

REGIONAL AND PROPERTY ANALYSIS:

HORICON-SHAW PLANNING GROUP



Wildlife Areas:

- Horicon Marsh
- Shaw Marsh
- Sinnissippi Public Hunting Ground

State Natural Area:

- Fourmile Island Rookery

Fishery Area:

- Horicon Rough Fish Station



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Primary authors: Yoyi Steele and Amy Staffen

GIS analysis and cartography: Amanda Kretschmer

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Cover Image: Horicon Marsh Wildlife Area
Photo by Jack Bartholmai

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LIST OF ACRONYMS

COA	Conservation Opportunity Area
EL	Ecological Landscape
HSPG	Horicon-Shaw Planning Group
NHI	Natural Heritage Inventory
NWR	National Wildlife Refuge
RPA	Regional and Property Analysis
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SGCN	Species of Greatest Conservation Need
SNA	State Natural Area
VPA	Voluntary Public Access
WA	Wildlife Area
WDNR	Wisconsin Department of Natural Resources
WisFIRS	Wisconsin Forest Inventory and Reporting System

INTRODUCTION AND OVERVIEW

PURPOSE OF A REGIONAL AND PROPERTY ANALYSIS

A Regional and Property Analysis (RPA) is required by Chapter NR 44, Wisconsin Administrative Code, when developing a Master Plan, plan revision, or plan amendment. The RPA forms the foundation of the master plan, providing the baseline information on the property or property group as well as information on how each property fits into or relates to its larger ecological and social context. Functionally, it identifies the most suitable potential future roles or niches for the properties and highlights those elements of the regional context that are most important to consider when planning the properties.

The **Regional Analysis** component of this document describes the broader recreational, cultural, economic, and biological/ecological environments that affect the Horicon-Shaw Planning Group properties and their uses. It identifies significant ecological and recreational needs within the planning group's region. It also defines existing and potential social demands or constraints affecting the properties that should be considered during the planning process.

The **Property Analysis** component of this document describes the properties' existing resources, uses, management opportunities, limitations, and needs. This section also describes surrounding and adjacent lands, indicating how the character of these lands may affect the properties or their uses.

The **Findings and Conclusions** component is the most important section of the RPA. Based on all the regional and property data in the body of the document, the Findings and Conclusions section outlines the best probable future role or niche for the properties. It helps focus the planning process and becomes the foundation for building the master plan's vision and goals, and action strategies.

INTRODUCTION TO THE PROPERTIES

OVERVIEW OF THE HORICON-SHAW PLANNING GROUP

The Horicon-Shaw Planning Group (HSPG; also referred to as "the plan area") includes four properties located in Dodge County in southeast Wisconsin (Map A). There are two Wildlife Areas, Horicon Marsh and Shaw Marsh. Horicon Marsh contains an embedded State Natural Area, Fourmile Island Rookery. The third property, Sinnissippi Public Hunting Ground, is an Extensive Wildlife Habitat parcel. The fourth property is a very small Fishery parcel known as the Horicon Rough Fish Station. In total, these properties comprise 12,396 acres of state protected and managed land.

Property acreages are provided in Table 1.

Table 1. Horicon-Shaw Planning Group Property Acreages.

Property	Acreage*	Embedded SNA	Acreage*
Wildlife Area			
Horicon Marsh	11,167	Fourmile Island Rookery	15
Shaw Marsh	928		
Extensive Wildlife Habitat			
Sinnissippi Public Hunting Ground	300		
Fishery			
Horicon Rough Fish Station	1		
Total: 12,396 acres			

*Property acreages are extracted from the WDNR Managed Lands GIS spatial database and may differ from the acreages represented in property deed legal descriptions.

The scope of use and management of a state property is governed by its official designation.

WILDLIFE AREAS

Wildlife Areas (WAs) are acquired and managed under the authority of Section 23.09(2)(d)3, Wisconsin Statutes, and Chapter NR 1.51, Wisconsin Administrative Code. They are designated to provide places where people can hunt, trap, and fish. WAs also are open for traditional outdoor uses of walking, skiing, snow shoeing, nature study, berry picking, and other low-impact recreational activities. As directed by NR 1.51 and NR 1.61, other recreational uses may be allowed on WAs by the Master Plan if those uses do not detract from the primary purpose of these properties.

STATE NATURAL AREAS

State Natural Areas (SNAs) are defined and authorized in Sections 23.27-23.29, Wisconsin Statutes and Chapter NR 1.32, Wisconsin Administrative Code as “an area of land or water which has educational or scientific value or is important as a reservoir of the state’s genetic or biological diversity and includes any buffer area necessary to protect the area’s natural value”. Section 23.27(1) defines natural areas as "reserves for native biotic communities...habitat[s] for endangered, threatened, or critical species...or areas with highly significant geological or archaeological features". Section 23.28(1) provides authority to designate areas as SNAs and Section 23.29 provides authority to legally dedicate and protect SNAs in perpetuity. While the intent of the SNA program is to preserve the best examples of the state’s diverse natural communities, other recreational uses may be allowed if they do not threaten the site's natural values.

OTHER STATE-OWNED LANDS

The HSPG also includes two properties that were acquired under the authority of the

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Extensive Wildlife Habitat Program and Fisheries Management, two statewide programs that permit purchase of small-acreage sites outside of existing property project boundaries. These parcels are acquired to protect important fish and wildlife habitat and provide public recreational opportunities.

ANALYSIS OF THE REGIONAL CONTEXT

This analysis describes the regional context of the HSPG using three main elements. The **Recreation Resources, Use, and Demand** section provides an overview of the outdoor recreational activities and use patterns that characterize the region. The **Land Use and Socio-economic Characteristics** section describes the region's human population, land use, and economic issues. The **Biological Resources and Ecological Capability** section highlights significant physical, biological, and ecological features such as soils, water resources, vegetation, and rare habitats and species that help frame the region's land management opportunities, priorities, and considerations.

RECREATION RESOURCES, USE, AND DEMAND

THE ECONOMIC VALUE OF WILDLIFE-RELATED RECREATION

The primary recreational focus of the HSPG properties is hunting, fishing, trapping, and other wildlife- and nature-based recreation. These activities generate a significant amount of economic benefit for local, state, and national economies. The 2011 National Survey on Fishing, Hunting, and Wildlife-Associated Recreation (USFWS and USCB 2011) reported on participation and expenditures of U.S. residents in fishing, hunting, and wildlife-watching activities (this includes observing, photographing, and feeding fish or wildlife). In 2011, 90.1 million U.S. residents (age 16 and older) participated in these wildlife-related recreational activities and spent \$145 billion doing so.

Wisconsin is a major contributor to these figures: 3.5 million Wisconsin residents and non-residents participated in wildlife-related recreation in 2011, with expenditures of \$5.5 billion. Wisconsin was ranked second in the nation in numbers of both resident and non-resident hunters (Southwick Associates 2012), second in number of resident bird-watchers (which make up the vast majority of wildlife-watchers) (Carver 2013), third in number of non-resident anglers, and ninth in angler expenditures (Southwick Associates 2013). A summary of participation and expenditures for wildlife-related recreation is given in Table 2.

Table 2. Wisconsin Wildlife-related Recreation Participation and Expenditures, 2011.

	Hunting	Fishing	Wildlife-watching
Total participation	895,000	1.2 million	2.4 million
Residents	763,000	910,000	-
Non-residents	131,000	337,000	-
Total days afield	12.2 million	21.3 million	6.1 million*
Residents	10.1 million	14.6 million	-
Non-residents	2.1 million	6.7 million	-
Total Expenditures	\$2.5 billion	\$1.4 billion	\$1.5 billion
State/local tax revenue	\$228 million	\$148 million	-

Sources: USFWS and USCB 2011; Southwick Associates 2012, 2013.

*Number refers only to participants who watched wildlife at least 1 mile away from their home.

DEFINING THE REGION

The *Statewide Comprehensive Outdoor Recreation Plan (SCORP)* is the primary source of information on outdoor recreation in Wisconsin. The SCORP periodically evaluates status, trends, demand, and needs for outdoor recreation throughout the state using a variety of public surveys, interviews, and listening sessions. The current plan is for the period 2011-2016 (WDNR 2012b). This plan examines broad recreational trends across the state with a focus on developing a strategy to integrate Wisconsin into America’s Great Outdoors, a national initiative launched by President Obama in 2010 that encourages state and local communities to develop local, grassroots conservation and recreation initiatives. This approach contrasts with that used in the 2005-2010 SCORP (WDNR 2006b), which divided Wisconsin into eight planning regions, each representing a particular combination of demographic trends, tourism influences, and environment types, and assessed current and future recreational trends and needs in more detail within each region. The current analysis draws on both of these plans in order to characterize the recreational context of the plan area, as well as on outdoor recreation planning documents for Dodge County.

Regional Characteristics: The 2005-2010 SCORP

The HSPG falls within the Southern Gateways Region, one of eight regions profiled in the 2005-2010 SCORP. The following is an excerpt from the description of this region:

“The Southern Gateways Region is located in the south-central part of the state and encompasses Columbia, Dane, Dodge, Green, Iowa, Jefferson, Lafayette, Richland, Rock, and Sauk Counties. From the rolling green hills of the southern parts of the region, to the centrally-located Wisconsin River, and the marshy areas of eastern portions, this region contains a variety of environments, the combination of which provide a wide array of recreational opportunities....The central presence of Madison impacts much of the Southern Gateways Region.” (WDNR 2006b, p. 5-4).

The 2005-2010 SCORP compared and contrasted participation rates in recreational activities among both Wisconsin residents and out-of-state visitors; public perspectives on issues creating impediments to recreation and recreation needs; and regional supply shortages among the different regions. Table 3 summarizes these characteristics for the Southern Gateways Region.

Table 3. Recreational Characteristics of the Southern Gateways Region.

Highest Participation Rate*	Top-ranked Activities among Non-residents	Recreation Issues & Needs	Regional Supply Shortages
<ul style="list-style-type: none"> • Walk for pleasure • Picnicking • Nature-based 	<ul style="list-style-type: none"> • Sightseeing • Downhill skiing • Birdwatching 	<p>Issues:</p> <ul style="list-style-type: none"> • Budget constraints on park & recreation programs 	<p>Nature-based:</p> <ul style="list-style-type: none"> • Backcountry/walk-in camping

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Highest Participation Rate*	Top-ranked Activities among Non-residents	Recreation Issues & Needs	Regional Supply Shortages
educational program • Tennis outdoors • Visit a dog park to walk a pet • Kayaking • Dog sledding	• Picnicking • Hiking • Camping	• Increased competition for natural resources • Increased ATV usage & associated impacts • Increasing multiple-use recreation conflicts • Lack of maintenance on parks & recreation areas • Lack of park & recreation staff • Overcrowding • Poor water quality impairing recreation • Protecting silent sport areas Needs: • More ATV usage opportunities • More biking trails • More camping opportunities • More canoeing opportunities • More cross-country skiing opportunities • More hiking trails • More horse trails	• Boat launches – carry-in • Natural areas • Parks • Public water access • Trails – hiking • Trails – horseback riding Developed Setting: • Boat launches - trailerable • Camps – educational • Dog parks • Nature centers • Picnic areas • Sailboat clubs/rentals • Trails - bicycle

Source: WDNR 2006b.

* These are the activities for which the Southern Gateways Region had the highest participation rates (among Wisconsin residents) of any region in the state.

Future Trends: The 2011-2016 SCORP

The 2011-2016 SCORP (WDNR 2012b) includes an examination of changes in participation in a variety of recreational activities in Wisconsin over a 15-year period from 1994 to 2009. Using these data as well as industry forecasts and opinions of recreation professionals, this SCORP presents projected trends identifying activities that will show increasing, stable, and decreasing demand over the 5-year period 2011-2016. These are shown in Table 4.

Table 4. Projected Trends in Wisconsin Recreational Activities.

Increasing Demand	Stable Demand	Decreasing Demand
• Adventure racing • Driving for pleasure • Developed/RV camping • Kayaking • Visit a dog park • Soccer outdoors • BMX biking • Climbing	• Walking for pleasure • Running or jogging • Waterparks • Motor boating • Day hiking • Golf • Tent camping • Snowboarding	• Hunting • Inline skating • Skateboarding/skate parks • Horseback riding on trails • Softball • Downhill skiing

ANALYSIS OF THE REGIONAL CONTEXT

Increasing Demand	Stable Demand	Decreasing Demand
<ul style="list-style-type: none"> • Stand up paddling/paddleboarding • Triathlon (on- and off-road) • Off-highway vehicle driving • Gardening or landscaping for pleasure 	<ul style="list-style-type: none"> • Trail running • View/photograph wildlife • Bicycling (road and non-paved) • Snowshoeing 	

Source: WDNR 2012b.

RECREATION IN DODGE COUNTY

Dodge County presents a largely rural aspect with an abundance of wetlands and surface waters, flat to gently rolling topography, and several significant cultural/archaeological sites. These features support various recreational activities in mostly undeveloped or low-development settings. Recreation in the county also is influenced by relatively low amounts of both public land and forested land. Opportunities exist for a variety of wildlife-related recreational activities such as hunting, fishing, trapping, and wildlife viewing. Trails are available for both motorized (ATVs, snowmobiles) and non-motorized uses (hiking, biking, horseback riding, cross-country skiing). Other activities include picnicking, boating, paddling, camping, and golf. Cities, towns, and villages throughout the county offer facilities in more developed settings such as playgrounds, ball fields/courts, and ice-skating rinks (Dodge County 2003).

Hunting and Trapping

Hunting and trapping opportunities in Dodge County are available on the county's state and federal lands and on private lands leased through the Voluntary Public Access (VPA) program. DNR lands in Dodge County, including Stewardship Grant parcels, comprise over 15,267 acres. Another 396 acres of private lands are leased for public hunting through the VPA program. These are short-term leases, purchased with funds provided through a USDA Voluntary Public Access and Habitat Incentive Program (VPA-HIP) grant as part of the federal Farm Bill, and are set to expire between 2015 and 2017. VPA lands are open to hunting and trapping. Parcels purchased through the state Stewardship Grant program are open to nature-based outdoor activities (includes hunting & trapping) as defined in the law. Federal lands in Dodge County include 724 acres of Waterfowl Production Areas (WPAs) and approximately 20,000 acres of the Horicon National Wildlife Refuge (NWR). WPAs are open to hunting and trapping. The Horicon NWR offers trapping opportunities but restricts hunting to pheasant, partridge, deer, rabbit, and squirrel. Hunting and trapping are not allowed on county- or municipally-owned parks.

These traditional outdoor pursuits are popular in Dodge County. Opportunities exist for deer, pheasant, turkey, waterfowl, dove, small game, and both upland and wetland furbearers. License and stamp/permit purchases are one indicator of participation in these activities. Over 50,000 licenses (the vast majority were resident licenses) were sold each year in Dodge County between 2009 and 2013. Table 5 summarizes average yearly resident license sales for popular game species during this time period.

Table 5. Average Annual Resident License Sales in Dodge County, 2009-2013.

Resident License Type	Average Number Sold
Conservation Patron & Sports	2,492
Gun Deer	9,316
Archery	3,838
Goose Permit (Early & Exterior)	1,979
Turkey (Fall & Spring)	2,862
Small Game	2,427
Waterfowl Stamp	1,825
Pheasant Stamp	1,330
Trapping	497

Source: WDNR.

Shooting

A variety of shooting opportunities are available in Dodge County. An inventory of shooting ranges across the state compiled by WDNR in 2013 contained twenty listings for Dodge County, including numerous sportsmen’s clubs, several commercial operations, and one correctional institution. All twenty were listed as offering shooting facilities for trap, two for sporting clays, and eleven for rifle/pistol. Most of these entities restrict access to members and guests. Several offer opportunities to the general public, although open times and fees may vary. There are no publically operated ranges in Dodge County.

Fishing and Water-based Activities

Dodge County has over 21,000 acres of surface waters, including 31 lakes (18 created by dams) and 50 rivers and streams. Lakes include Beaver Dam Lake (the county’s largest lake and the 16th largest in the state), Sinnissippi Lake, Fox Lake, and Lake Emily. The Rock River is the county’s largest river. Other rivers include the Beaver Dam, Crawfish, Ashippun, and Rubicon rivers. These resources offer opportunities for fishing, paddling, and boating.

Fishing is a popular recreational activity. Resident annual fishing license purchases averaged 11,036 in Dodge County between 2009 and 2013. Both shore and boat fishing opportunities exist for numerous species including panfish, walleye, largemouth bass, catfish, bullhead, yellow perch, muskellunge, and Northern pike. There are 5.3 miles of Class II and 3 miles of Class III trout waters in Dodge County. Inland Trout Stamp purchases in Dodge County averaged over 900 between 2009 and 2013.

Paddlers can take advantage of the Rock River Water Trail, a portion of which traverses Dodge County. This trail extends from the headwaters of the Rock River above Horicon NWR 330 miles south to the confluence with the Mississippi River at the Quad Cities in Iowa and Illinois. The Rock River Water Trail is the first National Water Trail in Wisconsin, designated into the National Water Trail System by the U.S. Secretary of the

Interior in March, 2013. The Dodge County portion comprises approximately 65 miles with 32 signed access sites representing three segments of the trail: Northern segment; East Branch to Horicon; and Horicon to Watertown. Paddling also is available on other rivers and on the Horicon Marsh WA, which offers a canoe trail through the marsh on the Rock River. Larger lakes can accommodate activities such as speed-boating, sailing, water-skiing, and jet-skiing.

Camping

Camping is available in Dodge County at county-owned and private facilities. Facilities exist for RV-style camping and tent camping, and both electrified and non-electrified sites are available. The state and federal lands in the county do not allow camping.

Trails

The Wild Goose State Trail is a 34-mile compacted limestone trail on an abandoned railroad grade. It extends from the City of Fond du Lac in Fond du Lac County south, skirting the western edge of Horicon NWR, to Clyman Junction in Dodge County. The trail is cooperatively managed by Dodge and Fond du Lac counties. Hiking, bicycling, jogging, and dog-walking all are permitted on the trail. In Dodge County, a separate horse trail parallels the main trail for 14 miles between Highway 60 and Pautsch Road. Winter ATV use is permitted on the trail in Dodge County only between December 1 and March 31. The trail is open to snowmobiles and connects with county trail networks. Cross-country skiing and snowshoeing are also permitted but the trail is not groomed and users must share the trail with snowmobiles.

Other trail opportunities exist on federal, state and county lands. Motorized trail opportunities include 20 miles of ATV trails (mostly on the Wild Goose Trail) and 320 miles of snowmobile trails, which also connect to trail networks in neighboring counties. In addition to the Wild Goose Trail, a biking route (36-mile loop) has been mapped on county roads around Horicon Marsh. Designated hiking trails exist on both the Horicon NWR and Horicon Marsh WA, as well as in various county parks. Additional hiking, cross-country skiing, and snowshoeing opportunities are available on state-owned lands along stocking lanes, firebreaks, and informal hunter/angler walking trails.

Wildlife Viewing and Outdoor Education

The public lands of the plan area counties offer exceptional wildlife viewing opportunities. The Great Wisconsin Birding and Nature Trail (GWBNT) is a mapped auto trail extending throughout the state that directs visitors to sites offering outstanding bird-watching and other nature viewing opportunities. Dodge County falls within the Southern Savanna Region of the trail. There are four GWBNT waypoints in Dodge County (WDNR 2008b), two of which are on the HSPG properties. The four sites are Horicon Marsh WA, Horicon NWR, Shaw Marsh WA, and Theresa Marsh WA, Northern Unit. Viewing opportunities for waterfowl and waterbirds such as geese, ducks, terns, pelicans, and herons are especially significant. Horicon Marsh is well known as one of

the top birding destinations in the Midwest, attracting thousands of visitors each year during both spring and fall migrations and the summer breeding season to enjoy the hundreds of thousands of migrating waterfowl, cranes, pelican and heron nesting colonies, breeding osprey, and variety of songbirds found throughout the marsh.

Both the Horicon WA and the Horicon NWR offer diverse environmental education programs and interpretive facilities for children and adults. The Marsh Haven Nature Center is a non-profit, all-volunteer organization located just north of the Horicon Marsh in Waupun that also offers nature education programs, overnight accommodation for groups, exhibits and displays, as well as trails, an observation tower, and a picnic shelter.

LAND USE AND SOCIO-ECONOMIC CHARACTERISTICS

DEFINING THE REGION

Most of the available land use, population, and recreational data and information for the state are organized by county. The Applied Population Laboratory (APL) at the University of Wisconsin-Madison has divided the state into ten regions comprised of various county groupings, and prepared socio-economic profiles for each region. These profiles are the primary source of information for the following sections.

The HSPG is located in Dodge County, which falls into Region 9 (APL 2010). Region 9 includes eight other counties in south-central Wisconsin: Columbia, Dane, Green, Iowa, Jefferson, Lafayette, Rock, and Sauk. This analysis will focus on Dodge County, expanding to include the larger Region as appropriate.

LAND USE

Region 9 is most notable for its large proportion of agricultural land (68%). The counties in this Region are consistently among the highest agricultural producers in the state for both row crops and dairy, and also have numerous small farms devoted to producing vegetables, fruit, and meat for farm markets and community-supported agriculture operations. Region 9 is also characterized by its relatively little forested land, low amount of public conservation land, and land values that are higher than the state average across all land categories save wetlands.

Land uses in Dodge County (Table 6) generally reflect this pattern, although Dodge does differ from other counties in Region 9 in some respects. Dodge County has the lowest proportion of forested land of all the counties in Region 9 and the third-highest proportion of wetlands. It also has the highest proportion of public conservation land in all of Region 9. This largely is due to the presence of the extensive, publically-owned Horicon Marsh, whose southern third is State Wildlife Area and northern two-thirds is National Wildlife Refuge (NWR).

Table 6. Major Land Uses in Dodge County.

Land Use	Percentage*
Agriculture	63.4
Wetland	13.8
Public conservation land	8.3
Residential	5.0
Forest	4.7
Commercial	1.5

Source: APL 2010.

*Percentages do not add to 100 because some land uses are not included (e.g., water; grassland; roadways, etc.).

The USFWS and the WDNR are the largest providers of public land in the county. In addition to Horicon NWR, the USFWS owns three Waterfowl Production Areas (WPAs). Other WDNR-owned lands in Dodge County include Theresa Wildlife Area; Waterloo-Mud Lake Wildlife Area; scattered Glacial Habitat Restoration Area parcels; various scattered wildlife and fishery parcels purchased through the Statewide Habitat Area and Scattered Wildlife Habitat programs; and the Wild Goose State Trail. There are numerous easements throughout the county that support the wetland mitigation, non-point easement, and streambank programs. There also are approximately 396 acres of private land that have been leased for public hunting and other recreation through the Voluntary Public Access (VPA) program, part of the federal Farm Bill. These are short-term leases, scheduled to expire between 2015 and 2017. Leased lands are not managed by WDNR, though assistance with habitat management and food plots may be available depending on funding.

Land values in Region 9 are most heavily influenced by the Madison metropolitan area, which has a relatively strong and stable economy and has experienced consistent and rapid growth for many decades. This has resulted in significant development pressure and high land values. High-quality, productive soils have made agricultural land values among the highest in the state. Land values per acre increased across all categories in Region 9 from the period 2000 to 2007, with the largest increases seen in forested and agricultural land. This trend was mirrored in Dodge County.

High land values and development pressure can fuel conversion of undeveloped land. Region 9 lost 3.9% and 0.3% of undeveloped agricultural and forest land, respectively, to residential or commercial uses between 2000 and 2008, reflecting a similar statewide trend. At the same time, the region gained agricultural and forested parcels, very likely due to parcelization, the subdividing of larger tracts into smaller ones. This phenomenon often increases development, fragments natural habitats, negatively impacts water quality, and can take land out of agricultural and timber production. It also can make implementing management or coordinating recreation access more challenging due to the increased numbers of landowners, some of whom may have conflicting views. Agricultural acreage and number of agricultural parcels both declined in Dodge County during 2000-2008, while forested acreage and number of forest parcels both increased.

This suggests that agricultural land suffered most from conversion to development while parcelization was most evident on forested land.

TRANSPORTATION NETWORK

Region 9 has a highly developed transportation network of local, county, and state roads as well as various interstate and US highways and airports that connect it to the nearby major metropolitan areas of Milwaukee and Chicago.

Dodge County is served by an extensive road network connecting it to various surrounding population centers. Major roadways include US Highways 151 and 41, State Highways 16, 26, 33, 49, 60, and 67, and numerous county and local roads.

POPULATION

Region 9 is one of the most heavily populated areas of the state, comprising approximately 18% of Wisconsin's total population and having a population density of 143 persons per square mile in 2008 (APL 2010). Sixty percent of the population in this region lives in cities. The cities of Madison, Janesville, Beloit, and Watertown are particularly densely populated. The population in Region 9 grew by greater than 8% over the period 2000-2008, a rate faster than the state as a whole. Dane and Sauk counties showed especially large increases. This growth is expected to continue into the next several decades, although projected rates of increase vary quite broadly among the different counties. While populations in Dodge and Lafayette counties are expected to grow only slowly, those in Dane, Green, Rock, and Sauk counties are expected to increase rapidly. Sauk and Dane counties are projected to be the fifth and sixth fastest-growing counties in the state in terms of percent population change by 2040. Dane and Rock currently are the second and ninth most populous counties in the state, respectively, and are expected to retain these ranks through 2040 (Egan-Robertson 2013).

Table 7. Dodge County Population Trends.

2000 Census population	85,897
2010 Census population	88,759
Percent change, 2000-2010	+3.3%
Projected 2040 population	95,650
Percent change, 2010-2040	+7.8%
2013 population density (persons/square mile)	101.5

Sources: APL 2010; Egan-Robertson 2013; Wisconsin Demographic Services Center 2011, 2013.

Table 7 provides key population data for Dodge County. Although it currently is the third most populous county in Region 9, it experienced the slowest rate of growth of all the Region 9 counties between 2000 and 2010. This relatively modest pace of increase is

expected to continue through 2040. Only Lafayette County is expected to grow more slowly.

In terms of age structure, Region 9's population is younger than Wisconsin's as a whole, but is aging at a moderate rate. Currently, every county in Region 9 has greater than 20% of its population under the age of 20 and less than 20% over the age of 65. A large shift in the over-65 population is expected statewide by 2040. In Region 9, every county is projected to experience an increase in the over-65 age-group to at least 20% of its total population. Dodge County is one of three counties in Region 9 projected to have between 25 and 30% of its population over age 65 by 2040.

Racially and ethnically, Region 9 is somewhat more diverse than the state as a whole. This is largely driven by Dane County, which is by far the most diverse county in the region, and, to a lesser extent, by Rock County. While the population is still almost 90% non-Hispanic White, the Hispanic population grew significantly between 2000 and 2008, and Hispanic children make up a growing proportion of young residents.

ECONOMIC CONTEXT

The top employment sectors in Region 9 in 2008 were manufacturing, health care and social assistance, retail trade, and educational services. Manufacturing employed the most people in the region between 2000 and 2008 but also was the industry that showed the greatest declines in employment during this period, decreasing by 21%. Retail trade also declined somewhat. Health care and social assistance and professional, scientific, and technical industries showed strong gains during this period. Dodge County suffered the second highest loss in manufacturing employment (-25%) of all of Region 9, while gaining 12% in health care and social assistance.

Employment in extractive industries, including agriculture, forestry, fishing, hunting, and mining, accounts for approximately 4.4% of total employment in Region 9. Lafayette County is the most dependent on this type of employment at 36.3% and Dane County is the least at 1.9%. Dodge County is in the mid-to-lower range among Region 9 counties, at 9.2%. Employment in extractive industries declined in every county in Region 9 between 1997 and 2007, with much of the reduction occurring in hired farm labor.

Employment in industries related to tourism and recreation, which include arts, entertainment, recreation, accommodation, and food services, accounts for approximately 9% of all employment in Region 9, and is particularly important for Columbia and Sauk counties. Employment in these industries grew rapidly in the region from 2000 to 2008, increasing by 13% (compared to 10% for Wisconsin as a whole). In Dodge County, tourism and recreation industries employed 6.5% of all workers in 2008. For the period 2000 to 2008, employment in arts, entertainment, and recreation declined and employment in accommodation and food services increased.

Currently, Dodge County is a leader in the production of cheese, barley, alfalfa, hay and peas for canning (Dodge County, WI – Official Internet Site). Local manufacturers

produce wood and metal products, lawn care equipment, stainless steel equipment and ice fishing gear. The three largest employers, accounting for over 4,700 jobs, are Quad/Graphics, John Deere Horicon Works, and the Beaver Dam Community Hospital. Median household income for Dodge County was \$53,782 for the period 2008-2012, and 8.3% of county's population fell below the poverty level (United States Census Bureau).

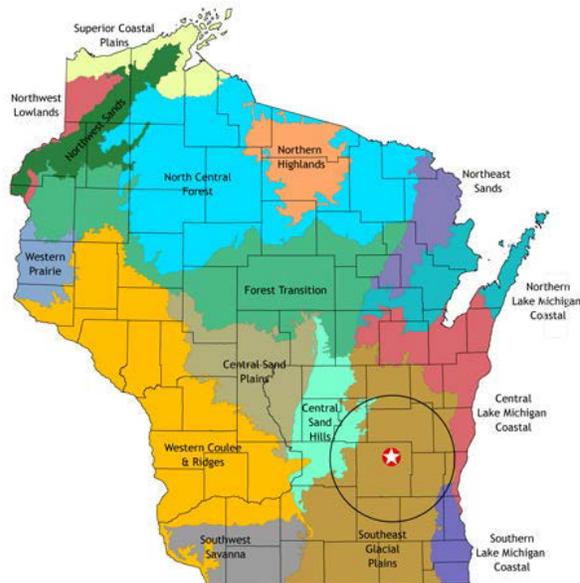
Overall, Region 9's economy is shifting away from manufacturing and towards the more services-oriented sectors, such as health care and social assistance and tourism and recreation, a shift that is generally reflected in Dodge County.

BIOLOGICAL RESOURCES AND ECOLOGICAL CAPABILITY

DEFINING THE REGION

The ecological characteristics of the HSPG will be described using the framework of Ecological Landscapes (ELs), regions of the state that have distinct ecological characteristics and management opportunities. The WDNR has divided the state into 16 ELs, which are based substantially on subsections of a national system of ecoregions called the National Hierarchical Framework of Ecological Units (Cleland et al. 1997). The HSPG falls within the Southeast Glacial Plains EL (Figure 1). This Landscape comprises the "region" for the purposes of this analysis. The following section is based on the description of this EL from *Ecological Landscapes of Wisconsin* (WDNR 2014), a resource that identifies the best areas of the state from an ecological perspective to manage for natural communities, including their key habitats, aquatic features, and native plants and animals. Consult this document for additional detail.

Figure 1. Ecological Landscapes of Wisconsin. The star shows the approximate location of the HSPG.



SOUTHEAST GLACIAL PLAINS ECOLOGICAL LANDSCAPE

The HSPG lies within the Southeast Glacial Plains Ecological Landscape, which borders Illinois and covers a large area of southeastern Wisconsin.

The Southeast Glacial Plains EL is home to some of the world's best examples of continental glacial activity. Most of this EL is composed of glacial materials deposited during the Wisconsin Ice Age. Apart from the interlobate moraine (a long ridge-like formation that developed between the Green Bay and Lake

Michigan lobes during the Wisconsin Glaciation), most of the region offers moderate topographical relief, with glacial deposits forming the greatest irregularities (Martin 1974).

There are 66 watersheds that lie entirely or partially within this EL. These drain north into Green Bay, east into Lake Michigan, and southwest into the Mississippi River via the Rock and Wisconsin rivers. The Southeast Glacial Plains has the second highest total acreage of open water of Wisconsin's 16 ELs, as well as the largest area of impounded waters. Numerous springs feed coldwater streams, with the higher quality trout streams occurring mostly in the eastern and southwestern portions of this EL. There are also some high quality warmwater streams in this Landscape, especially in areas where land cover tends to be forested or wetland-dominated. Polluted stormwater runoff, hydrological modifications, erosion, streambank grazing, excavation of headwater ponds, and dams threaten many streams and associated riparian habitats in the Southeast Glacial Plains.

Historically, vegetation in the Southeast Glacial Plains consisted of a mix of prairie, oak forests, savanna, and maple-basswood forests. Wet-mesic Prairie, Southern Sedge Meadow, Emergent Marsh, Calcareous Fen, and tamarack swamp were found in poorly drained, wetter portions of the Landscape, while end moraines and drumlins supported savannas and forests.

The Southeast Glacial Plains EL has undergone dramatic changes in land use and land cover, incurred by settlers who plowed the prairies, drained the wetlands, and cut the forests for lumber and to make way for farmland. The Landscape went from a primarily open structure of prairies, wetlands, and savanna to primarily agricultural cropland. Remaining forests occupy only about 10% of the land area, with important cover types including oak, maple-basswood, and lowland hardwoods. Over half of the wetlands in this Landscape were drained for farming purposes; some escaped this fate because they were simply too difficult to drain.

Natural Communities

The Wisconsin Wildlife Action Plan (WDNR 2006a) identified management opportunities for natural communities by EL, as the different ELs present varying opportunities to sustain the state's native natural communities. The goal of sustaining natural communities consists of managing for natural community types that 1) historically occurred in a given EL and 2) have a high potential to maintain their characteristic composition, structure, and ecological function over a long period of time (e.g., 100 years). This can help guide land and water management activities so that they are compatible with the local ecology of a given EL while maintaining important components of ecological diversity and function.

Management potential for natural communities in a given EL can be characterized by opportunity. A “**major**” opportunity indicates that the natural communities can be sustained in the EL, either because many significant occurrences of the natural

ANALYSIS OF THE REGIONAL CONTEXT

community have been recorded in the landscape or major restoration activities are likely to be successful in maintaining the community’s composition, structure, and ecological function over a longer period of time. An “**important**” opportunity indicates that although the natural community does not occur extensively or commonly in the EL, one to several occurrences are present and are important in sustaining the community in the state. In some cases, important opportunities may exist because the natural community may be restricted to just one or a few ELs within the state and there may be a lack of opportunities elsewhere.

The Southeast Glacial Plains EL presents “major” or “important” opportunities to manage for 34 natural community types. Of these 34 natural communities, 11 occur on the HSPG properties (Table 8).

Table 8. Natural Community Management Opportunities of the HSPG.

Major	Important
Emergent Marsh	Submergent Marsh
Impoundment/Reservoir	
Inland Lake	
Shrub-carr	
Southern Sedge Meadow	
Surrogate Grassland	
Warmwater Rivers	
Warmwater Streams	
Wet-mesic Prairie	

Rare and High Conservation Priority Species

Numerous rare species are known from the Southeast Glacial Plains EL. “Rare” species include those classified as “Endangered,” “Threatened,” or “Special Concern” on the WDNR’s Natural Heritage Inventory (NHI) Working List (WDNR 2011). Table 9 lists the number of species in each of these classifications known to occur in the Southeast Glacial Plains based on information stored in the NHI database as of 2012.

Table 9. Listing Status for Rare Species in the Southeast Glacial Plains as of 2012.

Listing Status	Taxa					Total Fauna	Total Plants	Total Listed
	Mammals	Birds	Herptiles	Fishes	Invertebrates			
State Endangered	0	9	7	5	11	32	10	42
State Threatened	1	9	3	6	5	24	27	51
State Special Concern	2	18	3	8	54	85	48	133
Federally Endangered	0	0	0	0	2	2	0	2
Federally Threatened	0	0	0	0	0	0	2	2

ANALYSIS OF THE REGIONAL CONTEXT

Listing Status	Taxa					Total Fauna	Total Plants	Total Listed
	Mammals	Birds	Herptiles	Fishes	Invertebrates			
Federal Candidate	0	0	1	0	2	3	0	3

Source: NHI database.

The Wisconsin Wildlife Action Plan (WDNR 2006a) identified Species of Greatest Conservation Need (SGCN), including birds, fish, mammals, herptiles, and invertebrates. SGCN are species in need of conservation action because they are:

- already listed as endangered or threatened;
- at risk because of threats to their life history needs or habitats;
- declining in adjacent states or nationally, though stable in Wisconsin;
- of unknown status in Wisconsin and suspected to be vulnerable.

There are 21 vertebrate SGCN significantly associated with the Southeast Glacial Plains Ecological Landscape (WDNR 2012a, Appendix E). This means that these species are (and/or historically were) significantly associated with this EL, and that restoration of those natural communities with which these species are associated would significantly improve their condition.

ANALYSIS OF THE PROPERTIES

HORICON-SHAW PLANNING GROUP PROPERTIES

The Horicon-Shaw Planning Group (HSPG) includes four properties located in Dodge County in southeast Wisconsin (Map A). There are two Wildlife Areas, Horicon Marsh and Shaw Marsh. Horicon Marsh contains an embedded State Natural Area, Fourmile Island Rookery. The third property, Sinnissippi Public Hunting Ground, is an Extensive Wildlife Habitat parcel. The fourth property is a very small Fishery parcel known as the Horicon Rough Fish Station. The properties are described briefly below.

- **Horicon Marsh Wildlife Area** (11,145 acres) is located due north of the City of Horicon, one-and-one-half miles west of the City of Mayville, and eight miles east and northeast of the City of Beaver Dam.
- **Shaw Marsh Wildlife Area** (924 acres) is located less than one mile south-southeast of the City of Beaver Dam.
- **Sinnissippi Public Hunting Grounds** (345 acres) is located on the north shore of Lake Sinnissippi, approximately three miles east of the City of Juneau and two miles south of the City of Horicon.
- **Horicon Rough Fish Station** (1 acre) is located less than one mile south of the City of Horicon on the south bank of the Rock River.

PHYSICAL ENVIRONMENT

Much of the information for the following sections is taken from the *Rapid Ecological Assessment for Shaw Marsh and Horicon Marsh Wildlife Areas* (WDNR 2012a).

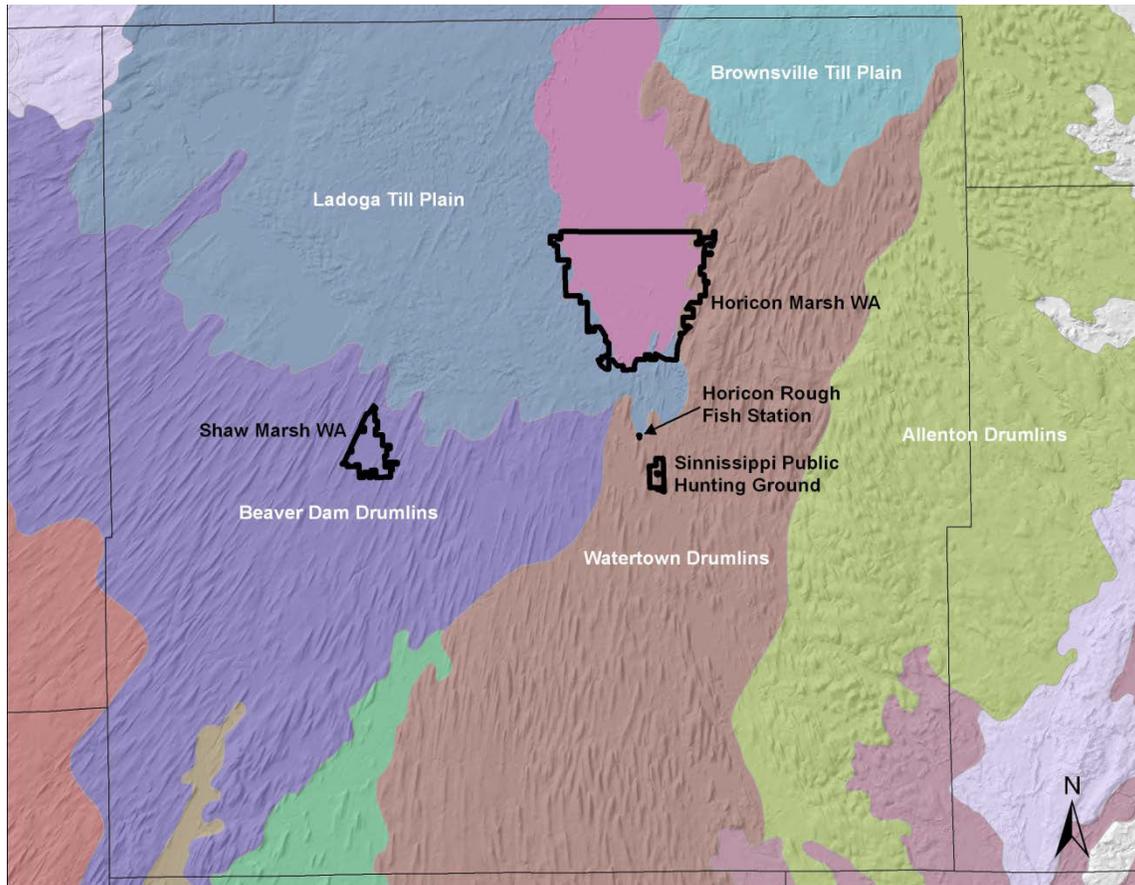
GEOLOGY AND SOILS

Land Type Associations (LTAs) represent a classification system that divides landscapes into ecologically significant regions at multiple scales (Cleland et al. 1997). The HSPG lies within three LTAs: Horicon Marsh, Beaver Dam Drumlins, and Watertown Drumlins (Figure 2), that together delineate a landscape of rolling till plains, lake basins, and one of the highest concentrations of drumlins (linear relief features in Fig. 2) in the world. Characteristic landforms and soils of the four LTAs are as follows:

- **Horicon Marsh:** The characteristic landform pattern is nearly level marsh with organic deposits. Soils are predominantly very poorly-drained muck.
- **Beaver Dam Drumlins:** The characteristic landform pattern is rolling till plains with drumlins and scattered muck deposits. Soils are predominantly well-drained silt over calcareous sandy loam till.
- **Watertown Drumlins:** Landform pattern is undulating till plain; drumlins, lake plains, and muck areas are common. Soils are predominantly moderately well-

drained silt and loam over calcareous sandy loam till or silty, loamy, and clayey lacustrine.

Figure 2. Land Type Associations of the HSPG.



These drumlins and other glacial features were formed during the Pleistocene era by the Green Bay Lobe of the Wisconsin Glaciation. The Glacial Lake Horicon basin was carved out by glacial meltwater that dammed up behind a moraine. As the Rock River eroded the morainal dam the lake drained, allowing the deposition of silt, clay and peat and setting the stage for the development of Horicon Marsh.

Throughout the broader Dodge County landscape, soils may be derived from glacial outwash (sands and gravels) or lacustrine deposits (clays and sands). Silty loess between six and 48 inches deep also was deposited by wind in various places throughout the area (Hole 1976). Nearly all of the county's soils are rich in calcium carbonates derived from the underlying dolomite bedrock, making them highly productive.

HYDROLOGY

The HSPG lies within three watersheds: Upper Rock River; Beaver Dam River; and Sinnissippi Lake. The Upper Rock River Watershed is divided roughly in half by a county boundary, with the northern portion of the watershed in Fond du Lac County and the southern portion in Dodge County. This watershed encompasses approximately 258 square miles and includes 335 total stream miles, 1,629 total lake acres, and 40,443 total wetland acres (WDNR Watershed Webpage). In addition to Horicon Marsh, the dominant water features of the watershed include the West Branch of the Rock River and the South Branch of the Rock River. A number of small creeks, drainage ditches, and small ponds comprise the remainder of the water features.

The Beaver Dam River Watershed is located primarily in Dodge County, with small segments lying in Columbia, Green Lake and Fond du Lac counties. The Beaver Dam River is the largest river in the watershed, flowing from Beaver Dam Lake at the City of Beaver Dam and following a generally southward course, passing the Village of Lowell before joining the Crawfish River at Mud Lake in the Town of Shields.

The Sinnissippi Lake Watershed is located primarily in Dodge and Jefferson counties. It encompasses approximately 237 square miles and includes the main stem of the Rock River from the Horicon dam downstream to the Lower Watertown dam and all the streams flowing into the Rock within this reach. Numerous wetlands are adjacent to the streams in this watershed.

VEGETATION AND NATURAL COMMUNITIES

The plan area is embedded in a largely agricultural landscape with small towns and low-density development in the vicinity. Wetlands (mostly Emergent Marsh and Southern Sedge Meadow) and open water occupy the largest core areas on the HSPG properties, while uplands represent a relatively minor subset of the total acreages. Uplands consist mostly of small woodlots, prairie plantings, earthen dikes and wooded drumlin islands. Major cover types are described below as well as in WDNR (2012a), pages 21-24. For property-specific details on vegetation and natural communities, see "Property Descriptions."

Wetland Communities

Emergent Marshes are dominated by cat-tail, arrowhead, bur-reed, bulrush, common reed, and reed canary grass.

Submergent Marsh macrophytes occur in open water, typically in deeper water than Emergent Marsh species though their boundaries sometimes overlap. Dominant species include various species of pondweeds, duckweeds, and milfoils.

Southern Sedge Meadow is present only in scattered patches within the HSPG wetlands. Many former Southern Sedge Meadows have been degraded by human activities such as

cultivation, drainage, siltation, and grazing and are now dominated by reed canary grass. A small number of forb generalists occasionally may be found in these wetlands; these include sawtooth sunflower, giant goldenrod, and New England aster.

Occasional patches contain native species typical of Southern Sedge Meadow that have not completely succumbed to reed canary grass. These native species include Canada bluejoint grass, swamp milkweed, Angelica, and prairie cordgrass.

Shrub-carr is dominated by willows, red-osier dogwood, and silky dogwood, with an understory of reed canary grass.

Native species typical of ***Wet-mesic Prairie*** occasionally occur within the reed canary grass-dominated wetlands of the HSPG properties. Some of these typical species include New England aster, stiff cowbane, and golden Alexander. This is an exceptionally rare natural community, and should be protected wherever it occurs.

Upland Communities

Little plant community data were collected for areas with the following cover types, but they should not be overlooked for their provision of important cover, nesting, and foraging areas for numerous wildlife species, or for future restoration opportunities.

Wooded Uplands: These occur at the periphery of the core wetland areas in the HSPG and on drumlin islands. These wooded uplands typically are small and low-diversity, with dense brushy undergrowth and ruderal or invasive ground flora. Occasional open-grown bur and white oaks are found being engulfed by other trees and shrubs. Cottonwood and aspen are common as well.

Surrogate Grasslands: Old fields (dominated by exotic cool-season grasses such as smooth brome) and prairie plantings can provide important habitat for grassland birds and buffer adjacent wetlands from deleterious agricultural runoff.

Cropland: Approximately 20 acres at Shaw Marsh and five acres at Horicon Marsh are share-cropped for marsh hay mowing.

WILDLIFE RESOURCES

Game species on the HSPG properties include white-tailed deer, turkey, ring-necked pheasant, waterfowl, mourning dove, snipe, rails, and woodcock. Furbearers include raccoon, fox, coyote, skunk, opossum, mink, muskrat, beaver, weasel, and otter.

Horicon WA is part of the larger Horicon Marsh, which has been recognized as both a Wetland of International Importance under the Ramsar Convention and as a Globally Important Bird Area (Steele 2007). Horicon WA provides both breeding and migratory stopover habitat for a wide array of waterfowl, waterbirds, shorebirds, and landbirds, including various species of high conservation priority.

Horicon WA also is located in close proximity to the Neda Mine SNA, the largest bat hibernaculum in the state, and serves as an important source of insects for foraging bats. Seven species of bats have been documented on Horicon WA.

FISH COMMUNITIES

Waters in the interior of Horicon Marsh are dominated by carp, black bullheads, and brown bullheads. Occasionally, Northern pike, black crappie, and white crappie are caught by anglers; however, current surveys indicate that these populations are very small. Other species present include bowfin, yellow bullhead, central mudminnow, bluntnose and fathead minnow, white sucker, largemouth bass, black crappie, rock bass, bluegill, green sunfish, pumpkinseed, yellow perch, and walleye. The East Branch of the Rock River, a major tributary to the marsh, supports more diverse riverine habitat with improved angling opportunities for walleye and Northern pike.

On Shaw Marsh WA, Shultz Creek currently supports a limited forage fishery. Shaw Brook currently supports a warmwater sport fishery containing Northern pike, largemouth bass, central mudminnow, fathead minnow, white sucker, blackstripe topminnow, brook stickleback, tadpole madtom, black and yellow bullhead, bluegill, pumpkinseed, green sunfish, fantail darter and Johnny darter. There may be seasonal movement of fish from the Beaver Dam River into Shaw Brook's lower reaches.

At Horicon Rough Fish Station, the fishery includes Northern pike, walleye, bowfin, yellow, black and brown bullhead, central mudminnow, bluntnose and fathead minnow, white sucker, largemouth bass, black crappie, rock bass, bluegill, green sunfish, pumpkinseed and yellow perch.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

The HSPG is noted for its globally important habitat for birds (WDNR 2012a). Seventeen rare bird species have been documented here, including two State Endangered, one State Threatened, and 14 Special Concern species. Horicon Marsh also provides important foraging habitat for a number of rare bats. Table 10 lists the rare species documented on the HSPG properties along with their natural community associations. Please compare this table with the one presented in WDNR (2012a), Appendix E, which shows vertebrate SGCN of the entire Southeast Glacial Plains EL cross-listed with natural community types present at Horicon Marsh and Shaw Marsh WAs. While Table 10 below presents a "snapshot in time" showing what rare species and SGCN are currently known on the property group, Appendix E also shows species that could potentially occur there, presenting possible conservation targets.

Table 10. Documented Rare Species on the HSPG Properties and Their Natural Community Associations (from WDNR 2012a). Numbers denote degree of association within the Southeast Glacial Plains EL, where 3 = significant association, 2 = important association, and 1 = low association (WDNR 2006a).

Species	Year Last Observed	State Status*	Coolwater Streams	Emergent Marsh	Impoundments / Reservoirs	Inland Lake	Shrub-carr	Southern Sedge Meadow	Surrogate Grasslands	Warmwater Rivers	Wet-mesic Prairie
Birds											
American Bittern (<i>Botaurus lentiginosus</i>)	2011	SC/M		3			1	2	1		
American White Pelican (<i>Pelecanus erythrorhynchos</i>) †‡	2011	SC/M				X					
Bald Eagle (<i>Haliaeetus leucocephalus</i>) †	2011	SC/P			3	3				3	
Black-crowned Night-Heron (<i>Nycticorax nycticorax</i>) ‡	1989	SC/M		X							
Black Tern (<i>Chlidonias niger</i>)	2008	END		3	2	2		1			
Blue-winged Teal (<i>Anas discors</i>)	2011	SC/M		3	2	2		2	2	1	2
Brown Thrasher (<i>Toxostoma rufum</i>)	2000	SC/M							2		
Bufflehead (<i>Bucephala albeola</i>) §	2011	--	Associated w/mature forest in/near riparian areas								
Common Moorhen (<i>Gallinula chloropus</i>) ‡	2011	SC/M		X		X					
Forster's Tern (<i>Sterna forsteri</i>)	1981	END		3	2	1		1			
Great Egret (<i>Ardea alba</i>)	1997	THR		3						2	
King Rail (<i>Rallus elegans</i>)	2011	SC/M		3				2			
Northern Harrier (<i>Circus cyaneus</i>)	2000	SC/M		1			1	2	3		3
Redhead (<i>Aythya americana</i>)	2011	SC/M		3							
Whooping Crane (<i>Grus americana</i>) †	2011	SC/F L		3				2			
Willow Flycatcher (<i>Empidonax traillii</i>)	2011	SC/M					3	2	2		2
Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>) ‡	2000	SC/M		X							
Bats											
Big Brown Bat (<i>Eptesicus fuscus</i>) †	2005	END	Variety of habitats, especially edge near water & farmland								
Eastern Pipistrelle (<i>Perimyotis subflavus</i>) ‡	2005	THR	x							x	
Eastern Red Bat (<i>Lasiurus borealis</i>) †	2005	SC/N	3	2	1	2	2	2		2	
Hoary Bat (<i>Lasiurus cinereus</i>) †	2005	SC/N	3	2	1	2	2	2		2	
Little Brown Bat (<i>Myotis lucifugus</i>) †	2005	THR	Forage over open water/near shorelines, along edge habitat								
Northern Long-eared Bat (<i>Myotis septentrionalis</i>) †	2005	THR	3	2	1	2	2	2		2	
Silver-haired Bat (<i>Lasionycteris noctivagans</i>) †	2005	SC/N	3	2	1	2	2	2		2	

* For an explanation of state status, see <http://dnr.wi.gov/>, keyword search “working list”.

† Foraging records only.

‡ Identified as SGCN after publication of Wildlife Action Plan (WDNR 2006a); numeric degrees of association with natural communities will be provided in the 2015 Wildlife Action Plan update.

§ Not an SGCN, so natural community associations not provided; included here because this represents first confirmed breeding occurrence in Wisconsin.

SITES OF HIGH CONSERVATION SIGNIFICANCE

CONSERVATION OPPORTUNITY AREAS

The Wisconsin Wildlife Action Plan Implementation (WDNR 2008a) refined and focused the information in the 2005 plan by prioritizing the more than 1,700 conservation actions listed in the plan and identifying Conservation Opportunity Areas (COAs), specific places on the landscape where those actions can be implemented most effectively and efficiently. The Horicon Marsh COA, which encompasses all of the Horicon Marsh WA, was identified as a high-quality wetland community of State Significance due to its extensive size, impounded areas with the ability to manipulate water levels, and associated upland grass. The following Priority Conservation Actions apply to the HSPG properties:

- Preserve and manage all wet-mesic prairie sites, restore degraded sites, and manage the sites in a matrix of surrogate grasslands and other shrub and savanna habitats for area-sensitive species.
- Maintain large blocks of open sedge meadow and manage within a complex of associated wetlands such as wet prairie, emergent marsh, shrub-carr, alder thicket and floodplain forest by maintaining hydrology, tree cutting and harvest, prescribed fire and eradicating invasive plant species.
- This landscape has an especially important role for managing shorebird habitat on public lands at flowages and impoundments. Through dikes, water levels can be raised to flood these areas, and through water control structures, water levels can be manipulated to benefit shorebirds. Migration phenology and specific habitat requirements must be considered when managing for shorebirds.

PRIMARY SITES

Primary Sites generally encompass the best examples of 1) both rare and representative natural communities, 2) documented occurrences of rare species, and/or 3) opportunities for ecological restoration or connections. These sites warrant high protection and/or restoration consideration during the development of the new property master plan. Information on Primary Sites is meant to be considered along with other information when identifying opportunities for various management designations during the master planning process.

Two Primary Sites have been identified on the HSPG properties, Horicon Marsh WA and Fourmile Island Rookery (WDNR 2012a). These are shown in Map B-7. Brief Primary Site descriptions are included in the individual property descriptions below; see Appendix G in WDNR (2012a) for full descriptions.

OPPORTUNITIES FOR WILDLIFE MANAGEMENT AND CONSERVATION

Globally Important Habitat for Birds

Horicon Marsh WA contributes about 11,000 acres to the 33,000-acre greater Horicon Marsh (National Wildlife Refuge plus State Wildlife Area). It is the largest freshwater cattail marsh in the United States and has been recognized as both a Wetland of International Importance under the Ramsar Convention and as a Globally Important Bird Area. The large emergent wetlands and associated open-water areas of Horicon Marsh WA, combined with seasonal mudflats, offer waterfowl, shorebirds, and colonial waterbirds diverse habitats during the migratory seasons. The site provides important breeding habitat for both common and rare or declining waterfowl, marsh birds, and colonial waterbirds, and has the largest breeding population of redhead (Special Concern) east of the Mississippi River. Horicon Marsh WA provides important winter habitat for wandering Arctic birds. Fourmile Island State Natural Area lies within Horicon Marsh, and harbors one of the largest colonial waterbird rookeries in the state. For a detailed discussion of this theme, see WDNR (2012a), pages 26-30.

Grassland Bird Habitat

At Shaw Marsh WA and, to a lesser extent, at Sinnissippi Public Hunting Ground, a significant opportunity exists to promote much-needed grassland bird habitat within a largely agricultural landscape. The continued conversion of former croplands to native prairie plantings will expand the area of open landscape in natural cover (already quite large at Shaw Marsh WA). Large areas within Shaw WA show evidence of degraded but unplowed wet-mesic prairie; restoration of these areas could introduce a type of grassland that is usable by a greater variety of bird species than the existing reed canary grass-dominated wetlands.

Bat Conservation

During fall acoustical surveys conducted by WDNR at Horicon Marsh WA in 2005, seven bat species were observed, two of which are state-threatened and three of which are special concern (Table 10). Horicon Marsh WA is in close proximity to the Neda Mine SNA, the largest bat hibernaculum in the state (and possibly the Midwest), and likely serves as an important foraging area for resident bats. Horicon Marsh provides an important source of insects, especially during the fall when bats need to build up fat reserves for winter hibernation and long-distance migration.

Prairie Restoration

At Shaw Marsh, an opportunity may exist to restore Wet-mesic Prairie and Southern Sedge Meadow, as large areas on the property show evidence of remnant, unplowed sod. Wet-mesic Prairie is exceptionally rare in Wisconsin, and its protection and restoration is

vital to the preservation of Wisconsin's native biodiversity, including SGCN that are specialists to this type of community.

MANAGEMENT THREATS AND LIMITATIONS

Hydrologic alteration, impaired water quality, development pressures, and invasive species are major threats to managing and protecting wildlife and other biodiversity on the plan area properties.

Many wetlands within the Southeast Glacial Plains EL, including in the plan area, already have been altered or lost due to conversion to agricultural use, dredge spoil disposal, stream channelization, road construction, and residential development. Residential and recreational developments (often with associated hydrological modifications such as ditching, diking, channelization, pond construction, and groundwater withdrawals) and infrastructure construction such as roads, power lines, culverts and ditches can disrupt hydrology, serve as a source of pollutants, facilitate the spread of invasive species, and act as physical barriers inhibiting or preventing the movements of some species. Water quality issues affecting the wetlands of the HSPG properties stem largely from agricultural, urban/suburban, and road runoff. This runoff introduces excessive sediments and nutrients that have fostered exceptional growth of cattails, particularly in Horicon Marsh WA, resulting in a near-monoculture of this aggressive plant in many places. Non-native carp, which are abundant at Horicon Marsh WA, further reduce water quality by roiling marsh sediments and uprooting aquatic plants.

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

The frequent usage of the plan area for recreation has contributed to the introduction and spread of non-native invasive species throughout the HSPG properties. Parking areas, trails, and other high-use areas are typical entry points for non-native invasive species that are introduced by visitors' footwear, clothing, vehicle tires, boats, and recreational equipment. Once established, these invasives may continue to spread along natural corridors (e.g., waterways) and along human-made corridors (e.g., trails and roads). They even have the potential to invade remote natural areas via vectors such as wind, water, and wildlife. Non-native invasive species may also be spread inadvertently

through management activities such as timber operations and roadside mowing, especially if Best Management Practices aren't followed.

Eighteen non-native invasive species are widespread within the HSPG and pose the greatest immediate threat to native species diversity, rare species habitats, or high-quality natural communities. These include reed canary grass, hybrid cattail, purple loosestrife, and common carp. See WDNR (2012a, pages 32-34) for a full list of widespread invasive species (Table 7) and those that could potentially appear on the properties (Table 8), as well as a more detailed discussion of invasive species impacts.

CULTURAL RESOURCES

The region within which the plan area is embedded has a very long history of human occupation. As glaciers receded to the north, Paleo Indian people quickly moved into the region (ca. 12,000-8000 BC), gathering plants and hunting mega-fauna such as mammoth. Sites associated with Paleo Indians are scattered thinly over the landscape. Later, as the climate became drier and warmer (ca. 8000-1000 BC), Archaic period peoples using the atlatl and darts gathered and hunted a wide variety of plants and animals, developing specialized tool kits featuring ground stone items such as grooved axes. Archaic communities were succeeded, in turn, by Woodland Indians (ca. 1000 BC-1000 AD), known especially for their use of pottery, construction of burial mounds, development of horticulture and, late in the period, development of the bow and arrow. Still later (ca. 1000 AD-historic era), numerous Oneota communities, featuring large and sometimes fortified sites, settled the land, grew crops including corn, and traded extensively. The Historic Indian peoples of what would become Wisconsin likely developed from Oneota and related peoples.

As for other areas of the state, cultural resource investigations in Dodge County are ongoing. State Statutes (44.40) as well as Manual Code (1810.10) require that any activities with the potential to disturb archaeological sites will only be undertaken after consultation with the Department Archaeologist.

PROPERTY DESCRIPTIONS: HISTORY, RESOURCES, AND USE

HORICON MARSH WILDLIFE AREA

Current State Ownership:	11,167 acres
Current Acreage Goal:	11,326 acres
Current Project Boundary:	11,762 acres

PROPERTY DESCRIPTION

Horicon Marsh WA is located in Dodge County, due north of the City of Horicon, due west of the City of Mayville, and approximately seven miles east of the City of Beaver Dam and 16 miles southeast of the City of Fond du Lac (Map B-1). It comprises roughly the southern third of the larger Horicon Marsh, the northern two-thirds of which is the Horicon National Wildlife Refuge. Acquisition for Horicon WA began in 1940 to provide public hunting, trapping, fishing, education, and other compatible recreational opportunities. The wildlife area consists of 11,167 acres owned in fee title by WDNR available for public hunting and other recreation.

Horicon Marsh (including the state-owned wildlife area and the federally-owned wildlife refuge) was an important duck hunting area in the late 1800's and early 1900's, both for commercial and recreational purposes. During that time, several shooting clubs leased large acreages for exclusive hunting by membership. Local hunters voiced dissatisfaction with this arrangement, as they had no place to hunt. Their challenge resulted in a Wisconsin Supreme Court decision in 1914 stating that since the marsh was part of the navigable Rock River, it must remain public. This ended the era of private shooting clubs.

During the early 1900's, the "Main Ditch" was dug from north to south through the center of the marsh to allow for muck farming. Various factors, including poor drainage and lack of fertility, caused this drainage venture to fail. The marsh vegetation slowly began to re-establish, although during years of drought large peat fires burned sizeable holes in the marsh. Due to the efforts of the Izaak Walton League (Horicon Chapter led by Louis "Curley" Radke), the Wisconsin Legislature passed the Horicon Marsh Wildlife Refuge Bill in 1927 for the restoration of the marsh. This bill provided \$250,000 for land acquisition and \$10,000 for building a dam in the City of Horicon. The bill is now embodied in Section 29.571 of the Wisconsin Statutes.

In 1930, despite the fact that insufficient funds were available to buy land, the dam was constructed in Horicon and the marsh was flooded. Flooded landowners successfully sued the state to open the dam, although this decision was later overturned by the Wisconsin Supreme Court. By 1940, the state was allowed to flood the marsh, with the

provision that flooded landowners must be compensated. The state (using federal Pittman-Robertson funds) was able to finally purchase land, totaling 7,000 acres. At the same time, the federal government purchased the northern two-thirds of the marsh. By 1946, the state had acquired 10,478 acres, providing sufficient area to flood the marsh to the maximum level set by the Public Service Commission (contour level 75.30 feet, Horicon datum).

Horicon Marsh is the largest contiguous freshwater cattail marsh in the lower 48 states, and was designated as a Wetland of International Importance under the Ramsar Convention in 1991. The entire Horicon Marsh (including both the wildlife area and federal wildlife refuge) is identified as an Important Bird Area (IBA) which supports significant numbers of waterfowl and shorebirds during migration. This IBA hosts the largest breeding population of redhead east of the Mississippi River, as well as significant numbers of wetland-dependent birds (Steele 2007). Significant opportunities for biodiversity conservation at Horicon WA include:

- Migratory bird habitat
- Breeding bird habitat (marsh birds, waterfowl, colonial nesting birds)
- Wintering bird habitat
- Bat habitat

Recreation

Horicon Marsh WA provides excellent hunting opportunities for waterfowl, deer, turkey, pheasant, mourning dove, and small game such as rabbit and squirrel. There are two waterfowl refuges on the marsh that are closed to waterfowl hunting, one on Burnett impoundment in the northwest part of the marsh and another in the south-central portion. There also is a wildlife refuge established near Palmatory Street that is closed to all hunting year-round. In recent years food plots have been planted by WDNR staff and in conjunction with sharecroppers for mourning dove and early goose season hunting. Sunflowers, corn, and winter wheat are generally the crops planted on these sites. An accessible hunting blind built in 2012 may be reserved daily on a first-come-first-served basis. A 45-acre dog training area is designated near the northwest corner of the property and may be used by anyone with a dog training permit as long as Horicon Marsh WA is specified on the permit.

Horicon Marsh is designated and managed as a State Fur Farm (NR 15.11, Wis. Admin. Code). Trapping and hunting of furbearing animals therefore is allowed only by written permit. Trapping rights for units within the marsh generally are awarded via an annual auction. Target species, trapping dates, methods of take, trapping units, and allowable access all may change annually based on wildlife populations and habitat conditions.

Anglers plying the waters in the interior of Horicon Marsh will find a fishery dominated by carp, black bullheads, and brown bullheads. Occasionally, Northern pike, black crappie, and white crappie are caught by anglers; however, current surveys indicate that these populations are very small. Other species present include bowfin, yellow bullhead, central mudminnow, bluntnose and fathead minnow, white sucker, largemouth bass,

black crappie, rock bass, bluegill, green sunfish, pumpkinseed, yellow perch, and walleye. The East Branch of the Rock River, a major tributary to the marsh, supports diverse riverine habitat that offers improved angling opportunities for walleye and Northern pike. Shore fishing opportunities exist on the Rock River in Horicon and the East Branch of the Rock River at the Greenhead boat launch and Northern Road.

Many visitors come to Horicon Marsh to view wildlife. Visitors are encouraged to explore the property on their own, but there are several featured overlooks and wildlife viewing areas. The Palmatory Street overlook, Horicon Marsh Education and Visitor Center, and the Greenhead Road parking lot provide excellent viewing opportunities.

Horicon Marsh provides some of the best bird watching in the state, with over 300 different species documented on the property. Spring and fall migrations are peak viewing times. Photography blinds located near the Education and Visitors Center may be used on a first-come-first-served basis. The Horicon Marsh Bird Festival, held each year in May during peak migration, offers visitors a variety of fieldtrips and other bird-related activities. WDNR staff often serve as lecturers and guides for this event.

Fourmile Island SNA, located along the east branch of the Rock River, is home to an historic rookery currently being used solely by great blue herons. The island is closed to the public from April 15-September 1 to prevent any disturbance to the birds. A surveillance web camera and solar panel were attached to one of the artificial nesting poles in 2014 to allow the public to view the great blue herons during their nesting season via the Internet.

Canoes, kayaks, and boats are allowed throughout the marsh. Canoe, kayak and boat launching is provided at Greenhead, Nebraska Street, Burnett Ditch, and Chestnut Street boat landings. A 6.7-mile-long canoe trail recently was designated through the middle of the marsh, starting at the Greenhead boat landing and terminating at the Nebraska Street boat launch. WDNR and the Friends of Horicon Marsh host a Marsh Paddle event each year.

There are five miles of designated and maintained hiking trails open to the public at Horicon Marsh WA. There are also many miles of dikes, pheasant stocking lanes, fire breaks, and interior access roads mowed for management purposes that are open to hiking year-round. The property is also open to snow shoeing and cross-country skiing in the winter, although there are no groomed trails specifically for these activities. An annual candlelight snowshoe event is held at the Education Center.

The Horicon Marsh Education and Visitor Center is a 25,000-square-foot facility that was purchased by the Department of Natural Resources in 1992. After a lengthy fundraising effort by the Friends of Horicon Marsh and WDNR, the existing building was largely redesigned and construction began in 2007. When the building reopened in March 2009 it offered several new amenities, including two 30-seat classrooms and a 120-seat auditorium with an 8x12-foot rear projection HD screen. In addition to housing the

Horicon Marsh Wildlife Conservation Education Program, it also serves as a satellite WDNR Service Center.

Since the opening in 2009, the Education and Visitor Center has become a popular destination for visitors to the area looking to explore the Horicon Marsh. Visitor rates have approached 50,000 per year, not including Education Program participants. On average, the Horicon Marsh Wildlife Education Program conducts 139 on-site programs per year, reaching over 4,000 participants. The Center also serves as a central location for larger events such as the Horicon Marsh Bird Festival, Archaeology Weekend, and Candlelight Snowshoe/Hike. For instance, in 2013 over 3,400 people visited the Center during 11 scheduled events.

There are significant changes coming to the Education and Visitor Center in 2014. In 2013, a \$3.2 million project started in an effort to design, construct, and install interpretive educational displays and exhibits at the Center. These exhibits will include a variety of means for educating and informing visitors about the Horicon Marsh. The primary exhibit area will be a 4,000-square-foot space to be known as the Explorium. Completion is expected in August, 2015. These new educational and interpretive features are expected to substantially increase visitor rates. Education Center staff expect the annual visitation rate to triple, resulting in 150,000 people visiting the Center each year.

Wildlife and Fishery Resources and Habitat Management

Horicon Marsh WA hosts abundant and diverse wildlife resources. Game species include white-tailed deer, turkey, waterfowl, mourning dove, snipe, rails, rabbit, squirrel, and ring-necked pheasant, and woodcock. Furbearers include coyote, fox, raccoon, skunk, opossum, mink, weasels, beaver, otter, and muskrat. Many non-game species also occur here, including a wide variety of birds, reptiles, amphibians, and bats. Over 300 species of birds have been recorded on Horicon Marsh, including waterfowl, waterbirds, shorebirds, songbirds, and raptors, and over half stay to breed.

Over the years, much of the management focus has been on providing and enhancing wetland and associated upland habitats for waterfowl and other game species by developing nesting cover, controlling water levels to encourage natural wetland food plants, and controlling competition from non-native invasive species. These activities also benefit the host of non-game wetland-dependent species using the property. More recently, management activities have expanded to include protecting the biodiversity of the marsh and addressing land use practices in the surrounding uplands of the local watershed that affect the marsh's long-term health and integrity.

Common habitat management techniques employed by wildlife management staff include prescribed burning, chemical treatments of undesirable vegetation, timber harvesting, timber stand improvement cuttings, mowing, manipulating water levels, sharecropping, planting prairie, removing fencelines and treerows, and targeting invasive species. Special projects also are conducted to assist in the recovery of threatened and endangered species.

Many wildlife and vegetative surveys are conducted on the property each year. Wildlife management staff band Canada geese, wood ducks, mallards, and mourning doves annually. Some of the surveys conducted include nest counts at Fourmile Island Rookery, waterfowl counts, vegetative diversity sampling, soil sampling (in cooperation with UW Stevens Point), prescribed burn evaluations, public use surveys, opening weekend duck bag checks, avian influenza sampling, botulism sampling, bird counts, furbearer harvest reports, wood duck house monitoring, bluebird nestbox monitoring, and monitoring of exotic invasive species.

Much of the fisheries management focus at Horicon Marsh has been on rough fish control, especially of the non-native invasive common carp. The property has a rich history of rough fish management, including one of the largest carp eradication projects in the state, which took place in 1973 and encompassed the entire Rock River watershed above Hustisford. The 1973 chemical treatment involved summer drawdowns (during two years due to rains in 1972) and aerial application of the fish toxicant antimycin. It was hoped that the effects of this treatment would be permanent, but within ten years carp once again dominated the fishery in the Marsh. Carp are able to re-enter the property from elsewhere within the watershed, and natural resource managers now realize that periodic chemical treatment for carp control will be necessary on an ongoing basis. Occasional spot treatments using rotenone were conducted in 1985 and larger chemical treatments of the state and federal portions of the Horicon Marsh were conducted during the winters of 1986 and 2000. Additional rough fish management activities have included the operation of fish traps, rough fish removal crews (in the 1950s), contract fishing, and predatory fish stocking. An electric carp barrier is operated below the Horicon Dam to exclude spawning migrations of carp from entering the marsh. A state-issued rough fish removal contract is currently in place for Horicon Marsh, Lake Koshong and the connecting portion of the Rock River, though execution of the contract often is sporadic.

The other primary fisheries management activity currently underway is stocking of Northern pike and walleye into the Horicon Marsh and its connected rivers. A Northern pike spawning marsh, located on the East Branch of the Rock River, has been utilized in the past. Providing a fishery within the confines of waterfowl management has proven to be challenging. High levels of sedimentation, low water flow and high turbidity all result in poor water quality and low dissolved oxygen for aquatic life. Water quality monitoring conducted within the lateral ditches of the marsh has documented dissolved oxygen concentrations below standards for supporting fish and aquatic life.

Wildlife SGCN and other rare or declining species tracked by the Wisconsin NHI program that have been documented at Horicon Marsh WA include marsh birds, colonial waterbirds, grassland/shrubland birds, waterfowl, and bats (Table 11; also, see Table 10).

Table 11. Rare or Declining Species of Horicon Marsh WA by Guild.

Species Guild	State Status			Total
	Special Concern	Threatened	Endangered	
Marsh birds	6	1	2	9
Colonial waterbirds	1	1	-	2
Grassland/shrub birds	2	-	-	2
Waterfowl	3	-	-	3
Bats	3	3	1	7

Administrative Facilities and Access

Horicon Marsh WA contains a significant amount of infrastructure, much of it developed over the years to improve wildlife habitat and public recreation. Infrastructure is shown on Maps B-2 through B-5.

There are currently 12 parking lots and four boat launches scattered around the periphery of the marsh to provide public access. A 6.7-mile-canoe/kayak trail starting at the Greenhead boat launch and terminating at the Nebraska Street boat launch has also been established in recent years. An accessible hunting blind was constructed on the east side of Burnett Impoundment in 2012. Shore fishing opportunities exist on the Rock River in Horicon and East Branch of the Rock River at the Greenhead boat launch and Northern Road. There are two photography blinds, a 1,250-foot-long boardwalk, five miles of designated hiking trails, a picnic shelter, three designated picnic areas, restrooms, a gift shop, and an educational facility, the Horicon Marsh Education and Visitors Center, open to the public. The interpretative displays in the Education Center will be completed and open to the public in 2015.

There are two waterfowl closed areas on Horicon WA, a 260-acre one at Burnett Ditch in the northwest part of the property (NR 11.02(3)(a), Wis. Admin. Code) and a 1,400-acre one in the south-central portion (NR 11.05(1)(a)). A 230-acre refuge closed to all hunting is located near Palmatory Street (NR 15.10), and Fourmile Island SNA is designated as a seasonal no-entry refuge to protect nesting birds (NR 15.03(5)(a)). Closed/restricted areas are shown on Map B-9.

The WDNR Wildlife and Fisheries mechanical and woodworking shop is located on Palmatory Street, along with two equipment storage sheds, an air monitoring station, three boathouses, a pit toilet for the public, and an observation deck. Fisheries Management operates a storage building located off of Swan Road.

The creation of eight large sub-impoundments allows wildlife staff to manipulate water levels to the desired levels. Approximately 12.5 miles of earthen dikes surround these impoundments and require significant staff time to maintain. There are 16 water control structures, 16 culverts, and two pumphouses used to divert and manipulate water levels

on the marsh. In addition, the WDNR maintains and operates the dam at the outlet of Horicon Marsh, which is on the Rock River in the City of Horicon.

Habitats and Vegetative Cover

Horicon Marsh harbors approximately 9,000 acres of wetlands, more than 1,300 acres of open water/aquatic communities, and approximately 31 miles of river, creek, channel and ditch. The dominant cover types are Emergent Marsh and Submergent Marsh. Bands of Shrub-carr of variable widths grow along river margins. Wooded uplands occur at the periphery of the core wetland areas and on 15 drumlin islands. These wooded uplands are typically small and low-diversity, with dense brushy undergrowth and weedy or invasive ground flora. Occasional open-grown bur and white oaks are found being engulfed by other trees and shrubs. Cottonwood and aspen are particularly common on the drumlins. Surrogate grassland in the form of old field vegetation or planted prairie occupies approximately 550 acres at Horicon Marsh, while 18 acres are still retained as cultivated cropland or food plots. More detailed descriptions of vegetation and natural communities are available in WDNR (2012a), pages 21-24.

A breakdown of generalized cover types for Horicon Marsh WA based on the Wisconsin Forest Inventory and Reporting System (WisFIRS) is given in Table 12. Cover types are shown on Map B-6.

Table 12. Horicon Marsh WA Cover Types.

Cover Type	% Cover
Emergent Vegetation	79
Forest	4
Grassland	5
Lowland Brush	2
Lowland Grass	7
Open Water	2

Forest Resources

According to current WisFIRS data, forested land on Horicon Marsh WA comprises some 490 acres. Much of this land is inaccessible for the purposes of management due to its location on islands within the marsh. Other forested land is located along the perimeter of the marsh. Forest types on the property include bottomland hardwood (46%), aspen (22%), central hardwoods (18%), and oak (10%). Bottomland hardwoods typically are composed of a combination of green ash, silver maple, cottonwood, black willow, and swamp white oak. Central hardwood stands can contain a mix of hardwood species including but not limited to black cherry, elm, black walnut, shagbark and bitternut hickories, hackberry, and honey locust. Upland oak species include white oak, red oak, black oak, and bur oak. Much of the forested acreage is relatively mature, with

stands of hardwoods on the marsh as old as 120 years of age, while other stands of recently regenerated aspen are very young.

State Natural Areas

Horicon Marsh WA contains one embedded SNA, the **Fourmile Island Rookery** (see Map B-1). This narrow island, located near the center of the WA, is forested with large oak, elm, basswood, aspen, and cottonwood, which are used for nesting by a variety of colonial waterbirds. For fifty years, this site harbored the largest colonial waterbird rookery in the state, with hundreds of nesting pairs of primarily great blue heron, along with great egret, black-crowned night-heron, and double-crested cormorant. Damage to trees from a 1984 windstorm, Dutch elm disease, and effects of heron guano build-up have reduced the nesting habitat in recent years. Most nesting currently is limited to artificial nesting platforms on the east side of the island. Fourmile Island Rookery is SNA Number 41 and was designated in 1965.

Primary Sites (see Map B-7)

Horicon Marsh Wildlife Area – 10,855 acres

Almost the entire Horicon Marsh WA has been identified as a Primary Site due to its extensive emergent wetlands, areas of open water, and seasonal mudflats. These habitats provide both breeding and migratory stopover habitat for a diverse array of waterfowl, shorebirds, and colonial waterbirds, including some rare or declining species. Horicon Marsh WA also provides important winter habitat for Arctic wanderers such as snowy owl, snow bunting, Northern shrike, and Lapland longspur.

Fourmile Island Rookery – 15 acres

This site comprises the Fourmile Island Rookery SNA, which is embedded within the Horicon Marsh WA. It has been identified as a Primary Site due to its importance as a rookery for colonial waterbird species such as great blue heron, great egret, black-crowned night-heron, and double-crested cormorant.

Soils, Geology, and Hydrology

Soils in those portions of Horicon Marsh WA that are subject to flooding are Houghton muck. Peat depths range from 3-10 feet, with an average of 4-5 feet. Upland soils at Horicon, including those of the drumlin islands within the marsh, are mostly silt loams.

The landforms of Dodge County were created by the Green Bay lobe of the Wisconsin glaciation during the Pleistocene era. Horicon Marsh WA lies within this landscape of rolling till plains, lake basins, and one of the highest concentrations of drumlins in the world. The Glacial Lake Horicon basin was carved out by glacial meltwater that dammed up behind a moraine. As the Rock River eroded the morainal dam, the lake drained, allowing the deposition of silt, clay and peat, setting the stage for the

development of Horicon Marsh. The bedrock underlying Horicon Marsh WA and surroundings is primarily dolomite, which is covered mostly by loess, glacial drift, alluvium, residuum, and lacustrine deposits.

Horicon Marsh WA lies within the Upper Rock River watershed. The Rock River forms at Horicon Marsh where its east and west branches conjoin. A dam on the Rock River in the town of Horicon allows artificial regulation of the waters of Horicon Marsh WA. The West Branch of the Rock River is a warmwater fishery that has its headwaters east of the Village of Brandon. It flows east and then south through mainly agricultural land, including many drained wetlands. The West Branch is the principle source of runoff, nutrient and sediment loading to the Horicon Marsh. The East Branch of the Rock River is also a warmwater fishery. Both the East and West Branches of the Rock River are listed as impaired waters by the WDNR due to pollution from total phosphorus, sediment, and suspended solids. Spring Brook originates from springs and flows into Burnett Ditch at the northwest corner of Horicon Marsh Wildlife Area. The Burnett Sanitary District discharges wastewater effluent to this creek. A number of ditches and dikes throughout Horicon Marsh WA create expanses of open water of various sizes and configurations. Level, flat-bottomed ditches closed at both ends hold water rather than draining it, while lift pumps flood areas behind the dikes, creating impoundments. Horicon Marsh is therefore seasonally flooded in some areas and permanently flooded in others.

Horicon Marsh is listed on the Impaired Waters List due to low dissolved oxygen levels and degraded habitat resulting from elevated levels of total phosphorus and suspended sediment. These pollutants originate from a mix of point and nonpoint sources.

Cultural Resources

Horicon Marsh and its margins have a long history of human occupation. For thousands of years, Native Americans traveled along and through the marsh, utilizing the abundant and varied aquatic resources of the marsh and its adjacent grasslands. Sites associated with Indian peoples include a variety of linear, conical, and effigy burial mounds, as well as both prehistoric and historic camp sites and workshops. As with cultural explorations in other areas of the state, while many sites have been recorded many more remain to be found.

Historic Euro-American occupation of the area saw the building of nearby towns, farms, homesteads, and cemeteries, as well as dramatic (and sometimes ill-considered) development of the marsh itself. Variously dammed, drained, and burned, the marsh today – the largest freshwater cattail marsh in the US – is managed as wildlife habitat by the US Fish & Wildlife Service on the north and by Wisconsin DNR on the south.

On the WDNR-owned portion of the marsh, State Statutes (44.40) as well as Manual Code (1810.10) require that any activities with the potential to disturb archaeological sites will only be undertaken after consultation with the Department Archaeologist. Section 106 of the National Historic Preservation Act applies to undertakings on the federal portion of the marsh.

SHAW MARSH WILDLIFE AREA

Current State Ownership:	928 acres
Current Acreage Goal:	1,330 acres
Current Project Boundary:	1,380 acres

PROPERTY DESCRIPTION

Shaw Marsh Wildlife Area (WA) is located about one mile south of Beaver Dam in Dodge County (Map C-1). The property consists of 928 acres owned in fee title by WDNR and available for public hunting and other recreation. There also are 12 acres of easements closed to public access. Acquisition for Shaw WA began in 1960 to protect the wetland for wildlife and to provide a public hunting area.

A significant opportunity exists at Shaw Marsh WA to promote grassland bird habitat through continued prairie planting and wetland restoration.

Recreation

During the fall hunting season Shaw Marsh is stocked with pheasants from the State Game Farm to enhance public hunting opportunities. Various successful Learn to Hunt Pheasant programs also have taken place here. Because of this, and also due to its proximity to the City of Beaver Dam, Shaw Marsh receives heavy pheasant hunting pressure. In addition to pheasant hunting, very good opportunities exist for deer, turkey, waterfowl, and small game hunting. Occasionally WDNR staff coordinate with sharecroppers to plant sunflowers and wheat on the property to provide hunting fields for mourning doves and geese. Furbearer resources such as muskrat and raccoon also are abundant on Shaw Marsh, providing good trapping and hunting opportunities. In terms of wildlife viewing, Shaw Hill Road to the west offers an excellent overlook of the marsh, while Parker Road provides good waterfowl and wading bird viewing in the spring.

Wildlife Resources and Habitat Management

Habitat management on this property has focused primarily on grassland and wetland restoration and maintenance, with some attention also going to forest stands. Although there is little forested acreage on this property, Forestry and Wildlife staff continue to maintain the oak, hickory, and aspen components of the woodlots for wildlife benefits. Wildlife staff employ a number of techniques to maintain these habitats including periodic prescribed burns, invasive brush and tree removal, chemical spot treatments for exotic invasive vegetation, sharecropping, periodic timber harvest, and timber stand improvement thinning. Sharecropping is used as an intermediate tool to provide a ‘clean slate’ for new prairie plantings and also to attract wildlife for hunting and wildlife viewing opportunities. Habitats on this property are well-suited for white-tailed deer,

wild turkey, ring-necked pheasant, waterfowl, wading birds, sandhill cranes, woodcock, furbearers, mourning doves, small game, as many non-game grassland- and wetland-dependent birds.

No fisheries management activities are planned for the property. Shultz Creek currently supports a limited forage fishery. Shaw Brook currently supports a warmwater sport fishery containing Northern pike, largemouth bass, central mudminnow, fathead minnow, white sucker, blackstripe topminnow, brook stickleback, tadpole madtom, black and yellow bullhead, bluegill, pumpkinseed, green sunfish, fantail darter and Johnny darter. There may be seasonal movement of fish from the Beaver Dam River into Shaw Brook's lower reaches.

Only two wildlife SGCN are known from Shaw Marsh WA: willow flycatcher and blue-winged teal. No rare species tracked by NHI are known from the property. WDNR (2012a) contains a list of rare or declining species for the entire HSPG property group.

Administrative Facilities and Access

There are six gravel parking lots maintained on this property for public access. All were graded and re-graveled in 2012 using state Stewardship funding aimed at improving infrastructure and access. One building is present on the property off Blackbird Road and is maintained by WDNR Wildlife Management. WDNR Law Enforcement also utilizes storage space in this building through a 2012 Memorandum of Understanding with Wildlife Management. Access to the east side of Shaw Brook for management purposes is currently being planned. There is a degraded roadbed running north to south from Parker Road to the parking lot on Blackbird Road. This is currently only used as a firebreak but could potentially be used as a berm to help manage and maintain water levels on the west half of the marsh. Infrastructure is shown on Map C-2.

Habitat and Vegetative Cover

Shaw Marsh has approximately 900 acres of wetlands and approximately four miles of channels, ditches and creek. The main cover types on the property are Emergent Marsh and wet meadows. A small area of Shrub-carr occurs along the west-central edge of the marsh, and is typified by willows and dogwoods with an understory of reed canary grass. Wet meadows are dominated by reed canary grass but are occasionally punctuated by small areas containing native species typical of Wet-mesic Prairie such as golden Alexander. Wooded uplands occur at the periphery of the core wetland areas and on drumlin islands. Very large black and bur oaks and sizeable white oaks, shagbark hickory, and swamp white oaks grow in these areas, but their ground layers are devastated by heavy infestations of aggressive or non-native invasive species such as garlic mustard. Approximately 187 acres of former cropland has been converted to prairie at Shaw Marsh. Some 20 acres currently are sharecropped and are planted to row crops and small grains, while 20-40 acres are share-cropped for annual marsh hay mowing. More detailed descriptions of vegetation and natural communities are provided in WDNR (2012a), pages 21-24.

A breakdown of generalized cover types for Shaw Marsh WA based on the Wisconsin Forest Inventory and Reporting System (WisFIRS) is given in Table 13. Cover types are shown on Map C-3.

Table 13. Shaw Marsh WA Cover Types.

Cover Type	% Cover
Emergent Vegetation	21
Forest	2
Grassland	22
Lowland Grass	54

Forest Resources

According to current WisFIRS data, there are only 29 acres of forested land on Shaw Marsh WA, accounting for just two percent of the total property acreage. Forest types on the property include central hardwoods (62%), oak (10%), aspen (10%), miscellaneous deciduous (10%), and bottomland hardwoods (7%). Invasive exotic plants and the exotic insect pest emerald ash borer will create significant challenges in maintaining the current acreage of forested land on the property. All the forested stands on the property have been found to contain invasive exotic plants. Invasive exotic species found throughout the property include common buckthorn, honeysuckle, multi-flora rose, garlic mustard, and reed canary grass.

Primary Sites

No primary sites were designated at Shaw Marsh WA.

Soils, Geology, and Hydrology

At Shaw Marsh WA, wetland soils include Houghton and Palms muck with depths up to 60 inches; some lower layers may have peat. Upland soils at Shaw Marsh are mostly silt loams with a lesser component of Pella silty clay loam.

The landforms of Dodge County were created by the Green Bay lobe of the Wisconsin glaciation during the Pleistocene era. Shaw Marsh lies within this landscape of rolling till plains, lake basins, and one of the highest concentrations of drumlins in the world. The bedrock underlying Shaw Marsh and surroundings is primarily dolomite, which is covered mostly by loess, glacial drift, alluvium, residuum, and lacustrine deposits.

Shaw Marsh lies within the Beaver Dam River watershed. Water quality monitoring indicates that polluted runoff effects are severe on most streams and lakes within this watershed. Because of this, WDNR selected the watershed as a priority project in 1991. Shaw Brook and its tributary, Schultz Creek, both of which flow through Shaw Marsh, were partially channelized in the past. Shaw Brook is a cool-water stream with no listed

impairments. Schultz Creek is a cool headwater stream and is rated by the WDNR as impaired due to pollution from sediment/total suspended solids. Drainage tiles and ditches were installed here, and several artificial ponds were excavated.

Cultural Resources

According to the State Historical Society, there currently are no records of any sites of architectural, historical, or archaeological significance on the property.

SINNISSIPPI PUBLIC HUNTING GROUND

Current State Ownership:	300 acres
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PROPERTY DESCRIPTION

Sinnissippi Public Hunting Ground is located approximately 2 miles south of the City of Horicon in Dodge County, on the north shore of Lake Sinnissippi (Map D-1). The property comprises 300 acres owned in fee title by WDNR, purchased in 1975 and 1984. It property was acquired under the authority of the Extensive Wildlife Habitat Program, a statewide program that permits the purchase of small-acreage sites outside of existing property project boundaries.

Sinnissippi offers modest management opportunity to promote grassland bird habitat through prairie and wetland restoration.

Recreation

The major recreational uses of this property are hunting and fishing. For its size, Sinnissippi receives heavy hunting pressure in the fall, primarily for deer, pheasant, and waterfowl hunting. The property also receives some use by hikers and wildlife watchers. A short quarter-mile hike up the dirt two-track from the parking area offers a good vantage point with excellent views of the property and Lake Sinnissippi.

Wildlife Resources and Habitat Management

Habitat management on this property has focused primarily on grassland restoration and timber stand improvement. There is little potential to directly manage wetlands via water level manipulation due to the property's small size and likely effects on surrounding private ownerships. Grasslands and wetlands are managed with periodic prescribed burns to rejuvenate vegetation and with chemical spot treatments to control exotic invasive plants. Timber harvests and timber stand improvement activities have been conducted on Sinnissippi to promote the regeneration and vigor of trees such as aspen, oaks, sugar maple, and shagbark and bitternut hickories. The property is stocked with pheasants in the fall.

The habitat on Sinnissippi is well suited for white-tailed deer, wild turkey, ring necked pheasant, waterfowl, wading birds, and many other species of grassland- and wetland-dependent birds, frogs, turtles, small game and furbearers.

No rare species tracked by NHI are known from the property.

Administrative Facilities and Access

Sinnissippi Public Hunting Ground has very little infrastructure (Map D-2). There is one gravel parking lot near the center of the property on Horseshoe Road. A gated, unimproved service road runs from the parking lot all the way to Lake Sinnissippi and is used by WDNR staff for management purposes. Another cable gate is located a quarter mile north from the parking lot.

Habitat and Vegetative Cover

Habitats at Sinnissippi primarily consist of wetlands and open water; only about 27% of the property is uplands. The main cover type is emergent marsh dominated by cattail. Sedge and rush communities exist in pockets around open water and ditches. Small areas of Shrub-carr occur along the edges of the marsh/upland interface, typified by willows and dogwoods with an understory of reed canary grass. Wooded uplands occur on drumlin islands and along spoil piles from previous ditching. Large sugar maple, basswood, and aspen are dominant in the southernmost woodlots, while black oak, bur oaks, sizeable white oaks, shagbark hickory, and bitternut hickory occur elsewhere on the property. Bottlebrush grass is thriving in the understory of the east-central woodlot. Invasive species such as honeysuckle and common buckthorn are taking over the understory in most of the woodlots. Garlic mustard has been documented, but there is potential to eliminate it on the property. Approximately 52 acres of former cropland have been converted to native prairie grasses and forbs. Sharecropping was discontinued because of topography (steep hillsides with up to 30% slopes) and highly erodible soils.

A breakdown of generalized cover types for Sinnissippi based on the Wisconsin Forest Inventory and Reporting System (WisFIRS) is given in Table 14. Cover types are shown on Map D-3.

Table 14. Sinnissippi Public Hunting Ground Cover Types.

Cover Type	% Cover
Emergent Vegetation	49
Forest	8
Grassland	21
Open Water	21
Upland Brush	1

Forest Resources

Sinnissippi currently contains six forested stands with a total of 31 acres of forest according to the most recent WisFIRS data. Forest cover types on the property include oak (42%), aspen (26%), central hardwoods (16%), and northern hardwoods (16%). Recent management activities were conducted in four stands to regenerate aspen, thin oak and hickory, and release sugar maple, oak, hickory, cherry, and basswood.

Soils, Geology, and Hydrology

At Sinnissippi, wetland soils include Houghton muck, Saprists, and Aquents with depths up to 60 inches. These soils are very poorly drained and are subject to frequent and very long periods of flooding. Upland soils are mostly silt loams, with a lesser component of silty clay loam, loam, and fine sandy loam.

The landforms of Dodge County were created by the Green Bay lobe of the Wisconsin glaciation during the Pleistocene era. Sinnissippi lies within this landscape of rolling till plains, lake basins, and one of the highest concentrations of drumlins in the world. There are two main drumlins on this property which make up the majority of the uplands.

Sinnissippi lies within the Sinnissippi Lake watershed, which includes the main stem of the Rock River from the dam at Horicon downstream to the Watertown dam and all the streams which flow into the Rock in this reach. Water quality monitoring indicates that polluted runoff effects are severe on most streams and lakes within this watershed, particularly for high levels of phosphorus (this stretch of the Rock River is rated as an Impaired Water by the WDNR). Ditches were installed here in an attempt to drain the area. With the installation of the Hustisford dam and subsequent creation of Lake Sinnissippi to the south, most of the wetland soils have become entirely inundated with water.

Cultural Resources

According to the State Historical Society, there currently are no records of any sites of architectural, historical, or archaeological significance on the property.

HORICON ROUGH FISH STATION

PROPERTY DESCRIPTION

The Horicon Rough Fish Station is a very small parcel (1.41 acres) located less than one mile south of the City of Horicon, on the south bank of the Rock River (Map D-1). The parcel was originally leased in 1957 by the Wisconsin Conservation Department (precursor to the WDNR) as an access point to the Rock River for rough fish management operations. The parcel was named the Rock River Fisheries Station Trap #1 and was one of several stations on the Rock River where state crews operated carp traps and conducted seining to remove carp from the river. As part of the station, the state constructed a small building and a rough fish loading platform on the property and a rough fish trap was constructed in the Rock River at this location. The parcel was officially purchased in 1961 to secure rough fish management operations at this location and to provide public access for hunting and fishing on the Rock River if fisheries management operations ceased. By 1970, rough fish management methods had shifted towards chemical control and operation of the rough fish station ceased. The infrastructure, including the building, loading platform and fish trap, was removed.

Current vegetation on the property includes mowed lawn, disturbed wetlands consisting of reed canary grass and cattails, and shrubs.

The property currently provides public access opportunities for shore fishing, ice fishing and launch sites for canoes and other small craft. Public access currently is provided via foot travel. The fishery at this location includes Northern pike, walleye, bowfin, yellow, black and brown bullhead, central mudminnow, bluntnose and fathead minnow, white sucker, largemouth bass, black crappie, rock bass, bluegill, green sunfish, pumpkinseed and yellow perch. Current management of the property includes mowing, boundary and sign posting, and routine maintenance.

FINDINGS AND CONCLUSIONS

This section presents findings and conclusions based on all the regional and property-specific data contained in this RPA. The first two sub-sections summarize existing conditions and trends on the properties and in the region, including the properties' recreational needs, opportunities, limitations and significance and the ecological significance and capability of the properties. The final sub-section presents the major findings and conclusions. This summary is not meant to be an exhaustive overview, but rather highlights the major themes brought forth in the RPA.

These findings and conclusions will help guide future management, use, and development of the HSPG properties by highlighting significant opportunities and limitations on these properties, and setting the stage for a reasonable range of management alternatives that may be considered during the master planning process. As planning continues, these conclusions will help define the Vision and Goals of the future Master Plan.

THE HSPG PROPERTIES

The Horicon-Shaw Planning Group includes four properties located in Dodge County in southeast Wisconsin (Map A). There are two Wildlife Areas, Horicon Marsh and Shaw Marsh. Horicon Marsh contains an embedded State Natural Area, Fourmile Island Rookery. The third property, Sinnissippi Public Hunting Ground, is an Extensive Wildlife Habitat parcel. The fourth property is a very small Fishery parcel known as the Horicon Rough Fish Station. In total, these properties comprise 12,396 acres of state protected and managed land.

Open wetlands and water are dominant natural features on the HSPG properties. Some of these habitats exist in tracts that are extensive or that are regionally rare or significant. Notably, Horicon Marsh WA is part of the greater Horicon Marsh, the largest fresh-water cattail marsh in the United States. Open wetlands, including emergent and submergent marshes, sedge meadows, and shrub swamps, comprise approximately 81% of land cover in the plan area. Aspen, oak and other upland hardwoods, grasslands, upland brush, and agriculture make up the remainder.

The plan area is embedded in a mostly rural landscape dominated by agriculture. However, several local population centers, including Horicon, Beaver Dam, Waupun, and Mayville, are located close by and the larger, heavily populated cities of Madison and Milwaukee are only about an hour's drive away. Dodge County has a higher proportion of public land (8.3%) than surrounding counties, but still far below the 23% for the state as a whole. Therefore, the HSPG properties do receive fairly significant pressure for recreational use, especially at certain times of the year. Dodge County is in a densely populated part of the state that has exhibited faster-than-average population growth over the past decade or so. This growth is expected to continue through 2040, driven largely by increases in Dane, Green, Rock, and Sauk counties. The Dodge County population also is expected to grow through this period, though at a more modest pace. This is likely

to affect the HSPG properties, as regional population size and growth can be significant drivers of recreational demand on public lands. Like other surrounding counties and the state as a whole, the population of Dodge County is aging. Dodge County is projected to have between 25 and 30% of its population over the age of 65 by 2040.

Economically, Dodge County and the surrounding region are in transition. There is a shift away from manufacturing and towards a more services-based economy, with sectors such as health care and social assistance, tourism, and recreation showing gains.

RECREATIONAL SIGNIFICANCE AND CAPABILITY

REGIONAL CONTEXT

Recreationally, the region of south-central Wisconsin where the HSPG properties are located is notable for its diverse environments and unique geological features that support a variety of recreational activities. It is also notable for its mix of rural and urban influences, comparatively low proportion of public recreation land, and effects of a relatively dense and growing population. These characteristics are reflected in activities with high participation rates and in the recreational issues and needs and regional supply shortages identified by residents. Activities with high participation rates in this region include traditionally urban/developed-setting pursuits such as visiting a dog park and outdoor tennis as well as nature-based/less-developed-setting activities such as nature-based educational programs, kayaking, and dog sledding. Identified supply shortages reflect demand for recreation in both urban (dog parks, ice skating rinks, tennis courts) and rural (backcountry camping, natural areas) settings. Identified issues such as increased competition for natural resources, increasing multiple-use recreation conflicts, and overcrowding, as well as requests for both more ATV opportunities and protection of silent sport areas illustrate population pressures and competition for limited recreation land.

Dodge County is largely rural with an abundance of wetlands and surface waters, and supports recreational activities in mostly undeveloped or low-development settings. The county's federal and state lands (including the properties in the plan area) are the main providers of public land open to the traditional outdoor pursuits of hunting, fishing, and trapping, activities which are popular in Dodge County. Cities, towns, and villages offer facilities in more developed settings such as playgrounds and ball courts. County and municipal parks do not allow hunting or trapping.

Projected population growth in Dodge County and in the surrounding region likely will lead to increased demand for outdoor recreational opportunities, and increased usage of public lands. A generally aging population may increasingly request physically less demanding pursuits such as wildlife viewing as well as more accessible infrastructure.

PROPERTY USES, CAPABILITIES, AND LIMITATIONS

The HSPG properties' proximity to several local population centers and location in a region of the state that is both densely populated and has a low proportion of public recreation land are significant from a recreational perspective. These properties provide public land nearby to various local towns and cities and are easily accessible from the larger Madison and Milwaukee metropolitan areas. The HSPG properties, therefore, are and will continue to be important providers of public outdoor recreational opportunities close to where people live and where recreational demand is high.

The main recreational uses of the HSPG properties are the traditional outdoor pursuits of hunting, fishing, and trapping. The properties receive heavy hunting use, especially for deer, waterfowl, and pheasant hunting but also for turkey, mourning dove, and small game such as rabbit and squirrel. Trappers pursue primarily muskrat, mink, and raccoon, along with lesser numbers of beaver, otter, fox, coyote, opossum, skunk, and weasels. Horicon WA and Horicon Rough Fish Station offer the best angling opportunities, with both shore fishing and boat access sites. The properties also are used for other outdoor recreation, such as wildlife viewing, hiking, paddling, and cross-country skiing and snow-shoeing.

Horicon WA is unique among the four properties in the plan area. It is much larger in size than the others, has considerably more infrastructure, and offers facilities and recreational opportunities that the other properties do not, e.g., hunting and photography blinds, dog training area, designated trails. Horicon WA is well-known as an excellent place for wildlife viewing and nature enjoyment. The annual Horicon Marsh Bird Festival is one of the most popular bird festivals in the state, and has even received some national visibility. Horicon WA is well-poised to meet additional demand for bird-watching, an activity that has greatly increased in popularity in recent years. The presence of the Horicon Marsh Education and Visitors Center also presents unique opportunities. This already excellent facility is one of WDNR's premier centers for wildlife conservation education. An extensive new area of interpretive displays and exhibits currently is under construction, which will significantly expand the facility's educational offerings, appeal, and reach.

Potential exists on the HSPG properties to enhance existing recreational opportunities or develop additional ones, particularly in cooperation with external partners such as the Friends of Horicon Marsh, Ducks Unlimited, and Horicon Marsh Bird Club. Examples may include interpretive features and accessible viewing platforms, hunting blinds, or shore fishing opportunities. Kayaking and stand-up paddling/paddleboarding both are activities projected to show increasing demand in Wisconsin over the next five years, and the HSPG properties may offer opportunity to meet some of this demand.

There may be potential to provide a public shooting range on the HSPG properties. Shooting opportunities are available at various facilities in Dodge County but many of these are not open to the general public. Increasing public access to shooting ranges is part of WDNR's efforts to promote responsible gun ownership and safe hunting

experiences. Target shooting is also becoming more popular as a sport. Shooting ranges, whether on public lands or leased private facilities, provide a valuable service, though noise, safety, and environmental concerns can cause conflicts if the activity is not well managed or the facility appropriately sited.

Some opportunity may exist to increase access to private land for public hunting in the plan area by seeking renewal of existing leases and soliciting additional enrollments of private land in the Voluntary Public Access (VPA) program now that this program has been reauthorized as part of the 2014 Farm Bill.

The HSPG properties are not well suited to meeting most of the activities projected in the 2011-2016 SCORP (WDNR 2012) to have increasing demand in Wisconsin (e.g., adventure racing; developed/RV camping; visit a dog park; soccer outdoors; climbing), nor to addressing many of the regional nature-based supply shortages (campsites, parks, and land-based trails) identified for the Southern Gateways Region in the 2005-2010 SCORP (WDNR 2006c). Recreational activities in developed settings, camping, and the majority of land-based trails (biking; horseback riding; ATV; snowmobile) generally are not permitted on WAs and SNAs; uses cannot be permitted if they are incompatible with the primary purpose of the property. Many soils on the plan area properties are wet, poorly drained, or permanently or seasonally inundated. Steep slopes and erodible soils pose limitations in some upland areas (see maps B-10 and C-5).

The traditional consumptive activities and other nature-based pursuits currently available are the most compatible with the properties' primary purpose, dominant wetland vegetation communities, and mostly rural character, as well as with the physical limitations imposed by soils and topography.

ECOLOGICAL SIGNIFICANCE AND CAPABILITY

REGIONAL CONTEXT

The HSPG properties are contained within the Southeast Glacial Plains Ecological Landscape, a region notable for its abundance of glacial features (till plains, lake basins, drumlins, etc.), acreage of both open and impounded water, and diverse wetland communities. Emergent and submergent marshes, sedge meadow, and shrub-carr are wetland types for which the HSPG properties offer significant management opportunities. The Horicon Marsh COA, which encompasses all of Horicon Marsh WA, is considered to be a high-quality wetland community of State Significance due to its extensive size, impounded areas with the ability to manipulate water levels, and associated upland grass. Some opportunity may exist to restore examples of wet-mesic prairie, an exceptionally rare community in the state. Twenty-seven rare species, including 17 species of birds, have been documented on the plan area properties.

PROPERTY OPPORTUNITIES

Globally Important Bird Habitat

Horicon Marsh WA is part of the greater Horicon Marsh, the largest fresh-water cattail marsh in the United States. Horicon Marsh was designated as a Wetland of International Importance under the Ramsar Convention in 1991 and as an Important Bird Area of Global significance in 2001. The large emergent wetlands and associated open-water areas of Horicon Marsh WA, combined with seasonal mudflats, offer waterfowl, shorebirds, and colonial waterbirds diverse habitats during the migratory seasons. The site also provides important breeding habitat for both common and rare or declining waterfowl, marsh birds, and colonial waterbirds, and hosts the largest breeding population of redhead east of the Mississippi River. Horicon Marsh WA provides important winter habitat for wandering Arctic birds. Fourmile Island SNA, located within Horicon Marsh WA, harbors one of the largest colonial waterbird rookeries in the state.

Grassland Bird Habitat

At Shaw Marsh WA and, to a lesser extent, at Sinnissippi Public Hunting Ground, a significant opportunity exists to promote much-needed grassland bird habitat within a largely agricultural landscape. The continued conversion of former croplands to native prairie plantings will expand the area of open landscape in natural cover (already fairly extensive at Shaw Marsh). Large areas within Shaw Marsh show evidence of degraded but unplowed Wet-mesic Prairie; restoration of these areas could provide a type of grassland that is usable by a greater variety of bird species than the existing reed canary grass-dominated wetlands.

Bat Conservation

Fall acoustical surveys conducted by WDNR at Horicon Marsh WA in 2005 recorded seven bat species. Horicon Marsh WA is in close proximity to the Neda Mine SNA, the largest bat hibernaculum in the state (and possibly the Midwest), and likely serves as an important foraging area for resident bats. Horicon Marsh provides an important source of insects, especially during the fall when bats need to build up fat reserves for winter hibernation and long-distance migration.

Prairie Restoration

At Shaw Marsh, an opportunity may exist to restore Wet-mesic Prairie and Southern Sedge Meadow, as areas on the property show evidence of remnant, unplowed sod. Wet-mesic Prairie is exceptionally rare in Wisconsin, and its protection and restoration is vital to the preservation of Wisconsin's native biodiversity, including SGCN that are specialists to this community type.

LIMITATIONS AND CHALLENGES

Hydrologic alteration, impaired water quality, development pressures, and invasive species all represent major challenges to maintaining the ecological integrity of the HSPG properties.

Many wetlands within the Southeast Glacial Plains EL, including in the plan area, already have been altered or lost due to conversion to agricultural use, dredge spoil disposal, stream channelization, road construction, and residential development. Residential and recreational developments (often with associated hydrological modifications such as ditching, diking, channelization, pond construction, and groundwater withdrawals) and infrastructure construction such as roads, power lines, culverts and ditches can disrupt hydrology, serve as a source of pollutants, facilitate the spread of invasive species, and act as physical barriers inhibiting or preventing the movements of some wildlife species. Water quality issues affecting the wetlands of the HSPG properties stem largely from agricultural, urban/suburban, and road runoff. This runoff introduces excessive sediments and nutrients that have fostered exceptional growth of cattails, particularly in Horicon Marsh WA, resulting in a near-monoculture of this aggressive plant in many places. Non-native carp, which are abundant at Horicon Marsh WA, further reduce water quality by roiling marsh sediments and uprooting aquatic plants.

Other invasive species also present a significant threat. Non-native invasive species thrive in newly disturbed areas, but also may invade and compromise high-quality natural areas. They establish quickly, tolerate a wide range of conditions, are easily dispersed, and are relatively free of the diseases, predators, and competitors that kept their populations in check in their native range. Non-native invasive plants can out-compete and even kill native plants by monopolizing light, water, and nutrients, and by altering soil chemistry and mycorrhizal relationships. In situations where non-native invasive plants become dominant, they may even alter ecological processes by limiting use of prescribed fire, modifying hydrology, impeding tree regeneration, and ultimately impacting forest composition. Eighteen non-native invasive species are widespread within the HSPG and pose the greatest immediate threat to native species diversity, rare species habitats, or high-quality natural communities. These include reed canary grass, hybrid cattail, purple loosestrife, common buckthorn, garlic mustard, and common carp.

SUMMARY

The HSPG properties contain significant wetland and open-water habitats, including emergent and submergent marsh, sedge meadow, shrub swamp, and seasonal mudflats, as well as associated upland grasslands. The extensive wetlands have been internationally recognized for their importance to both breeding and migrating birds, including waterfowl, waterbirds, shorebirds, and, to a lesser extent, landbirds. They also provide important foraging habitat for a number of rare bats.

Recreationally, the properties are important providers of public recreation land in close proximity to local and regional population centers. Deer, waterfowl, and upland game

FINDINGS AND CONCLUSIONS

hunting, wetland furbearer trapping, and fishing are popular pursuits. The properties also are used for wildlife viewing, especially for waterfowl, pelicans, herons, rails, and other wetland birds. Other activities include dog training, hiking, paddling, cross-country skiing, nature enjoyment, and environmental education. These activities are compatible with the properties' physical characteristics and mostly rural character. There is some potential to accommodate additional lightly-developed opportunities such as viewing platforms, hunting blinds, and interpretive features. The properties will also be evaluated for potential to site a public shooting range. However, wet or erodible soils limit development of most trails and other recreational infrastructure. Low-impact, outdoor, nature-based activities are and will continue to be these properties' best and most appropriate recreational use.

With projected increases in population growth and development pressure, recreational demand on these properties will increase. Thoughtful planning and management and creative partnerships will be needed to protect and maintain ecological values while providing a high-quality recreational experience for an increasing number of users.

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APPENDIX A: SPECIES LIST

The following table provides scientific names for species referred to by common name in the RPA.

Common Name	Scientific Name
Angelica	<i>Angelica atropurpurea</i>
arrowhead	<i>Sagittaria spp.</i>
aspen	<i>Populus tremuloides, P. grandidentata</i>
basswood (American)	<i>Tilia americana</i>
beaver	<i>Castor canadensis</i>
bitternut hickory	<i>Carya cordiformis</i>
black bullhead	<i>Ameiurus melas</i>
black cherry	<i>Prunus serotina</i>
black crappie	<i>Pomoxis nigromaculatus</i>
black oak	<i>Quercus velutina</i>
black walnut	<i>Juglans nigra</i>
black-crowned night-heron	<i>Nycticorax nycticorax</i>
blackstripe topminnow	<i>Fundulus notatus</i>
bluebird (Eastern)	<i>Sialia sialis</i>
bluegill	<i>Lepomis macrochirus</i>
blue-winged teal	<i>Anas discors</i>
bluntnose minnow	<i>Pimephales notatus</i>
bottlebrush grass	<i>Elymus hystrix</i>
bowfin	<i>Amia calva</i>
brown bullhead	<i>Ameiurus nebulosus</i>
bulrush	<i>Scirpus spp.</i>
bur oak	<i>Quercus macrocarpa</i>
bur-reed	<i>Sparganium eurycarpum</i>
Canada bluejoint grass	<i>Calamagrostis canadensis</i>
cattail	<i>Typha x glauca, T. latifolia and T. angustifolia</i>
central mudminnow	<i>Umbra limi</i>
common buckthorn	<i>Rhamnus cathartica</i>
common carp	<i>Cyprinus carpio</i>
common reed	<i>Phragmites australis</i>
cottontail rabbit	<i>Sylvilagus floridanus</i>
cottonwood	<i>Populus deltoides</i>
coyote	<i>Canis latrans</i>
dogwoods	<i>Cornus spp.</i>
double-crested cormorant	<i>Phalacrocorax auritus</i>
duckweeds	<i>Lemna spp.</i>
elm	<i>Ulmus spp.</i>
fantail darter	<i>Etheostoma flabellare</i>
fathead minnow	<i>Pimephales promelas</i>

APPENDIX A – Species List

Common Name	Scientific Name
fox	<i>Vulpes vulpes, Urocyon cinereoargenteus</i>
garlic mustard	<i>Alliaria petiolata</i>
giant goldenrod	<i>Solidago gigantea</i>
golden Alexander	<i>Zizia aurea</i>
goose (Canada)	<i>Branta canadensis</i>
gray partridge	<i>Perdix perdix</i>
great blue heron	<i>Ardea herodias</i>
great egret	<i>Ardea alba</i>
green ash	<i>Fraxinus pennsylvanica</i>
green sunfish	<i>Lepomis cyanellus</i>
hackberry	<i>Celtis occidentalis</i>
hickory	<i>Carya spp.</i>
honey locust	<i>Gleditsia triacanthos</i>
honeysuckle	<i>Lonicera spp.</i>
hybrid cattail	<i>Typha x Glauca</i>
Johnny darter	<i>Etheostoma nigrum</i>
largemouth bass	<i>Micropterus salmoides</i>
mallard	<i>Anas platyrhynchos</i>
maple	<i>Acer spp.</i>
milfoils	<i>Myriophyllum spp.</i>
mink	<i>Neovison vison</i>
mourning dove	<i>Zenaida macroura</i>
multiflora rose	<i>Rosa multiflora</i>
muskellunge	<i>Esox masquinongy</i>
muskrat	<i>Ondatra zibethicus</i>
New England aster	<i>Aster novae- anglicae</i>
Northern pike	<i>Esox lucius</i>
oak	<i>Quercus spp.</i>
opossum	<i>Didelphis virginiana</i>
otter	<i>Lutra canadensis</i>
pondweeds	<i>Potamogeton spp.</i>
prairie cordgrass	<i>Spartina pectinata</i>
pumpkinseed	<i>Lepomis gibbosus</i>
purple loosestrife	<i>Lythrum salicaria</i>
raccoon	<i>Procyon lotor</i>
red oak	<i>Quercus rubra</i>
redhead	<i>Aythya americana</i>
red-osier dogwood	<i>Cornus stolonifera</i>
reed canary grass	<i>Phalaris arundinacea</i>
ring-necked pheasant	<i>Phasianus colchicus</i>
rock bass	<i>Ambloplites rupestris</i>
sawtooth sunflower	<i>Helianthus grosseserratus</i>
shagbark hickory	<i>Carya ovata</i>
silky dogwood	<i>Cornus amomum</i>

APPENDIX A – Species List

Common Name	Scientific Name
silver maple	<i>Acer saccharinum</i>
skunk	<i>Mephitis mephitis</i>
smooth brome	<i>Bromus inermis</i>
snipe (Wilson's)	<i>Gallinago delicata</i>
squirrel	<i>Sciurus spp.</i>
stiff cowbane	<i>Oxypolis rigidior</i>
sugar maple	<i>Acer saccharum</i>
swamp milkweed	<i>Asclepias incarnata</i>
swamp white oak	<i>Quercus bicolor</i>
tamarack	<i>Larix laricina</i>
walleye	<i>Sander vitreus</i>
weasel	<i>Mustela spp.</i>
white crappie	<i>Pomoxis annularis</i>
white oak	<i>Quercus alba</i>
white sucker	<i>Catostomus commersonii</i>
white-tailed deer	<i>Odocoileus virginianus</i>
wild parsnip	<i>Pastinaca sativa</i>
wild turkey	<i>Meleagris gallopavo</i>
willow flycatcher	<i>Empidonax traillii</i>
willows	<i>Salix spp.</i>
wood duck	<i>Aix sponsa</i>
woodcock (American)	<i>Scolopax minor</i>
yellow bullhead	<i>Ameiurus natalis</i>
yellow perch	<i>Perca flavescens</i>