Priority Landscapes and Issues

PRIORITIES BASED ON THE NATIONAL PRIORITIES

The Forest Service developed three national themes with associated objectives to identify where and how the USDA Forest Service, State & Private Forestry Unit (S&PF) resources should be focused in order to make the most significant progress in providing diverse and sustainable public benefits from trees and forests. The three national themes are set in law as national priorities and the state forest action plan is required to be consistent with them. Each national priority has several objectives and performance measures on which states need to report.

The national priorities are:

1. Conserve and manage working forest landscapes for multiple values and uses.
2. Protect forests from threats.
3. Enhance public benefits from trees and forests.

Recognizing the importance of the national priorities, they have been used here to organize priority landscapes and issues. The priority landscapes and issues, as outlined in this section, can then be used to focus action and achieve state and national objectives.

Methodology

The Resilient Forest and Forest Threats and Rarity Priority Landscapes (Maps 19 and 20) were developed by calculating either 1) the percentage of land in a certain category (e.g. protected, forested, certified) per Ecological landscape, or 2) the weighted averages by area of the attribute (e.g. the average of all the attribute values weighted by the area they occupy on the landscape to have a final value for each

Ecological Landscape). Then, for each Ecological Landscape, and for each contributing attribute, we normalized it by dividing value by the highest value of all EL. We then added the values to obtain a rank of the Ecological Landscapes (Table 9; Table 10). *A detailed GIS methodology is available on request.*

CONSERVE AND MANAGE WORKING FOREST LANDSCAPES FOR MULTIPLE VALUES AND USES.

In evaluating what should be considered a priority from the perspective of conserving and managing working forests for multiple values and uses, both geospatial (landscape) and non-geospatial (issue) information was considered to prioritize to protect existing forests. The areas that are highlighted through this lens have an abundance of well managed forested land, and areas that may be more resilient in the face of external stressors. This priority landscape, considered with other information from research, surveys and monitoring, and the priority issues identified below, helps determine which issues and areas are the most critical.

Ecological Landscape	Forested Land	Sustainably Managed land	Carbon in Forested Areas	Resilience Score	Resilient Forests Score
North Central Forest	0.98	1.00	0.96	0.82	3.8
Northwest Lowlands	0.96	0.98	0.87	0.78	3.6
Northern Highland	0.88	0.86	0.93	0.80	3.5
Northeast Sands	1.00	0.80	0.91	0.75	3.5
Northwest Sands	0.96	0.94	0.75	0.79	3.4
Superior Coastal Plain	0.89	0.60	0.87	0.78	3.1
Central Sand Plains	0.74	0.83	0.76	0.61	2.9
Western Coulees and Ridges	0.54	0.49	0.80	1.00	2.8
Forest Transition	0.58	0.51	0.91	0.68	2.7
Northern Lake Michigan Coastal	0.49	0.40	0.98	0.57	2.4
Central Sand Hills	0.48	0.39	0.80	0.64	2.3
Central Lake Michigan Coastal	0.22	0.44	1.00	0.53	2.2
Western Prairie	0.26	0.32	0.78	0.67	2.0
Southeast Glacial Plains	0.17	0.33	0.87	0.63	2.0
Southwest Savanna	0.13	0.27	0.79	0.60	1.8
Southern Lake Michigan Coastal	0.11	0.09	0.85	0.52	1.6

Table 9: Normalized values of the geospatial attributes that contributed to the Resilient Forests Priority Landscape.

The following sections describe the contributing geospatial attributes for each priority landscape.

Priority Geospatial Attributes of Resilient Forests in Wisconsin

Forested land: Forests provide a myriad of benefits and services and are an important resource to maintain. We used the level 4 forested land cover classes of the Wiscland 2.0 dataset to calculate the total area of forested land by ecological landscape (*Appendix G*). When planning for preserving working forest landscapes, areas with a higher percentage of forest have a higher priority.

Sustainably managed land: Not all forested lands are managed similarly or have the same management goals. Private landowners' goals can vary from habitat conservation, to aesthetic values, to intensive timber extraction. Some landowners are enrolled in programs that require a sustainable management plan which includes timber production. Forest land that is sustainably managed guarantees that the resource will be available for future generations and therefore, ecological landscapes with a higher percentage of sustainably managed forests have a higher priority.

Carbon in forested areas: Carbon storage in forests, mainly as wood, is an important offset to greenhouse gas emissions. The Forest Inventory and Analysis Program (FIA) compiles and maintains a national database that is publicly available. Based on the total carbon (in short tons) estimates from the FIA database, ecological landscapes with higher percentages of carbon per forested acre, are ranked higher.

Resilience score: Under a changing climate, some forest species and associated ecosystems may shift, degrade, or even disappear. However, some areas have a higher ability to retain their intrinsic characteristics and continue to support diversity and the consequent benefits to society. The Nature Conservancy created a report and a map for Resilient Sites for Terrestrial Conservation in Eastern North America, where they defined resilient sites as "an area of land with sufficient variability and microclimate options to enable species and ecosystems to persist in the face of climate change and which will maintain this ability over time" (Anderson et al., 2018).

Areas with an above average resilient score should be maintain and prioritized as areas with the greatest potential to both mitigate and adapt for climate change. Ecological landscapes with more areas with an "above average" resilient score, are scored higher.
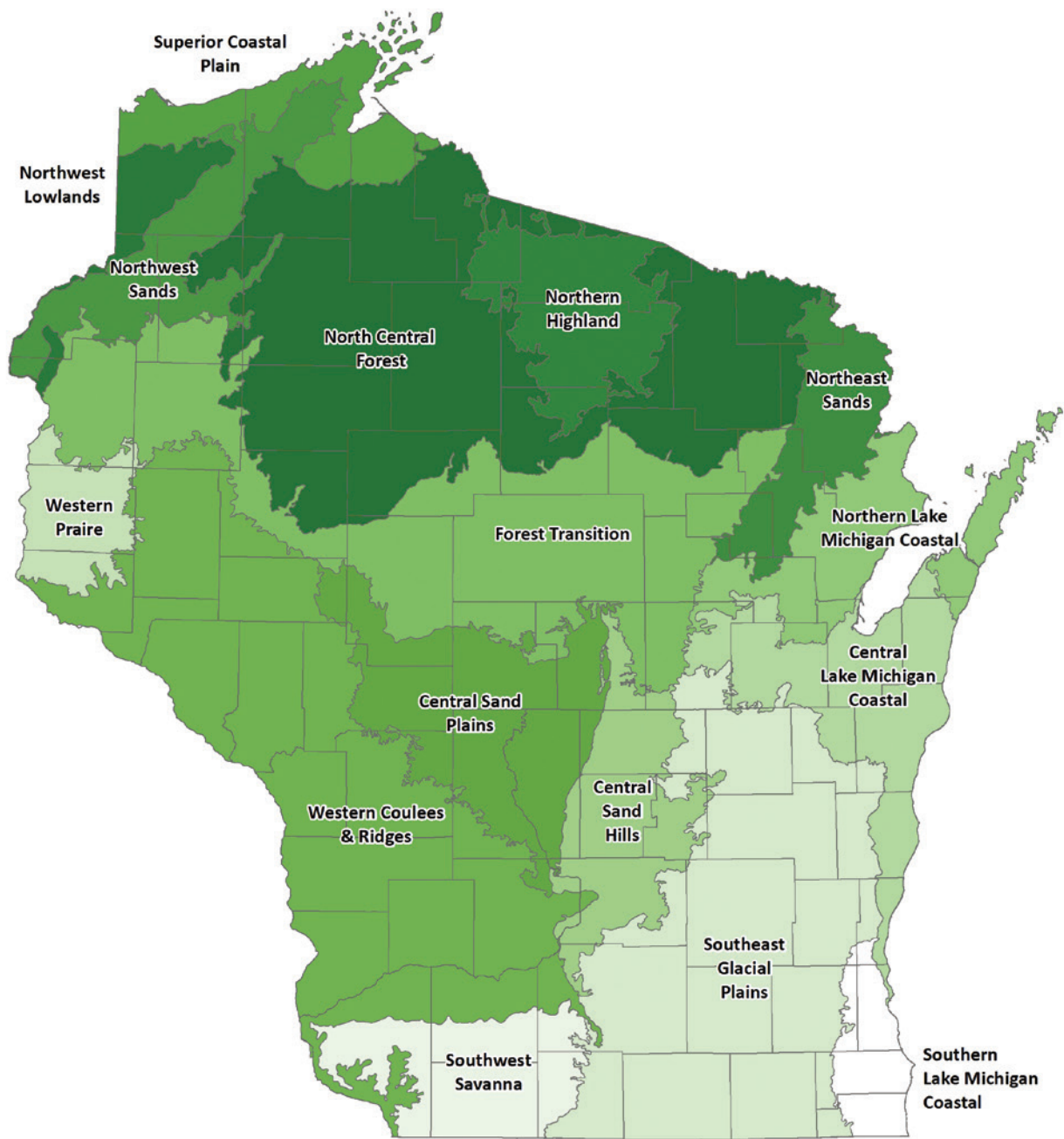
Priority Issues of Resilient Forests

Landscape-scale management: Ideally, management should consider the larger ecological context, not just a specific site as landscape context has an important effect on ecological processes and influences the function and viability of a given site. This is especially true for smaller sites. For example, contiguous areas of natural land cover that include dry uplands all the way to lowlands with intact hydrology throughout should be considered as a whole, as opposed to just looking at the individual stands or cover types that make up that continuum. This cannot always be done within a single landholding, but sometimes there are opportunities to work collaboratively across property lines to manage a group of management units toward compatible objectives. Landscape-scale planning can be used to help identify these opportunities (for more information, visit dnr.wi.gov and search: *Landscapes*).

Cultural value: Some forests have social or cultural value beyond their ecological or economic value. For example, black ash basket making is a valued tradition for some native American tribes and is at risk as emerald ash borer spreads. The cultural value of a forest may vary considerably from group to group or person to person so considering how to factor it into a priority landscape is best done on a case by case basis.

Rena Johnson/Courtesy of the National Association of State Foresters

MAP 19 - RESILIENT FORESTS PRIORITY LANDSCAPE

Superior Coastal
Plain

Northwest
Lowlands

Northwest
Sands

North Central
Forest

Northern
Highland

Northeast
Sands

Western
Prairie

Forest Transition

Northern Lake
Michigan Coastal

Central
Lake Michigan
Coastal

Central Sand
Plains

Central
Sand
Hills

Western Coulees
& Ridges

Southeast
Glacial
Plains

Southwest
Savanna

Southern
Lake Michigan
Coastal

Lower priority   Higher priority

Miles
0   50

N

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Division of Forestry

Map 19: Priority Landscape – Resilient Forests. Ecological landscapes of Wisconsin ranked based on criteria that identify existing functional forests in the State.

PROTECT FORESTS FROM THREATS.

Throughout the state, Wisconsin's forests are threatened by both native and exotic insects and diseases, invasive plants, deer, damaging storms, changing climate, and air pollutants. The processes have long played an important role in forest succession, reducing tree density in overstocked stands, creating openings in the canopy that encourage successful regeneration, and providing down woody material. In some cases, tree diseases, insect infestations or other damaging threats can cause such high levels of mortality that a species may be reduced to only a few individuals on a site or over an extensive area. This priority landscape focuses on protecting forests from threats, and, considered with other information from research, surveys and monitoring, and the priority issues identified below, helps determine which issues and areas are the most critical.

Ecological Landscape	Forest Risk	Conservation Opportunity Areas	Resilience Score	Forest Type Rarity and Opportunity	Threats and Rarity Score
Western Coulees and Ridges	0.84	0.68	1.00	1.00	3.5
Central Sand Hills	1.00	0.62	0.88	0.63	3.1
Central Sand Plains	0.90	0.59	0.77	0.85	3.1
Northwest Sands	0.79	1.00	0.67	0.45	2.9
Superior Coastal Plain	0.46	0.86	0.94	0.49	2.8
Northern Highland	0.66	0.72	0.93	0.39	2.7
Northeast Sands	0.72	0.70	0.80	0.45	2.7
Southeast Glacial Plains	0.88	0.29	0.77	0.69	2.6
Northern Lake Michigan Coastal	0.71	0.46	0.59	0.53	2.3
North Central Forest	0.80	0.46	0.69	0.47	2.4
Northwest Lowlands	0.56	0.56	0.74	0.32	2.2
Southern Lake Michigan Coastal	0.81	0.00	0.91	0.28	2.0
Central Lake Michigan Coastal	0.80	0.22	0.59	0.38	2.0
Forest Transition	0.66	0.23	0.63	0.41	1.9
Western Prairie	0.88	0.08	0.63	0.31	1.9
Southwest Savanna	0.78	0.00	0.57	0.36	1.7

Table 10: Normalized values of the geospatial attributed to the Threats and rarity Priority Landscape.

Priority Geospatial Attributes of Forest Threats
Wildlife Action Plan – Conservation Opportunity Areas (COA's) in forested habitats: Wisconsin's Wildlife Action Plan identified COA's to protect native Wisconsin species of greatest conservation need (SGCN). The COA's include forest habitat which could benefit SGCN. Forest communities that are under-represented in the state are of special concern and are considered when prioritizing areas for management. Ecological landscapes with a higher percentage of area in **forested** COAs score higher.

Forest type rarity and opportunity: The Natural Heritage Inventory tracks examples of all types of Wisconsin's natural communities that are deemed significant because of their undisturbed condition, size, what occurs around them, and other reasons. Each natural community is assigned a State rank. For more information visit dnr.wi.gov and search: *NHI.*

Based on the presence or absence of natural communities in each ecological landscape, the opportunity to preserve the community, and on each community's State rank, each EL was given a score. Higher scores mean that ecological landscape has either an abundance of communities or communities that have a high State rank or that represent a major opportunity.

Resiliency score: Under a changing climate, some forest species and associated ecosystems composition may shift, degrade, or even disappear. However, some areas have a higher ability to retain their intrinsic characteristics and continue to support diversity and the consequent benefits to society. The Nature Conservancy created a report and a map for Resilient Sites for Terrestrial Conservation in Eastern North America, where they defined resilient sites as "an area of land with sufficient variability and microclimate

options to enable species and ecosystems to persist in the face of climate change and which will maintain this ability over time" (Anderson et al., 2018).

Areas with a below average resilient score are of concern as they are at a higher risk of being lost, degrading, or converting to other land cover. Ecological Landscapes with more areas with a "below average" resilient score, are scored higher.

Forest risk of mortality from insects and diseases 2020-2030: Risk of forest mortality from insects and diseases is one component of the rarity priority landscape map. Risk of mortality was assessed by listing out major insects and diseases that impact each tree species or forest type included in level 4 (finest scale) of Wisconsin's WISCLAND 2 dataset. We then assigned a risk score from 0-5 (0 = no risk, 5= very high risk) for each tree species or forest type over the next ten years north and south of the tension zone. Risk was defined as significant mortality that could be mapped during an aerial survey.

We were not able to include all major forest health concerns because of lack of data or if the data was not easily mapped.

Priority Issues of Forest Threats
Climate change: The potential impact of climate change on species movement, intensity and frequency of natural hazards, and opportunities for mitigation are all important issues and should be prioritized but are difficult to map. Important mitigation actions are listed in the strategy part of the assessment, including reforestation, afforestation and maintenance of forested land. For example, the best places for reforestation or afforestation might not occur on those high priority landscapes as mapped (Map 19; Map 20).

Climate change is exacerbating the impacts of catastrophic events on forests. Resilience is key to limiting impacts. Therefore, the highest priority landscapes for abiotic issues are forested areas where resilience can be improved or in protecting and mitigating damage in non-resilient rare forests.

Wisconsin has joined the leading states in the country and stands in a position to a be a strong example for climate change related actions, projects, legislation, and industry thriving examples of sustainable forests. In December 2019, Governor Tony Evers signed the executive order #52 "relating to the creation of the Governor's task force on climate change", which main goal is to develop a strategy to mitigate and adapt to the effects of a changing climate. In addition, Wisconsin is one of the 24 States that comprise the United States Climate Alliance, a bipartisan coalition committed to reducing greenhouse gas emissions consistent with the goals of the 2015 Paris Agreement. In sum, one of the most impactful mitigation actions the forestry sector can do is to identify new approaches to protect and restore our forests and other critical landscapes.

Climate change adaptation actions often fulfill other societal goals, such as sustainable development, disaster risk reduction, or improvements in quality of life, and can therefore be incorporated into existing decision-making processes. Agencies, universities, and other research organizations whose aim is to manage natural resources within the state, should collaborate and share information that will help inform landowners, managers, and policy makers. Funding should be provided to support research and collaboration.

Deer: Another criterion that is difficult to map is deer damage to forest regeneration due to over-browsing. There are several trials across the state that have documented the connection between deer and forest health, but no statewide data exist. Possible proxy data to use are locations where deer populations are over goal (See additional information on deer populations and management at dnr.wi.gov and search: *Deer management*). Deer can cause forest damage anywhere, but over-populated areas could have a greater impact on forest regeneration.

Invasive plants: Efforts to increase mapping of invasive plants are underway. The Wisconsin Shared Terrestrial Invasive Plant Presence viewer *https://fyi.extension.wisc.edu/wifdn/tools/wistipp-viewer/* was recently released and other databases such as EDDMapS *https://www.eddmaps.org/* are collecting information online and via mobile applications. However, more consistent, long-term data is needed before it will be suitable for mapping priority landscapes. Nonetheless, based on FIA data and site visits from across the state that the majority of invasive plants establish in southern Wisconsin and spread north. The highest priority landscapes for invasive plants would be areas with new introductions of NR40 prohibited species. Removal of small populations of NR40 restricted species in areas where they are not common would be a secondary goal. High priority landscapes would also include state natural areas, conservation lands, and areas with threatened plants.

New invasive species: Known (e.g., hemlock woolly adelgid) and unknown invasive pests establish regularly in Wisconsin. The introduction of a new invasive could significantly change Wisconsin's highest priority landscapes. For example, if Asian longhorned beetle were found in Wisconsin we would immediately shift our resources and focus to eradicating it from the state. Updated priority

MAP 20 - FOREST THREATS AND RARITY PRIORITY LANDSCAPE
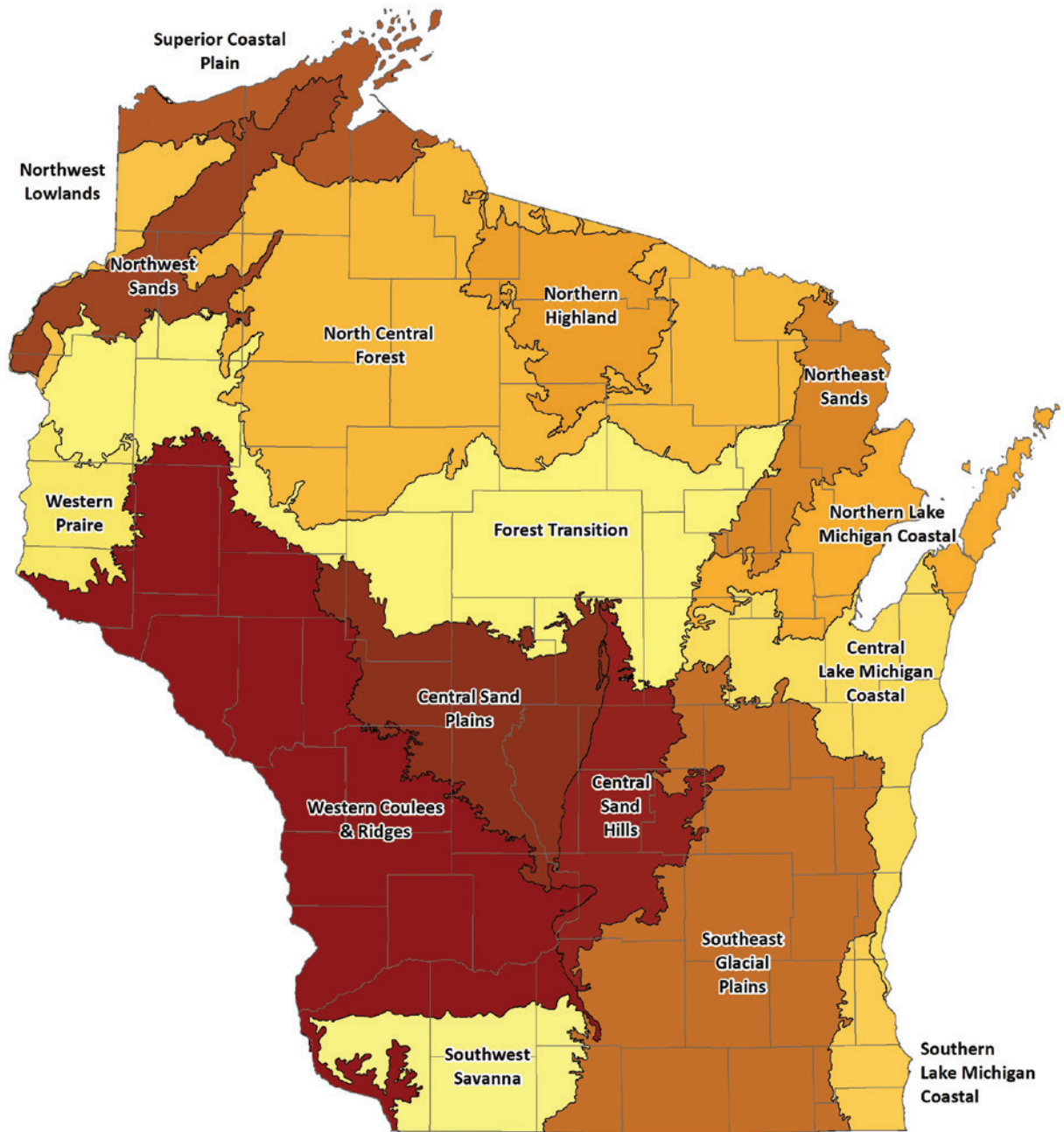
Map 20: Priority Landscape – Forest Threats and Rarity. Ecological landscapes of Wisconsin ranked based on forested areas that are at risk or susceptible from threats.

landscape maps will be created as needed to address new invasive species.

Fragmentation and parcelization: The benefits of large forest patches include, but are not limited to, wildlife habitat, aesthetics, recreation activities, climate change resilience, and economies of scale for timber management. Average forest parcel size has decreased over time and the number of private landowners has increased. In 1997, the statewide average parcel was 37 acres. In 2006, the average dropped to 28 acres. Smaller forest ownerships can make it difficult to manage a forest. We do not have geospatial data on forest parcel size and therefore it is not represented on this map. Depending on the strategy, average parcel size is a factor that may be prioritized.

ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS.

Forests provide a myriad of economic, ecological, social, and public health benefits. Wisconsin's forests supply timber products, wildlife habitat, watershed protection, recreation, aesthetic values among many other things that support our state's economy and way of life. The priority issues identified below, considered with other information from research, surveys, and monitoring help determine which issues and areas are the most critical to address.

Issues of Forest Benefits

Ecosystem services: Ecosystems provide benefits to human well-being that support direct or indirectly quality of life or survival. Ecosystem services can be grouped into four main categories: provisioning (e.g. wood, fiber, food, fresh water), regulating (e.g. climate regulation, water purification, soil biodiversity), habitat (e.g. to migratory species), and cultural (e.g. recreation, aesthetic values, spiritual enrichment) services. Plant communities in general, whenever present can provide any combination of ecosystem services and are, therefore, beneficial to the public.

Water quality: Forest ecosystems in combination with soil organisms, have the ability to purify water and have a profound impact on water movement. Vegetation cover is important in controlling floods, water flow, and water quantity and quality. Forests with dedicated management actions often provide clean water at a much lower cost than man-made substitutes like water treatment plants. Water quality in Wisconsin is increasingly a public health issue and it should be the focus whenever there is forest management. There are considerable connections between protecting water quality and the geospatial priority landscapes that were developed for Resilient Forests and Protecting Forest from Threats.

Workforce: Skilled and diverse workforce availability is a priority issue for all sectors of forestry in Wisconsin. Growing this workforce to meet the needs of urban and rural forest landowners, public lands management and safety, and private industry demands, as well as supporting high levels of compensation, training, safety and quality of life for that workforce should be considered a priority issue for Wisconsin. Opportunities for increasing awareness and interest in forestry careers exist at all age levels should be prioritized.

Recreation opportunities: Forests provide a variety of recreation opportunities. Many communities in forested areas depend heavily on forest industry and forest-based recreation and tourism dollars. There is currently no geospatial data on these recreation opportunities, but opportunities for increasing connectivity between recreational trails and building capacity for site appropriate recreational activities should be prioritized.

Third party certified forests: A requirement of some ecosystem markets is that lands be third-party certified as sustainably managed. Wisconsin leads the nation with implementing third-party forest certification standards including the Sustainable Forestry Initiative® (SFI®), Forest Stewardship Council® (FSC®), and the American Tree Farm System® (ATFS), a program of the American Forest Foundation. The Wisconsin DNR, the Wisconsin County Forests program and private owners through the Managed Forest Law program achieved certification in response to market demand for certified fiber. They and other private and corporate owners have maintained certified status since the mid-2000's. Since 2005, forest industry, tribes, NIPF landowners, MFL owners, WDNR and county forests have expanded certification to nearly 7.5 million acres or almost 50% of the commercial forests in Wisconsin. At the current time, the most benefit for certified fiber is realized in the paper and pulp industry. To date, the economic impact to other sectors is mixed. There is an opportunity in the future to grow the economic benefits for the entire wood product industry.

Non-timber forest products: Non-timber forest products support local economies and are culturally important. There is limited geospatial data to represent nontimber forest products and their economic potential. Non-timber forest products are collected all over the State and in almost every forest type, therefore, are difficult to represent spatially.

MULTI-STATE PRIORITIES

Difficult and complex forestry issues often span political and urban/rural boundaries. In many cases, the best approach to addressing these issues and opportunities involves a concerted effort that exceeds the reach of individual state forestry organizations and their partners. Wisconsin worked with neighboring states and the USDA Forest Service to develop the list of multi-state priority landscapes and issues. These are not listed in any significant order.

MULTI-STATE PRIORITY LANDSCAPES

Driftless Area
Issues associated with the area: Cold water, spring fed streams that are sensitive to non-point source pollution due to the karst geology; Maintenance of a high value recreational resource. Trout Unlimited has estimated that anglers generate an annual $1.1 billion economic benefit; Forest fragmentation impacting forest-interior bird habitat; Lack of forest management related to limited market accessibility; Forest invasives decreases sunlight to understory plants as they die off bare soil on steep slopes is subject to soil erosion.

- *Driftless Area Initiative*

The Great Lakes
Issues associated with the area: Aquatic invasive species; Habitat and species loss; Coastal health; Areas of Concerns (related to sewer overflow discharges); Nonpoint source pollution; Contaminated sediments and toxic pollutants; Coordination of data collection and communication; Development of Indicators for measuring the health of the Great Lakes; Need for sustainable development

Opportunities for partnership, cooperation, and projects: Partner with land trusts, conservation organizations, local communities and, localstate agencies to protect or restore riparian forests and upland habitats; Partner with state water quality regulatory agencies to promote the use of urban forests for storm water reduction and on-site infiltration.

- *Great Lakes Regional Collaboration*
- *Great Lakes Restoration Initiative*
- *Lakewide Management Partnerships for Lake Michigan and Lake Superior Partnerships, and the corresponding Lakewide Action and Management Plans*
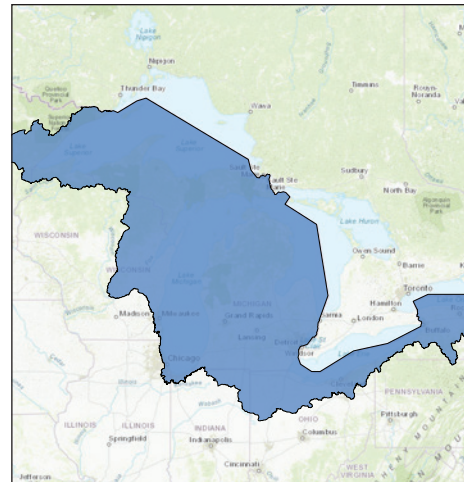
Midwest Glacial Lakes Partnership
The mission of the Midwest Glacial Lakes Partnership is to work together to protect, rehabilitate, and enhance sustainable fish habitats in glacial lakes of the Midwest for the use and enjoyment of current and future generations.
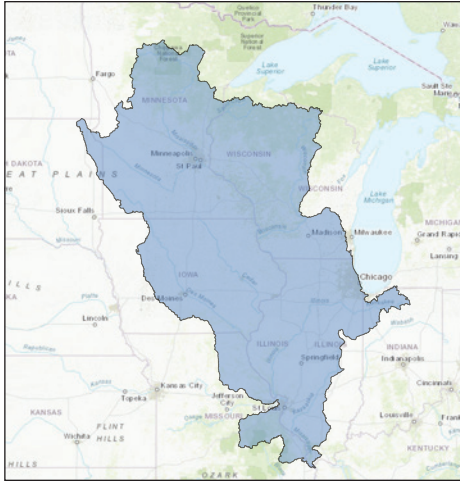
- *Midwest Glacial Lakes Partnership*
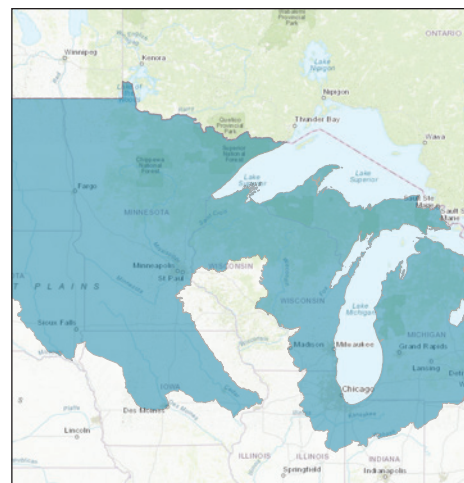
Upper Mississippi Watershed
Issues associated with the area: Water pollution; Loss of migratory bird habitat; Forest loss and fragmentation

Opportunities for partnership, cooperation, and projects: There are many overlapping initiative and opportunities for partnership within the Upper Mississippi Basin.

- *Upper Mississippi Forest Partnership*

White Oak Initiative
The White Oak Initiative works to ensure the long-term sustainability of America's white oak and the economic, social and conservation benefits derived from white oak dominated forests. While currently white oak growing stocks are sufficient to meet demand, forest monitoring, and long-term projections indicate problems in maintaining high-quality white oak regeneration.

White oak is critical to many wildlife species, and to industries making forest products such as furniture, flooring, cabinetry, barrels for wine and spirits, as well as for recreational activities like hunting, generating billions of dollars to local economies throughout the white oak region.

- *White Oak Initiative*

MULTI-STATE ISSUES

- Adaptation and mitigation / Climate change
- Biodiversity and forest habitats for wildlife
- Water quality and forested watersheds
- Flood resiliency
- Reduce wildfire risk
- Great Lakes Fire Compact
- Manage insects, diseases and invasive plants
- Sustain forest industry and diversify markets
- Valuing ecosystem services
- Promote sustainable, active private forest management
- Keeping forests as forests and intergenerational transfer of anland
- Human health benefits of forests
- Urban and community forestry and green infrastructure
- Outreach and conservation education
- Using FIA data to understand trends and support decision making