

Acadia National Park & Katahdin Woods and Waters National Monument

Project Brief

National Park Service
U.S. Department of the Interior

Natural Resource Condition
Assessment Program



New Maps of Forest Tree Species Occurrence and Health Support Park Planning and Management

Key Messages

- Forests cover most of Acadia National Park and Katahdin Woods and Waters National Monument. Their importance was recognized in the establishment of each park.
- Invasive pests (such as hemlock wooly adelgid), pathogens, and other stressors threaten forest health.
- Both parks lacked maps of tree species occurrence and tree health at fine spatial resolution.
- This project used existing ground, airborne, and satellite imagery to map tree occurrence and health.
- The three types of map layers produced are an important resource for park planning and management.

More Information to Help Our Forests

Park managers at Acadia National Park (NP) and Katahdin Woods and Waters National Monument (NM) now have another tool in their toolbox for understanding and managing one of the parks' most important resources—forests. Forests cover most of [Acadia NP](#) and [Katahdin Woods and Waters NM](#). These forests are a source of biodiversity in the parks and for surrounding areas.

However, invasive pests, pathogens, stress, and herbivory are accelerating rates of change in forest composition in Maine. The emerald ash borer (EAB), hemlock wooly adelgid (HWA), and other insect pests have recently expanded to Maine and are expected to cause large-scale tree mortality. An outbreak of [red pine scale](#), confirmed in 2014, killed nearly all of the red pine in Acadia NP. The HWA was detected in Acadia in 2022, and the EAB was detected in the park in late 2025. Neither HWA nor EAB has been found to date in Katahdin Woods and Waters, but beech leaf disease (BLD) was detected in the monument in 2025. BLD is caused by an invasive microscopic worm, or nematode.

To assist with park planning and management, including tracking forest health, and identifying vulnerable areas and trying to increase their resilience, managers at Acadia and Katahdin Woods and Waters undertook a tree/forest mapping project. They teamed up with several partner groups, led by researchers at the Schoodic Institute at Acadia National Park. The research team produced three types of maps/map layers, and they looked at the utility of the maps for managing tree species under threat.



A large Eastern hemlock at Acadia NP. This tree had a diameter at breast height of 1 meter (3.3 feet). Eastern hemlock is an important species at both Acadia NP and Katahdin Woods and Waters NM. Photo: NPS/Jesse Wheeler

Three Types of Maps

Dominant Canopy Tree Species maps

These maps cover an area including and beyond the borders of the two parks. They're based on U.S. Forest Service data.

- The map layer indicates the dominant canopy tree species in each 30-m pixel (medium resolution). The layer does well at mapping common species, but likely underrepresents species that are less common or less concentrated (e.g., Eastern hemlock and ash).
- There are 32 species included in this product, including white ash, American beech, sugar maple, Eastern hemlock, Eastern white pine, and red pine.
- The data used represent conditions in 2011–2012, so a limitation is that dominance may have changed since that time.

Tree Crown Health maps

Combined with the dominant species layer (see above) and additional aerial detection surveys completed for the project, the aim for this layer is to help identify unhealthy stands and the causal agents of the damage, and to use the information to prioritize areas for early detection, monitoring, and management.

- The map layer is based on 2018 National Agriculture Inventory Program (NAIP) aerial photos at a 60-cm resolution, as well as aerial surveys by surveyors with the U.S. Forest Service who identified and mapped tree canopy damage from the air in 2018. It highlights hotspots of tree stress and death.
- This product may not be as useful for non-dominant species (e.g., ash, Eastern hemlock).
- Data were collected in 2018, so mapped canopy damage areas are now several years old and may underrepresent canopy damage.

Reflectance-based Tree Species and Health maps

For this product, researchers created high-resolution maps of tree species distribution and health across the park landscapes using aerial and satellite data. These maps complement the other map products.

- This species mapping approach is based on the fact that each tree species has a unique reflectance (or “color” profile).
- Researchers produced maps for 16 species in 10 genera, including hemlock, beech, oak, ash, spruce, cedar, pine, birch, maple, and fir.
- The maps should be treated as drafts because they were not ground truthed. They are also not as accurate for less common or non-dominant species.

Multiple Sources of Information Strengthen Knowledge and Management

Although there are some limitations with each of the three map products, pairing them with the other products and managers’ knowledge of the landscape provides useful information for park and other land managers at and surrounding the parks.

Eastern Hemlock, a Species of Park Interest

Eastern hemlock (*Tsuga canadensis*) is an ecologically important species at both Acadia and Katahdin Woods and Waters, but it’s not dominant on the landscape at either park (Figure 1). This shade-tolerant species has the longest lifespan in eastern forests (New England Forestry Foundation 2021). Eastern hemlock is threatened by the HWA, an invasive insect from Asia that feeds on the trees’ sap. The threat from this pest is one reason why park managers need information on hemlock distribution.

How are the Parks Using this Information?

The maps produced from this study will be used by both parks for planning, management, and as a general source of information on park trees and forests. The maps represent a snapshot in time, based on the years the data (aerial, satellite,

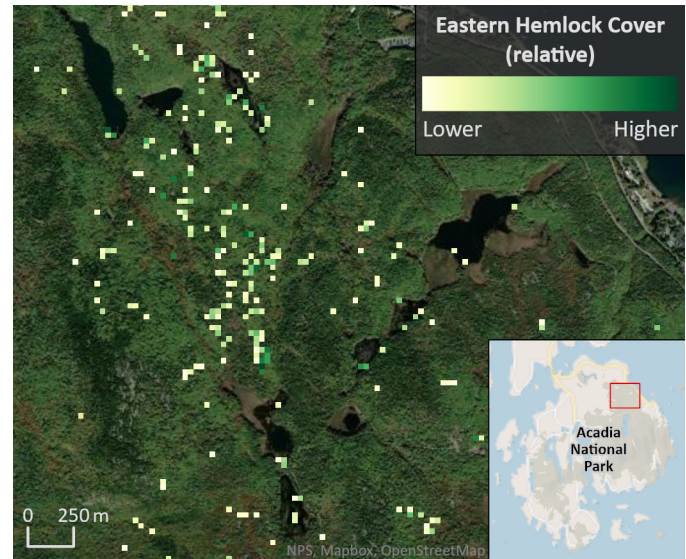


Figure 1. Distribution & cover of Eastern hemlock on the northeast side of Mount Desert Island, Acadia NP, based on the dominant canopy tree species map layer. Figure: NPS, using NPS, Mapbox, and OpenStreetMap (basemap), and Watson et al. 2026 (hemlock cover).

etc.) were collected. Creating similar maps in the future could be used to monitor forest change. Additional map uses include:

- **Park planning and document/plan preparation.**
- **Baseline information for Katahdin Woods and Waters NM**, which has little baseline forest data because of its relatively recent establishment.
- **Identifying areas that are vulnerable to emerging pests** via the tree species maps and forest stress maps. The maps can help managers focus survey and/or management efforts in critical areas (e.g., due to overlap with sensitive resources, visitor use, or other infrastructure) on the large park landscapes.
- **Managing species declines.** Park managers are using scenario planning to prepare management responses to declines in the abundance of some tree species that may occur over the next few decades due to changes in climate.

Literature Cited

New England Forestry Foundation. 2021. [Meet the Eastern Hemlock](#). Webpage visited on 24 June 2026.

This Brief is Based on:

- Watson, V.K., K.A. Lima, C.E. Arnsperger, W.B. Monahan, P.R. Nelson, J.S. Wheeler, A.J. Miller-Rushing, K. Walker, and N.A. Fisichelli. 2026. Forest Resource Mapping Products for Acadia National Park and Katahdin Woods and Waters National Monument. Unpublished Report. National Park Service, Fort Collins, Colorado. Available at <https://irma.nps.gov/DataStore/Reference/Profile/2317931>