

Forest Climate Indicators: New Climate Tools for Forestry Applications

Project overview and tool showcase
April 30, 2026



Northeast Regional Climate Center



Climate Hubs

U.S. DEPARTMENT OF AGRICULTURE

Acknowledgements

Project Team

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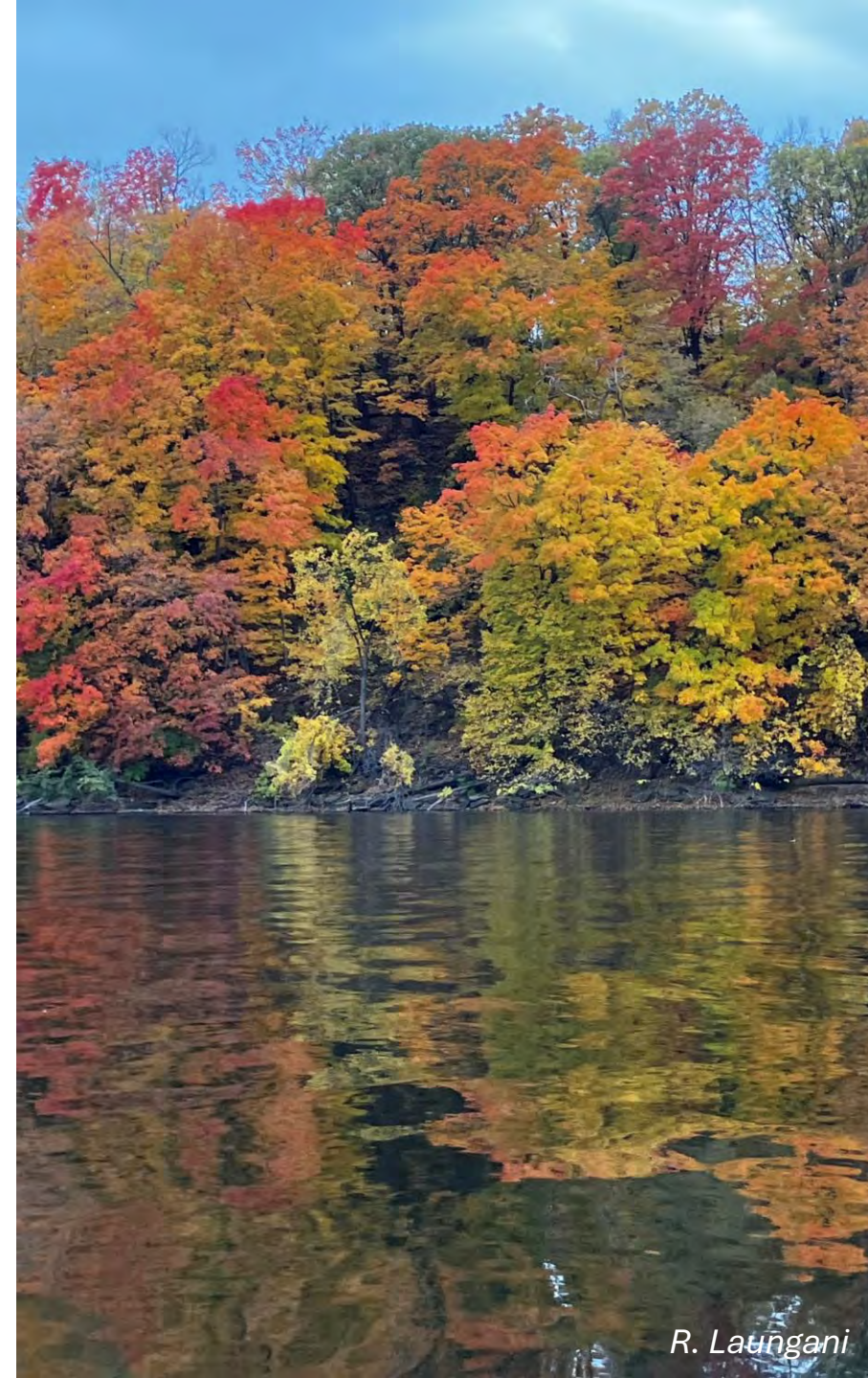
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Agenda

- Project Background and Goals
- Needs Assessment
- Tool Development and Demonstration
- Synergistic Activities and Next Steps



Did you know?

There are 176 million acres of forests in the Northeast and Midwest regions.



N. Umphlett, NRCC



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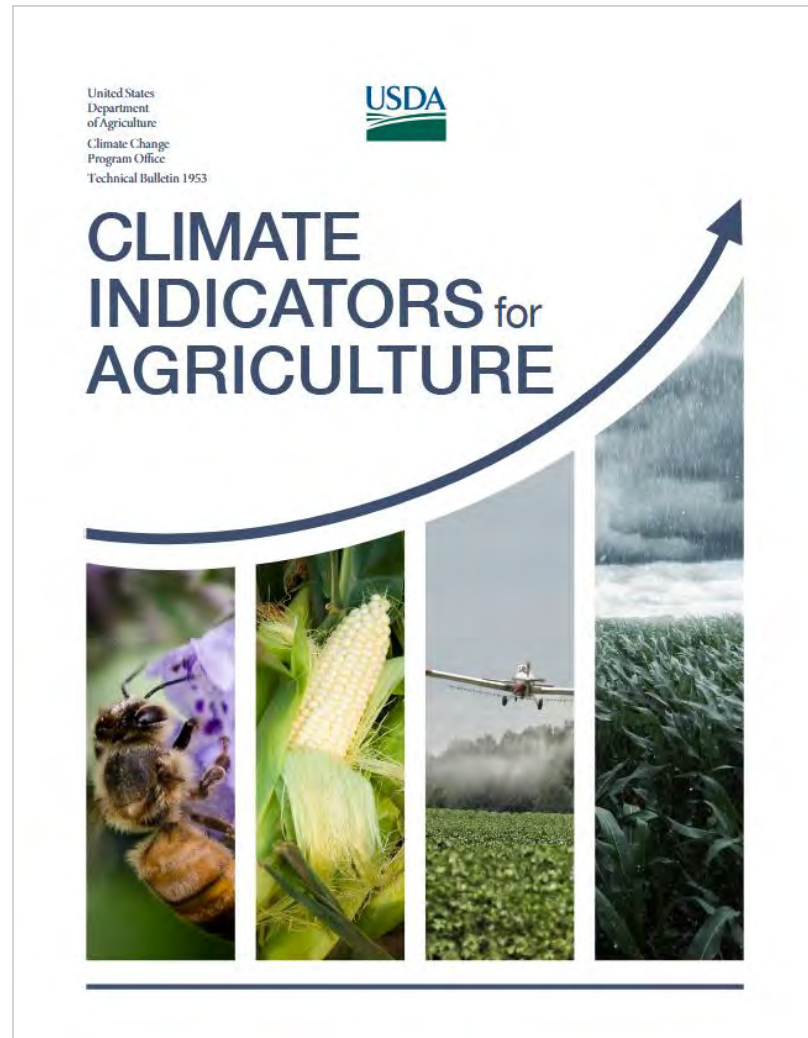


N. Umphlett, NRCC



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Linking to Management



- Despite a wide range of climate indicators in the literature, relatively few tools directly link them to forest management decisions.
- There is a need to contextualize climate data for forestry-specific applications.



Project Background

Goal: Increase availability of actionable and relevant climate indicators via an interactive online tool to support forest management and planning in the Northeast and Midwest regions.

Anticipated tool users: State foresters, Private foresters, Tribal foresters, forest planners, land managers, Extension professionals

What are indicators:

- Reference tools that can track rates of change, or trends of a phenomenon using measured data, modeled data, or an index
- Can warn of change, inform decision-making, and communicate and track key social and biophysical changes



Listening Sessions

- 14 listening sessions with Forest Service personnel (ecologists, resource managers, foresters, climate change coordinators, etc.), totaling 79 staff across the Northeast and Midwest



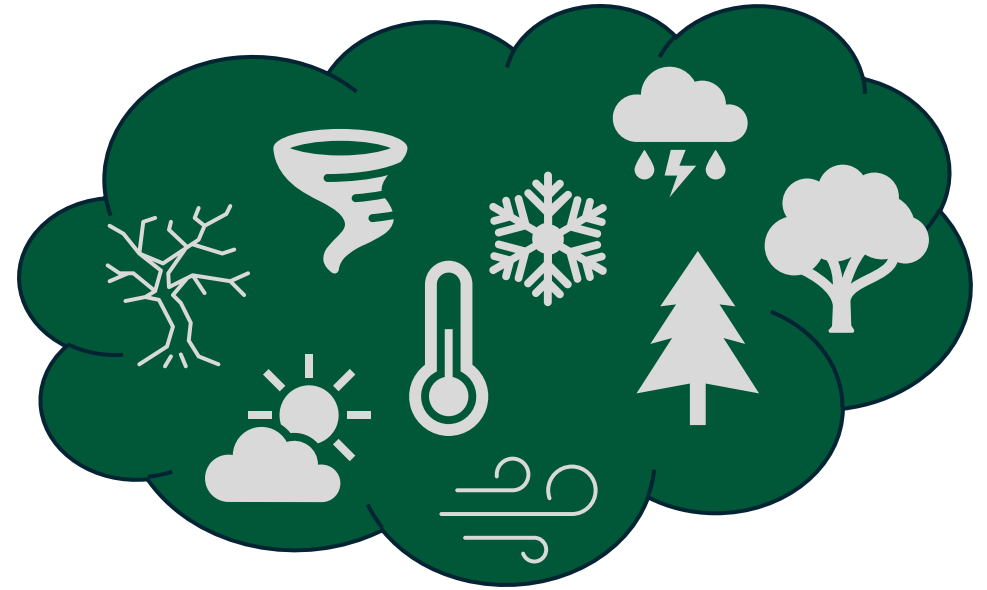
- | | | |
|---|--|--|
| 1. Green Mountain National Forest & Finger Lakes National Forest | 4. Ottawa National Forest | 9. White Mountain National Forest |
| 2. Northern Institute of Applied Climate Science / Northern Forests Climate Hub | 5. Hoosier National Forest | 10. Huron-Manistee National Forest |
| 3. Monongahela National Forest | 6. Mark Twain National Forest | 11. Office of Sustainability and Climate |
| | 7. Chequamegon-Nicolet National Forest | 12. R9 Tribal Relations |
| | 8. Shawnee National Forest | 13. R9 Watershed Forestry |
| | | 14. R9 Climate Coordinators |

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Understanding Needs

- 14 listening sessions with Forest Service personnel (ecologists, resource managers, foresters, climate change coordinators, etc.), totaling 79 staff across the Northeast and Midwest
- Brainstorm climate indicator needs for forest planning and management



Developing Themes

- 14 listening sessions with Forest Service personnel (ecologists, resource managers, foresters, climate change coordinators, etc.), totaling 79 staff across the Northeast and Midwest
- Brainstorm climate indicator needs for forest planning and management
- Developed a list of 7 thematic needs along with ~55+ related indicators

TABLE 1.
PRIORITIZATION RESULTS FROM R9 CLIMATE CHANGE COORDINATOR LISTENING SESSION

THEME	NUMBER OF VOTES	WEIGHTED PRIORITIZATION BASED ON RANKING *
Timber Operations	6	6
Weather Extremes & Storms	8	11
Oak Decline **	2	2
Pests, Pathogens, and Invasive Species	3	7
Winter Recreation	1	2
Fire	2	2
Tree Growth Projections and Impacts ***	1	2
Refugia ***	0	0

* Based on the following calculation: (# of people who voted for theme as their #1 concern x 3) + (# of people who voted for theme as their #2 concern x 2) + (# of people who voted for theme as their #3 concern x 1)

** considered its own category for prioritization

*** removed from final list of themes



Needs Assessment

- 14 listening sessions with Forest Service personnel (ecologists, resource managers, foresters, climate change coordinators, etc.), totaling 79 staff across the Northeast and Midwest
- Brainstorm climate indicator needs for forest planning and management
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Access report here:



Identifying and Prioritizing Climate Indicators Among USDA Forest Service Staff



Development Process

Prioritize challenges for tool development

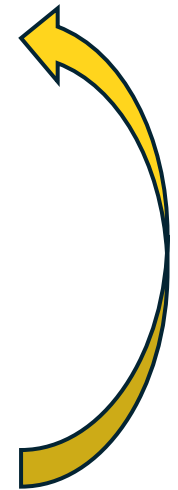
Forest impact research to identify relevant indicators

Indicator, thresholds, and background info sent to developers

Internal team feedback

User feedback

Tool refinement




Climate indicators convey real-time information about changing conditions. When climate indicators can be linked to forest health impacts, they provide key information for understanding risk through time. The tools below can help forest managers and planners prepare for risk by informing near-term decision making and longer-term resiliency planning.

Pests and Pathogens



Spring Freeze Damage



Weather and Climate Data



Select a box to see available tools for specific forest health impacts. Each tool provides:

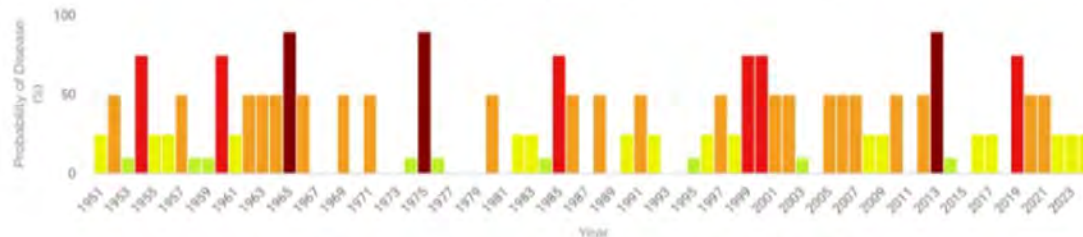
A quick national look at anomalous current conditions



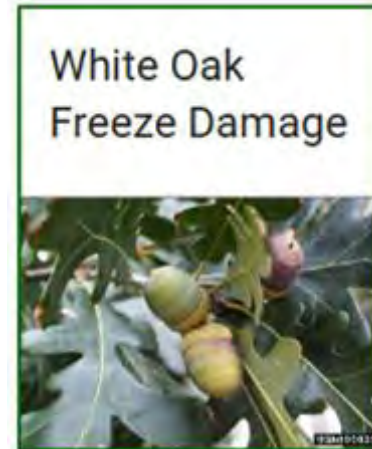
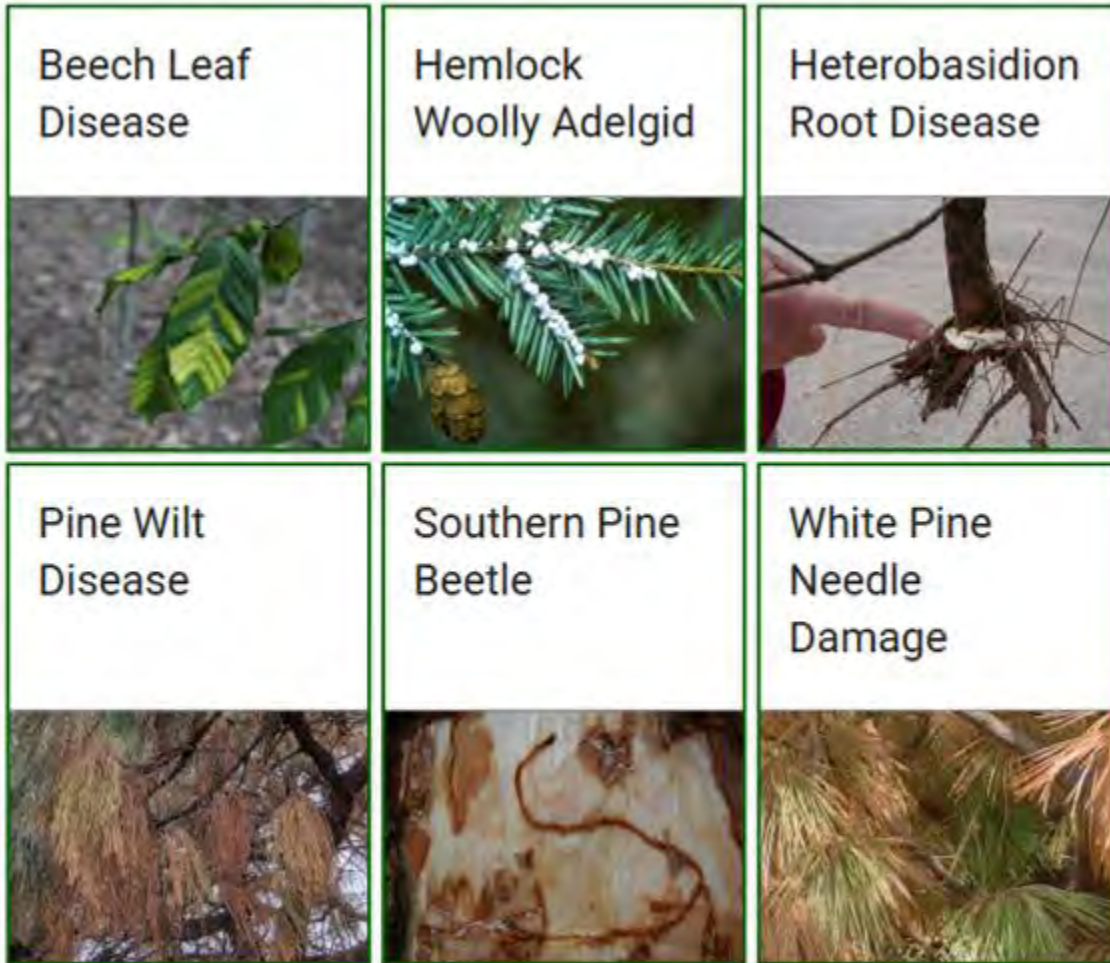
One or more time series to detect trends and changes.

Probability of Beech Leaf Disease Based on Isothermality

Location: Ithaca, Tompkins County, New York

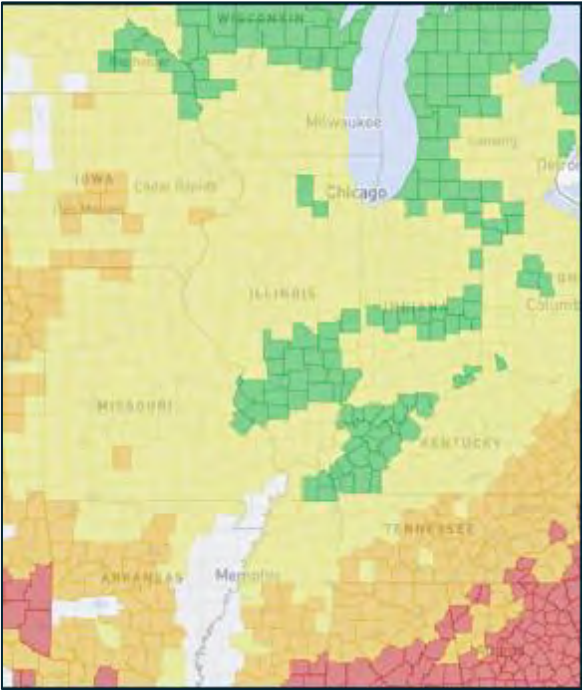


Suite of Tools

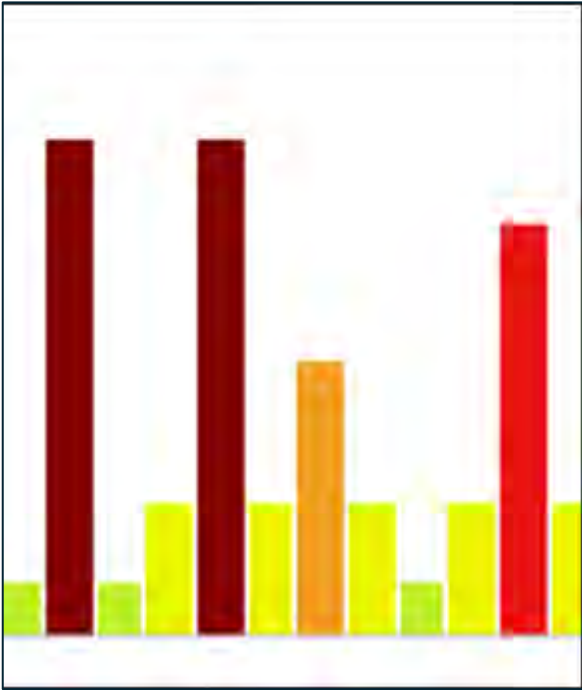


Tool Components

Maps




Charts



Supplemental Info

INTRODUCTION	Introduction
CONNECTION TO CLIMATE	The hemlock woolly adelgid (hemlock (<i>Tsuga canadensis</i>)) have limited resistance to HW, discoloration, desiccation, loss can increase the amount of light ultimately lead to a change in range and, in some areas, mo
HEMLOCK WOOLLY ADELGID INDICATOR MAPS AND INTERPRETATION	
HEMLOCK WOOLLY ADELGID INDICATOR SERIES AND INTERPRETATION	
MANAGEMENT STRATEGIES FOR HEMLOCK WOOLLY ADELGID	
ABOUT THE DATA	
ADDITIONAL RESOURCES	



Spring Freeze Damage



Joseph O'Brien, Bugwood.org, cropped



Live Tool Demonstration Followed by Q&A

Next Steps

Revising tools, as needed

- Ongoing
- Let us know if you have feedback!

Exploring other themes: timber operations, winter recreation

- Ongoing; future directions

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Thank you!



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