7). Most elements were characterized by coarse and widespread data and were relatively ineffective at identifying specific areas of Working Lands conservation value. Therefore, after

inspection of the preliminary cumulative CV raster, the Working Lands weighted raster was excluded from further analyses due to the diluting effect its large areas of highest possible score had on cumulative analyses products. Nevertheless, the Working Land weighted raster was used in a complementary fashion to the final cumulative CV raster due to its utility in identifying areas where strategies involving farmland preservation incentive programs and partners might be possible.

Finally, the Natural Resources, Water Quality, and Community Heritage weighted rasters were analyzed using the cell statistics function; however, during this final process the mean of the overlapping cell values of the multiple input rasters was calculated. This final process produced a cumulative CV raster (Figure 17) which was classified using natural breaks into four CV categories (i.e., Low: 0-6.4, Medium: >6.4-11.4, Medium High: >11.4-18.0, High: >18.0). The CV classification was applied uniformly to all theme weighted rasters to facilitate comparison between themes and allow the evaluation of the relative contribution of each theme to the final cumulative CV raster.

Table 5. Natural Resources Elements Scoring System.

Fundamental Data Sets	Value Ratio Per Element	Weighted Value Per Element	Cumulative Point Value	Cumulative Weighted Value[2]
NHI Birds (17 species)[1]	6:1	0.696	102	11.833
NHI Fish (6 species)[1]	6:1	0.696	126	14.617
NHI Herp (3 species)[1]	6:1	0.696	36	4.176
NHI Insects (33 species)[1]	6:1	0.696	18	2.088
NHI Mammals (3 species)[1]	6:1	0.696	198	22.970
NHI Mollusks (4 species)[1]	6:1	0.696	18	2.088
NHI Plants (50 species)[1]	6:1	0.696	24	2.784
NHI Communities (21 communities)[1]	6:1	0.696	300	34.803
NHI Other Natural Features	3:1	0.348	3	0.348
WDNR Conservation Opportunities Areas	3:1	0.348	3	0.348
WDNR Land Legacy Places	3:1	0.348	3	0.348
WBCI Important Bird Areas	3:1	0.348	3	0.348
WDNR State Natural Areas	3:1	0.348	3	0.348
WDNR Critical Habitats	3:1	0.348	3	0.348
WDNR Priority Wetlands	3:1	0.348	3	0.348
WDNR Class I Trout Waters	3:1	0.348	3	0.348
NHI Waters	1:1	0.116	1	0.116
LSBF Fish Spawning Sites	1:1	0.116	1	0.116
LSBF Important Habitat Sites	1:1	0.116	1	0.116
LSBF Important Habitat Areas	1:1	0.116	1	0.116
SLEC Coastal Wetlands	1:1	0.116	1	0.116
USGS Forest Fragmentation - Connectivity	1:1	0.116	1	0.116
NRCS Wetland Indicator Soils	1:1	0.116	1	0.116
WDNR Priority Watershed	1:1	0.116	1	0.116
WDNR Quality Wetlands	1:1	0.116	1	0.116
WDNR Wild Rice Waters	1:1	0.116	1	0.116
WDNR Muskellunge Waters	1:1	0.116	1	0.116
WDNR Walleye Waters	1:1	0.116	1	0.116
Perennial Rivers 150 m buffer	1:1	0.116	1	0.116
Lakes less than 50 acres	1:1	0.116	1	0.116
Public Lands 800 m buffer	1:1	0.116	1	0.116
Other Conservation Lands 800 m buffer	1:1	0.116	1	0.116
Natural Resources Totals			**862**	**100.00**

[1]Selected Natural Heritage Inventory Elements were considered individually to adjust scores accordingly at locations where multiple species occurred concomitantly. For example, the weight for each bird species was 0.696 and therefore, would be 1.392 where occurrences overlapped. If these species occurred within an NHI Community, the combined score at the three overlapping areas would be 2.088.
[2]Because each conservation theme was considered equal in importance, a multiplier of 0.116 was used to ensure that a total possible score for Natural Resources was 100.

Table 6. Water Quality Elements Scoring System.

Fundamental Data Sets	Value Ratio Per Element	Point Value	Weighted Value Per Element[1]
WDNR Outstanding & Exceptional Resource Waters	3:1	3	9.675
WDNR Aquatic Conservation Opportunity Areas	3:1	3	9.675
WDNR Priority Wetlands	3:1	3	9.675
WDNR Class III Wild Lakes 150 m buffer	3:1	3	9.675
WDNR Class III Wild Lakes Protected Shoreline 150 m buffer	3:1	3	9.675
Lake Superior Eroding Clay Bank Shoreline 100 m buffer	3:1	3	9.675
NED Slopes > 30 % slope	3:1	3	9.675
Perennial Rivers 150 m buffer	3:1	3	9.675
SLEC Coastal Wetlands	1:1	1	3.225
NRCS Wetland Indicator Soils	1:1	1	3.225
WDNR Priority Watersheds	1:1	1	3.225
WDNR Quality Wetlands	1:1	1	3.225
WDNR Highly Susceptible Soils to Ground Contamination	1:1	1	3.225
Intermittent Rivers 30 m buffer	1:1	1	3.225
Lakes less than 50 acres	1:1	1	3.225
Water Quality Totals		**31**	**100.00**

[1]Because each conservation theme was considered equal in importance, a multiplier of 3.225 was used to ensure that a total possible score for Water Quality was 100.

Table 7. Working Lands Elements Scoring System.

Fundamental Data Sets	Value Ratio Per Element	Point Value	Weighted Value Per Element[1]
NRCS Soils of statewide importance or prime farmlands	3:1	3	37.5
Douglas County Zoned Agriculture – Perennial Rivers 150 m buffer	3:1	3	37.5
Douglas County Zoned Agriculture (A1) or Forestry (F1)	1:1	1	12.5
WDNR Forest Crop Law or Managed Forest Law Programs	1:1	1	12.5
Working Lands Totals		**8**	**100.00**

[1]Because each conservation theme was considered equal in importance, a multiplier of 12.5 was used to ensure that a total possible score for Working Lands was 100.

Table 8. Community Heritage Elements Scoring System.

Fundamental Data Sets	Value Ratio Per Element	Point Value	Weighted Value Per Element[1]
National Wild and Scenic Rivers	2:1	2	8.511
Notable Waterfalls and Cascades	2:1	2	8.511
WDNR Wild Rice Waters	3:2	1.5	6.383
NPS North Country National Scenic Trail 400 m buffer	3:2	1.5	6.383
WDNR/Douglas County Cross-Country Ski Trail 400 m buffer	3:2	1.5	6.383
Recognized Canoe Trails	3:2	1.5	6.383
Cultural and Historical Resources	3:2	1.5	6.383
Historic Farm 800 m buffer	3:2	1.5	6.383
Public Lands 800 m buffer	3:2	1.5	6.383
Population Centers 800 m buffer	3:2	1.5	6.383
Other Conservation Lands 800 m buffer	3:2	1.5	6.383
WDNR/Douglas County Multi-Use Trail 400 m buffer	1:1	1	4.255
Lake Superior Circle Tour Route 400 m buffer	1:1	1	4.255
Lake Superior Shoreline 200 m buffer	1:1	1	4.255
Lake Superior Eroding Clay Bank Shoreline 100 m buffer	1:1	1	4.255
Prominent Hills and Ridges	1:1	1	4.255
Douglas Geologic Fault	1:1	1	4.255
Community Heritage Totals		**27.5**	**100.00**

[1]Because each conservation theme was considered equal in importance, a multiplier of 4.255 was used to ensure that a total possible score for Community Heritage was 100.

Table 9. Highest Conservation Value per Conservation Themes used to Modify Scores before Cumulative Scored Analysis.

Conservation Theme	Highest Value/Divisor[1]
Natural Resources	9.744
Water Quality	58.059
Working Lands	100.000
Community Heritage	29.787

[1]Values from conservation theme raster before smoothing of neighborhood statistic function.

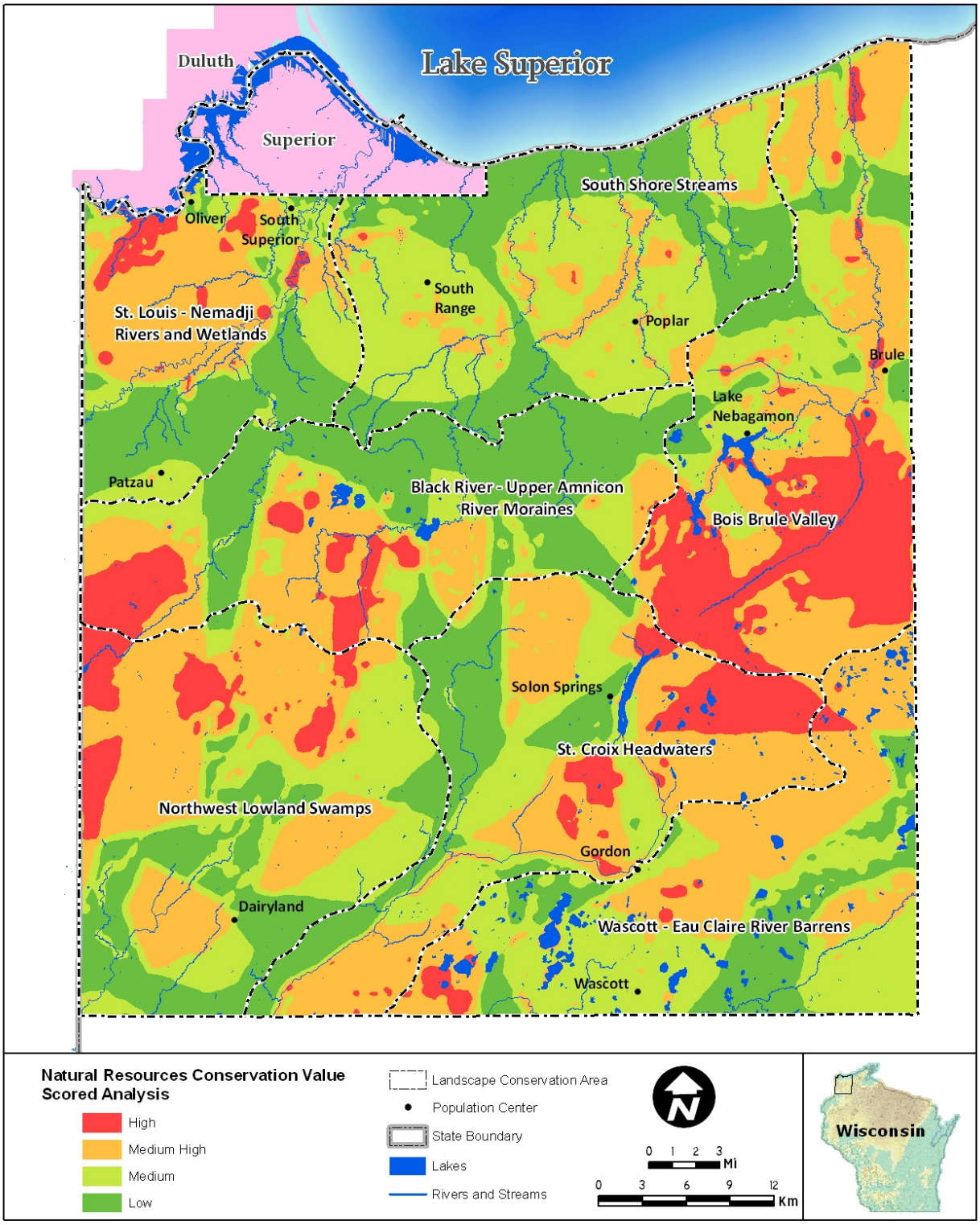


Figure 13. Natural Resources CV Scored Analysis.

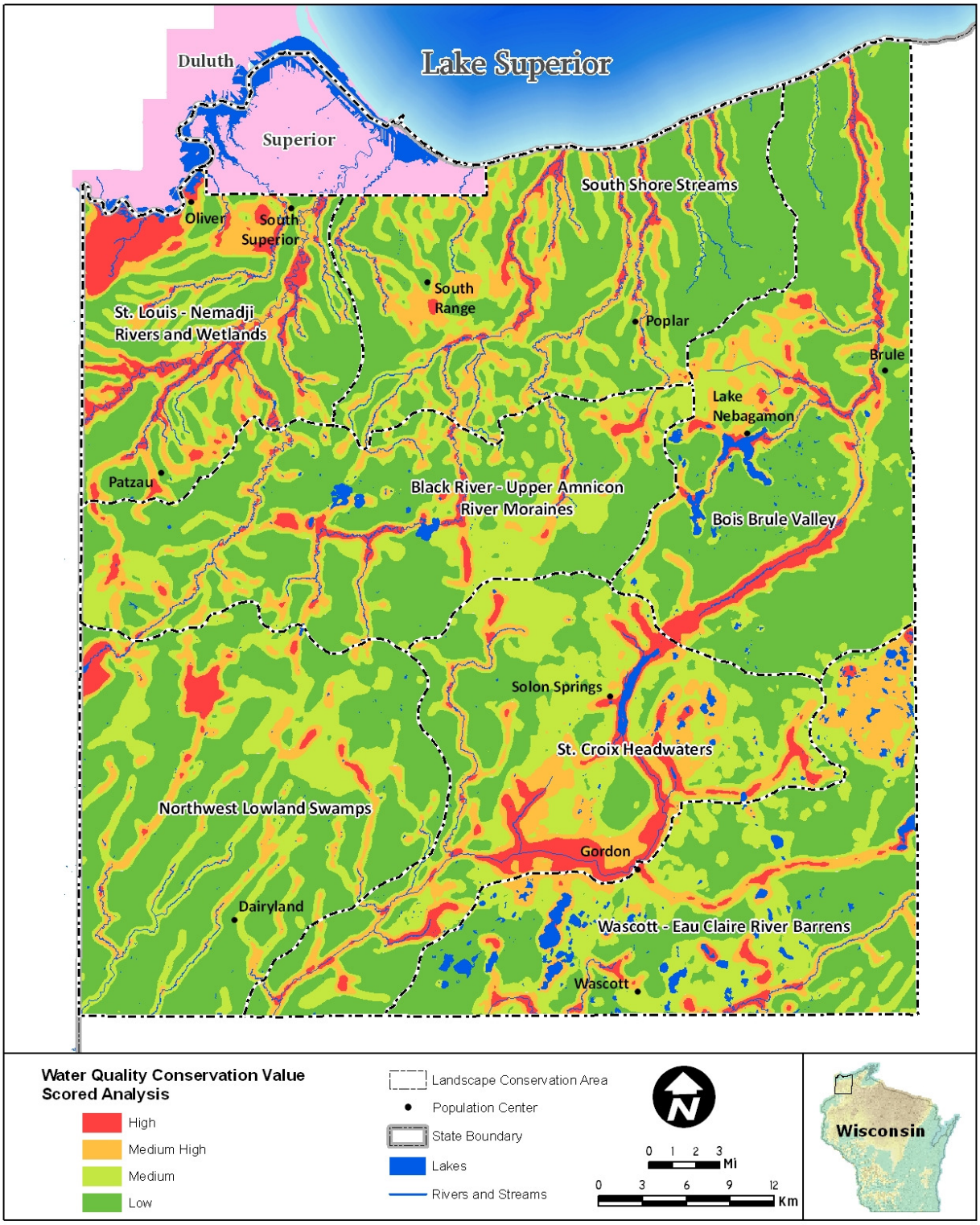


Figure 14. Water Quality CV Scored Analysis.

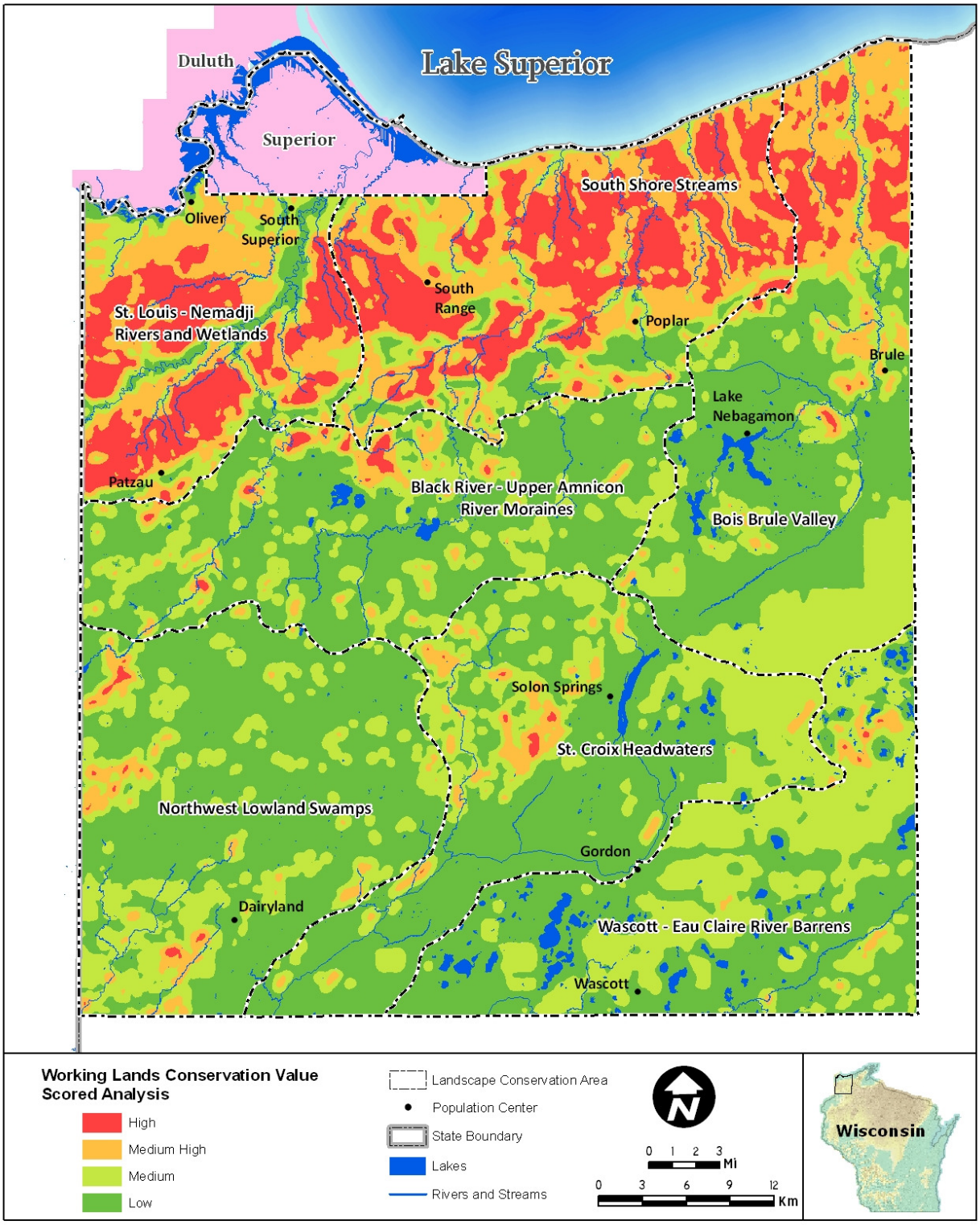


Figure 15. Working Lands CV Scored Analysis.

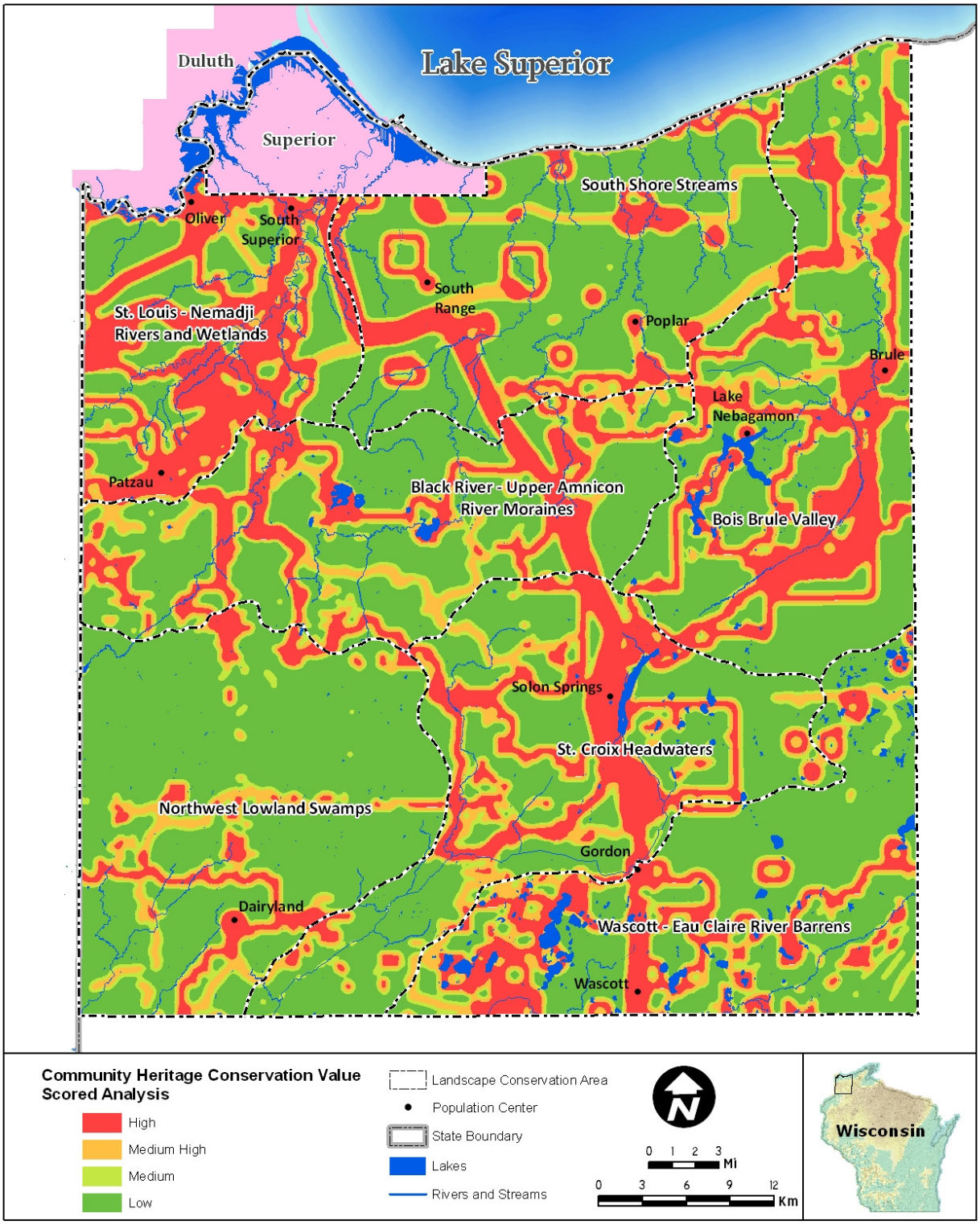


Figure 16. Community Heritage CV Scored Analysis.

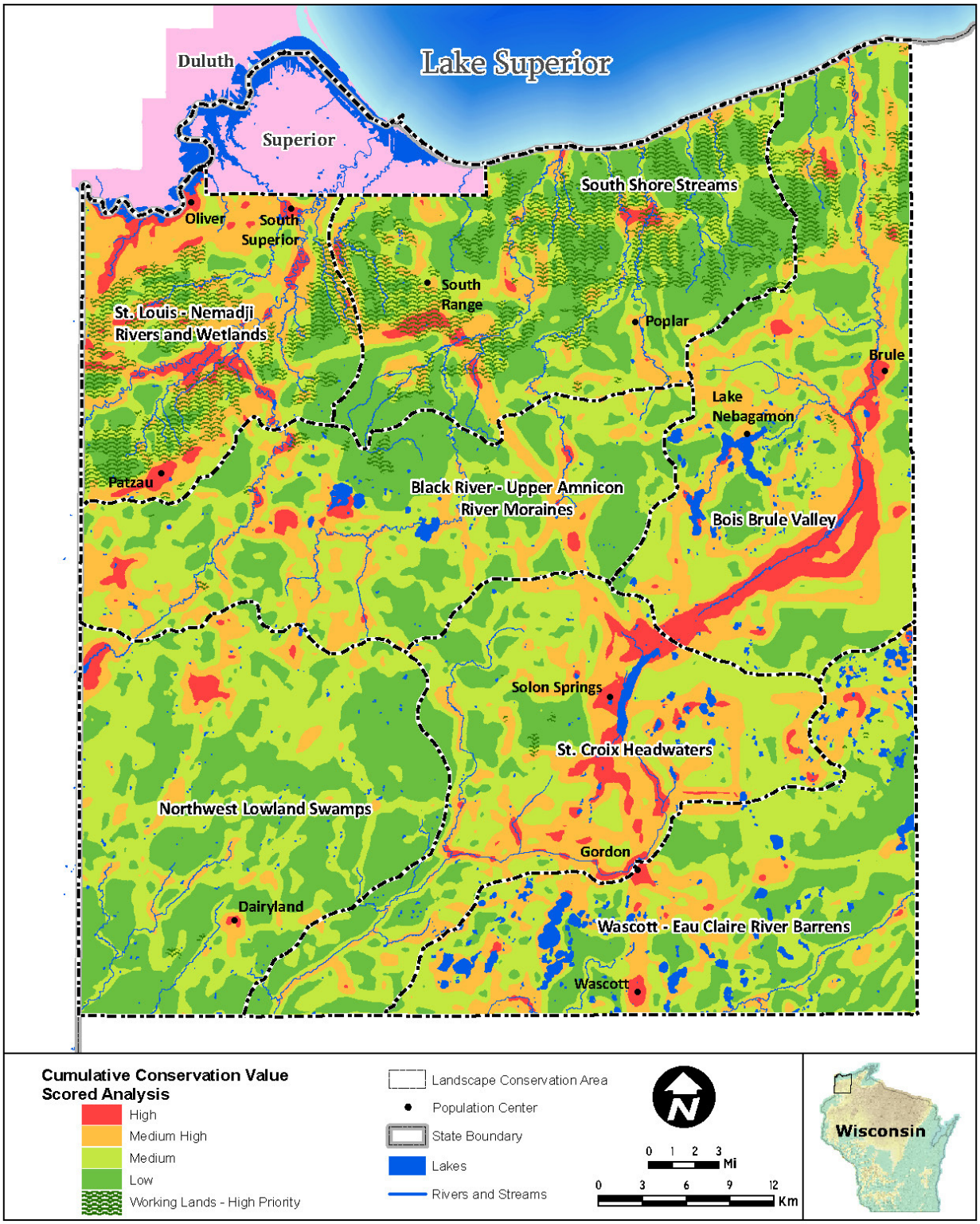


Figure 17. Cumulative CV Scored Analysis.

Identifying Priority Conservation Areas

Priority Conservation Areas (PCA) were identified using the cumulative CV raster and the Douglas County parcel data set. First, all parcels were assigned to an LCA based on the location of the parcel's geometric center. Next, parcels owned by federal, state, county, or local municipalities were deleted from further consideration. Finally, the remaining parcels were assigned a CV based on their location in relation to the cumulative CV weighted raster. Parcels were assigned the CV of the highest intersected value (Figure 18). Parcels assigned with a CV of High or Medium High were considered PCAs.

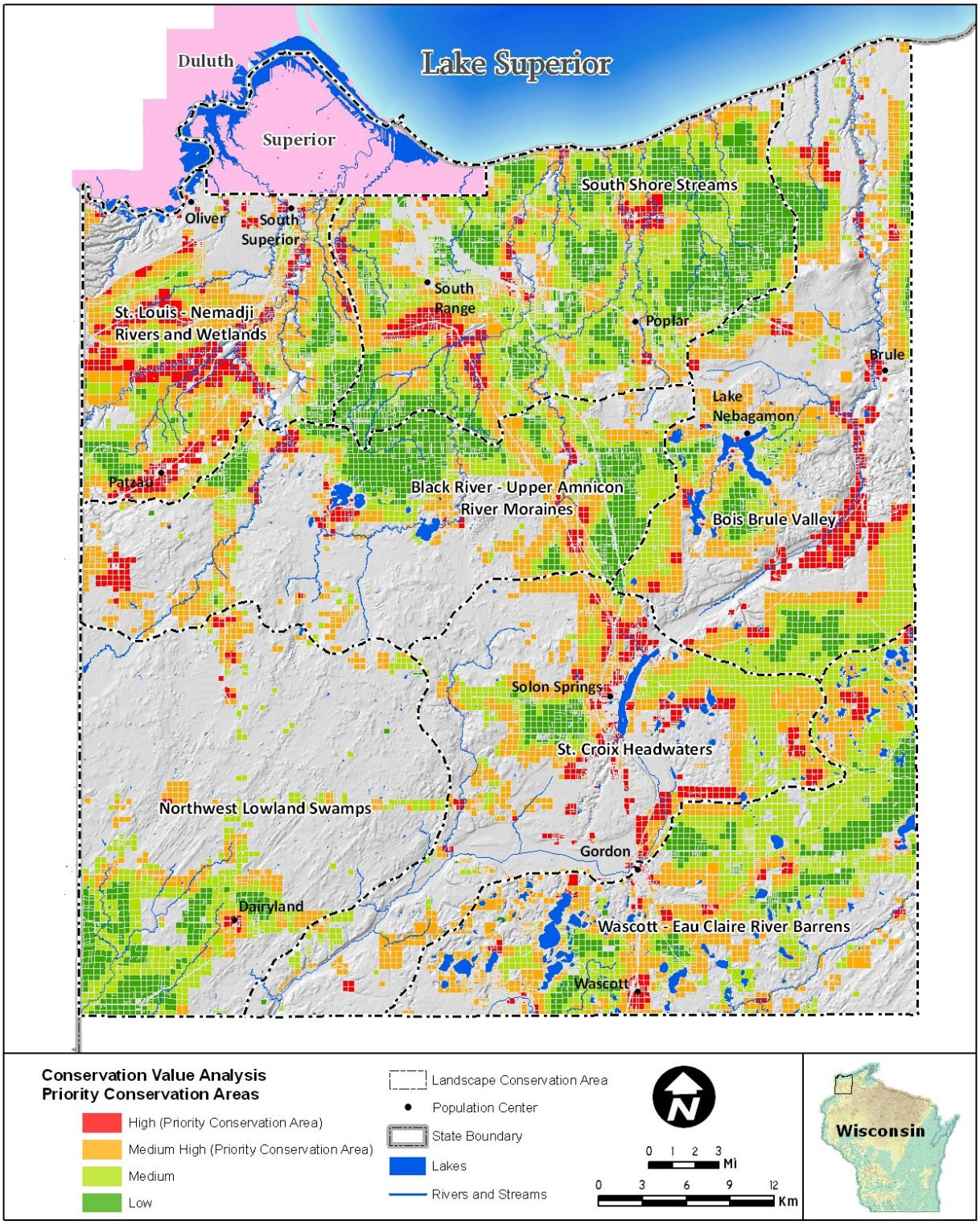


Figure 18. Priority Conservation Areas within Douglas County.

FUTURE PRIORITIZATION AND FEASIBILITY ANALYSES RECOMMENDATIONS

This initial analysis is designed to prioritize lands and identify focus areas with high conservation value per BRC's mission statement. Additional data sets that address novel criteria and provide explicit parameters can build on the present analysis to provide a thorough land prioritization model and feasibility analyses. A feasibility analysis and robust land prioritization model can be used for more detailed and project-specific planning and decision-making. Future analyses should take into account quantitative goals, the degree of threat posed by potential development and/or parcelization, the cost of conservation, and the spatial arrangement of conservation areas (e.g., size of areas, connectivity between them), and methods of implementation (NatureServe 2009).

PEER REVIEW

Finally, the Landscape and Priority Conservation Areas, and subsequent draft Strategic Conservation Plan underwent a peer review process by staff of partner organizations and agency professionals familiar with Douglas County's natural and water resources, working lands and local communities. BRC executive director, board members and staff helped compile a list of peer reviewers that subsequently agreed to participate in an objective review of the portfolio and plan (Appendix D). Input from reviewers was solicited for their feedback through a detailed mailing that included analysis methods, landscape and priority conservation area descriptions, maps, and initial recommended conservation strategies. Reviewers were asked to provide feedback on the following items based on their professional and personal knowledge of Douglas County:

1. The validity of the proposed LCAs and PCAs and their relative importance;
2. The type and level of threat faced by each LCA and PCA; and
3. The identification of appropriate conservation strategies including potential partners and funding sources to recommend for each LCA and PCA.

Upon completion of the review period, feedback from reviewers was compiled and incorporated into the final Strategic Conservation Plan as appropriate.

IV. Landscape and Priority Conservation Areas

Seven LCAs were delineated within Douglas County, excluding the City of Superior (Figure 6). Using the results of the Cumulative and Conservation Theme CV scored analyses, each LCA was ranked based on the mean CV for the area (Table 10). The St. Louis – Nemadji Rivers and Wetlands LCA ranked the highest overall indicating that, in general, projects targeted within the LCA could yield multiple and/or large benefits towards conservation goals. Nevertheless, various LCAs ranked high in regards to different Conservation Theme CV results (Table 10). Conservation theme-specific goals could be addressed by focusing on the LCAs with strength in the different conservation themes where they rank high. Obviously, CV scores differed within each LCA with some areas scoring higher than others. Areas that had scores classified as High or Medium High were considered to have significant conservation value and are hereafter referred to as Priority Conservation Areas (PCAs). Within each LCA, several PCAs were identified primarily based on the results of the Cumulative CV scored analysis.

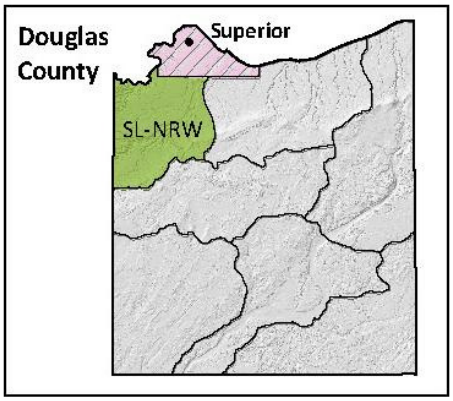
Table 10. Cumulative and Conservation Theme Ranking based on CV Scored Analysis.

	CV Rank[1]				
Landscape Conservation Area	**Cumul.[2]**	**NR[3]**	**WQ[4]**	**WL[5]**	**CH[6]**
St. Louis – Nemadji Rivers and Wetlands	**1**	5	1	2	1
Boise Brule Valley	**2**	1	6	3	2
St. Croix Headwaters	**3**	2	2	5	3
Wascott – Eau Claire River Barrens	**4**	4	3	7	5
Black River – Upper Amnicon River Moraines	**5**	6	5	6	4
South Shore Streams	**6**	7	4	1	6
Northwest Lowland Swamps	**7**	3	7	4	7

[1]Conservation Value rankings are based on the respective weighted, smoothed rasters.
[2]Cumulative based on the Natural Resources, Water Quality and Community Heritage Conservation Themes.
[3]Natural Resources
[4]Water Quality
[5]Working Lands
[6]Community Heritage

The detailed summaries that follow provide information regarding the conservation value, land use and population trends, and threats of each LCA and its constituent PCA.

ST. LOUIS – NEMADJI RIVERS AND WETLANDS



LCA Description

The St. Louis – Nemadji River and Wetlands LCA (SL-NRW LCA) is located in the northwestern portion of Douglas County primarily within the Towns of Superior and Summit (Figure 19). The LCA is relatively small in comparison with the other LCA's in the plan (i.e., approx. 9 % of Douglas County). In addition, the majority of the lands within the LCA are privately owned with less than 23 % owned and managed as public lands primarily by the WDNR and Douglas County. The communities of South Superior, Oliver and Patzau contribute heavily to the relatively high population of this LCA. Unlike much of Douglas County, agriculture is the primary land use type.

The SL-NRW LCA primarily is situated within the Superior Coastal Plain Ecological Landscape. The Douglas Lake-Modified Till Plain and Carlton Plains are the predominant Landtype Associations. The LCA is characterized by expansive areas of emergent wetlands and marshes associated with large dentric river systems. Wetlands are common throughout and perennial and intermittent streams are abundant. The climate is greatly influenced by Lake Superior resulting in cooler summers, warmer winters, and relatively greater precipitation compared to inland areas. Although the topography gently slopes to the north, abundant perennial and intermittent streams dissect the landscape causing deep V-shaped ravines and highly erodible stream banks. The soils are uniformly lacustrine (formed by deposits from extinct lakes), contain high clay content, and are poorly drained. The most common habitat types are Grassland, Aspen, Lowland Shrub (broad-leaf deciduous), and Mixed Deciduous/Coniferous Forest. Three high priority natural communities (particularly Mesic Floodplain Terrace and Floodplain Forest) occur within the Nemadji River valley.

Conservation Value Analysis

The Conservation Value Scored Analysis ranked the SL-NRW LCA first overall (Table 11). High scores for Water Quality and Community Heritage contributed significantly to the overall ranking (Figure 20 and 21; Table 11). Working Lands are extensive in this LCA and overlap many areas with high value in other conservation themes. Over 53 % of the LCA was classified as having High or Medium High conservation value (Table 12).

The abundant rivers, streams and wetlands in the SL-NRW LCA provide an abundance of habitats for many plant and wildlife species. Some of the most unique and important features include the rare **floodplain forests associated with the Nemadji River Bottoms**, the **red clay flats associated with the Bad River Breaks and Pokegama – Carnegie Wetlands**, and the **St. Louis Estuary**. These areas have been identified as having significant conservation value by several other conservation efforts (Table 13). According to the Natural Heritage Inventory, 34 plant and animal species (with S1-S3 and/or G1-G3 ranking) have been recorded in the LCA since 1970 (Table 14; Appendix E). Thirteen species have been identified as Species of Greatest Conservation Need by the

Wisconsin Wildlife Action Plan (WDNR 2005) and include a variety of wetlands associated bird species (e.g., Black Tern, Le Conte's Sparrow, and Least Bittern).

Occurring in the St. Louis – Nemadji River and Black River – Upper Nemadji watersheds, the LCA contains over 230 miles of perennial rivers and streams of which 10% are designated Outstanding or Excellent Resource Waters and Class I Trout Waters. At least 19 streams and five lakes and/or wetlands have been recognized as having significant conservation value (Table 15 and 16).

In addition to its abundant hydrologic features, the LCA is valued for its suitability for rural-based land use of agriculture and forestry. Over 77 % of the LCA currently is zoned by Douglas County for either agricultural or forestry working lands. Lands within the LCA area well suited for agriculture and almost 52 % of the LCA's soils have been classified as prime or statewide important soils for agriculture by the NRCS. Nevertheless, forestry is also a dominant land use in the LCA.

The many miles of recreational trails and Pattison State Park contribute heavily to the community heritage resource values of the LCA. Although multi-use Douglas County trails predominate, more than 17 miles of the North Country National Scenic Trail add to the scenic and passive recreational opportunities present in the LCA. The Douglas Fault and the associated Superior Escarpment figure prominently in the southern portion of the LCA. In addition, the highest waterfall in Wisconsin (i.e., Big Manitou Falls) drops 165 feet over the fault and along with Little Manitou and Copper Creek Falls contribute to the unique scenic qualities present in the LCA.

Population and Land Use Trends

Relative to the county's projected population growth of 24 % most of the unincorporated municipalities in the LCA are expected to see similar increases. Sine the 1950s, the town of Superior has observed population growth above the county's average and is expected to continue this pattern into the future.

Almost all municipalities have experienced increases in the number of parcels zoned for residential land use although some towns including Parkland and Oakland have experienced losses in acreage of residential lands. All municipalities decreased in the number of parcels and total acreage of agricultural lands. The number of forested parcels increased in most municipalities; however, total acreage of forested lands decreased in Superior and Summit. Commercial land use either increased or remained relatively constant throughout the municipalities in this LCA.

Threats and Opportunities

Conflicting land use practices account for the primary threats affecting the SL-NRW LCA. Land use conversions include increasing development in rural areas, especially along lake and stream shorelines, and the loss and/or fragmentation of agriculture and forest landscapes for recreation and residential development. The subdivision of land into increasingly smaller parcels and changes in land ownership result in differences in land management techniques and can result in losses of critical habitat. Habitat fragmentation is often associated with losses to species biodiversity and contributes to the spread of invasive species. Land use practices, including current agricultural

practices, are a threat to water quality and may result in increased concentration of flows, increased peak runoff problems, and may restrict movement and migration of aquatic species. The SL- NRW LCA ranked at the top in overall cumulative conservation value due to high scores in Water Quality and Community Heritage. Nearly 22 % of the privately owned parcels in the LCA fall within the High conservation value class (Table 17).

Within areas of high conservation value, development threatens important rivers and tributaries, swamps, undeveloped wetlands, and the Lake Superior shoreline. Many large rivers are susceptible to continued development as many seasonal residences are converted to permanent residences and construction of new homes increases. Development resulting in increased impervious surface area throughout the watershed, or changes to the natural flow of aquatic systems, results in increased pollution and impairs water quality. Development impacts the highly erodible clay soils causing erosion and sedimentation which affects water quality and biodiversity. Disturbance from development and changes in land use practices also promotes the spread of non-native invasive species and threatens species diversity. Continued development also threatens lands suitable for passive recreational activities and existing recreational corridors.

Some of the LCA's high conservation value resources currently are owned by the WDNR and Douglas County and are managed as public lands. However, over 37,000 acres were classified as Priority Conservation Areas (PCAs) based on their high cumulative conservation value scores (Table 17; Figure 22). Priority Conservation Areas serve as a platform for identifying areas where proactive land protection programs can be targeted and implemented. Within the SL-NRW LCA, opportunities for proactive land protection in the form of conservation easements and working lands preservation are especially abundant. **Areas of focused conservation attention where proactive land protection will likely be pursued include the riparian corridors along the Pokegama and Black Rivers, and Balsam Creek and its headwaters (Empire Creek, Little Balsam Creek)**. The lands surrounding these streams have diverse natural resources and hydrologic features important for maintaining high water quality and merit focused conservation interest. Many of these streams are classified as Trout Streams and WDNR Priority Streams and therefore ample partnership opportunities also exist. **Opportunities for working lands protection exists throughout much of the LCA, although proactive land protection programs will focus on lands adjacent to Balsam Creek and its headwaters and the Pokegama River**. For a more detailed description of the focus areas, including potential partnership opportunities, refer to the Conservation Strategies section.

Supporting Data

Conservation Value (CV) Scored Analysis

Table 11. Results of Cumulative and Conservation Theme CV Scored Analysis in the St. Louis – Nemadji Rivers and Wetlands LCA.

Conservation Theme	Mean Score (Rank)	Maximum Score (Rank)
Cumulative CV	11.97 (1)	31.85 (4)
Natural Resources	9.41 (5)	28.69 (6)
Water Quality	10.78 (1)	47.25 (1)
Working Lands	34.89 (2)	73.58 (2)
Community Heritage	15.63 (1)	69.21 (2)

Table 12. Areal and Proportional Results of CV Classification in the St. Louis – Nemadji Rivers and Wetlands LCA.

Conservation Value Classes	Acres	Percent of LCA
High	10,064.1	12.4
Medium High	33,330.2	41.2
Medium	24,058.4	29.7
Low	13,417.4	16.6

General Information

Total Area: 80,870.0 acres
Percentage of Douglas County: 9.4 %
Public Lands Acreage: 18,080.4 acres (22.4 % of LCA)

Municipalities (*Towns unless otherwise indicated*)

- Superior*
- Summit
- Village of Oliver
- Village of Superior
- Oakland
- Parkland

* Asterisk denotes municipality/ies that contribute > 50 % of LCA acreage.

Communities

- South Superior
- Oliver
- Patzau
- Foxboro
- Boylston Junction

Natural Resources

Ecological Landscapes

- Superior Coastal Plain*
- Northwest Lowlands

Landtype Associations

- Douglas Lake-Modified Till Plain*
- Pattison Moraines
- Carlton Plains
- Dairylands Moraines

* Asterisk denotes landscape/s and landtype/s that contribute > 50 % of LCA acreage

Table 13. Areas Identified or Designated for Conservation Purposes by other Conservation Efforts within the St. Louis – Nemadji Rivers and Wetlands LCA.

Conservation Effort	Site Name
WDNR State Natural Areas	• Big Manitou Falls and Gorge • Nemadji River Floodplain Forest • Pokegama Carnegie Wetlands
WDNR Conservation Opportunity Areas	• Pokegama – Nemadji Wetlands • St. Louis Estuary
WDNR Land Legacy Places	• Highway 2 Grasslands • Manitou Falls – Black River • Nemadji River and Wetlands • St. Louis Estuary and Pokegama Wetlands • Western Lake Superior Drowned River Mouths
Douglas County Critical Scenic Areas	• Pattison Park • St. Louis River • View of Duluth Hills at night • Red River Area • Stream areas that drain red clay basin
LSBF Important Habitat Sites/Areas	• Oliver Wetlands • Red River • St. Louis Estuary

Natural Heritage Inventory (NHI) Element Occurrences List

NHI G1 Elements: 0
NHI S1 Elements: 4
NHI G2 – G3 Elements: 3
NHI S1 – S3 Elements: 33
NHI Natural Communities: 3
Species of Greatest Conservation Need: 13

Table 14. NHI Element Occurrences, Rankings and Designations of Natural Communities and Plant and Wildlife Species within the St. Louis – Nemadji Rivers and Wetlands LCA.

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Community	Floodplain Forest	G3	S3	
	Mesic Floodplain Terrace	GNR	S2	
	Northern Sedge Meadow	G4	S3	
Bird	American Bittern	G4	S3	Y
	Black Tern	G4	S2	Y
	Connecticut Warbler	G4	S2	Y
	Le Conte's Sparrow	G4	S2	Y
	Least Bittern	G5	S3	N
	Upland Sandpiper	G5	S2	Y
	Western Meadowlark	G5	S2	Y
Mammal	American Marten	G5	S3	Y
	Gray Wolf	G4	S2	Y
Herpetafauna	Wood Turtle	G4	S2	Y
Fish	American Eel	G4	S2	Y
	Lake Sturgeon	G3	S3	Y
Snail	Mystery Vertigo	G4	S1	Y
Beetle	Predaceous Diving Beetle (*Hydroporus vittatus*)	GNR	S3	Y
Plant	Arrow-leaved Sweet-coltsfoot	G5	S3	
	Crawe Sedge	G5	S3	
	Floating Marsh-marigold	G5	S1	
	Large Roundleaf Orchid	G5	S3	
	Laurentian Bladder Fern	G3	S2	
	Marsh Grass-of-parnassus	G5	S2	
	Marsh Horsetail	G5	S2	
	Northern Black Currant	G5	S3	
	Northern Bur-reed	G4	S2	
	Northern Yellow Lady's-slipper	G5	S3	
	Oregon Woodsia (Tetraploid)	G5	S1	
	Seaside Crowfoot	G5	S2	
	Showy Lady's-slipper	G4	S3	
	Slender Spike-rush	G4	S2	
	Slim-stem Small-reedgrass	G5	S3	
	Small Yellow Water Crowfoot	G5	S2	
Plant	Spike-rush	G4	S1	
	Tea-leaved Willow	G5	S2	
	Variegated Horsetail	G5	S3	
	Vasey Rush	G5	S3	N

[1]Global Rank includes species that are: (G1) critically imperiled globally; (G2) imperiled globally; (G3) very rare and local throughout range; (G4) apparently globally secure though rare in parts; (G5) demonstrably secure globally though rare in parts; and (GNR) not ranked (WDNR 2010).
[2]State Rank includes species that are: (S1) critically imperiled in Wisconsin; (S2) imperiled in Wisconsin; (S3) rare or uncommon in Wisconsin; and (SU) possibly in peril in Wisconsin but status uncertain (WDNR 2010).
[3]Species of Greatest Conservation Need (SGCN) only applies to animal species (WDNR 2009a).

Water Quality and Hydrologic Features

Perennial Rivers and Streams: 231.8 miles
Outstanding and Excellent Resource Waters: 23.2 miles
Class I Trout Rivers and Streams: 23.2 miles
Lakes and other water bodies: 1,320.5 acres (1.6 % of LCA)
Intermittent Streams: 154.4 miles
Soils Highly Susceptible to Ground Contamination: 0 acres

WDNR Watersheds

- St. Louis and Lower Nemadji River*
- Black and Upper Nemadji River
- Amnicon and Middle Rivers

* Asterisk denotes watershed/s that contribute > 50 % of LCA acreage

Table 15. Rivers and Streams with Special Designation or Identified as having High Conservation Value within the St. Louis – Nemadji Rivers and Wetlands LCA.

Name	OERW[1]	NHI[2]	Fish Spawning[3]	Class I Trout[4]	Muskellunge[5]	Priority Wetlands[6]
Balsam Creek						x
Black River		x				x
Clear Creek		x				
Copper Creek						x
Crawford Creek						x
Empire Creek	x			x		x
Little Balsam Creek	x			x		x
Little Pokegama River		x				
Mud Creek						x
Nemadji River		x	x		x	x
Pokegama River		x	x			x
Red River	x	x		x		x
Rock Creek	x			x		x
Rocky Run						x
St. Louis River		x			x	x
Stony Brook		x				x
Unnamed Creeks[7]	3	3		3		2

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Lake Superior Binational Forum Fish Spawning Waters
[4]Wisconsin DNR Class I Trout Waters
[5]Wisconsin DNR natural reproducing MuskellungeWaters
[6]Wisconsin DNR Priority Wetlands
[7]Number of unnamed creeks are given per designation category

Table 16. Lakes and Wetlands with Special Designation or Identified as having High Conservation Value within the St. Louis – Nemadji Rivers and Wetlands LCA.

Name	NHI[1]	Priority Wetlands[2]
Interfalls Lake	x	
Nemadji River Bottoms		x
Oliver Marsh		x
Pokegama – Carnegie Wetlands		x
Red River Breaks/St. Louis River Marshes		x

[1]Wisconsin DNR Natural Heritage Inventory Waters
[2]Wisconsin DNR Priority Wetlands

Working Lands

Agriculture and Forestry Zoning: 62,541.9 acres (77.3 % of LCA)

- **Agriculture Zoning:** 37,547.4 acres (60.0 % of A1/F1 zoning)
- **Forestry Zoning:** 24,994.5 acres (40.0 % of A1/F1 zoning)

Prime farmlands and farmlands of statewide importance: 41,917.8 acres (51.8 % of LCA)
Forest Crop Law or Managed Forest Law: 7,529.4 acres (9.3 % of LCA)

Community Heritage

Recreation

- North Country National Scenic Trail: 17.1 miles
- Gandy Dancer Trail: 9.2 miles
- Saunder's Grade Trail: 10.1 miles
- Wild Rivers Trail: 2.1 miles
- Douglas County Multi-use Trails: 15.9 miles

Geology and Topography

- Douglas Fault
- Lake Superior Eroding Scarps: 0.2 miles
- Superior Escarpment
- Pattison Lookout Tower Hill
- Thunder Hill

Waterfalls and Cascades

- Big Manitou Falls
- Copper Creek Falls
- Little Manitou Falls

Priority Conservation Areas

Number of Privately Owned Parcels: 11,569
Area of Privately Owned Parcels: 57,873.1 acres (71.6 % of LCA)
Mean Area of Privately Owned Parcels: 5.00 acres

Table 17. CV Classification Distribution among Privately Owned Parcels in the St. Louis – Nemadji Rivers and Wetlands LCA.

CV Classification	Number of Parcels	Total Area	Percent	Mean Area
High	2,575	12,430.5	21.5	4.83
Medium High	5,814	25,183.9	43.5	4.33
Medium	2,571	14,208.3	24.6	5.53
Low	609	6,050.4	10.5	9.93
Total	11,569	57,873.1	100.0	5.00

[1]Priority Conservation Areas include those parcels with conservation value classes High and Medium High.
[2]Number and area of parcels apparently with conservation easements and/or being held for conservation purposes are indicated in parentheses.

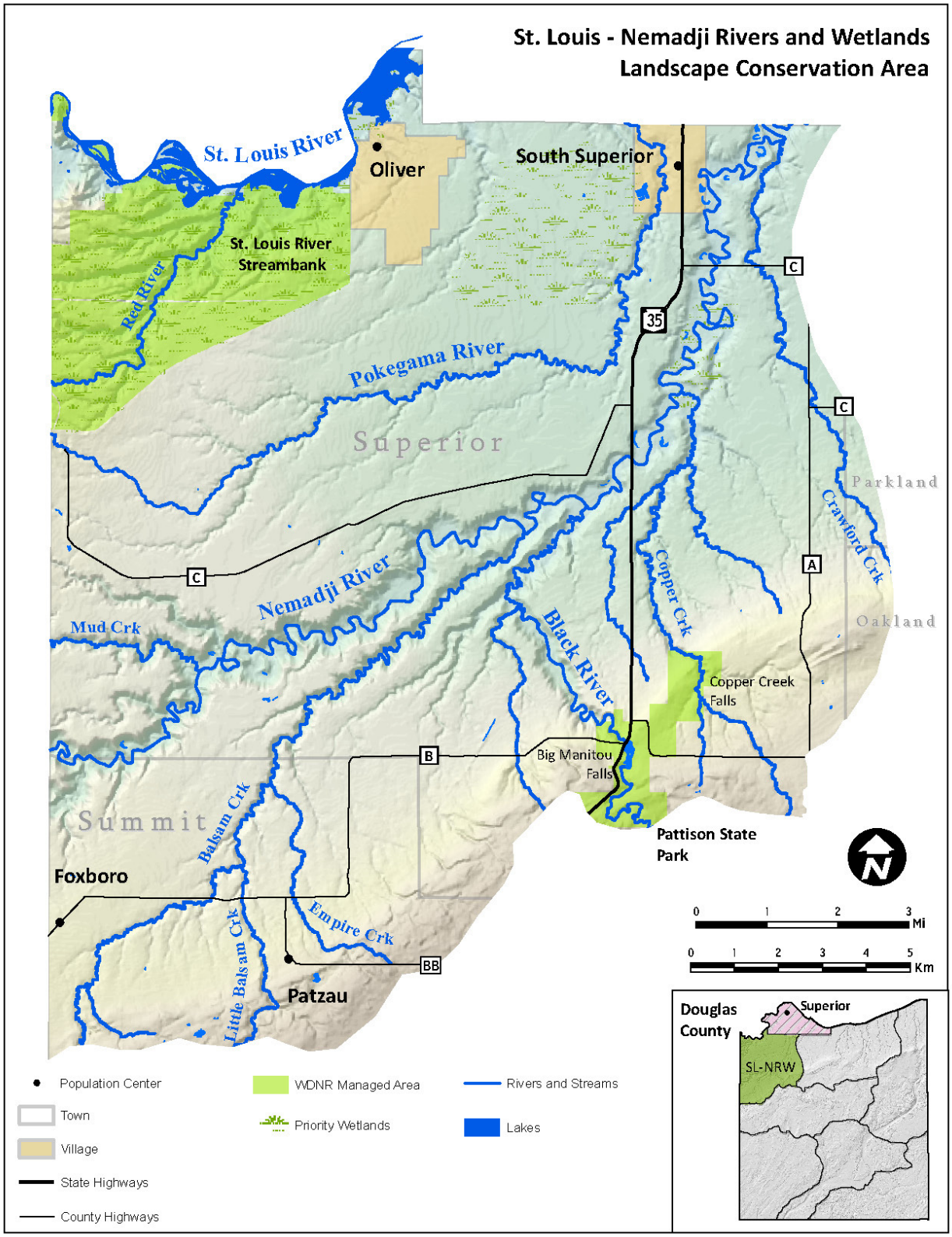


Figure 19. St. Louis – Nemadji Rivers and Wetlands LCA.

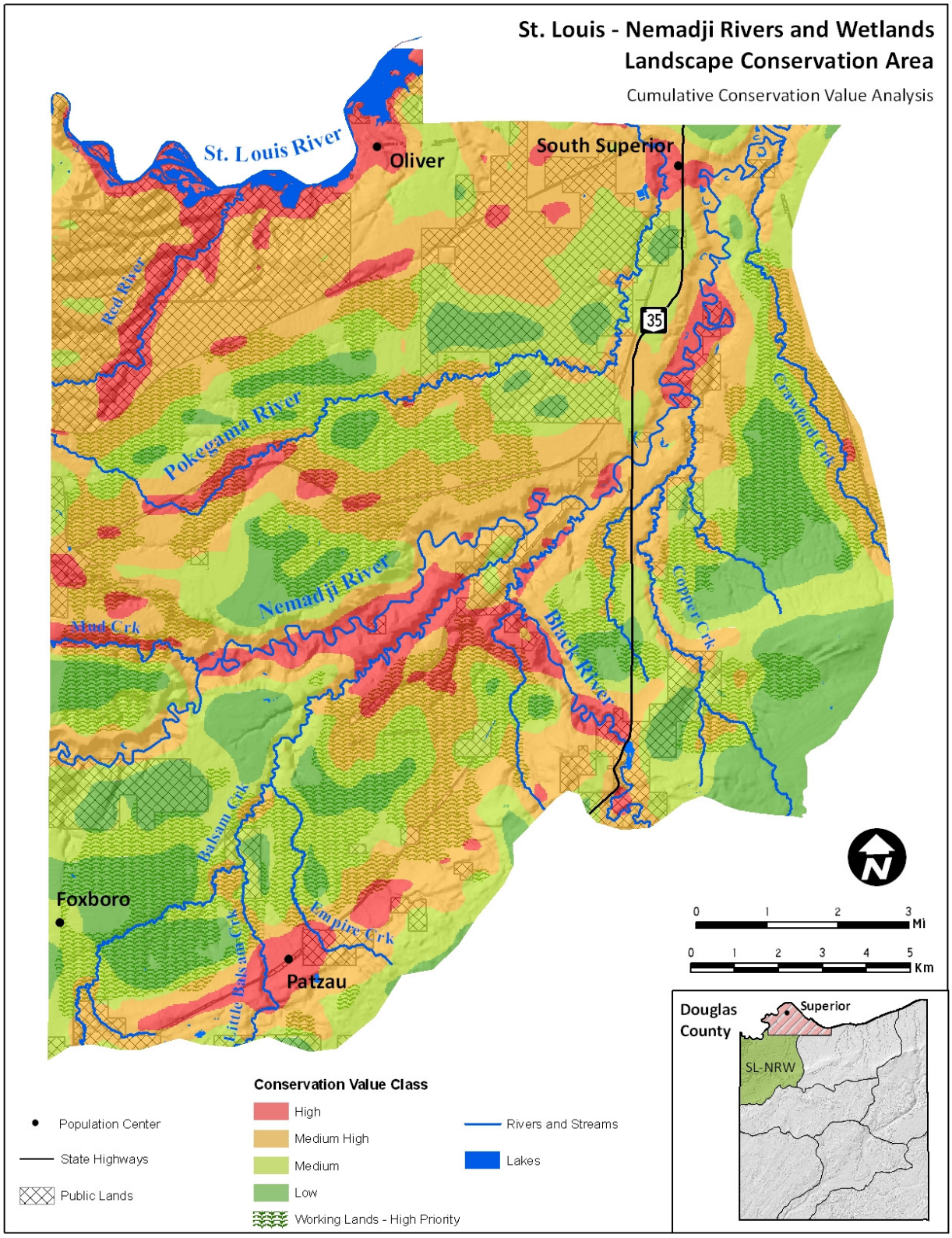


Figure 20. St. Louis – Nemadji Rivers and Wetlands LCA Cumulative Conservation Value Analysis.

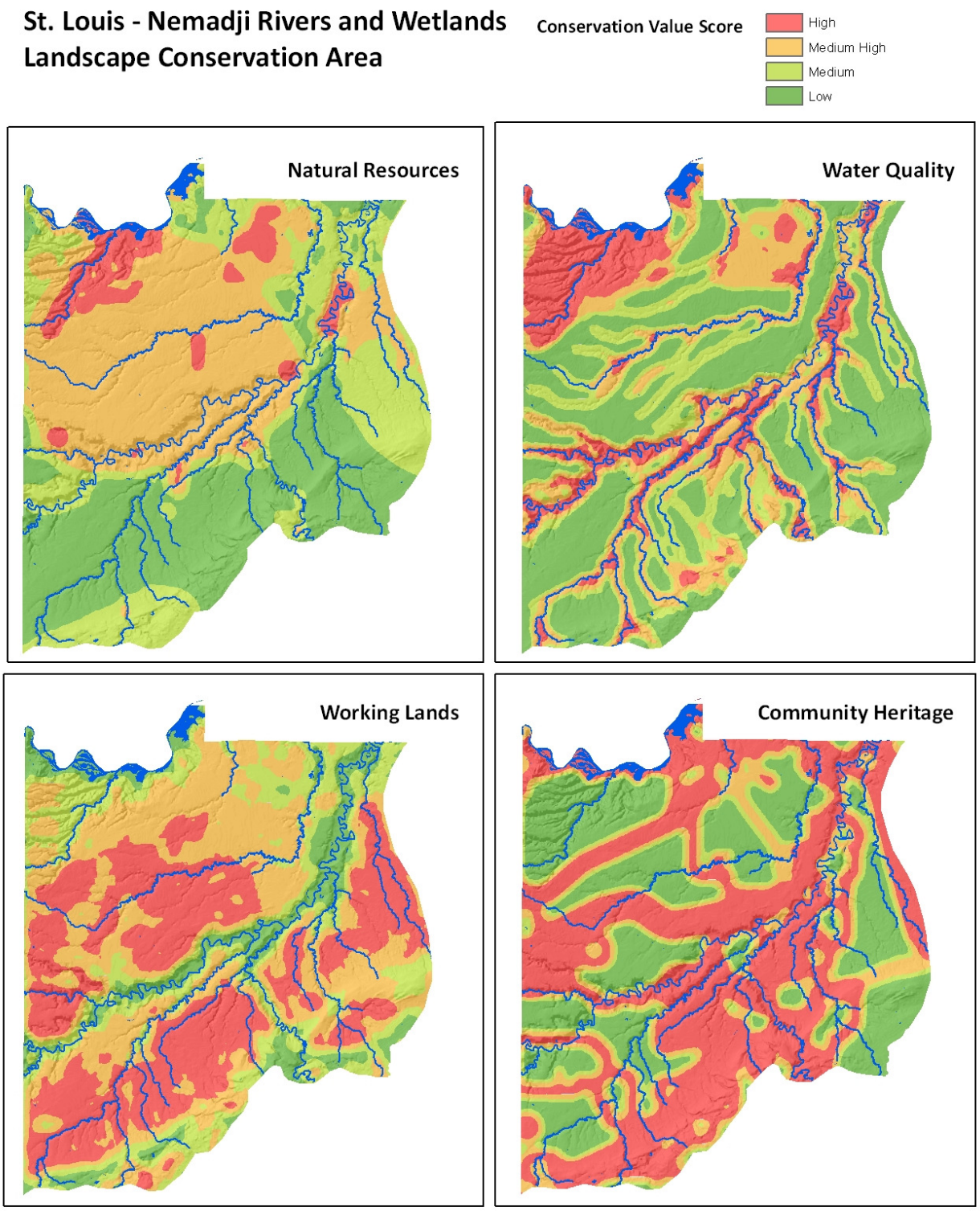


Figure 21. St. Louis – Nemadji Rivers and Wetlands LCA Conservation Themes Conservation Value Analysis.

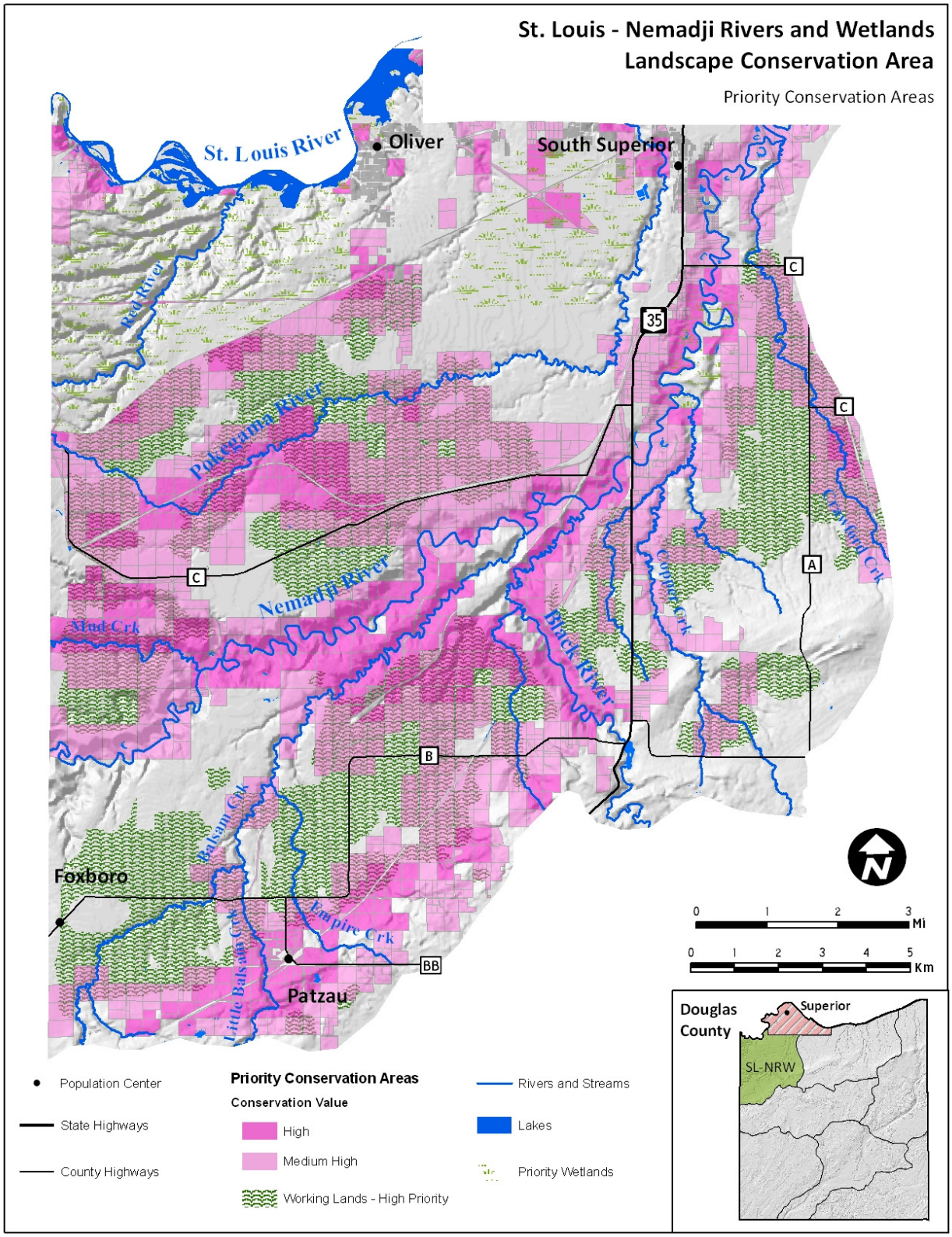
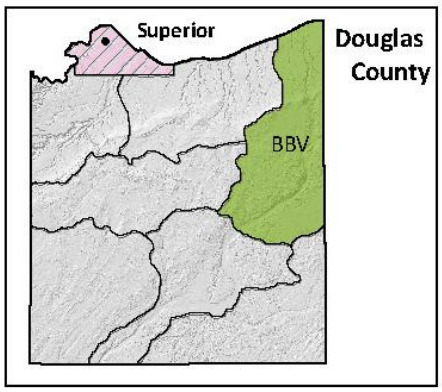


Figure 22. St. Louis – Nemadji Rivers and Wetlands LCA Priority Conservation Areas.

BOIS BRULE VALLEY

LCA Description



The Bois Brule Valley LCA (BBV LCA) is located in the northeastern portion of Douglas County primarily within the Towns of Highland, Brule, Cloverland, and Bennett (Figure 23). The LCA comprises nearly 16 % of Douglas County, and over 42 % is owned and managed as public lands primarily by the Brule River State Forest. The communities of Lake Nebagamon and Brule contribute to the moderate population size of this LCA in relation to the rest of Douglas County. Agriculture and forestry are the primary land use types in this LCA.

The BBV LCA primarily is situated within the Superior Coastal Plain and Northwest Sands Ecological Landscape, although the LCA also encompasses the distal northern extension of the Northwest Lowlands Ecological Landscapes and Pattison Moraine Landtype Association. The Douglas Lake-Modified Till Plain and Bayfield Level Barrens are the predominant Landtype Associations. The LCA captures the full extent of the Bois Brule River system and terminates at the Lake Superior shoreline to the north. The topography is diverse, exemplifying the many physiographic features present throughout the area including rolling and nearly level outwash plains, valleys, floodplains, stream terraces, undulating moraines with deep v-shaped ravines, and rolling glacial thrust mass hills. Perennial and intermittent rivers and steams are common and lakes are relatively abundant. Other important features include Lake Nebagamon, Lake Minnesuing, and Steele Lake, as well as Blueberry Creek and its associated wetlands and swamps. Soils are variable throughout the area; however, excessively drained, sandy loam soils are common. The most common habitat types are Mixed Deciduous/Coniferous Forest, Aspen, Grassland, and Shrubland. Twelve high priority natural communities (particularly Boreal Forest and Pine Barrens) occur along the length of the Bois Brule River and within the Blueberry Swamp area.

Conservation Value Analysis

The Conservation Value Scored Analysis ranked the BBV LCA second overall (Table 18). High scores for Natural Resources and Community Heritage contributed significantly to the overall ranking (Figure 24 and 25; Table 18). Working Lands are extensive in the northern part of the LCA. Over 36 % of the LCA was classified as having High or Medium High conservation value (Table 19).

The BBV LCA is very diverse across conservation themes. Notably, the Bois Brule River Valley's diverse forest types, grasslands and barrens, and swamps and wetlands have been identified as having significant conservation value by several other conservation efforts (Table 20). According to the Natural Heritage Inventory, 43 plant and animal species (with S1-S3 and/or G1-G3 ranking) have been recorded in the LCA since 1970 (Table 21; Appendix E). Nineteen species have been identified as Species of Greatest Conservation Need by the Wisconsin Wildlife Action Plan and include various bird (i.e.,

Northern Goshawk, Sharp-tailed Grouse and various warbler species), amphibian (i.e., four-toed salamander), and fish species (i.e., American Eel) among others.

The LCA is dominated by the Bois Brule River watershed and contains nearly 146 miles of perennial rivers and streams of which approximately 83 % are designated Outstanding or Excellent Resource Waters and over 58 % are designated Class I Trout Waters by WDNR. At least 48 streams and 24 lakes and/or wetlands have been recognized as having significant conservation value (Table 22 and 23).

In addition to its natural resource diversity and unique hydrologic features, the LCA also is valued for its suitability for rural-based land uses of agriculture and forestry. The vast majority of the LCA (> 83 %) currently is zoned by Douglas County for either agricultural or forestry working lands. Over 19 % of the LCA's soils have been classified as prime or statewide important soils for agriculture by the NRCS especially in the northern portion within the Superior Coastal Plain Landscape Ecoregion. Overall, however, forestry is the predominant land use in the LCA.

Nearly 30 % of the privately owned lands in the LCA are within a ½ mile of public lands. In addition, many miles of recreational trails contribute heavily to the community heritage resource values of the LCA. With over 44 miles of the Brule River canoe trail, over 23 miles of the North Country National Scenic Trail, and over 12 miles of specially designated cross-country skiing trails, the scenic and passive recreational opportunities present in the LCA are unequalled within Douglas County. Some of the prominent geologic features within the LCA include over 11 miles of Lake Superior shoreline with associated scarps, the Douglas Fault and associated hills, ridges, and cascades, and the unique wide valley of the Brule Glacial Spillway. Besides encompassing the areas geologic history, a rich cultural history is present as exemplified by features such as the Brule – St. Croix Portage and the presidential retreat of Cedar Island Lodge.

Population and Land Use Trends

Relative to the county's projected population growth of 24 % most of the unincorporated municipalities in the LCA are expected to see similar increases. Although the town of Brule experienced a population decline since the 1950s, its population is expected to increase above the county's average in years to come. Highland's population has continued to increase and continued growth similar to the county's average is expected.

Almost all municipalities have experienced increases in the number of parcels zoned for residential land use although some towns including Brule have experienced losses in acreage of residential lands. Most municipalities decreased in the number of agricultural use parcels and all municipalities except Highland decreased in the acreage of agricultural lands. The number of forested parcels increased in most municipalities; however, the number of forest parcels and acreage of forest lands declined in Highland. Commercial land use either increased or remained relatively constant throughout the municipalities in this LCA.

Threats and Opportunities

Conflicting land use practices account for the primary threats affecting the BBV LCA. Land use conversions include increasing development in rural areas, especially along lake

and stream shorelines, and loss and/or fragmentation of agriculture and forest landscapes for recreation and residential development. The subdivision of land into increasingly smaller parcels and changes in land ownership result in differences in land management techniques and can result in losses of critical habitat. Habitat fragmentation often leads to losses in species diversity and contributes to the spread of invasive species. Land use practices, including current agricultural practices, are a threat to water quality and may result in increased concentration of flows, increased peak runoff problems, and may restrict movement and migration of aquatic species. Ranked above the county's average in overall cumulative conservation value, and placed at or near the top for Natural Resources and Community Heritage, about 13 % of the privately owned lands in the LCA fall within the High conservation value class (Table 24).

Development threatens swamps, undeveloped bogs, wetlands, barrens, and the Lake Superior shoreline specific to this LCA as well as important rivers, headwaters and tributaries. Several lakes and many large rivers are susceptible to continued development as many seasonal residences are converted to permanent residences and construction of new homes increases. Development resulting in increased impervious surface area throughout the watershed, or changes to the natural flow of aquatic systems, results in increased pollution, erosion and sedimentation, impaired water quality, and contributes to groundwater contamination and loss of aquatic biodiversity. Disturbance from development and changes in land use practices also promotes the spread of non-native invasive species, threatens overall species diversity, and compromises many rare species and communities unique to this LCA.

Many of the LCA's high conservation value lands are owned by the WDNR and Douglas County and managed as public lands. Nevertheless, over 37,000 acres were classified as Priority Conservation Areas (PCAs) based on their high cumulative conservation value scores (Table 24). Several PCAs have been identified where opportunities for future conservation projects exist (Figure 26). Within the BBV LCA, opportunities for proactive land protection in the form of conservation easements, land acquisition, management agreements, and working lands preservation are especially abundant. **Areas of focused conservation attention where proactive land protection will likely be pursued include the riparian corridor along Blueberry Creek and its confluence with the Bois Brule River**. **The tributaries that feed into Blueberry Swamp and the swamp itself including Blueberry Creek and its confluence with the Bois Brule River have been identified by other conservation efforts as having high value for natural resources and water quality. Opportunities for land acquisition exist within the Brule River State Forest, along Trask Creek, and within Sand Barren communities in the southeastern portion of the LCA.** In addition, **habitat management agreements will be pursued to protect areas within the Barren communities** and **Best Management Practices (BMP) promoted along Trask Creek**. Opportunities for working lands protection exists on lands adjacent to the Brule River State Forest in the Lake Superior plain along Smith and Trask Creeks (Figure 25). There are ample partnership opportunities within the BBV LCA as the majority of PCAs are adjacent to public lands and many fall within WDNR's acquisition zone. For a more detailed description of the focus areas, including potential partnership opportunities, refer to the Conservation Strategies section.

Supporting Data

Conservation Value (CV) Scored Analysis

Table 18. Results of Cumulative and Conservation Theme CV Scored Analysis in the Bois Brule Valley LCA.

Conservation Theme	Mean Score (Rank)	Maximum Score (Rank)
Cumulative CV	10.65 (2)	41.07 (1)
Natural Resources	15.31 (1)	74.10 (1)
Water Quality	6.42 (6)	38.78 (3)
Working Lands	20.46 (3)	63.71 (4)
Community Heritage	10.15 (2)	59.24 (3)

Table 19. Areal and Proportional Results of CV Classification in the Bois Brule Valley LCA.

Conservation Value Classes	Acres	Percent of LCA
High	13,086.48	9.6
Medium High	36,642.41	26.8
Medium	54,284.54	39.7
Low	32,581.48	23.9

General Information

Total Area: 136,594.9 acres
Percentage of Douglas County: 15.9 %
Public Lands Acreage: 57,785.6 acres (42.3 % of LCA)
Municipalities (*Towns unless otherwise indicated*)

- Highland*
- Brule*
- Cloverland
- Bennett
- Village of Lake Nebagamon
- Solon Springs
- Maple
- Hawthorne
- Amnicon
- Village of Poplar

* Asterisk denotes municipality/ies that contribute > 50 % of LCA acreage.

Communities

- Lake Nebagamon
- Brule
- Waino
- Blueberry

Natural Resources

Ecological Landscapes

- Northwest Sands*

- Superior Coastal Plain*
- Northwest Lowlands

Landtype Associations

- Douglas Lake-Modified Till Plain*
- Pattison Moraines*
- Bayfield Level Barrens*
- Upper Brule-St. Croix Valley
- Oula Washed Moraine
- Winneboujou Glacial Trust Hills
- Bayfield Rolling Outwash Barrens

* Asterisk denotes landscape/s and landtype/s that contribute › 50 % of LCA acreage

Table 20. Areas Identified or Designated for Conservation Purposes within the Bois Brule Valley LCA.

Conservation Effort	Site Name
WDNR State Natural Areas	• Bear Beach • Blueberry Swamp • Brule Glacial Spillway • Brule River Boreal Forest • Brule Rush Lake • Motts Ravine
WDNR Conservation Opportunity Areas	• Blueberry Swamp • Brule Boreal Forest • Douglas and Bayfield County Barrens • Lake Superior Grasslands (minimal)
WBCI Important Bird Areas	• Brule Glacial Spillway
WDNR Land Legacy Places	• Bois Brule River • Highway 2 Grasslands • Namekagon – Brule Barrens
Douglas County Critical Scenic Areas	• Brule River • Brule River Fish Hatchery • Brule River Valley • Lake Nebagamon • Lake Superior Shoreline • Mouth of Brule River • Panoramic views of Lake Superior • Portage Trails • Stream valleys that drain red clay basin • View from Lake Superior to the shoreline
LSBF Important Habitat Sites/Areas	• Brule River Watershed • Iron River Watershed • Martinson's Landing • Smith Creek Estuary

Natural Heritage Inventory (NHI) Element Occurrences List

NHI G1 Elements: 0
NHI S1 Elements: 4
NHI G2 – G3 Elements: 7
NHI S1 – S3 Elements: 50
NHI Natural Communities: 12
Species of Greatest Conservation Need: 19

Table 21. NHI Element Occurrences, Rankings and Designations of Natural Communities and Plant and Wildlife Species within the Bois Brule Valley LCA.

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Community	Boreal Forest	G3	S2	
	Hardwood Swamp	G4	S3	
	Inland Beach	G4	S3	
	Northern Dry Forest	G3	S3	
	Northern Dry-mesic Forest	G4	S3	
	Northern Wet-mesic Forest	G3	S3	
	Pine Barrens	G2	S2	
	Poor Fen	G3	S3	
	Spring Pond	GNR	S3	
	Springs and Spring Runs, Soft	GNR	SU	
	Stream--Fast, Soft, Cold	GNR	SU	
	Tamarack (Poor) Swamp	G4	S3	
Bird	American Bittern	G4	S3	Y
	Black-throated Blue Warbler	G5	S3	Y
	Cape May Warbler	G5	S3	N
	Cerulean Warbler	G4	S2	Y
	Connecticut Warbler	G4	S2	Y
	Northern Goshawk	G5	S2	Y
	Sharp-tailed Grouse	G4	S1	Y
	Upland Sandpiper	G5	S2	Y
	Clevedon Road Bird Rookery	G5	SU	
Mammal	Gray Wolf	G4	S2	Y
Herpetafauna	Four-toed Salamander	G5	S3	Y
	Wood Turtle	G4	S2	Y
Fish	American Eel	G4	S2	Y
Beetle	Crawling Water Beetle (*Haliplus canadensis*)	GNR	S2	Y
	Crawling Water Beetle (*Haliplus pantherinus*)	GNR	S2	Y
	Predaceous Diving Beetle (*Hydroporus pseudovilis*)	GNR	S1	Y
	Predaceous Diving Beetle (*Hydroporus badiellus*)	GNR	S3	N
	Tiger Beetle (*Cicindela patruela patruela*)	G3	S2	Y
	Water Scavenger Beetle (*Cymbiodyta acuminata*)	GNR	S3	Y
	Beach-dune Tiger Beetle (*Cicindela hirticollis rhodensis*)	G5	S2	Y
Butterfly	Bog Fritillary	G5	S3	N
Dragonfly	Aurora Damselfly	G5	S3	N

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Dragonfly	Forcipate Emerald	G5	S2	Y
	Gloyd's Bluet	G4	S1	Y
Plant	Alpine Cotton-grass	G5	S2	
	Arrow-leaved Sweet-coltsfoot	G5	S3	
	Autumnal Water-starwort	G5	S2	
	Brown Beakrush	G4	S2	
	Dwarf Milkweed	G5	S3	
	Fairy Slipper	G5	S3	
	Fragrant Fern	G5	S3	
	Lapland Buttercup	G5	S1	
	Large Roundleaf Orchid	G5	S3	
	Marsh Willow-herb	G5	S3	
	Northern Black Currant	G5	S3	
	Northern Yellow Lady's-slipper	G5	S3	
	Purple Clematis	G5	S3	
	Ram's-head Lady's-slipper	G3	S2	
	Richardson Sedge	G4	S2	
	Sheathed Sedge	G5	S3	
	Showy Lady's-slipper	G4	S3	
	Sparse-flowered Sedge	G5	S3	
	Swamp-pink	G4	S3	
	Vasey Rush	G5	S3	
	White Adder's-mouth	G4	S3	

[1]Global Rank includes species that are: (G1) critically imperiled globally; (G2) imperiled globally; (G3) very rare and local throughout range; (G4) apparently globally secure though rare in parts; (G5) demonstrably secure globally though rare in parts; and (GNR) not ranked (WDNR 2010).
[2]State Rank includes species that are: (S1) critically imperiled in Wisconsin; (S2) imperiled in Wisconsin; (S3) rare or uncommon in Wisconsin; and (SU) possibly in peril in Wisconsin but status uncertain (WDNR 2010).
[3]Species of Greatest Conservation Need (SGCN) only applies to animal species (WDNR 2009a).

Water Quality and Hydrologic Features

Perennial Rivers and Streams: 145.9 miles
Outstanding and Excellent Resource Waters: 121.1 miles
Class 1 Trout Rivers and Streams: 84.9 miles
Lakes and other water bodies: 2,651.6 acres (1.9 % of LCA)
Intermittent Streams: 145.9 miles
Soils Highly Susceptible to Ground Contamination: 14,394.9 acres (10.5 % of LCA)

WDNR Watersheds

- Bois Brule River*
- Amnicon and Middle Rivers
- Upper St. Croix and Eau Claire Rivers
- Iron River

* Asterisk denotes watershed/s that contribute › 50 % of LCA acreage

Table 22. Rivers and Streams with Special Designation or Identified as having High Conservation Value within the Bois Brule Valley LCA.

Name	OERW[1]	NHI[2]	Fish Spawning[3]	Class I Trout[4]	Priority Wetlands[5]
Anderson Creek	x			x	x
Angel Creek	x	x		x	x
Blueberry Creek	x	x		x	x
Bois Brule River	x	x	x	x	x
Casey Creek	x			x	x
Catlin Creek	x	x		x	x
E Fork Bois Brule R.	x	x		x	x
Fish Creek		x			x
Hansen Creek	x	x			x
Jerseth Creek	x	x		x	x
Kaspar Creek	x				x
Little Bois Brule River	x	x		x	x
Minnesuing Creek	x	x			x
Nebagamon Creek	x	x			x
Percival Creek	x			x	x
Porcupine Creek		x			x
Rocky Run	x			x	x
Sandy Run Creek	x			x	
Smith Creek					x
St. Croix Creek	x	x		x	x
Trask Creek	x				x
W Fork Bois Brule R.	x	x		x	
Wilson Creek	x	x		x	x
Unnamed Creeks[6]	25	2		8	3

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Lake Superior Binational Forum Fish Spawning Waters
[4]Wisconsin DNR Class I Trout Waters
[5]Wisconsin DNR Priority Wetlands
[6]Number of unnamed creeks are given per designation category

Table 23. Lakes and Wetlands with Special Designation or Identified as having High Conservation Value within the Bois Brule Valley LCA.

Name	OERW[1]	NHI[2]	Priority Wetlands[3]	Walleye[4]
Beaupre Springs		x		
Big Lake		x		
Brule Spillway			x	
Cedar Island Ponds		x		
Deer Lake		x		
Divide Swamp			x	
Hoodoo Lake		x	x	
Lake Minnesuing	x	x		x
Lake Nebagamon	x	x		x

Name	OERW[1]	NHI[2]	Priority Wetlands[3]	Walleye[4]
Little Steele Lake	x			
Lucius Lake		x		
Lydon Lake		x		
McDougal Springs	x	x		
Mills Lake		x		
Mouth of Bois Brule River			x	
Rush Lake		x	x	
Saunder's Pond		x		
Shoberg Lake		x		
Smith Lake		x	x	
South Twin Lake	x			
Spring Lake		x		
Steele Lake	x			
Unnamed Spring[5]		1		
Unnamed Lake[5]		1		

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Wisconsin DNR Priority Wetlands
[4]Wisconsin DNR natural reproducing Walleye Waters
[5]Number of unnamed springs and lakes are given per designation category

Working Lands

Agriculture and Forestry Zoning: 114,468.9 acres (83.8 % of LCA)

- **Agriculture Zoning:** 21,256.3 acres (18.6 % of A1/F1 zoning)
- **Forestry Zoning:** 93,212.6 acres (81.4 % of A1/F1 zoning)

Prime farmlands and farmlands of statewide importance: 26,648.0 acres (19.5 % of LCA)
Forest Crop Law or Managed Forest Law: 22,544.9 acres (16.5 % of LCA)

Community Heritage

Recreation

- North Country National Scenic Trail: 23.7 miles
- Cross-country Skiing Trails: 12.7 miles
- Canoe River Trials: 44.5 miles (Bois Brule River)
- Douglas County Multi-use Trails: 12.2 miles
- Lake Superior Circle Tour Route: 11.3 miles

Geology and Topography

- Douglas Fault
- Lake Superior Shoreline: 11.3 miles
- Lake Superior Eroding Scarps: 1.3 miles
- Superior Escarpment
- Brule Lookout Tower Hill
- Dergerman Road Hills
- Fire Tower Hill
- Lake Minnesuing Hill

- Pine Tree Landing Hill
- Stoney Hill
- Sugar Camp Hill

Waterfalls and Cascades

- Lenroot Ledges
- May Ledges

Cultural and Historic Sites

- Cedar Island Lodge
- Brule – St. Croix Portage
- Lake Nebagamon Auditorium

Priority Conservation Areas

Number of Privately Owned Parcels: 6,386
Area of Privately Owned Parcels: 72,674.6 acres (53.2 % of LCA)
Mean Area of Privately Owned Parcels: 11.38 acres

Table 24. CV Classification Distribution among Privately Owned Parcels in the Bois Brule Valley LCA.

CV Classification	Number of Parcels	Total Area	Percent	Mean Area
High	1,135 (99)	9,538.7	13.1	8.40
Medium High	2967 (31)	27,974.0	38.5	9.43
Medium	1,758	24,200.2	33.3	13.77
Low	526	10,961.8	15.1	20.83
Total	6,386	72,674.6	100.0	11.38

[1]Priority Conservation Areas include those parcels with conservation value classes High and Medium High.
[2]Number and area of parcels apparently with conservation easements and/or being held for conservation purposes are indicated in parentheses.

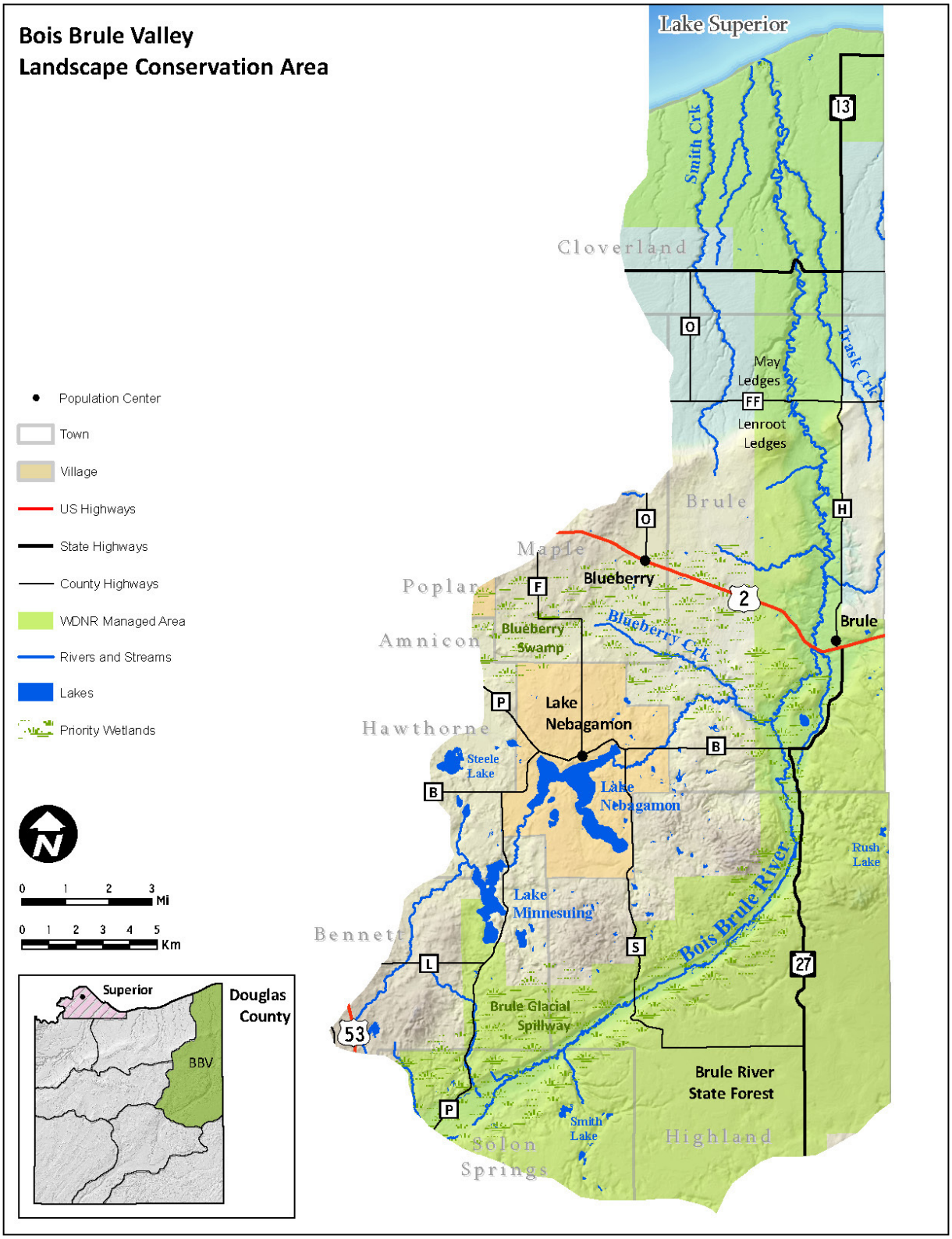


Figure 23. Bois Brule Valley LCA.

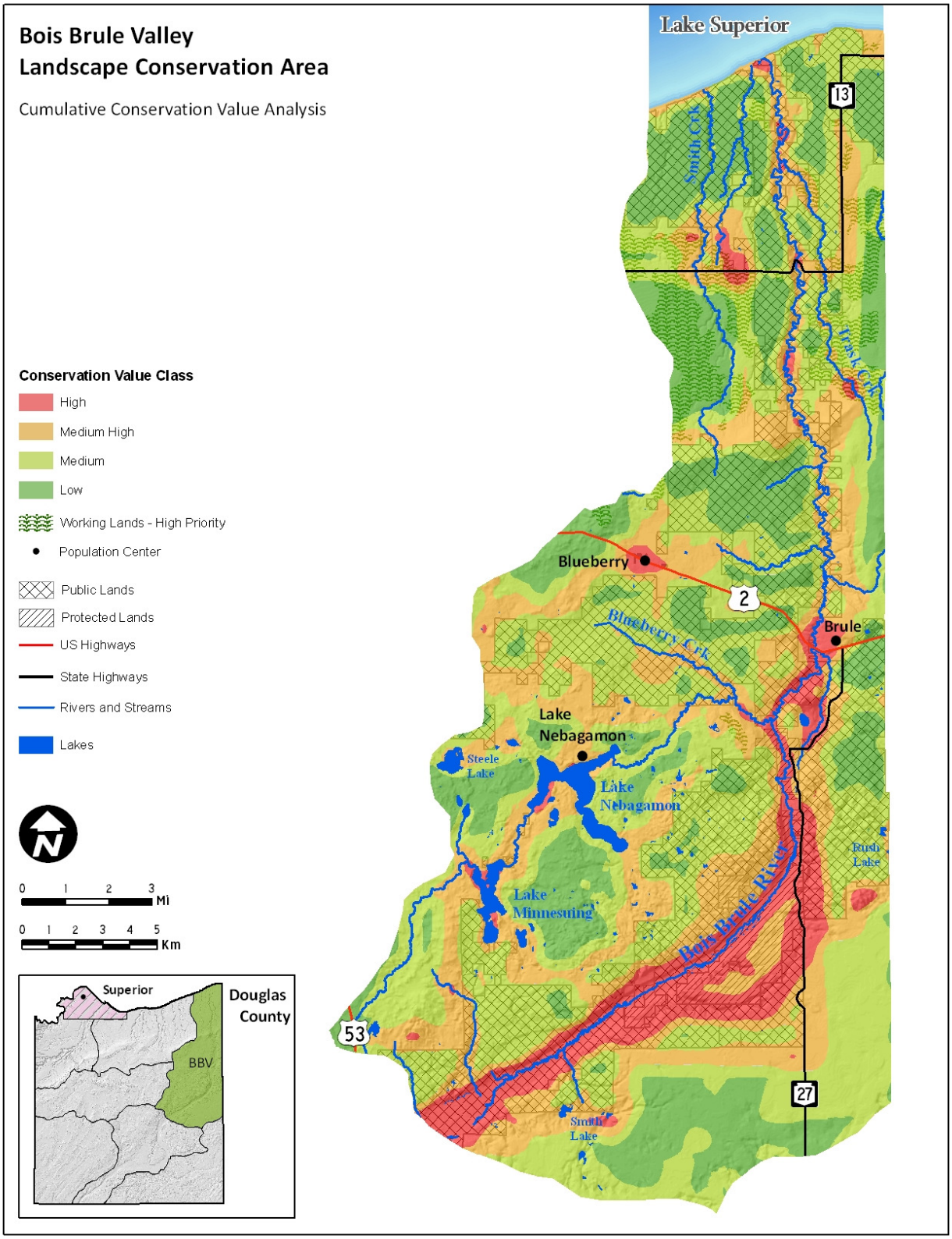


Figure 24. Bois Brule Valley LCA Cumulative Conservation Value Analysis.

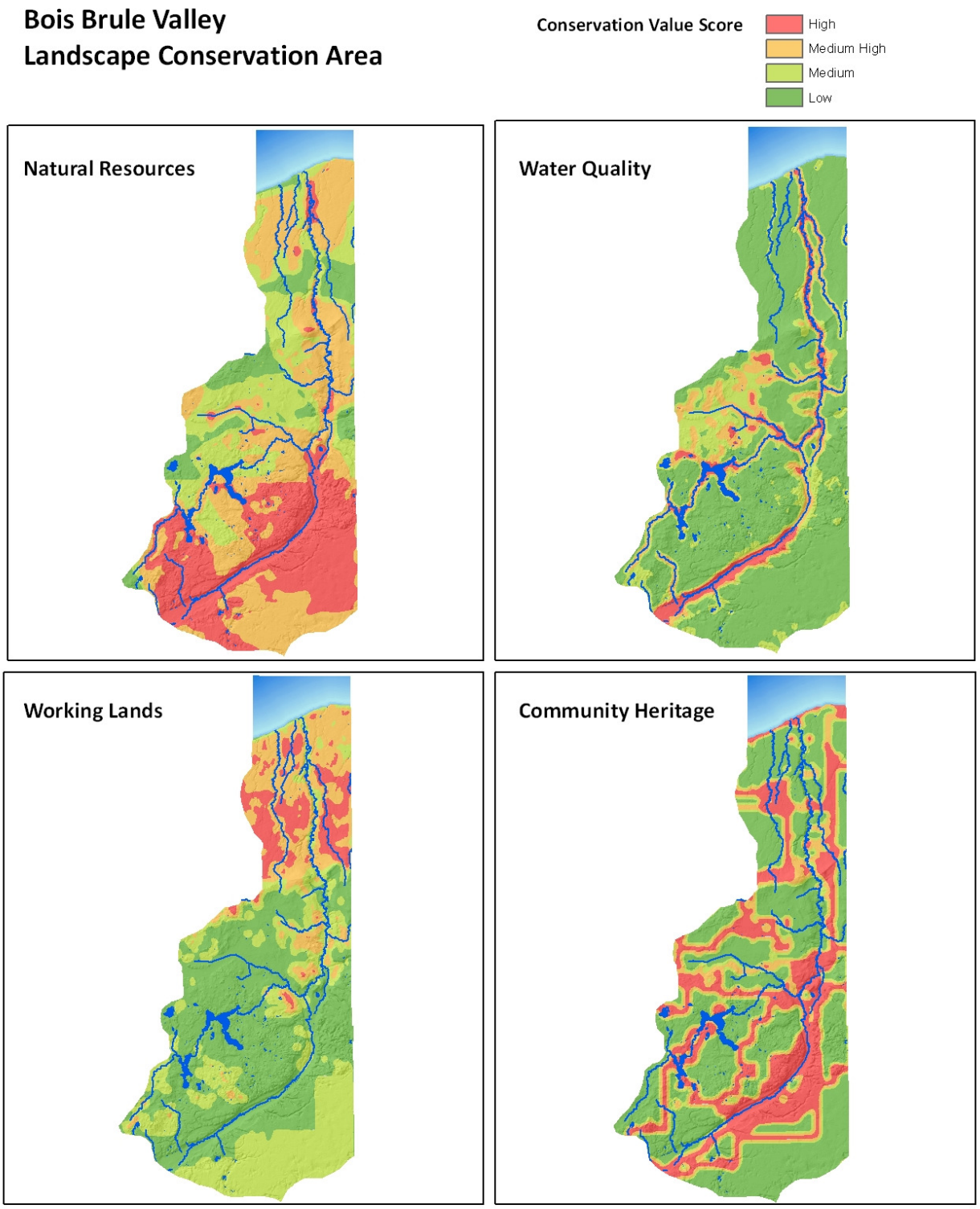


Figure 25. Bois Brule Valley LCA Conservation Themes Conservation Value Analysis.

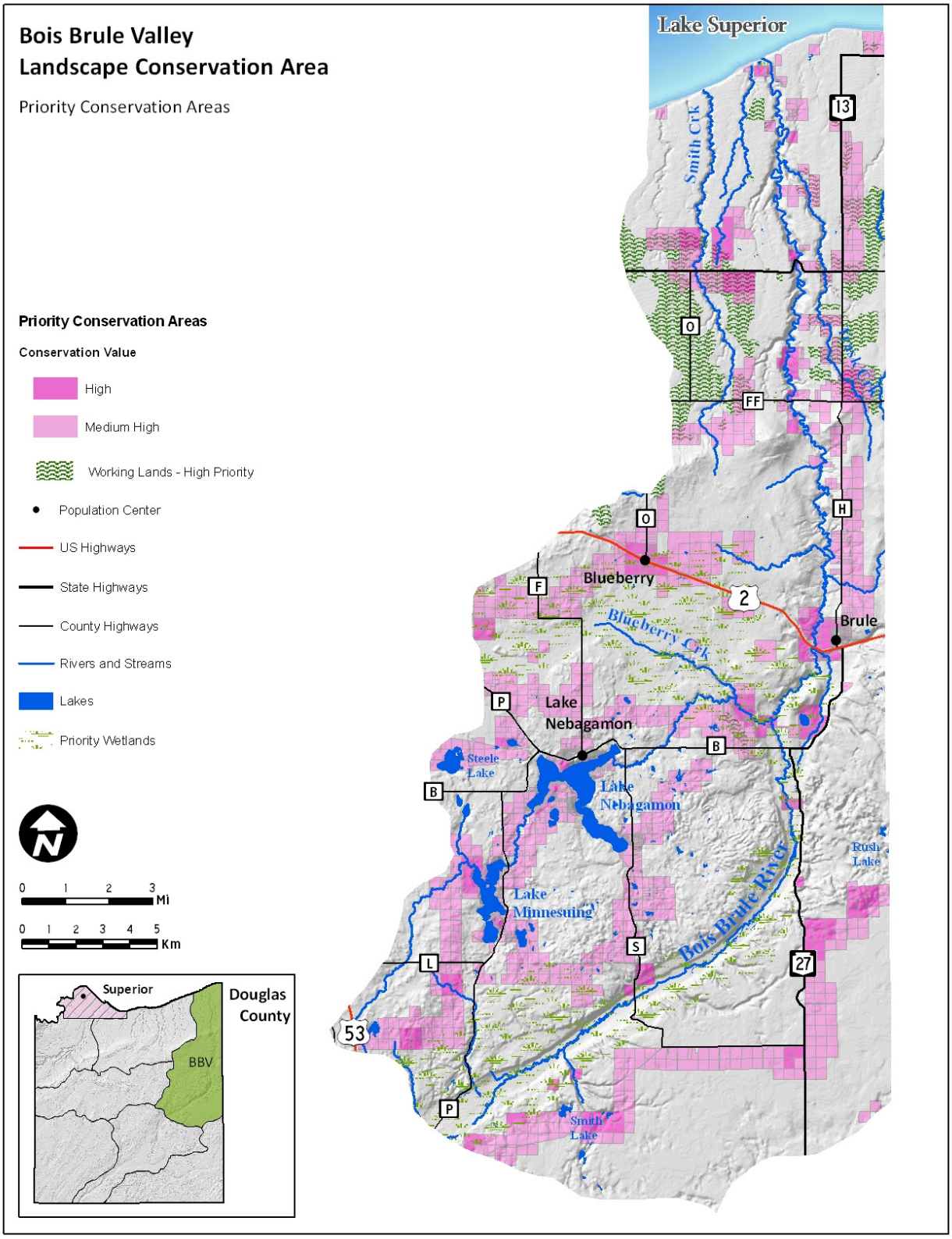
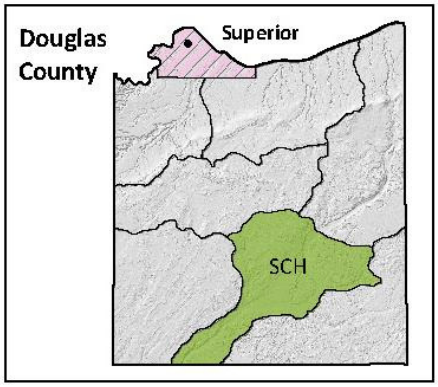


Figure 26. Bois Brule Valley LCA Priority Conservation Areas.

ST. CROIX HEADWATERS

LCA Description



The St. Croix Headwaters LCA (SCH LCA) is located in the south-central portion of Douglas County primarily within the Towns of Solon Springs, Gordon, and Wascott (Figure 27). The LCA comprises approximately 14 % of Douglas County, and almost 53 % is owned and managed as public lands primarily by the county's Forestry Department; however, the WDNR and National Park Service have various important holdings. The Village of Solon Springs and other communities along U.S. Highway 53 contribute to the moderate population size of this LCA in relation to the rest of Douglas County. Agriculture and forestry are the primary land use types in this LCA.

The SCH LCA is situated primarily within the Northwest Sands Ecological Landscape, although it also encompasses a notable portion of the Northwest Lowlands Ecological Landscapes including the Dairyland Moraines and Pattison Moraines Landtype Associations. However, the Bayfield Level Barrens and Gordon Rolling Barrens are the predominant Landtype Associations. The LCA captures the headwaters of the St. Croix River, notably its origin in Divide Swamp via St. Croix Creek and Upper St. Croix Lake. The topography exemplifies the physiographic features present throughout the area including the nearly level outwash plain of the St. Croix River Valley and the undulating and rolling moraines found throughout the northwestern portion of the LCA. Perennial and intermittent rivers and steams are common and lakes are abundant. Other important features include the St. Croix Flowage, Twin Lakes and Upper and Lower Ox Lakes and wetlands and the Douglas County Wildlife Area Barrens. Well-drained, sandy soils are common. The most common habitat types are Mixed Deciduous/Coniferous Forest, Aspen, Jack Pine Forest, and Shrubland. Five natural communities (particularly Pine Barrens) occur adjacent and along the length of the St. Croix River and Divide Swamp area.

Conservation Value Analysis

The Conservation Value Scored Analysis ranked the SCH LCA third overall (Table 25). High scores for Natural Resources, Water Quality, and Community Heritage contributed significantly to the overall ranking (Figure 28 and 29; Table 25). Over 37 % of the LCA was classified as having High or Medium High conservation value (Table 26).

The St. Croix Headwaters is very diverse across conservation themes. Notably, the St. Croix River and the surrounding barrens, swamps and wetlands have been identified as having significant conservation value by several other conservation efforts (Table 27). According to the Natural Heritage Inventory, 35 plant and animal species (with S1-S3 and/or G1-G3 ranking) have been recorded in the LCA since 1970 (Table 28; Appendix E). Fifteen species have been identified as Species of Greatest Conservation Need by the Wisconsin Wildlife Action Plan (WDNR 2005) and include Kirtland's Warbler and three fish species including Lake Sturgeon.

The LCA is dominated by the St. Croix and Eau Claire River watershed (including the Upper watershed) and contains more than 142 miles of perennial rivers and streams of which 36.5 % (52 mi) are designated Outstanding or Excellent Resource Waters and over 12 % (17 mi.) are designated Class I Trout Waters by WDNR. At least 29 streams and 12 lakes and/or wetlands have significant conservation value (Table 29 and 30).

In addition to its natural resource diversity, unique hydrologic features, and rich community heritage the LCA also is valued for its suitability for agriculture and forestry. The vast majority of the LCA (approx. 82 %) currently is zoned by Douglas County for either agricultural or forestry lands. Less than 6 % of the LCA's soils have been classified as prime or statewide important soils for agriculture by the NRCS. Forestry is by far the predominant land use in the LCA.

Approximately 27 % of the privately owned lands in the LCA are within a ½ mile of public lands. In addition, many miles of recreational trails provide community heritage/resource value. With 33 miles of the St. Croix River canoe trail, over 32 miles of the North Country National Scenic Trail, and over 10 miles of specially designated cross-country skiing trails, the scenic and passive recreational opportunities present in the LCA rivals only the Bois Brule Valley LCA within Douglas County. The typically rolling topography of the LCA is mostly devoid of prominent hills and ridges but is characterized by the wide and somewhat indistinct St. Croix River Valley.

Population and Land Use Trends

Relative to the county's projected population growth of 24 % most unincorporated municipalities in the LCA are expected to see similar increases. Solon Springs and Gordon have observed population increases since the 1950s, and are projected to increase at rates higher than the county's average in years to come.

All municipalities have experienced increases in the number parcels zoned for residential land use; however, Solon Springs has observed a decrease in the acreage of residential lands. Almost all municipalities decreased in the number of agricultural use parcels with the exception of Solon Springs. The number of forested parcels increased in most municipalities although decreases in the number of parcels and acreage of forested lands occurred in some towns including Gordon.

Threats and Opportunities

Conflicting land use practices account for the primary threats affecting the SCH LCA. Land use conversions include increasing development in rural areas, especially along lake and stream shorelines, and fragmentation of forest landscapes for recreation and residential development. The subdivision of land into increasingly smaller parcels and changes in land ownership result in differences in land management techniques and can result in losses of critical habitat. Habitat fragmentation often associated leads to loss of biodiversity and contributes to the spread of invasive species. Residential development, and certain forestry and agricultural practices, threaten water quality and may result in increased concentration of flows, increased peak runoff problems, adversely impacting aquatic species. The SCH LCA ranked near the top for Natural Resources and Water

Quality values. Approximately 18 % of the privately owned lands in the LCA fall within the High conservation value class (Table 31).

Within the areas of high conservation value, development threatens swamps, undeveloped bogs, and barrens specific to this LCA as well as important rivers like the St. Croix Riverway, headwaters and tributaries. Several lakes and many large rivers are susceptible to continued development as many seasonal residences are converted to permanent residences and construction of new homes increases. Development resulting in increased impervious surface area throughout the watershed, or changes to the natural flow of aquatic systems, results in increased pollution and impairs water quality, and contributes to groundwater contamination. Incompatible development practices impact the soils, causing erosion and sedimentation affecting water quality and biodiversity. Disturbance from development and changes in land use practices also promotes the spread of non-native invasive species, threatens overall species diversity, and compromises many rare species and communities unique to this LCA. In addition, continued development threatens lands suitable for passive recreational activities and existing recreational corridors.

Many of the areas of high conservation value are currently owned by Douglas County, WDNR and the National Park Service and are managed as public lands. Nevertheless, over 33,000 acres were classified as Priority Conservation Areas (PCAs) based on their high cumulative conservation value scores (Table 31). Several PCAs, where opportunities for future conservation projects exist, have been identified in the LCA (Figure 30). Within the SCH LCA, opportunities for proactive land protection in the form of conservation easements, land acquisition, and management agreements are especially abundant. **Areas of focused conservation attention where proactive land protection will likely be pursued include the riparian corridors along the St. Croix River and Flowage, Catlin Creek, Beebe Creek, Buckley Creek, and Lower Ox Creek. Opportunities for land acquisition exist within the St. Croix National Scenic Riverway along the St. Croix River and Buckley Creek.** In addition, **habitat management agreements will be pursued to protect areas within the Barren communities in the southern and eastern portions of the LCA and cooperative management agreements on lands along Upper Ox Creek**. The majority of these focus areas are adjacent to public lands, within trail corridors, and encompass forestry lands, all factors that contribute to the regions rural-based working lands and community heritage. There are ample partnership opportunities within the SCH LCA as the majority of PCAs are adjacent to public lands and some fall within a federal acquisition zone (St. Croix National Scenic Riverway). In addition, many of the streams are classified as Trout Streams and WDNR Priority Streams and therefore additional partnership opportunities exist. For a more detailed description of the focus areas, including potential partnership opportunities, refer to the Conservation Strategies section.

Supporting Data

Conservation Value (CV) Scored Analysis

Table 25. Results of Cumulative and Conservation Theme CV Scored Analysis in the St. Croix Headwaters LCA.

Conservation Theme	Mean Score (Rank)	Maximum Score (Rank)
Cumulative CV	10.49 (3)	40.59 (2)
Natural Resources	11.63 (2)	71.33 (2)
Water Quality	9.82 (2)	41.28 (2)
Working Lands	14.96 (5)	51.36 (5)
Community Heritage	9.95 (3)	70.23 (1)

Table 26. Areal and Proportional Results of CV Classification in the St. Croix Headwaters LCA.

Conservation Value Classes	Acres	Percent of LCA
High	9,009.1	7.3
Medium High	36,789.0	29.9
Medium	53,194.4	43.3
Low	23,906.5	19.5

General Information

Total Area: 122,899.0 acres
Percentage of Douglas County: 14.3 %
Public Lands Acreage: 64,778.1 acres (52.7 % of LCA)

Municipalities (*Towns unless otherwise indicated*)

- Solon Springs*
- Gordon*
- Wascott
- Dairyland
- Bennett
- Highland
- Village of Solon Springs
- Oakland

* Asterisk denotes municipality/ies that contribute > 50 % of LCA acreage.

Communities

- Solon Springs
- Upper St. Croix Lake

Natural Resources

Ecological Landscapes

- Northwest Sands*
- Northwest Lowlands

Landtype Associations

- Bayfield Level Barrens*
- Dairyland Moraines*
- Gordon Rolling Barrens
- Upper Brule-St. Croix Valley
- St. Croix Plains

* Asterisk denotes landscape/s and landtype/s that contribute > 50 % of LCA acreage

Table 27. Areas Identified or Designated for Conservation Purposes by other Conservation Efforts within the St. Croix Headwaters LCA.

Conservation Effort	Site Name
WDNR State Natural Areas	• Brule Glacial Spillway (minimal) • Buckley Creek and Barrens • Flat Lake • Solon Springs Sharptail Barrens
WDNR Conservation Opportunity Areas	• Blueberry Swamp • Douglas and Bayfield County Barrens • Namekagon Barrens • Northwest Lowlands Bogs (minimal) • Upper St. Croix – Namekagon Rivers
WBCI Important Bird Areas	• Brule Glacial Spillway (minimal) • Moose Junction Peatlands • Namekagon – Solon Springs Barrens
WDNR Land Legacy Places	• Namekagon – Brule Barrens • St. Croix River
Douglas County Critical Scenic Areas	• Beebe Creek • Douglas County Bird Sanctuary • Lower St. Croix • Lucius Woods State Park • Portage Trails • St. Croix River and St. Croix Lake
LSBF Important Habitat Sites/Areas	• Brule River Watershed (minimal)

Natural Heritage Inventory (NHI) Element Occurrences List

NHI G1 Elements: 1
NHI S1 Elements: 5
NHI G2 – G3 Elements: 5
NHI S1 – S3 Elements: 35
NHI Natural Communities: 5
Species of Greatest Conservation Need: 15

Table 28. NHI Element Occurrences, Rankings and Designations of Natural Communities and Plant and Wildlife Species within the St. Croix Headwaters LCA.

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Community	Hardwood Swamp	G4	S3	
	Northern Dry-mesic Forest	G4	S3	
	Northern Wet-mesic Forest	G3	S3	
	Pine Barrens	G2	S2	
	Tamarack (Poor) Swamp	G4	S3	
Bird	Black Tern	G4	S2	Y
	Connecticut Warbler	G4	S2	Y
	Kirtland's Warbler	G1	S1	Y
	Least Bittern	G5	S3	N
Mammal	Gray Wolf	G4	S2	Y
Herpetafauna	Blanding's Turtle	G4	S3	Y
	Wood Turtle	G4	S2	Y
Fish	Gilt Darter	G4	S2	Y
	Greater Redhorse	G4	S3	Y
	Lake Sturgeon	G3	S3	Y
Mussel	Purple Wartyback	G5	S1	Y
	Round Pigtoe	G4	S3	N
Beetle	Predaceous Diving Beetle (*Agabus bicolor*)	GNR	S3	Y
	Tiger Beetle (*Cincindela patruela patruela*)	G3	S2	Y
Butterfly	Chryxus Arctic	G5	S2	N
	Cobweb Skipper	G4	S2	Y
	Dusted Skipper	G5	S3	N
	Leonard's Skipper	G4	S3	N
Moth	Midwestern Fen Buckmoth	G5	S3	Y
Dragonfly	Extra-striped Snaketail (*Ophiogomphus anomalus*)	G4	S3	Y
	Pronghorned Clubtail	G5	S2	N
Caddisfly	Lepidostomatid Caddisfly (*Lepidostoma libum*)	G3	S1	Y
Plant	Arrow-leaved Sweet-coltsfoot	G5	S3	
	Fir Clubmoss	G5	S2	
	Flodman Thistle	G5	S1	
	Hooker Orchis	G4	S2	
	Lapland Buttercup	G5	S1	
	Marsh Horsetail	G5	S2	
	Marsh Willow-herb	G5	S3	

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
	Northern Black Currant	G5	S3	
Plant	Northern Bur-reed	G4	S2	
	Northern Yellow Lady's-slipper	G5	S3	
	Sheathed Sedge	G5	S3	
	Showy Lady's-slipper	G4	S3	
	Sparse-flowered Sedge	G5	S3	
	Swamp-pink	G4	S3	

[1]Global Rank includes species that are: (G1) critically imperiled globally; (G2) imperiled globally; (G3) very rare and local throughout range; (G4) apparently globally secure though rare in parts; (G5) demonstrably secure globally though rare in parts; and (GNR) not ranked (WDNR 2010).
[2]State Rank includes species that are: (S1) critically imperiled in Wisconsin; (S2) imperiled in Wisconsin; (S3) rare or uncommon in Wisconsin; and (SU) possibly in peril in Wisconsin but status uncertain (WDNR 2010).
[3]Species of Greatest Conservation Need (SGCN) only applies to animal species (WDNR 2009a).

Water Quality and Hydrologic Features

Perennial Rivers and Streams: 142.1 miles
Outstanding and Excellent Resource Waters: 51.9 miles
Class 1 Trout Rivers and Streams: 17.6 miles
Lakes and other water bodies: 4,825.6 acres (3.9 % of LCA)
Intermittent Streams: 77.1 miles
Soils Highly Susceptible to Ground Contamination: 39,463.8 acres (32.1 % of LCA)

WDNR Watersheds

- Upper St. Croix and Eau Claire Rivers*
- St. Croix and Eau Claire Rivers
- Bois Brule River
- Amnicon and Middle Rivers
- Totagatic River
- Lower Namekagon River

* Asterisk denotes watershed/s that contribute > 50 % of LCA acreage

Table 29. Rivers and Streams with Special Designation or Identified as having High Conservation Value within the St. Croix Headwaters LCA.

Name	OERW[1]	NHI[2]	Class I Trout[3]	Wild Rice[4]	Priority Wetlands[5]	Wild and Scenic[6]
Arnold Creek	x		x		x	
Bacon Creek	x		x		x	
Beaver Creek		x			x	
Beebe Creek	x		x		x	
Buckety Creek					x	
Buckley Creek		x			x	
Catlin Creek	x	x	x		x	
Crotte Creek		x			x	
Eau Claire River		x			x	

Name	OERW[1]	NHI[2]	Class I Trout[3]	Wild Rice[4]	Priority Wetlands[5]	Wild and Scenic[6]
Leo Creek		x			x	
Lord Creek					x	
Lower Ox Creek		x			x	
Moose River	x	x			x	
Mud Creek		x			x	
Park Creek					x	
Porcupine Creek		x			x	
Potter Creek	x		x			
St. Croix Creek	x	x	x		x	
St. Croix River	x	x		x	x	x
Spring Creek		x			x	
Thompson Creek					x	
Upper Ox Creek					x	
Unnamed Creeks[7]		2			7	

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Wisconsin DNR Class I Trout Waters
[4]Wisconsin DNR Wild Rice Waters
[5]Wisconsin DNR Priority Wetlands
[6]Wild and Scenic Rivers Act (US Code Chapter 28 § 1271-1287)
[7]Number of unnamed creeks are given per designation category

Table 30. Lakes and Wetlands with Special Designation or Identified as having High Conservation Value within the St. Croix Headwaters LCA.

Name	OERW[1]	NHI[2]	Priority Wetlands[3]	Wild Rice[4]	Walleye[5]
Divide Swamp			x		
Flat Lake		x			
Lower Ox Lake		x		x	
Moose Lake		x			
Nye Lake				x	
St. Croix Flowage	x	x			
Upper Ox Lake		x		x	
Upper St. Croix Lake	x	x			x
Unnamed Spring[6]		1			
Unnamed Lake[6]		3			

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Wisconsin DNR Priority Wetlands
[4]Wisconsin DNR Wild Rice Waters
[5]Wisconsin DNR natural reproducing Walleye Waters
[6]Number of unnamed springs and lakes are given per designation category

Working Lands

Agriculture and Forestry Zoning: 100,499.8 acres (81.8 % of LCA)

- **Agriculture Zoning:** 9,001.9 acres (9.0 % of A1/F1 zoning)
- **Forestry Zoning:** 91,497.9 acres (91.0 % of A1/F1 zoning)

Prime farmlands and farmlands of statewide importance: 7,258.4 acres (5.9 % of LCA)
Forest Crop Law or Managed Forest Law: 18,898.2 acres (15.4 % of LCA)

Community Heritage

Recreation

- North Country National Scenic Trail: 32.4 miles
- Cross-country Skiing Trails: 10.3 miles
- Canoe River Trials: 33.0 miles (St. Croix River)
- Wild Rivers Trail: 13.7 miles
- Douglas County Multi-use Trails: 60.7 miles

Geology and Topography

- Bennett Lookout Tower Hill

Cultural and Historic Sites

- Brule – St. Croix Portage

Priority Conservation Areas

Number of Privately Owned Parcels: 5,490
Area of Privately Owned Parcels: 51,831.8 acres (42.2 % of LCA)
Mean Area of Privately Owned Parcels: 9.44 acres

Table 31. CV Classification Distribution among Privately Owned Parcels in the St. Croix Headwaters LCA.

CV Classification	Number of Parcels	Total Area	Percent	Mean Area
High	1,875	9,371.5	18.1	5.00
Medium High	2,242	24,247.0	46.8	10.81
Medium	1,198	15,468.6	29.8	12.91
Low	175	2,744.8	5.3	15.68
Total	5,490	51,831.8	100.0	9.44

[1]Priority Conservation Areas include those parcels with conservation value classes High and Medium High.
[2]Number and area of parcels apparently with conservation easements and/or being held for conservation purposes are indicated in parentheses.

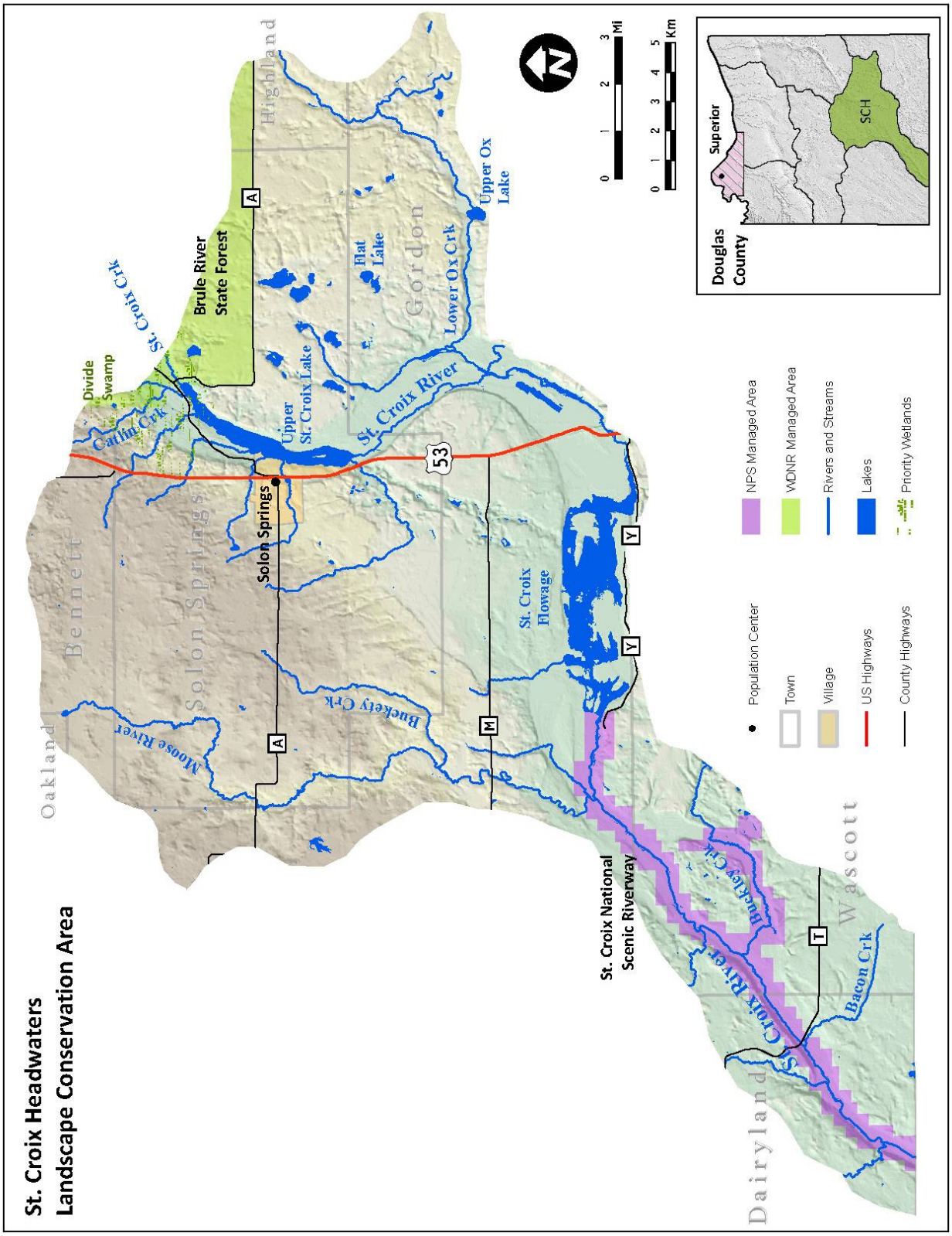


Figure 27. St. Croix Headwaters LCA.

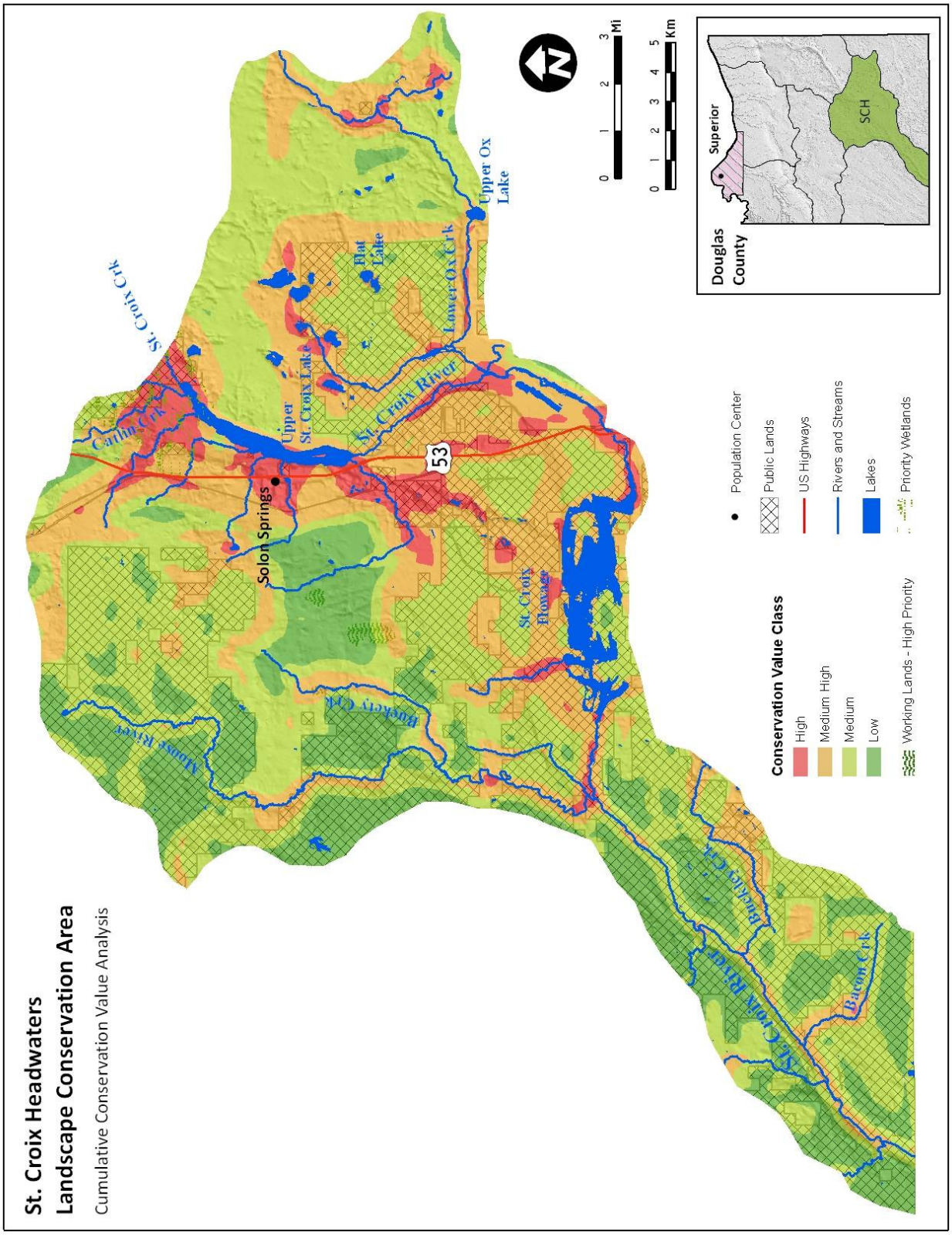


Figure 28. St. Croix Headwaters LCA Cumulative Conservation Value Analysis.

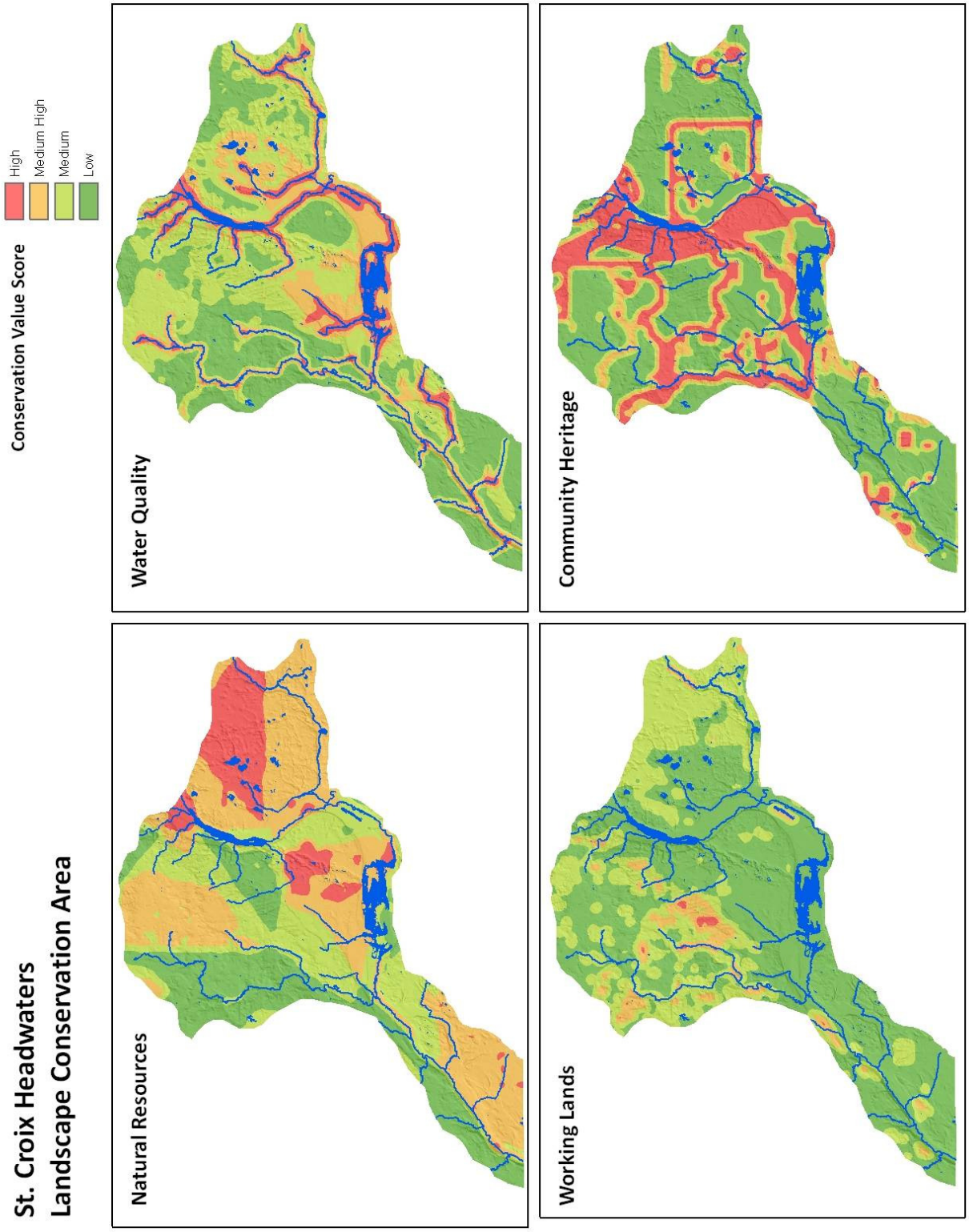


Figure 29. St. Croix Headwaters LCA Conservation Themes Conservation Value Analysis.

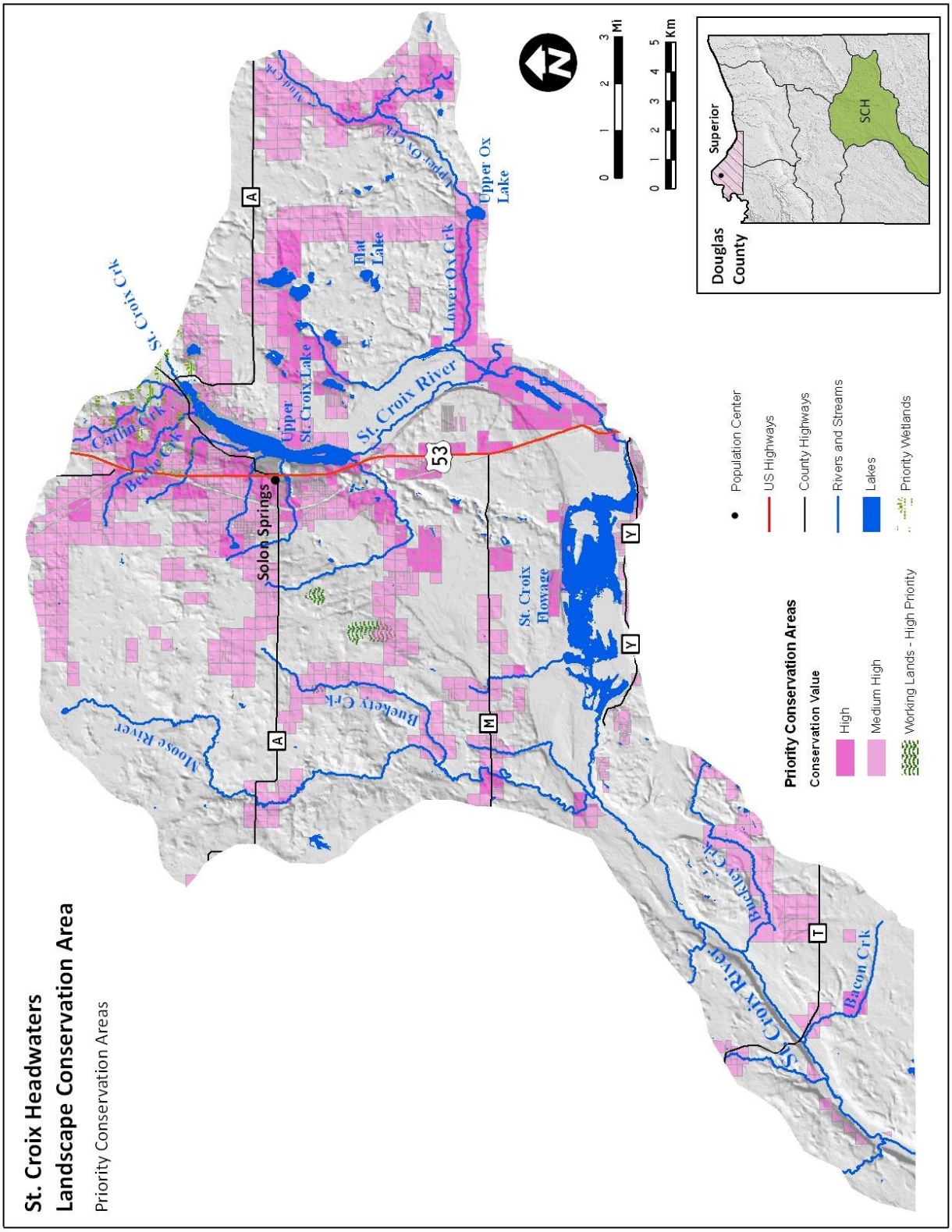
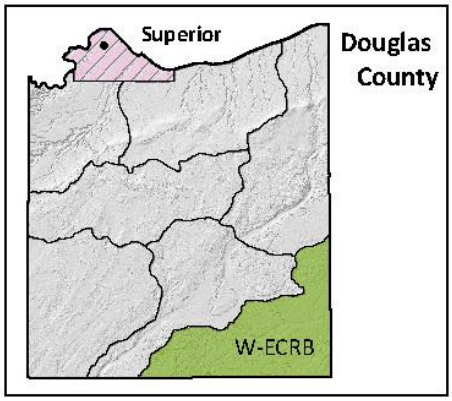


Figure 30. St. Croix Headwaters LCA Priority Conservation Areas.

WASCOTT – EAU CLAIRE RIVER BARRENS



LCA Description

The Wascott – Eau Claire River Barrens LCA (W-ECRB LCA) is located in the southeastern portion of Douglas County within the Towns of Wascott, Gordon, and Highland (Figure 31). The LCA comprises over 13 % of Douglas County and the majority of the land is privately owned. Less than 12 % of the LCA is owned and managed primarily by the county's Forestry Department as public lands. The communities of Gordon and Wascott along U.S. Highway 53 contribute heavily to the low population of this LCA in relation to the rest of Douglas County. Like much of Douglas County, forestry is the primary land use type.

Primarily situated within the Northwest Sands Ecological Landscape, the predominant Landtype Associations of this LCA are the Gordon Rolling Barrens and Bayfield Level Barrens. In addition, inclusions of the North Central Forest Ecological Landscape and several Landtype Associations are unique to the LCA and found nowhere else in Douglas County. Barrens are common in the LCA and the topography is characterized by expansive level to rolling outwash plains with relatively small inclusions of hills and rolling moraines. Although two large rivers are present in the LCA, the Eau Claire and Ounce Rivers, perennial and intermittent streams are sparse overall. However, lakes are extremely plentiful especially in the southwestern and northeastern portions of the LCA. Well-drained, sandy soils are common. The most common habitat types are Jack Pine, Mixed Deciduous/Coniferous Forest, Shrubland, and Aspen. Nine natural communities (particularly Great Lakes Beaches) occur primarily in the lake areas.

Conservation Value Analysis

The Conservation Value Scored Analysis ranked the W-ECRB LCA fourth overall (Table 32). Relatively high scores for Natural Resources and Water Quality contributed significantly to the overall ranking (Figure 32 and 33; Table 32). Over 24 % of the LCA was classified as having High or Medium High conservation value (Table 33).

Natural resources hot spots in the LCA include the lands surrounding Crystal and Bardon Lakes and the Beauregard Lake area. The LCA's existing (and potential) barrens, lakes and wetlands have been identified as having significant conservation value by several other conservation efforts (Table 34). According to the Natural Heritage Inventory, 18 plant and animal species (with S1-S3 and/or G1-G3 ranking) have been recorded here since 1970 (Table 35; Appendix E). Thirteen species have been identified as Species of Greatest Conservation Need by the Wisconsin Wildlife Action Plan (WDNR 2005) and include Kirtland's Warbler and two fish species among others.

The LCA encompasses large portions of the Totagatic River and St. Croix and Eau Claire River watersheds and contains over 82 miles of perennial rivers and streams of nearly 8 % are designated Outstanding or Excellent Resource Waters and less than 2 % are designated Class I Trout Waters by WDNR. At least 10 streams and 32 lakes and/or

wetlands have been recognized as having significant conservation value including four Class 3 Wild Lakes (Table 36 and 37).

In addition to its natural resource diversity and abundant lakes, the LCA also is valued for its suitability for agriculture and forestry. The vast majority of the LCA (> 77 %) currently is zoned by Douglas County for either agricultural or forestry. Less than 2 % of the LCA's soils have been classified as prime or statewide important soils for agriculture by the NRCS. Forestry is by far the predominant land use in the LCA.

Many miles of recreational trails contribute heavily to the community heritage resource values of the LCA. Almost 26 miles of Canoe Trails on the Eau Claire and Totagatic Rivers add to the scenic and passive recreational opportunities present in the LCA. Several areas in the western portion of the LCA (e.g., Beauregard Knolls, and Ounce River Ridges) interrupt the typically rolling topography of the LCA.

Population and Land Use Trends

Relative to the county's projected population growth of 24 % most of the unincorporated municipalities in the LCA are expected to observe increases higher than the county's average. Wascott has observed substantial population growth since the 1950s, and is expected to continue growing at rates higher than the county's average in years to come.

All municipalities have experienced increases in the number of parcels and total acreage of residential lands. As of 2008, Wascott and Gordon were two of the County's top three towns with the greatest number of residential use parcels and total acreage of residential lands. Agricultural use parcels decreased in all municipalities although the total acreage of agricultural lands increased in Highland. Most municipalities observed a decrease in forest use parcels and all saw decreases in the total acreage of forest lands.

Threats and Opportunities

Conflicting land use practices are the primary threats affecting the Wascott-Eau Claire River Barrens. Land use conversions include increasing development in rural areas, especially along lake and stream shorelines, and fragmentation of forest landscapes for recreation and residential development. The subdivision of land into increasingly smaller parcels and changes in land ownership lead to different land management techniques among parcels, often resulting in loss of critical habitat. Habitat fragmentation frequently leads to loss of species diversity and contributes to the spread of invasive species. Incompatible land use practices, including current agricultural practices, are a threat to water quality and may result in increased concentration of flows, increased peak runoff problems, and may restrict movement and migration of aquatic species. Ranked below the county's average in overall cumulative conservation value, the area is above average for Water Quality Resources. Less than 5 % of the privately owned parcels in the LCA fall within the High conservation value class (Table 38).

Within areas with high conservation value, development threatens barrens, lakes, wetlands, and important rivers and tributaries. Several lakes and many large rivers are susceptible to continued development as many seasonal residences are converted to permanent residences and construction of new homes increases. Development resulting in increased impervious surface area throughout the watershed, or changes to the natural

flow of aquatic systems, results in increased pollution and water quality impairment, and contributes to groundwater contamination. Improper development of shorelines often leads to erosion and sedimentation which affects water quality and biodiversity. Disturbance from development and changes in land use practices also promotes the spread of non-native invasive species and threatens overall species diversity.

Some of the LCA's high conservation value resource areas are owned by Douglas County and managed as public lands. Nevertheless, more than 31,000 acres were classified as Priority Conservation Areas (PCAs) based on their high cumulative conservation value scores (Table 38). Several Priority Areas have been identified in the LCA where opportunities for future conservation projects exist (Figure 34). Within the W-ECRB LCA, opportunities for proactive land protection in the form of conservation easements and management agreements are present. **Areas where proactive land protection should be pursued include the riparian corridors along the Eau Claire River and the confluence of the Ounce and Totagatic Rivers**. **Habitat management agreements may be pursued to protect areas within Barren communities in the northern and western portions of the LCA**. Many of these focus areas are adjacent to public lands and encompass forestry land. Several of the streams are classified as Trout Streams and WDNR Priority Streams and therefore potential partnership opportunities exist. For a more detailed description of the focus areas, including potential partnership opportunities, refer to the Conservation Strategies section.

Supporting Data

Conservation Value (CV) Scored Analysis

Table 32. Results of Cumulative and Conservation Theme CV Scored Analysis in the Wascott – Eau Claire River Barrens LCA.

Conservation Theme	Mean Score (Rank)	Maximum Score (Rank)
Cumulative CV	8.87 (4)	34.01 (3)
Natural Resources	10.05 (4)	30.47 (5)
Water Quality	7.82 (3)	36.59 (4)
Working Lands	14.58 (7)	48.59 (7)
Community Heritage	8.75 (5)	58.76 (4)

Table 33. Areal and Proportional Results of CV Classification in the Wascott – Eau Claire River Barrens LCA.

Conservation Value Classes	Acres	Percent of LCA
High	2,290.4	2.0
Medium High	25,942.3	22.3
Medium	53,081.1	45.7
Low	34,790.7	30.0

General Information

Total Area: 116,104.5 acres
Percentage of Douglas County: 13.5 %
Public Lands Acreage: 31,654.9 acres (11.8 % of LCA)

Municipalities (*Towns unless otherwise indicated*)

- Wascott*
- Gordon
- Highland

* Asterisk denotes municipality/ies that contribute > 50 % of LCA acreage.

Communities

- Gordon
- Wascott

Natural Resources

Ecological Landscapes

- Northwest Sands*
- North Central Forest

Landtype Associations

- Gordon Rolling Barrens*
- Bayfield Level Barrens

- Smokey Hill Basalt Ridge
- Beauregard Knolls
- Webb Lake Collapsed Barrens
- Cable Rolling Outwash
- Hayward Moraines

* Asterisk denotes landscape/s and landtype/s that contribute > 50 % of LCA acreage

Table 34. Areas Identified or Designated for Conservation Purposes by other Conservation Efforts within the Wascott – Eau Claire River Barrens LCA.

Conservation Effort	Site Name
WDNR State Natural Areas	• Buckley Creek • Goose Lake
WDNR Conservation Opportunity Areas	• Douglas and Bayfield County Barrens • Namekagon Barrens
WBCI Important Bird Areas	• Namekagon-Solon Springs Barrens
WDNR Land Legacy Places	• Eau Claire River • Lower Totagatic River • Namekagon-Brule Barrens • St. Croix River (minimal)
WDNR Critical Habitat Areas	• Bardon Lake Sensitive Area
Douglas County Critical Scenic Areas	• Eau Claire River and Lake Area • Gordon Flowage • Minong Flowage

Natural Heritage Inventory (NHI) Element Occurrences List

NHI G1 Elements: 1
NHI S1 Elements: 2
NHI G2 – G3 Elements: 4
NHI S1 – S3 Elements: 25
NHI Natural Communities: 9
Species of Greatest Conservation Need: 13

Table 35. NHI Element Occurrences, Rankings and Designations of Natural Communities and Plant and Wildlife Species within the Wascott – Eau Claire River Barrens LCA.

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Community	Great Lakes Beach	G3	S2	
	Inland Beach	G4	S3	
	Lake--Deep, Soft, Seepage	GNR	S3	
	Lake--Shallow, Soft, Drainage	GNR	S3	
	Northern Dry Forest	G3	S3	
	Northern Dry-mesic Forest	G4	S3	
	Northern Sedge Meadow	G4	S3	
	Poor Fen	G3	S3	
	Tamarack (Poor) Swamp	G4	S3	
Bird	Connecticut Warbler	G4	S2	Y
	Kirtland's Warbler	G1	S1	Y
	Merlin	G5	S2	
	Sharp-tailed Grouse	G4	S1	Y
	Upland Sandpiper	G5	S2	Y
	Whip-poor-will	G5	S4	Y
Mammal	Gray Wolf	G4	S2	Y
Herpetafauna	Blanding's Turtle	G4	S3	Y
	Wood Turtle	G4	S2	Y
Fish	Banded Killifish	G5	S3	Y
	Least Darter	G5	S3	Y
Beetle	Predaceous Diving Beetle (*Hydroporus vittatus*)	GNR	S3	Y
	Predaceous Diving Beetle (*Hydroporus badiellus*)	GNR	S3	N
	Tiger Beetle (*Cicindela patruela patruela*)	G3	S2	Y
	Water Scavenger Beetle (*Cymbiodyta acuminata*)	GNR	S3	Y
	Water Scavenger Beetle (*Cymbiodyta minima*)	GNR	S3	N
Butterfly	Chryxus Arctic	G5	S2	Y
	Henry's Elfin	G5	S1	N
Dragonfly	Elfin Skimmer	G4	S2	Y
	Forcipate Emerald	G5	S2	Y
Plant	Common Bog Arrow-grass	G5	S3	
	Dwarf Milkweed	G5	S3	

[1]Global Rank includes species that are: (G1) critically imperiled globally; (G2) imperiled globally; (G3) very rare and local throughout range; (G4) apparently globally secure though rare in parts; (G5) demonstrably secure globally though rare in parts; and (GNR) not ranked (WDNR 2010).
[2]State Rank includes species that are: (S1) critically imperiled in Wisconsin; (S2) imperiled in Wisconsin; (S3) rare or uncommon in Wisconsin; (S4) apparently secure in Wisconsin; and (SU) possibly in peril in Wisconsin but status uncertain (WDNR 2010).
[3]Species of Greatest Conservation Need (SGCN) only applies to animal species (WDNR 2005).

Water Quality and Hydrologic Features

Perennial Rivers and Streams: 82.4 miles
Outstanding and Excellent Resource Waters: 6.5 miles
Class 1 Trout Rivers and Streams: 1.4 miles
Lakes and other water bodies: 7,063.7 acres (6.1 % of LCA)
Intermittent Streams: 11.9 miles
Soils Highly Susceptible to Ground Contamination: 43,259.8 acres (37.3 % of LCA)

WDNR Watersheds

- Totagatic River*
- Upper St. Croix and Eau Claire Rivers
- St. Croix and Eau Claire Rivers
- Lower Namekagon River

* Asterisk denotes watershed/s that contribute > 50 % of LCA acreage

Table 36. Rivers and Streams with Special Designation or Identified as having High Conservation Value within the Wascott – Eau Claire River Barrens LCA.

Name	OERW[1]	NHI[2]	Class I Trout[3]	Priority Wetlands[4]	Wild and Scenic[5]
Bergen Creek		x		x	
Buckley Creek				x	
Cranberry Creek	x	x	x		
Eau Claire River		x		x	
Mud Creek		x		x	
Ounce River		x		x	
Totagatic River	x	x		x	x
Unnamed[6]		2		3	

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Wisconsin DNR Class I Trout Waters
[4]Wisconsin DNR Priority Wetlands
[5]Wild and Scenic Rivers Act (US Code Chapter 28 § 1271-1287)
[6]Number of unnamed creeks are given per designation category

Table 37. Lakes and Wetlands with Special Designation or Identified as having High Conservation Value within the Wascott – Eau Claire River Barrens LCA.

Name	OERW[1]	NHI[2]	Wild Lake[3]	Wild Rice[4]	Class I Trout[5]	Walleye[6]	Muskellunge[7]
Bardon Lake	x	x				x	
Bass Lake						x	
Beauregard Lake						x	
Beglinger Lake		x					
Bond Lake	x	x					
Chain Lakes		x					
Clear Lake		x				x	
Cranberry Spring					x		
Crotty Lake		x					

Name	OERW[1]	NHI[2]	Wild Lake[3]	Wild Rice[4]	Class I Trout[5]	Walleye[6]	Muskellunge[7]
Crystal Lake		x					
Goose Lake		x					
Grover Lake		x					
Hopkins Lake		x					
Jack Pine Lake			x				
Leader Lake						x	
Loon Lake		x					
Lower Eau Claire Lake	x	x				x	x
Minong Flowage		x		x		x	
Muck Lake			x				
Mulligan Lake		x		x			
Person Lake		x					
Red Lake		x					
Round Lake		x					
Sauntry's Pocket Lake		x					
Sawyer Lake		x					
Snake Lake		x					
Two Mile Lake		x					
Upper Chain Lake			x				
Unnamed		4	1				

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Wisconsin DNR Class III Wild Lakes
[4]Wisconsin DNR Wild Rice Waters
[5]Wisconsin DNR Class I Trout Waters
[6]Wisconsin DNR natural reproducing Walleye Waters
[7]Wisconsin DNR natural reproducing Muskellunge Waters

Working Lands

Agriculture and Forestry Zoning: 90,053.9 acres (77.6 % of LCA)
- **Agriculture Zoning:** 2,224.2 acres (2.5 % of A1/F1 zoning)
- **Forestry Zoning:** 87,829.7 acres (97.5 % of A1/F1 zoning)

Prime farmlands and farmlands of statewide importance: 1,422.9 acres (1.2 % of LCA)
Forest Crop Law or Managed Forest Law: 40,064.1 acres (34.5 % of LCA)

Community Heritage

Recreation
- Canoe River Trials: 25.8 miles (Eau Claire and Totagatic Rivers)
- Wild and Scenic River: 4.7 miles (Totagatic River)
- Wild Rivers Trail: 6.5 miles
- Douglas County Multi-use Trails: 24.6 miles

Geology and Topography
- Beauregard Knolls
- Doetsch Road Hills
- Highland Lookout Tower Moraine
- Ounce River Ridges

Priority Conservation Areas

Number of Privately Owned Parcels: 6,496
Area of Privately Owned Parcels: 72,858.9 acres (62.8 % of LCA)
Mean Area of Privately Owned Parcels: 11.22 acres

Table 38. CV Classification Distribution among Privately Owned Parcels in the Wascott – Eau Claire River Barrens LCA.

CV Classification	Number of Parcels	Total Area	Percent	Mean Area
High	500	3,474.4	4.8	6.90
Medium High	3,001	27,679.2	38.0	9.20
Medium	2,256	30,345.2	41.6	13.45
Low	739	11,360.2	15.6	15.37
Total	6,496	72,859.0	100.0	11.22

[1]Priority Conservation Areas include those parcels with conservation value classes High and Medium High.
[2]Number and area of parcels apparently with conservation easements and/or being held for conservation purposes are indicated in parentheses.

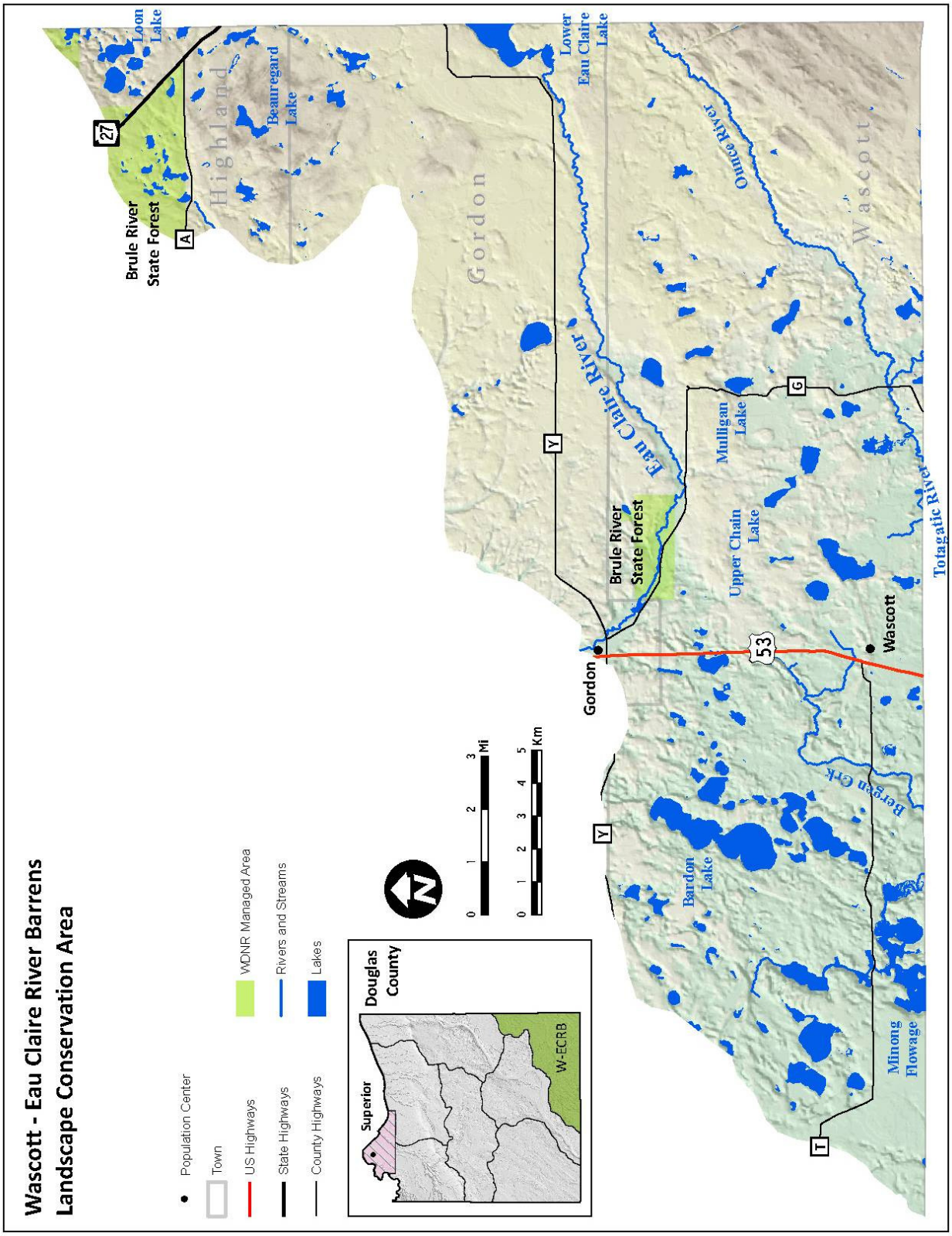


Figure 31. Wascott – Eau Claire River Barrens LCA.

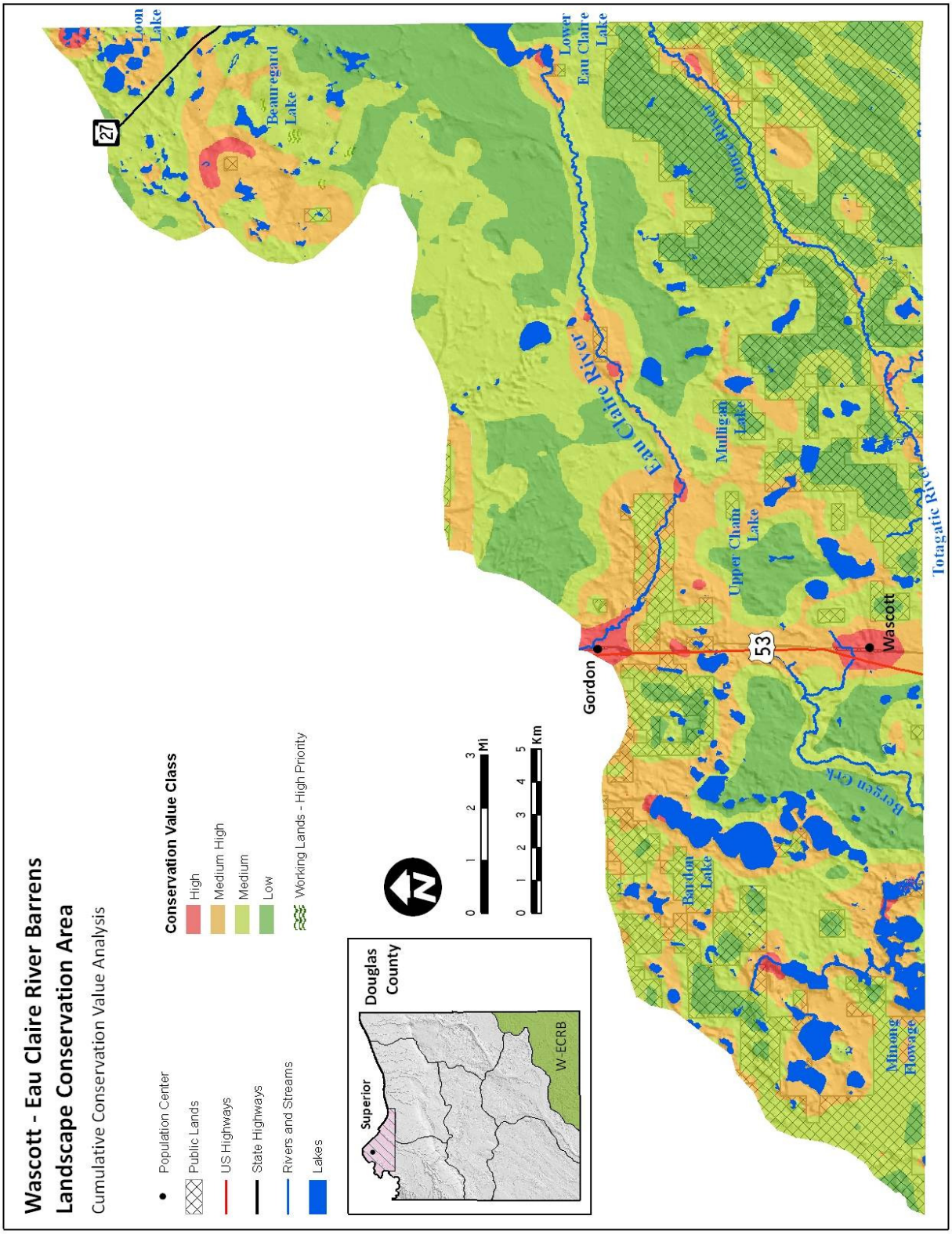


Figure 32. Wascott – Eau Claire River Barrens LCA Cumulative Conservation Value Analysis.

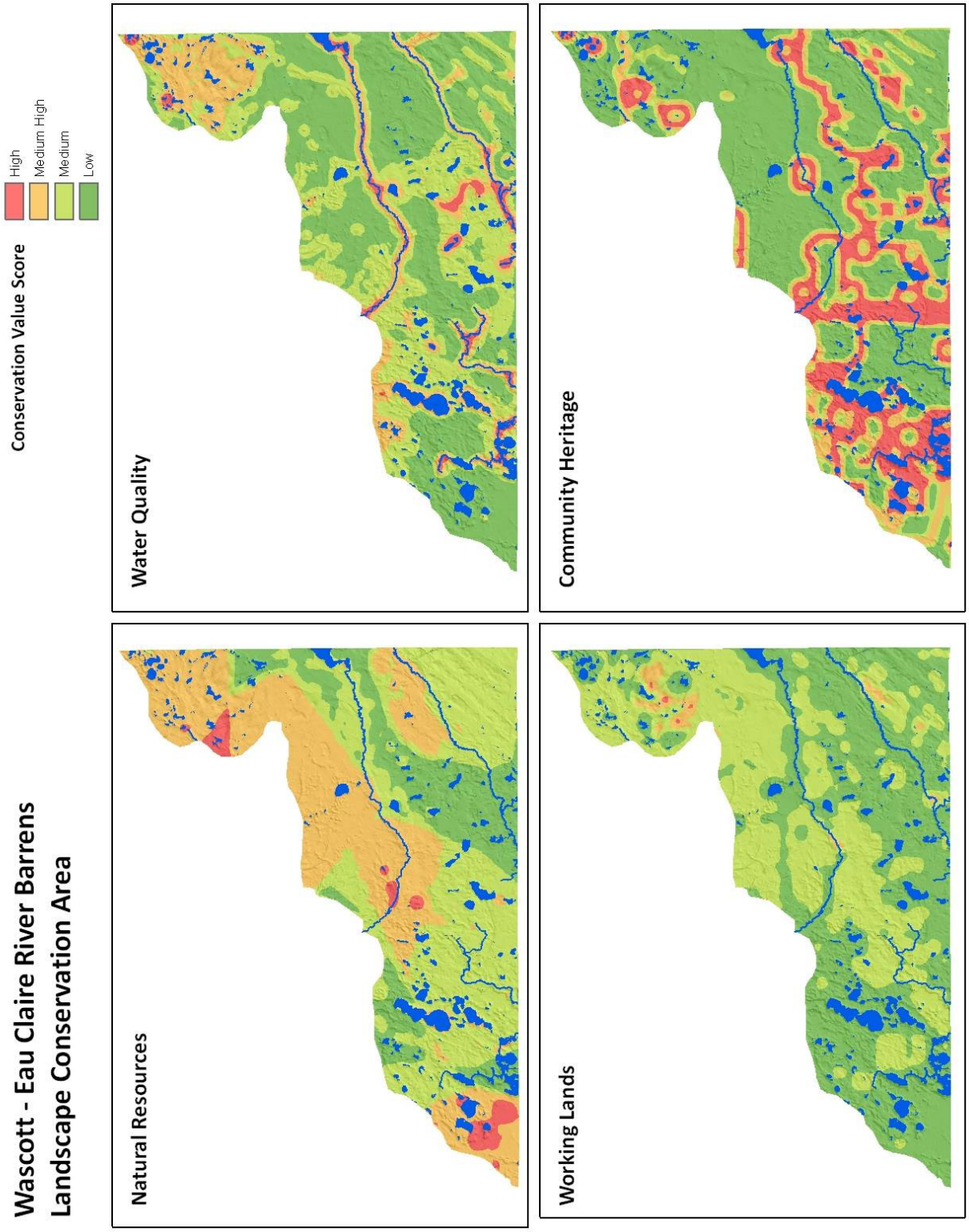


Figure 33. Wascott – Eau Claire River Barrens LCA Conservation Themes Conservation Value Analysis.

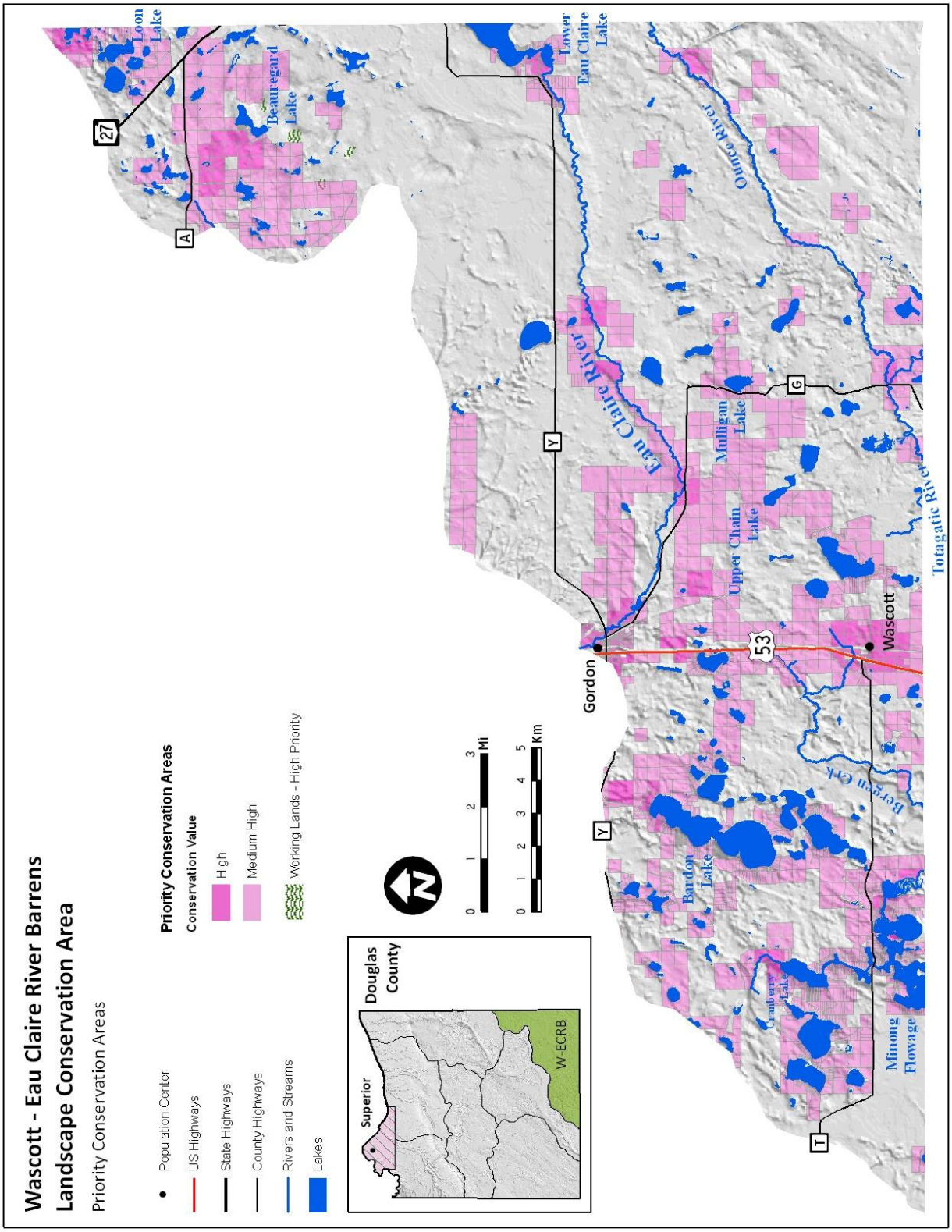
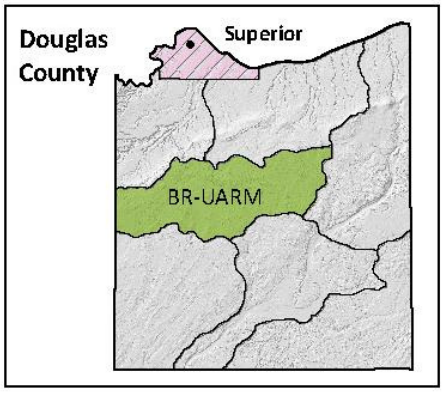


Figure 34. Wascott – Eau Claire River Barrens LCA Priority Conservation Areas.

BLACK RIVER - UPPER AMNICON RIVER MORAINES

LCA Description



The Black River – Upper Amnicon River Moraines LCA (BR-UARM LCA) is located in the central portion of Douglas County primarily within the Towns of Summit, Oakland, Hawthorne, and Bennett (Figure 35). The LCA comprises nearly 14 % of Douglas County, and over 49 % is owned and managed as public lands primarily by the county's Forestry Department. The communities of Hawthorne and Bennett contribute to the moderate population of this LCA in relation to the rest of Douglas County. Like much of Douglas County, forestry is the primary land use type.

The BR–UARM LCA primarily is situated within the Northwest Lowlands Ecological Landscape, although the LCA also encompasses several small inclusions of the Superior Coastal Plain and Northwest Sands Ecological Landscapes and their constituent Landtype Associations. The Pattison and Dairyland Moraines are the predominant Landtype Associations and are characterized by an undulating topography formed by extensive ground and end moraines. Perennial and intermittent streams and lakes are common and swamps and bogs are abundant in poorly drained lowland areas. The predominant soils are well-drained sandy loams. In this heavily forested LCA, the most common habitat types are Mixed Deciduous/Coniferous Forest, Aspen, and Lowlands Shrub. Three high priority natural communities (particularly Boreal Forest) occur in and around the lowland bogs of the Amnicon River headwaters.

Conservation Value Analysis

The Conservation Value Scored Analysis ranked the BR-UARM LCA fifth overall (Table 39). Relatively low scores for Natural Resources and Water Quality contributed significantly to the overall ranking (Figure 36 and 37; Table 39). Working Lands are extensive in the northern part of the LCA. Nearly 24 % of the LCA was classified as having High or Medium High conservation value (Table 40).

The BR-UARM LCA is moderately diverse across conservation themes. Notably, the LCA's peatlands and bogs have been identified as having significant conservation value by several other conservation efforts (Table 41). According to the Natural Heritage Inventory, 22 plant and animal species (with S1-S3 and/or G1-G3 ranking) have been recorded in the LCA since 1970 (Table 42; Appendix E). Twelve species have been identified as Species of Greatest Conservation Need by the Wisconsin Wildlife Action Plan (WDNR 2005), the majority of which are insects although several charismatic species (i.e., gray wolf and American marten) also are worthy of mention.

The western third of the LCA occurs in the Black and Upper Nemadji River watershed with most of the remaining LCA occupied by the Amnicon and Middle River watershed. The LCA contains over 182 miles of perennial rivers and streams of which more than 55 % are designated Outstanding or Excellent Resource Waters and approximately 6 % are

designated Class I Trout Waters by WDNR. At least 17 streams and nine lakes and/or wetlands have been recognized as having significant conservation value including one Class 3 Wild Lake (Table 43 and 44).

In addition to its natural resources and water quality, the LCA also is valued for agriculture and forestry. The vast majority of the LCA (› 84 %) currently is zoned by Douglas County for either agricultural or forestry. Less than 6 % of the LCA's soils have been classified as prime or statewide important soils for agriculture by the NRCS and forestry is the predominant land use in these areas.

The relatively large amount of area within a ½ mile of public lands and the many miles of recreational trails contribute heavily to the community heritage resource values of the LCA. Over 19 miles of the North Country National Scenic Trail add to the scenic and passive recreational opportunities present in the LCA. Along with a short portion of the Douglas Fault, the various hills and ridges interspersed among the swampy lowlands add to the topographic diversity of the LCA and enhance the scenic quality of the relatively undeveloped surrounding lands.

Population and Land Use Trends

Relative to the county's projected population growth of 24 %, the municipalities in the LCA are expected to see similar increases. Oakland is expected to experience population increases above the county's average while Summit is projected to grow below the county's average.

All municipalities have experienced increases in the number parcels zoned for residential land use. Almost all municipalities decreased in the number of agricultural use parcels and all municipalities decreased in the acreage of agricultural lands. The number of forested parcels increased in most municipalities although decreases in the number of parcels and acreage of forest lands occurred in some towns including Oakland. Although Summit and Oakland have some of the most forested lands in the LCA, both experienced a drop in the acreage of forest lands. Commercial land use either increased or remained relatively constant throughout the municipalities, although a slight decrease in the acreage of commercial lands was noted in a few of the towns.

Threats and Opportunities

Conflicting land use practices are the primary threats affecting the BR-UARM LCA. Land use conversions include increasing development in rural areas, especially along lake and stream shorelines, and fragmentation of forest landscapes for recreation and residential development. The subdivision of land into increasingly smaller parcels and changes in land ownership lead to different land management techniques among parcels, often resulting in loss of critical habitat. Habitat fragmentation frequently leads to loss of species diversity and contributes to the spread of invasive species. Incompatible land use practices, including current agricultural practices, are a threat to water quality and may result in increased concentration of flows, increased peak runoff problems, and may restrict movement and migration of aquatic species. Ranked among the lowest in cumulative conservation value, less than 7 % of privately owned lands in the LCA fall within the High conservation value class (Table 45).

Development threatens swamps and undeveloped bogs specific to this LCA as well as important rivers, headwaters and tributaries. Several lakes and many large rivers are susceptible to continued development as many seasonal residences are converted to permanent residences and construction of new homes increases. Development resulting in increased impervious surface area throughout the watershed, or changes to the natural flow of aquatic systems, results in increased pollution and water quality impairment, and contributes to groundwater contamination. Improper development of shorelines often leads to erosion and sedimentation which affects water quality and biodiversity. Disturbance from development and changes in land use practices also promotes the spread of non-native invasive species and threatens overall species.

Many of the LCA's high conservation value resources currently are owned by Douglas County and managed as public lands. Nevertheless, over 23,000 acres were classified as Priority Conservation Areas (PCAs) based on their high cumulative conservation value scores (Table 45). Several PCAs have been identified in the LCA where opportunities for future conservation projects exist (Figure 38). Within the BR-UARM LCA, opportunities for proactive land protection in the form of conservation easements are present. **Areas of focused conservation attention where proactive land protection should be pursued include the riparian corridors along the Amnicon River, Black River, Middle River, and Balsam Creek headwaters (Big Balsam Creek)**. The lowland bogs and tributaries that feed these river systems have been identified by other conservation efforts as having high value for natural resources such as trout and bird species. In addition, these streams contribute greatly to the water quality of this and several other LCAs. Many of these focus areas are adjacent to public lands and several encompass agricultural lands that contribute to the regions rural-based working lands heritage. Several of the streams are classified as Trout Streams and WDNR Priority Streams and therefore potential partnership opportunities also exist. For a more detailed description of the focus areas, including potential partnership opportunities, refer to the Conservation Strategies section.

Supporting Data

Conservation Value (CV) Scored Analysis

Table 39. Results of Cumulative and Conservation Theme CV Scored Analysis in the Black River – Upper Amnicon River Moraines LCA.

Conservation Theme	Mean Score (Rank)	Maximum Score (Rank)
Cumulative CV	8.36 (5)	28.05 (6)
Natural Resources	9.25 (6)	50.21 (4)
Water Quality	6.65 (5)	30.52 (6)
Working Lands	14.82 (6)	70.07 (3)
Community Heritage	9.11 (4)	58.47 (5)

Table 40. Areal and Proportional Results of CV Classification in the Black River – Upper Amnicon River Moraines LCA.

Conservation Value Classes	Acres	Percent of LCA
High	2,910.02	2.4
Medium High	25,547.02	21.5
Medium	47,495.54	40.0
Low	42,845.80	36.07

General Information

Total Area: 118,798.4 acres
Percentage of Douglas County: 13.8 %
Public Lands Acreage: 58,412.7 acres (49.2 % of LCA)

Municipalities (*Towns unless otherwise indicated*)

- Summit*
- Oakland*
- Hawthorne
- Bennett
- Gordon
- Superior
- Solon Spring
- Amnicon

* Asterisk denotes municipality/ies that contribute > 50 % of LCA acreage.

Communities

- Hawthorne
- Bennett

Natural Resources

Ecological Landscapes

- Northwest Lowlands*
- Northwest Sands
- Superior Coastal Plain

Landtype Associations

- Pattison Moraines*
- Dairyland Moraines
- Oula Washed Moraine
- Carlton Plains
- Douglas Lake-Modified Till Plain

* Asterisk denotes landscape/s and landtype/s that contribute > 50 % of LCA acreage

Table 41. Areas Identified or Designated for Conservation Purposes by other Conservation Efforts within the Black River – Upper Amnicon River Moraines LCA.

Conservation Effort	Site Name
WDNR State Natural Areas	• Erickson Creek Forest and Wetlands
WDNR Conservation Opportunity Areas	• Northwest Lowland Bogs • Blueberry Swamp (minimal)
WBCI Important Bird Areas	• Moose Junction Peatlands
WDNR Land Legacy Places	• Manitou Falls-Black River (substantial portion of Black River) • Empire and Belden Swamp (minimal)
Douglas County Critical Scenic Areas	• Bear Lake Park • Bennett Firetower Area • Lyman Lake Park • Stream valleys that drain red clay basin
LSBF Important Habitat Sites/Areas	• Brule River Watershed (minimal)

Natural Heritage Inventory (NHI) Element Occurrences List

NHI G1 Elements: 0
NHI S1 Elements: 3
NHI G2 – G3 Elements: 1
NHI S1 – S3 Elements: 22
NHI Natural Communities: 3
Species of Greatest Conservation Need: 12

Table 42. NHI Element Occurrences, Rankings and Designations of Natural Communities and Plant and Wildlife Species within the Black River – Upper Amnicon River Moraines LCA.

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Community	Black Spruce Swamp	G5	S3	
	Boreal Forest	G3	S2	
	Northern Dry-mesic Forest	G4	S3	
Bird	Connecticut Warbler	G4	S2	Y
	Black River Tributary Wetland Bird Rookery	G5	SU	
Mammal	American Marten	G5	S3	Y
	Gray Wolf	G4	S2	Y
Herpetafauna	Wood Turtle	G4	S2	Y
Beetle	Predaceous Diving Beetle (*Agabus bicolor*)	GNR	S3	Y
	Predaceous Diving Beetle (*Hydroporus vittatus*)	GNR	S3	Y
	Tiger Beetle (*Cicindela patruela patruela*)	G3	S2	Y
Butterfly	Arctic Fritillary	G5	S1	Y
	Bog Fritillary	G5	S3	N
	Dorcas Copper	G5	S1	N
	Freija Fritillary	G5	S2	Y
	Red-disked Alpine	G5	S2	Y
Dragonfly	Aurora Damselfly	G5	S3	N
	Forcipate Emerald	G5	S2	Y
	Lake Darner	G5	S3	N
	Subarctic Darner	G5	S1	Y
Plant	Northern Bur-reed	G4	S2	
	Russet Cotton-grass	G5	S2	
	Small Yellow Water Crowfoot	G5	S2	
	Sparse-flowered Sedge	G5	S3	
	Tea-leaved Willow	G5	S2	
	Vasey Rush	G5	S3	

[1]Global Rank includes species that are: (G1) critically imperiled globally; (G2) imperiled globally; (G3) very rare and local throughout range; (G4) apparently globally secure though rare in parts; (G5) demonstrably secure globally though rare in parts; and (GNR) not ranked (WDNR 2010).
[2]State Rank includes species that are: (S1) critically imperiled in Wisconsin; (S2) imperiled in Wisconsin; (S3) rare or uncommon in Wisconsin; and (SU) possibly in peril in Wisconsin but status uncertain (WDNR 2010).
[3]Species of Greatest Conservation Need (SGCN) only applies to animal species (WDNR 2009a).

Water Quality and Hydrologic Features

Perennial Rivers and Streams: 182.7 miles
Outstanding and Excellent Resource Waters: 100.9 miles
Class 1 Trout Rivers and Streams: 11.0 miles
Lakes and other water bodies: 1,345.6 acres (1.1 % of LCA)
Intermittent Streams: 36.4 miles
Soils Highly Susceptible to Ground Contamination: 28,028.5 acres (23.6 % of LCA)

WDNR Watersheds

- Amnicon and Middle Rivers*
- Black and Upper Nemadji River
- Bois Brule River
- St. Croix and Eau Claire Rivers
- St. Louis and Lower Nemadji River
- Upper St. Croix and Eau Claire Rivers

* Asterisk denotes watershed/s that contribute > 50 % of LCA acreage

Table 43. Rivers and Streams with Special Designation or Identified as having High Conservation Value within the Black River – Upper Amnicon River Moraines LCA.

Name	OERW[1]	NHI[2]	Fish Spawning[3]	Class I Trout[4]	Priority Wetlands[5]
Amnicon River	x	x	x		x
Balsam Creek					x
Bear Creek		x			x
Big Balsam Creek	x			x	
Black River		x			x
Copper Creek					x
Cranberry Creek				x	x
Ericson Creek		x			x
Little Amnicon River					x
Little Balsam Creek	x			x	x
Middle River		x	x		x
Poplar River		x	x		x
Rock Creek	x			x	x
Silver Creek		x			x
Unnamed Creeks[6]		3			2

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Lake Superior Binational Forum Fish Spawning Waters
[4]Wisconsin DNR Class I Trout Waters
[5]Wisconsin DNR Priority Wetlands
[6]Number of unnamed creeks are given per designation category.

Table 44. Lakes and Wetlands with Special Designation or Identified as having High Conservation Value within the Black River – Upper Amnicon River Moraines LCA.

Name	NHI[1]	Priority Wetlands[2]	Wild Lake[3]	Wild Rice[4]	Walleye[5]	Muskellunge[6]
Amnicon Lake	x			x	x	x
Bear Lake					x	x
Breitzman Lake	x					
Dowling Lake					x	x
Lake Newman	x		x			
Lyman Lake						x
Mud Lake			x			
Mud Lake Bog		x				
One Buck Lake	x					

[1]Wisconsin DNR Natural Heritage Inventory Waters
[2]Lake Superior Binational Forum Fish Spawning Waters
[3]Wisconsin DNR Class III Wild Lakes
[4]Wisconsin DNR Class III Wild Rice Waters
[5]Wisconsin DNR natural reproducing Walleye Waters
[6]Wisconsin DNR natural reproducing Muskellunge Waters

Working Lands

Agriculture and Forestry Zoning: 100,653.7 acres (84.7 % of LCA)

- **Agriculture Zoning:** 16,636.9 acres (16.5 % of A1/F1 zoning)
- **Forestry Zoning:** 84,016.8 acres (83.5 % of A1/F1 zoning)

Prime farmlands and farmlands of statewide importance: 6,921.9 acres (5.8 % of LCA)
Forest Crop Law or Managed Forest Law: 5,807.9 acres (4.9 % of LCA)

Community Heritage

Recreation

- North Country National Scenic Trail: 19.3 miles
- Wild Rivers Trail : 7.4 miles
- Gandy Dancer Trail: 2.5 miles
- Douglas County Multi-use Trails: 55.2 miles

Geology and Topography

- Douglas Fault
- Superior Escarpment
- Balsam Creek Ridge
- Empire Creek Hill
- North Benner Road Hill
- Pattison Lookout Tower Hill
- Pikes Peak

Priority Conservation Areas

Number of Privately Owned Parcels: 3,713
Area of Privately Owned Parcels: 56,831.4 acres (47.8 % of LCA)
Mean Area of Privately Owned Parcels: 15.31 acres

Table 45. CV Classification Distribution among Privately Owned Parcels in the Black River – Upper Amnicon River Moraines LCA.

CV Classification[1]	Number of Parcels[2]	Total Area	Percent	Mean Area
High	455	3,898.0	6.9	8.57
Medium High	1230 (7)	19,573.8 (15.0)	34.4	15.91
Medium	1,083	15,254.9	26.8	14.09
Low	945	18,104.8	31.9	19.16
Total	3,713	56,831.5	100.0	15.31

[1]Priority Conservation Areas include those parcels with conservation value classes High and Medium High.
[2]Number and area of parcels apparently with conservation easements and/or being held for conservation purposes are indicated in parentheses.

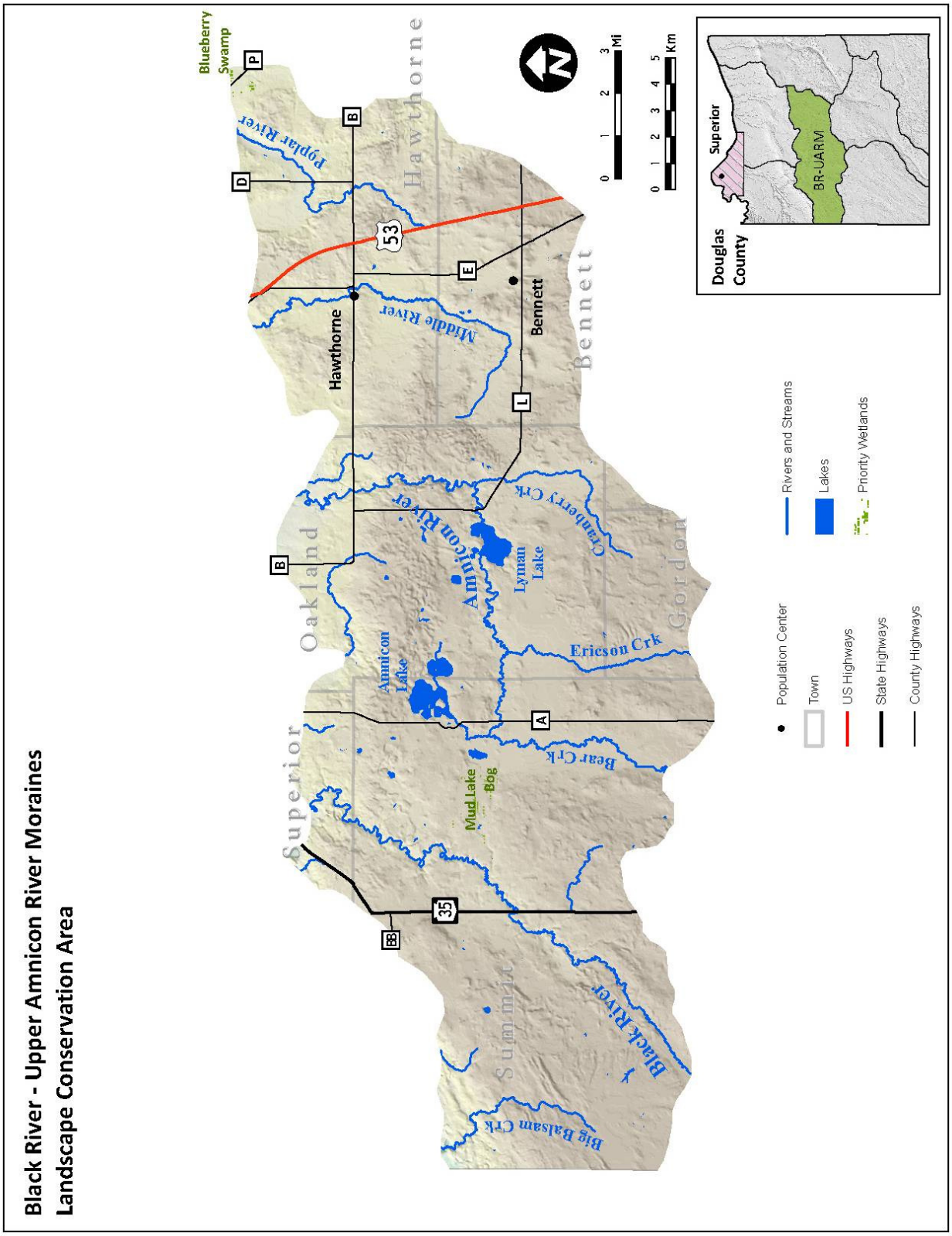


Figure 35. Black River – Upper Amnicon River Moraines LCA.

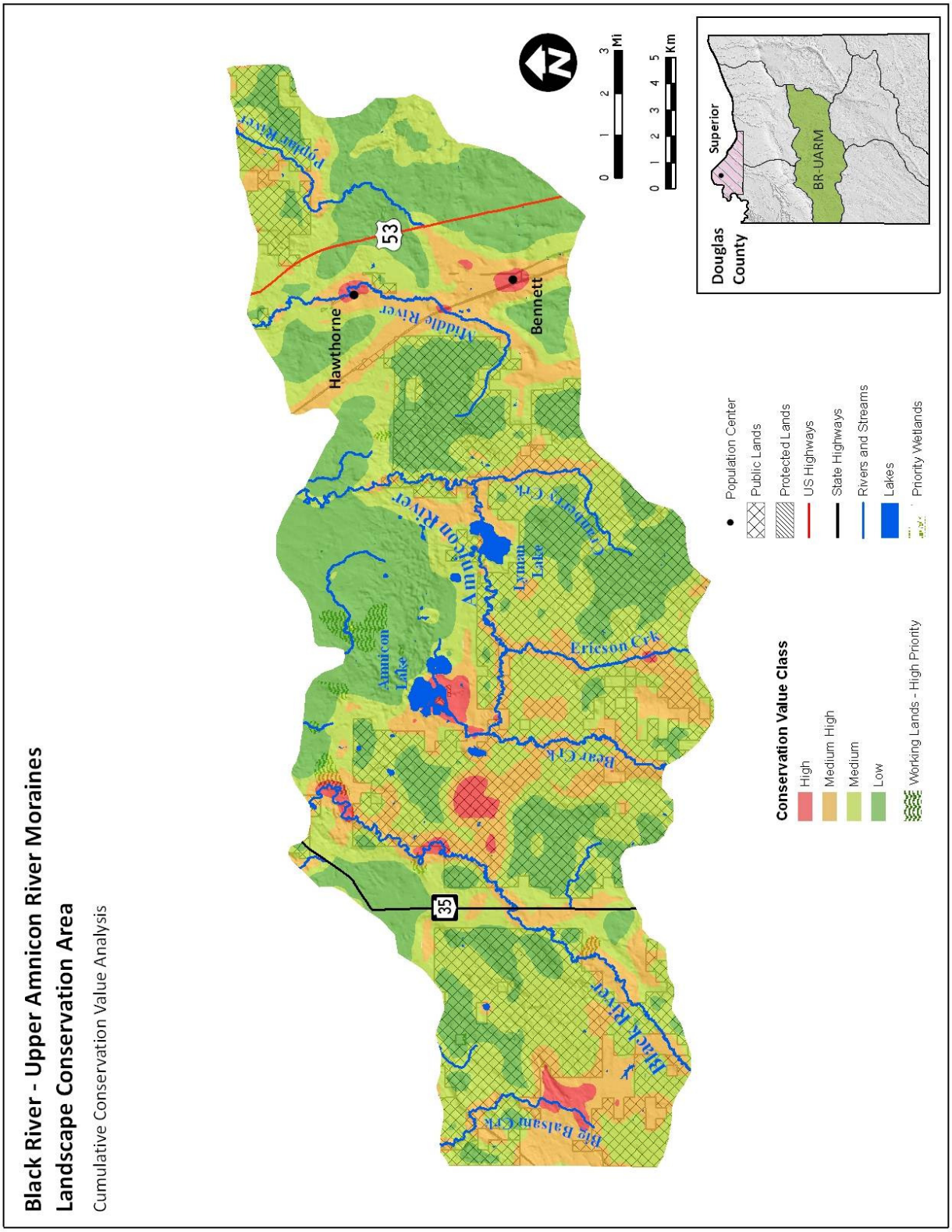


Figure 36. Black River – Upper Amnicon River Moraines LCA Cumulative Conservation Value Analysis.

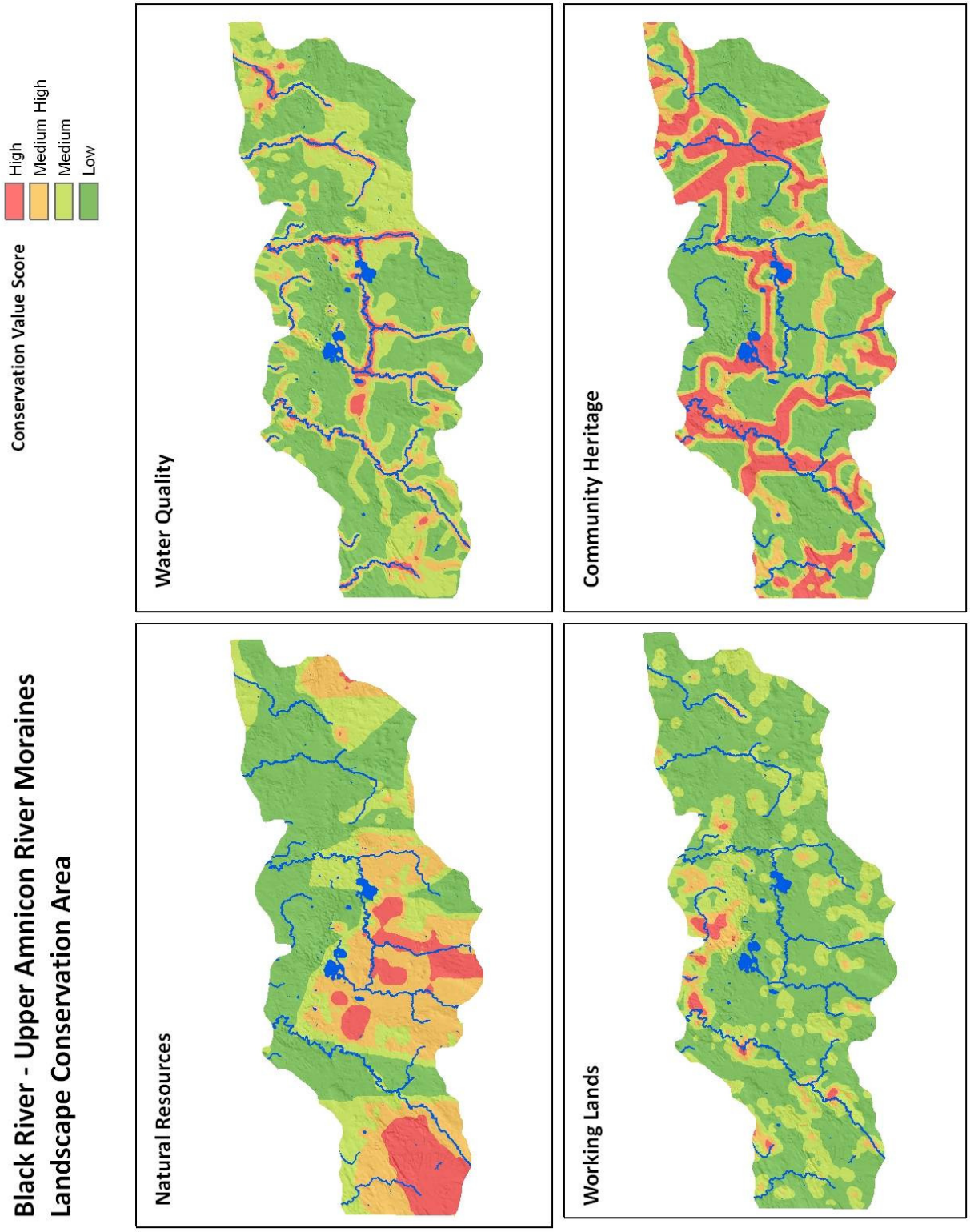


Figure 37. Black River – Upper Amnicon River Moraines LCA Conservation Themes Conservation Value Analysis.

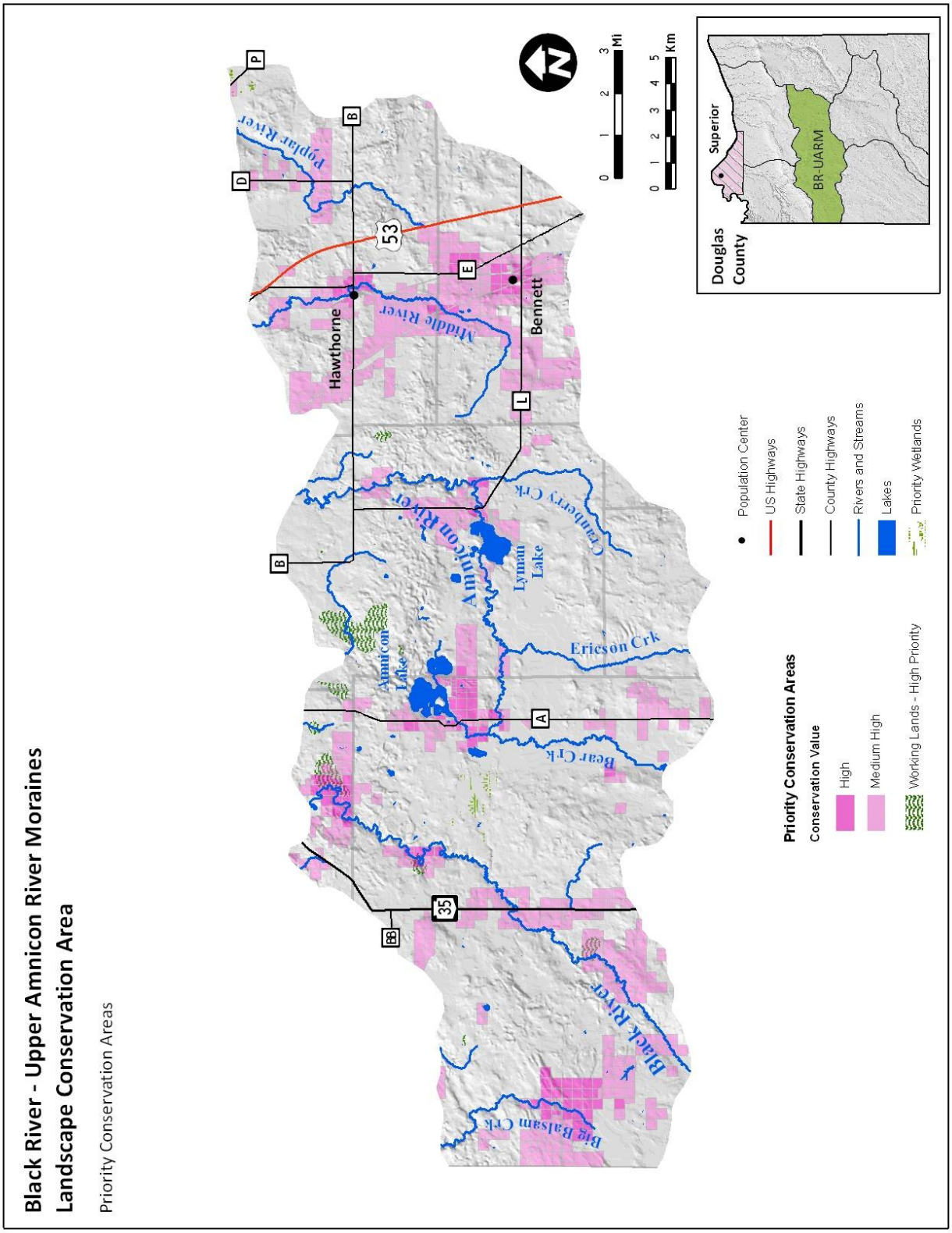
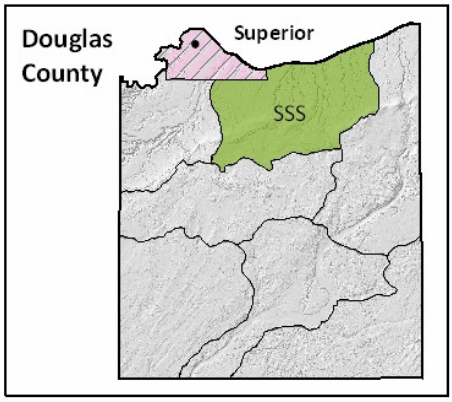


Figure 38. Black River – Upper Amnicon River Moraines LCA Priority Conservation Areas.

SOUTH SHORE STREAMS



LCA Description

The South Shore Streams LCA (SSS LCA) is located in the north-central portion of Douglas County encompassing the entire Town of Lakeside, and most of Amnicon, Parkland, Maple, and the Village of Poplar (Figure 39). The LCA comprises 14 % of Douglas County and has the least amount of public lands (3.3 %). The most populous of the LCAs, the communities of South Range, Polar, Wentworth, and Maple contribute substantially to the high populations in relation to the other LCAs. Agriculture is by far the primary land use type in the LCA and in this aspect is rivaled only by the St. Louis – Nemadji Rivers and Wetlands LCA.

The SSS LCA is situated almost entirely within the Superior Coastal Plain Ecological Landscape. The Douglas Lake-Modified Till Plain and Carlton Plains are the predominant Landtype Associations and the LCA is bounded by the Superior Escarpment to the south and Lake Superior to the north. Like the St. Louis – Nemadji Rivers and Wetlands LCA, climate is influenced greatly by Lake Superior resulting in cooler summers, warmer winters, and relatively greater precipitation compared to inland areas. The shoreline is greatly impacted by wind and water disturbance, resulting in unique landform and vegetation characteristics like eroding scarps, sandy beaches, and sand dunes. Although the topography gently slopes to the north, abundant perennial and intermittent streams dissect the landscape causing deep V-shaped ravines and highly erodible stream banks. The soils are uniformly lacustrine (formed by deposits from extinct lakes), contain high clay content, and are poorly drained. The once heavily forested LCA has been fragmented by agricultural use and now much of the land is open. The most common habitat types are Grassland, Aspen, and Mixed Deciduous/Coniferous Forest. One high priority natural community (Boreal Forest) occurs at the mouth of Pearson Creek on Lake Superior.

Conservation Value Analysis

The Conservation Value Analysis ranked the SSS LCA sixth overall (Table 46) and working Lands are extensive in this LCA and contributed to the highest rank in this conservation theme among LCAs. Over 17 % of the LCA was classified as having High or Medium High conservation value (Table 47).

The abundant rivers, streams and coastal wetlands in the SSS LCA provide habitats for many plant and wildlife species. The major rivers and creeks that traverse the LCA on their way to Lake Superior provide excellent fish spawning habitat for a variety of species and have been identified as having significant conservation value by several other conservation efforts (Table 48). According to the Natural Heritage Inventory, 19 plant and animal species (with S1-S3 and/or G1-G3 ranking) have been recorded in the LCA since 1970 (Table 49; Appendix E). Nine species have been identified as Species of

Greatest Conservation Need by the Wisconsin Wildlife Action Plan (WDNR 2005) and include the gray wolf and the Boreal Top, a rare snail.

The LCA occurs predominantly in the Amnicon and Middle Rivers watershed with a substantial portion of the St. Louis and Lower Nemadji River watershed in the western portion of the area. The LCA contains over 320 miles of perennial rivers and streams of which less than 10 % are designated Outstanding or Excellent Resource Waters and approximately 2 % as Class I Trout Waters. At least 18 streams have been recognized as having significant conservation value (Table 50).

In addition to its abundant hydrologic features, the LCA is valued for its suitability for agriculture and forestry. Over 79 % of the LCA currently is zoned by Douglas County for either agricultural or forestry working lands. Lands within the LCA area well suited for agriculture and almost 56 % of the LCA's soils have been classified as prime or statewide important soils for agriculture by the NRCS. Nevertheless, forestry is also a dominant land use in the LCA.

The many miles of recreational trails and Amnicon Falls State Park contribute heavily to the community heritage resource values of the LCA. Due to the limited amount of public lands, multi-use Douglas County trails are the predominant recreational opportunity present in the LCA. The Douglas Fault and the associated Superior Escarpment hills and ridges figure prominently in the southern portion of the LCA. In addition, Upper and Lower Amnicon and Snake Pit Falls cascade over the fault contribute to the unique scenic qualities present in the LCA. A testament to the rich cultural heritage of the area, the historical Davidson Windmill is a well-known and prominent landmark found on the Lake Superior Circle Tour Route.

Population and Land Use Trends

Relative to the county's projected population growth of 24 % most unincorporated municipalities in the LCA are expected to see similar increases. Lakeside and Amnicon have observed population increases since the 1950s, and are projected to increase at rates similar to the county's average in years to come. Parkland has observed a decline in population over the past 50 years and is expected to see further population decline into the future.

Most municipalities have experienced increases in the number parcels zoned for residential land use; however, the number of residential parcels and total acreage of residential lands have decreased in Parkland. All municipalities observed a decrease in the number of agricultural use parcels and total acreage of agricultural lands. The number of forested parcels increased in most municipalities although decreases in the number of parcels and acreage of forested lands occurred in some towns including Amnicon. Commercial land use either increased or remained relatively constant throughout the municipalities, although a slight decrease in the acreage of commercial lands was noted for the town of Amnicon.

Threats and Opportunities

Conflicting land use practices account for the primary threats affecting the SSS LCA. Land use conversions include increasing development in rural areas, especially along lake

and stream shorelines, and loss and/or fragmentation of agriculture and forest landscapes for recreation and residential development. The subdivision of land into increasingly smaller parcels and changes in land ownership lead to different land management techniques among parcels, often resulting in loss of critical habitat. Habitat fragmentation frequently leads to loss of species diversity and contributes to the spread of invasive species. Incompatible land use practices, including current agricultural practices, are a threat to water quality and may result in increased concentration of flows, increased peak runoff problems, and may restrict movement and migration of aquatic species. This LCA ranked near the bottom in cumulative conservation value, largely due to relatively low scores for most of the conservation themes; however, this LCA ranked first in the Working Lands category. Less than 6 % of the privately owned lands in the LCA fall within the High conservation value class (Table 51).

Within areas with high conservation value, development threatens important rivers and tributaries, wetlands, the Lake Superior shoreline, and working lands. Several lakes and many large rivers are susceptible to continued development as many seasonal residences are converted to permanent residences and construction of new homes increases. Development resulting in increased impervious surface area throughout the watershed, or changes to the natural flow of aquatic systems, results in increased pollution and impairs water quality, and contributes to groundwater contamination. Development impacts the highly erodible clay soils common in this LCA, causing erosion and sedimentation which affects water quality and biodiversity. Disturbance from development and changes in land use practices also promotes the spread of non-native invasive species, threatens overall species diversity, and compromises the health of the area's species and natural communities.

Other than Amnicon Falls State Park, the majority of the LCA's high conservation value areas are located on privately owned lands. Approximately 29,000 acres were classified as Priority Conservation Areas (PCAs) based on high cumulative conservation value scores (Table 51). Several PCAs are large and contiguous across the LCA (Figure 42). Within the SSS LCA, opportunities for proactive land protection in the form of conservation easements and working lands preservation are especially abundant. **Areas of focused conservation attention where proactive land protection should be pursued include the riparian corridors along the Amnicon River, Middle River, and Poplar River**. High Working Lands and Water Quality conservation value is reflected throughout this LCA and opportunities for working lands protection are present. For a more detailed description of the focus areas, including potential partnership opportunities, refer to the Conservation Strategies section.

Supporting Data

Conservation Value (CV) Scored Analysis

Table 46. Results of Cumulative and Conservation Theme CV Scored Analysis in the South Shore Streams LCA.

Conservation Theme	Mean Score (Rank)	Maximum Score (Rank)
Cumulative CV	7.29 (6)	26.68 (7)
Natural Resources	7.51 (7)	21.65 (7)
Water Quality	6.75 (4)	27.65 (7)
Working Lands	36.84 (1)	79.88 (1)
Community Heritage	7.63 (6)	49.93 (6)

Table 47. Areal and Proportional Results of CV Classification in the South Shore Streams LCA.

Conservation Value Classes	Acres	Percent of LCA
High	2,899.0	2.4
Medium High	18,130.7	15.1
Medium	39,016.9	32.5
Low	60,087.9	50.0

General Information

Total Area: 120,134.6 acres
Percentage of Douglas County: 14.0 %
Public Lands Acreage: 3,965.3 acres (3.3 % of LCA)

Municipalities (*Towns unless otherwise indicated*)

- Lakeside*
- Amnicon*
- Parkland*
- Oakland
- Maple
- Cloverland
- Village of Poplar
- Hawthorne
- Superior
- Brule

* Asterisk denotes municipality/ies that contribute > 50 % of LCA acreage.

Communities

- South Range
- Poplar
- Maple
- Wentworth
- Hines

Natural Resources

Ecological Landscapes

- Superior Coastal Plain*
- Northwest Lowlands
- Northwest Sands

Landtype Associations

- Douglas Lake-Modified Till Plain*
- Carlton Plains
- Pattison Moraines
- Oula Washed Moraine

* Asterisk denotes landscape/s and landtype/s that contribute > 50 % of LCA acreage

Table 48. Areas Identified or Designated for Conservation Purposes by other Conservation Efforts within the South Shore Streams LCA.

Conservation Effort	Site Name
WDNR State Natural Areas	• Bear Beach
WDNR Conservation Opportunity Areas	• Blueberry Swamp (minimal) • Brule Boreal Forest • Lake Superior Grasslands • Pokegama – Nemadji Wetlands
WDNR Land Legacy Places	• Highway 2 Grasslands • Middle River Contact
Douglas County Critical Scenic Areas	• Amnicon Falls • Estuaries – Poplar and Middle Rivers • Highway 13 – Amnicon and Miller Creeks • Lake Superior Shoreline • Panoramic views of Lake Superior • Stream valleys that drain red clay basin • View from Lake Superior to the shoreline • View of Duluth Hills at night
LSBF Important Habitat Sites/Areas	• Amnicon River Estuary • Brule River Watershed (minimal) • Middle River Estuary • Pearson Creek Estuary • Poplar River Estuary • Small Estuaries

Natural Heritage Inventory (NHI) Element Occurrences List

NHI G1 Elements: 0
NHI S1 Elements: 2
NHI G2 – G3 Elements: 2
NHI S1 – S3 Elements: 18
NHI Natural Communities: 1
Species of Greatest Conservation Need: 9

Table 49. NHI Element Occurrences, Rankings and Designations of Natural Communities and Plant and Wildlife Species within the South Shore Streams LCA.

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Community	Boreal Forest	G3	S2	
Bird	Connecticut Warbler	G4	S2	Y
	Upland Sandpiper	G5	S2	Y
	Western Meadowlark	G5	S2	Y
Mammal	Gray Wolf	G4	S2	Y
Herpetafauna	Wood Turtle	G4	S2	Y
Snail	Boreal Top	G5	S1	Y
Beetle	Predaceous Diving Beetle (*Hydroporus vittatus*)	GNR	S3	Y
	Beach-dune Tiger Beetle (*Cicindela hirticollis rhodensis*)	G5	S2	Y
Dragonfly	Aurora Damselfly	G5	S3	N
	Gloyd's Bluet	G4	S1	Y
Stonefly	Perlodid Stonefly (*Isoperla bilineata*)	G5	S2	N
	Perlodid Stonefly (*Isoperla marlynia*)	G5	S3	N
Plant	Arrow-leaved Sweet-coltsfoot	G5	S3	
	Fragrant Fern	G5	S3	
	Laurentian Bladder Fern	G3	S2	
	Northern Bur-reed	G4	S2	
	Showy Lady's-slipper	G4	S3	
	Slender Spike-rush	G4	S2	
	Vasey Rush	G5	S3	

[1]Global Rank includes species that are: (G1) critically imperiled globally; (G2) imperiled globally; (G3) very rare and local throughout range; (G4) apparently globally secure though rare in parts; (G5) demonstrably secure globally though rare in parts; and (GNR) not ranked (WDNR 2010).
[2]State Rank includes species that are: (S1) critically imperiled in Wisconsin; (S2) imperiled in Wisconsin; (S3) rare or uncommon in Wisconsin; and (SU) possibly in peril in Wisconsin but status uncertain (WDNR 2010).
[3]Species of Greatest Conservation Need (SGCN) only applies to animal species (WDNR 2009a).

Water Quality and Hydrologic Features

Perennial Rivers and Streams: 322.5 miles
Outstanding and Excellent Resource Waters: 31.0 miles
Class I Trout Rivers and Streams: 7.0 miles
Lakes and other water bodies: 432.7 acres (0.4 % of LCA)
Intermittent Streams: 249.8 miles
Soils Highly Susceptible to Ground Contamination: 984.2 acres (0.8 % of LCA)

WDNR Watersheds

- Amnicon and Middle Rivers*
- St. Louis and Lower Nemadji River
- Bois Brule River

* Asterisk denotes watershed/s that contribute > 50 % of LCA acreage

Table 50. Rivers and Streams with Special Designation or Identified as having High Conservation Value within the South Shore Streams LCA.

Name	OERW[1]	NHI[2]	Fish Spawning[3]	Class I Trout[4]	Muskellunge[5]	Priority Wetlands[6]
Amnicon River	x	x	x		x	x
Anderson Creek	x			x		x
Bardon Creek						x
Bear Creek		x				x
Bluff Creek		x				x
Crawford Creek						x
Dutchman Creek		x				
Hanson Creek		x				
Haukkala Creek						x
Little Amnicon River						x
Middle River		x	x			x
Pearson Creek		x				x
Poplar River		x	x			x
Silver Creek		x				x
Unnamed Creeks[7]		4				

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Lake Superior Binational Forum Fish Spawning Waters
[4]Wisconsin DNR Class I Trout Waters
[5]Wisconsin DNR natural reproducing Muskellunge Waters
[6]Wisconsin DNR Priority Wetlands
[7]Number of unnamed creeks are given per designation category

Working Lands

Agriculture and Forestry Zoning: 95,080.8 acres (79.1 % of LCA)

- **Agriculture Zoning:** 69,106.9 acres (72.7 % of A1/F1 zoning)
- **Forestry Zoning:** 25,973.9 acres (27.3 % of A1/F1 zoning)

Prime farmlands and farmlands of statewide importance: 67,113.9 acres (55.9 % of LCA)
Forest Crop Law or Managed Forest Law: 4,142.9 acres (3.4 % of LCA)

Community Heritage

Recreation

- Wild Rivers Trail: 10.0 miles
- Douglas County Multi-use Trails: 17.8 miles
- Lake Superior Circle Tour Route: 17.8 miles

Geology and Topography

- Douglas Fault
- Lake Superior Shoreline: 19.5 miles
- Lake Superior Eroding Scarps: 3.3 miles
- Superior Escarpment
- Bayfield Road Hill
- Flannagan Lookout Tower Ridge
- Little Amnicon River Ridge
- Moonshine Road Hill
- Rifle Range Hill

Waterfalls and Cascades

- Lower Amnicon Falls
- Snake Pit Falls
- Upper Amnicon Falls

Cultural and Historical Sites

- Davidson Windmill

Priority Conservation Areas

Number of Privately Owned Parcels: 11,485
Area of Privately Owned Parcels: 106,669.6 acres (88.8 % of LCA)
Mean Area of Privately Owned Parcels: 9.29 acres

Table 51. CV Classification Distribution among Privately Owned Parcels in the South Shore Streams LCA.

CV Classification	Number of Parcels	Total Area	Percent	Mean Area
High	310 (3)	5,513.3	5.2	17.78
Medium High	2,513 (5)	23,476.8	22.0	9.34
Medium	5,141	40,913.9	38.4	8.00
Low	3,521	36,765.6	34.5	10.44
Total	11,485	106,669.6	100.0	9.29

[1]Priority Conservation Areas include those parcels with conservation value classes High and Medium High.
[2]Number and area of parcels apparently with conservation easements and/or being held for conservation purposes are indicated in parentheses.

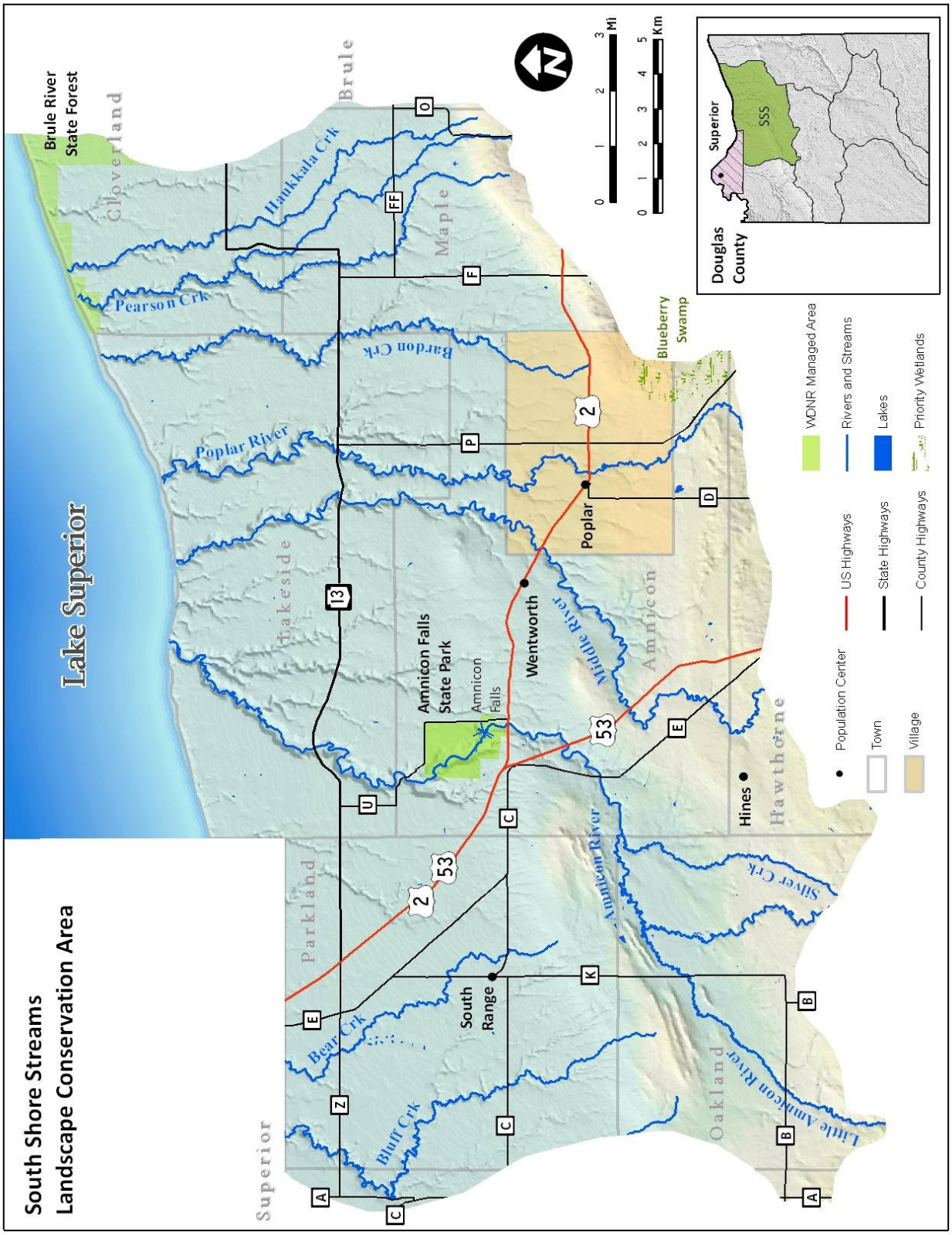


Figure 39. South Shore Streams LCA.

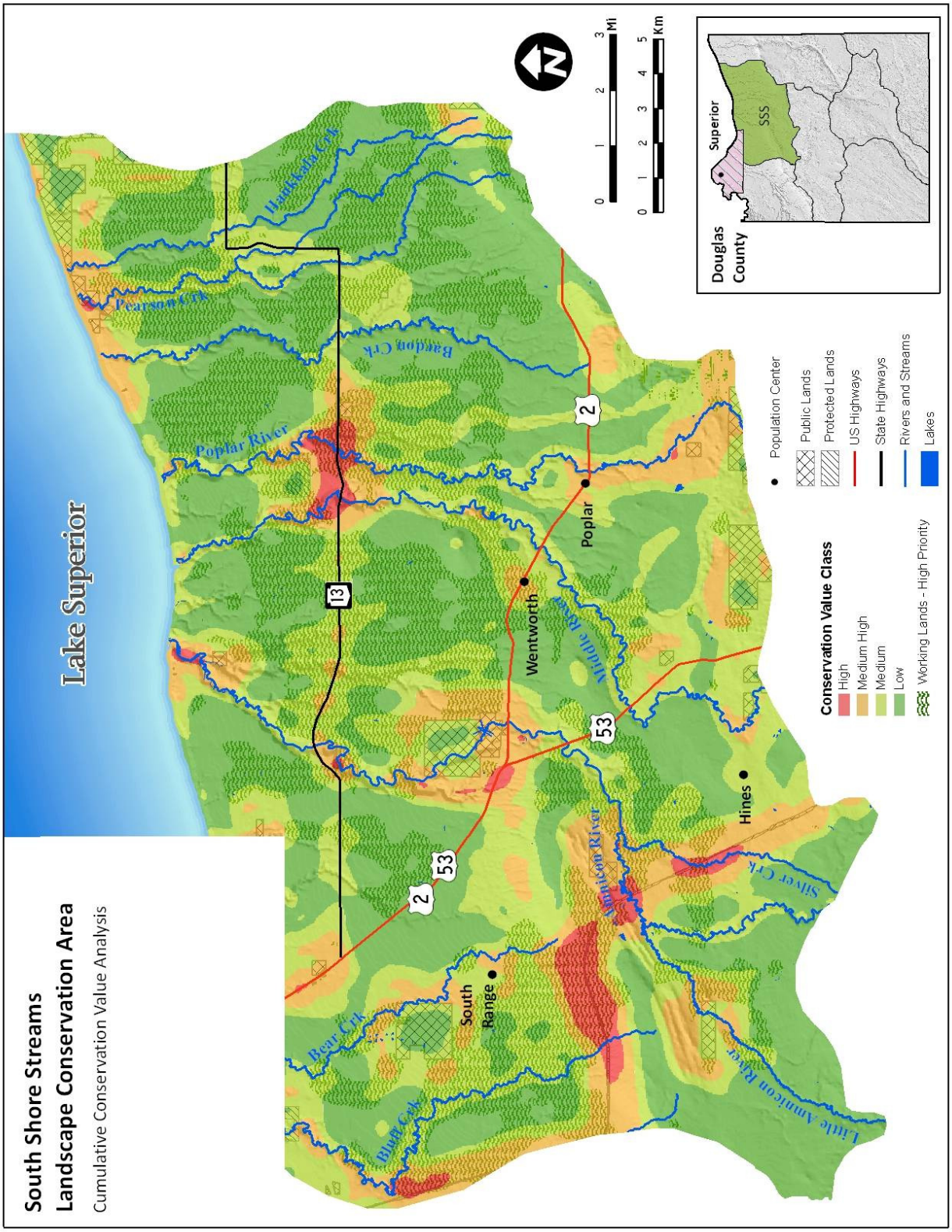


Figure 40. South Shore Streams LCA Cumulative Conservation Value Analysis.

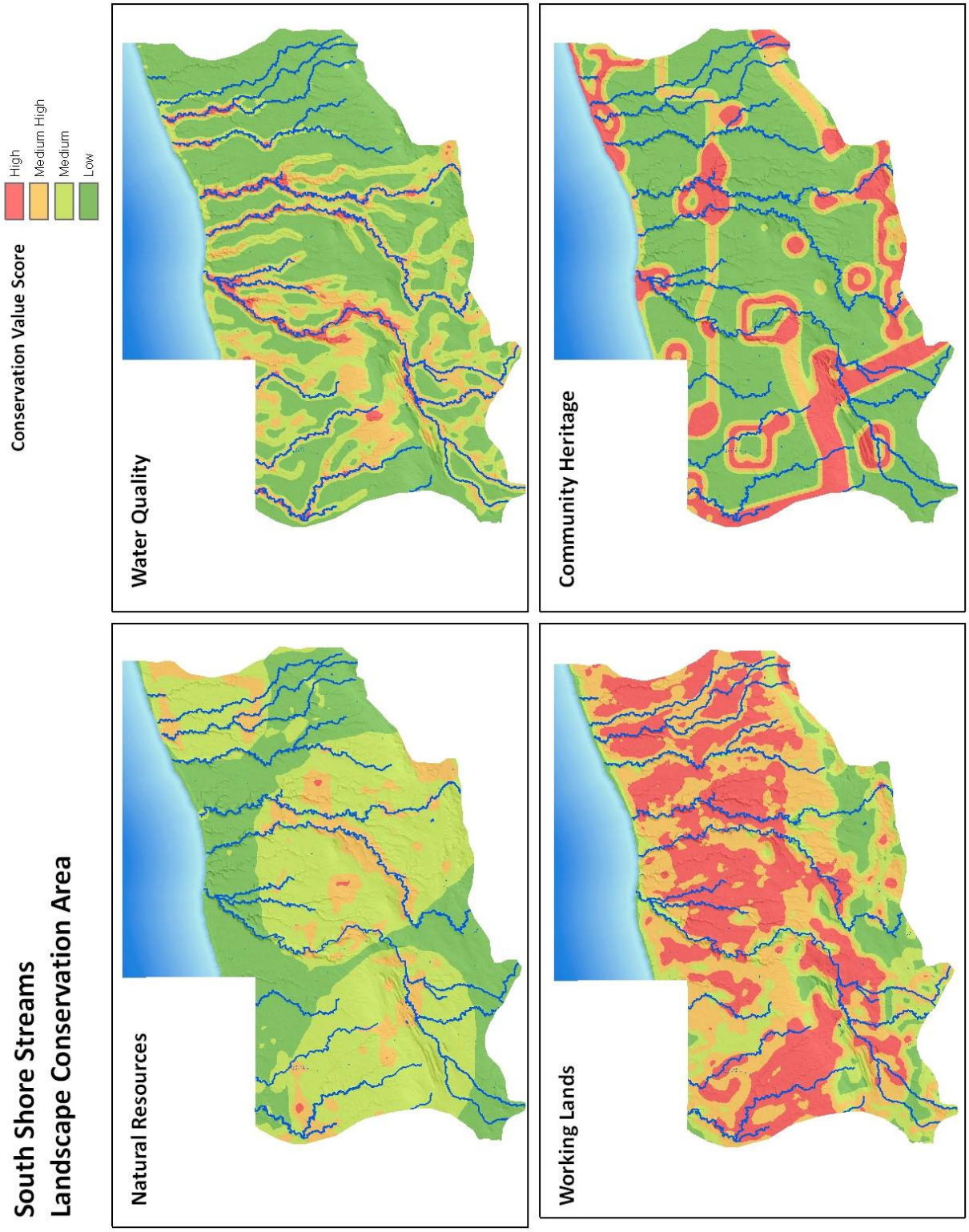


Figure 41. South Shore Streams LCA Conservation Themes Conservation Value Analysis.

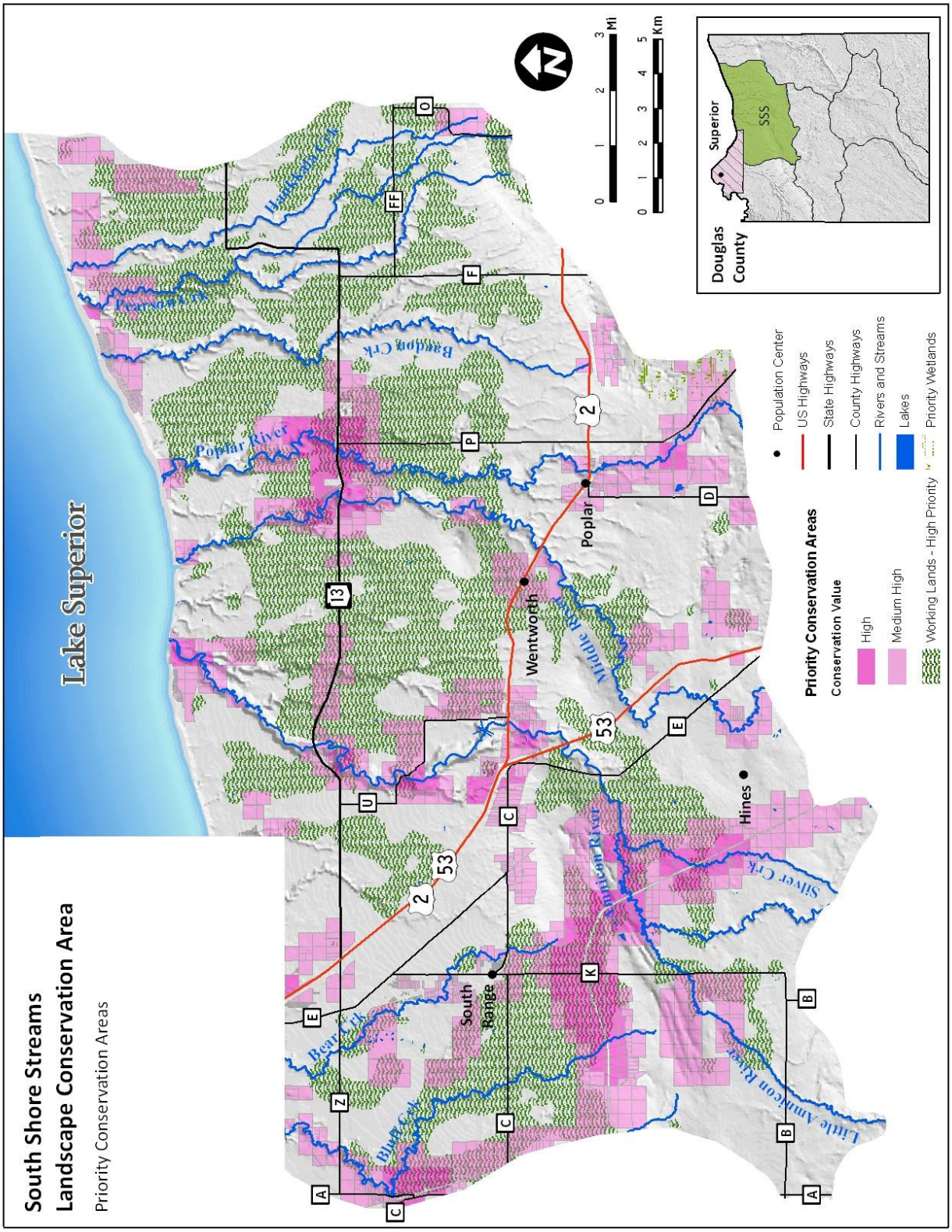
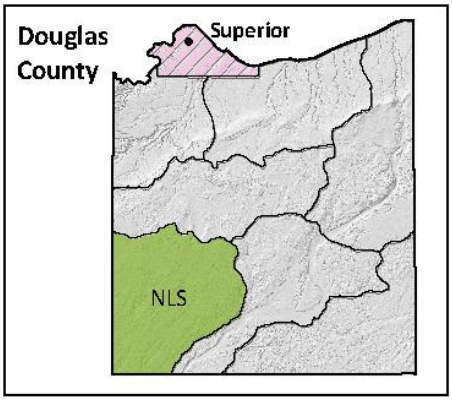


Figure 42. South Shore Streams LCA Priority Conservation Areas.

NORTHWEST LOWLAND SWAMPS



LCA Description

The Northwest Lowland Swamps LCA (NWLS LCA) is located in the southwestern portion of Douglas County primarily within the Towns of Dairyland, Summit, and Gordon (Figure 43). The LCA comprises nearly 16 % of Douglas County, and over 71 % is owned and managed as public lands primarily by the county's Forestry Department. Like much of Douglas County, forestry is the primary land use type.

The NWLS LCA is situated primarily within the Northwest Lowlands Ecological Landscape. The Dairyland and Pattison Moraines are the predominant Landtype Associations and are characterized by rolling collapsed and undulating moraines. Swamps and bogs are especially abundant in the poorly drained lowland areas that dominate the LCA. Soils are typically well-drained, sandy loams. In this swampy landscape, the most common habitat types are Mixed Deciduous/Coniferous Forest, Lowlands Shrub, Aspen, and Forested Wetlands. Four high priority natural communities (particularly Hardwood Swamp) occur in and around Black Lake Bog, and Belden and Empire Swamps.

Conservation Value Analysis

The Conservation Value Scored Analysis ranked the NWLS LCA seventh overall (Table 52). Over 9 % of the LCA was classified as having High or Medium High conservation value (Table 53).

The NWLS LCA has moderately diverse natural resources and abundant forestlands. Notably, the LCA's peatlands and bogs have been identified as having significant conservation value by several other conservation efforts (Table 54). According to the Natural Heritage Inventory, 20 plant and animal species (with S1-S3 and/or G1-G3 ranking) have been recorded in the LCA since 1970 (Table 55; Appendix E). Eleven species have been identified as Species of Greatest Conservation Need by the Wisconsin Wildlife Action Plan (WDNR 2005) and include the relatively rare American marten and Blanding's turtle.

The vast majority of the LCA occurs in the Upper Tamarack River watershed and includes over 162 miles of perennial rivers and streams of which 13.3 % are designated Outstanding or Excellent Resource Waters. At least 11 streams and six lakes and/or wetlands have been recognized as having significant conservation value (Table 56 and 57).

In addition to its natural resources, the LCA is valued for its suitability for forestry. The overwhelming majority of the LCA (> 93 %) currently is zoned by Douglas County for either agricultural or forestry. Less than 6 % of the LCA's soils have been classified as prime or statewide important soils for agriculture by the NRCS.

The many miles of recreational trails contribute heavily to the community heritage resources of the LCA. Although multi-use Douglas County trails predominate, more than 3 miles of the North Country National Scenic Trail add to the scenic and passive recreational opportunities present. The highest point in Douglas County, Summit Hill, is located within the LCA. A few other hills and ridges are interspersed among the swampy lowlands and add to the scenic quality of the mostly undeveloped surrounding lands.

Population and Land Use Trends

Relative to the county's projected population growth of 24 % most of the unincorporated municipalities in the LCA are expected to see increases with the notable exception of Dairyland. Since the 1950s, Dairyland has observed nearly a 50% decline in residents and its population is expected to decrease in the coming years.

All municipalities have experienced increases in the number of parcels and acreage of residential land and decreases in the number of agricultural use parcels and acreage. The number of forested parcels increased in most municipalities; yet, most experienced a decrease in the total acreage of forested lands. Commercial land use either increased or remained relatively constant throughout most of the municipalities in this LCA.

Threats and Opportunities

Conflicting land use practices is the primary threat affecting the NWLS LCA. Increasing development in rural areas, especially along lake and stream shorelines, and fragmentation of forest landscapes for recreation and residential development is occuring. The subdivision of land into increasingly smaller parcels and changes in land ownership result in differences in land management techniques and habitat loss. Habitat loss and fragmentation leads to reduced species diversity and contributes to the spread of invasive species. Incompatible land use practices, including some current agricultural practices, threaten water quality and may result in increased concentration of flows, and increased peak runoff problems.

Within areas of high conservation value, development threatens swamps and undeveloped bogs specific to this LCA as well as important headwaters and tributaries. Development resulting in increased impervious surface area throughout the watershed, or changes to the natural flow of aquatic systems, results in erosion and sedimentation, increased pollution, impaired water quality, and contributes to groundwater contamination, ultimately affecting biodiversity. Disturbance from development and changes in land use practices also promotes the spread of non-native invasive species. Continued development also threatens lands suitable for passive recreational activities and existing recreational corridors.

The majority of the LCA's areas of high conservation value currently are owned by Douglas County and managed as public lands. Over 9,000 acres were classified as Priority Conservation Areas (PCAs) based on their high cumulative conservation value scores (Table 58; Figure 46). A few PCAs and opportunities for future conservation projects exist, although most of the lowland bogs identified as having high conservation

value currently are protected as State Natural Areas. Overall though, conservation opportunities within the LCA are limited.

Supporting Data

Conservation Value (CV) Scored Analysis

Table 52. Results of Cumulative and Conservation Theme CV Scored Analysis in the Northwest Lowland Swamps LCA.

Conservation Theme	Mean Score (Rank)	Maximum Score (Rank)
Cumulative CV	6.93 (7)	29.53 (5)
Natural Resources	10.93 (3)	50.46 (3)
Water Quality	5.74 (7)	32.32 (5)
Working Lands	15.18 (4)	49.79 (6)
Community Heritage	4.09 (7)	43.00 (7)

Table 53. Areal and Proportional Results of CV Classification in the Northwest Lowland Swamps LCA.

Conservation Value Classes	Acres	Percent of LCA
High	2,157.7	1.6
Medium High	10,108.1	7.5
Medium	55,432.2	41.2
Low	67,000.0	49.7

General Information

Total Area: 134,697.9 acres
Percentage of Douglas County: 15.7 %
Public Lands Acreage: 95,793.6 acres (71.1 % of LCA)

Municipalities (*Towns unless otherwise indicated*)

- Dairyland*
- Summit
- Gordon
- Wascott

* Asterisk denotes municipality/ies that contribute > 50 % of LCA acreage.

Communities

- Cozy Corner
- Dairyland
- Moose Junction
- Chaffey

Natural Resources

Ecological Landscapes

- Northwest Lowlands*
- Northwest Sands

Landtype Associations

- Dairyland Moraines*
- Pattison Moraines
- St. Croix Plains
- Bayfield Level Barrens

* Asterisk denotes landscape/s and landtype/s that contribute > 50 % of LCA acreage

Table 54. Areas Identified or Designated for Conservation Purposes by other Conservation Efforts within the Northwest Lowland Swamps LCA.

Conservation Effort	Site Name
WDNR State Natural Areas	• Belden Swamp • Black Lake Bog • Empire Swamp
WDNR Conservation Opportunity Areas	• Northwest Lowlands Bogs
WBCI Important Bird Areas	• Moose Junction Peatlands
WDNR Land Legacy Places	• Chase Creek • Empire and Belden Swamp • Manitou Falls – Black River • Upper Tamarack and Spruce Rivers

Natural Heritage Inventory (NHI) Element Occurrences List

NHI G1 Elements: 0
NHI S1 Elements: 5
NHI G2 – G3 Elements: 2
NHI S1 – S3 Elements: 19
NHI Natural Communities: 4
Species of Greatest Conservation Need: 11

Table 55. NHI Element Occurrences, Rankings and Designations of Natural Communities and Plant and Wildlife Species within the Northwest Lowland Swamps LCA.

Type	Common Name	Global Rank[1]	State Rank[2]	SGCN[3]
Community	Black Spruce Swamp	G5	S3	
	Hardwood Swamp	G4	S3	
	Northern Sedge Meadow	G4	S3	
	Northern Wet-mesic Forest	G3	S3	
Bird	Le Conte's Sparrow	G4	S2	Y
	Northern Goshawk	G5	S2	Y
	Yellow Rail	G4	S1	Y
Mammal	American Marten	G5	S3	Y
	Gray Wolf	G4	S2	Y
Herpetafauna	Blanding's Turtle	G4	S3	Y
Beetle	Tiger Beetle (*Cicindela patruela patruela*)	G3	S2	Y
Butterfly	Arctic Fritillary	G5	S1	Y
	Bog Fritillary	G5	S3	N
	Dorcas Copper	G5	S1	N
	Freija Fritillary	G5	S2	Y
	Frigga Fritillary	G5	S2	Y
Dragonfly	Black Meadowhawk	G5	S3	N
	Lake Darner	G5	S3	N
	Subarctic Darner	G5	S1	Y
Plant	Arrow-leaved Sweet-coltsfoot	G5	S3	
	Lesser Wintergreen	G5	S1	
	Mingan's Moonwort	G4	S2	
	Russet Cotton-grass	G5	S2	
	Sparse-flowered Sedge	G5	S3	

[1]Global Rank includes species that are: (G1) critically imperiled globally; (G2) imperiled globally; (G3) very rare and local throughout range; (G4) apparently globally secure though rare in parts; (G5) demonstrably secure globally though rare in parts; and (GNR) not ranked (WDNR 2010).
[2]State Rank includes species that are: (S1) critically imperiled in Wisconsin; (S2) imperiled in Wisconsin; (S3) rare or uncommon in Wisconsin; and (SU) possibly in peril in Wisconsin but status uncertain (WDNR 2010).
[3]Species of Greatest Conservation Need (SGCN) only applies to animal species (WDNR 2009a).

Water Quality and Hydrologic Features

Perennial Rivers and Streams: 162.2 miles
Outstanding and Excellent Resource Waters: 21.5 miles
Lakes and other water bodies: 576.7 acres (0.4 % of LCA)
Intermittent Streams: 40.0 miles
Soils Highly Susceptible to Ground Contamination: 20,135.6 acres (14.9 % of LCA)

WDNR Watersheds

- Upper Tamarack River*
- St. Croix and Eau Claire Rivers
- Black and Upper Nemadji River
- Amnicon and Middle Rivers

* Asterisk denotes watershed/s that contribute › 50 % of LCA acreage

Table 56. Rivers and Streams with Special Designation or Identified as having High Conservation Value within the Northwest Lowland Swamps LCA.

Name	OERW[1]	NHI[2]	Priority Wetlands[3]
Bear Creek		x	x
Beaver Creek		x	x
Black River		x	x
Chases Brook (Creek)		x	x
Crotte Creek		x	x
East Branch Hay Creek		x	x
Ericson Creek		x	x
Hay Creek		x	
Spruce River	x	x	x
Thompson Creek			x
Unnamed[4]		1	

[1]Wisconsin DNR Outstanding and Excellent Resource Waters
[2]Wisconsin DNR Natural Heritage Inventory Waters
[3]Wisconsin DNR Priority Wetlands
[4]Number of unnamed creeks are given per designation category

Table 57. Lakes and Wetlands with Special Designation or Identified as having High Conservation Value within the Northwest Lowland Swamps LCA.

Name	NHI[1]	Priority Wetlands[2]	Wild Rice[3]	Walleye[4]	Muskellunge[5]
Bear Lake				x	x
Belden Swamp		x			
Black Lake	x				
Black Lake Bog		x			
McGraw Lake	x				
Radigan Flowage	x		x		

[1]Wisconsin DNR Natural Heritage Inventory Waters
[2]Wisconsin DNR Priority Wetlands
[3]Wisconsin DNR Wild Rice Waters
[4]Wisconsin DNR natural reproducing Walleye Waters
[5]Wisconsin DNR natural reproducing Muskellunge Waters

Working Lands

Agriculture and Forestry Zoning: 126,143.1 acres (93.6 % of LCA)

- **Agriculture Zoning:** 5,312.1 acres (4.2 % of A1/F1 zoning)
- **Forestry Zoning:** 120,831.0 acres (95.8 % of A1/F1 zoning)

Prime farmlands and farmlands of statewide importance: 7,750.9 acres (5.8 % of LCA)
Forest Crop Law or Managed Forest Law: 8,727.9 acres (6.5 % of LCA)

Community Heritage

Recreation

- North Country National Scenic Trail: 3.7 miles
- Douglas County Multi-use Trails: 54.2 miles

Geology and Topography

- Bear Creek Ridge
- Dairyland Lookout Tower
- Empire Wilderness Road Hill
- Summit Hill (Highest point in Douglas County)

Priority Conservation Areas

Number of Privately Owned Parcels: 1,177
Area of Privately Owned Parcels: 34,959.9 acres (25.9 % of LCA)
Mean Area of Privately Owned Parcels: 29.70 acres

Table 58. CV Classification Distribution among Privately Owned Parcels in the Northwest Lowland Swamps LCA.

CV Classification	Number of Parcels	Total Area	Percent	Mean Area
High	32	821.6	2.3	25.67
Medium High	292	8,643.0	24.7	29.60
Medium	513	16,211.4	46.4	31.60
Low	340	9,283.9	26.6	27.31
Total	1,177	34,959.9	100.0	29.70

[1]Priority Conservation Areas include those parcels with conservation value classes High and Medium High.
[2]Number and area of parcels apparently with conservation easements and/or being held for conservation purposes are indicated in parentheses.

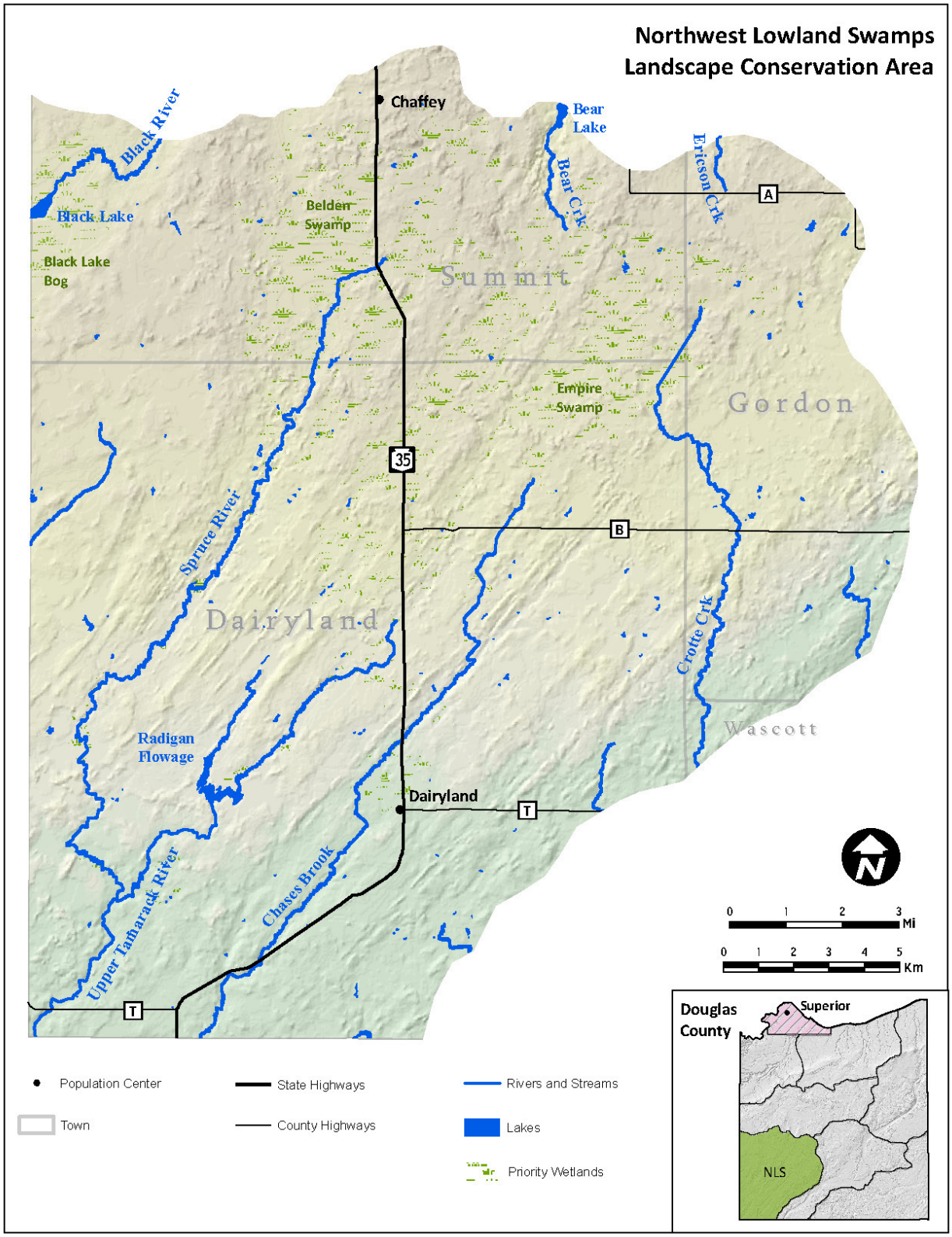


Figure 43. Northwest Lowland Swamps LCA.

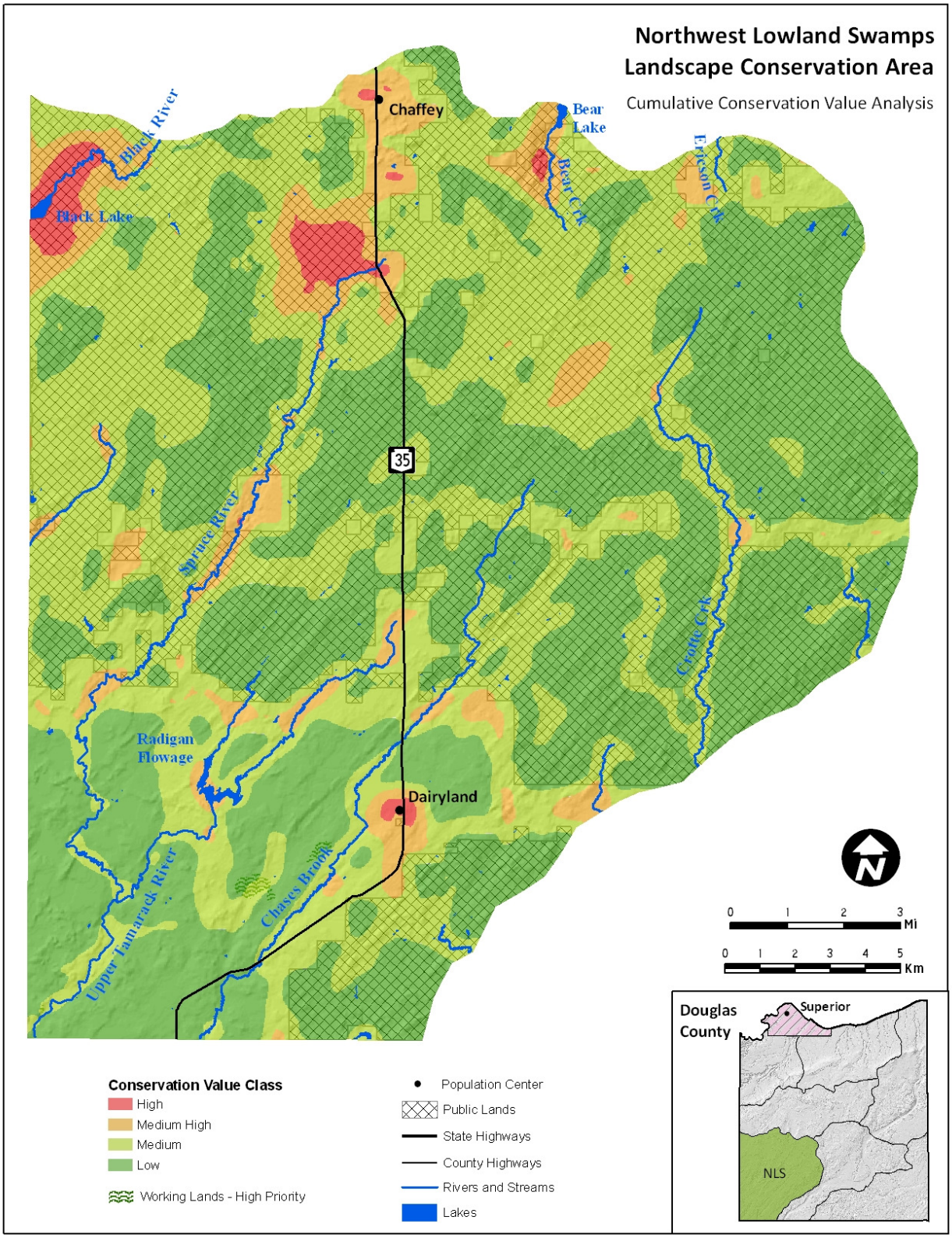


Figure 44. Northwest Lowland Swamps LCA Cumulative Conservation Value Analysis.

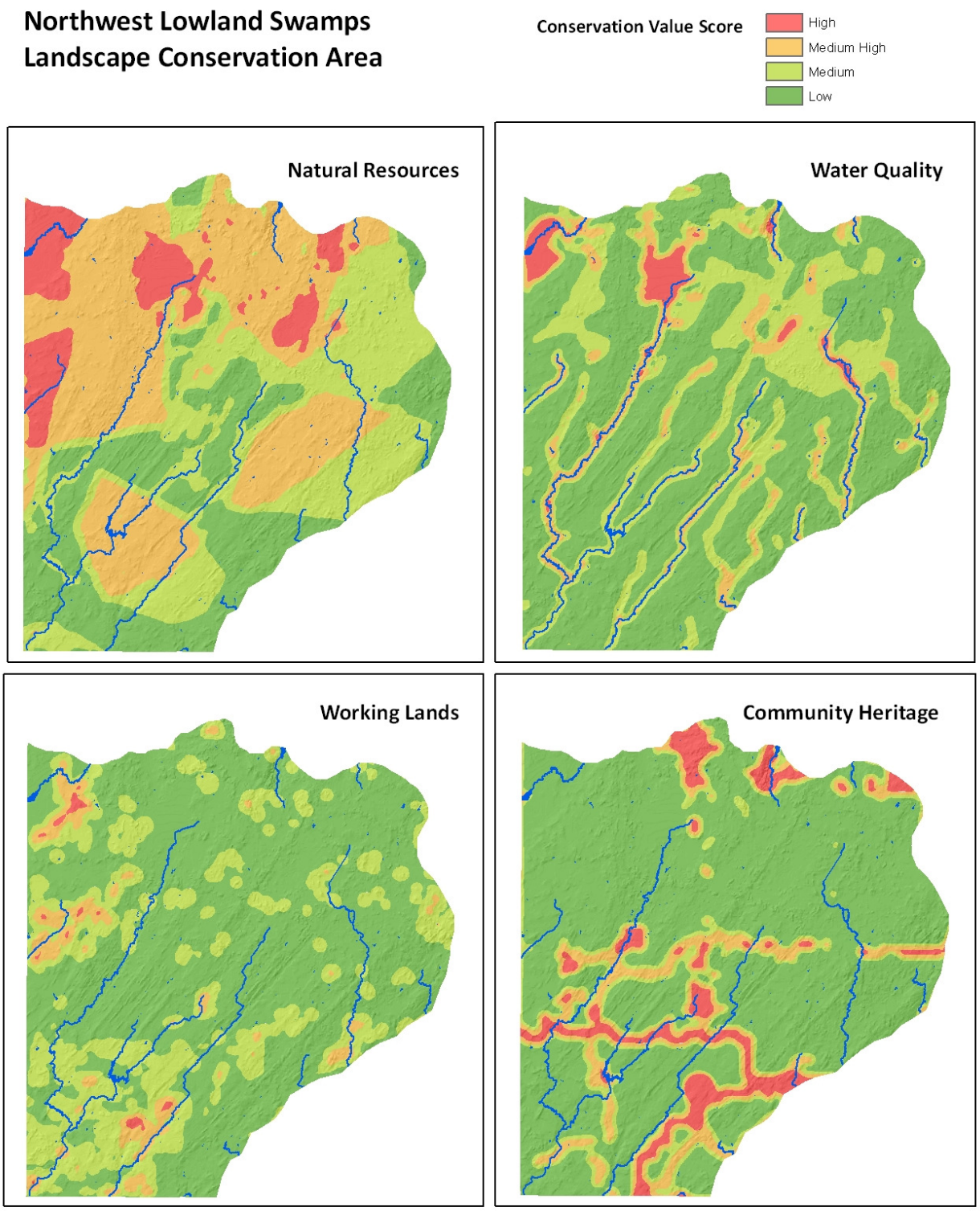


Figure 45. Northwest Lowland Swamps LCA Conservation Themes Conservation Value Analysis.

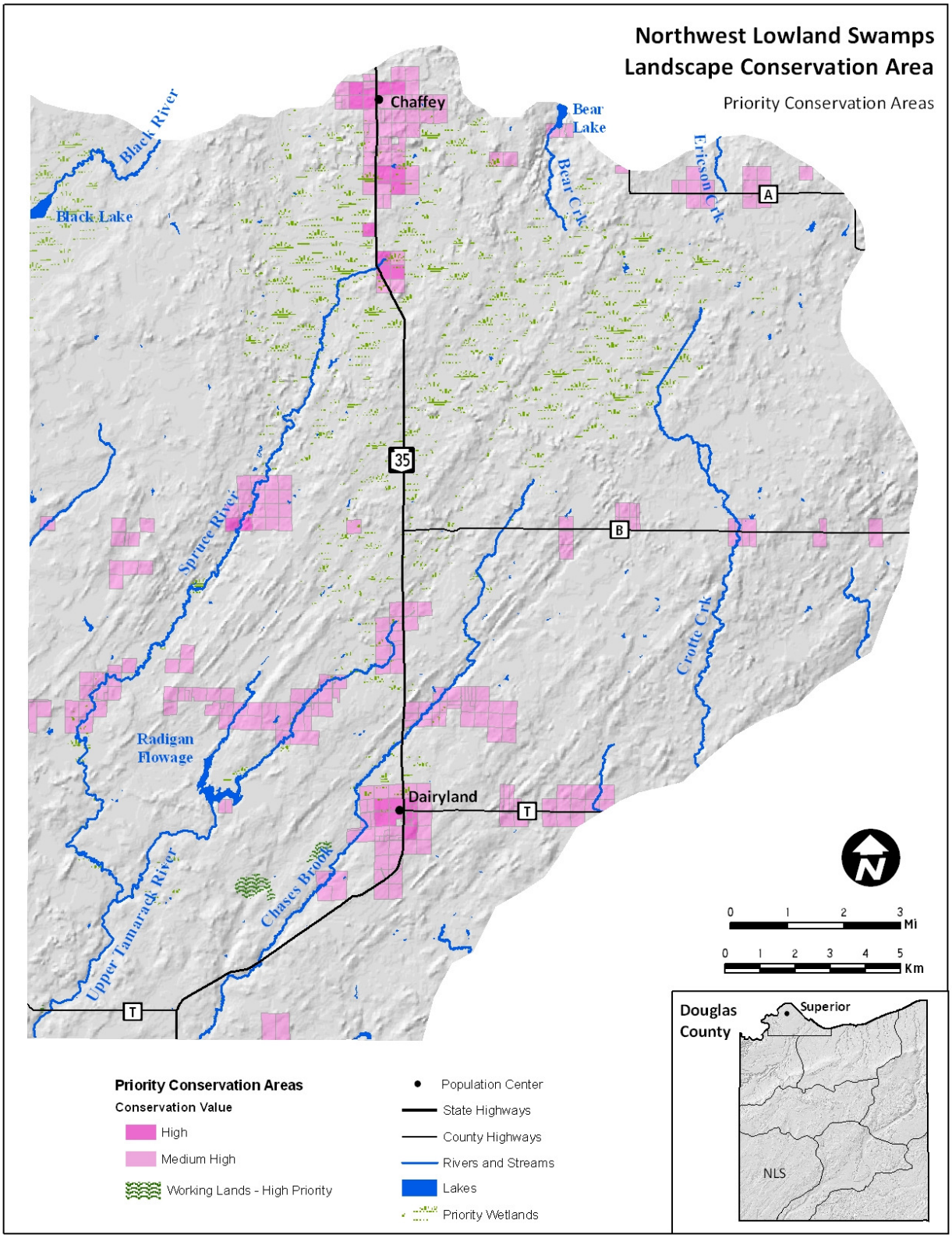


Figure 46. Northwest Lowland Swamps LCA Priority Conservation Areas.

V. CONSERVATION STRATEGIES

Several key conservation strategies have been developed to ensure continued conservation success through effective and pro-active land protection programs. Effective land protection involves Action, Outreach and Education, Advocacy, and Collaboration. Specific conservation strategies are defined for each fundamental land protection component along with a list of tools and/or activities and potential funding sources. Most importantly, potential partnerships should be pursued with Federal, State, and local agencies, conservation organizations, and interested parties and be leveraged across the various land protection components and conservation strategies.

ACTION

Implement direct conservation activities that will protect, enhance and restore natural resources, water quality, community heritage, and working lands' capacity of Douglas County.

Tools/ Activities

- Conservation Easements (permanent and term) – Donated, Purchased, and Bargain Sale
- Land Acquisition – Donated, Purchased, and Bargain Sale
- Implement Best Management Practices
- Landowner Management Agreements
- Active Land Management

Potential Partners

A list of potential partners who provide access to either direct protection or management is provided in Table 59.

Table 59. Potential Partners Providing Direct Protection or Management.

Partner	Protection	Management	Specific LCA
Douglas County Association of Lakes & Streams (DCALS)	X		All
Douglas County Forestry Department (DCFD)	X	X	All
Douglas County Land Conservation Committee (DCLCC)	X	X	All
Farm Service Agency (FSA)	X	X	All
Friends of the Bird Sanctuary (FOTBS)	X		• St. Croix Headwaters
Friends of the Brule (FOTB)		X	• Bois Brule Valley
Friends of the St. Croix Headwaters (FOTSCH)	X		• St. Croix Headwaters • Wascott – Eau Claire River Barrens
Great Lakes Commission (GLC)	X		• Bois Brule Valley • South Shore Streams
Great Lakes Indian and Fish Wildlife Commission (GLIFWC)		X	• Bois Brule Valley • South Shore Streams
Lake Superior Binational Program (LSBP)	X		• Bois Brule Valley • South Shore Streams
Living Forest Cooperative (LFC)		X	All
National Parks Service (NPS)	X	X	• Northwest Lowland Swamps • St. Croix Headwaters • Wascott – Eau Claire River Barrens
Natural Resources Conservation Service (NRCS)	X	X	All
National Oceanic & Atmospheric Agency (NOAA)	X		All
Northwoods Weed Cooperative (NWC)		X	All
River Alliance of Wisconsin (RAW)	X		All
St. Croix River Association (SCRA)	X		• St. Croix Headwaters
St. Louis River Alliance (SLRA)	X	X	• St. Louis – Nemadji Rivers and Wetlands
The Conservation Fund (TCF) - Bridge Loan Program	X		All
The Nature Conservancy (TNC)	X		• Bois Brule Valley
Trout Unlimited (TU)	X	X	• Black River – Upper Amnicon River Moraines

Partner	Protection	Management	Specific LCA
			• Bois Brule Valley • South Shore Streams • St. Croix Headwaters • St. Louis – Nemadji Rivers and Wetlands • Wascott – Eau Claire River Barrens
United States Environmental Protection Agency (EPA)	X		All
United States Fish & Wildlife Service (USFWS)	X	X	All
University of Wisconsin Extension (UWEX)		X	All
Wisconsin Department of Agriculture, Trade, Consumer Protection (DATCP)	X	X	All
Wisconsin Department of Natural Resources (WDNR)	X	X	All
Wisconsin Land & Water Conservation Association (WLWCA)	X		All
Wisconsin Wetlands Association (WWA)	X		All

Potential Funding/Programs

Funding sources or programs that may help provide or assist with direct conservation activities:

- Bock Foundation (Northern forests)
- Douglas County Environmental Reserve Fund
- Douglas County Land Conservation Department
- Douglas County Soil and Water Resource Management Program
- FWS North American Wetlands Conservation Act
- FWS Partners for Fish and Wildlife Program
- Knowles-Nelson Stewardship Program
- Mott Foundation
- National Fish and Wildlife Foundation (Five Star Restoration, Migratory Bird Conservation)
- National Parks Service - Land and Water Conservation Fund (State assistance)
- NOAA - Coastal Estuarine Land Conservation Program
- Northwoods Protection Fund of the Trust for Public Lands
- NRCS Environmental Quality Incentive Program
- NRCS Stewardship Conservation Program
- NRCS Wetland Reserve Program
- NRCS Wildlife Habitat Incentive Program
- The Conservation Fund Bridge Loans
- USDA Conservation Reserve Program
- USDA Farm and Ranchland Protection Program
- USDA Farm Bill Programs (CRP, CREP, WHIP, EQIP, WRP)
- USDA Forest Stewardship Program, Forest Land Enhancement Program, Forest Legacy Program
- US FWS Cooperative Endangered Species Conservation Fund
- WDNR Lake Management Protection Grants
- WDNR Landowner Incentive Program
- WDNR Managed Forestland Agreement (MFL)
- WDNR River Protection Grants
- WDNR Wisconsin Forest Landowner Grant Program
- Wildlife Forever Challenge Grants
- Wisconsin Coastal Management Program
- Wisconsin Working Lands Initiative (PACE)

Potential Partnership Opportunities within Priority Conservation Focus Areas

While these strategies can be applied to all the Landscape and Priority Conservation Areas, specific focus areas were identified to provide more specific attention to the strategies. These focus areas are provided below in Table 60.

Table 60. Initial Focus Areas for Potential Partnership Opportunities.

LCA	Focus Areas	Specific Strategies and Partnership Opportunities within Focus Areas (Partners)
Black River - Upper Amnicon River Moraines	• Riparian protection along Amnicon River[1], Black River[1,2], Balsam Creek Headwaters (Big Balsam Creek)[2], Middle River[1]	• Conservation easements (WDNR[1], Trout Unlimited[2])
Bois Brule Valley	• Protection along Blueberry Creek [1,2] and Swamp Confluence • Habitat management implementation and facilitation within Sand Barren communities (south of the Brule River in the southern portion of LCA) • Working lands protection adjacent to Smith Creek • BMP implementation along Trask Creek	• Conservation easements (WDNR[1], Trout Unlimited[2]) • Land Acquisition within Douglas County Brule River State Forest Acquisition Area - Blueberry Creek and Brule River Confluence, Trask Creek and Sand Barrens (WDNR, State Forestry, The Conservation Fund) • Sand Barrens Habitat Cooperative Management Agreements (State Forest, County Forest, National Forest, WDNR -Natural Resources/ Endangered Resources, private landowners) • Farmland Preservation- PACE (DATCP, NRCS, County Conservationist) • Encourage sustainable forestry • MFL- Managed Forest Law (WDNR- Forestry, State Forestry) • BMP establishment along Trask Creek (County Conservationist)
Northwest Lowland Swamps	*Focus Areas were not identified within this LCA*	*Focus Areas were not identified within this LCA*
St. Croix Headwaters	• Riparian protection along the St. Croix River and Flowage[1], Catlin Creek[1,2], Beebe Creek[1,2], Buckley Creek[1,2], and Lower Ox Creek[1,2] • Habitat management implementation and facilitation within Sand Barren communities (south of the St. Croix River in the panhandle of the LCA and the eastern portion of the LCA) • Forestry protection adjacent to the St Croix River and Flowage[1]	• Conservation easements (WDNR[1], Trout Unlimited[2]) • Land Acquisition within St. Croix National Scenic Riverway – St. Croix River and Buckley Creek – (NPS, Federal agencies) • Sand Barrens Habitat Cooperative Management Agreements (State Forest, County Forest, National Forest, WDNR -Natural Resources/ Endangered Resources, private landowners) • Cooperative Management Agreements • Encourage sustainable forestry • MFL (WDNR- Forestry, State Forestry)

LCA	Focus Areas	Specific Strategies and Partnership Opportunities within Focus Areas (Partners)
	• Cooperative management on lands along Upper Ox Creek	
South Shore Streams	• Riparian protection along Amnicon River[1], Middle River[1], and Poplar River[1,2] • Working lands protection	• Conservation easements (WDNR[1], Trout Unlimited[2]) • Farmland Preservation- PACE (DATCP, NRCS, County Conservationist)
St. Louis – Nemadji Rivers and Wetlands	• Riparian protection along Balsam Creek[1,2], Balsam Creek Headwaters (Empire Creek[1,2], Little Balsam Creek[1,2]), Black River[1,2], Pokegama River[1] • Working lands protection • Support ongoing conservation efforts along Nemadji River[3]	• Conservation easements (WDNR[1], Trout Unlimited[2]) • Farmland Preservation- PACE (DATCP, NRCS, County Conservationist)
Wascott – Eau Claire River Barrens	• Protection along Eau Claire River[1,2], Ounce River[1,2] and Totagatic River Junction • Habitat management implementation and facilitation within Sand Barren communities (northern half of LCA and west of Cranberry Lake)	• Conservation easements (WDNR[1], Trout Unlimited[2]) • Sand Barrens Habitat Cooperative Management Agreements (State Forest, County Forest, National Forest, WDNR -Natural Resources/ Endangered Resources, private landowners)

1Designated Wisconsin DNR Priority Streams and therefore potential partnership opportunities with WDNR exist.
[2]Designated Trout Streams and therefore potential partnership opportunities with Trout Unlimited exist.
[3]West Wisconsin Land Trust (WWLT) is actively conducting land protection projects on the Nemadji River corridor, and therefore BRC is not addressing this area specifically, although opportunistic land protection projects or partnerships would be considered.

OUTREACH AND EDUCATION

Implement targeted landowner outreach regarding conservation resources, impacts of threats, and conservation options available for the private landowner.

Tools/Activities

- Direct mailings to landowners within the Priority Conservation Areas;
- Implement targeted workshops held in Priority Conservation Areas to address specific resource and landowner concerns;
- Host informal special events such as hikes, canoe trips, or others as appropriate, inviting not only members but landowners in Priority Conservation Areas as well.

Potential Partners

A list of potential partners for carrying out these targeted outreach strategies is provided in Table 61. If there is a known geographic area of interest for a particular partner that corresponds to a specific Landscape Conservation Area it is provided under the column entitled "Specific LCA".

Table 61. Potential Outreach Partners.

Partner	Agriculture	Forestry	Community Heritage/ Water Resources	Specific LCA
American Farmland Trust (AFT)	X			All
Douglas County Conservation Service (DCCS)	X	X	X	All
Friends of the Brule (FOTB)			X	• Bois Brule Valley
Friends of the Bird Sanctuary (FOTBS)			X	• St. Croix Headwaters
Friends of the St. Croix Headwaters (FOTSCH)			X	• Northwest Lowland Swamps • St. Croix Headwaters
Gordon/ St. Croix Flowage Association (GSCFA)			X	• St. Croix Headwaters
Living Forest Cooperative (LFC)		X		All
North County Trail Association (NCTA)			X	• Bois Brule Valley • Black River – Upper Amnicon River Moraines • Northwest Lowland Swamps • St. Croix Headwaters • St. Louis – Nemadji Rivers and Wetlands
National Parks Service (NPS)		X	X	• Northwest Lowland Swamps • St. Croix Headwaters • Wascott – Eau Claire River Barrens
Natural Resources Conservation Service (NRCS)	X	X	X	All
River Alliance of Wisconsin (RAW)			X	All
St. Croix River Association (SCRA)			X	• St. Croix Headwaters
St. Louis River Alliance (SLRA)			X	• St. Louis – Nemadji Rivers and Wetlands
Trout Unlimited (TU)			X	• Black River – Upper Amnicon River Moraines • Bois Brule Valley • South Shore Streams • St. Croix Headwaters

Partner	Agriculture	Forestry	Community Heritage/ Water Resources	Specific LCA
				• St. Louis – Nemadji Rivers and Wetlands • Wascott – Eau Claire River Barrens
Upper St. Croix Lakes Association (USCLA)			X	• St. Croix Headwaters
United States Fish & Wildlife Service (USFWS)			X	All
University of Wisconsin Extension (UWEX)	X	X	X	All
Wisconsin Department of Natural Resources (WDNR)	X	X	X	All
Wisconsin Wetlands Association (WWA)			X	• Bois Brule Valley (Blueberry Swamp, Brule Glacial Spillway) • Black River – Upper Amnicon River Moraines (Black Lake Bog) • St. Croix Headwaters (Empire Swamp)
Wisconsin Woodland Owner's Association (WWOA)		X		All

Potential Funding/Programs

- Wisconsin Environmental Education Board (WEEB) Forestry Education Grant
- Mott Foundation
- National Fish and Wildlife Foundation
- WDNR Rivers Program, WDNR Lakes Program

Focus Areas within each Landscape Conservation Area

While these strategies can be applied to all the Landscape Conservation Area, initial focus areas were identified within each to provide further detail to the strategies. These focus areas are provided below in Table 62.

Table 62. Initial Focus Areas for employing Targeted Outreach Strategies.

LCA	Working Lands Outreach	Natural Heritage/ Water Resources Outreach
Black River - Upper Amnicon River Moraines	Oakland, Summit, Superior	Amnicon River, Black River, Balsam Creek Headwaters (Big Balsam Creek), Middle River
Bois Brule Valley	Brule, Cloverland	Barrens, Smith Creek, Trask Creek, Blueberry Creek and swamps
Northwest Lowland Swamps	Minimal High Priority Working Lands	
St. Croix Headwaters	Minimal High Priority Working Lands	Barrens, Catlin Creek, Beebe Creek, Upper Ox Creek, Lower Ox Creek, St. Croix River and Flowage
South Shore Streams	Amnicon, Cloverland, Lakeside, Maple, Oakland, Parkland, Poplar	Amnicon River, Middle River, Poplar River
St. Louis – Nemadji Rivers and Wetlands	Summit, Superior	Balsam Creek, Balsam Creek Headwaters (Empire Creek, Little Balsam Creek), Black River
Wascott – Eau Claire River Barrens	Minimal High Priority Working Lands	Barrens, Eau Claire River, Ounce River

ADVOCACY

Promote policies and funding mechanisms at the local level that protect and conserve natural resources and support economic growth of Douglas County.

Tools/Activities

- Encourage the establishment of local farmland preservation programs with sustainable funding mechanisms
- Encourage coordination between long-term land use planning and working lands preservation planning
- Encourage the inclusion of forest lands in Wisconsin Working Lands Initiative (PACE)
- Conduct outreach to key decision makers such as Town Boards and Comprehensive Planning Committees to raise awareness of BRC and to convey findings of this Plan

Potential Partners/Funding

- American Farmland Trust (AFT)
- Douglas County Conservation Department (DCCD)
- Living Forest Cooperative (LFC)
- Mott Foundation
- River Alliance of Wisconsin (RAW)
- St. Croix River Association (SCRA)
- St. Louis River Alliance (SLRA)
- Wisconsin Woodland Owner's Association (WWOA)

COLLABORATION

Engage conservation and community organizations, government agencies, local corporations and interested citizens in conservation activities in Douglas County to promote and strengthen partnerships that maintain and enhance the region's natural resources.

Tools/Activities

- Hold public meetings to share results of plan and tools for land protection with interested parties
- Discuss partnership opportunities with other conservation organizations
- Engage in Comprehensive Douglas County Land Use Planning process
- Engage with potential partners on a semi-regular basis to gain a better understanding of each other's priorities and to share technical expertise (e.g., establish a listserv, semi-annual lunch, conservation outings)

- Collaborate with agencies that complement land protection
- Seek landscape level grants for protection or planning

Potential Funding/Programs

- Mott Foundation
- National Fish and Wildlife Foundation (e.g., Five Star Restoration, Migratory Bird Conservation)

Potential Partners

A list of potential partnership opportunities are provided in Table 65. As partnership opportunities often evolve out of actual opportunities and needs, this list will always be changing.

Table 65. Potential Partnership Opportunities.

Partner	Potential Opportunity Description
Town Planning Commissions	• Public meetings to relay BRC priorities and ways Land Trusts can collaborate with Towns to fulfill comprehensive planning goals
Douglas County	• Communicate findings of plan and tools for land protection
St. Louis River Alliance St. Croix River Association Friends of the St. Croix Headwaters River Alliance of Wisconsin Friends of the Brule Friends of the Bird Sanctuary Western Wisconsin Land Trust	• Share priorities, • Discuss partnership opportunities, • Seek landscape level grants for protection or planning in northwestern Wisconsin and Lake Superior Basin.

VI. Conclusions

The completion of this Strategic Conservation Plan for Douglas County, Wisconsin is an important step in achieving BRC's goals to strengthen proactive land protection efforts and increase efficiency and conservation effectiveness by accomplishing the following:

- Strengthening relationships with other conservation professionals and entities throughout the County, thus enhancing implementation;
- Compiling and reconciling all pertinent and available data sets and making them readily accessible to staff, facilitating future project selection and evaluation of conservation opportunities;
- Enabling the Conservancy to target outreach efforts to landowners and land use decision makers with respect to conservation opportunities; and
- Providing a foundation for more detailed planning efforts that focus on specific areas.

While the Strategic Conservation Plan offers BRC an opportunity to strengthen and focus its land protection efforts, it is important to recognize the Plan's limitations. Data sets were not ground-truthed, therefore any inaccuracies or limitations of the data sets utilized in the analysis were not corrected. For example, community heritage data are limited to where inventories have been implemented and there may be additional important element occurrences not yet identified by Wisconsin Natural Heritage Inventory. Also, the plan does not evaluate or consider the level of potential conservation interest from landowners, real estate market values and key land-use decision makers and therefore a feasibility study may be a warranted next step. Since the objective of this plan was to identify areas with high conservation significance on a broad landscape scale, it should not be used as the only evaluation tool for proposed site-specific land protection projects. Finally, in order to be useful over the long term, the Strategic Conservation Plan should be regularly updated as new or revised data become available.

The Strategic Conservation Plan will serve as a valuable tool for guiding BRC's land protection efforts and will help strengthen the organization's capacity to achieve protection of Douglas County, Wisconsin's rich array of conservation values. The Plan will be used to direct BRC's outreach efforts to landowners, communities, and key decision-makers thus enhancing the organization's proactive land protection efforts by strategically directing it to the areas of the County where conservation values are concentrated. BRC will also continue to respond to conservation inquiries outside of the identified Priority Conservation Areas. The Plan provides an opportunity to reach out to and build partnerships with other conservation entities that are focusing their efforts within the same geographic region. Finally, this Plan will serve to communicate BRC's priorities and illustrate the need for effective and strategic conservation in Douglas County.

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VIII. Appendices

APPENDIX A. CHARACTERISTICS OF ECOLOGICAL LANDSCAPE UNITS WITHIN DOUGLAS COUNTY

ECOLOGICAL LANDSCAPES *Landtype Association*	DOUGLAS COUNTY AREA (%)	TOPOGRAPHY/ SOILS	HISTORICAL VEGETATION	CURRENT VEGETATION	IMPORTANT FEATURES	THREATS/ OPPORTUNITIES	MUNICIPALITIES (TYPE)
Northwest Lowlands *Dairyland Moraines* *Pattison Moraines* *Winneboujou Glacial Thrust Hills* *St. Croix Plains*	38.3%	• Gently undulating topography • Ground and end moraines, drumlins • Soils loamy • Peat deposits in poorly drained lowlands	• Forested with paper birch, fir, sugar maple, aspen, and white spruce, with some white and red pine on the drier ridges • Black spruce/ tamarack, white cedar and black ash swamps in lowlands	• Forest largely intact with aspen, paper birch, sugar maple, basswood, spruce, and fir	• Largely unbroken forest • Large, undisturbed peatland complexes • St. Croix River System/ Headwaters	• Overharvesting of forests • Protect intact forests, increase patch size and connectivity • Retain peatland complexes • Protect headwaters streams, corridors, and watersheds	Amnicon (T) Bennett (T) Brule (T) Dairyland (T) Gordon (T) Hawthorne (T) Highland (T) Maple (T) Oakland (T) Solon Springs (T) Summit (T) Superior (T) Wascott (T) Lake Nebagamon (V) Solon Springs (V)
Superior Coastal Plain *Douglas Lake-Modified Till Plain* *Carlton Plains*	30.4%	• Level, or nearly level, clay plain sloping towards Lake Superior • Soils originally formed in a lacustrine environment, high clay content	• Forested with combination of white pine, white spruce, balsam fir, paper birch, balsam poplar, trembling aspen, and white cedar • Large peatlands on shoreline of Lake Superior and a few inland sites	• Fragmented forest with open areas converted to grass cover • Aspen and birch dominated forests	• Lake Superior shoreline • Numerous rivers and streams • Some of regions best known trout waters	• Overharvesting of forests • Fragmentation of forest/ conversion to agriculture • Protect Lake Superior's shoreline and estuaries • Protect clay plain boreal forests • Protect stream corridors	Amnicon (T) Brule (T) Cloverland (T) Hawthorne (T) Lakeside (T) Maple (T) Oakland (T) Parkland (T) Summit (T) Superior (T) Oliver (V) Poplar (V) Superior (V)

Ecological Landscapes *Landtype Association*	Douglas County Area (%)	Topography/ Soils	Historical Vegetation	Current Vegetation	Important Features	Threats/ Opportunities	Municipalities (Type)
Northwest Sands *Bayfield Level Barrens* *Gordon Rolling Barrens* *Oula Washed Moraine* *Upper Brule – St. Croix Valley* *Beauregard Knolls* *Webb Lake Collapsed Barrens* *Bayfield Rolling Outwash Barrens*	30.4%	• Flat plains or terraces along glacial meltwater channels • Collapsed outwash plains with kettle lakes • Sandy, deep, soils with low organic matter content	• Jack pine and scrub oak forest and barrens • White and red pine forests	• Mix of forest (pine, aspen-birch and oak forests), grassland, and agriculture • Some wetlands in river valleys	• Jack pine- northern pin oak forest and wetlands • St. Croix-Namekagon and Brule River headwaters	• Overharvesting of forests • Increase extent of dry jack pine-northern pin oak forest • White and red pine restoration • Oak pine barrens and wetlands restoration • Improve water quality	Amnicon (T) Bennett (T) Brule (T) Dairyland (T) Gordon (T) Hawthorne (T) Highland (T) Maple (T) Solon Springs (T) Wascott (T) Lake Nebagamon (V) Poplar (V) Solon Springs (V)
North Central Forest *Smokey Hill Basalt Ridge* *Cable Rolling Outwash* *Hayward Moraines*	1%	• End and ground moraines • Pitted outwash and bedrock areas • Soils are sandy loam, sand, and silts	• Hemlock-hardwood forest dominated by hemlock, sugar maple, and yellow birch	• Hardwood forest dominated by sugar maple, basswood, and red maple • Wetlands • Agriculture	• Northern hardwood forests • Kettle lakes, cedar swamps, and other wetlands	• Overharvesting of forests • Protect northern hardwood forests, increase patch size and connectivity • Protect kettle lakes, cedar swamps, and other wetlands	Gordon (T) Wascott (T)

Source: WDNR 2009b.

APPENDIX B. FUNDAMENTAL DATASETS

Fundamental data sets used for analysis were acquired from a variety of sources and partners to represent focus area selection criteria. Most data sets were available in the public domain and were acquired from websites cited below. Other data sets containing privileged or sensitive information were acquired directly from the department, agency or organization. A few data sets were created in-house (by GeoCosmos) using hard copy document or map sources as reference. A detailed explanation of the fundamental data sets used in the present analysis and the conservation themes they address is given below and summarized in Table 3 of the Plan.

Natural Heritage Inventory

Established in 1985 by the Wisconsin Legislature and maintained by the WDNR Bureau of Endangered Resources, the Natural Heritage Inventory (NHI) program maintains data on the locations and status of rare species, natural communities, and natural features in Wisconsin (WDNR 2009b). NHI elements with G1 – G3, S1 – S3, or SU global and/or state rankings were identified for the present analysis because they are considered critically imperiled or rare.

One hundred twenty-four NHI elements (i.e., plant, animal, natural community or feature) fitting the ranking criteria have been documented within Douglas County (excluding the City of Superior) since 1970 (Table A1). Plant and insect species comprise the majority of elements (42 and 33, respectively) followed by birds (14), fishes (6), mollusks (4), herpetafauna (3), and mammals (2). In addition, NHI has identified 19 natural community and one natural feature elements (Table A1). The spatial data was acquired from Dawn Hinebaugh, Endangered Resources Program, WDNR, and is current as of 2008.

The following analysis data sets were derived from the Natural Heritage Inventory Database:

- NHI Birds
- NHI Fish
- NHI Herpetafauna
- NHI Insects
- NHI Mollusks
- NHI Plants
- NHI Communities
- NHI Other Natural Features

WDNR Conservation Opportunity Areas

WDNR developed a Wildlife Action Plan (WDNR 2005) that identifies species in greatest need of conservation and the habitats, or Conservation Opportunity Areas (COAs), required to support these species. Seven terrestrial COAs occur within Douglas County including Blueberry Swamp, Brule Boreal Forest, Douglas and Bayfield County Barrens, Lake Superior Grasslands, Namekagon Barrens, Northwest Lowland Bogs, and Pokegama – Nemadji Wetlands. In addition, two aquatic COAs (i.e., St. Louis Estuary and Upper St. Croix – Namekagon Rivers) are present in Douglas County. The spatial data was acquired from Dawn Hinebaugh, Endangered Resources Program, WDNR, and is current as of 2008.

WDNR Wisconsin Land Legacy Places

The Wisconsin Land Legacy Report describes special legacy places in Wisconsin that will be critical to meet both the conservation and the recreational needs of the state for the next fifty years (Pohlman et al. 2006). The report identified 15 areas including Boise Brule River, Chase Creek, Eau Claire River, Empire and Belden Swamp, Highway 2 Grasslands, Lower Totagatic River, Manitou Falls – Black River, Middle River Contact, Namekagon – Brule Barrens, Nemadji River and Wetlands, St. Croix River, St. Louis

Estuary and Pokegama Wetlands, Upper Tamarack and Spruce Rivers, Western Lake Superior Drowned River Mouths, Wisconsin Point located in Douglas County.

Spatial data was created by GeoCosmos using place descriptions from Pohlman et al. 2006 to manipulate various source data sets including National Hydrography Dataset (NHD), WISCLAND Land Cover, Great Lakes Coastal Wetland Consortium (GLCWC) Coastal Wetlands, WDNR Wetlands Indicator Soils, NAIP aerial photography (http://www.fsa.usda.gov/Internet/FSA_File/naip_2009_info_final.pdf), 24k Digital Raster Graphics (DRGs), WDNR Ecoregions, and Wisconsin Roads 2000. Several geoprocessing methods were used to create features including attribute and location selection, buffers, and heads up digitizing (HUD). Details regarding the procedure can be found in the metadata accompanying the data set.

WBCI Important Bird Areas

The Wisconsin Important Bird Areas (IBA) Program is part of the Wisconsin Bird Conservation Initiative (WBCI), a collaborative, statewide partnership of over 160 different agencies, NGOs, and businesses that have endorsed a general framework for bird conservation in Wisconsin (WBCI 2009). IBAs are sites containing critical habitat for one or more species of breeding or non-breeding birds. They are identified through a nomination process involving technical review by a panel of bird and habitat experts, using science-based criteria and supporting documentation, particularly data on bird diversity and abundance. The IBA 'designation' is a voluntary one that recognizes the importance of a site for birds and encourages conservation and management to maintain or improve the resources that make the site significant. IBA site boundaries are delineated to encompass all or most of the resources and features required by the species for which the sites are important, and are meant to be used to support voluntary, collaborative stewardship strategies for those resources and features. The identification of a site as an IBA carries no legal status or regulatory requirements whatsoever.

The IBA Program makes provision for periodic review of IBAs, as bird populations and habitats can shift, increase, or decline with a changing landscape. New sites may be added and existing sites can increase or decrease in size or be eliminated altogether. IBA boundaries, therefore, are dynamic and may change over time. WBCI provides spatial data on IBA boundaries "as is", and makes no warranty as to their future accuracy nor to their fitness or suitability for any particular purpose. Responsibility for the appropriate use of IBA boundary data rests solely with the users of those data.

In Douglas County, four sites have been officially approved as IBA sites – Brule River Glacial Spillway, Moose Junction Peatlands, Namekagon – Solon Springs Barrens, and Wisconsin Point (Steele 2007, National Audubon Society 2009). The spatial data was prepared by Aaron Kenealy in December 2009 and acquired with the permission of Ms. Yoyi Steele, Wisconsin Bird Conservation Initiative, WDNR.

WDNR State Natural Areas

In 1951, the State Board for the Preservation of Scientific Areas was created as the first state-sponsored natural area protection program in the nation and evolved into the WDNR's State Natural Areas (SNA) Program. The SNA Program is located in the Department of Natural Resources' Bureau of Endangered Resources and protects outstanding native natural communities, significant geological formations, and archaeological sites. Currently, SNAs protect habitat and provide refuge for more than 90% of the plants and 75% of the animals on Wisconsin's list of endangered and threatened species (WDNR 2009c).

Eighteen SNAs are present in Douglas County including Bear Beach, Belden Swamp, Big Manitou Falls and Gorge, Black Lake Bog, Blueberry Swamp, Brule Glacial Spillway, Brule River Boreal Forest, Brule Rush Lake, Buckley Creek and Barrens, Dwight's Point and Pokegama Wetlands, Empire Swamp, Erickson Creek Forest and Wetlands, Flat Lake, Goose Lake, Motts Ravine, Nemadji River Floodplain

Forest, Pokegama Carnegie Wetlands, and Solon Springs Sharp-tail Barrens. The spatial data was acquired from Dawn Hinebaugh, Endangered Resources Program, WDNR, and is current as of 2008.

WDNR Surface Water Integrated Monitoring System

Surface Water Integrated Monitoring System (SWIMS) is Wisconsin's repository for water and sediment monitoring data collected for Clean Water Act work and is the source of data sharing through the federal Water Quality Exchange Network. In addition, SWIMS harbors information regarding Wisconsin's designated waters. WDNR Fisheries and Water Quality Biologists as well as citizen volunteers use the system to review and document water monitoring results for Wisconsin's lakes, streams and wetlands (http://dnr.wi.gov/org/water/swims/). The SWIMS data sets were acquired from Matt Rehwald, Surface Water Data Analyst, Bureau of Watershed Management, WDNR, and is current as of 2009.

Designated waters within the SWIMS database consist of a variety of overlapping categories. The categories are more fully defined in chapter NR 1.05-1.07 of the Wisconsin Administrative Code (http://www.legis.state.wi.us/rsb/code/nr/nr001.pdf). Data sets have been developed for the following designated waters: Areas of special natural resources interest (ASNRI), public rights features (PRF), and priority navigable waterways (PNW).

ASNRI is the most extensive designated waters category and includes waters within State Natural Areas; Wild and Scenic Rivers; Trout waters; Outstanding & Exceptional Resource Water; NHI waters (i.e., waters inhabited or used by endangered, threatened, or special concern species identified in the NHI); Wild Rice waters within the Ceded Territory; and waters within a Special Area Management Plan, Special Wetland Inventory Study area, or Coastal Wetlands of Wisconsin study area.

Designated waters in the PRF category include sensitive areas of lakes and rivers, and other PRFs such as natural/scenic shorelines, fish and wildlife habitat among others. In addition to the features defined above, PNW designated waters also include Muskellunge waters, Sturgeon waters, Walleye waters, and lakes less than 50 acres.

The following analysis data sets were derived from the SWIMS Database:

- WDNR Critical Habitat
- WDNR Priority Wetlands
- WDNR Class I Trout Waters
- NHI Waters
- WDNR Quality Wetlands
- WDNR Wild Rice Waters
- WDNR Muskellunge Waters
- WDNR Walleye Waters
- Lakes Less than 50 acres
- WDNR Outstanding & Exceptional Resource Waters

Lake Superior Basin Fish Spawning Areas

The Lake Superior Binational Forum (LSBF) Critical Habitat Committee developed and mapped areas important for fish spawning in the Lake Superior Basin as part of the Lake Superior Binational Program (LSBF 2006). The data set identifies nine sites for the following 15 fish species including Brook Trout, Brown Trout, Burbot, Carp, Chinook Salmon, Coho Salmon, Lake Whitefish, Longnose Sucker, Muskellunge Pink Salmon, Shorthead Redhorse, Silver Redhorse, Steelhead, Walleye, and White Sucker. Because important fish spawning site data was represented by point data, a polygon data set was created by GeoCosmos via HUD using various data sources (i.e., site names, NAIP, NHD, GLCWC Coastal Wetlands, etc.) to delineate the referenced features.

Lake Superior Basin Important Habitat Sites and Areas

In addition, to fish spawning areas, the LSBF Critical Habitat Committee developed and mapped sites of important habitats in the Lake Superior Basin as part of the Lake Superior Binational Program (LSBF 2006). The data set was derived from state heritage program databases, published literature, and local resource manager knowledge. The LSBF Critical Habitat Committee has identified 16 sites that provide critical habitat in Douglas County including Allouez Bay, Amnicon River Estuary, Brule River Watershed, Hog Island, Martinson's Landing, Middle River Estuary, Mud Lake, Nemadji River Mouth, Oliver Wetlands, Pearson Creek Estuary, Poplar River Estuary, Red River, Small Estuaries, Smith Creek Estuary, Superior Municipal Forest and Wisconsin Point. In addition, the committee identified three important habitat areas including the St. Louis Estuary, and the Brule River and Iron River watersheds. Because important habitat site data was represented by point data, a polygon data set was created by GeoCosmos via HUD using various data sources (i.e., site names, NAIP, NHD, GLCWC Coastal Wetlands, etc.) to delineate the referenced features.

GLCWC Coastal Wetlands

The Great Lakes Coastal Wetland Inventory was developed through the Great Lakes Coastal Wetland Consortium (GLCWC) as a bi-national initiative to create a single, hydro-geomorphically classified inventory of all coastal wetlands of the Great Lakes Basin. This inventory is built upon the most comprehensive coastal wetland data currently available for the Great Lakes and connecting channels. The Wisconsin Wetland Inventory is the major dataset included for the Douglas County planning area. This data set revealed 22 coastal wetland areas present in Douglas County. The spatial data was compiled by GLCWC in 2004 and downloaded from the Great Lakes Commission Great Lakes Information Network web page (http://www.glc.org/wetlands/inventory.html).

USGS Forest Fragmentation – Connectivity

This data set is an excerpt from an assessment of forest fragmentation causes within the conterminous United States. The data set represents forest connectivity (i.e., forest-forest edges), naturally caused forest fragmentation (i.e., forest-natural edges), and human caused forest fragmentation (i.e., forest-human edges) based on forest edge measurements for every pixel (270 m^2). Less fragmented forests are considered higher quality wildlife habitat because they provide connections to other intact forest communities and are important for movement of wildlife between habitats. Connectivity of forest value was determined for each forested pixel by calculating the proportion of adjacent pixel pairs that were both forest, given that at least one of a pair was forest, for pixel pairs within a 9×9 pixel (0.7 km^2) window centered on the subject pixel. The forest connectivity (i.e., forest-forest edges) grid from the parent data set was extracted and used in the present analysis to determine areas with high forest connectivity.

Pixels with the highest connectivity values (value ≥ 99) were used in the present analysis. The spatial data was compiled by USGS in 2004 and downloaded from The National Atlas of the United States: Causes of Forest Fragmentation in the United States web page (http://nationalatlas.gov/mld/frfrg2i.html).

NRCS Wetlands Indicator Soils

The Wetland Indicator Soils represent soils mapped by the NRCS in the drainage classes of somewhat poorly, poorly and very poorly drained soils. Soils mapped within these drainage classes are soil types typically found within areas designated as wetlands. To identify potential wetlands with Douglas County, the data set was created by selecting soils classified as very poorly drained. The data is maintained by WDNR and was acquired from Matt Rehwald, Bureau of Watershed Management and is current as of 2009.

WDNR Priority Watersheds

WDNR has identified priority watersheds to implement projects to restore or protect high water quality and provide critically important habitat throughout the Wisconsin through the Watershed Management Program (WDNR 2009d). The Upper St. Croix and Eau Claire Rivers Watershed was selected from the WDNR watershed dataset and exported as a separate data set by GeoCosmos. The watershed data set was downloaded from WDNR's Public GIS ftp site (ftp://dnrftp01.wi.gov/geodata/), and is current as of 2009.

Perennial Rivers 150 meter buffer

Perennial rivers and streams provide important aquatic habitat and their protection and proper management is vital in maintaining high water quality. In addition, perennial streams are usually bordered by riparian habitat crucial to many plant and wildlife species. Buffer widths to maintain high water quality and functioning riparian habitat corridors is dependent on many factors (Wenger and Fowler 2000). Based on guidelines (Fischer and Fischenich 2000) for forests similar to those found in Douglas County, a conservative buffer of 150 meters was created around all perennial rivers and streams in the planning area. The data set was created using the NHD maintained by the USGS (http://nhd.usgs.gov/). NHDFlowlines representing perennial streams were selected and buffered by GeoCosmos.

Public Lands 800 meter buffer

Unprotected lands adjacent to public lands can provide connections to other open protected or open space lands and are important for movement of wildlife between habitats or through developed corridors so that natural areas do not become isolated islands. These lands that share a boundary with, or are in proximity to, a state or county forest, national or state park or riverway, nature preserve, or other public preserve, also provide access to public land or public waters.

To provide a data set representing unprotected lands adjacent to public lands, an 800 meter (approx. ½ mile) buffer was created around public lands (e.g., national trail and riverways; state parks, forests, trails and Natural Areas; county parks and forest, etc.) selected from the Douglas County parcel dataset. GeoCosmos conducted data selection and the buffer geoprocessing procedure. The Douglas County parcel data was prepared by Cameron Bertsch, Douglas County Land Conservation Department, and is current as of 2009.

Other Conservation Lands 800 meter buffer

Protected conservation lands provide habitat and forest connectivity beneficial to wildlife and, where public access is allowed, passive recreation. To provide a data set representing unprotected lands adjacent to conservation lands, an 800 meter (approx. ½ mile) buffer was created around lands protected by various conservation organizations and efforts (e.g., The Nature Conservancy, West Wisconsin Land Trust, National Park Service, etc.) that were selected from the Douglas County parcel dataset. Data selection and the buffer geoprocessing procedure were conducted by GeoCosmos. The Douglas County parcel data was prepared by Cameron Bertsch, Douglas County Land Conservation Department, and is current as of 2009.

WDNR Class III Wild Lakes 150 meter buffer

An inventory of Wild Lakes in Douglas County was conducted to evaluate the rate of development and protection status of their shorelines. Based on housing density per mile of shoreline, each lake was placed into one of three classes. Class III lakes have the lowest housing density along the shoreline. A 150 meter buffer was created around the shorelines of Class III Wild Lakes to identify lands that could be protected

to maintained scenic integrity and protect water quality. The Wild Lakes data set was acquired from Mark Swenson, UWSP College of Natural Resources, and is current as of 2006. Class III Wild Lakes within Douglas County were selected and buffered by GeoCosmos.

WDNR Class III Wild Lakes Protected Shoreline 150 meter buffer

Based on the Wild Lakes Inventory, a 150 meter buffer was created around the protected shorelines to identify lands that could be protected to maintained scenic integrity and protect water quality. The Wild Lakes shoreline data set was acquired from Mark Swenson, UWSP College of Natural Resources, and is current as of 2006. Shoreline classified as protected were selected and buffered by GeoCosmos.

Lake Superior Eroding Clay Bank Shoreline 100 meter buffer

The Lake Superior shoreline is a unique, outstanding physiographic characteristic of the landscape that increases the scenic quality of an area. In addition, development on eroding clay banks can affect water quality negatively by contributing to higher sediment loads. A 100 meter buffer was created around the eroding scarps to identify lands that potentially could be protected to maintained scenic integrity and protect water quality. The Lake Superior shoreline data set was acquired from Chad Kostner, GIS Specialist, Northwest Regional Planning Commission, and is current as of 2008. Shoreline classified as eroding clay scarp was selected and buffered by GeoCosmos.

NED Slopes › 30 % slope

Development on steep slopes can diminish an areas scenic qualities as well as impact water quality negatively by contributing to higher sediment loads. Steep slopes are defined differently by local ordinances and according to development type. Nevertheless, slopes greater than 20 % generally are considered steep and some municipalities in Wisconsin recommend professional assistance when planning shoreland development meeting these specifications (BCLWCD 2008). Due to the coarseness of the elevation data set, many small-scale topographic subtleties are masked because elevation is generalized over a relatively large distance (30 m). Therefore, slopes greater than 30 % were considered steep in the present analysis to account for some of the scale issues. The data set was created using the National Elevation Dataset (NED) maintained by the USGS (http://ned.usgs.gov/) and acquired from the Seamless Data Distribution System (http://seamless.usgs.gov/). Percent slope was derived by GeoCosmos using the Spatial Analyst extension.

Groundwater Contamination Susceptibility Model

Lands that are susceptible to groundwater contamination affect an area's water quality. The Groundwater Contamination Susceptibility Model (GCSM) estimates the susceptibility of the state's groundwater to contamination from surface activities. The GCSM was developed by the WDNR, the USGS, the Wisconsin Geological and Natural History Survey, and the University of Wisconsin – Madison in the mid-1980s, and the model iteration used in the present analysis is current as of 2001. Protecting lands that are susceptible to groundwater contamination from development may also maintain higher water quality levels. Areas with lower scores are more susceptible to contamination; therefore, model polygon with values of 26 or less were selected and exported as a separate data set by GeoCosmos. The GCSM data set was downloaded from WDNR's Public GIS ftp site (ftp://dnrftp01.wi.gov/geodata/).

Intermittent Rivers 30 meter buffer

Protection and proper management of intermittent streams also is important in maintaining high water quality. A conservative buffer width of 30 meters around all intermittent streams in the planning area to maintain high water quality (i.e., reducing suspended sediment and nutrients, and maintaining appropriate water temperatures) was based on guidelines proposed by Fischer and Fischenich 2000. The data set was created using the NHD maintained by the USGS (http://nhd.usgs.gov/). NHDFlowlines representing intermittent streams were selected and buffered by GeoCosmos.

NRCS soils of statewide importance or prime farmlands

Soils of statewide importance or classified as prime farmlands are important for maintaining an area's agricultural base and preserving productive working lands. The data set was created using the Soil Survey Geographic Database (SSURGO) maintained by the NRCS and downloaded from the Soil Data Mart website (http://soildatamart.nrcs.usda.gov/). Soils classified as statewide importance or prime farmlands were selected from the SSURGO and exported as a separate data set by GeoCosmos.

Douglas County Zoned Agriculture – Perennial Stream 150 meter buffer

Another method to identify prime agricultural lands incorporated lands zoned for agriculture and lands adjacent to perennial streams. The data set was created by selecting parcels zoned as agriculture from the Douglas County parcel data set and intersecting them with the perennial river 150 meter buffer data set. GeoCosmos conducted this process.

Douglas County Zoned Agriculture (A1) or Forestry (F1)

Douglas County zoning data was used as a surrogate for agricultural and forestry working lands because accurate data on active agricultural and forestry lands is limited. Parcels zoned for agricultural and forestry use was selected from the Douglas County parcel data and exported as a separate data set by GeoCosmos. The Douglas County parcel data and related zoning tabular data were prepared by Cameron Bertsch, Douglas County Land Conservation Department, and are current as of 2009.

WDNR Forest Crop Law or Managed Forest Law Programs

Wisconsin's forest tax laws encourage sustainable forest management on private lands by providing a property tax incentive to landowners. Two different forest tax law programs currently exist: the Managed Forest Law and the Forest Crop Law. Both programs encourage proper management of woodlands by mandating a management plan that incorporates landowner objectives, timber management, wildlife management, water quality, and the environment as a whole to create a healthy and productive forest (WDNR 2009a). In exchange for following a written management plan and program rules, landowners pay forest tax law program rates in lieu of regular property taxes. The data set was downloaded from WDNR's Public GIS ftp site (ftp://dnrftp01.wi.gov/geodata/), and is current as of 2008.

National Wild and Scenic Rivers

The National Wild and Scenic Rivers Program was established by Congress in 1968 to preserve rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations (http://www.rivers.gov/). Rivers may be designated as wild, scenic or recreational depending on their access and amount of shoreline development. The Upper St. Croix River was one of the first rivers designated as a National Scenic River in the same year the Wild and Scenic River Act was ratified. The data set was created using the NHD maintained by the USGS (http://nhd.usgs.gov/). The Upper St. Croix River was selected from the NHDFlowlines feature class and exported as a separate data set by GeoCosmos.

Notable Waterfalls and Cascades

Waterfalls and cascades are unique, outstanding physiographic characteristics of the landscape that increase the scenic and recreational quality of an area. Notable waterfalls and cascades were compiled from various sources (http://gowaterfalling.com/; Lowry and Taubman 1998). The data set was created by GeoCosmos via HUD using various data sources (i.e., feature names, NAIP, NHD, 24k DRGs, etc.).

NPS North Country National Scenic Trail 400 meter buffer

The National Trails System Act of 1968, which authorized the Appalachian and Pacific Crest National Scenic Trails, also called for further study to be conducted on other potential projects including the

North Country Trail. In 1980 legislation authorizing the North Country National Scenic Trail (NST) was passed. The North Country NST, when fully developed, will stretch across seven states from New York to South Dakota (http://www.northcountrytrail.org/).

The trail will provide a non-motorized hiking path and complementary passive recreational opportunities for nearly 4,600 miles, over 200 miles of which are planned for Douglas County. A 400 meter (approx. ¼ mile) buffer was created around the trail to identify lands that potentially could be protected to maintain a relatively natural and undeveloped setting for the experience the trail engenders. The spatial data was acquired from Matthew Rowbotham, North Country Trail Association, and is current as of 2009. Proposed and certified segments of the trail were selected and buffered by GeoCosmos.

WDNR/Douglas County Cross-Country Ski Trail 400 meter buffer

Lands adjacent to state and county cross-country trails contribute to the scenic and passive recreational attributes of this outdoor activity. Development on these lands might obstruct scenic views or diminish the visual integrity of the trial system. A 400 meter (approx. ¼ mile) buffer was created around the trails to identify lands that potentially could be protected to maintain scenic integrity, and a relatively natural and undeveloped setting for the experience. The Douglas County spatial data was acquired from Chad Kostner, GIS Specialist, Northwest Regional Planning Commission, and is current as of 2008. The WDNR Afterhours Ski Trail was captured using NAIP 2008 aerial photography via HUD and using the WDNR trail map for reference (WDNR 2003). All trails were selected and buffered by GeoCosmos.

Recognized Canoe Trails

Canoe trails on rivers contribute to the scenic and passive recreational attributes of this outdoor activity. Development adjacent to canoe trails might obstruct scenic views or diminish the visual integrity of the trial system. The data set was created using the NHD maintained by the USGS (http://nhd.usgs.gov/). Recognized canoe trails within Douglas County (Lowry and Taubman 1998, Svob 1998) were selected from the NHDFlowlines feature class and buffered by GeoCosmos.

Douglas County Cultural and Historical Resources

Lands with recognized historic, archaeological, or cultural value are important community resources that document the rich heritage of an area. The Wisconsin Historical Society provides information for important historical sites within the state (http://www.wisconsinhistory.org/). Three sites were identified within Douglas County including Brule – St. Croix Portage, Davidson Windmill, and the Lake Nebagamon Auditorium. The data set was created by GeoCosmos via HUD using various data sources (i.e., feature names, 24k DRGs, Douglas County parcel data, etc.).

Douglas County Historic Farm 800 meter buffer

Farms with significant scenic beauty or historic resources are a valuable working lands and community resource. Undeveloped lands adjacent to historic farms help to preserve the scenic quality and open space of the resource. An 800 meter (approx. ½ mile) buffer around the Davidson Windmill farmlands was created to identify lands that potentially could be protected to maintain open space and scenic integrity. The Davidson Windmill property was identified via inspection of NAIP and selected from the Douglas County parcel data set and buffered by GeoCosmos.

Population Centers 800 meter buffer

Lands adjacent to rural population centers contain open space valuable to a community due to its proximity to developing areas or areas on which development appears imminent or due to its prominent role in how people perceive their community. An 800 meter (approx. ½ mile) buffer was created around the Douglas County population centers to identify lands that potentially could be protected to maintain

the open space surrounding these communities to protect their rural character. Populated place points were selected from the ESRI Data and Maps 9.3 data sets (2008) and buffered by GeoCosmos.

WDNR/Douglas County Multi-Use Trail 400 meter buffer

Lands adjacent to state and county recreational multi-use trails contribute to the scenic and recreational attributes of the greenway by virtue of proximity. Development on these lands might obstruct scenic views or diminish the visual integrity of the greenway. A 400 meter (approx. ¼ mile) buffer was created around the trails to identify lands that potentially could be protected to maintain scenic integrity. The spatial data was acquired from Chad Kostner, GIS Specialist, Northwest Regional Planning Commission, and is current as of 2008. All non-road trail segments were selected and buffered by GeoCosmos.

Lake Superior Circle Tour Route 400 meter buffer

The Lake Superior Circle Tour is an internationally recognized route that links the culturally rich communities surrounding one of the world's largest and lakes (http://www.lakesuperiorcircletour.info/). Lands adjacent to Lake Superior Circle Tour route contribute to the scenic and recreational attributes of the route by virtue of proximity. Development on these lands might obstruct scenic views or diminish the visual integrity of the route. A 400 meter (approx. ¼ mile) buffer was created around the route to identify lands that potentially could be protected to maintain scenic integrity. The spatial data was acquired from Chad Kostner, GIS Specialist, Northwest Regional Planning Commission, and is current as of 2008. GeoCosmos buffered the route.

Lake Superior Shoreline 200 meter buffer

The Lake Superior shoreline is a unique, outstanding physiographic characteristic of the landscape that increases the scenic and recreational quality of an area. A 200 meter buffer was created around the shoreline to identify lands that potentially could be protected to maintain scenic integrity, and a relatively natural and undeveloped setting for the experience. The Lake Superior shoreline data set was acquired from Chad Kostner, GIS Specialist, Northwest Regional Planning Commission, and is current as of 2008. GeoCosmos created the final data set by buffering the shoreline.

Prominent Hills and Ridges

Hills and ridges are unique, outstanding physiographic characteristics of the landscape that increase the scenic quality of an area. Development on prominent hills and ridges can diminish the visual integrity of the landscape. Prominent hills and ridges were identified using an NED derived contours and hillshade model, and 24k topographic DRGs. The data set was created by GeoCosmos via HUD using various data sources (i.e., geologic faults, bedrock geology, feature names, NED, 24k DRG, etc.).

Douglas Geologic Fault

Some geologic features are unique, outstanding physiographic characteristics of the landscape that increase the scenic, recreational, scientific and historical quality of an area. The Douglas Fault is an important geologic feature on the landscape that is associated with a variety of landscape features and historical events (Grant 1900). The data set was acquired from the USGS Mineral Resources On-line Spatial Data web page (http://tin.er.usgs.gov/geology/state/state.php?state=WI) and is current as of 2004. The Douglas Fault was selected and exported as a separate data set by GeoCosmos.

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APPENDIX C. CONSERVATION AND MANAGEMENT PLANS REFERENCED

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APPENDIX D. LIST OF REVIEWERS

Federal, State and County Agencies
Gary Haughn, District Conservationist, Natural Resources Conservation Service
Robin Maercklein, Biologist, St. Croix National Scenic Riverway
Bruce Moore, Water Resources Engineer, Wisconsin Department of Natural Resources
Christine Ostern, County Conservationist, Douglas County Department of Land Conservation

Conservation Organizations
Scott Peterson, Friends of the St. Croix Headwaters
Karin Kozie, Board Member, Bayfield Regional Conservancy
Dr. Kenneth Bro, Board Member, Bayfield Regional Conservancy

APPENDIX E. NATURAL HERITAGE INVENTORY ELEMENT OCCURRENCES

Natural Heritage Inventory element occurrences by Landscape Conservation Area.

Common Name	Scientific Name	Global Rank[1]	State Rank[2]	SL-NRW	BBV	SCH	W-ECRB	BR-UARM	SSS	NWLS
BIRDS										
Kirtland's Warbler	*Dendroica kirtlandii*	G1	S1			x	x			
Sharp-tailed Grouse	*Tympanuchus phasianellus*	G4	S1		x					
Yellow Rail	*Coturnicops noveboracensis*	G4	S1							x
Black Tern	*Chlidonias niger*	G4	S2	x		x				
Cerulean Warbler	*Dendroica cerulea*	G4	S2		x					
Connecticut Warbler	*Oporornis agilis*	G4	S2	x	x	x	x	x	x	
Le Conte's Sparrow	*Ammodramus leconteii*	G4	S2	x						x
Northern Goshawk	*Accipiter gentilis*	G5	S2		x					x
Upland Sandpiper	*Bartramia longicauda*	G5	S2	x	x				x	
Western Meadowlark	*Sturnella neglecta*	G5	S2	x					x	
American Bittern	*Botaurus lentiginosus*	G4	S3	x	x					
Least Bittern	*Ixobrychus exilis*	G5	S3	x		x				
Cape May Warbler	*Dendroica tigrina*	G5	S3		x					
Black-throated Blue Warbler	*Dendroica caerulescens*	G5	S3		x					
MAMMALS										
Gray Wolf	*Canis lupus*	G4	S2	x	x	x	x	x	x	x
American Marten	*Martes americana*	G5	S3	x				x		x
HERPETAFAUNA										
Wood Turtle	*Glyptemys insculpta*	G4	S2	x	x	x	x	x	x	
Blanding's Turtle	*Emydoidea blandingii*	G4	S3			x	x			x
Four-toed Salamander	*Hemidactylium scutatum*	G5	S3		x					
FISHES										
Lake Sturgeon	*Acipenser fulvescens*	G3	S3	x		x				
American Eel	*Anguilla rostrata*	G4	S2	x	x					
Gilt Darter	*Percina evides*	G4	S2			x				
Greater Redhorse	*Moxostoma valenciennesi*	G4	S3			x				
Banded Killifish	*Fundulus diaphanus*	G5	S3				x			
Least Darter	*Etheostoma microperca*	G5	S3				x			

Common Name	Scientific Name	Global Rank[1]	State Rank[2]	SL-NRW	BBV	SCH	W-ECRB	BR-UARM	SSS	NWLS
INSECTS										
Lepidostomatid Caddisfly	*Lepidostoma libum*	G3	S1			x				
Gloyd's Bluet	*Enallagma vernale*	G4	S1		x				x	
Dorcas Copper	*Lycaena dorcas*	G5	S1					x		x
Henry's Elfin	*Callophrys henrici*	G5	S1				x			
Arctic Fritillary	*Boloria chariclea*	G5	S1					x		x
Subarctic Darner	*Aeshna subarctica*	G5	S1					x		x
Predaceous Diving Beetle	*Hydroporus pseudovilis*	GNR	S1		x					
Tiger Beetle	*Cicindela patruela patruela*	G3	S2		x	x	x	x		x
Elfin Skimmer	*Nannothemis bella*	G4	S2				x			
Cobweb Skipper	*Hesperia metea*	G4	S2			x				
Frigga Fritillary	*Boloria frigga*	G5	S2							x
Freija Fritillary	*Boloria freija*	G5	S2					x		x
Red-disked Alpine	*Erebia discoidalis*	G5	S2					x		
Chryxus Arctic	*Oeneis chryxus*	G5	S2			x	x			
Pronghorned Clubtail	*Gomphus graslinellus*	G5	S2			x				
Forcipate Emerald	*Somatochlora forcipata*	G5	S2		x		x	x		
Perlodid Stonefly	*Isoperla bilineata*	G5	S2						x	
Beach-dune Tiger Beetle	*Cicindela hirticollis rhodensis*	G5	S2		x				x	
Crawling Water Beetle	*Haliplus canadensis*	GNR	S2		x					
Crawling Water Beetle	*Haliplus pantherinus*	GNR	S2		x					
Leonard's Skipper	*Hesperia leonardus*	G4	S3			x				
Dusted Skipper	*Atrytonopsis hianna*	G4	S3			x				
Bog Fritillary	*Boloria eunomia*	G5	S3		x			x		x
Lake Darner	*Aeshna eremita*	G5	S3					x		x
Black Meadowhawk	*Sympetrum danae*	G5	S3							x
Aurora Damselfly	*Chromagrion conditum*	G5	S3		x			x	x	
Perlodid Stonefly	*Isoperla marlynia*	G5	S3						x	
Midwestern Fen Buckmoth	*Hemileuca sp. 3*	G5	S3			x				
Predaceous Diving Beetle	*Agabus bicolor*	GNR	S3			x		x		
Predaceous Diving Beetle	*Hydroporus vittatus*	GNR	S3	x			x	x	x	
Predaceous Diving Beetle	*Hydroporus badiellus*	GNR	S3		x		x			
Water Scavenger Beetle	*Cymbiodyta acuminata*	GNR	S3		x		x			

Common Name	Scientific Name	Global Rank[1]	State Rank[2]	SL-NRW	BBV	SCH	W-ECRB	BR-UARM	SSS	NWLS
Water Scavenger Beetle	*Cymbiodyta minima*	GNR	S3				x			
MOLLUSKS										
Mystery Vertigo	*Vertigo paradoxa*	G4	S1	x						
Purple Wartyback	*Cyclonaias tuberculata*	G5	S1			x				
Boreal Top	*Zoogenetes harpa*	G5	S1						x	
Round Pigtoe	*Pleurobema sintoxia*	G4	S3			x				
PLANTS										
Spike-rush	*Eleocharis mamillata*	G4	S1	x						
Flodman Thistle	*Cirsium flodmanii*	G5	S1			x				
Lesser Wintergreen	*Pyrola minor*	G5	S1							x
Floating Marsh-marigold	*Caltha natans*	G5	S1	x						
Lapland Buttercup	*Ranunculus lapponicus*	G5	S1		x	x				
Oregon Woodsia (Tetraploid)	*Woodsia oregana ssp. cathcartiana*	G5	S1	x						
Ram's-head Lady's-slipper	*Cypripedium arietinum*	G3	S2		x					
Laurentian Bladder Fern	*Cystopteris laurentiana*	G3	S2	x					x	
Richardson Sedge	*Carex richardsonii*	G4	S2		x					
Slender Spike-rush	*Eleocharis nitida*	G4	S2	x					x	
Hooker Orchis	*Platanthera hookeri*	G4	S2			x				
Mingan's Moonwort	*Botrychium minganense*	G4	S2							x
Northern Bur-reed	*Sparganium glomeratum*	G4	S2	x		x		x	x	
Brown Beakrush	*Rhynchospora fusca*	G4	S2		x					
Autumnal Water-starwort	*Callitriche hermaphroditica*	G5	S2		x					
Seaside Crowfoot	*Ranunculus cymbalaria*	G5	S2	x						
Small Yellow Water Crowfoot	*Ranunculus gmelinii*	G5	S2	x				x		
Tea-leaved Willow	*Salix planifolia*	G5	S2	x				x		
Marsh Grass-of-parnassus	*Parnassia palustris*	G5	S2	x						
Alpine Cotton-grass	*Eriophorum alpinum*	G5	S2		x					
Russet Cotton-grass	*Eriophorum chamissonis*	G5	S2					x		x
Marsh Horsetail	*Equisetum palustre*	G5	S2	x		x				
Fir Clubmoss	*Huperzia selago*	G5	S2			x				
Swamp-pink	*Arethusa bulbosa*	G4	S3		x	x				
Showy Lady's-slipper	*Cypripedium reginae*	G4	S3	x	x	x			x	
White Adder's-mouth	*Malaxis monophyllos var.*	G4	S3		x					

Common Name	Scientific Name	Global Rank[1]	State Rank[2]	SL-NRW	BBV	SCH	W-ECRB	BR-UARM	SSS	NWLS
	brachypoda									
Arrow-leaved Sweet-coltsfoot	*Petasites sagittatus*	G5	S3	x	x	x			x	x
Northern Black Currant	*Ribes hudsonianum*	G5	S3	x	x	x				
Marsh Willow-herb	*Epilobium palustre*	G5	S3		x	x				
Purple Clematis	*Clematis occidentalis*	G5	S3		x					
Crawe Sedge	*Carex crawei*	G5	S3	x						
Sparse-flowered Sedge	*Carex tenuiflora*	G5	S3		x	x		x		x
Sheathed Sedge	*Carex vaginata*	G5	S3		x	x				
Common Bog Arrow-grass	*Triglochin maritima*	G5	S3				x			
Fairy Slipper	*Calypso bulbosa*	G5	S3		x					
Large Roundleaf Orchid	*Platanthera orbiculata*	G5	S3	x	x					
Slim-stem Small-reedgrass	*Calamagrostis stricta*	G5	S3	x						
Variegated Horsetail	*Equisetum variegatum*	G5	S3	x						
Dwarf Milkweed	*Asclepias ovalifolia*	G5	S3		x		x			
Vasey Rush	*Juncus vaseyi*	G5	S3	x	x			x	x	
Fragrant Fern	*Dryopteris fragrans var. remotiuscula*	G5	S3		x				x	
Northern Yellow Lady's-slipper	*Cypripedium parviflorum var. makasin*	G5	S3	x	x	x				

[1]Global Rank includes: (G1) Critically imperiled globally because of extreme rarity (≤ 5 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 – 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 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 (21 – 100 occurrences); (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; and (GNR) Not ranked.
[2]State Rank includes: (S1) Critically imperiled in Wisconsin because of extreme rarity (≤5 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 – 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 – 100 occurrences); (S4) Apparently secure in Wisconsin, with many occurrences; and (SU) Possibly in peril in the state, but their status is uncertain, and more information is needed.

Natural Heritage Inventory Natural Community occurrences by Landscape Conservation Area.

NATURAL COMMUNITIES	Description	Global Rank[1]	State Rank[2]	SL-NRW	SCP	BBV	SCH	W-ECRB	BR-UARM	NWLS
Pine Barrens	Pine barrens	G2	S2			x	x			
Great Lakes Beach	Great lakes beach	G3	S2					x		
Mesic Floodplain Terrace	Mesic floodplain terrace	GNR	S2	x						
Floodplain Forest	Floodplain forest	G3	S3	x						
Northern Wet-mesic Forest	Northern wet-mesic forest	G3	S3			x	x			x
Northern Dry Forest	Northern dry forest	G3	S3			x		x		
Boreal Forest	Boreal forest	G3	S2		x	x			x	
Poor Fen	Poor fen	G3	S3			x		x		
Hardwood Swamp	Hardwood swamp	G4	S3			x	x			x
Tamarack (Poor) Swamp	Tamarack (poor) swamp	G4	S3			x	x	x		
Northern Sedge Meadow	Northern sedge meadow	G4	S3	x				x		x
Northern Dry-mesic Forest	Northern dry-mesic forest	G4	S3			x	x	x	x	
Inland Beach	Inland beach	G4	S3			x		x		
Black Spruce Swamp	Black spruce swamp	G5	S3						x	x
Lake--Shallow, Soft, Drainage	Lake--shallow, soft, drainage	GNR	S3					x		
Lake--Deep, Soft, Seepage	Lake--deep, soft, seepage	GNR	S3					x		
Spring Pond	Spring pond	GNR	S3			x				
Springs and Spring Runs, Soft	Springs and spring runs, soft	GNR	SU			x				
Stream – Fast, Soft, Cold	Stream – fast, soft, cold	GNR	SU			x				
NATURAL FEATURES										
Bird Rookery	Rookery	G5	SU			x			x	

[1]Global Rank includes: (G1) Critically imperiled globally because of extreme rarity (≤ 5 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 – 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 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 (21 – 100 occurrences); (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; and (GNR) Not ranked.
[2]State Rank includes: (S1) Critically imperiled in Wisconsin because of extreme rarity (≤5 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 – 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 – 100 occurrences); (S4) Apparently secure in Wisconsin, with many occurrences; and (SU) Possibly in peril in the state, but their status is uncertain, and more information is needed