

October 30, 2019

Forest Ecosystem Monitoring Cooperative - sharing resources and data

Alexandra (Ali) Kosiba

Research Projects Coordinator



Forest Ecosystem Monitoring Cooperative

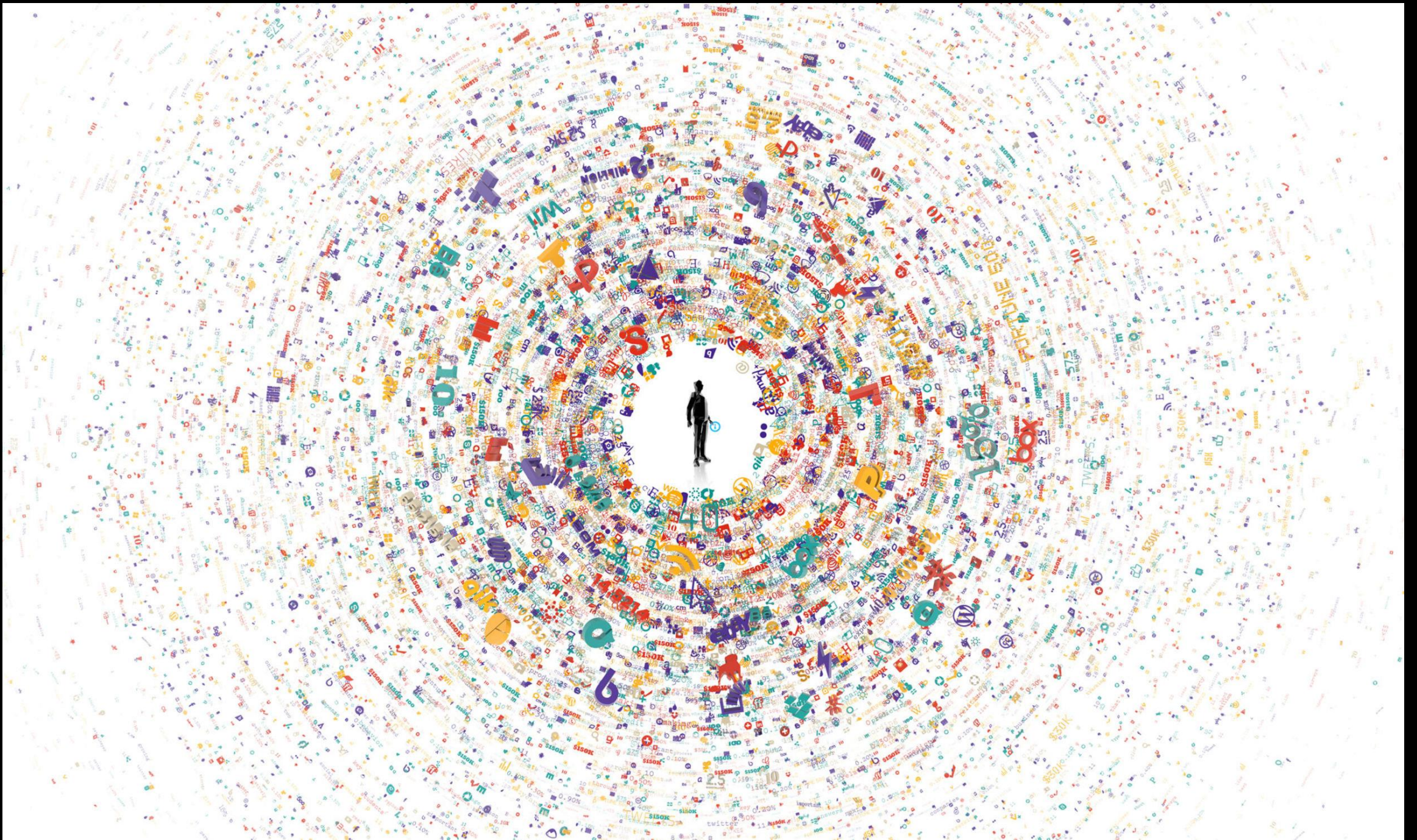


THE UNIVERSITY OF VERMONT
RUBENSTEIN
SCHOOL OF ENVIRONMENT
AND NATURAL RESOURCES

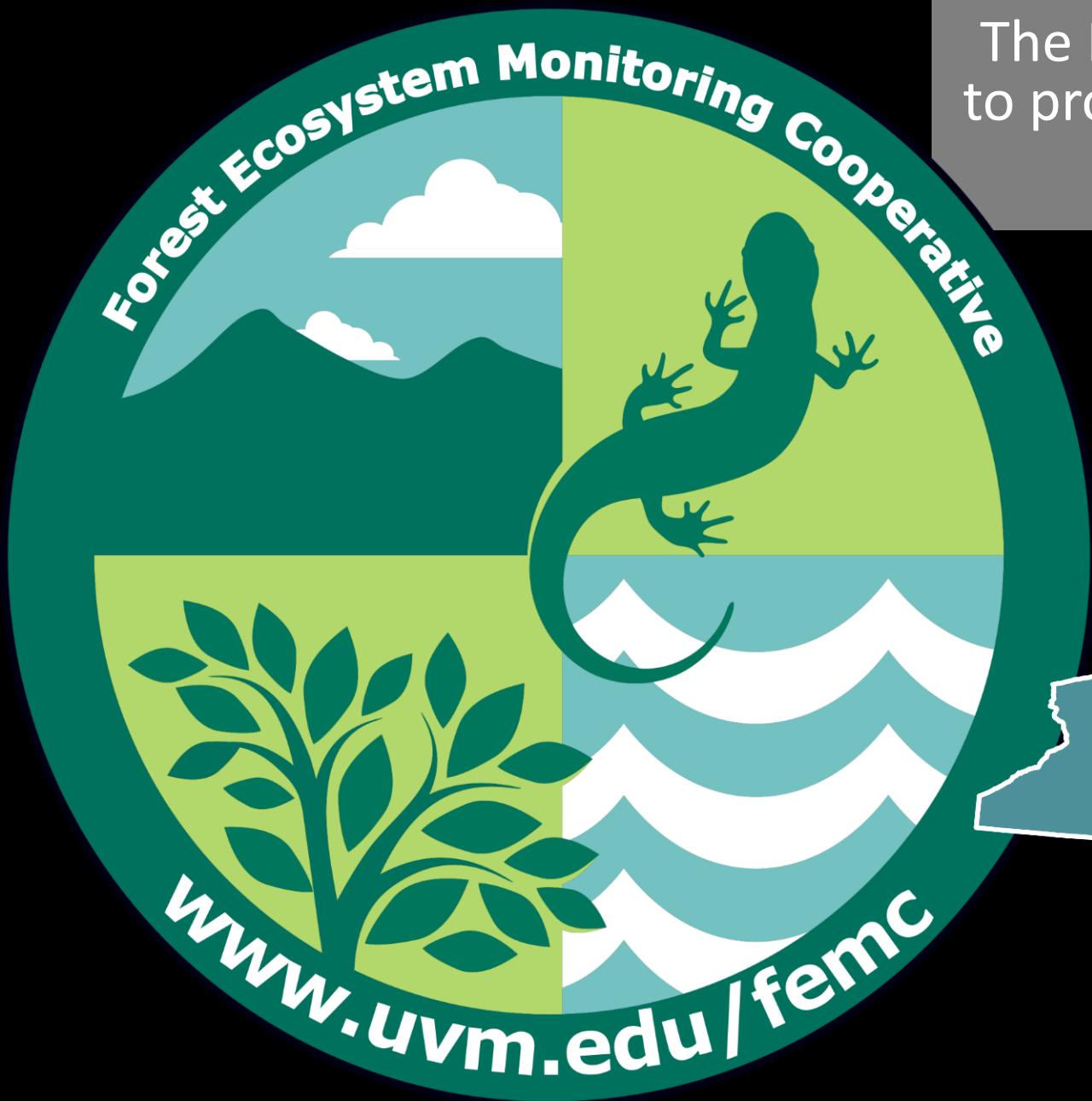
About me

- Forest Ecologist, Tree Physiologist
- Tree and forest health due to environmental change
- Data sharing and cooperation among the many stakeholders
- Convey information in an easy to digest and understand format for informed decision making

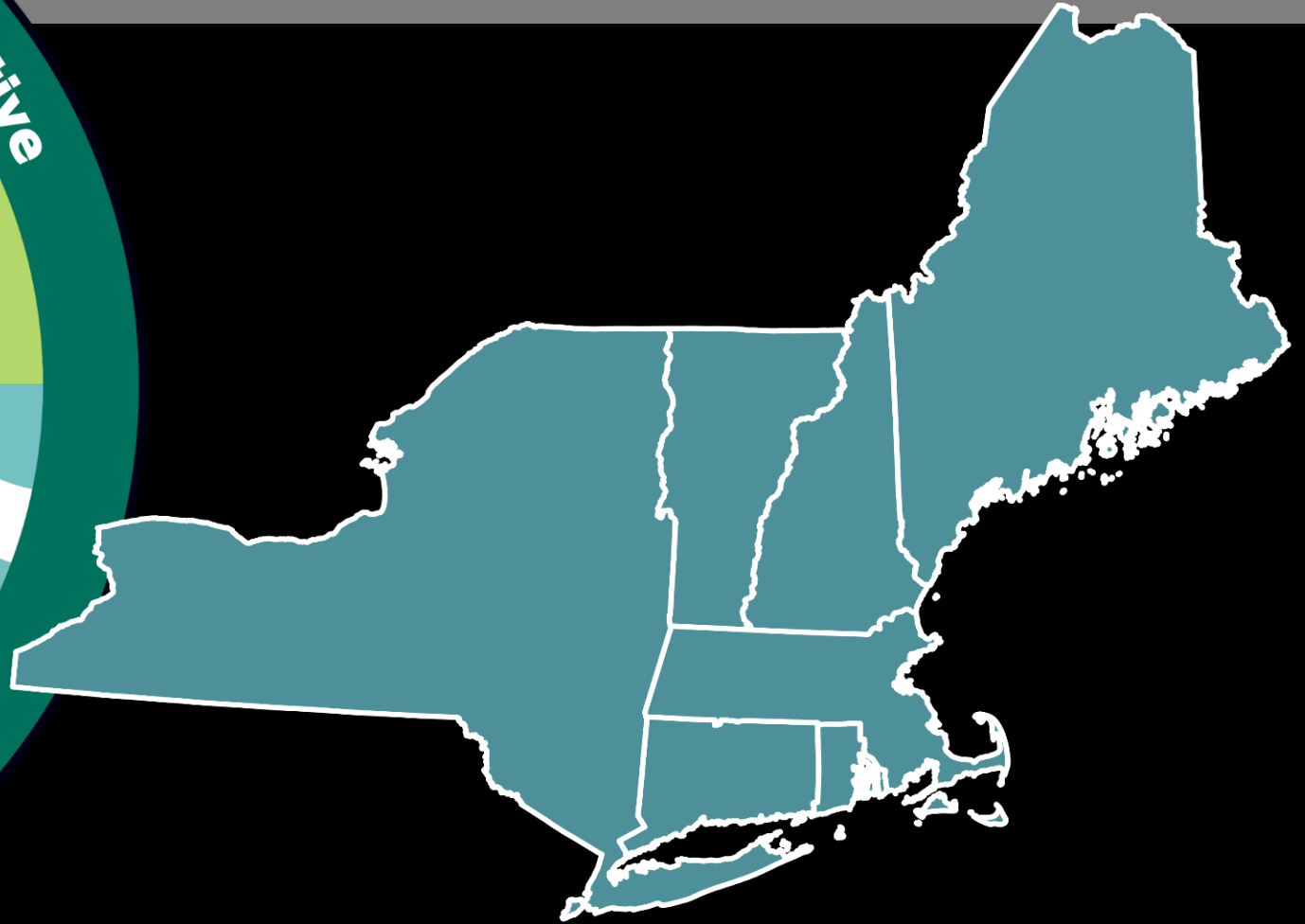


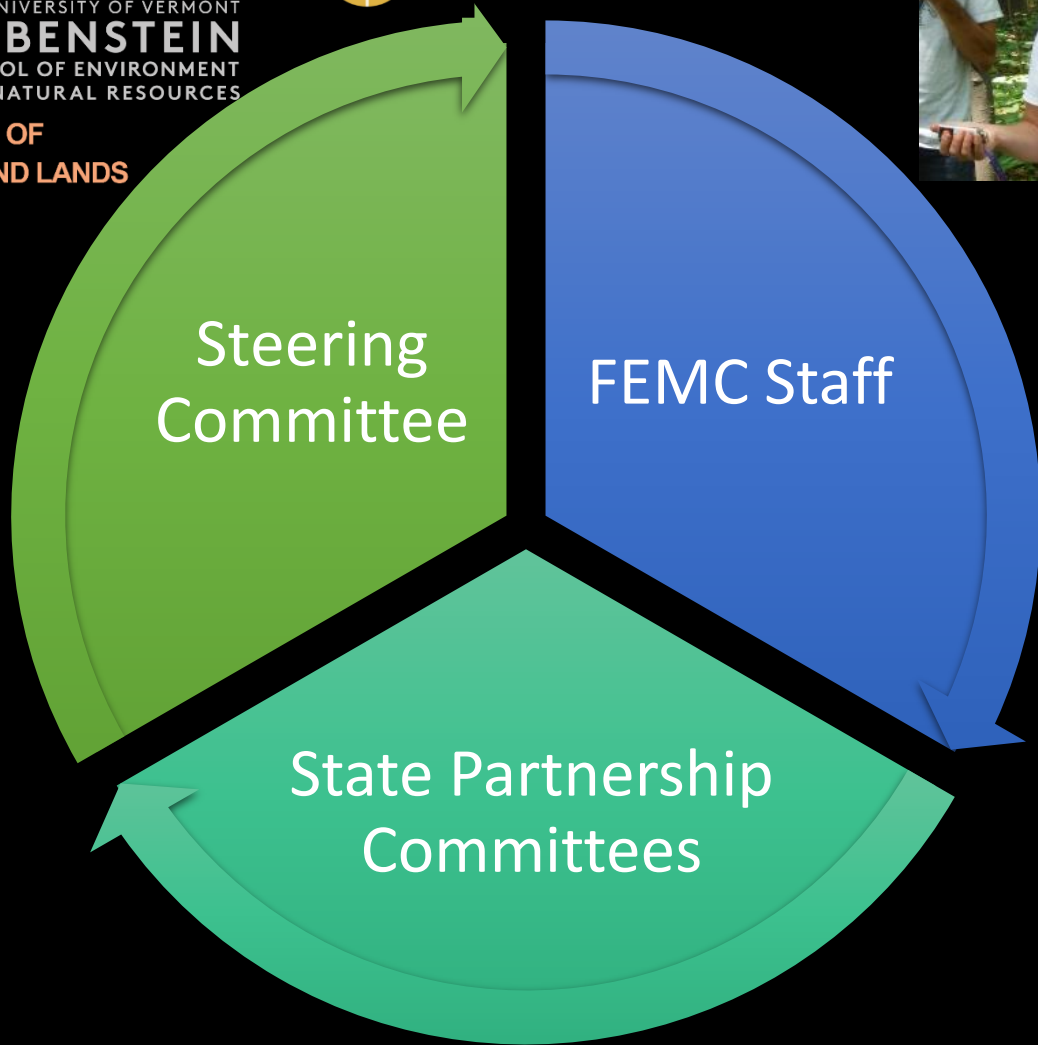




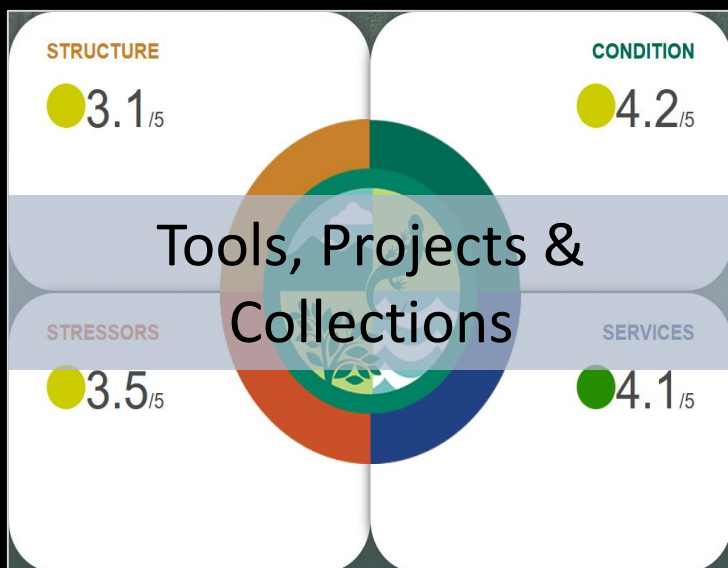


The FEMC is a regional cooperative that aims to provide better organization and data access related to forest ecosystems.





Plus many students, technicians, and interns



Data Archive

DATA

[Archive](#)
[Tools and Collections](#)
[About the Archive](#)
[Contribute Data](#)
[Resources](#)

Data is a valuable resource, and the FEMC believes that it should be shared and easily accessible. Find the latest monitoring and research data in our archive, and use our tools to explore and understand what it says about our region's forests.

The FEMC Data Archive

The [FEMC Data Archive](#) houses hundreds of research and monitoring projects and datasets related to forest ecosystems in the northeastern US. Click on a theme below or search to start exploring.



Search

Search by keyword, person, or other terms...



- *Secure data storage in perpetuity*
- *Machine readable metadata*
- *Searchable and discoverable via the web*
- *Free, open to public*
- *Levels of sharing available*

Keywords

Limit by Content Type

☒ Projects
 ☒ Datasets
 ☒ People
 ☒ Documents
 ☒ News
 ☒ Events

Limit by Taxonomy

Find results within data that identify species-specific information

In Kingdom

Any

Name includes

This is a... ☒ Common name ☐ Scientific name

Limit by Date

From To

Limit by Location

PROJECT

Projected hemlock woolly adelgid-induced losses (2013-2027) in riparian corridors in New York State

OVERVIEW DATASETS CONTRIBUTORS DOCUMENTS/IMAGES MANAGE

Type

Research project

Principal Investigator

- James Duncan +
- Alexandra Kosiba +

Contributing Organizations

- Forest Ecosystem Monitoring Cooperative (FEMC) +

See all contributors

Project Citation

Kosiba, AM and Duncan JA. (2018) Hemlock woolly adelgid-induced losses in riparian corridors in New York State. FEMC. Available online at: https://www.uvm.edu/femc/data/archive/project/hemlock-woolly-adelgid-riparian-losses-new-york

Links

Web Map: Hemlock woolly adelgid-

PROJECT OVERVIEW

The Forest Ecosystem Monitoring Cooperative collaborated with the New York Invasive Species Research Institute to identify and rank riparian corridors at potential risk of future hemlock losses due to hemlock woolly adelgid (HWA) in New York State (projected 2013-2027; USFS 2012). We combined preexisting spatial data projecting losses of hemlock due to HWA developed by the USDA Forest Service Forest Health Protection program (USFS 2012) with stream corridor and catchment data to quantify potential losses at 50', 100' and 200' buffers of stream reaches and summarized the results to HUC12 sub-catchments.



Objectives

Quantify the risks to stream corridors of hemlock loss due to hemlock woolly adelgid in New York and make this information easily accessible to the research and monitoring community.

Dataset Availability

DOCUMENTS AND FILES

Reports

Name	Date
Hemlock woolly adelgid-induced losses in riparian corridors in New York State	2018

DATASETS

Data Availability	Name	Description	Objective	Dates
Downloadable	100-foot riparian buffers with projected BA losses	Polygon delineations of 100-foot riparian buffers and metrics of projected HWA impacts (2013-2027).	The purpose of this dataset was to compute projected losses of eastern hemlock due to HWA (2013-2027; USFS 2012) in 100-foot riparian buffers to identify 'at risk' locations for monitoring, research, or management.	2018-06-01 to 2018-11-01
Downloadable	200-foot riparian buffers with projected BA losses	Polygon delineations of 200-foot riparian buffers and metrics of projected HWA impacts (2013-2027).	The purpose of this dataset was to compute projected losses of eastern hemlock due to HWA (2013-2027; USFS 2012) in 200-foot riparian buffers to identify 'at risk' locations for monitoring, research, or management.	2018-06-01 to 2018-11-01
Downloadable	50-foot riparian buffers with projected BA losses	Polygon delineations of 50-foot riparian buffers and metrics of projected HWA impacts (2013-2027).	The purpose of this dataset was to compute projected losses of eastern hemlock due to HWA (2013-2027; USFS 2012) in 50-foot riparian buffers to identify 'at risk' locations for monitoring, research, or management.	2018-06-01 to 2018-11-01
Downloadable	ArcGIS python script model	A python script model to be used with ArcGIS (10.5.1) to produce statistics based on stream riparian buffers and projected hemlock losses (USFS 2018).	The purpose of this model is to generate statistics for riparian buffers and sub-catchment watersheds (HUC12) using USFS projected basal area losses due to HWA.	2018-06-01 to 2018-11-01
Downloadable	Sub-catchment watersheds with associated losses due to HWA	Polygon delineations of sub-catchment watersheds (HUC12) with associated statistics (mean, sd, and max) for BA losses and percent BA losses due to HWA.	The purpose of this dataset was to summarize projected losses of eastern hemlock due to HWA (2013-2027; USFS 2012) in riparian buffers (50-	2018-06-01 to 2018-11-01

PROJECT: PROJECTED HEMLOCK WOOLLY ADELGID-INDUCED LOSSES (2013-2027) IN RIPARIAN CORRIDORS IN NEW YORK STATE

Dataset: 100-foot riparian buffers with projected BA losses

OVERVIEW METADATA DATA DOCUMENTS/IMAGES



Parent Project
Projected hemlock woolly adelgid-induced losses (2013-2027) in riparian corridors in New York State

- Tags
- Hemlock Woolly Adelgid
 - New York
 - Riparian Corridor
 - Stream Buffer
 - Tsuga Canadensis

Status
Completed

Data Availability
Available for download
Download Data

Data License
PUBLIC DOMAIN

Dataset Overview

Polygon delineations of 100-foot riparian buffers and metrics of projected HWA impacts (2013-2027).

See Full Dataset Documentation

Purpose	The purpose of this dataset was to compute projected losses of eastern hemlock due to HWA (2013-2027; USFS 2012) in 100-foot riparian buffers to identify 'at risk' locations for monitoring, research, or management.
Data Collection Status	Data collection for this dataset has been completed
Start date	2018-06-01
End date	2018-11-01
Data Availability	Available for download Download Data
Data License	PUBLIC DOMAIN
Preferred Citation	Kosiba, AM and Duncan, JA (2018) 100-foot riparian buffers with projected BA losses. FEMC. Available online at: https://www.uvm.edu/femc/data/archive/project/hemlock-woolly-adelgid-riparian-losses-new-york/dataset/100-foot-riparian-cooridors-with-projected
Update Frequency	Not planned
Maintenance Plan	Not provided
Links	No links available for this dataset
Related Datasets	View related datasets

Data Rescue

Inventorying and preserving data at risk of being lost

Examples:

- *Scanning historical reports*
- *Reformatting spreadsheets*
- *Archiving hand-drawn maps*

Formerly the Vermont monitoring cooperative

Search...

DATA MONITORING CO

Special Data Collection

Data Rescue: Inventory

Home Projects About Suggest a Rescue

Organization ⓘ
+ Show Contact - Institution

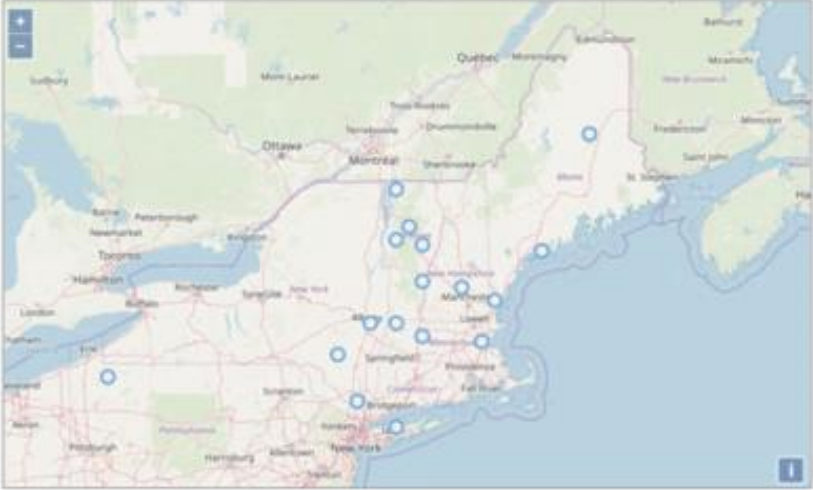
State ⓘ
+ Show All States

Year ⓘ 1832 to 2019
Date Range 1832-2019

Focus ⓘ
+ Show All Focuses

Status ⓘ
+ Show All Statuses

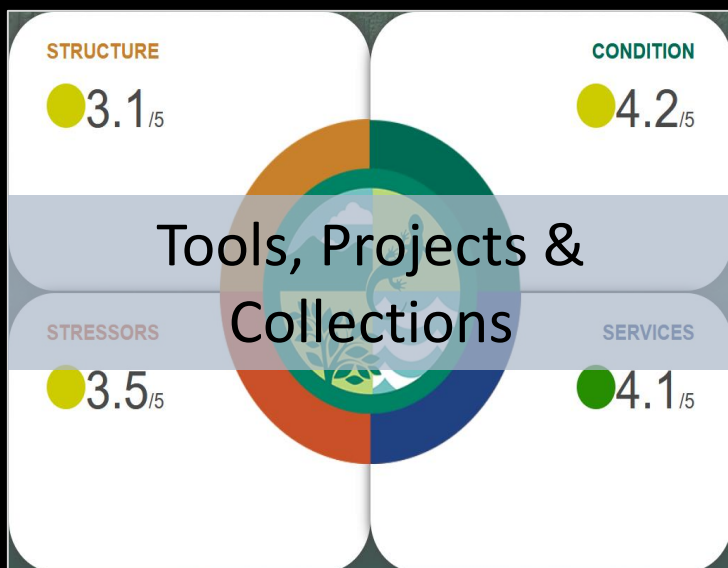
Clear Filters Update Map



Project Name ⓘ	Organization ⓘ	State ⓘ	Year ⓘ	Theme ⓘ
Cranberry Pool Vegetation Inventory	Missisquoi National Wildlife Refuge	VT	1987, 2000	Wildlife
Factors Affecting the Growth and Distribution of Pitch Pine	Missisquoi National Wildlife Refuge	VT	1987	Wildlife
Ring-billed Gull and Double-crested Cormorant Damage Report	Missisquoi National Wildlife Refuge	VT	1996	Wildlife

High Priority Data:

- ❖ Monitoring/inventory data
- ❖ Records over time
- ❖ High potential impact



Ecosystem Monitoring

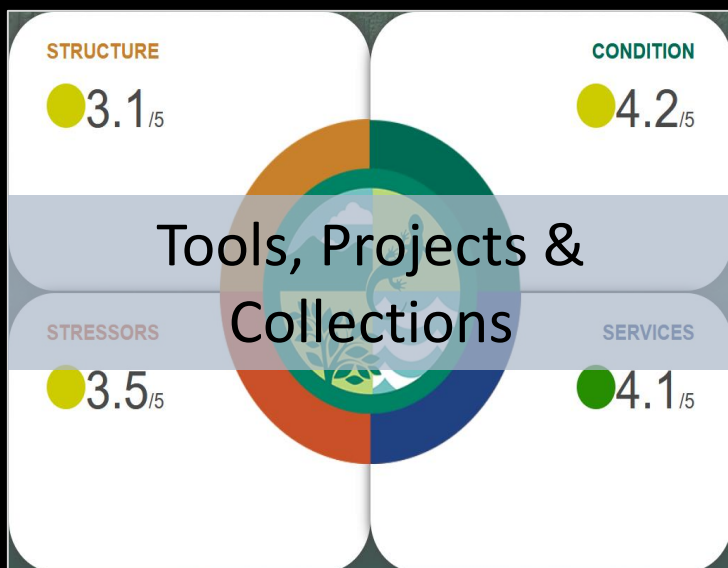
- *Data publically available*
- *Forest Health Monitoring include annual assessments on 49 plots in VT, 20 in MA*
 - *Expanding program to other states in 2020*

Forest Health



Air Quality



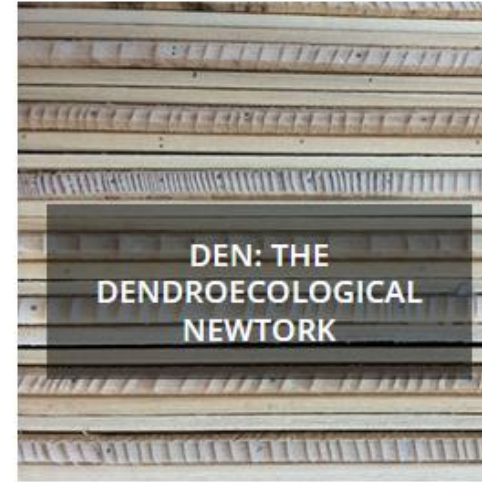
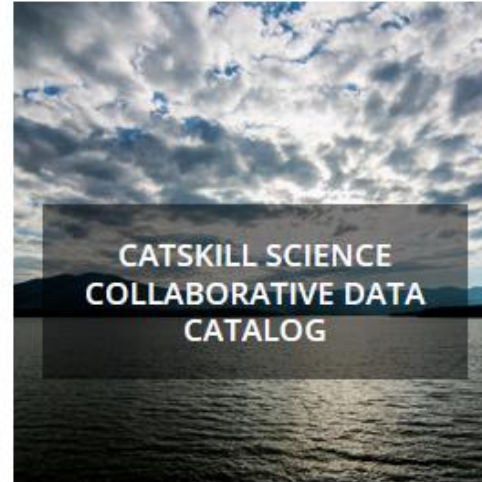


Tools, maps, collections

www.uvm.edu/femc/products/collections

Collections aim to organize data and increase ease of access

Building on top of the FEMC archive, we maintain a number of special collections of datasets and databases that support our partners in academia, state agencies, and federal agencies.



Climate Connection

www.uvm.edu/femc/climate-connection

Tools for understanding climate change and how it impacts forest ecosystems in the Northeast

Explore Climate Change

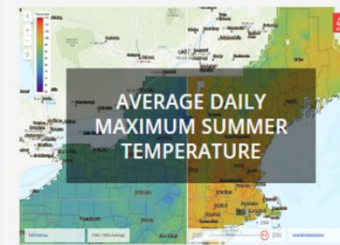
Get a quick handle on how climate change will affect temperature, precipitation, and other weather patterns in ways that are critical to forested ecosystems with this selection of online tools from trusted sources.

Type: Web Map
 Summary

Timeframe: Historical
 Projected
 Both

Focus: Temperature
 Precipitation
 Weather

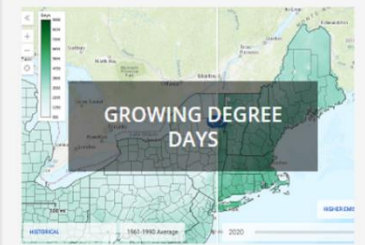
Downloadable:



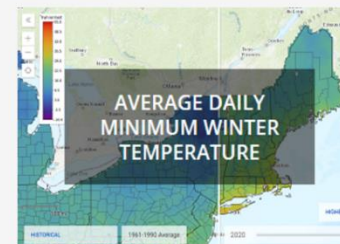
Source: NOAA's National Centers for Environmental Information



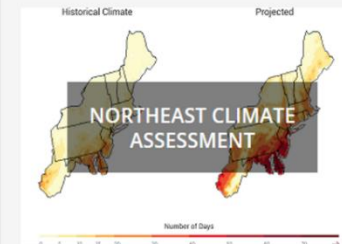
Source: NOAA's National Centers for Environmental Information



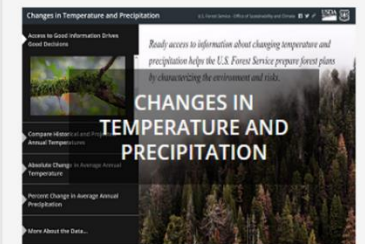
Source: NOAA's National Centers for Environmental Information



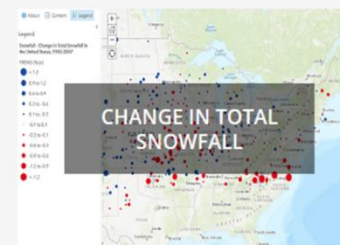
Source: NOAA's National Centers for Environmental Information



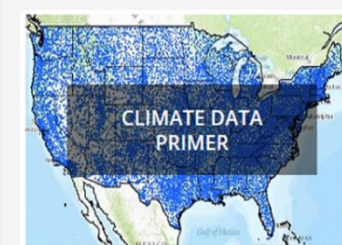
Source: US Global Change Research Project



Source: USDA Forest Service - Office of Sustainability and Climate



Source: Environmental Protection Agency (EPA)



Source: NOAA



Source: The Nature Conservancy

Explore Impacts of Climate Change

How will forested ecosystems respond to climate change? What impacts are we seeing already? We have assembled a range of tools you can use to explore the observed and predicted impacts of climate change on forests and the water, wildlife and people that depend on them.

Type: Web Map
 Summary

Timeframe: Historical
 Projected
 Both

Focus: Forests
 Water
 Wildlife
 People

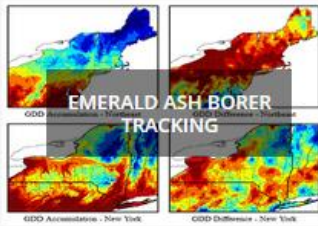
Downloadable:

Click a topic to filter the list of tools

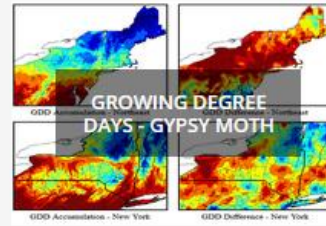
Show All Water Wildlife People Forests



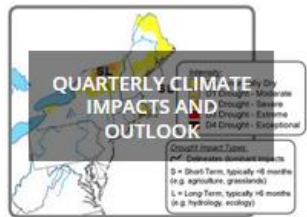
Source: USDA Forest Service Office of Sustainability and Climate (OSC), Northern Institute of Applied Climate Science (NIACS)



Source: Northeast Regional Climate Center



Source: Northeast Regional Climate Center



Source: National Integrated Drought Information System (NIDIS)

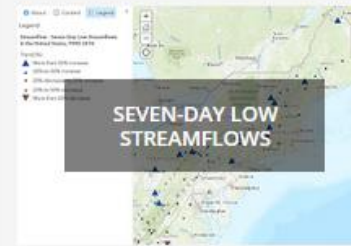


Source: Climate Nexus

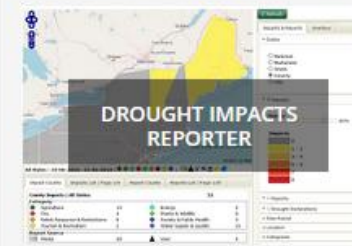


Source: Environmental Protection Agency (EPA)

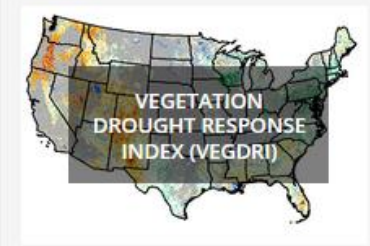
www.uvm.edu/femc/climate-connection



Source: Environmental Protection Agency (EPA)



Source: National Drought Mitigation Center



Source: National Drought Mitigation Center



Source: USDA Forest Service Northern Institute of Applied Climate Science (NIACS)



Source: Environmental Protection Agency



Source: Partnership for Resilience and Preparedness, NASA



Source: Environment America



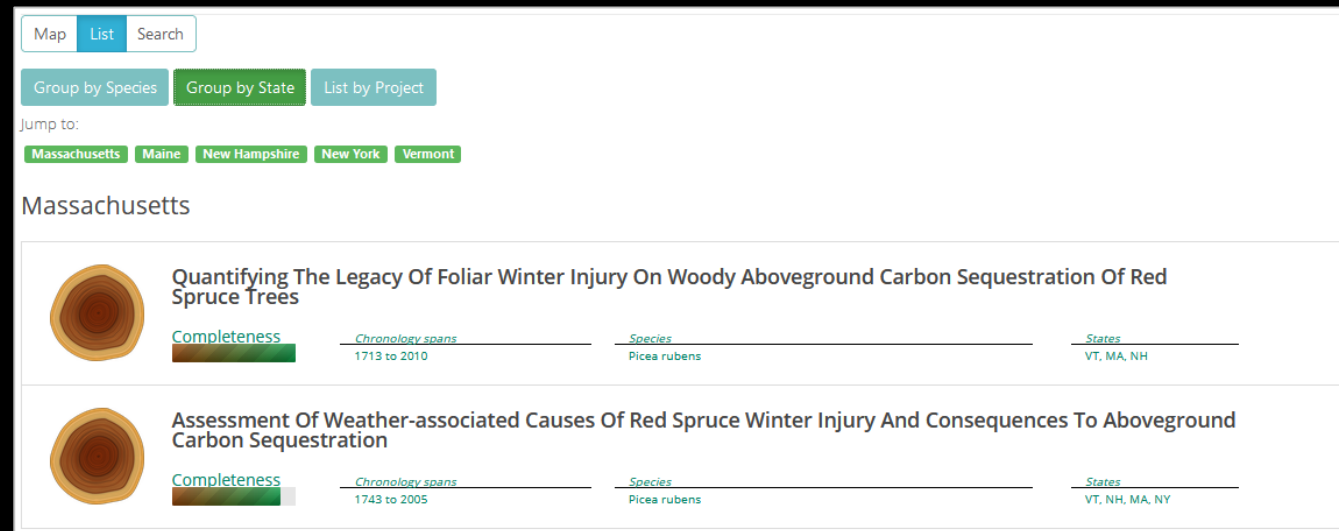
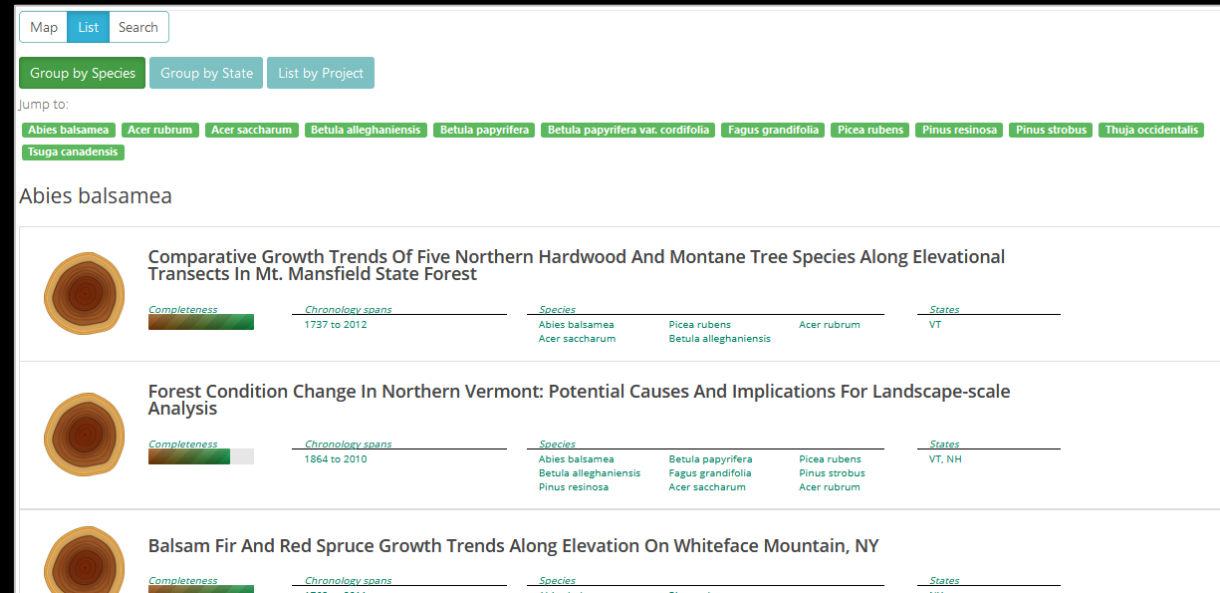
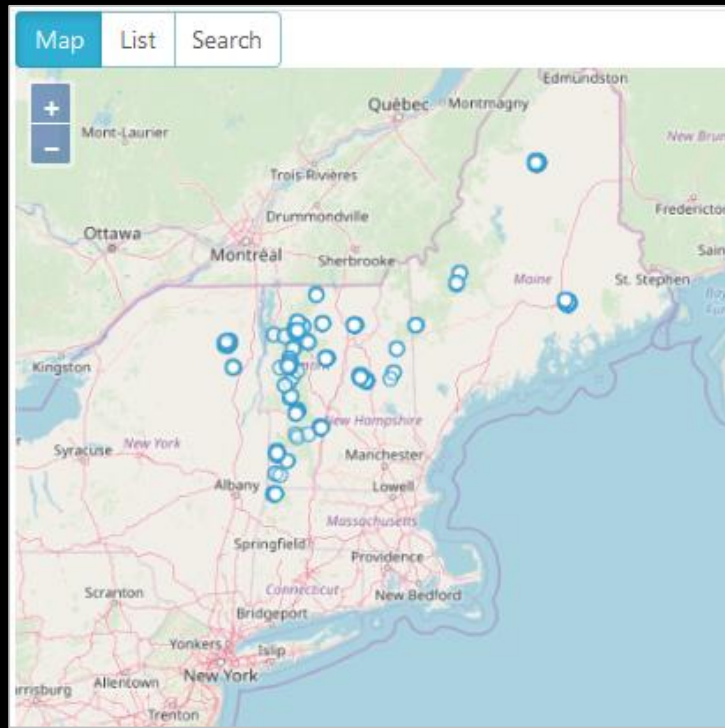
Source: Partnership for Resilience and Preparedness, World Resources Institute



Source: I-Tree

The DEN: DendroEcological Database

<https://www.uvm.edu/femc/dendro>

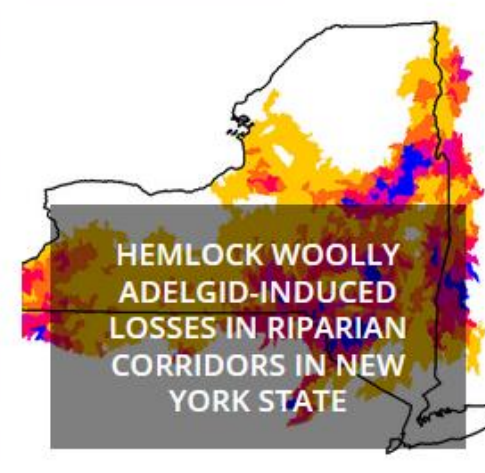
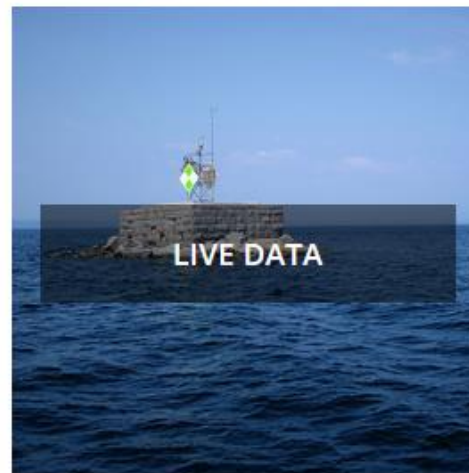
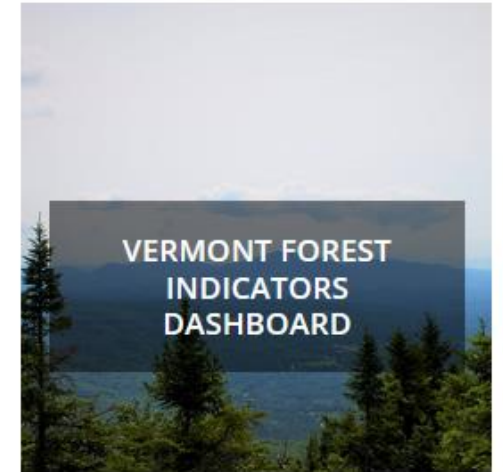
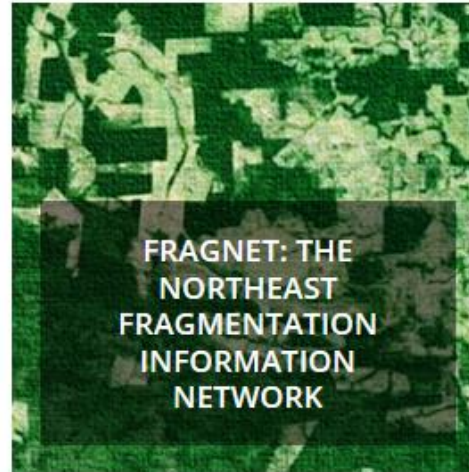


Tools, maps, collections

www.uvm.edu/femc/products/tools

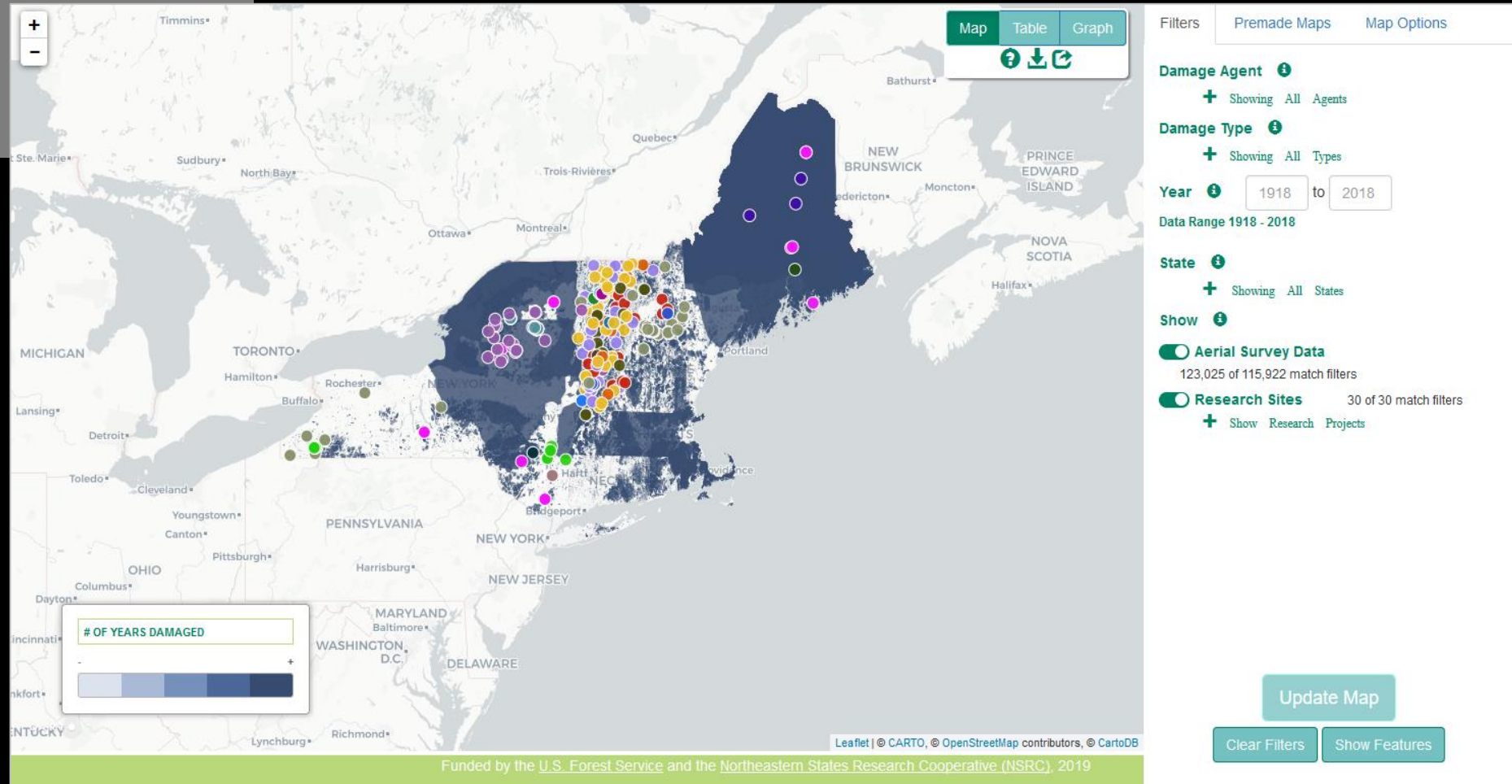
*Tools provide a
novel way to view
or interpret data*

On top of the database work of the FEMC, our collaborations and partnerships have lead to the development of environmental monitoring and data access tools that allow the everyday user to interact with and acquire data in new and customized ways.

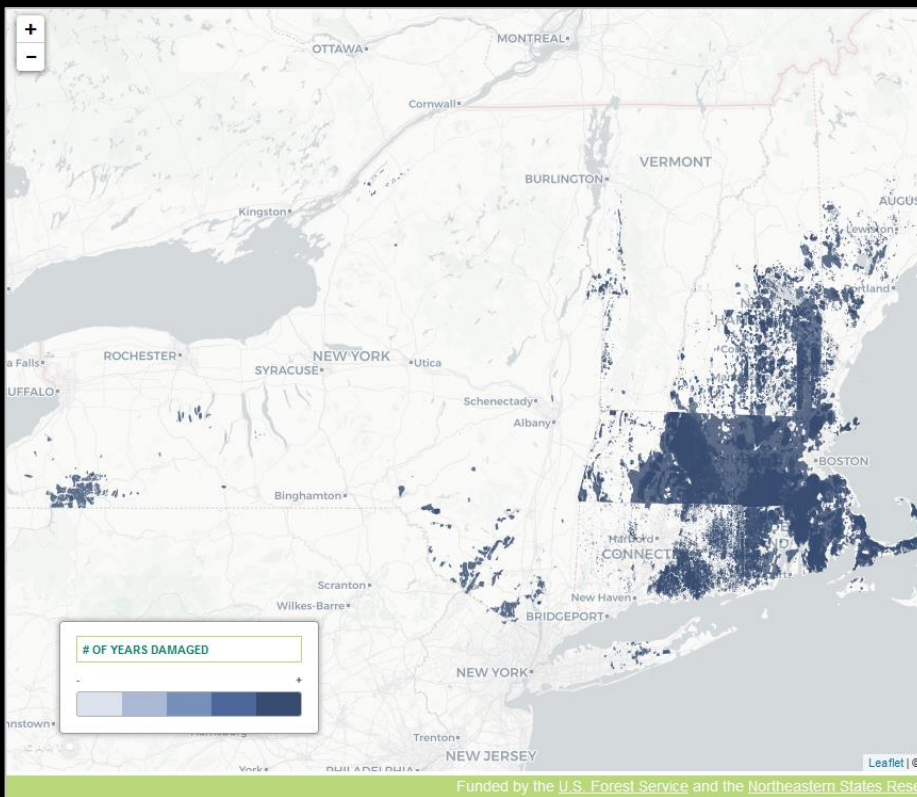


Northeastern Forest Health Atlas

www.uvm.edu/femc/forest-health-atlas



- Aerial detection surveys of tree damage
- Contains 100 years of data
- Filter by agent, location, damage type
- Produce premade maps, download data



Map Table Graph

Filters Premade Maps Map Options

Damage Agent **+**

Showing 1 Agents

12089: gypsy moth **X**

Start typing to filter agent list

- 50000: abiotic damage
- 50001: air pollutants
- 12015: alder flea beetle
- 15052: ambrosia beetles
- 41002: American beaver
- 25025: anthracnose
- 22089: apple scab
- 12026: arborvitae leafminer

Damage Type **+**

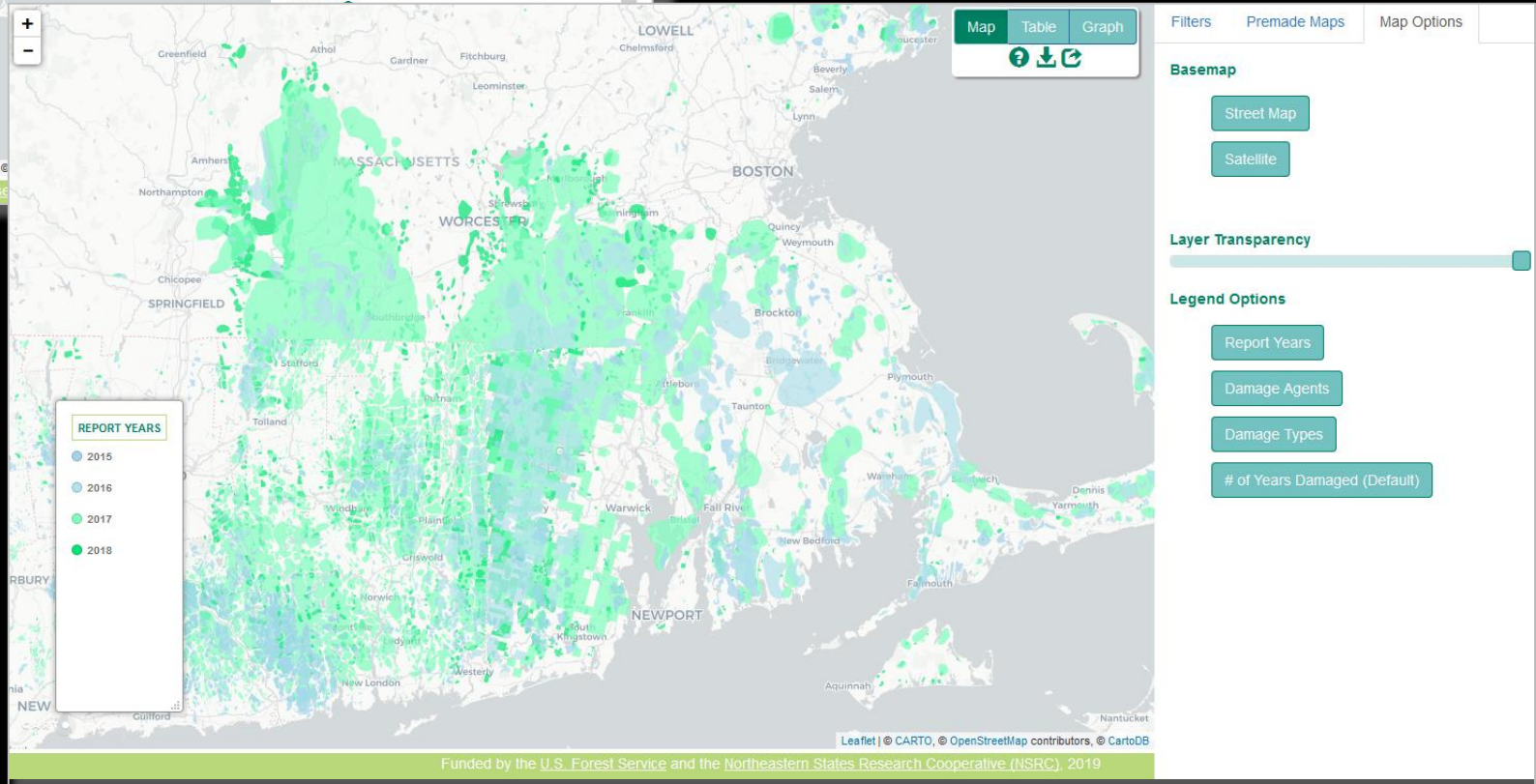
Showing All Types

Year **+** 1918 to 2018

Data Range 1934 - 2018

State **+**

Showing All States



www.uvm.edu/femc/forest-health-atlas

Table

Download Table

Area by Year Area by Agent **Area by Type** Agent by Frequency and Extent

#	Damage Type	Total Acres Damaged
0	Mortality	52,940
1	Defoliation	3,499,963
2	Discoloration	204
3	Dieback	50
4	Previously Undocumented (old) Mortality	125,318

Map **Table** Graph

🔍 ⬇️ ↻

Filters Premade Maps Map Options

Basemap

Street Map

Satellite

Layer Transparency

Legend Options

Report Years

Damage Agents

Damage Types

of Years Damaged (Default)

Funded by the U.S. Forest Service and the Northeastern S

+

-

MICHIGAN TORONTO HAMILTON ROCHESTER NEW YORK DETROIT BUFFALO CLEVELAND TOLEDO OHIO PENNSYLVANIA PITTSBURGH HARRISBURG DAYTON COLUMBUS MARYLAND BALTIMORE WASHINGTON, D.C. RICHMOND LYNCHBURG

Download Options

Format Options

☐ csv ☐ KML

☒ Shapefile ☐ GeoJSON

Premade Map Download Selection

☐ Gypsy Moth: All Damage Occurrences

☐ Gypsy Moth: Defoliation Occurrences

☐ Gypsy Moth: Mortality Occurrences

☐ Forest Tent Caterpillar: All Damage Occurrences

☐ Forest Tent Caterpillar: Defoliation Occurrences

☐ Forest Tent Caterpillar: Mortality Occurrences

☐ Winter Moth: All Damage Occurrences

☐ Winter Moth: Defoliation Occurrences

☐ Winter Moth: Mortality Occurrences

☐ Defoliation

☒ Mortality

Download

Done

Filters Premade Maps Map Options

Winter Moth: Mortality Occurrences

Forest Tent Caterpillar: Defoliation Occurrences

Forest Tent Caterpillar: All Damage Occurrences

Forest Tent Caterpillar: Mortality Occurrences

Gypsy Moth: Defoliation Occurrences

Gypsy Moth: All Damage Occurrences

Gypsy Moth: Mortality Occurrences

Defoliation

Mortality

This map shows the number of years an area has had mortality damage between 1918 and 2018. The first occurrence was in 1967 and the last in 2018.

Download

Leaflet | © CARTO, © OpenStreetMap contributors, © CartoDB

Funded by the U.S. Forest Service and the Northeastern States Research Cooperative (NSRC). 2019

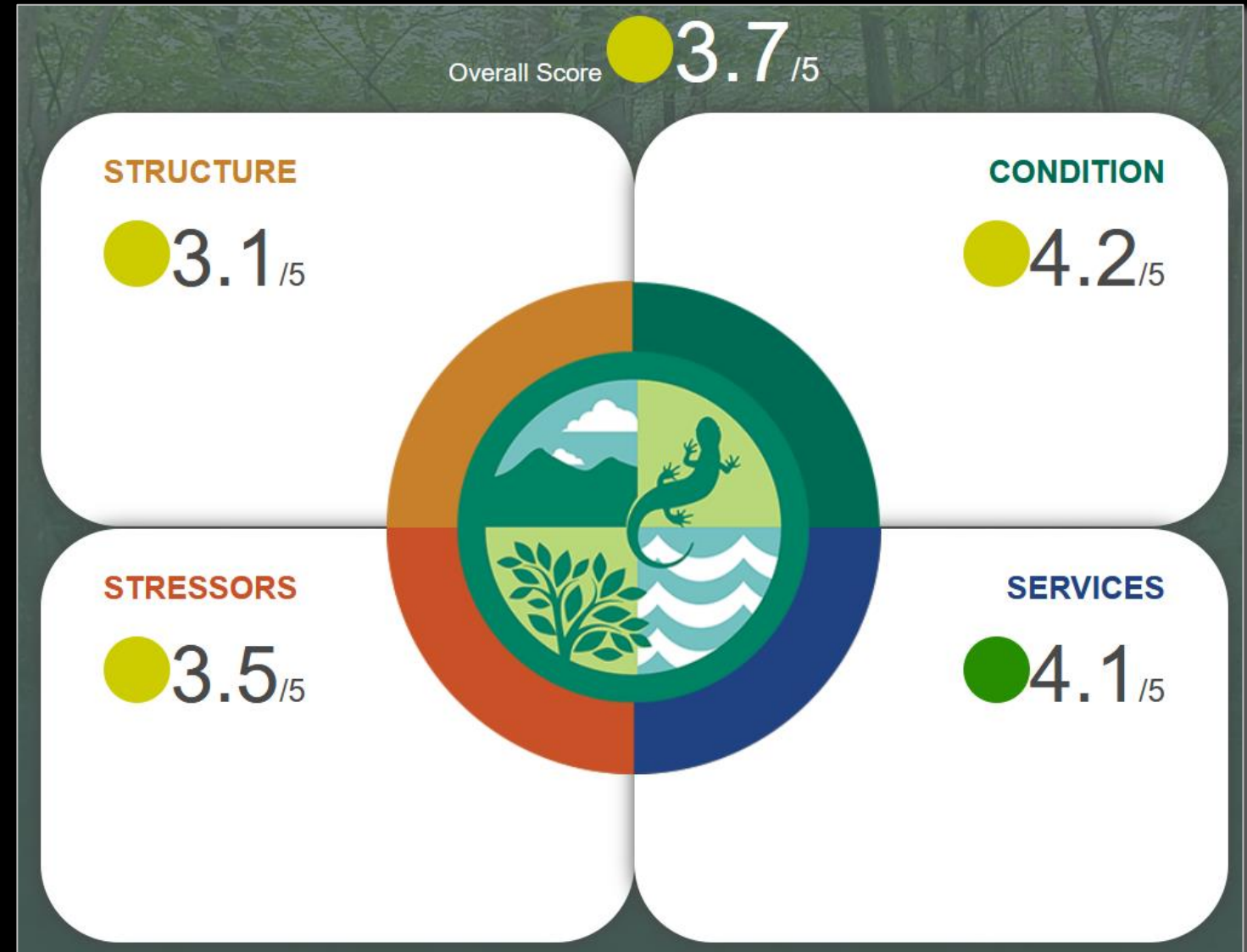
www.uvm.edu/femc/
forest-health-atlas

Forest Indicators Dashboard

www.uvm.edu/femc/indicators/vt

Combining dozens of key datasets into a snapshot of the overall status of Vermont's forests

- *Includes >30 long-term datasets*
- *Annual score and a long-term trend in relation to the target or status quo*



Tree Growth

Condition Score: 4.2/5

Condition Indicators:

- 15% Crown Dieback
- 15% Forest Damage
- 20% **Tree Growth**
- 10% Canopy Density
- 20% Forest Mortality
- 10% Damage and Decay
- 10% Tree Mortality

Score for 2017:

4.5/5

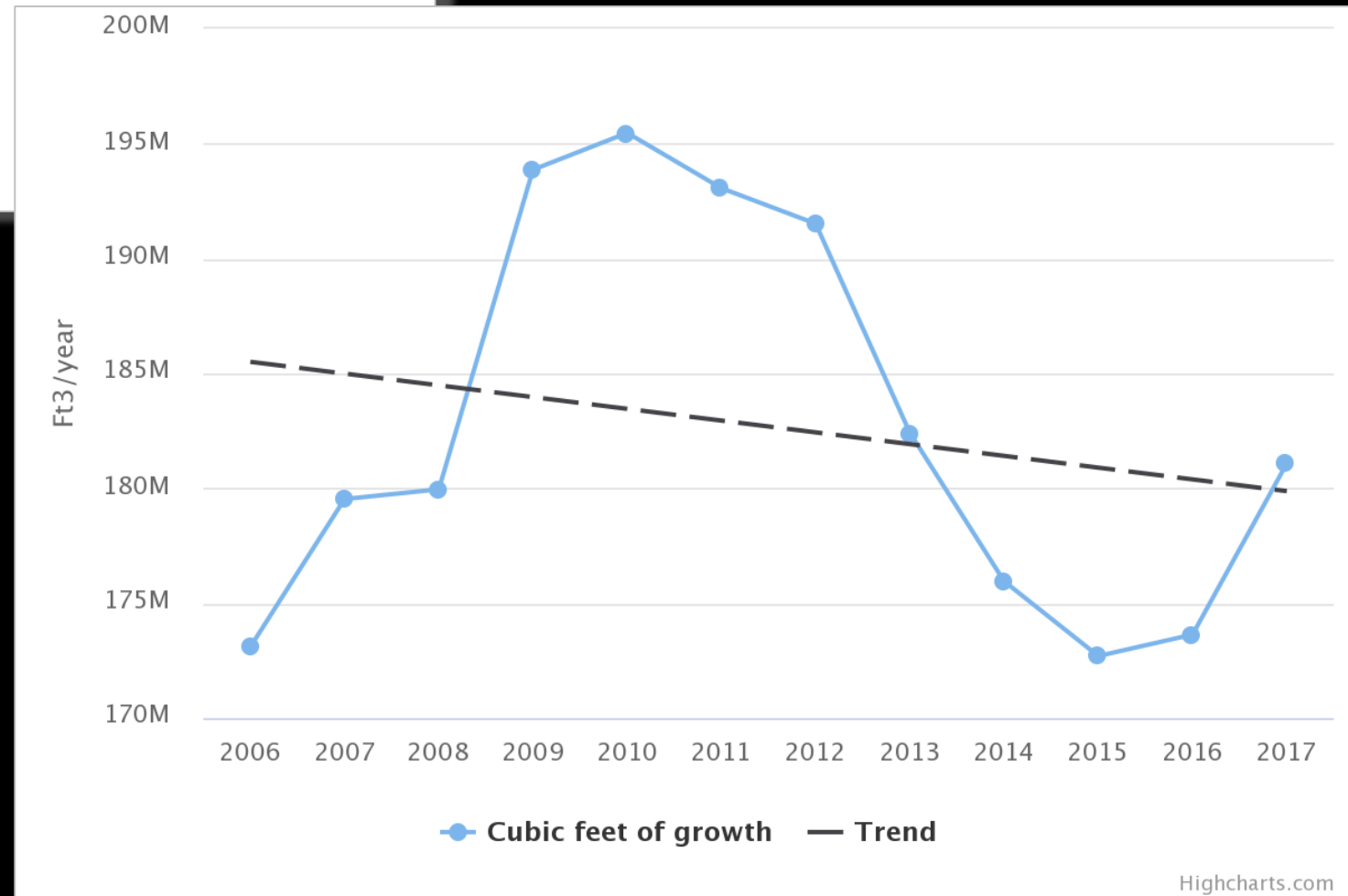
Long-Term Trend:

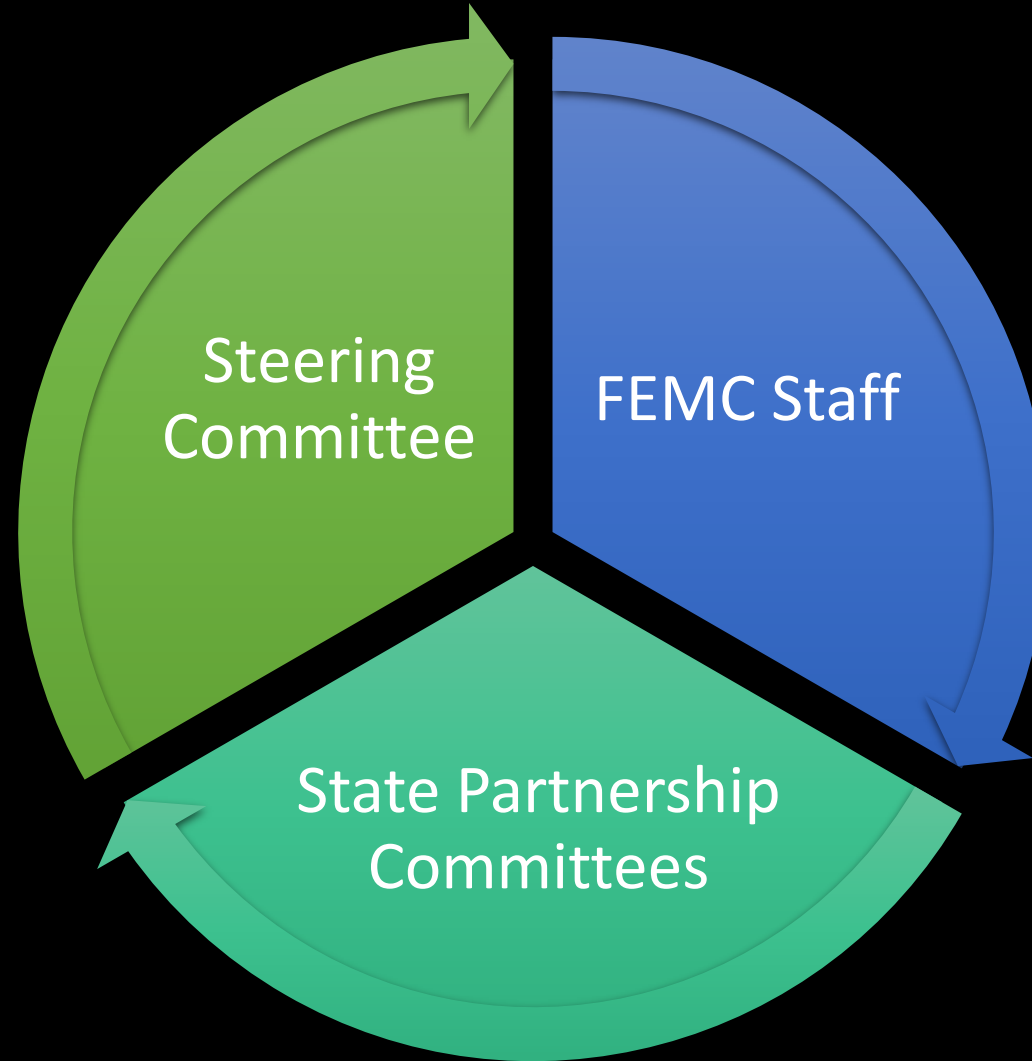
Scores are not changing over time



Forest growth provides information
on how much biomass Vermont's
trees add annually.

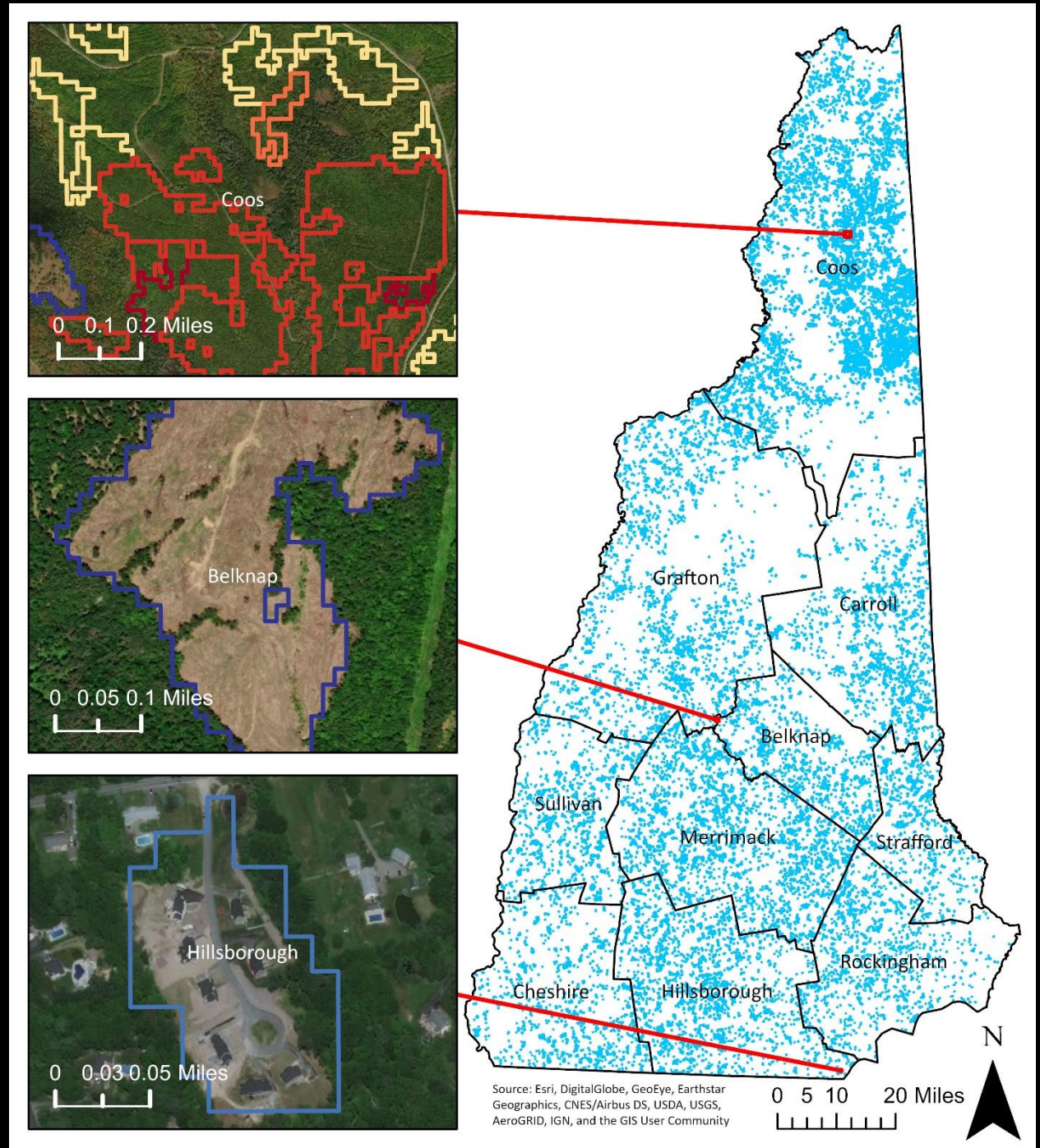
- Includes datasets for
 - Forest Structure
 - Forest Condition
 - Ecosystem Services
 - Stressors to Forests



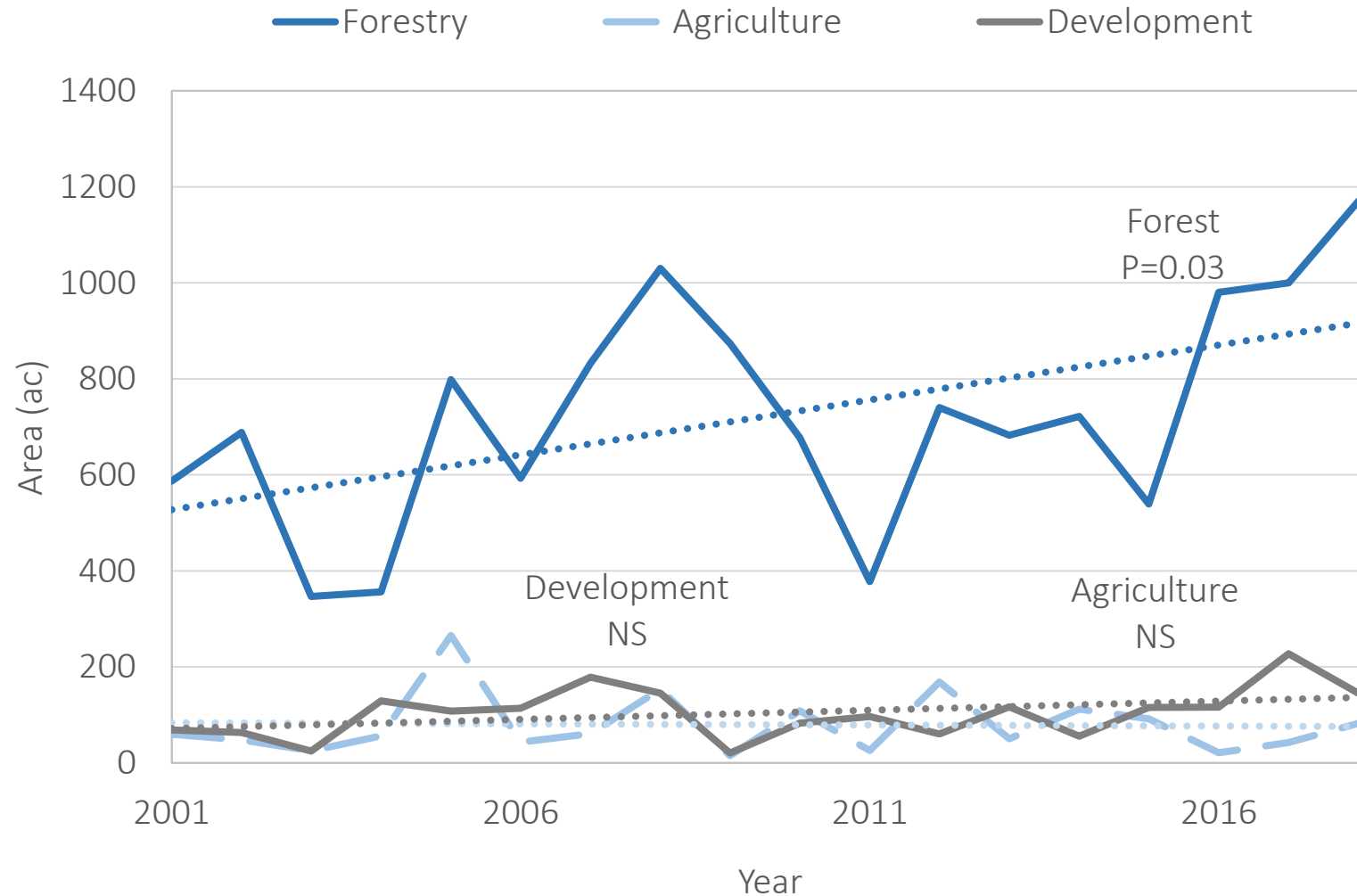


Inventory of intensive forest clearing in NH

- *Quantified amount of forest clearing by location and year*
- *Examined trends in clearing*
- *Compared post-harvest outcome*
- *Validated with known harvests and historical imagery*



Post-harvest outcomes



6,197 acres cut per year
classified as intensive cuts

X

80% cuts for silviculture

=

4,958 acres per year for
early successional forests

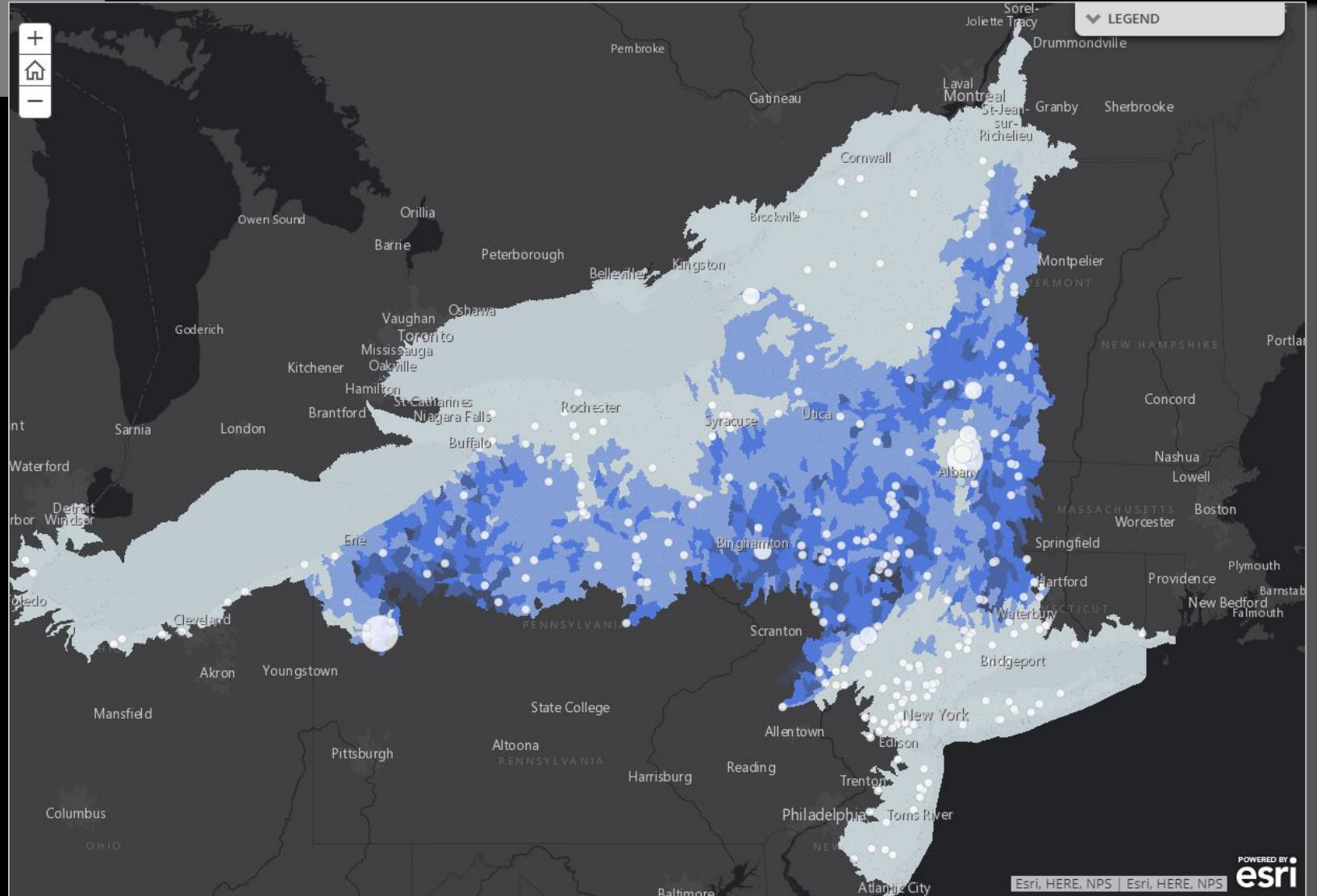
Or

0.08% of NH's forestland

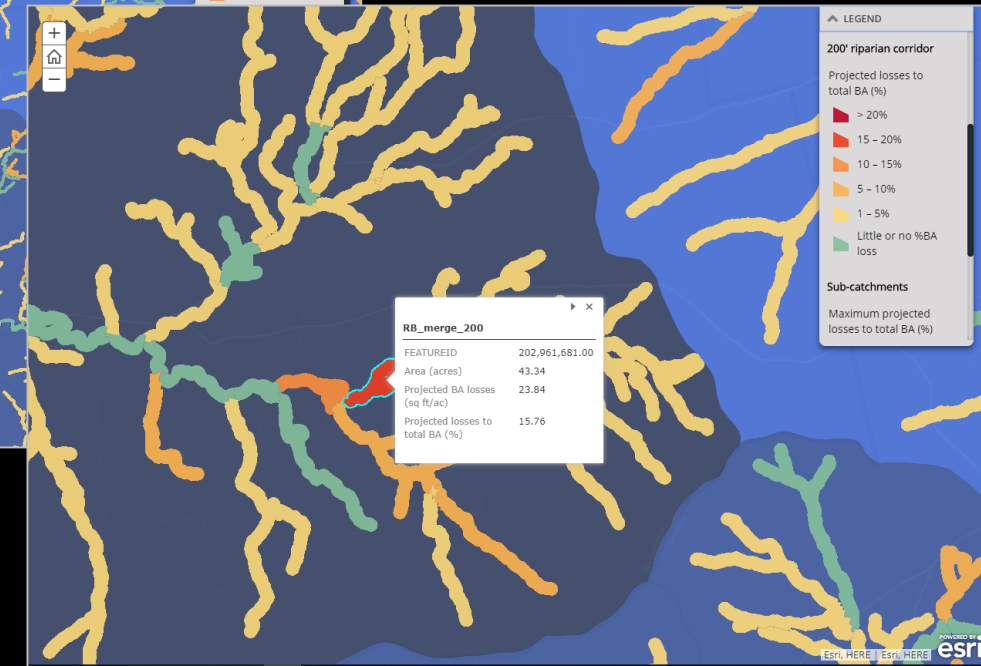
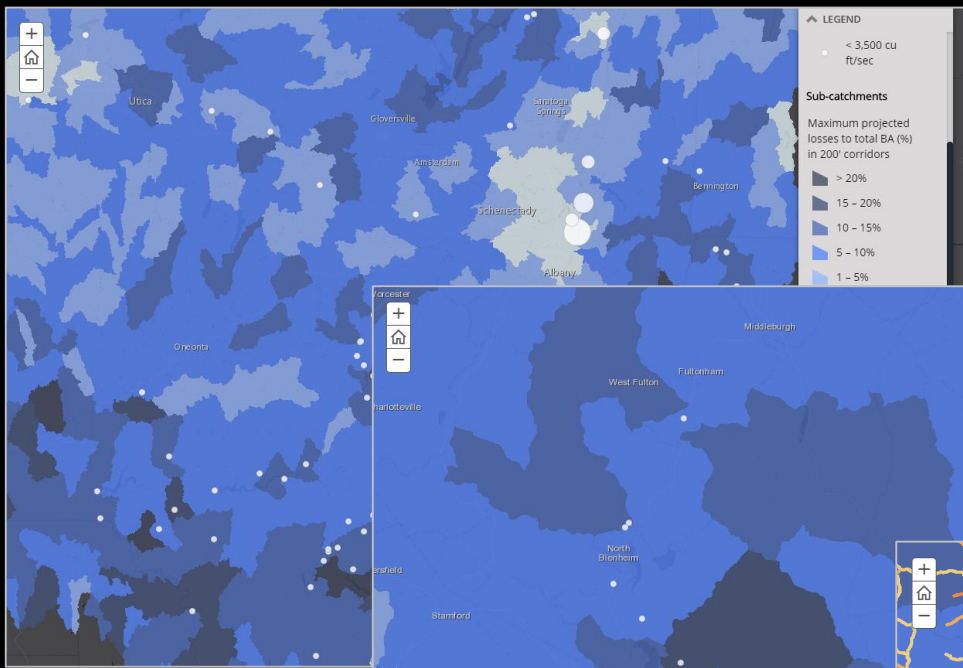
Note: subset of 10% of total cuts areas were assessed for post-harvest outcome

Kosiba and Duncan (in prep)

HWA-induced losses in riparian corridors in NY



Online maps
<https://arcg.is/1D1LXe>



- ~45% of NYS riparian buffer area at risk of some amount of hemlock loss
- <1% at risk of large losses (>15 ft²/ac BA)
- Central and southern portions of state most at risk

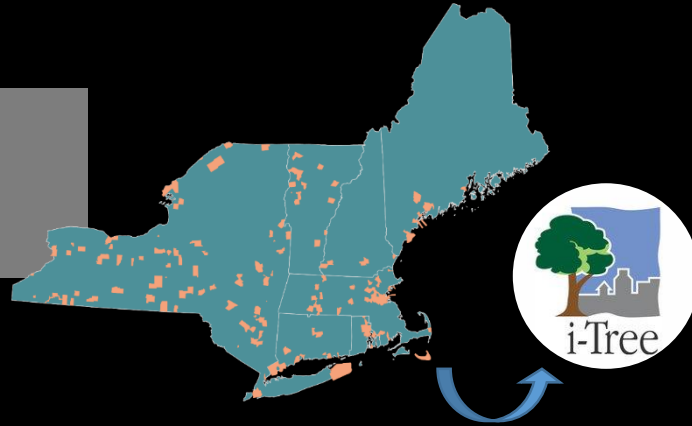
Online maps
<https://arcg.is/1D1LXe>

RB_merge_200	
FEATUREID	202,961,681.00
Area (acres)	43.34
Projected BA losses (sq ft/ac)	23.84
Projected losses to total BA (%)	15.76

Current projects

Regional Projects

Quantifying economic impacts of urban pests



REGEN: Northeast Forest Regeneration Data Portal



Looking for regen and CFI data

Continuous Forest Inventory Methods Comparison



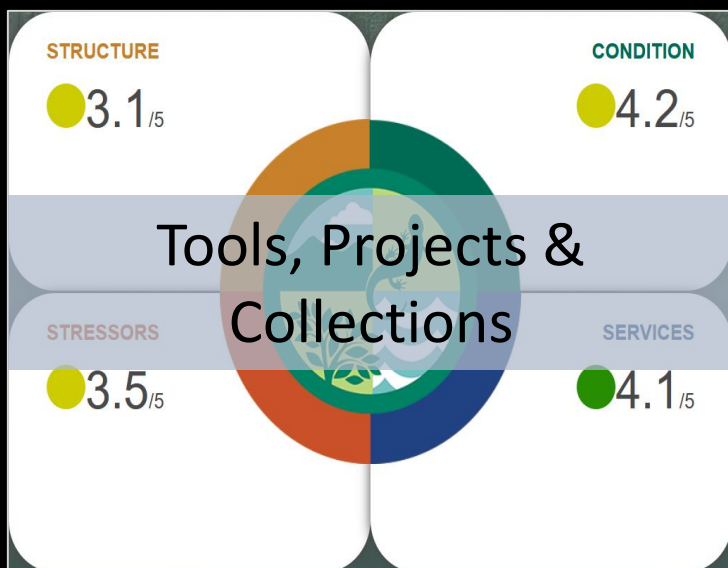
State Projects

New York Forest Indicators Dashboard

New Hampshire Forest Indicators Dashboard

Carbon Inventory for Pisgah State Park

Risk of invasive species spread to Adirondack Park



Collaborator Network

-

How to get involved with the FEMC

Feedback!

Join our
listserve

Contribute
data to a
project

Archive data
on the FEMC
Data Archive

Request
training or
presentations
on tools

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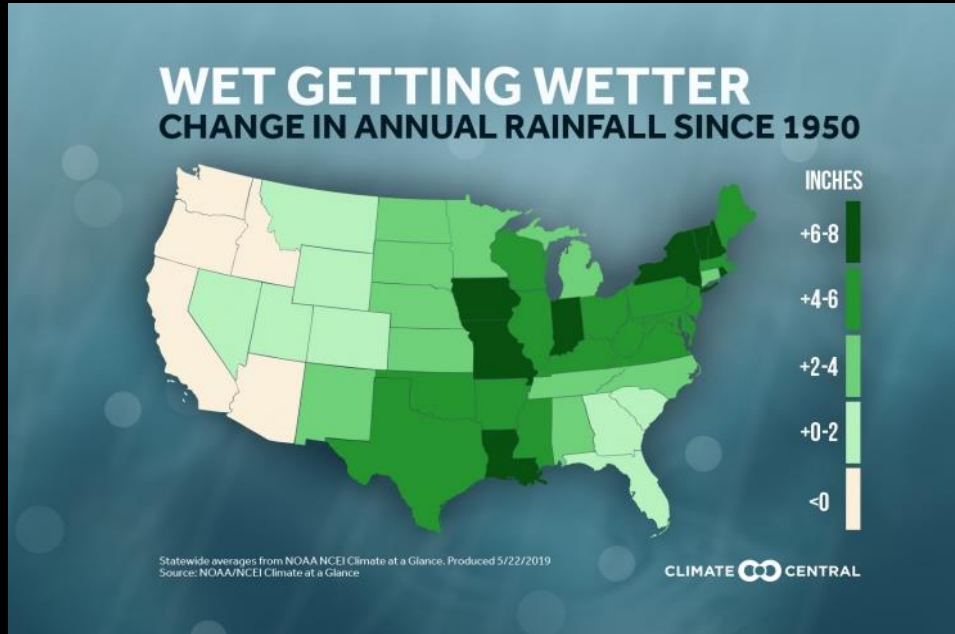
Other ideas
for how FEMC
can assist with
monitoring
and
assessment in
your field?
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Alexandra Kosiba

akosiba@uvm.edu

