Maine Woods Field Station: Building Research Capacity to Conserve the Wildlands of the Northeast

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Introduction

- The northeastern US is experiencing large shifts in climate, with warming winters, increased frequency of extreme precipitation events, and severe droughts [1-2].
- Since 2003, as part of its Maine Woods Initiative (MWI), AMC has conserved 130,000 acres of land in the 100-Mile Wilderness, which lies in the heart of Maine's north woods, a region that features some of the largest areas of undeveloped forests, lakes, and ponds in the United States, as well as an area of exceptionally high habitat connectivity and resilience to climate change [3].
- Significant components of MWI include: 1) restoring degraded forestland; 2) restoring watersheds to their more natural states; and 3) climate change research.
- Given the urgent need for an understanding of the effects of climate change in the Northeast coupled with the abundance of scientists conducting climate-related research in the region, the need to disseminate information about MWI as a resource is incredibly timely.

Pictures Above: The 130,000 protected acres within MWI contains both ample aquatic ecosystems, such as lakes, streams, and wetlands (left), and upland systems, such as northern hardwood and spruce-fir forests (right).

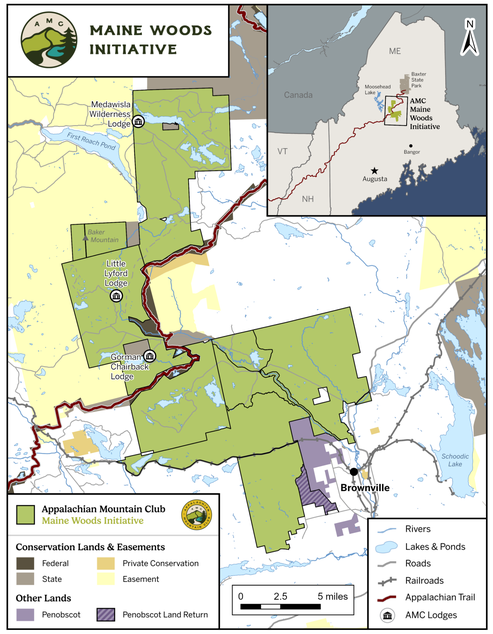
Key Gaps and Barriers

- There is no recognized field station in Maine's 3.5-million-acre North Woods, and it remains a largely under-studied landscape, newly open to science and ecological forest management since major transitions in large land ownership [4].
- Many scientists working in the region are largely unaware of AMC's ownership or of the natural resources and research infrastructure (research plots, sensors, forest treatments, existing data) that AMC and partners have recently developed.

Overarching Goal

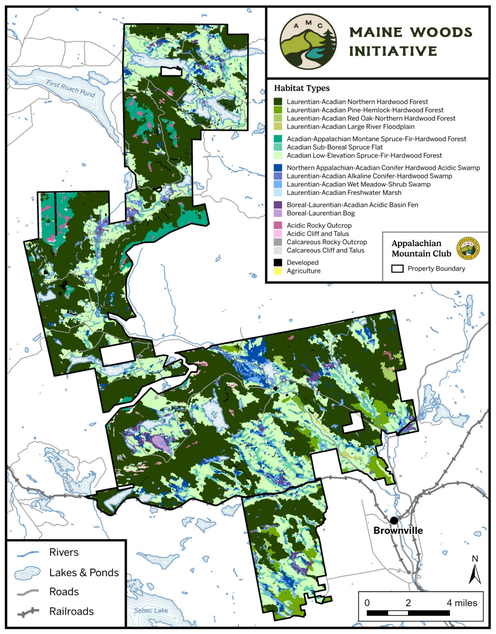
- **We plan to create a permanent research station in AMC's MWI.** We aim to expand research opportunities to more scientists and make MWI available for additional research projects with the ultimate purpose of conserving and restoring wildland ecosystems in northern Maine and nationwide.

The Maine Woods Initiative

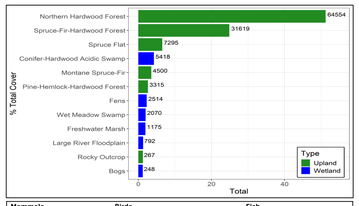


Map Left: MWI boundary and adjacent conservation lands. Future land acquisitions may further expand these boundaries.

Map Right: Habitat types within MWI boundaries based on Nature Conservancy (TNC) analysis and modeling (Northeast Habitat Map; https://www.maps.tnc.org/nehabitatmap/)



Forest and Aquatic Resources



Mammals	Birds	Fish
Species	*Species*	*Species*
Rock vole	Eastern bluebird	Lake trout
Long-tailed shrew	Horned lark	Brook trout
Canada lynx	Merlin	Landlocked Atlantic salmon
	Red-shouldered hawk	
	Cooper's hawk	
	Bald eagle	
	Northern goshawk	
	Red-breasted merganser	
	American black duck	
	Bicknell's thrush	
	Fox sparrow	
	Rusty blackbird	
	Great blue heron	
	Black tern	
	Peregrine falcon	
	Sedge wren	

Invertebrates	Herps	Plants
Species	*Species*	*Species*
Tidewater mucket	Northern spring salamander	Mountain sweet-cicely
Brook floater		
Roaring brook mayfly		

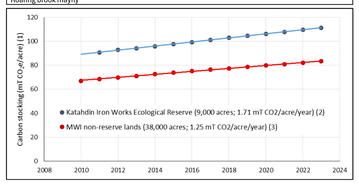


Figure Top-Left: Percent cover of major habitat types within MWI portioned between upland and wetland (labels represent total acreage).

Table Left: List of state and federally listed species potentially found within MWI.

Figure Bottom-Left: Increase in carbon stocks within core sections of active ecologically managed forests over the past two decades.

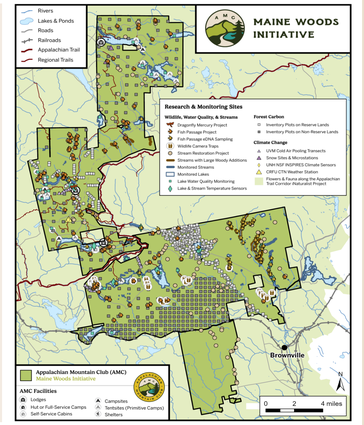
Current Research and Opportunities

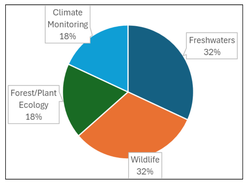
Over the past 30 years...

- 22 funded projects in MWI led by AMC, academic, agency, and NGO partners (see map on right; breakdown by topic on bottom-right).

Some examples...

- Climate research installations
- 30-year bird study
- Maine DEP's Biomonitoring
- Dragonfly Mercury Project
- Lake Stewards of Maine
- Citizen science projects such as iNaturalist
- 10-year study to support Atlantic salmon passage
- AMC's research on wildlife occupancy related to large wood additions





Take-Aways

- AMC's burgeoning research at MWI builds on the decades of research and long-term monitoring that AMC pursues across the region. Many scientists have already traveled to MWI to conduct research on its more than 50 lakes and ponds, over 130 stream restoration sites, rare bird habitat, and 130,000 acres of forest, including ecoreserve and forest restoration sites. We have hosted undergraduate research field courses at our New Hampshire facilities, a model ripe for expansion to MWI.
- MWI offers opportunities for research in silviculture, wildlands, plant ecology, freshwaters, biodiversity, climate, and social science related to natural resources. It is located in proximity to other ecologically significant lands, including Baxter State Park, the Appalachian Trail, Gulf Hagas National Natural Landmark, Debsconeag Lakes Wilderness Area, Nahmakanta ecological reserve, and Katahdin Woods and Waters National Monument, making MWI an ideal launch point for research.

The time is ripe to develop a network of researchers to participate in the creation of a MWI Research Field Station.

Next steps

- Complete an initial prospectus on the potential and feasibility of a MWI field research station.
- Compile all MWI-relevant data into a single searchable and public-facing database with associated metadata.
- Advertise the research potential of MWI and form additional partnerships with academic, NGO, and governmental organizations.
- Examine and address the infrastructure and other logistical needs that would help to better serve researchers.

References

[1] Burakowski, E. A., Contosta, A. R., Grogan, D., Nelson, S. J., Garlick, S., & Casson, N. (2022). Future of Winter in Northeastern North America: Climate Indicators Portray Warming and Snow Loss That Will Impact Ecosystems and Communities. Northeastern Naturalist, 28(sp11). https://doi.org/10.1656/045.028.s1112

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[3] Nelson, S., MacKenzie, C. M., Morelli, T., Wason, J., Wentzell, B., Hovel, R., Hodgkins, G., Miller-Rushing. A., Miller, D., Tatko, S., Cross, A., & Pounch, M. (2021). Introduction: Climate Change in the Mountains of Maine and the Northeast. *Northeastern Naturalist 28*(sp11). https://doi.org/10.1656/045.028.s1111

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For more about MWI, scan here: