

# DRAFT Maine 2018 - Forest Features

DRAFT Forest Area, Land Use, Forest Types, and  
 Ownership/Family Forest Ownership

Christopher W. Woodall and Bryan Hemmer | July 14, 2020

## Forest Area

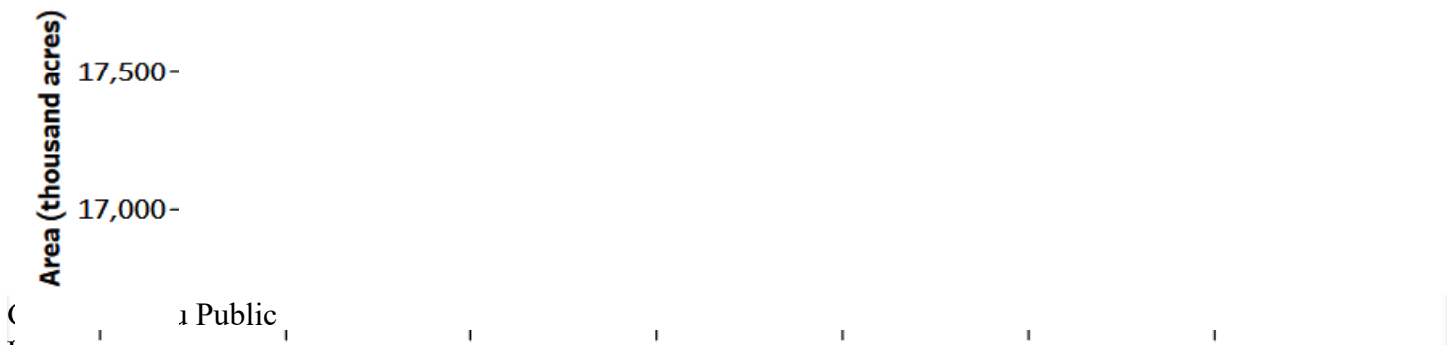
There are innumerable metrics that can be used to assess the current status and trends of any state's forest resources such as land use change, forest types, live tree mortality, standing dead tree abundance, and combinations thereof. Of all metrics, it is forest area and associated trends that is a vital metric of forest sustainability. Although Maine is widely regarded as a maritime state, it is its forests that have been a foundation for Maine's development, livelihood, and quality of life since its founding (Coolidge 1963, Irland 1998). Maine is the number one state in the Nation in terms of the percentage of forest covering land that is not occupied by one of its many water bodies.

*Interactive Figure 1 - Interactive map displays a map of land cover and selecting a county displays area estimates.*

## What we found

Eighty three percent of Maine is covered by forests at an estimated 17.5 million acres in 2018 which is nearly the same as was estimated when inventories first began in 1959.

Forest land and timberland by year, Maine.



*Interactive Figure 2 - Interactive Tableau dashboard shows forest land and timberland by year, Maine.*

The estimated peak of forest land area was in 2003 at 17.7 million acres. Timberland, which is forest capable of sustaining timber production, peaked at 17.2 million acres in 2003 but had a marked decline in 2018 to 16.6 million acres owing to conversion to non-forest uses and reserved into non-management status such as a National Monument. At the county level there have been divergent trends in the gain or loss of forest land area since the first inventory in 1959.

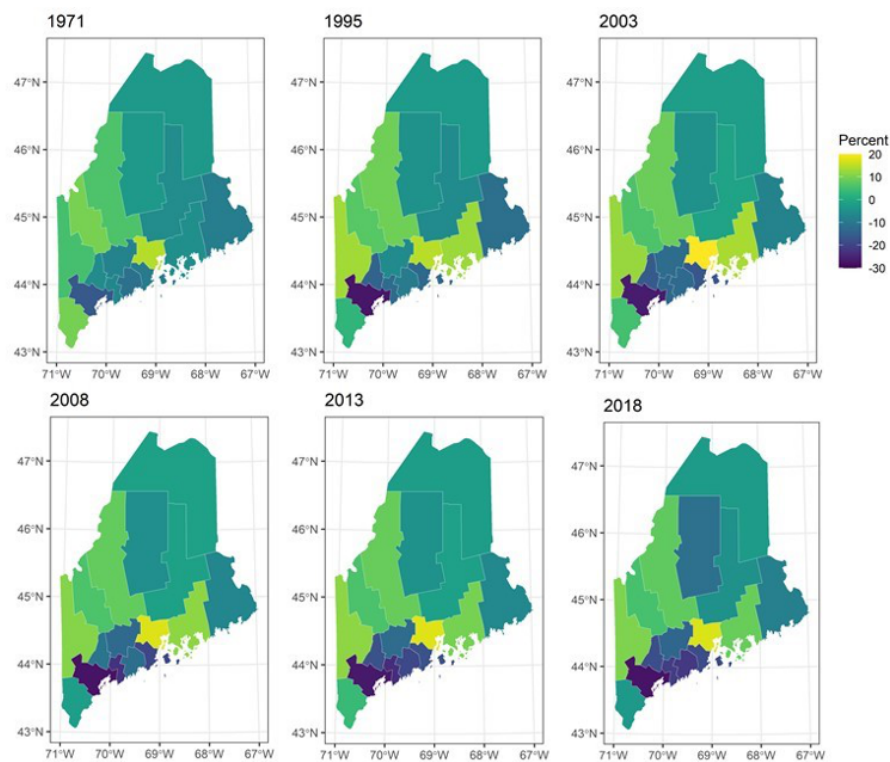


Figure 1 - Percent change in forest land area error since 1959 by county, Maine.

For some counties that include population centers, such as Cumberland, Lincoln, and Sagadahoc, there has been a net loss of forest land since 1959 nearing 30%. In contrast, the abandonment of agriculture in some counties have led to net increase (up to 20%) such as found in the counties of Waldo, Hancock, and Oxford.

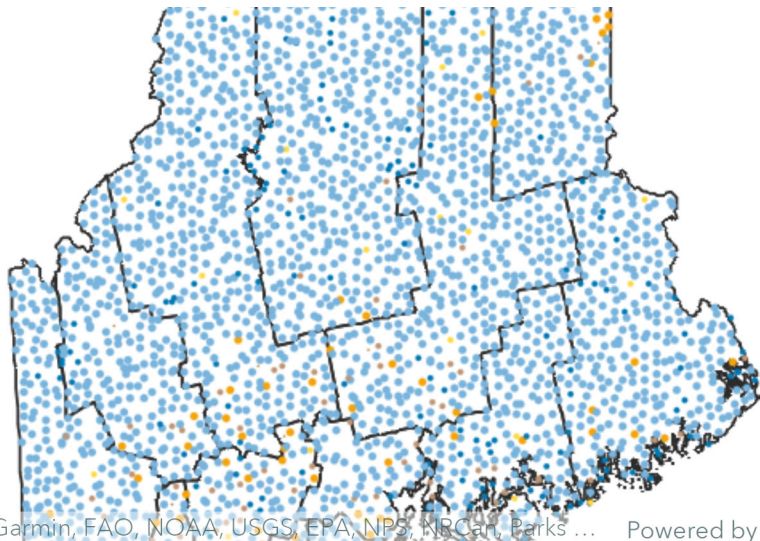
### **What this means**

This analysis reports the first significant decline in forest land area for many decades. As forest land cover estimates can fluctuate with greater uncertainty due to the perturbations to canopy cover due to forest management operations (Nelson et al. 2020), the 2018 inventory's forest land use assessment serves as a robust indicator of change. As timberland area decreased at a greater rate than forest land, the balance of forests available to industry, communities, and management actions should be monitored in the context of preservation practices (i.e., National Monument creation). As the forest land base is a driver of important forest ecosystem service production across the state (e.g., carbon sequestration, recreation, or clean water), the continued loss of forest surrounding population centers coupled with dwindling agricultural abandonment and second home development suggests continued loss of forest land area for the foreseeable future. The monitoring of these trends is of the utmost importance for management and policy decisions going forward.

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## **Land-use Change**

Forests cover 83 percent of Maine; terrestrial nonforest land uses and water comprise the remaining 10 and 7 percent of the surface area, respectively. Of terrestrial land uses, 89 percent of area is forest land, providing a critical resource and offering a wide range of benefits. FIA further characterizes land area by using several land use categories, which are aggregated for this report into agriculture, developed, forest, pasture/rangeland, water, wetlands, and other land (undeveloped beaches, nonvegetated lands, persisting snow and ice).



Interactive Figure 3 - Interactive map depicting approximate locations of FIA plots showing general land uses and counts on county level, Maine.

The conversion of forest land to nonforest and water uses is referred to as gross forest loss (or diversion), and the conversion of nonforest land and water to forest is known as gross forest gain (or reversion). The magnitude of the difference between gross loss and gross gain is defined as net forest change. By comparing the land uses on current Maine inventory plots (2014-2018) with the land uses recorded for the same plots measured during the previous inventory (2009-2013), hereafter referred to as 2018 and 2013, we can characterize forest land-use change dynamics. The total area of forest land in Maine has seen a 0.15% average annual rate of decrease since the previous inventory. To better understand Maine forest land dynamics, it is important to explore the underlying land-use changes occurring in the State. Understanding land-use change dynamics is essential for monitoring the sustainability of Maine’s forest resources and helps land managers make informed policy decisions.

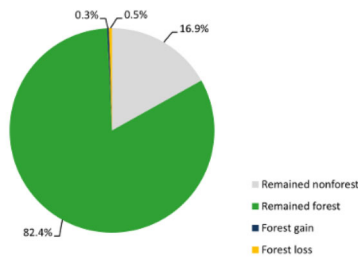
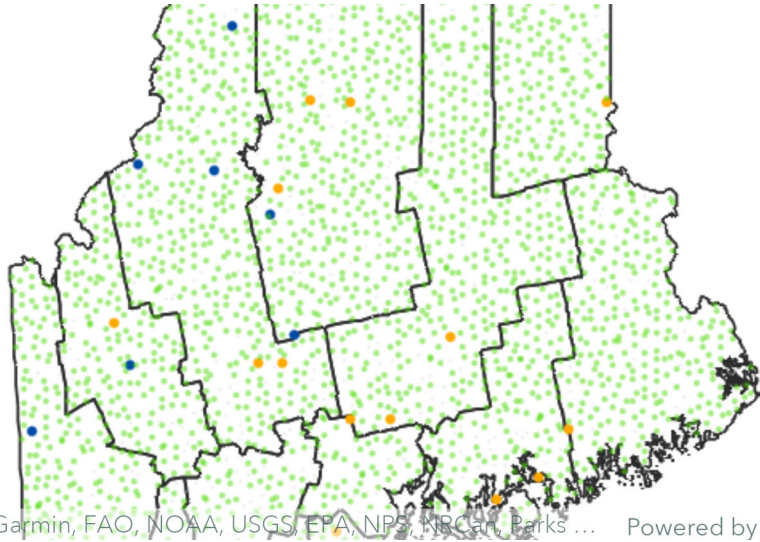


Figure 2 - Land use dynamics showing percentage of unchanged land, forest loss and forest gain, Maine, 2009-2013 to 2014-2018.

## What we found

Forest land area in Maine comprises about 17.5 million acres; other land uses, cover 3.7 million acres of the States’ surface area. Between 2013 and 2018, 82 percent of the land use in Maine remained forested, 17 percent remained in a nonforest land use, and 1 percent of land area

experienced change as forest diversions or reversions. Change plots – for mapping purposes, defined as those remeasured plots having land use gain or loss of at least 25% - are distributed throughout the State, with more forest loss plots shown.



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**Interactive Figure 4 - Interactive map depicting approximate locations of remeasured FIA plots showing per-plot forest gain and forest loss of at least 25%, and persisting forest and nonforest with <25% change and counts on county level, Maine.**

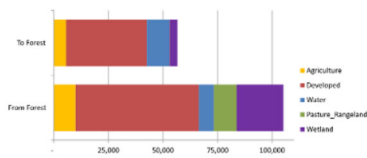


Figure 3 - Gross area forest loss and forest gain by land use category, Maine, 2009-2013 to 2014-2018.

The amount of forest that diverted to nonforest land (105,000 acres) exceeded the amount of nonforest reverted to new forest (57,000 acres), leading to slight net loss in total forest land area. Developed land was the predominant land use associated with both forest

loss (56,000 acres) and forest gain (40,000 acres). Distribution of forest diversions and reversions among other land uses are presented in the figure at left.

### What this means

The net loss of forest land reported in this inventory is small, with gross gain slightly offset by gross loss. Gains and losses from multiple causes are driving forest land-use change dynamics in Maine. Movement between forest and nonforest classifications may be a result of land meeting or not meeting FIA's definition of forest land due to small changes in understory disturbance, forest extent, or forest cover. Thus, some reported changes are not necessarily permanent.

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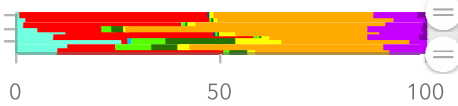
### Forest Type Groups

The composition of forests can be described by varying metrics, from the numbers of individual species of seedlings, saplings, and trees, to a broader view of the resource categorizing land based on shared characteristics. The broad-scale delineation of forest land is expressed as forest types which comprise tree species that generally coexist together in a forested setting. Similar forest types are collectively known as forest-type groups.





Aroostook, ME  
West, ME  
Cassidy, ME



White/red/jack pine  
Spruce/fir

Last update: 4 minutes ago

2008

Last update: 4 minutes ago

2013

Last update: 4 minutes ago

2018

Last update: 4 minutes ago

*Northern Research Station Forest Inventory and Analysis Forest-Type Groups*

### What we found

Over 75 percent of Maine's 17.5 million acres of forest land fall into just 2 forest-type groups, maple/beech/birch with 7.2 million acres (41 percent) and spruce/fir with 6.0 million acres (34 percent). In terms of individual forest types, 37 were identified but nearly 50 percent of forested area was in either the balsam fir type (2.3 million acres) or sugar maple/beech /yellow birch (6.2 million acres). Red spruce/balsam fir is the only other forest type that exceeds 1 million acres statewide. Aspen/birch occupies 10 percent of forested area statewide but reaches its highest concentration in the Western Maine inventory unit where it is 13 percent of forest land. Similar regional differences are evident in other major groups with spruce/fir ranging from 2 percent of Casco Bay to 49 percent of the Washington unit and maple/beech/birch reaching 59 percent in Western Maine but only 24 percent of Aroostook. Diversity of groups is greatest in the Capitol Region and Casco Bay units where 6 and 5 groups, respectively, have at least 5 percent of total forest land.

Shifts in the extent of forest-type groups are generally slow, though some change is observable over the last decade. Aspen/birch has declined in extent since 2008, falling from 12.8 percent to 10.1 percent of all forest land, a loss of half a million acres. The majority of the loss in aspen/birch acreage over the last 5 years became classified as either maple/beech /birch or spruce/fir in the latest inventory. Spruce/fir gained over 200,000 acres since 2008. Though maple/beech/birch gained substantial acreage from stands previously classified as aspen/birch, acreage moving from the maple/beech/birch group to other forest-type groups kept it stable since 2008.

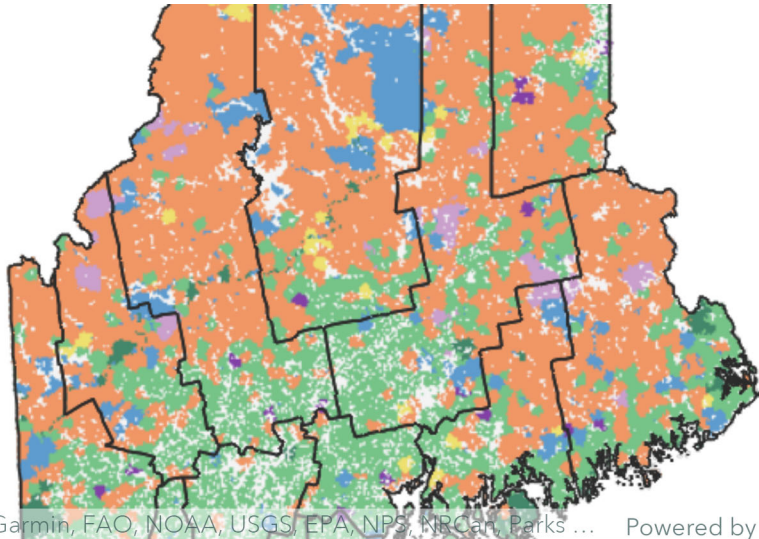
### **What this means**

Compared to other regions of the US, such as the central hardwoods, Maine has a limited number of forest types that dominate much of the extent of Maine's forest landscape. The delineation of these types across the State have been fairly static in concert with stable forest land area extent. Although the relatively low diversity of forest types across the state might limit the adaptive capacity of Maine to respond to major global change events such as invasive species, insect disturbances, or droughts it does enable concentrated focus on the conservation and/or management of a few forest types that cover most of Maine.

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## **Forest Land Ownership**

To a large extent, the availability and quality of forest resources are determined by landowners. It is the owners, working within biophysical, legal, and market constraints, who ultimately determine if the land will stay forested, how much timber will be supplied, what recreational opportunities will be available and to whom, and what types of wildlife habitat will be encouraged. By understanding the characteristics of forest land owners, the forest conservation community can help owners meet their needs, and in so doing, help conserve the forests for future generations. FIA's National Woodland Owner Survey (NWOS; Butler et al. In review; [www.fia.fs.fed.us/nwos](http://www.fia.fs.fed.us/nwos)) studies private forest landowners' attitudes, management objectives, and concerns with a focus on families, individuals, and other unincorporated groups, collectively referred to as "family forest owners".



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**Interactive Figure 6 - Interactive map of forest ownership with outlines of counties for Maine. Selecting a county displays estimates of ownership of forest land in that county.**

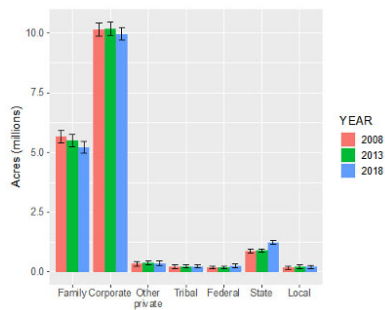


Figure 4 - Area of forest land by ownership group, Maine, 2008, 2013, and 2018. Error bars represent 95 percent confidence intervals.

## What we found

Nearly nine out of every ten acres of forest land in Maine are privately owned. The majority of these private acres, an estimated 10.0 million acres (56.9 percent of all forest land), are owned by corporations. Family forest owners control the next highest percentage (5.2 million acres; 29.9 percent). Other private

owners, including conservation organizations and unincorporated clubs and partnerships, own an additional 370,000 acres. Public agencies control 9.8 percent of the state's forest land. An estimated 1.2 million acres are managed by State forest, park, and wildlife agencies. The Federal government manages 257,000 acres. An additional 211,000 acres are managed by local government agencies. Within Tribal reservation boundaries, there are an estimated 236,000 acres of forest land. Over the past decade, there has been a net increase in the area of State owned forest land and net decreases in areas owned by family and corporate forest ownerships.

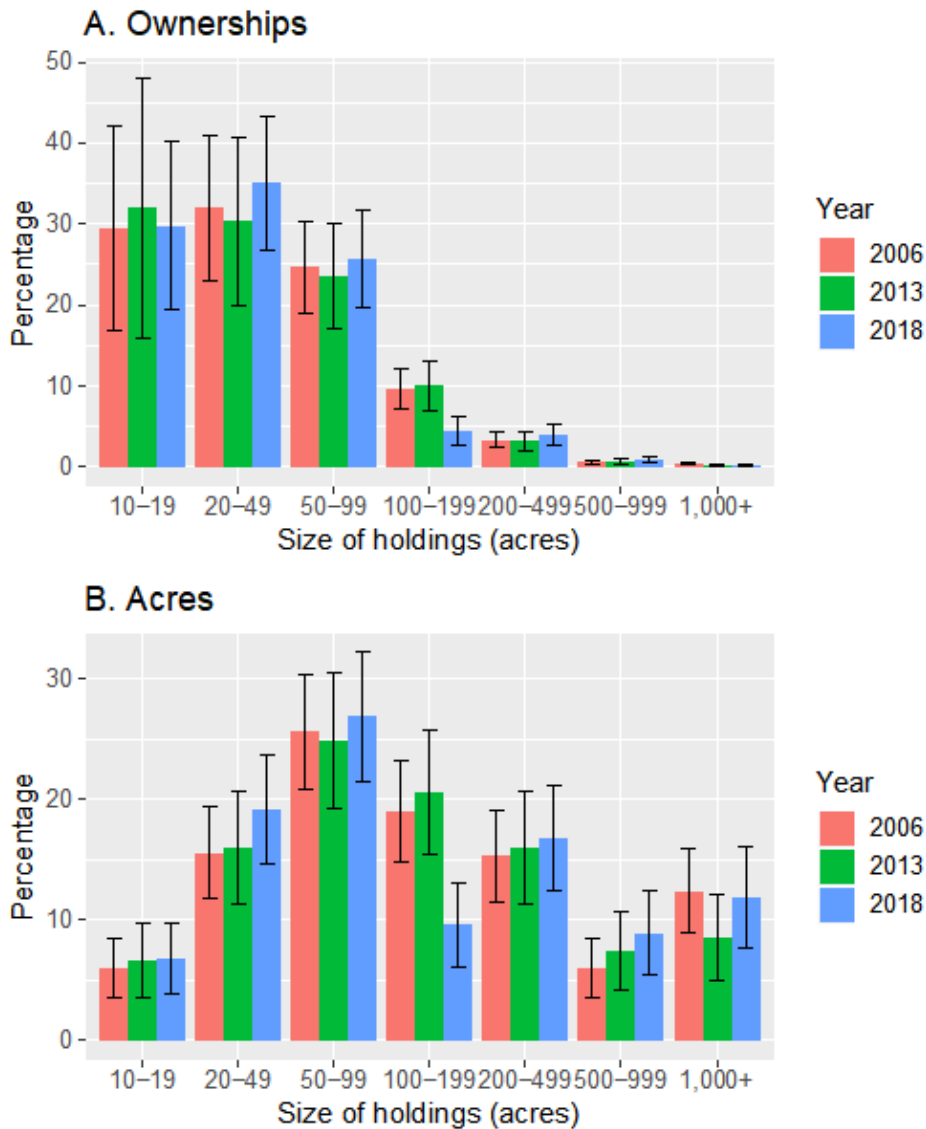


Figure 5 - Percentage of A) family forest ownerships and B) family forest acreage by size of forest holdings, Maine, 2006, 2013, and 2018. Error bars represent 95 percent confidence intervals.

There are an estimated 75,000 family forest ownerships with 10 or more acres of forest land across Maine. An estimated 64.8 percent of these family forest ownerships own less than 50 acres of forest land, but 74.0 percent of the family forest land is in holdings of at least 50 acres. The average size of a family forest holding in Maine is 62.5 acres.

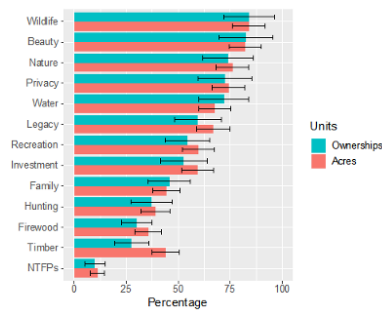


Figure 6 - Family forest (10+ acres) ownerships and acreage by reasons for owning, Maine, 2018. Percentages represent ownerships, and acreage owned by those ownerships, that rated each objective as important or very important. Error bars represent 95 percent confidence intervals.

The primary reasons for owning family forests are related to amenity values, such as wildlife, aesthetics, nature, and privacy. Objectives related to financial values, including timber production and land investment, are rated as dominant ownership reasons less frequently. These objectives have not changed substantially over the past decade.

Many family forest owners are active on their land. The most common activities are personal recreation, such as hiking or hunting, and cutting trees for personal use, such as firewood. And the intentions for doing these activities in the future are even greater.

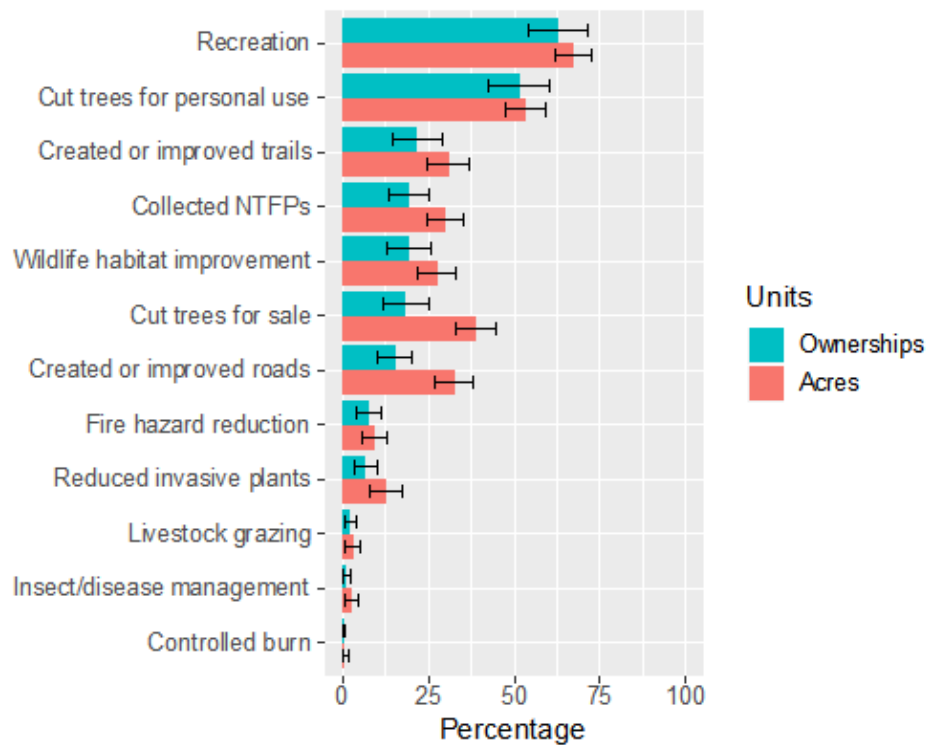


Figure 7 - Family forest (10+ acres) ownerships and acreage by recreation and management activities in the previous 5 years, Maine, 2018. Error bars represent 95 percent confidence intervals.



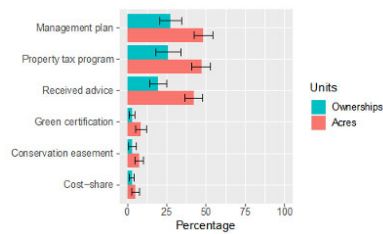


Figure 8 - Family forest (10+ acres) ownerships and acreage by forest management planning and program participation, Maine, 2018. Error bars represent 95 percent confidence intervals.

Most family forest owners are not participating in traditional forestry assistance programs and planning activities. An estimated 27.4 percent of the family forest ownerships (10 + acres), who own 48.3 percent of the family forest acres, have written forest management plans. Many of the plans are likely related to enrollment in property tax programs, in which an estimated 26.0 percent of ownerships (46.9 percent of acres) are enrolled. Participation in other programs, such as cost-share, green certification, or conservation easements, are much lower. An estimated 19.5 percent of the ownerships, who own 42.0 percent of the family forest land, have received advice in the previous five years.

### What this means

The fate of the forests lies primarily in the hands of those who own and control the land. It is therefore critical to understand forest owners and what policies and programs can help them conserve the forests. Looking particularly at family forest ownerships, the group that is the least understood and the fate of whose land is arguably the most uncertain, they own their land primarily for amenity reasons, but many are active on their land. Through well-designed extension, outreach, policies, programs, and other efforts, there are great opportunities to help these owners increase their engagement and stewardship of their lands, but a key will be getting them the right information, in the right format, from the right source, when they need it.

Another important trend to watch is the aging of family forest

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