





Forest Ownership

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The Forest Ownership section focuses on who owns Wisconsin's forest lands, how their ownership impacts sustainable management, the challenges they are facing, and what that might mean for the future. The purpose of this portion of the assessment is to provide a source of succinct, comprehensive, and scientifically based information and data that supports and informs the goals and strategies for sustainability related to forest land ownership.

Wisconsin's forests are owned by a wide variety of public and private entities. An estimated 68 percent of forest land in Wisconsin is privately owned (Figure 23). The majority of the estimated 11.5 million private acres are owned by family forest owners (9.7 million acres). Corporations own an estimated 1.5 million acres, and other private owners, including conservation organizations and unincorporated clubs and partnerships, own an estimated 0.3 million acres.

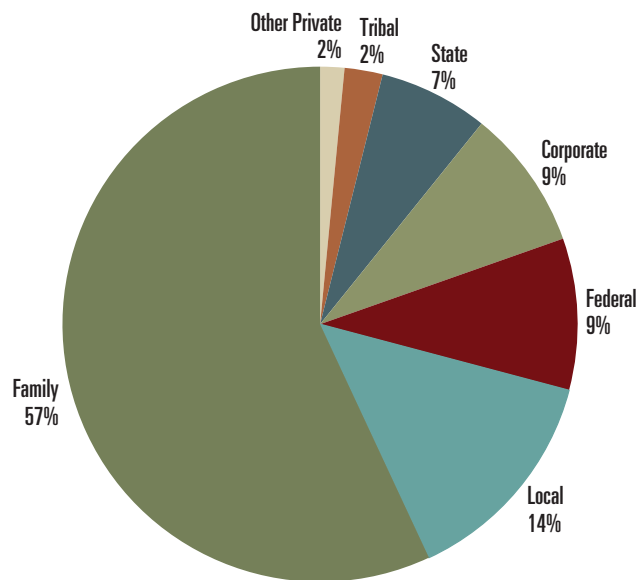


Figure 23: Percentage of forest land by ownership group. Source: U.S. Forest Service, 2017

Conversely, public entities hold 5.2 million acres of Wisconsin’s forest land. The federal government manages an estimated 1.6 million acres of forest land, much of this in the Chequamegon-Nicolet National Forest. The State of Wisconsin manages another 1.2 million acres of forest land. Local, primarily county, government agencies manage an estimated 2.4 million acres of forest land in the state (Map 15).

Native Americans tribes own 0.4 million acres of forest land. These lands are either managed by the tribes or by the federal government in trust on behalf of members of the tribal community.

Most of the state’s forest land is held by individual owners with a range of forest management priorities. On a state-wide scale, this means that changes in policy and forest management on public lands may be overshadowed by changes on private lands.

Within ownership, it is significant to evaluate the proportion of forested lands that are urban versus rural. Wisconsin cities and villages cover 2.1 million acres, just over 6 percent of the state’s total land area, and are home to 70 percent of the population (Map 16). The trees in these municipalities comprise the urban and community forests of our state and provide economic, environmental and social benefits to the people that live, work and play there.

The majority of urban and community forests in Wisconsin are found on residential lands managed by local municipalities and homeowners, with significant portions found on commercial and industrial lands as well as rights-of way. This shared ownership leads to shared responsibility among

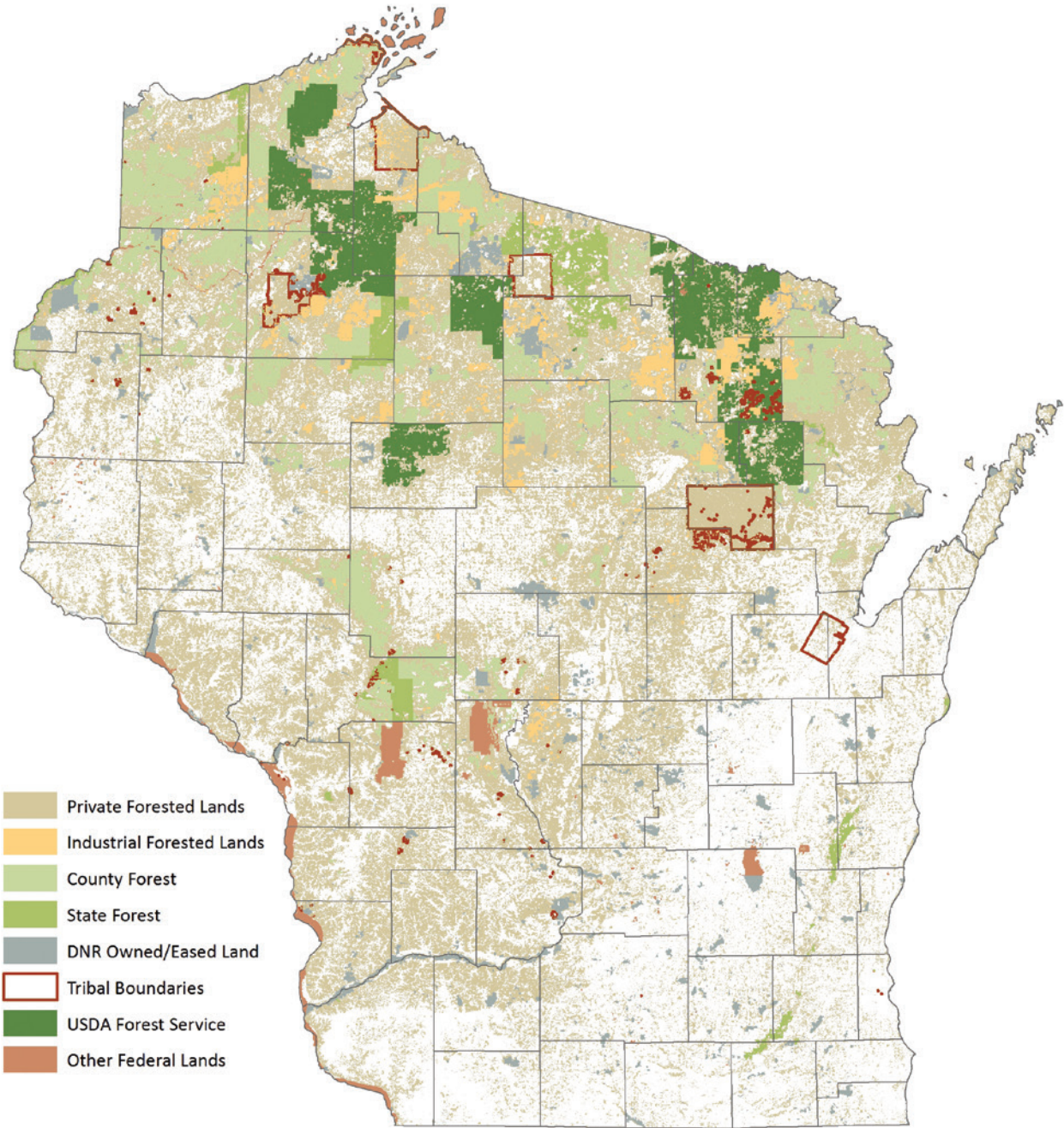
many partners, including local and state governments, residents, and private businesses, to effectively manage the urban forest resource.

In addition to evaluating ownership, the spatial make-up of protected lands in the state supports a wide range of activities, namely managing public lands to better protect biodiversity; provide improved recreation access and support public health campaigns; develop action strategies to mitigate climate change impacts (Gergely & McKerrow, 2016). The spatial distribution of protected lands is important for better management of ecosystems critical components, such as wildlife corridors, assessment of species minimum area requirements, edge effects, etc.

To evaluate public lands held in trust by national, state, and regional/local governments, as well as non-profit conservation organizations the USGS developed a program called The Protected Areas Database of the United States (PAD-US). Using this data, a 2016 evaluation shows that Wisconsin currently has a total of 6.1 million acres under GAP 1, 2, and 3 (GAP categories represent a ranking of most to least protected lands; 80 thousand, 3.1 and 2.9 million acres respectively) and 1.1 million acres under Gap Analysis Program GAP 4, which is not always considered as “protected” land. Most of the protected land with larger continuous patches in Wisconsin is located in the northern part of the state, while smaller, more dispersed patches are in the south (Map 17).



MAP 15 - FORESTLAND OWNERSHIP



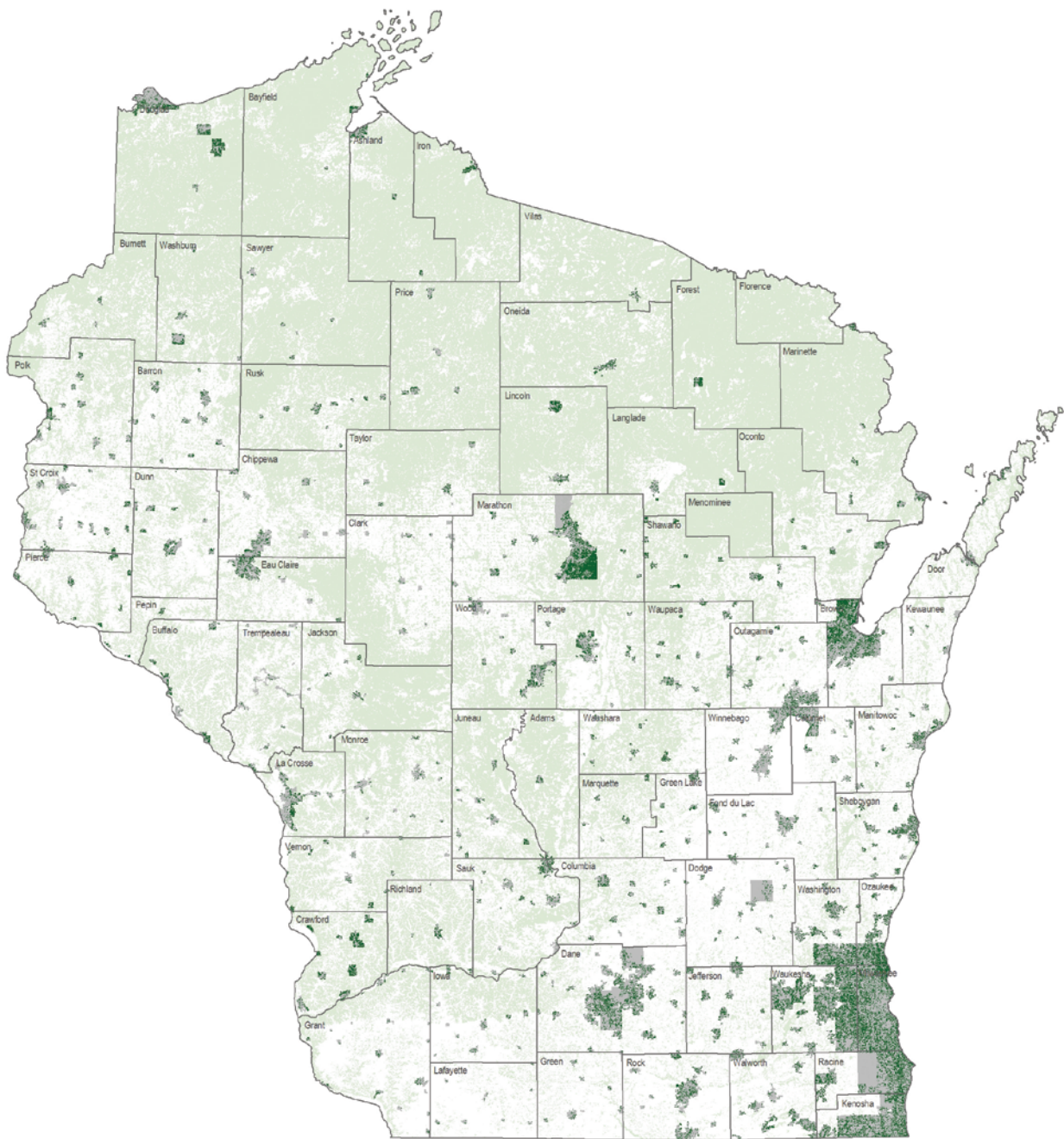
- Private Forested Lands
- Industrial Forested Lands
- County Forest
- State Forest
- DNR Owned/Eased Land
- Tribal Boundaries
- USDA Forest Service
- Other Federal Lands

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Map 15: Forest land ownership (Wisconsin DNR, 2018)

MAP 16 - URBAN TREE CANOPY IN INCORPORATED CITIES AND VILLAGES.



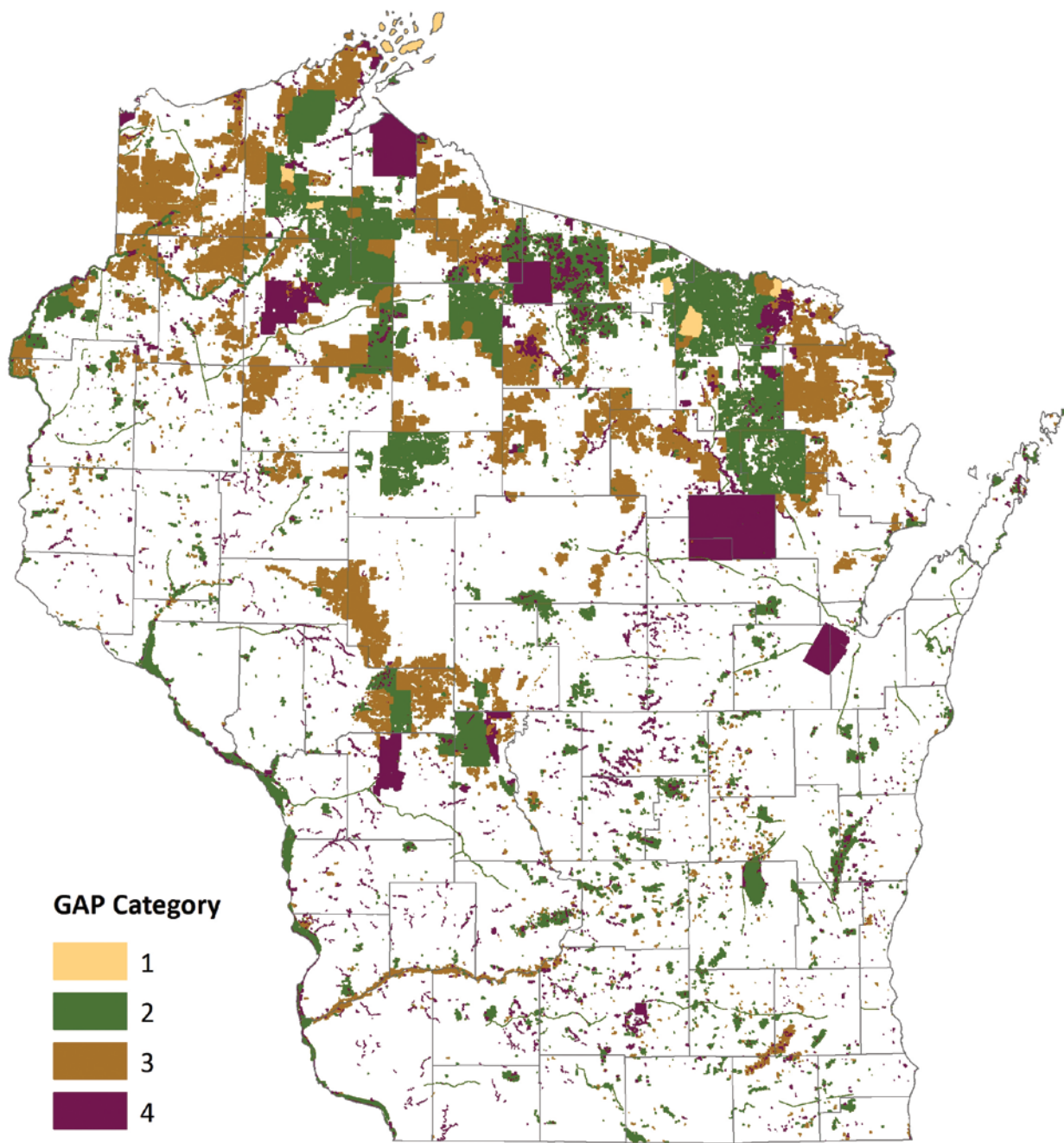
- Urban Tree Canopy
- Incorporated Cities and Villages
- Forest Land



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Map 16: Urban Tree Canopy in Incorporated Cities and Villages.

MAP 17 - LANDS IDENTIFIED IN THE WISCONSIN STEWARDSHIP GAP DATASET (SOURCE: USGS GAP ANALYSIS PROJECT)



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Map 17: Lands identified in the Wisconsin Stewardship GAP Dataset (Source: USGS Gap Analysis Project (GAP), 2018). GAP categories range from 1 to 4 with 1 having the highest form of protection and 4 having no known protection. More details can be found in Appendix G

PRIVATE FOREST LANDS

Wisconsin's 17 million acres of forest land cover nearly half of the state with individuals and families owning the largest share. An estimated 67 percent of the forest land of Wisconsin is privately-owned with roughly 426,000 non-industrial private forest landowners owning and caring for nearly 11.4 million acres of woodland.

These privately-owned forests contribute to the state's well-being ecologically, socially and economically. Ecological benefits include clean water, clean air, erosion control, wildlife habitat and sanctuaries for hundreds of species of rare plants and animals and natural communities. Social benefits include places for work, recreation, scenic beauty and solitude. Economically, they provide the raw materials for homes, offices, furniture, paper, medicines, paints, plastics and many products you might not realize come from trees. In Wisconsin, more than 1,200 wood-using companies produce nearly \$25 billion in forest products value every year, which includes primary and secondary outputs and value-added products. Over 64 percent of their raw material needs are supplied from private land and over 160,000 jobs in the state rely on the forest products industry.

ASSESSMENT

PRIVATE FOREST LAND OWNERSHIP

Trends in ownership ultimately drive how private forest lands are managed in Wisconsin. Here, trends in forest

fragmentation and ownership parcelization, demographics and landowner values are discussed to provide insight on what current ownership looks like and shed light on potential conditions and trends Wisconsin may face in the next 10 years. As families and individuals who are the primary owners of Wisconsin's forests continue to change, so too does the future management of Wisconsin's forests.

Trends in ownership patterns continue to show more landowners owning smaller parcel sizes. In Wisconsin, the average parcel size has steadily decreased from 37 acres (1997) to 26 acres (2013) (Butler et al. 2016). During this same period, the number of landowners increased from 263,000 to 426,000, a 61 percent increase (U.S. Forest Service, 2017). The number of large-scale forest owners (≥ 200 acres) has remained stable since 1997; however, acres owned by these same landowners has decreased (Figure 24). The most dramatic change in acreage occurred with owners of parcels 5,000 acres and greater. Most likely these lands have been sold off in smaller parcels, resulting in the increase in owners of less than 100 acres as large private industrial landowners have sold their lands to timber investment management operations (TIMOs) and real estate investment trusts (REITs) (L'Roe & Rissman, 2017) Copyright ? Taylor & Francis Group, LLC. Forestland divestment by vertically integrated forest products companies (VIFPCs. One example of this can be seen with trends in large ownerships, landowners who have more than 1,000 acres enrolled in Wisconsin's Forest Tax Law, which has declined by over 350,000 acres since 1999.

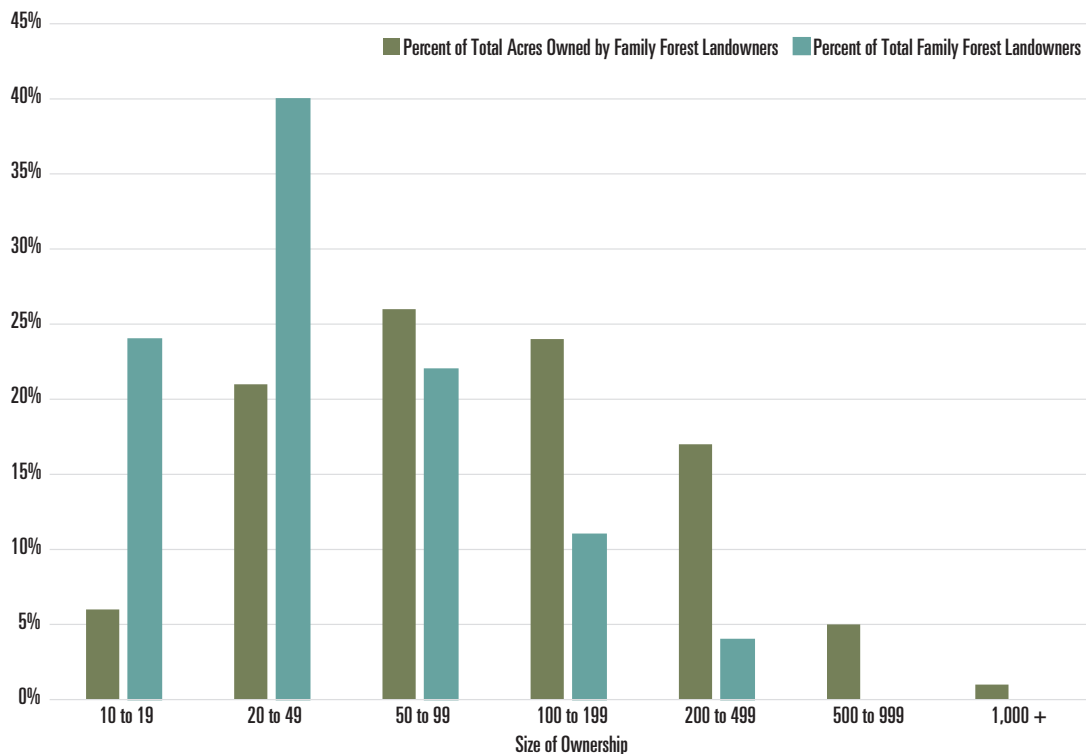


Figure 24: Size of forest parcel compared to percentage of number of landowners who own that size parcel and the percentage of parcels that size owned by family forest landowners (Butler et al., In review)

Conducting forest operations on small parcels is both economically and operationally challenging for several reasons. Most notably, the per acre operational cost increases as parcel size gets smaller. Other factors that may affect forest management activities on small parcels include access, increased fixed costs of logging equipment (e.g., moving equipment) and low-value products. Foresters and other natural resource professionals are challenged with meeting individual landowner management objectives as more landowners own smaller forests.

Nationally, millions of acres of privately-owned forest land will change hands in the coming decades as the baby-boom era landowners continue to age. Since 45 percent of family forests in the U.S. are owned by individuals over the age of 65, almost half of the nations' family forest owners will be deciding the future of their land (i.e. sell, convert to another use, parcel, conserve). Wisconsin forest landowners are not unique to this impending trend toward intergenerational transfer of ownership. The average age of family forest owners in Wisconsin is 61 years with 41 percent of the family forest land owned by those who are at least 65

years of age. As landowners age, the manner in which they transfer their land to the next generation will, at least in part, determine the future of Wisconsin's forests and how they are managed. Nearly 60 percent of Wisconsin forest landowners identify the opportunity to leave a legacy for their family as a reason for owning the land (U.S. Forest Service, 2017)

In Wisconsin, private forest landowners' value and own land for many reasons, including wildlife, recreation, aesthetics, hunting and privacy. Owning land for timber management tends not to rank very high as a reason for owning land (Figure 25). Consequently, many do not, as a common practice, participate in traditional forest management activities or assistance programs. With roughly 34 percent of family forest landowners having a written forest management plan to guide their land management decisions, there are significant opportunities to help family forest landowners increase their engagement and stewardship of their lands through targeted outreach, marketing and increased use of social media platforms.

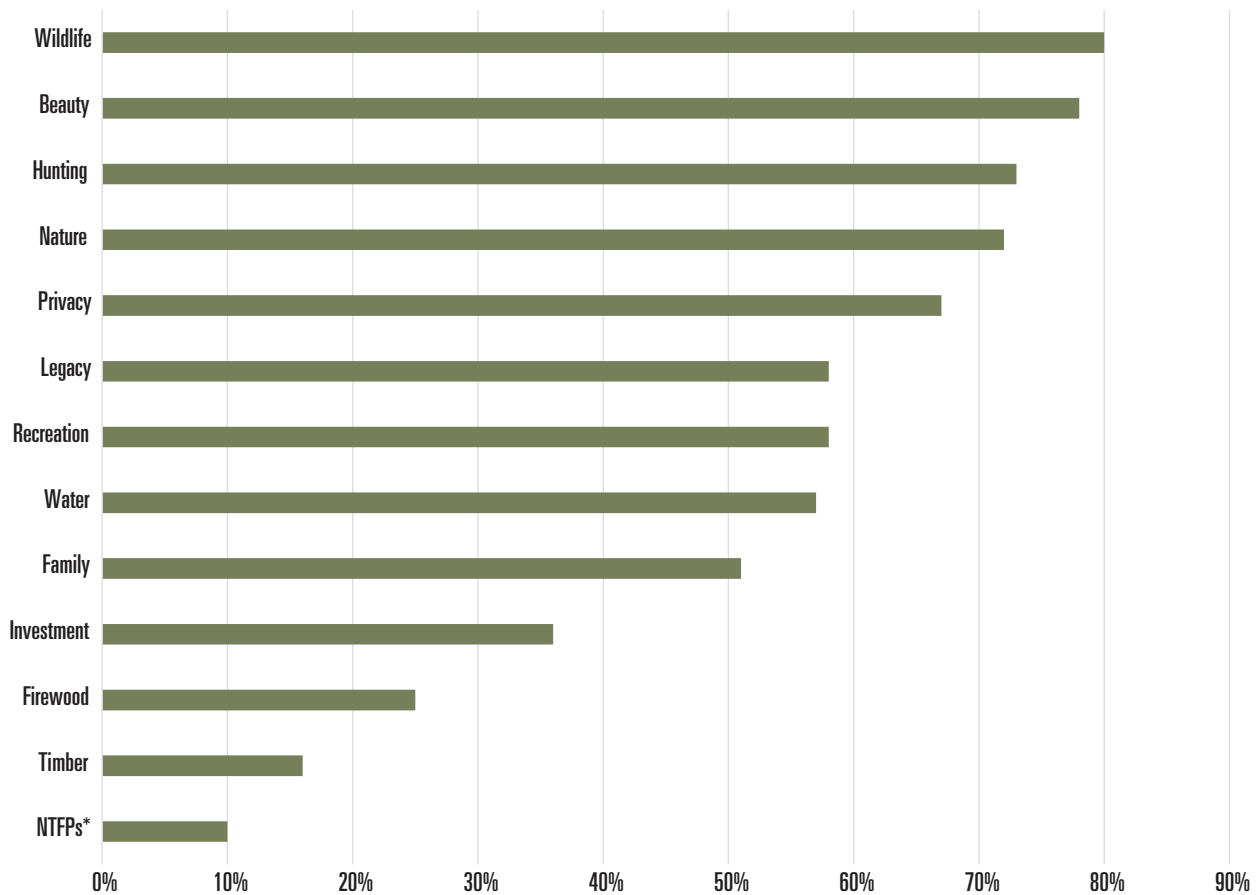


Figure 25: Wisconsin family forest landowners: reasons for owning land. Source: Butler et al., In review. *Non-timber forest products

As Wisconsin's forest landowner demographics change, the values of new owners and how they may use their land and the management decisions they may make are also likely to change. For example, a shift toward more landowners coming from urban backgrounds and, conversely, fewer landowners from rural farming backgrounds suggests an accompanying shift from traditional land-use practices to uses focused more on amenity values such as recreation and viewing wildlife. Broad and perhaps far-reaching implications for the future management of Wisconsin's forests

can be drawn from data supplied by the National Woodland Owner Survey (NWOS) and include (Butler et al., In review):

- Lack of knowledge or experience with land management decisions
- Unfamiliarity with resources and services available to assist with decision making
- Government mistrust
- Conflicting management goals and objectives

Private Forest Land Ownership: CONDITIONS & TRENDS

- The growing number of private forest landowners supports a corresponding need for technical forestry assistance, landowner education and outreach, and tools that encourage these new landowners to engage in sustainable forest management.^{1,3}
- Due to the impact landowners collectively have on the landscape, management of private forests has become increasingly important.^{1,3}
- Understanding the characteristics, attitudes, and behaviors of family forest ownerships is critical for developing and delivering effective programs, policies and services.^{1,3}
- Engaging effectively with private forest landowners is challenging due to the lack of agency and partner coordination, ability to leverage existing resources, and changes in how landowners value their land.^{1,2,3}

LANDOWNER INCENTIVE PROGRAMS

Economic factors such as rising land prices and property tax rates are notable concerns that make owning forest land prohibitively expensive for new landowners and perhaps less appealing to many current landowners. From 2010 to 2018 the average value of forest land increased by 5.1 %, from \$2,235 to \$2,349 per acre. While the tax rate for productive forest land between 2013 and 2018 decreased by 4.4% - from \$42.70 in 2013 to \$40.8 in 2018, the 2018 tax rate is still 22.3% above the 2008 tax rate, which was \$33.35. In addition, investments in intermediate cultural and/or maintenance practices tend to be labor intensive and costly. Unfamiliarity with landowner assistance programs may influence a person's willingness to own and manage the resources on the land. Consequently, current landowners may consider selling their land (in whole or in part) or may liquidate their forest assets to lessen their tax burden, while new landowners, who typically own fewer acres and may be well-intentioned, may not proactively manage their forests due to inexperience and challenges with small-scale forestry practices.

While participation in traditional forestry programs remains relatively low (<25 percent of Wisconsin landowners have a management plan), there are several landowner incentive

programs available to help landowners face the increasing cost of forest land ownership.

- **Tax Law Programs** Wisconsin's tax law programs – Managed Forest Law (MFL) and Forest Crop Law (FCL) – are the largest incentive program available to landowners, with over 50,500 orders of designation and 3.4 million acres enrolled, an increase in 10 percent since 2010. FCL is no longer open for enrollment, but annually an average of 1,510 landowners enroll, or re-enroll, in the MFL program. The success of the tax law programs can be seen in the analysis of FIA data comparing landowners enrolled in a tax law program versus landowner who are not. The analysis shows higher net growth and harvest rates and lower mortality rates on lands enrolled in a tax law program, which suggests overall better forest health (DNR, 2019).
- **Wisconsin Landowner Grant Program (WFLGP)** WFLGP is a Wisconsin cost-share program that covers up to 50 percent of the cost of non-commercial management practices. To be eligible for WFLGP, landowners must own between 10 and 500 acres and have an approved forest stewardship plan.
- **Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP)** The largest private lands conservation program in the nation,

CRP is administered by USDA's Farm Service Agency (FSA) that provides annual rental payments to landowners enrolled in the program. Contracts for enrolled land are 10-15 years in length. At its peak, there were nearly 37 million acres enrolled in the program. Over the past decade, CRP acreage has declined by 13 million acres due to a variety of economic factors. Supplementary to the CRP program, CREP targets high-priority conservation goals identified by the state, with federal funds supplemented with non-federal funds to achieve those goals.

- **Environmental Quality Incentive Program (EQIP)** EQIP provides technical and financial help to farm and forest landowners for conservation practices that benefit soil and water quality, wildlife habitat, plant condition, and other resource concerns. Through EQIP, landowners may receive financial and technical help with structural, vegetative and management conservation practices on agricultural land, including non-industrial private forestland. EQIP offers contracts for practice implementation from 1-10 years.
- **Conservation Stewardship Program (CSP)** CSP helps private forest landowners build on existing conservation efforts through a payment reward program for conservation they are already applying at the time of application and are willing to implement during the five-year contract. Ideal CSP participants are woodland owners

or managers who have a current forest management plan, are following forestry best management practices and are maintaining forest trails. Examples of forest management enhancement options available to forest land managers include timber stand improvement and wildlife habitat management.

- **Emergency Watershed Protection Program (EWP)** EWP is intended to take emergency measures to safeguard lives and property after a natural occurrence has caused a sudden impairment of the watershed. Through EWP, NRCS may purchase easements on any floodplain lands that have a history of repeated flooding. The EWP Program provides up to 75 percent of the cost of the watershed treatment or approved structural repairs.
- **Regional Conservation Partnership Program (RCPP)** RCPP promotes coordination between NRCS and partners to deliver conservation assistance to producers and landowners. Partners provide funding to leverage the NRCS investment with the overall goal of at least doubling the impact of program dollars. Projects range from a focus on a single small watershed to large, multi-state efforts and have included EQIP, CSO and easements for water quality, soil quality, wildlife habitat and other conservation projects throughout the state. Since FY-2014, Wisconsin has received nearly \$23 million to implement conservation projects throughout the state.

Landowner Incentive Programs: CONDITIONS & TRENDS

- Wisconsin's tax law programs continue to be the primary tool to provide financial assistance to promote sustainable management on private forest lands in Wisconsin.^{1,2}
- Landowner awareness and understanding of programs available to assist with their management needs continues to be low.^{1,2}

CONSERVATION EASEMENTS ON PRIVATE LAND

A conservation easement is a voluntary legal agreement between a landowner and a government agency or non-profit land trust that permanently limits specified current and future uses to protect water quality, wildlife habitat and other natural resources while allowing continued ownership and resource management. Since 2010, WI DNR has

doubled the number of acres protected using conservation easements to keep working forests as forests, bringing the total to nearly 297,000 acres (Figure 26). This effort helps protect and preserve the integrity of forest lands in perpetuity, prevent forest fragmentation and promote the sustainable use of the state's forests.



Figure 26: Acres Protected by WI DNR Conservation Easements in Wisconsin (2010 – 2019)

Gathering Waters– Wisconsin’s alliance for land trusts – and The Nature Conservancy continue to be partners and have strong programs that achieve land conservation goals through conservation easements. Land trusts associated with Gathering Waters collectively protect and manage over 280,000 acres with significant ecological, scenic, recreational, agricultural and historic value, a 40 percent increase since 2010. The Nature Conservancy has protected nearly 234,000 acres of land and water in some of Wisconsin’s most critical landscapes, an increase of 92,400 acres since 2010. Of former paper company lands, different types of lands were more likely to be parcelized, acquired by public agencies, and placed under conservation easement. Conservation easements have been successfully implemented on a large acreage of working forest land, but were less likely to be placed in areas at higher risk of withdrawal and development, compared to public lands (L’Roe & Rissman, 2017) Copyright ? Taylor & Francis Group, LLC. Forestland divestment by vertically integrated forest products companies (VIFPCs). The Forest Legacy Program (FLP) was created

as part of the 1990 Farm Bill to identify and protect and maintain access to forest products on environmentally important private forest lands threatened with conversion to non-forest uses. FLP funds have supported conservation easement acquisitions in Wisconsin, including large forest tracts formerly owned by paper companies. A complete description of the FLP program can be found in the Forest Legacy Program section within this document.

A recent study on the economic contributions of land protected by conservation easements through the federal FLP suggests working forests conserved through the FLP contribute substantially to rural economies. For example, for every 1,000 acres of FLP land protected by a conservation easement in northern Wisconsin & Michigan’s Upper Peninsula, the average annual value-added contribution is estimated to be \$126,912 and \$14,607 for timber and recreation, respectively (Murray, Catanzaro, Markowski-Lindsay, Butler, & Eichman, 2018).

Conservation Easements: CONDITIONS & TRENDS

- State and federal agencies and non-profit land trusts provide a significant amount of conserved land through easement acquisition and other conservation programs. ^{1,3}
- Large acreages owned by private landowners, companies, and investment groups continue to decline. ^{2,3}

PRIORITY ISSUE

In Wisconsin, private forest landowner's value and own their land for many reasons, including wildlife, recreation, aesthetics, hunting and privacy. One of the reasons for owning land that tends to rank low for many landowners is forest management. Consequently, many do not, as a common practice, participate in traditional forest management activities or assistance programs. We know roughly 25 percent of family forest landowners have a written forest management plan to guide their land management decisions, which indicates the majority of landowners do not. Coupled with an estimated 64% off raw materials needed by the wood-using industry in Wisconsin coming from private lands, there is tremendous opportunity to reach out to, engage and encourage landowners to sustainably manage their forests. Targeted outreach, marketing and increased use of other popular media platforms including social media offer new opportunities to engage landowners.

Engaging New ('unengaged') Landowners

In early 2018, the Wisconsin Private Forestry Advisory Committee (WPFAC), which serves as the state's Forest Stewardship Coordinating Committee identified the following desired outcomes and recommendations for engaging new landowners:

- Identify and prioritize strategies for engaging more private woodland owners
- Determine partner role(s) to facilitate strategy implementation
- Support the Private Forestry program goal of connecting 20,000 new non-industrial private forest (NIPF) landowners with a resource professional to sustainably manage the next 1,000,000 acres
- Encourage Wisconsin Department of Natural Resources (WDNR) Division of Forestry and University of Wisconsin-

Extension (UWEXT) to explore opportunities to align their public resources to achieve this goal.

- Encourage all stakeholders in the Wisconsin forestry community to adopt and embrace a landowner engagement model and strive to invest their unique resources and abilities towards this ambitious goal.

In most instances, the path toward greater landowner engagement can be described in terms of a process or model (Figure 27) which acknowledges the many different ways they engage with their forest and the steps often needed to advance them along the engagement continuum.

The model also describes the outreach phases incumbent upon the forestry community in order to advance landowners along the continuum. These outreach phases are described as:

- **Acquisition** – is about raising awareness among private woodland owners, and ultimately getting them to respond to outreach, whether our own or the work of our partners.
- **Cultivation** – is about educating landowners and connecting with and building trusting relationships with landowners.
- **Implementation** – is all about assisting landowners, providing our own services, but more importantly getting landowners connected with the private sector professionals who assist them with on-the-ground implementation.
- **Evaluation/Tracking/Monitoring** – acknowledges the importance of tracking progress toward achieving the goal, evaluating effectiveness and being able to adapt to changing circumstances.

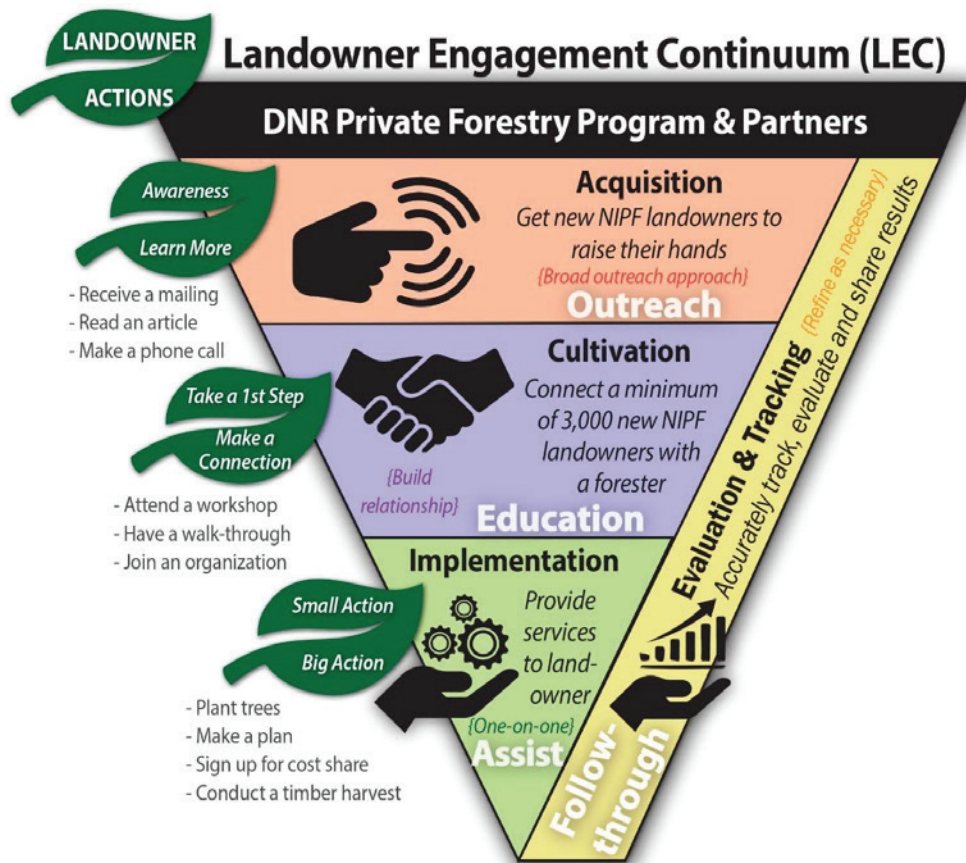


Figure 27: Landowner Engagement Continuum (LEC)

GOALS AND STRATEGIES

Goals and strategies are captured in subject areas throughout the plan. Many goals highlighted in one section of this document are pertinent to other sections. A list of all goals and strategies, including other goals related to Private Forest Lands, is included in the Summary of Goals and Strategies section.

GOAL Q: MORE LANDOWNERS ARE ACTIVELY ENGAGED IN MAKING INFORMED DECISIONS ABOUT THE MANAGEMENT OF THEIR WOODLAND.

Strategies

1. Increase the percentage of landowners who are guided by a management plan.
2. Improve coordination between state, federal and non-governmental agencies to ensure resources and programs are compatible with landowner management goals and objectives.
3. Increase awareness of resources available to private forest landowners.
4. Encourage participation in existing assistance programs available to private forest landowners.
5. Enhance landowner engagement and decision-making by identifying audiences and continuing engagement with outreach, education and relationship building between landowners and professional resource managers.

6. Support and promote Wisconsin's private forestry programs and encourage landowners to make investments in the management of their forests for public benefits.
7. Ensure forest ownership remains a viable investment for family and institutional forest owners.
8. Educate landowners to inspire them to become actively engaged for short- and long-term benefits and gains of good woodland management.

GOAL R: PRIVATE FOREST LANDOWNERS ARE BETTER CONNECTED TO EACH OTHER THROUGH PEER GROUPS AND NETWORKING OPPORTUNITIES.

Strategies

1. Develop and promote peer networks, landowner mentoring programs, support groups and other resources that promote learning and understanding about the value and benefit of land ownership and forest management.
2. Facilitate coordination among landowners seeking to 'bundle' forest management practices.
3. Establish networking opportunities for professionals (operators, loggers, foresters).
4. Recognize private forest landowners, Cooperating Foresters, and Certified Plan Writers (CPWs) for their contributions to Wisconsin forestry.

PUBLIC FOREST LANDS

Wisconsin's publicly owned forests, including federal, state, county and other local ownerships, represent 30 percent, or 5.2 million acres, of the total forested land in Wisconsin. Public forest lands are an essential component of the landscape, providing a range of ecological, economic and social benefits within a very predictable land base.

Public forest lands provide a wealth of benefits, including wildlife and aesthetic beauty, plant and animal habitat, timber products, and water purification, and serve as the setting for many of the state's most popular outdoor activities. Balancing the various uses, resources, and values of public forest land requires a thoughtful and deliberate approach to management unique to each ownership type. Public forests are managed using respective federal, state or local municipality laws and administrative codes as a baseline for management and use. All of Wisconsin's public forests are managed according to a "forest plan", which incorporates significant public input in its development and identifies desired future conditions and uses.

Public lands are seeing increased pressures, such as greater recreational use and resource extraction, from a wide range of interested and affected public and partners. At the same time, public forests are also under pressure from environmental stressors, including weather events and invasive plants, insects, and disease.

ASSESSMENT

PUBLIC FOREST LAND OWNERSHIP

Public forests include county forests; state-owned forests, including Wisconsin Department of Natural Resources and Board of Commissioner Public Lands; U.S. federal lands and national forests, which include U.S. Fish and Wildlife and U.S. Department of Defense lands; and a small number of municipal and local forests. Wisconsin County Forests Association (WCFA) plays an important role in facilitating county forests. Most of the public forest lands are in the northern half of the state, but every county has public forests of some sort. The amount of forest land, defined as publicly owned forests (not total land ownership), has increased from 5,088,963 acres in 2004 to 5,158,069 acres in 2017.

Tribal lands represent an additional 406,000 forested acres but generally not classified as public lands. (Figure 28).

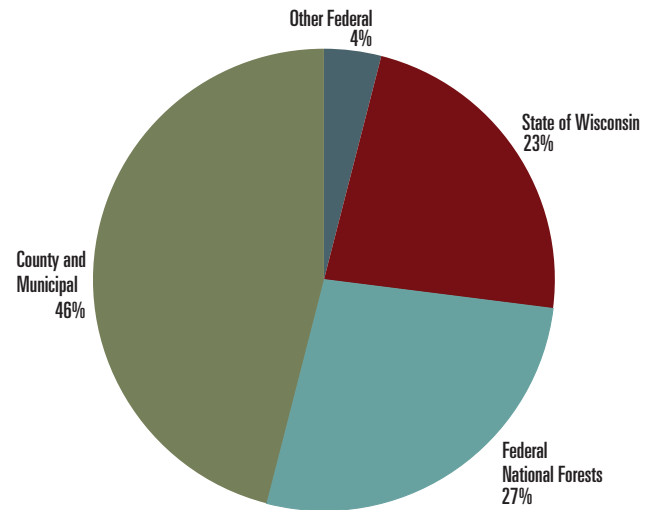


Figure 28: Acres of public forest land by ownership type (only includes forest land, not total ownership)

Most of the public forest land are on county forests, state forests and national forests. Public forest land ownership has increased slightly over time, as has all fee title ownership. Fee title ownership acquisition on federal and state lands have remained relatively stable over the last decade, with some small acquisitions focusing on inholdings within existing ownership boundaries. County forests have seen a slight increase in ownership of approximately 32,500 acres over the last 10 years, with over 2.4 million acres total, a significant contribution to Wisconsin forestry. Purchase of 21,100 of those acres was with Knowles Nelson Stewardship funds as matching acquisition grants.

Private ownership interests, within and adjacent to, public lands remain high and desirable for seasonal and permanent homes and recreation. These parcels provide nearby access to public lands for additional recreational pursuits. As described in the Private Forest Owner section, the number of private landowners is increasing as parcels are split for family members and sale.

Public Forest Land Ownership: CONDITIONS & TRENDS

- With more private landowners living within and adjacent to public lands, the public understanding of the benefits of forest management is mixed, with conflicting views on forest management.^{2, 3}
- Public forests are significant contributors to local and statewide forest products and recreational economies.^{1, 3}

PUBLIC FOREST LAND CHARACTERISTICS

Wisconsin’s statewide forest inventory and analysis program collects data consistently on all ownership types to assess the condition of Wisconsin’s forests in a statistically sound manner. Individual public forest owners have additional forest inventory and forest management systems for management operations.

Maintaining forest cover is a fundamental component of all public lands forest plans. The vast majority of public land ownership is in a forested condition with a range of cover types and age classes. Much of these forests occur in large

contiguous blocks of land with significant acreage along rivers and headwaters. Large blocks often serve as a backbone for biodiversity and other conservation values. Public lands often have areas that represent unique ecological habitats and designated as State Natural Areas.

Public forest lands are dominated by the aspen/birch, maple, oak and pine cover types. Slight changes over time with a decrease in the aspen/birch cover type with slight increases in the oak and pine types. All other cover types remain relative stable with slight fluctuation in the inventory year (Figure 29).

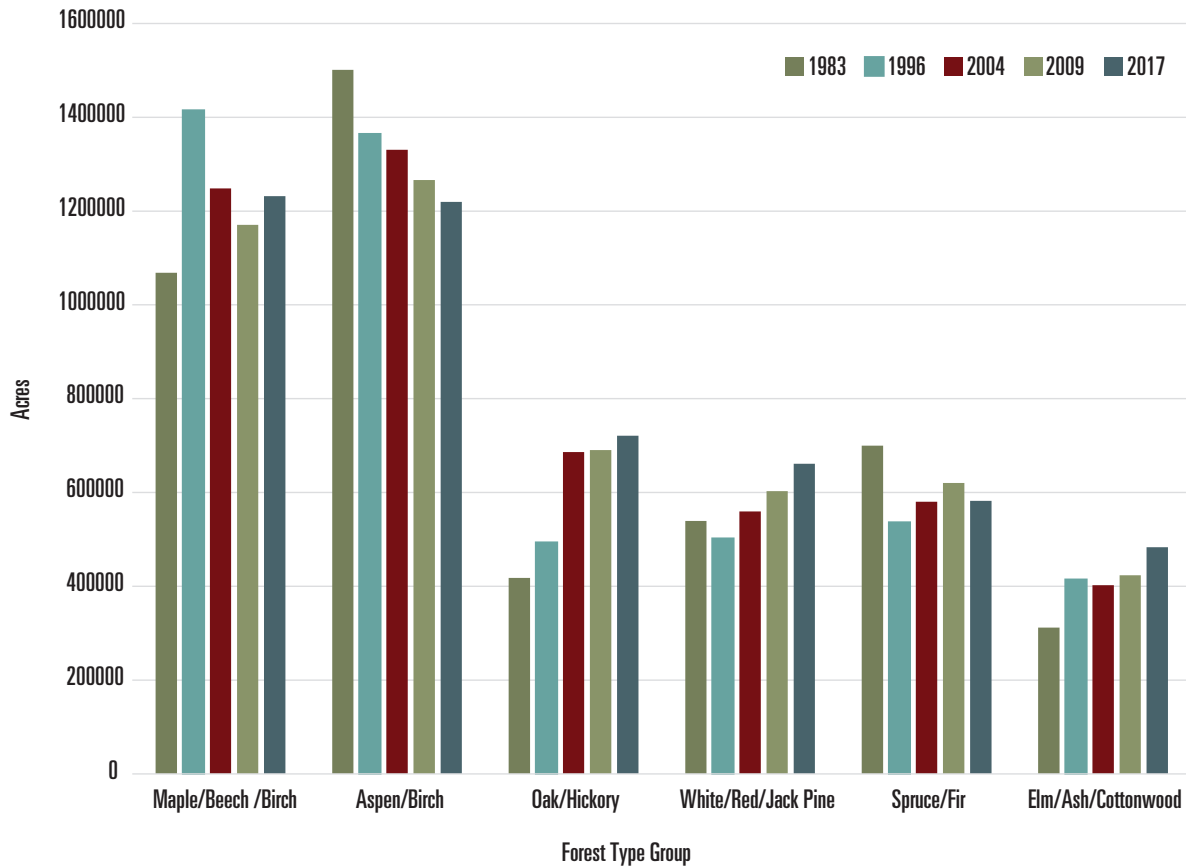


Figure 29: Forest type group by area on public lands from 1983 to 2017. Source: U.S. Forest Service, 2017

Forest management on public lands is an essential tool to meet forest and habitat management goals that require silvicultural treatments through commercial timber harvests. All public land holders have forest plans that identify management objectives and management prescriptions

used to calculate a sustainable harvest level. In some cases, a backlog of forest management activities exists preventing full plan implementation to meet harvest goals. Meeting the forest plans harvest goals is a common implementation measure.



Figure 30: Timber sales completed on county, WI DNR, and federally owned forest lands.

Public lands harvest goals are calculated using either an acreage-based or volume-based control system, basically identifying the acres or volume that can be managed sustainably each year. Timber harvests are scheduled and implemented to meet each property’s forest plan. For this reason, public forests provide a very predictable source of raw material for the forest products industry and significant contributors to local and statewide economies. Public lands represent approximately 30 percent of the statewide volume harvested annually. Revenues from timber sales, for the most part, are deposited back to respective accounts used

to implement forestry and other organizational programs and operations.

Wisconsin DNR and the Chequamegon Nicolet National Forest (CNNF) have worked together through a Good Neighbor Authority (GNA) agreement since 2015. The objective is to implement the CNNF land management plan through timber and other restoration projects. Work is accomplished through contracts and agreements with counties, consultants, and DNR staff. Generally, public agencies have increasingly contracted with consultants to meet desired land management goals.

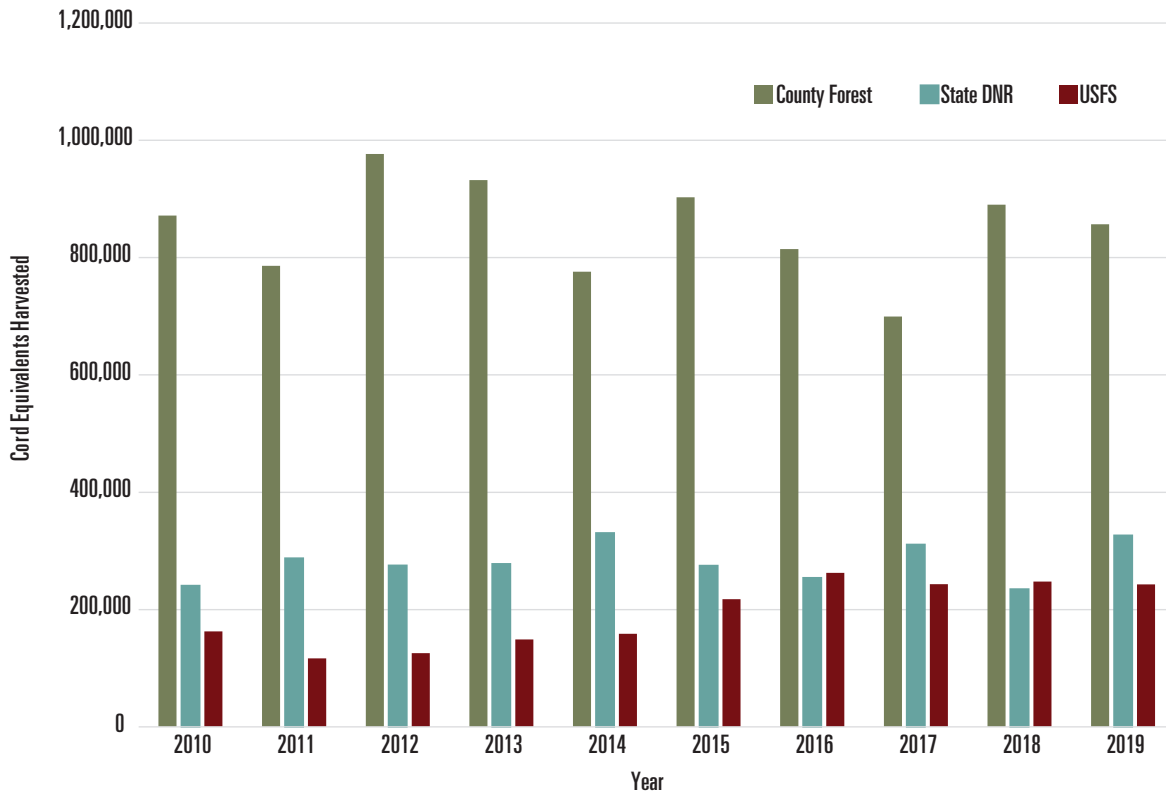


Figure 31: Annual cord equivalents harvested, in thousand cord equivalents, for county, WI DNR, and federally owned forest lands.

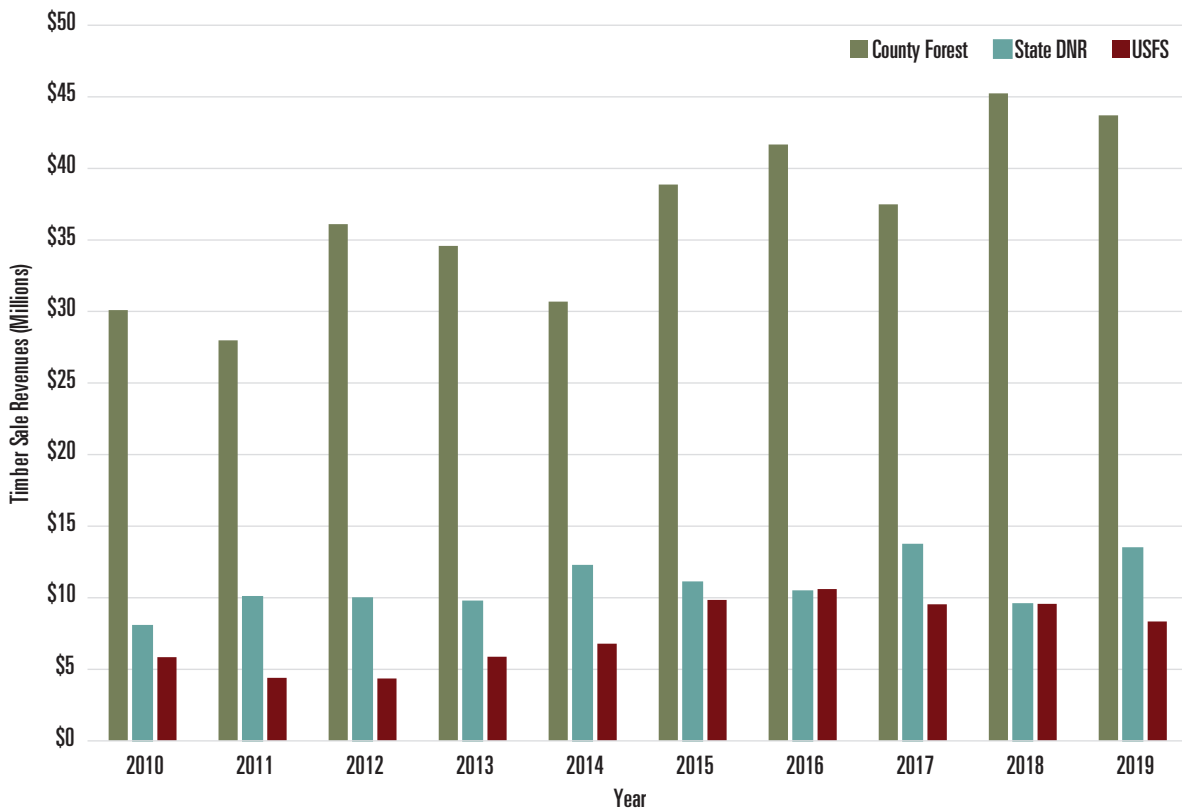


Figure 32: Annual timber sale revenues, in millions of dollars, for county, WI DNR, and federally owned forest lands.

Most public forest lands are certified by an independent third party supporting environmentally appropriate, socially beneficial, and economically viable management of the forests. Wisconsin has approximately 7.4 million acres, 45 percent, of all forest lands certified, of which public lands

represent approximately 4 million acres certified, just over half of the total certified forests in Wisconsin. Wisconsin DNR, BCPL and some County Forests are the certified public forest lands.

Public Forest Land Characteristics: CONDITIONS & TRENDS

- On public lands, forests succession is occurring, and cover types are changing.¹
- On public lands, large blocks of ownership allow for landscape level planning and management, and therefore, the ability to implement sustainable harvest levels to meet management objectives.¹
- Public lands provide predictable source of raw material to forest products economies among other social, environmental and public health benefits.^{1,3}

GOALS AND STRATEGIES

Goals and strategies are captured in subject areas throughout the plan. Many goals highlighted in one section of this document are pertinent to other sections. A list of all goals and strategies, including other goals related to Public Forest Lands, is included in the Summary of Goals and Strategies section.

GOAL S: WISCONSIN'S PUBLIC FORESTS ARE PLANNED AND MANAGED USING BEST AVAILABLE SCIENCE, AND PUBLIC INPUT.

Strategies

1. Engage the public and consider input in public forest management decisions.
2. Cooperate and communicate with tribes and others involved in cultural and historic resource management protection.
3. Utilize best available science and information when making management decisions.
4. Promote and maintain desired landscape conditions through planning and implementing habitat management and sustainable timber harvests.
5. Provide predictable and sustainable timber harvest levels to provide ecological, economic and social benefits.
6. Provide education and interpretive opportunities regarding the values, services, and benefits of public forests.
7. Maintain current public lands infrastructure inventories, monitor and assess conditions, and develop design standards appropriate for level of use and environmental resiliency.
8. Promote infrastructure improvements that meet current and future needs.
9. Provide opportunities for research.

URBAN AND COMMUNITY FORESTRY

The urban forest is defined as the trees and associated vegetation in cities, villages and other concentrated development. Wisconsin's urban forests provide a wide range of ecological, economic and social benefits for nearly four million residents, over 70 percent of the state's population, living in urban areas (U.S. Census Bureau, 2012).

Based on statewide estimates from field data collected in 2012, Wisconsin's urban forests contain nearly 43 million trees with an estimated total replacement value of almost \$19 billion (Nowak et al., 2017). In addition to enhancing the aesthetics of yards, city streets and parks, urban forests provide a wealth of services including air pollution reduction, storm water runoff retention and mitigation, wildlife habitat and forage, food for pollinators, energy conservation, improvement of human health and wellbeing, increased property values, and attraction of businesses, tourists and

residents. Additionally, the sustainable management of Wisconsin's urban forests support a robust workforce in both the private and public sectors.

Community, non-profit, government and private sector partners work together to encourage, enable and enhance sound management of Wisconsin's urban forest ecosystems; envisioning a healthy and sustainable urban forest ecosystem integral to healthy and sustainable communities.

ASSESSMENT

URBAN FOREST CHARACTERISTICS

The extent, composition and health of urban forests play an essential role in the overall state of Wisconsin's forests. The *Urban Forest Assessment (WisUFA)* program reports on the condition of Wisconsin's urban forests, informing *i-Tree Landscape* models to identify and track the environmental, economic and social benefits and services provided by the urban canopy in order to advance the planning, management and monitoring of Wisconsin's urban forest resource.



Highlights of Wisconsin's Urban Forests	
Canopy Distribution	<p>Across the state, average canopy cover in cities and villages is 29 percent and ranges from 1 percent to 71 percent.</p> <p>Across Wisconsin there are 554,868 acres of urban tree canopy, an area nearly the size of Rhode Island. On average, there are 5,834 square feet of canopy per person living in cities and villages, but this varies from as little as 323 to as much as 839,415 square feet depending on where one resides.</p> <p>In a national study, Nowak and Greenfield (2018) found that Wisconsin has seen a slight decline in urban tree canopy, a consistent trend throughout the nation.</p>
Composition and Structure	<p>Wisconsin has more small trees than large trees and displays a typical inverse-J shape diameter distribution (Nowak et al, 2017, p. 19). This pattern is a favorable indication of long-term sustainability of tree cover.</p> <p>From the most recent Urban Forest Inventory and Analysis (UFIA) statewide estimates across all ownerships, over 72 different tree species were sampled. Nearly 35 percent of all trees were either maple or ash.</p> <p>In the Wisconsin Community Tree Map (WCTM) there are 172 species and 67 genera recorded. Half of the trees in this database are either maple (35 percent) or ash (15 percent).</p> <p>Assessing species composition of municipal trees by diameter class, a proxy for age, reveals that species diversity is increasing over time (Figure 33).</p>
Health	<p>Based on UFIA field measurements, 17 percent of trees were reported as having stem decay and 18 percent as having trunk or bark inclusions.</p> <p>Millions of urban trees are susceptible to pests already in Wisconsin including gypsy moth, emerald ash borer, Dutch elm disease and oak wilt. Millions more are susceptible to pests that have not yet arrived like Asian longhorned beetle and non-native bark beetles.</p> <p>Across all ownerships, 11 percent of trees were classified as invasive, and common buckthorn is the third most common tree species in the state at 6.1 percent.</p> <p>Climate change is expected to influence Wisconsin's urban forests in the years to come. In addition to potential species shifts, severe climate extremes (e.g. wind, heat, drought, rain) could substantially impact forest structure and composition.</p>
Environmental, Social and Economic Benefits	<p>Urban trees can help mitigate climate change by sequestering atmospheric carbon, reducing energy use in buildings, and reducing stormwater runoff volumes. Additionally, urban trees are one strategy to mitigate human health impacts of climate change. For example, through shading and cooling trees can reduce urban heat islands in the face of warming temperatures. Research conducted in Madison found that urban tree canopy cover at or greater than 40 percent can lower summer daytime temperatures by as much as 10°F (Ziter, Pedersen, Kucharik, & Turner, 2019).</p> <p>Wisconsin's urban forests are estimated to remove about 27 million pounds of air pollutants a year, to the health benefit of over \$45 million. These health benefits include reducing symptoms of acute respiratory issues by 5,307 incidents and preventing 1,176 school loss days and 168 work loss days.</p> <p>The amount of CO₂ sequestered annually by urban trees in Wisconsin is equivalent to the greenhouse gas emissions from about 173,000 passenger vehicles driver for one year.</p> <p>The economic impact of reduced stormwater runoff due to urban trees is estimated to be \$26,769,680.</p>

Table 8: Highlights of Wisconsin's Urban Forests

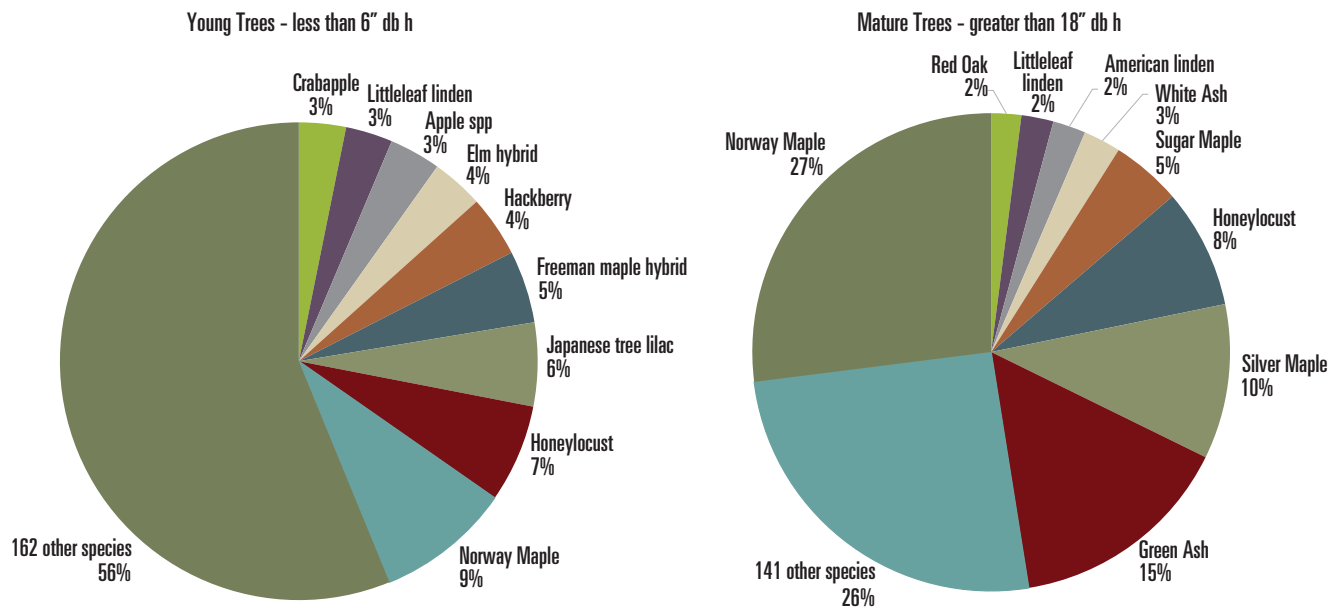


Figure 33: Species composition of municipal trees. Species richness and evenness are higher among smaller, younger trees when compared to larger, older trees. Source: Wisconsin Community Tree Map (WCTM) WI DNR, 2019

Urban Forest Characteristics: CONDITIONS & TRENDS

- Wisconsin's urban tree canopy has slightly declined.²
- Equitable distribution of and access to urban tree canopy is vital to the overall health of Wisconsin communities and their residents.³
- Increased tree species richness and evenness is critical to urban forest resilience, and there is opportunity for continued improvement, particularly with species evenness.^{1, 2, 3}
- Proper tree care and maintenance is critical to the health of urban trees.^{1, 2, 3}
- Wisconsin's urban forests continue to face threats from invasive plants, pests, and diseases and climate change.²

LOCAL URBAN AND COMMUNITY FORESTRY PROGRAMS

State Urban Forestry programs receive funding through the U.S. Forest Service State and Private Forestry Urban and Community Forestry program. In compliance with reporting requirements, Wisconsin DNR annually tracks local urban forestry program development for 685 Wisconsin communities through the Community Assistance Reporting System (CARS). These data show trends in the capacity of communities to manage their urban forests and can reveal both successes and opportunities for continued improvement.

From 2009 to 2018 there has been a net increase in the number of communities in attainment of each of the four elements (Figure 27: Landowner Engagement Continuum (LEC)4). Tree ordinances and/or policies are most common among communities, followed by an advocacy or advisory group, management plan, and professional staff. Of note is the near 40 percent increase in number of Wisconsin communities with professional staff over this 10-year period.

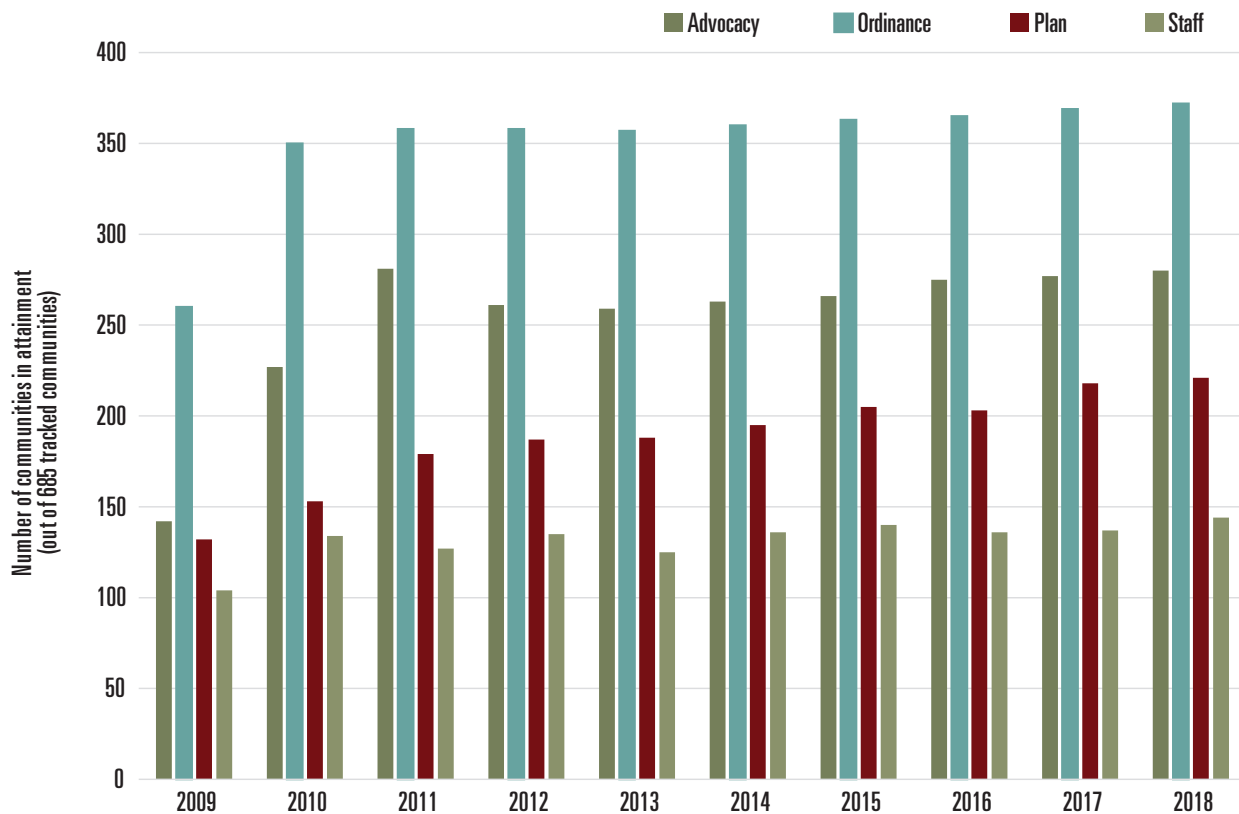


Figure 34: Number of Wisconsin communities with urban forestry advocacy groups, tree ordinances, tree management plans, and professional staff from 2009 to 2018. Source: USFS Community Accomplishment Reporting System (CARS)

Four comprehensive surveys have been conducted since 1990 to better understand the structure, function and needs of local urban and community forestry programs in Wisconsin communities. The latest survey was conducted in 2017, with previous surveys occurring in 1991, 1999 and 2008. A full summary of results from the 2017 survey, as well as a longitudinal analysis of results from all four surveys, can be found in the ‘Trees in Your Community, 2018’ report (Hauer & Lorentz, 2018). The following are highlights of those results.

- Ten percent of communities have participated in Wisconsin DNR’s Community Tree Management Institute (CTMI) training series. Upon course completion, participants meet the “professional staff” CARS requirement.
- After adjusting for inflation, total spending by all communities on the care of urban tree populations increased by 23 percent from 2008. This is likely due to increased costs of tree removal and replacement caused by EAB.
- Volunteer engagement occurred in 22 percent of communities, down from 29 percent in 2008.
- Of the communities with a species diversity goal, 30 percent are having difficulty in obtaining planting material to reach their goal.
- Communities with tree inventories continued to increase, rising to 44 percent in 2017 up from 33 percent in 2008.
- Nearly one-quarter of communities have had discussions on including trees as a public health tool.
- Over half of communities indicated they would benefit from a statewide credit on their Wisconsin DNR stormwater permit for retaining or planting tree canopy.
- The majority of solid wood is disposed of through firewood (38 percent) or mulch (33 percent). Less than 5 percent of wood volume is processed into lumber, sold as round wood, or made into furniture. Less than 10 percent of communities reported formal partnerships with wood utilization companies or other entities for removed trees.

Local Urban & Community Forestry Programs: CONDITIONS & TRENDS

- Continued growth of local urban and community forestry program capacity and available resources is critical for maintaining and increasing urban forest canopy.^{1,2}
- Availability of diverse tree planting stock is essential to growing a resilient urban forest.^{1,2,3}

HOMEOWNER PERCEPTIONS AND VALUES OF THE URBAN FOREST

In 2017, the Wisconsin Urban Landowner Survey (www.dnr.wi.gov, search: *Urban Landowner Survey*) was sent to 6,000 homeowners across four cities and their suburbs: Green Bay, Madison, Milwaukee, and Wausau. Results of this survey provide a broader understanding of homeowner attitudes and behaviors toward the trees in their yard and help inform how urban forestry professionals can motivate homeowners to support urban forestry programs and to become active stewards of their trees. Highlights from the survey include:

- Wisconsin residents value their trees and the benefits they provide; however, they have concerns about trees causing damage to their property, causing power outages and growing too big.
- Over 80 percent of respondents were likely to prune trees in the next five years, but only about one-third said they were likely to plant trees in that same timeframe.
- The most trusted sources of information were tree care professionals, friends or family, and garden center staff. Of governmental agencies, UW Extension was the most trusted.
- Talking with someone was the most preferred method of communication, followed by the internet or other social media.

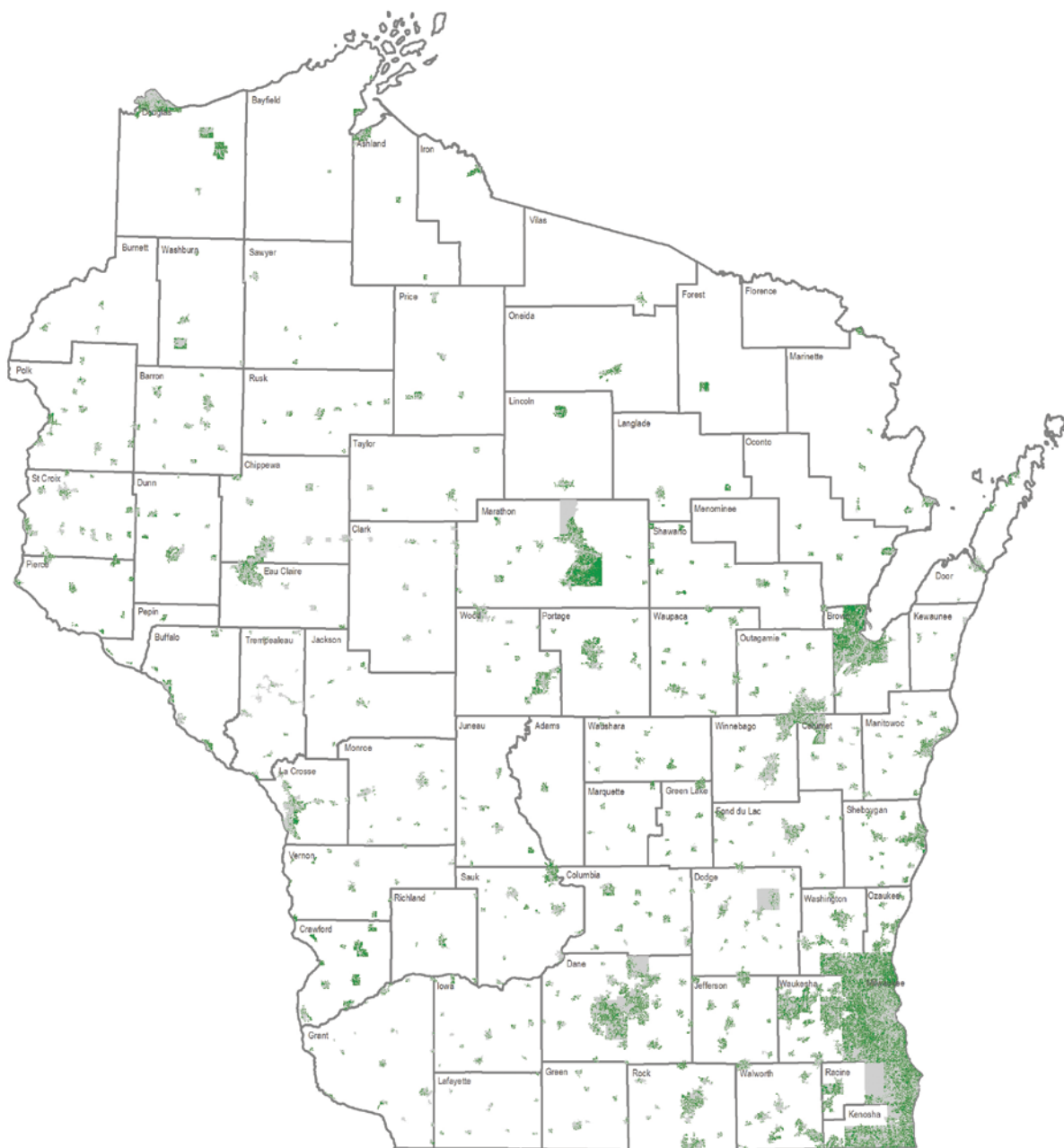
Homeowner Perceptions & Values of the Urban Forest: CONDITIONS & TRENDS



- Urban homeowners are likely receptive to outreach and education initiatives, but have preferred methods and sources of communication.¹
- The majority of urban homeowners are actively managing the trees on their property, but are less likely to plant new trees.^{1,2}
- Urban homeowners value their trees and the benefits they provide, but also have concerns, such as property damage.^{1,2,3}

WORKFORCE NEEDS AND CAREER PATHWAYS

Assessment on “*Workforce needs and career pathways*” can be found in the Socioeconomics section.

MAP 18 - URBAN AND COMMUNITY FORESTS PRIORITY LANDSCAPE



-  Urban Tree Canopy
-  Incorporated Cities and Villages



Dec 17, 2019 jpk
Division of Forestry

Map 18: Priority Landscape - Urban and Community Forestry Priority Landscape Map

PRIORITY LANDSCAPE & ISSUES

All urban and community forests are a Priority Landscape in Wisconsin's State Forest Action Plan (Map 18). Within this Priority Landscape there are Priority Issues that we were unable to map because the data is not geospatial in nature and/or statewide geospatial data does not currently exist.

PRIORITY ISSUES

Outreach and Education:

Engaging new and familiar audiences to provide education and build awareness around the benefits and responsibilities of planting and maintaining trees is a priority issue in Wisconsin. Through a recent survey of homeowners in four Wisconsin communities, results indicate that Wisconsinites value their trees and the benefits they provide, but also have concerns including potential property damage and power outages. From decision makers to homeowners, consistent messaging to address their concerns, discuss the benefits of trees, and emphasize the importance of proactive and regular tree care and maintenance is essential to maintaining or increasing a healthy urban tree canopy across the state.

Equitable Distribution of Urban Tree Canopy and the Benefits it Provides:

At the community level, tree canopy in Wisconsin's cities and villages ranges from as much as 71% to as little as 1%. Furthermore, the distribution of tree canopy within those municipal boundaries is not always even, with higher canopy cover often present in more affluent areas and neighborhoods of a given community. With inequitable distribution of canopy across and within communities comes inequitable distribution of the health, environmental, social and economic benefits provided by those trees. Maintaining or increasing urban tree canopy cover is a priority issue in Wisconsin and includes prioritizing areas within communities that currently have lower levels of canopy than others. This is especially important when considering the health and social consequences of climate change, and their focused impacts on densely populated areas.

Urban Forest Resilience:

Wisconsinites have seen the devastating effects of Dutch elm disease and more recently emerald ash borer sweep through our communities and forests. In an effort to not repeat the same mistakes, and in the face of climate change, building healthy and resilient urban forests is a priority issue in Wisconsin. Diversity in tree species, age, and form can allow for more resilience in the face of future threats. Tree inventories, plans and climate change adaptation strategies can help inform urban forest management approaches for Wisconsin communities. More information on pests and diseases and climate change can be found in those sections within this plan. Additional resources on urban forests and climate change can also be found through the Climate Change Response Framework's website (Northern Institute of Applied Climate Science, 2020; Ontl et al., 2020).

Availability of and access to diverse nursery stock, for local governments to plant on public lands and homeowners and business to plant on their properties, is a priority issue in Wisconsin to ensure communities and residents alike can contribute to a more diverse and resilient urban forest for current and future generations.

Trees in the urban environment, especially in the boulevards, are subject to a number of stressors not typically found in the natural environment. These include highly altered soil and hydrology, road salt, increased temperatures, confined growing space, mechanical damage from weed whackers, etc. Given these challenges and the desire to increase species diversity we encourage the use of both native and non-native/non-invasive species where appropriate. Parks and yards are ideal places to plant native tree species that are less tolerant of urban stressors. The use of hearty native and non-native species, like honey locust and Gingko, respectively, are options for the challenges faced by street-side trees.

Urban Trees and Stormwater:

Trees and forests reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. The presence of trees also helps to slow down and temporarily store runoff, which further promotes infiltration, and decreases flooding and erosion downstream. If credits towards water quality standards are someday offered for a responsible leaf management program and for promoting tree canopy in the community, this may be the motivation some local leaders need to see trees as part of the solution. A better understanding and recognition of the impacts of urban forests on water quality and quantity is a priority issue in Wisconsin.

Available and Qualified Workforce of Arboriculture and Urban Forestry Professionals:

Anecdotally, private and municipal employers of arborists and urban forestry professionals have noted a shortage in qualified workers to meet current demands. Wisconsin has been a leader in developing the Arborist Apprenticeship and Pre-Apprenticeship programs and has a strong offering of arboriculture and urban forestry degrees at technical colleges and universities geographically dispersed throughout the state. However, to meet demand and retain qualified workers and industry professionals, a better understanding of employment data, labor market information, and perceived and real barriers to entry to the arboriculture and urban forestry professions is needed.

Urban Wood Utilization:

As trees continue to be removed from urban and community forests due to insect and disease issues, old age, or other factors such as development, there is opportunity to utilize these materials to their highest and best use. Education, awareness and market development for urban sourced materials among architects, interior designers, and

consumers, among others, is essential to the viability of urban wood utilization.

Local Urban and Community Forestry Program Capacity

Building and sustaining local urban and community forestry program capacity is the foundation of a healthy urban forest canopy. Professional staff, community member engagement through advisory/advocacy groups, enforceable tree ordinances and an active management plan are how we track and measure local program capacity. Technical and financial assistance that helps communities attain or sustain these elements is a priority issue in Wisconsin.

GOALS AND STRATEGIES

Goals and strategies are captured in subject areas throughout the plan. Many goals highlighted in one section of this document are pertinent to other sections. A list of all goals and strategies, including other goals related to Urban and Community Forestry, is included in the Summary of Goals and Strategies section.

GOAL T: URBAN AND COMMUNITY FORESTS ARE MORE DIVERSE, WITH INCREASED TREE CANOPY.

Strategies

1. Monitor urban and community tree canopy across all Wisconsin communities.
2. Increase tree planting and prioritize efforts in areas with lower levels of tree canopy in urban and community forests.
3. Maintain and manage existing trees in urban and community forests.
4. Increase supply and access to diverse nursery stock for urban and community forests.
5. Develop and support education and outreach on the benefits that trees provide, and address concerns and negative perceptions.
6. Develop and support education and outreach on the benefits of tree species diversity in urban and community forests.

GOAL U: URBAN AND COMMUNITY FORESTS ARE INCREASINGLY USED AS ESSENTIAL TOOLS TO ACHIEVE ECONOMIC, ENVIRONMENTAL, SOCIAL AND PUBLIC HEALTH GOALS.

Strategies

1. Encourage and support multi-sector partnerships and collaboration.
2. Include urban and community forestry in strategic planning and policy development of partner sectors.
3. Engage new audiences and professionals from affiliated fields to maximize the benefits of urban and community forests.
4. Promote economic, ecological, social and public health benefits of urban and community forests.
5. Promote the use of urban wood for environmental and economic benefits.

GOAL V: URBAN AND COMMUNITY FORESTS ARE INCREASINGLY HEALTHY AND RESILIENT TO CURRENT AND EMERGING STRESSORS.

Strategies

1. Engage volunteers and community members in tree care and maintenance.
2. Support recognition of successful urban and community forestry programs and initiatives.
3. Monitor impacts of stressors including pests, disease and climate change in urban and community forests.
4. Use urban and community forests as a tool to mitigate climate change and its effects.
5. Increase tree species, age and structure diversity of urban and community forests.
6. Develop and implement climate change mitigation and adaptation strategies in urban and community forests.
7. Incentivize proper tree planting, care and maintenance in urban areas and communities.
8. Use and promote sound science to improve and manage urban and community forests.

