

CHAPTER 3: REGIONAL AND PROPERTY ANALYSIS

Information in the following sections is substantially taken from the Northeast Sands chapter of the *Ecological Landscapes of Wisconsin* book (WDNR 2015b). Consult this document for greater detail.

ECOLOGICAL CHARACTERISTICS AND MANAGEMENT OPPORTUNITIES

PHYSICAL CHARACTERISTICS

The Northeast Sands Ecological Landscape (NES EL), located in northeastern Wisconsin, includes portions of Florence, Marinette, Oconto, Menominee, and Shawano counties (Figure 3.1). It encompasses 1,542 square miles (987,176 acres), which represents 2.8% of Wisconsin's total area, and is the fifth smallest EL in the state. The climate generally is similar to other northern ELs, with an annual average temperature of 41.6°F but with a January minimum temperature average higher than other northern ELs and an average August maximum temperature (78.8°F) that is the third coolest of any EL in the state. The growing season is short (122 days), limiting potential for row-crop agriculture.

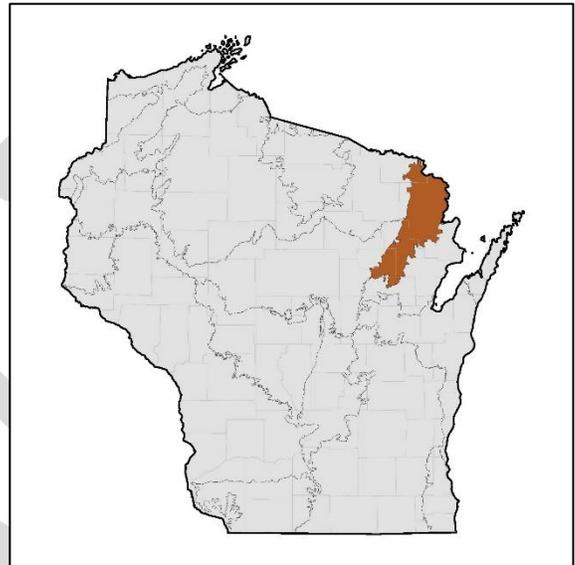


Figure 3.1. Northeast Sands Ecological Landscape

Precambrian bedrock underlies almost the entire NES EL. Waterfalls, almost all of which are associated with this ancient bedrock, are prominent in the northern part of the NES. A small area of Cambrian sandstone occurs along the eastern edge of the Landscape. The EL was covered by the Green Bay lobe in the last part of the Wisconsin glaciation, and outwash was deposited over lower-lying surface features as the ice melted and retreated eastward. As a result, the topography now appears as nearly-level-to-rolling sandy outwash plain, pitted in places, and with sandy heads-of-outwash and loamy moraines protruding through the sediments. More than half the land surface consists of outwash sand and gravel, and the dominant soil is excessively drained and sandy with a loamy sand surface, rapid permeability, and very low available water capacity.

Rivers in the NES EL include the Menominee, Peshtigo, Pike, Pine, Oconto, South Branch of the Oconto, and Wolf. The Pine-Popple and Pike rivers are three of only five state-designated Wild Rivers and the Wolf River is a National Wild and Scenic River. Many high-quality coldwater streams exist in this EL, prized by trout anglers. There are scattered lakes, and several large impoundments have been constructed, such as those on the Peshtigo and Menominee rivers. The 30,000-acre Brazeau Swamp-Waupee Lake-Peshtigo Brook complex, consisting of white cedar swamp, swamp hardwoods, lowland shrub, and sedge meadow, is the largest wetland complex in the NES and one of the largest in the state. Water quality generally is good, with 221 rivers and streams and one impoundment designated as Exceptional or Outstanding Resource Waters. Some portions of the Brazeau Swamp have suffered hydrologic disruption from conversion to agriculture and from the construction of STH 64.

Historical vegetation in the NES was a mix of northern hardwood forests, jack pine-northern pin (scrub) oak forest and barrens, and coniferous forested wetlands. Approximately 30% of the Landscape contained extensive northern hardwood forests, of which two-thirds included hemlock and white pine and one-third included beech as dominant or co-dominant species. The jack pine-scrub oak forest and barrens covered another 30% of the area, largely in the northern half of the EL where sandy soils predominate. Conifer wetlands made up 20% of the area, scattered throughout the Landscape with the largest contiguous block occupying much of the current Brazeau Swamp complex. White pine-red pine forests made up 15% of the land area, with open water, aspen-birch forest, and brush comprising the remainder. Collectively, the pine species were the most dominant group in the NES historically, with white pine highest in importance followed by red pine and jack pine. Hemlock also was a species of high importance.

Current land cover is quite different from what it was historically. Forests predominate, more so than they did historically, covering almost 77% of the NES EL. Aspen is the most abundant cover type. Pine barrens is much reduced from its historical extent, having succeeded to dense forests of pine, oak, and aspen in the absence of fire or been replaced by red pine plantations. Pines have declined in importance, while oak and red maple have increased. Northern hardwood forests are still common but have changed in species composition, now often dominated by sugar maple with basswood and white ash among the associates. Lowland communities include conifer swamps of white cedar, black spruce, and tamarack, and shrub swamps dominated by alder. Agriculture comprises only 7% of the land area and is mostly concentrated in the southeastern and northernmost portions of the EL.

OUTSTANDING ECOLOGICAL OPPORTUNITIES

The NES EL offers the following outstanding ecological management opportunities:

- Extensive forests
- Forest communities with high biodiversity value
- Barrens and bracken grasslands
- River/stream corridors and other aquatic and wetland habitats
- Bedrock features

Extensive forests – Three-quarters of the NES EL is forested, the highest proportion of forested land of any EL. These extensive forests play a significant role in maintaining high water quality and viable populations of many native plants and animals, and present opportunities to manage at larger scales for connectivity and to restore habitat types, successional stages, and structural conditions that are currently uncommon or declining.

High-biodiversity-value forest communities – Forest types that are especially important and well represented in the NES compared to other parts of the state include: dry (jack pine and scrub oak) and dry-mesic forests (white pine-red pine); mesic forests of beech, sugar maple, and hemlock; and wet-mesic forests dominated by white cedar, which harbor high numbers of rare plants and animals and are vulnerable to hydrologic disruption and excessive white-tailed deer herbivory.

Barrens and bracken grasslands – These communities, once much more common in this Landscape, provide critical breeding habitat for many grassland birds as well as a number of herps, mammals, and

insects. The NES is one of only three ELs in the state where management for species associated with the globally imperiled pine barrens community can be accomplished effectively, and is the EL with the best opportunity to manage for bracken grasslands.

River/stream corridors and other aquatic and wetland habitats – Several river corridors, including those of the Peshtigo, Oconto, Pine, and Pike rivers, offer opportunity to protect high-biodiversity-value aquatic habitats. Some of these corridors are bordered by rock outcrops and stands of conifers and/or relatively old forest that may support species rare elsewhere in the EL. Twenty percent of the NES EL is wetlands, the sixth highest percentage of all ELs. Wetlands such as bogs, fens, marshes, sedge meadows, and shrub swamps provide high ecological value. Undeveloped ponds and lakes, including those with unusual properties such as marl lakes, also constitute important opportunities for aquatic species.

Bedrock features – Exposures of bedrock are locally common and prominent in the NES. These features, which include outcrops, cliffs, glades, and talus slopes, support rare plants and animals, including some bedrock specialists.

NATURAL COMMUNITIES

A natural community is an assemblage of interacting plants, animals, other organisms, and the physical environment in which they occur that is shaped primarily by natural processes, and may be repeated across a landscape where similar environmental conditions prevail. The Wisconsin Wildlife Action Plan (WDNR 2015c) identified management opportunities for natural communities by EL, as the different ELs present varying opportunities to sustain the state’s native natural communities.

Management potential for natural communities in a given EL is characterized by opportunity. A “**major**” opportunity indicates that a natural community can be sustained in the EL, either because many significant occurrences of the natural community have been recorded in that Landscape or major restoration activities are likely to be successful in maintaining the community’s composition, structure, and ecological function over a long 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 should be considered for management there because of limited geographical distribution and a lack of better opportunities elsewhere.

The NES EL presents “major” or “important” opportunities to manage for 33 natural community types. Of these, the properties to be planned in the NES regional plan offer opportunity to protect, restore, and manage 29 (WDNR 2018a). These are listed in Table 3.1. Natural community definitions can be found on the DNR’s [Natural Community webpages](#) or, in more detail, in Chapter 7 of the *Ecological Landscapes* book (WDNR 2015a).

Table 3.1. Natural Community Management Opportunities of the Northeast Sands EL Properties.

| Major | Important |
|--------------------|--------------------|
| Aspen-Birch | Alder Thicket |
| Bracken Grassland | Bedrock Glade |
| Coldwater Streams | Black Spruce Swamp |
| Conifer Plantation | Emergent Marsh |

| Major | Important |
|---------------------------|--------------------------------|
| Coolwater Streams | Lake – hard, bog |
| Floating-leaved Marsh | Lake – unique |
| Lacustrine Mud Flat | Lake – soft, bog |
| Northern Dry Forest | Northern Hardwood Swamp |
| Northern Dry-mesic Forest | Northern Mesic Forest |
| Northern Wet-mesic Forest | Northern Sedge Meadow |
| Pine Barrens | Northern Tamarack Swamp |
| | Northern Wet Forest |
| | Open Bog |
| | Poor Fen |
| | Spring Pond, Lake – Spring |
| | Springs and Spring Runs – Hard |
| | Springs and Spring Runs – Soft |
| | Submergent Marsh |

SIGNIFICANT WILDLIFE RESOURCES

Rare Species

The Wisconsin Wildlife Action Plan (WDNR 2015c) identified Species of Greatest Conservation Need (SGCN), species in need of conservation action because they are:

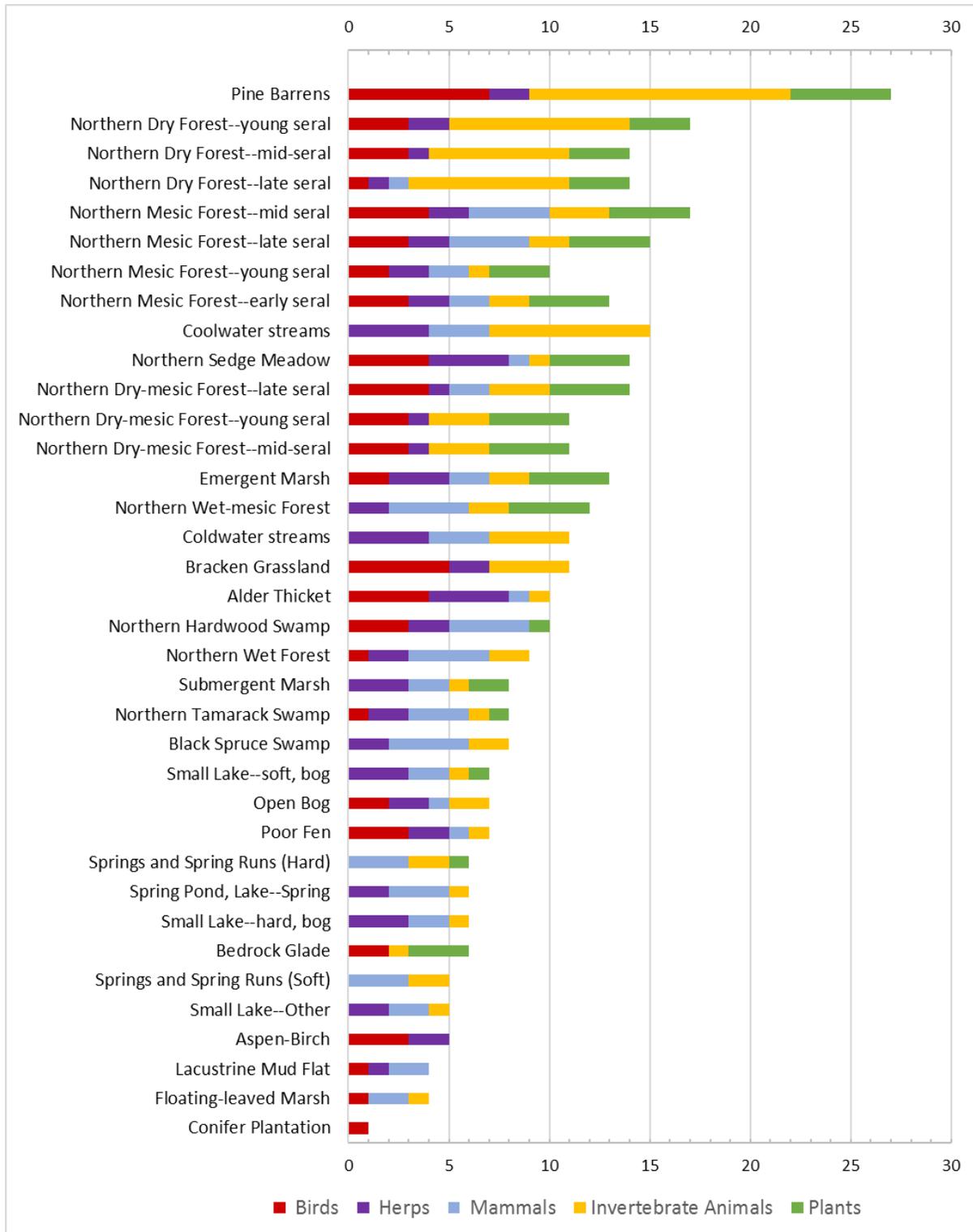
- already listed as endangered or threatened;
- at risk because of threats to their life history needs or habitats;
- declining in adjacent states or nationally, though stable in Wisconsin;
- of unknown status in Wisconsin and suspected to be vulnerable.

There are 52 SGCN and 22 rare plants that are highly or moderately associated with the NES EL. This means that these species are (and/or historically were) significantly associated with this Landscape, and that restoration of those species' natural habitats would significantly improve their condition. The Wildlife Action Plan also highlighted natural communities in each EL that are most important to SGCN. While there are many natural communities in the NES EL that have significant conservation opportunity, some of these communities support greater numbers of SGCN and rare plants than others.

For example, pine barrens support a considerable number of rare species in the NES EL. While not all of these species may necessarily occur on pine barrens on DNR properties, this community (and others with higher species counts) provide a disproportionate benefit to a larger number of SGCN and rare plants across the NES EL and may warrant special consideration in the master planning process.

The intersection of SGCN and rare plants with priority natural communities highlights the best opportunities for management on the NES EL from an ecological and biodiversity perspective. This intersection is shown in Figure 3.2 below (taken from WDNR 2018a).

Figure 3.2. Number of SGCN and Rare Plants Highly or Moderately Associated with Natural Communities having Major or Important Opportunity in the NES EL.



The NES EL contains one of only four counties in the state where the federally endangered Kirtland's warbler has been documented and one of only three counties where the bird has been confirmed as breeding (USFWS 2017). The NES is one of only three ELs that could potentially support a breeding population of this species. The state endangered Northern blue butterfly is found only in northeastern Wisconsin in association with its larval host plant, dwarf bilberry, a rare barrens species occurring in small patches beneath scattered pines on sandy soils in association with bracken fern, sweet-fern, and barren-strawberry.



Kirtland's warbler; photo by USFWS

The NES is one of only three ELs in the state where management for species dependent on pine barrens and bracken grassland can be effectively accomplished. Conifer swamps dominated by white cedar, which support high numbers of rare plants and animals, are relatively common in this landscape, with some of Wisconsin's largest examples found here. A large portion of this EL contains significant blocks of working forests that support extensive forest wildlife species such as breeding neotropical migrant birds and forest raptors. Calcareous habitats such as alkaline cliffs, glades, talus slopes, fens, and white cedar swamps support rare terrestrial snails.

Cold and coolwater streams are abundant in the NES, providing habitat for native brook trout and rare invertebrates such as extra-striped snaketail and pygmy snaketail dragonflies. Medium-sized warmwater rivers, including the Menominee, Peshtigo, and Pike, Pine, and Oconto provide habitat for rare mussels and aquatic invertebrates.

Game Species

The extensive forests and high-quality waters of the NES EL provide habitat for diverse and abundant populations of game species. White-tailed deer, bear, ruffed grouse, woodcock, waterfowl, and furbearers such as beaver, otter, fisher, and bobcat are common. Cold and coolwater streams support brook and brown trout, and warmwater rivers and impoundments contain populations of game fish such as northern pike, walleye, smallmouth and largemouth bass, bluegill, yellow perch, black crappie, and other panfish.

SOCIO-ECONOMIC AND CULTURAL CONTEXT

SOCIO-ECONOMIC CHARACTERISTICS

A significant proportion (approximately 38%) of the land in the NES EL is in public ownership (federal, state, or county). The Landscape also includes the eastern portion of the Menominee Reservation, which occupies the majority of Menominee County. Three-quarters of the land is forested, with about 62% of that being in private ownership. Agriculture makes up only 7% of the land area and is mostly concentrated in the southeastern and northernmost portions of the EL.

The four counties making up the majority of the NES EL (Florence, Marinette, Menominee, and Oconto) are traditionally rural, with a low population density – 27 persons/square mile in 2010, compared to 105 for the state as a whole. Population density is higher in Marinette and Oconto counties and lower in Menominee and Florence counties. The population is largely homogenous white with the exception of Menominee County, which is 87% Native American. Population trends are mixed for the four NES counties, with Florence and Marinette counties projected to lose population between the period 2010-2040 while Menominee and Oconto counties are expected to increase in population. Oconto and especially Menominee counties are projected to be among the fastest-growing counties in terms of percent population increase over this period. As with the state as a whole, the populations of the NES counties are aging. The proportion of residents age 65 and over is expected to increase in all counties over the period 2010-2040, most dramatically in Florence and Marinette counties which are projected to have at least 3 out of every 10 residents age 65 and over by 2040 (Egan-Robertson 2013).

Housing density across the NES counties is substantially lower than that for the state as a whole. As with population density, housing density is highest in Oconto and Marinette counties and lowest in Florence and Menominee counties. Seasonal and recreational homes are prevalent, accounting for over a quarter of housing stock, well above the state average. Florence County has the highest proportion of housing in seasonal homes, followed by Menominee, Marinette, and Oconto counties.

Oconto County is the most urban-influenced of the NES counties, due to its proximity to the Green Bay metropolitan area. Marinette County is considered to have moderate urban influence, while Menominee and Florence counties are more remote and rural, with little urban influence. Florence and Marinette counties also are considered nonmetro recreation counties, due to a combination of economic factors indicating dependence on tourism and recreation dollars, as well as retirement destination counties, due to recent significant increases in the proportion of residents age 60 and over. Menominee County is distinguished from the others in suffering from much higher rates of poverty and unemployment.

Residents of the NES counties have generally had lower educational attainment than much of the rest of the state, particularly in terms of higher education. Per capita and median household income levels generally are lower than the state average. Per capita income for the NES counties in 2016 was lower than the state average of \$29,253, ranging from a high of \$28,358 in Florence County to a low of \$15,171 in Menominee County. Median household income in 2016 ranged from \$55,018 in Oconto County to \$37,147 in Menominee County, compared to the statewide median household income of \$54,610 (USCB 2018). The NES counties, particularly Menominee County, have also experienced unemployment rates higher than the state average. Economic sectors accounting for the highest percentages of jobs in the NES counties are Government, Manufacturing (non-wood), Tourism, Health Care and Social Services, and Retail Trade. However, several other sectors, including Mining, Forest Products and Processing, and Agriculture, Fishing, and Hunting, contribute more jobs in the NES counties than the state average for those sectors. In some cases, these sectors contribute more income in the NES counties than jobs in other sectors, demonstrating the economic importance of the region's natural resource base.

CULTURAL CONTEXT

There is a long history of human resource use and settlement in the NES EL, though the archaeology of northern Wisconsin is fragmentary and poorly understood. There is little evidence of habitation in the NES until the time of the Woodland tradition (approximately 2,500 to 350 years ago, although starting somewhat later in northern Wisconsin than in the south). By the 1630s, the Menominee were established in much of northeastern Wisconsin, centered on the NES EL, along the Menominee River. They likely had

contact with French fur traders, who arrived in Wisconsin in the 1650s. The fur trade was firmly established in Wisconsin by the end of the 1600s and lasted into the early 1800s, when overexploitation of furbearers caused the fur trade to move north into Canada. The U.S. Government acquired land from various Wisconsin tribes through removal treaties after the Indian Removal Act of 1830 and relocated tribal members to lands west of the Mississippi River, although the Menominee signed a treaty in 1854 establishing a reservation of over 250,000 acres, mostly in present-day Menominee County (WDNR 2015d). Permanent Euro-American settlement in the region began in 1851 with the founding of Oconto County.

Archaeological explorations have been challenging in many parts of the region due to the dense forest cover, lack of access to the rivers, and few active farms. Both archaeological and historical sites have been documented. Although other sites likely remain to be discovered, it is reasonable to assume that the region was sparsely settled historically (as it is now) and did not support a large number of people. Cultural resource investigations are ongoing.

RECREATIONAL RESOURCES AND OPPORTUNITIES

SIGNIFICANT RECREATION RESOURCES

The NES EL has over 375,000 acres, or 38% of all land and water, in public ownership, ranking fifth out of the 16 ELs in Wisconsin. This gives the NES an abundant land and water base for public recreation:

- Over 32,000 acres of public waters
- 231,000 acres of county lands
- 72,000 acres of federal lands
- Over 40,000 acres of DNR-managed recreational lands, including:
 - Almost 11,000 acres of State Forest
 - Over 6,300 acres of State Trails and Wild Rivers
 - Over 5,500 acres of Fishery and Wildlife Areas
 - Over 7,600 acres of State Parks and Recreation Areas
 - Over 8,800 acres of State Natural Areas
 - Almost 1,000 acres of Forest Legacy land (privately owned but open to public recreation)

The public lands in the NES EL offer a wide variety of recreational activities, including hunting, fishing, trapping, motorized and non-motorized trail activities, paddling, camping, wildlife watching and nature appreciation, and scenic viewing. Water-based pursuits are a special draw here, with the many high-quality, scenic rivers and streams. The Menominee, Peshtigo, Pike, and Pine-Popple rivers are very popular for paddling and fishing, drawing thousands of visitors each year. The Roaring Rapids section of the Peshtigo is considered to be the finest whitewater paddling opportunity in the Midwest. Fishing on the numerous high-quality trout streams that flow into the major rivers is also very popular, and the larger rivers and flowages contain quality warmwater game fisheries. The many waterfalls and rapids that exist in the northern portion of the EL add to the scenic appeal. Hunting, particularly for deer and ruffed grouse, is another major draw. Hiking, bird watching, swimming, and bicycling are other popular activities.

The *Wisconsin Land Legacy Report* (Pohlman et al. 2006), which identified those places most important to meeting the state’s conservation and recreation needs over the next 50 years, identified 12 sites located partially or completely within the NES EL. This is fewer Legacy Sites than exist in other ELs. However, three of the sites – Athelstane Barrens, Chequamegon-Nicolet National Forest, and the Menominee County Forest – have the highest rating for conservation significance, and two of the sites – the Chequamegon-Nicolet and the Peshtigo River – have the highest rating for recreation potential.

The number of recreational facilities such as trails and campgrounds in the NES is not as high as in other parts of the state. The NES counties have over 1,700 miles of recreational trails (motorized and non-motorized), but rank 11th out of 16 ELs in overall trail density (miles of trail per square mile of land). The density of hiking, biking, and cross-country ski trails is lower compared to the rest of the state, though the density of ATV trails is higher. Similarly, the NES ranks 12th out of the 16 ELs in both the number and the density of campgrounds (both public and privately owned).

REGIONAL RECREATION PARTICIPATION AND NEEDS



Figure 3.3. Recreation Regions of the Northeast Sands EL

A recent [Recreation Opportunities Analysis \(ROA\)](#) solicited public input about popular recreational activities in different recreation regions around the state, as well as regional recreational needs and shortages, through open house meetings and online public input forms. The recreation regions encompassing the NES EL are mostly Upper Lake Michigan Coastal (WDNR 2018b) with a small portion in Northwoods (WDNR 2017a) (Figure 3.3). A small area also falls into the Lake Winnebago Waters region, but there are very few DNR properties here, all of them small. Using the information gathered through this effort, as well as from the results of a 2016 survey about recreation participation and needs administered to a random sample of Wisconsin residents statewide as part of the development of the 2019-2023 [SCORP](#), the ROA identified recreation opportunities most needed in the Upper Lake Michigan Coastal (ULMC) and Northwoods regions and the potential role of DNR properties in helping to meet these needs.

Table 3.2 lists popular activities in the ULMC and Northwoods regions according to the results of the ROA public input and the SCORP survey. Overall, the results from both efforts are similar, although there are some differences, especially for the ULMC. For both regions, activities that were noted as popular in the ROA public input but not in the SCORP survey are shown in **red font**.

In terms of recreation shortages and needs, additional opportunities for trail-based activities, especially hiking/walking trails, were commonly cited as needs by respondents in both regions. More camping and more public shore access to lakes and streams were also widely identified as needs.

Table 3.2. Popular Recreation Activities in the Upper Lake Michigan Coastal and Northwoods Recreation Regions.

| Upper Lake Michigan Coastal | | Northwoods | |
|--|---|---|--|
| ROA | SCORP | ROA | SCORP |
| <ul style="list-style-type: none"> • Bicycling – paved trails • Bicycling – mtn. biking, single track • Camping – tent • Camping – RV/pop-up • Canoeing/kayaking • Cross-country skiing/snowshoeing • Fishing – from boat, canoe, kayak • Hiking, walking, trail running • Horseback riding • Swimming • Wildlife/bird watching | <ul style="list-style-type: none"> • Bicycling – paved trails • Fishing – from boat, canoe, kayak • Hiking, walking, trail running • Swimming • Wildlife/bird watching | <ul style="list-style-type: none"> • ATV/UTV riding • Bicycling – paved trails • Bicycling – mtn. biking, single track • Camping – tent • Canoeing/kayaking • Cross-country skiing/snowshoeing • Fishing – from boat, canoe, kayak • Fishing – from shore • Fishing – ice fishing • Harvesting berries, mushrooms, etc. • Hiking, walking, trail running • Motorboating • Snowmobiling • Swimming • Wildlife/bird watching | <ul style="list-style-type: none"> • ATV/UTV riding • Canoeing/kayaking • Cross-country skiing/snowshoeing • Fishing – from boat, canoe, kayak • Fishing – from shore • Fishing – ice fishing • Harvesting berries, mushrooms, etc. • Hiking, walking, trail running • Motorboating • Snowmobiling • Swimming • Wildlife/bird watching |

(Activities shown in red font were noted as popular in the ROA public input but not in the SCORP survey.)

The SCORP results noted where responses from specific regions of the state differed from the state average. Residents of the ULMC counties identified the following recreation need in their home counties at a higher rate than the state average:

- Public shore access to lakes, rivers, and streams

Residents of the ULMC counties identified the following recreation needs in their home counties at a lower rate than the state average. An asterisk (*) indicates where the SCORP results differ from the ROA, as the marked activities were among the top 10 most frequently identified as needed in the region by ROA respondents:

- Bicycling trails*
- Ball fields
- Outdoor courts for tennis, handball, and basketball
- Local parks and playgrounds*

Similarly, residents of the Northwoods counties identified the following recreation needs in their home counties at a higher rate than the state average:

- Public boat launches
- Trails for motorized recreation
- Hunting opportunities

Residents of Northwoods counties identified the following recreation needs in their home counties at a lower rate than the state average:

- Ball fields
- Local parks and playgrounds

The ROA used the information from both the SCORP survey and the ROA public input to group most-needed recreation activities into high, medium, and low categories. Table 3.3 lists activities ranked as high future recreation needs for the two regions.

Table 3.3. High-ranked Future Recreation Needs for the Upper Lake Michigan Coastal and Northwoods Recreation Regions.

| Upper Lake Michigan Coastal | Northwoods |
|--|---|
| <ul style="list-style-type: none"> • Bicycling – bicycle touring/road biking • Bicycling – mountain/off-road biking • Bird or wildlife watching • Camping - developed • Camping - primitive • Canoeing or kayaking • Fishing – lake fishing from boat, canoe, kayak • Fishing – lake fishing from shore, pier • Fishing – stream/river fishing from shore, wading • Hiking, walking, trail running, backpacking • Horseback riding • Motorboating – waterski/tubing/personal watercraft • Visiting a beach, beach walking | <ul style="list-style-type: none"> • ATV/UTV riding • Bicycling – bicycle touring/road biking • Bicycling – mountain/off-road biking • Camping - developed • Camping - primitive • Canoeing or kayaking • Fishing – lake fishing from boat, canoe, kayak • Fishing – lake fishing from shore, pier • Fishing – stream/river fishing from shore, wading • Four-wheel vehicle driving • Hiking, walking, trail running, backpacking • Hunting – big game • Off-highway motorcycle riding • Participating in nature-based education programs • Snowmobiling |

LANDSCAPE CONSIDERATIONS FOR PLANNING AND MANAGEMENT

The NES EL has significant public land holdings which provide abundant recreation opportunities, particularly in settings that are remote or wild. Extensive forests provide diverse forest habitats, support local economies, and offer varied management opportunities. Restoration and landscape-scale management opportunities exist for globally imperiled pine barrens.

There is a shortage of older forest and of large patches. Many stands are composed of young or medium-aged trees dominated by one or a few species. Older, structurally complex, or floristically diverse stands are rare. A focus on early-successional aspen management has led to the creation of large amounts of

edge habitats that have promoted generalist species at the expense of interior or area-sensitive species. Many areas of former pine barrens have succeeded to forest or been replaced by plantation pine. Opportunities exist to maintain large habitat patches, improve connectivity between smaller patches, and include areas of extended rotation or development of old-growth characteristics within working forests. There also are opportunities to increase the conifer component in different forest types, especially species like white pine, hemlock, red pine, and jack pine.

Early-successional management could be extended to include species like jack pine and scrub oak, much reduced from their historical abundance. Dry forest, barrens, and bracken grassland management could be coordinated (including across ownerships) to connect barrens remnants and increase effective habitat size. Prescribed fire is potentially an important management tool in many parts of the NES, to maintain and enhance dry forest and barrens communities.

As in other parts of the state, high white-tailed deer populations are exerting heavy browse pressure on seedlings and saplings of forest trees such as hemlock and white cedar as well as on shrubs and herbs, with negative impacts on forest composition and structure. A number of invasive species are established in the region, with others likely to appear in the near future. Aggressive species like European swamp thistle and glossy buckthorn threaten conifer swamps. Glossy buckthorn is widespread and locally common in the southern and eastern portions of the NES, particularly in disturbed white cedar swamps, and has the potential to completely overwhelm the understories of these wet-mesic forest communities. Emerald ash borer threatens the black ash component of hardwood swamps.

Forested river and stream corridors help to maintain high water quality of surface waters. Some of these corridors offer good opportunity to connect small, scattered stands of older forest, especially coniferous forest, that support species rare elsewhere in the EL. Hydrologic modifications include large dams on several of the major rivers. Installation of fish passage structures at hydroelectric dams would allow migratory fish to access spawning, wintering, and foraging habitats. Shoreline development along rivers and streams is a significant concern and is likely to increase in the future.

Recreationally, the NES is a destination for a variety of outdoor recreation activities taking place mostly in lightly-developed, rural, or remote settings. Hunting, fishing, trapping, paddling, wildlife viewing, and a variety of both motorized and non-motorized trail activities are popular. The high proportion of public recreation land provides a variety of recreation facilities with a range of amenities, including campgrounds, trails, and boat launches. Some existing federal, state, and county ownerships are extensive and can accommodate a range of recreation activities, including those that are potentially incompatible.

Recreational needs and shortages have been identified for the region. Additional opportunity for trail-based activities – especially hiking and bicycling – camping, and more public access to rivers and lakes are high-ranked needs for the NES. There is potential to add or expand recreation activities on department properties in the NES to meet some of these shortages. Proper siting will be necessary in order to ensure a quality recreational experience for users that is compatible with property designations and physical capabilities. Road access, proximity to population centers, and trail connections to regional networks are important recreation factors to consider in planning for new or expanded uses. Ecologically, extensive wetlands in portions of the NES limit the variety of recreational activities that can be supported. Fragile vegetation and thin or erodible soils in other areas may limit trail-based pursuits. Some areas that are rugged in character and challenging to access may be more suited to activities that can be pursued in remote settings with few facilities.

SIGNIFICANCE OF THE PROPERTIES WITHIN THE LANDSCAPE

This analysis focuses on significance of the properties for which the NES plan establishes management; it does not include the properties that already have NR 44-compliant plans.

PROPERTY ECOLOGICAL MANAGEMENT OPPORTUNITIES

The properties to be planned within the NES are major contributors to the ecological significance of the Landscape. Collectively, the properties present opportunities to protect, manage, and restore all the major ecological features of the NES: extensive forests, high-biodiversity-value forest communities; barrens and bracken grasslands; river/stream corridors and other aquatic/wetland habitats; and bedrock features (WDNR 2011, 2012a, b, c, 2013a, b, c, 2014b, 2017b, 2018a, 2018c). Table 3.4 summarizes the major ecological management opportunities offered by the ten major properties in the NES EL plan.

Table 3.4. Ecological Management Opportunities on Properties of the Northeast Sands EL Plan.

| Property | Extensive Forests | High-biodiversity-value Forest Communities | Barrens & Bracken Grasslands | River/stream Corridors, Aquatic, Wetlands | Bedrock Features |
|-------------------------------------|-------------------|--|------------------------------|---|------------------|
| Amberg Wildlife Area | X | X | X | X | |
| Dunbar Barrens SNA | | X | X | | X |
| Haley Creek Swamp SNA | X | X | | X | |
| Miscauno Wildlife Area | X | X | | X | |
| Peshtigo Brook Wildlife Area | X | X | | X | |
| Pike Wild River | X | X | X | X | X |
| Pine-Popple Wild Rivers | X | X | | X | X |
| S. Branch Oconto River Fishery Area | X | | | X | |
| Spread Eagle Barrens SNA | | X | X | X | |
| Town Corner Wildlife Area | X | X | | X | X |

The **Pine-Popple** and **Pike Wild Rivers**, three of only five state-designated Wild Rivers in Wisconsin, feature densely forested corridors with diverse forest communities and significant tracts of older forest, including hemlock-hardwoods, drier pine-oak-aspen, lowland hardwoods, and conifer swamps. These forests host a high diversity of breeding birds, including forest-interior species, conifer-dependent species, and forest raptors. All three Wild Rivers are designated as Outstanding Resource Waters with excellent water quality, and both properties protect high-quality aquatic and wetland habitats such as springs, seeps, ephemeral ponds, peatlands, and sedge meadows. The central portion of the Pike Wild River property presents restoration and management opportunities for pine barrens, dry forest, and bedrock glade communities. Both properties contain bedrock features such as glades, cliffs, and outcrops.

Haley Creek Swamp State Natural Area (SNA) is within and adjacent to the project boundary of the Pine-Popple Wild Rivers, and protects similar habitats, including an undisturbed wetland complex of spring ponds, fen, and conifer swamp, a mile-long coldwater stream segment, and hemlock-hardwood forest in the uplands. Both the lowland and upland forests on this property represent the only remnant of the

former Goodman timber block that still retains old forest characteristics with mature stand structure, and constitute one of the best opportunities in this landscape to manage for old-growth conditions.

Spread Eagle Barrens SNA and **Dunbar Barrens SNA** offer opportunity to manage for the globally imperiled pine barrens community. Spread Eagle Barrens is the best place in the state for bracken grasslands. Bracken grassland is a regionally unique type of pine barrens, composed of a mix of native and non-native species, known only from the NES EL. It occurs on gently rolling uplands and frost pockets (treeless depressions where frost may occur at any time of year) in pitted outwash. Although not contributing significantly to native botanical diversity, bracken grasslands support a variety of rare and declining species dependent on open grassland/barrens habitats. Opportunity exists on both Spread Eagle and Dunbar Barrens for landscape-scale restoration and management of these open habitats, including through coordination of management with adjacent landowners (We Energies, Florence County Forest, and Marinette County Forest).

The **Wildlife and Fishery Areas** contain extensive forests of aspen, oak, and pine, and wetland complexes of conifer and hardwood swamps, shrub wetlands, and sedge meadow. Three embedded SNAs on these properties protect extensive, undisturbed sedge meadows, white cedar-black spruce-tamarack conifer swamps, fens, and springs. Opportunities exist to manage for dry pine-oak barrens, encourage and perpetuate older forest, structural diversity, and larger patches, and increase representation of conifers such as hemlock, pines, and balsam fir.

Department Habitat Priorities

The department has identified habitat management priorities for DNR managed lands in different regions of the state that generally correspond to Bureau of Wildlife Management administrative districts. This prioritization is intended to focus available resources in order to maximize habitat benefits. The majority of department habitat management resources will be focused on the highest priority habitats in each district. The NES EL falls within the North and Northeast Districts. Table 3.5 lists the top terrestrial/wetland and aquatic habitat priorities for these two districts.

Table 3.5. DNR Priority Habitats for the Northeast and North Districts.

| Northeast | | North | |
|--|---|---|---|
| Terrestrial/Wetland | Aquatic | Terrestrial/Wetland | Aquatic |
| <ul style="list-style-type: none"> • Deep marsh/shallow lakes (hemi-marsh goal) • Emergent wetlands (wet/sedge meadow, shallow marsh, mudflats) • Great Lakes dunes, wetlands, and shores • Oak/pine barrens • Old forests (natural origin pine, hemlock, cedar, n. hardwood) | <ul style="list-style-type: none"> • Coldwater streams • Large lake – shallow, hard and very hard (marl), drainage • Large lake – shallow, soft, drainage (includes Winnebago system) • Lake Michigan • Springs and spring runs (hard) • Springs and spring runs (soft) • Warmwater rivers | <ul style="list-style-type: none"> • Deep marsh/shallow lakes (only those with significant wild rice opportunity) • Great Lakes dunes, wetlands, and shores • Oak/pine barrens • Old forests (natural origin pine, hemlock, cedar, n. hardwood) • Young forest (primarily aspen) | <ul style="list-style-type: none"> • Coldwater streams • Large lake – deep, soft and very soft, seepage • Large lake – deep, soft, drainage • Large lake – shallow, soft, drainage • Lake Superior • Spring pond, lake - spring • Springs and spring runs (hard) • Springs and spring runs (soft) |

SITES OF HIGH CONSERVATION SIGNIFICANCE

Conservation Opportunity Areas

The [Wisconsin Wildlife Action Plan](#) identified [Conservation Opportunity Areas \(COAs\)](#) in each EL, places that contain significant ecological features, natural communities, or habitat for Species of Greatest Conservation Need (SGCN). COAs represent sites that Wisconsin has a responsibility to protect or conserve from global, continental, upper Midwest, or state perspectives. COAs are described in more detail in WDNR (2008). The following COAs encompass all or portions of properties included in the NES EL plan:

Global significance

- Dunbar Barrens COA: Dunbar Barrens SNA

Continental significance

- Nicolet Hemlock-Hardwoods COA: Haley Creek Swamp SNA; Pine-Popple Wild Rivers

Upper Midwest significance

- Pine-Popple Rivers COA (aquatic): Pine-Popple Wild Rivers
- Spread Eagle Barrens COA: Spread Eagle Barrens SNA

State significance

- Amberg COA: Amberg Wildlife Area; Pike Wild River
- Brazeau Swamp COA: Peshtigo Brook Wildlife Area
- Northeast Wisconsin Forest COA: South Branch Oconto River Fishery Area

Primary Sites

Primary Sites are those identified by the department for special consideration during the planning process. These sites generally encompass the best examples of 1) rare and representative natural communities and 2) documented rare species populations with opportunities for restoration or connections. Primary Sites warrant high protection and/or restoration consideration during the development of a property master plan, and can be considered High Conservation Value Forests for Forest Certification. The following properties included in the NES EL plan have identified Primary Sites:

Amberg Wildlife Area (WDNR 2018a)

- Amberg Swamp Conifers

Haley Creek Swamp SNA (WDNR 2011)

- Goodman Wild Lakes and Pine River

Miscauno Wildlife Area (WDNR 2018a)

- Miscauno Cedar Swamp SNA

Peshtigo Brook Wildlife Area (WDNR 2018a)

- Peshtigo Brook Floodplain and Shrub-carr
- Peshtigo Brook Meadow and Woods SNA

Pine-Popple Wild Rivers (WDNR 2011)

- Goodman Wild Lakes and Pine River

Pike Wild River (WDNR 2012a)

- Pike Wild River Corridor
- Little South Branch Pike River
- Pike Wild River Conifer Hardwoods

Spread Eagle Barrens SNA (WDNR 2011):

- Spread Eagle Barrens SNA

Town Corner Wildlife Area (WDNR 2018a)

- Town Corner Cedars SNA

PROPERTY RECREATIONAL OPPORTUNITIES

As with ecological opportunity, the properties provide regionally significant recreational resources, particularly for those seeking a more remote or wild experience. All the major properties offer extensive tracts for hunting and trapping. The Pine-Popple and Pike Wild Rivers feature outstanding paddling and fishing, as well as scenic enjoyment of their many rapids, waterfalls, and bedrock outcrops. Various coldwater streams on the properties are excellent for trout fishing. The properties also offer opportunity for a variety of other activities, including hiking, wildlife viewing, gathering of wild edibles, and cross-country skiing/snow-shoeing.

The *Wisconsin Land Legacy Report* (Pohlman et al. 2006), which identified those places most important to meeting the state's conservation and recreation needs over the next 50 years, identified 12 Legacy Sites located partially or completely within the NES EL. The following Legacy Sites encompass all or portions of properties included in the NES EL plan:

Brazeau Swamp:

- Peshtigo Brook Wildlife Area

Oconto River:

- South Branch Oconto River Fishery Area

Pike River:

- Pike Wild River

Pine-Popple River:

- Pine-Popple Wild Rivers

Spread Eagle Barrens:

- Spread Eagle Barrens SNA

The *Land Legacy Report* assigned each Legacy Site a rating for both conservation significance and recreation potential. Recreation potential for Legacy Sites was assigned on a five-point scale with 1 being lowest and 5 being highest, taking into account factors like the types and variety of recreation activities offered, potential to fill gaps in recreation demand and reduce conflict between current and future users, accessibility to residents, proximity to large population centers, and ability to link recreation areas together (Pohlman et al. 2006, p.43).

The Brazeau Swamp Legacy Site was assigned a recreation potential score of 1, indicating that the site “possesses limited recreation potential, could offer a few (generally low-impact) land and/or water-based recreation opportunities, might meet some existing or anticipated future recreation demands, is likely not of an adequate size to accommodate potentially incompatible activities, could link recreation areas, and/or is near small population centers.”

The Spread Eagle Barrens Legacy Site was assigned a recreation potential score of 2, indicating that the site “possesses good to moderate recreation potential, could offer some land and/or water-based recreation opportunities, might meet some existing or anticipated future recreation demands, may not be of adequate size to accommodate potentially incompatible activities, could link recreation areas, and/or is near mid-sized population centers.”

The Oconto River, Pike River, and Pine-Popple River Legacy Sites all were assigned a recreation potential score of 3, indicating that each site “possesses very good recreation potential, could offer a variety of land and/or water-based recreation opportunities, could meet some existing or anticipated future recreation demands, may be of adequate size to accommodate some potentially incompatible activities, could link important recreation areas, and/or is near mid to large population centers.”

A [Recreation Opportunities Analysis \(ROA\)](#) conducted by the department identified existing outdoor-based recreation opportunities and future recreation needs in each of eight recreation regions around the state. The study identified future needs for providing high-quality recreation experiences and evaluated the potential role of department properties in helping meet those needs. The analyses for the recreation regions covering the NES EL properties were completed in 2017 and 2018. Eight of the ten major properties in the NES EL plan are included in the Upper Lake Michigan Coastal recreation region. Two properties fall into the Northwoods recreation region. Table 3.3 (above) lists the activities that the ROA reports for each of these two regions (WDNR 2017a, 2018b) ranked as high future recreation needs.

Some properties in the NES EL plan may have potential to meet recreational shortages and high-ranked recreation needs, including non-motorized trail activities and additional public access to lakes and rivers for fishing and paddling. The following properties were identified as having the potential to add the following recreational activities:

- **Pine-Popple Wild Rivers:** bicycling – bike touring/road riding
- **Spread Eagle Barrens State Natural Area:** bicycling – mountain biking/off-road biking
- **Dunbar Barrens State Natural Area:** bicycling – mountain biking/off-road biking
- **Wausaukee Timber Demonstration Forest:** primitive camping

The ROA reports also made more general (not property-specific) recommendations for opportunities that might be added or expanded at several or many properties, noted specific features needed for these different activities, and described general opportunities or considerations to take into account. These are summarized in Table 3.6.

Table 3.6. Summary of General Recommendations for New/Expanded Recreational Activities in the Upper Lake Michigan Coastal and Northwoods Recreation Regions.

| Activity | Needs | Opportunities/Considerations |
|--|--|--|
| Bicycling – bike touring/road biking | Surfaced trails | Expansion of existing networks linking cities, villages, campgrounds |
| Bicycling – mountain/off-road biking | Constructed single-track trails | Expand existing opportunities; new destinations; varying difficulties, including “technical” skill areas |
| Camping – developed | More electrified sites | Existing campgrounds |
| Camping – primitive | More sites | Pit toilets, no electricity/generators; serving hunters, wilderness adventurers, water recreationists |
| Canoeing/kayaking | More carry-in sites with walk-in trails | Many waterbodies |
| Hiking/walking/running trails | Designated loop trails of varying lengths | Proximity to cities & villages would be most popular; linking cities/villages to local & state parks |
| Horseback riding | More trails | Trails connecting to a network; loop trails within a single property |
| Hunting – big game | Access | Easier access to remote areas |
| Lake fishing - boat | Improved boat access sites (ramps for trailered boats) | Access to Lake Michigan or Green Bay |
| Lake fishing – shore/pier | More docks/piers | Properties near cities & villages with easy road access |
| Motorized recreation trails | More trails/routes | Connections to existing networks; access during the hunting season |
| Nature-based education programs | More programs | Partners adding/expanding offerings at larger properties |
| Stream/river fishing – shore or wading | More access | Acquisition of key parcels |

The planning process will evaluate the potential and suitability of the NES EL properties to add or expand these activities to help meet future recreation needs.

Property-specific Considerations

The three state-designated Wild Rivers in the NES EL plan have unique management guidance described in administrative code that must be adhered to when evaluating potential recreational activities.

Per NR 302.02(4), Wis. Admin. Code, Wild Rivers have an established protection zone comprising “the area of land within 400 feet of the waters or to the visual horizon from the water whichever is greater on either side of the wild river”. No development, including campgrounds, is allowed on DNR-managed lands adjacent to shorelines in the protection zone, nor beyond the protection zone up to at least a ¼-mile from either side of the wild river other than that which is necessary to accommodate users of the wild rivers. Additionally, no vegetation control (save for erosion control or restoration activities) is allowed within 150 feet from the bank on either side of the wild river.