



United States Department of Agriculture

Forest Health Monitoring for Pests and Pathogens of Trees



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Southern Region

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Forest Service

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Monitoring for forest pests and pathogens:

- National Forest System
- Research
- State and Private Forestry
 - Forest Health Protection



❖ Forest Health Monitoring (FHM)



Forest Health Protection



Insects



Diseases

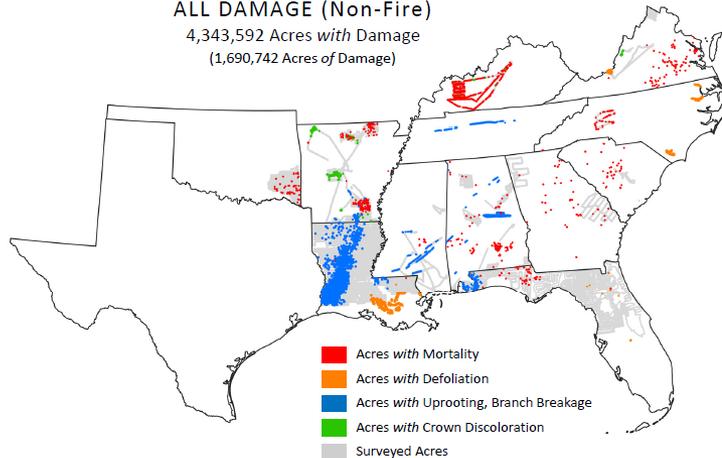


Non-native Invasives



Southern Region Forest Health Protection 2020 Insect & Disease Survey

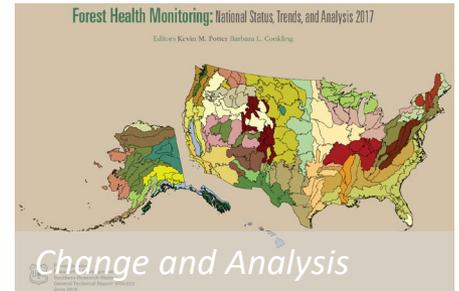
ALL DAMAGE (Non-Fire)
4,343,592 Acres with Damage
(1,690,742 Acres of Damage)



These maps are compiled from all spatial data on partial survey coverage and forest health conditions submitted to the Forest Health Protection during CY 2020.



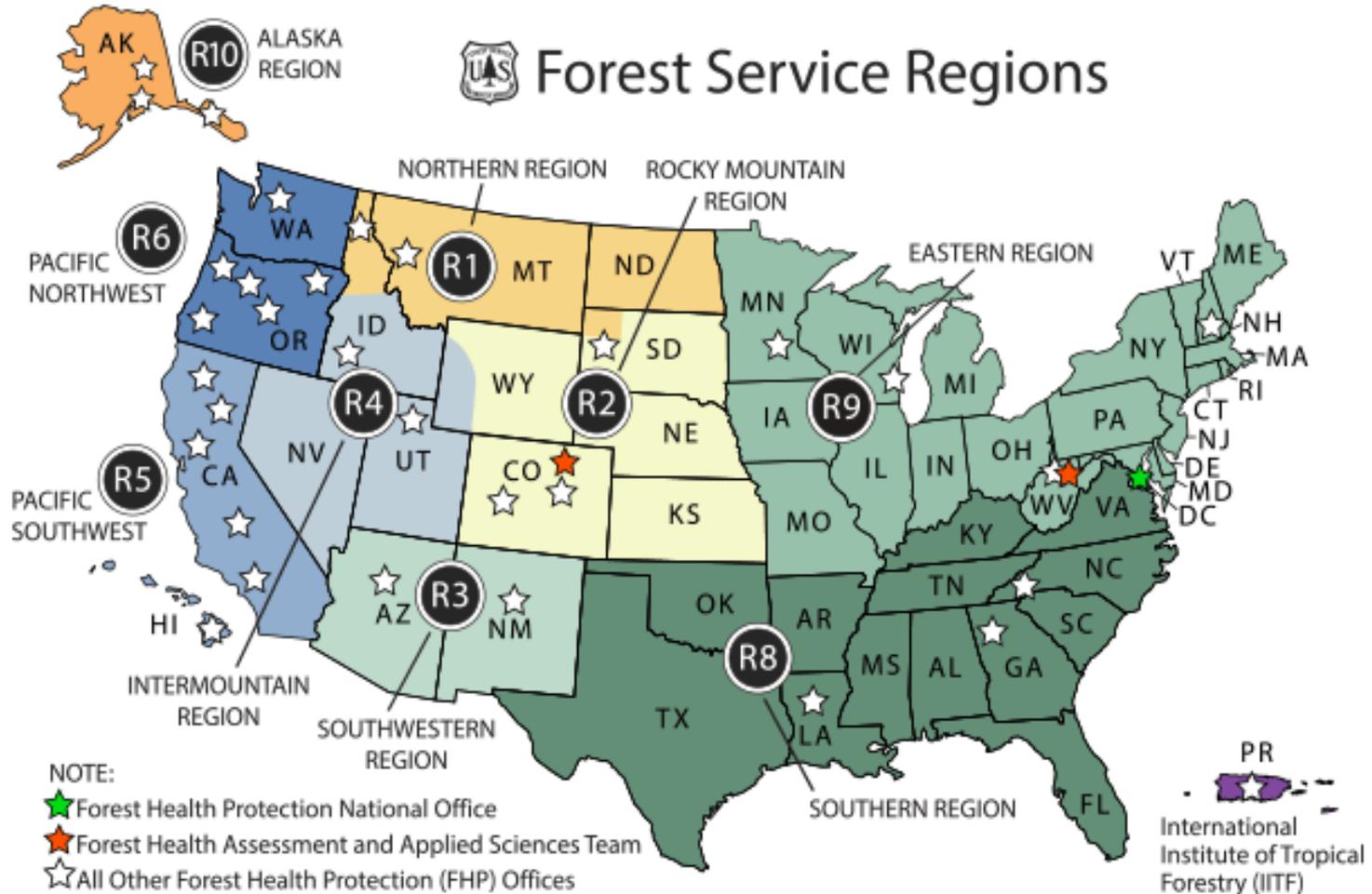
Damage & Disturbance



Change and Analysis

FHM: Detection Monitoring and Analysis





Detection Monitoring

- Aerial Surveys
 - ✓ *Nationally standardized*
- Ground surveys
 - ✓ *By trained specialists*
- Remote sensing tools
 - ✓ *ForWarn II, HiForm & more...*

Cooperatively carried out by state forestry agencies and USFS personnel



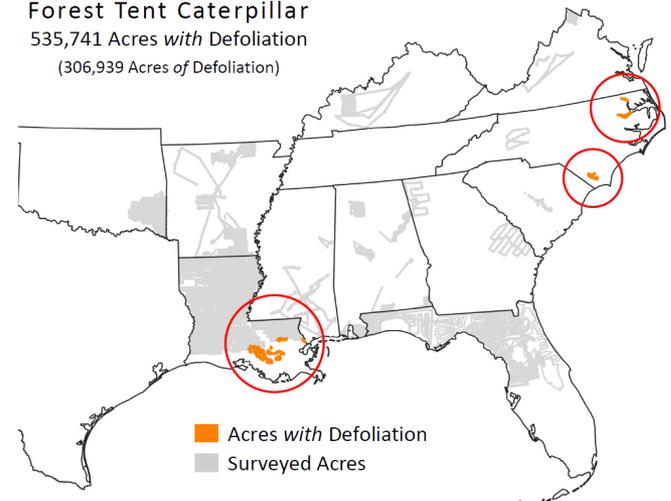
Detection Monitoring

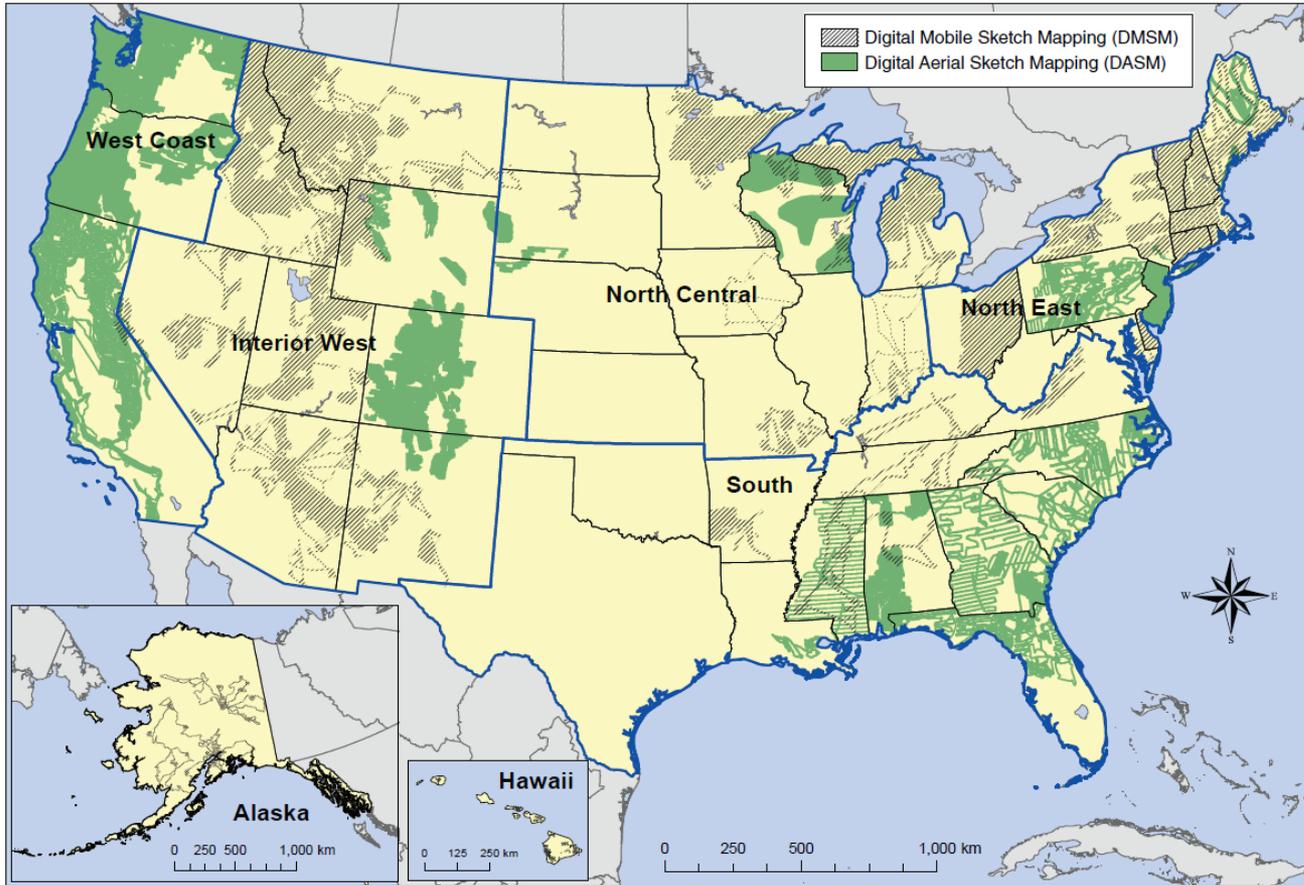
Aerial Survey

- Still the gold-standard approach for mapping large disturbance events
- Federal, state, and private lands
- Standardized nationally, but coverage varies widely



Forest Tent Caterpillar
 535,741 Acres with Defoliation
 (306,939 Acres of Defoliation)

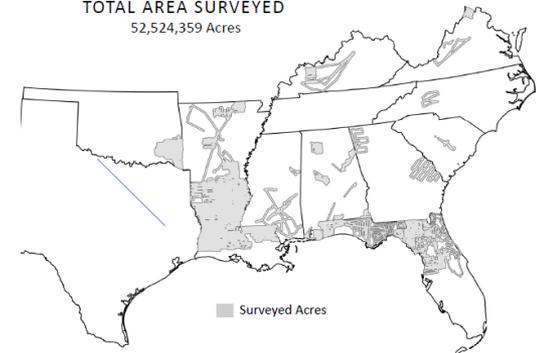




2016 National Aerial Survey Coverage

Southern Region Forest Health Protection 2020 Insect & Disease Survey

TOTAL AREA SURVEYED
52,524,359 Acres



These maps are compiled from all spatial data on aerial survey coverage and forest health conditions submitted to the Forest Health Inventory during 1/1/2020.





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Forest Tent Caterpillar Defoliation

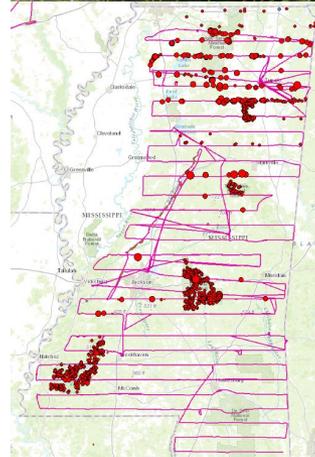
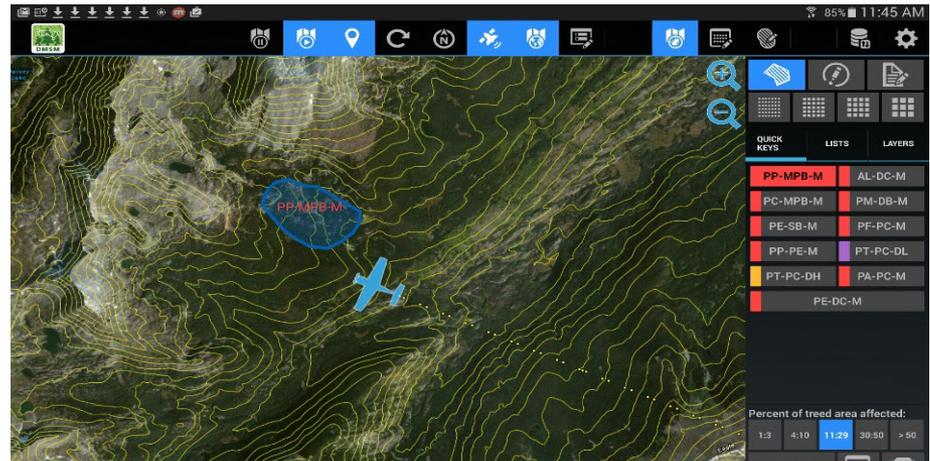
Photos: North Carolina Forest Service



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Digital Mobile Sketch Mapping - FHAAST

- Designed for aerial survey, forest health applications
- Also a separate application for use in ground survey
- Goal is to simplify and standardize forest health data collection methodology, improve data accessibility, and secure data storage



Detection Monitoring

Ground Survey

- Can occur before or after an aerial survey flight
- Ground-truth data is essential to supplement aerial survey and remote sensing tools



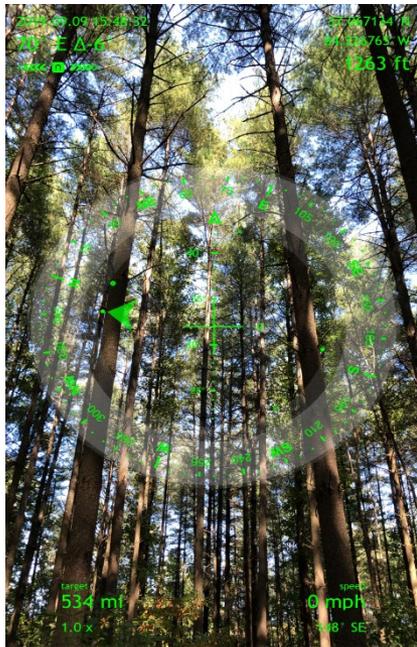


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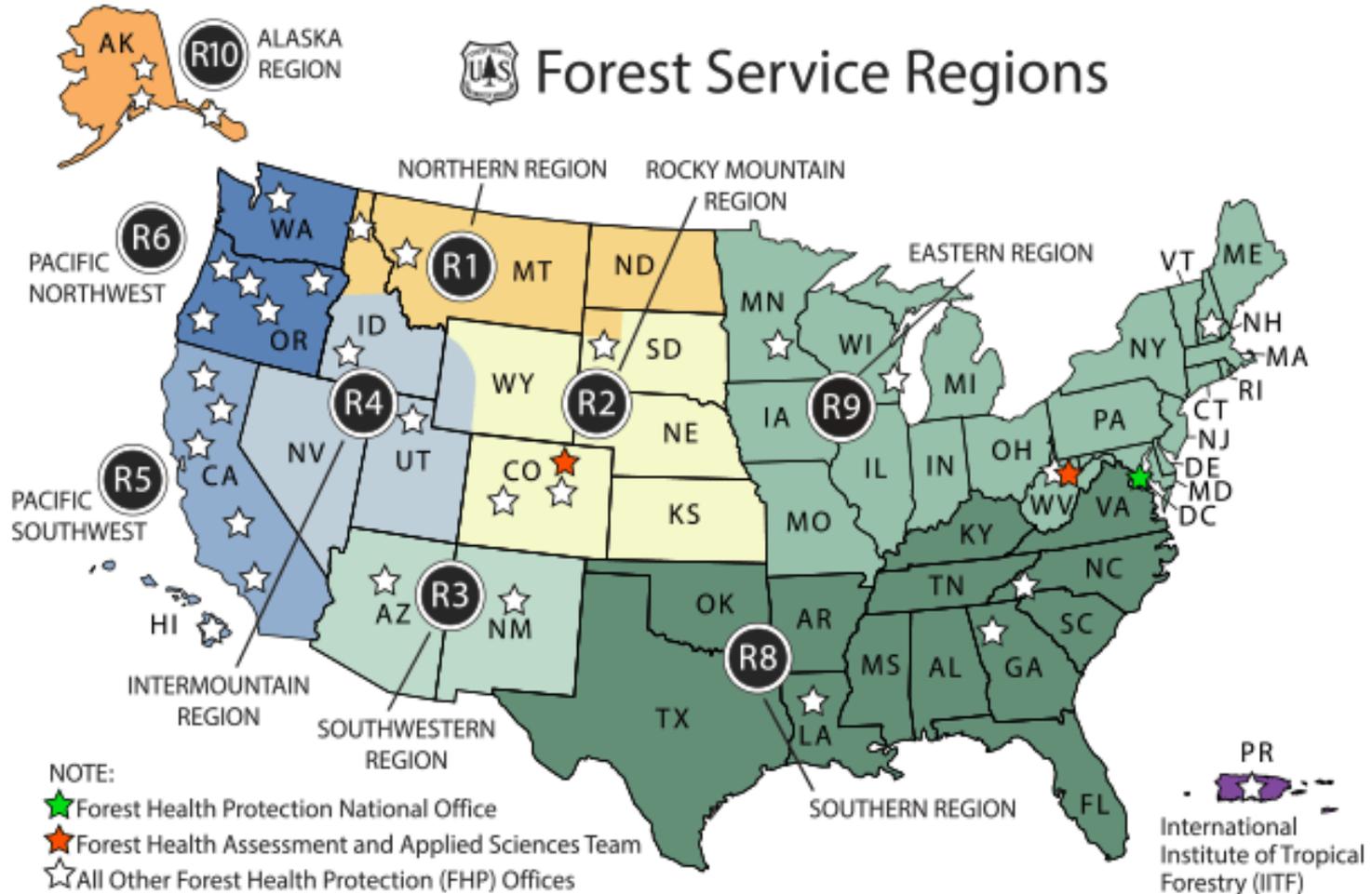
Detection Monitoring

Ground Survey

Insect and Disease Specialists
Inspections and Diagnostics



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Detection Monitoring – Remote Sensing

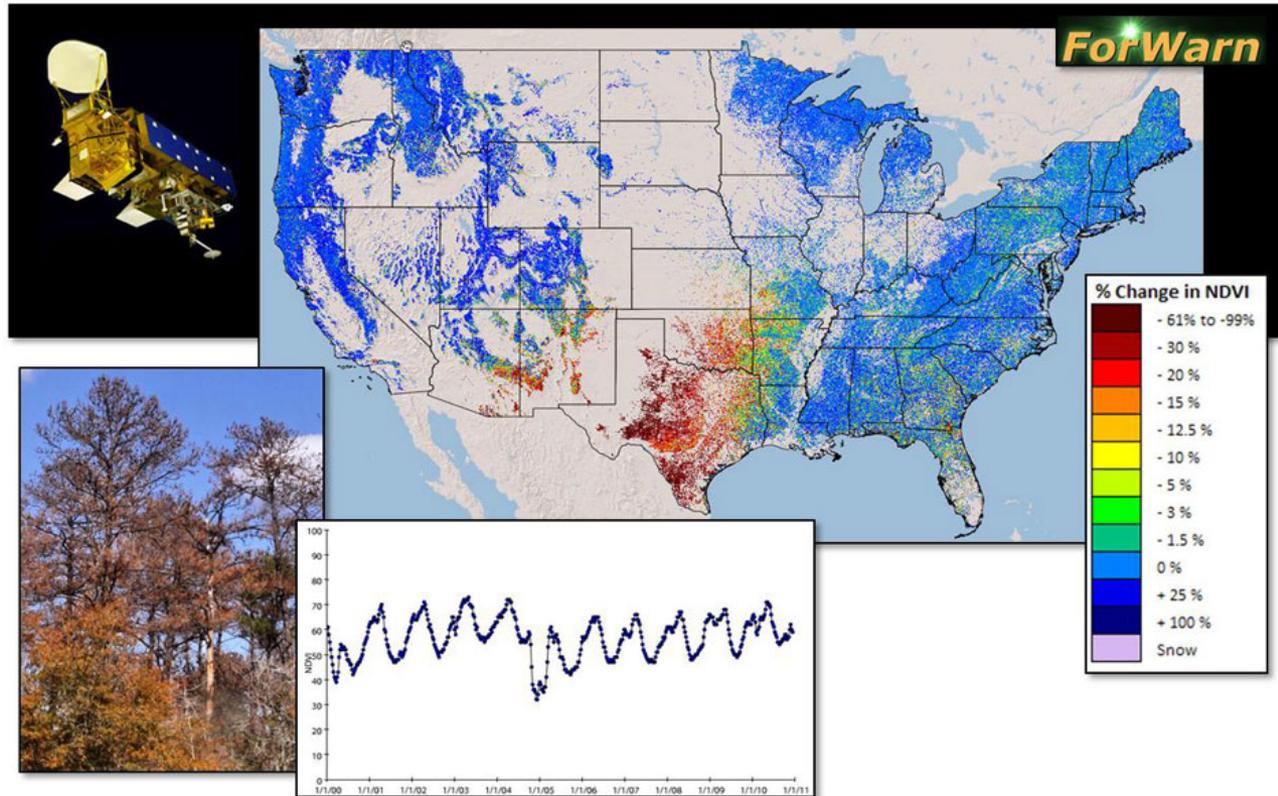
- New tools like *ForWarn II* and *HiForm* are game-changers
- Not meant to replace aerial survey or ground truth activities, but to guide those activities more effectively
- These tools are powerful but must be use with care
- Standardized use and application are still significant challenges



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Detection Monitoring

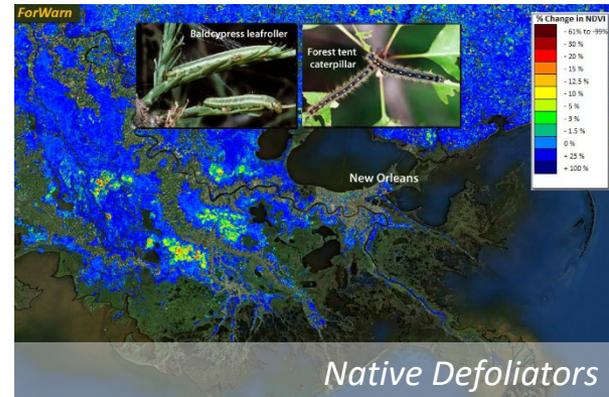
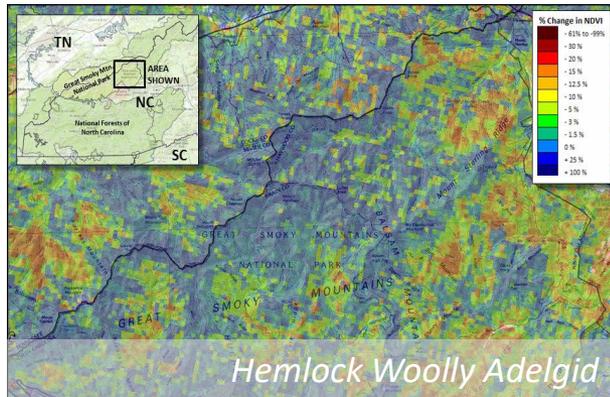
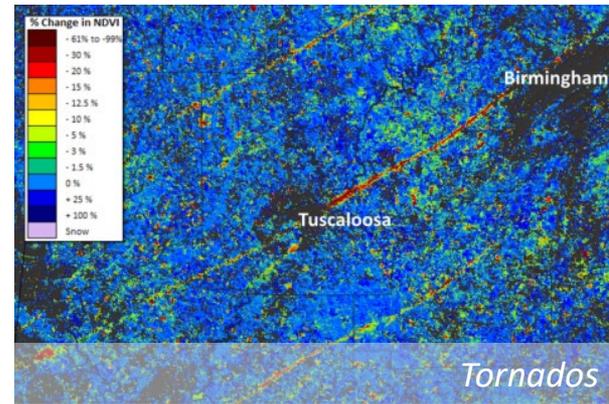
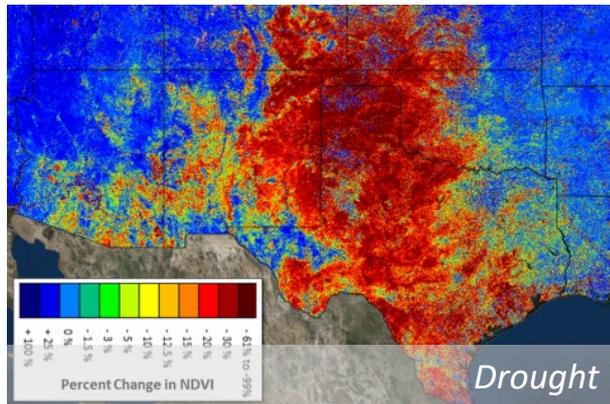
Remote Sensing



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ForWarn II

Satellite-Based Change Recognition and Tracking



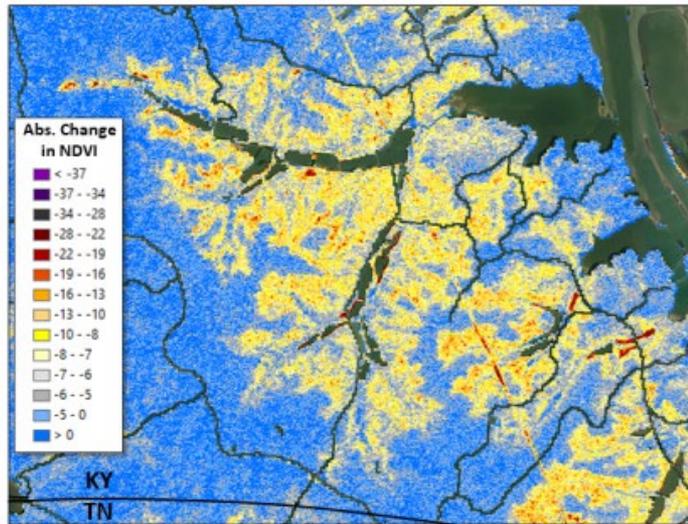
HiForm

High-Resolution Forest Mapping

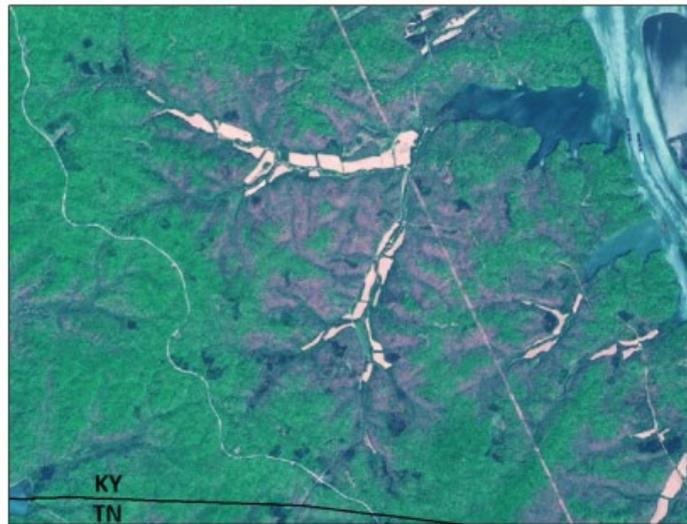
Land Between the Lakes

Absolute Change in NDVI and True Color Perspectives

20 Apr. 2020 vs. 21 Apr. 2019
Atmospherically-corrected NDVI change



20 Apr. 2020
Atmospherically-corrected true color





Analysis and Reporting

Synthesis of information from various data sources within and external to the Forest Service to produce issue-driven reports on status and change in forest health at national, regional, and state levels

2005 Forest Health Highlights Massachusetts

The Resource
 The Forest Service of Massachusetts has been directed to plan and execute a forest health assessment of the State's forests. The assessment is a multi-year effort to evaluate the health of the State's forests and to identify areas of concern. The assessment will be completed by the end of 2005.

Special Issues
 The most significant special issues identified in the assessment are: (1) the impact of invasive species, (2) the impact of climate change, and (3) the impact of land use change. These issues are being addressed through a variety of programs and initiatives.

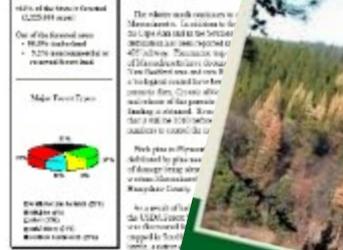
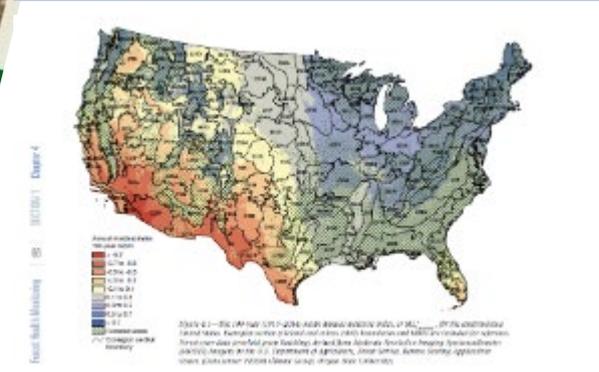
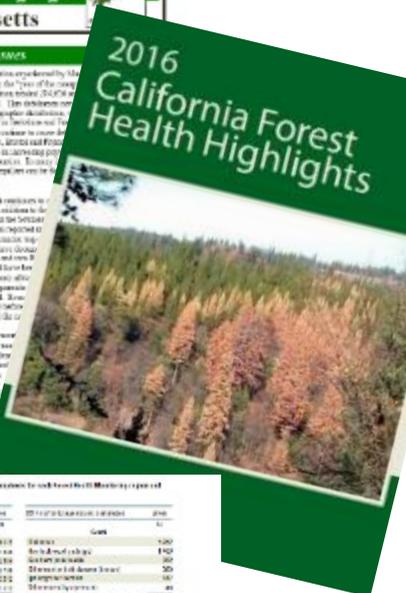


Table 1.1. By the number of reports submitted for each Forest Health Monitoring report to the State of Massachusetts.

Forest Health Monitoring Report	Number of Reports	Percentage of Total
Forest Health Monitoring Report 1	100	100%
Forest Health Monitoring Report 2	100	100%
Forest Health Monitoring Report 3	100	100%
Forest Health Monitoring Report 4	100	100%
Forest Health Monitoring Report 5	100	100%
Forest Health Monitoring Report 6	100	100%
Forest Health Monitoring Report 7	100	100%
Forest Health Monitoring Report 8	100	100%
Forest Health Monitoring Report 9	100	100%
Forest Health Monitoring Report 10	100	100%





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USDA Forest Service:

<https://www.fs.usda.gov/>

Forest Health Protection:

<https://www.fs.fed.us/foresthealth/>

FHP Contacts and Field Offices

<https://www.fs.fed.us/foresthealth/contact-us/regional-contacts.shtml>

Forest Health Monitoring:

<https://www.fhm.fs.fed.us/>

Forest Health Publications and Reports:

<https://www.fs.fed.us/foresthealth/publications/>

Forest Health Assessment and Applied Sciences Team:

<https://www.fs.fed.us/foresthealth/applied-sciences/>

Forest Inventory and Analysis

<https://www.fia.fs.fed.us/>

Evaluation Monitoring

<https://www.fs.fed.us/foresthealth/fhm/em/>

ForWarn II

<https://forwarn.forestthreats.org>

HiForm

<https://hiform.org>



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