



Steven Kuzma

Forest Health Monitoring Program Update



Borys M. Tkacz
National Program Manager



Forest Health Monitoring Program

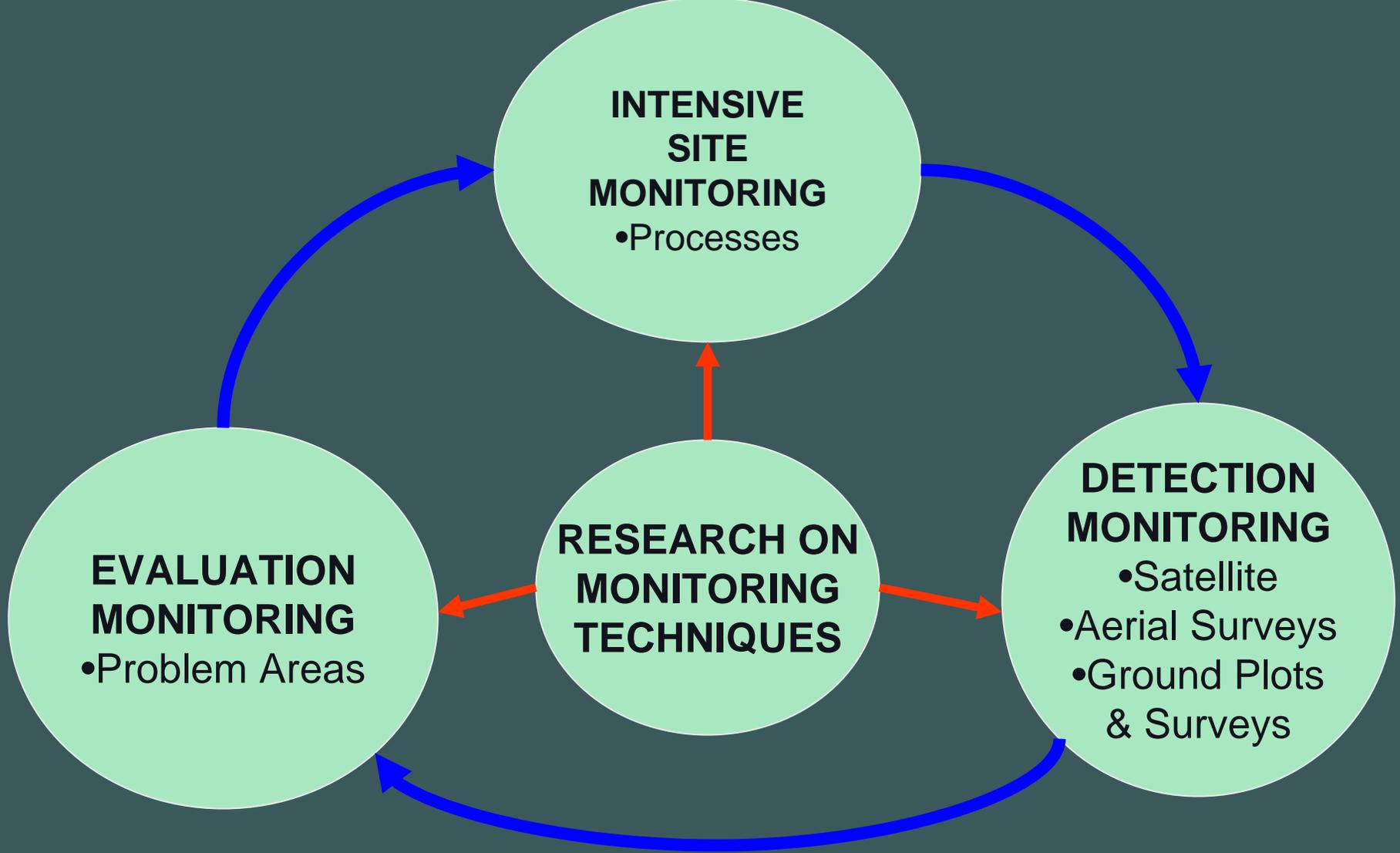
- Initiated in 1990 to provide information on the status, changes, and trends in forest health and sustainability.
- The FHM program provides information on all forest lands to land-managers and policy makers that affects, directly or indirectly, all Americans.



Forest Health Monitoring (FHM)

Objectives:

- Establish a monitoring system throughout the forests of the United States to determine detrimental changes or improvements that occur over time.
- Provide baseline and health trend information that is statistically precise and accurate.
- Report annually on status and changes to forest health.



Forest Health Monitoring Program

Topics

- Changes in Program Management
- 2003 Highlights
 - Detection Monitoring
 - Evaluation Monitoring
 - Research on Monitoring Techniques
 - Analysis and Reporting
 - Risk Map Update
- Future Direction

Changes in Program Management

- Steering Committee
- Management Team



FHM Steering Committee

- Robin Thompson, Assoc. Dep. Chief SPF
- Barbara Weber, Assoc. Dep. Chief R&D
- Gloria Manning, Assoc. Dep. Chief NFS
- Larry Kotchman, ND State Forester, Chair NASF Forest Health Com.
- Vacant, Chair NASF Research Com.

FHM Management Team

Chair – National Program Manager- Borys Tkacz

FHP Rep. for each FHM Region

- NE – Jim Steinman
- NC – Manfred Mielke
- SO – Jim Brown
- INT –Ralph Thier
- **WC – Alison Nelson**

State Rep. for each FHM Region

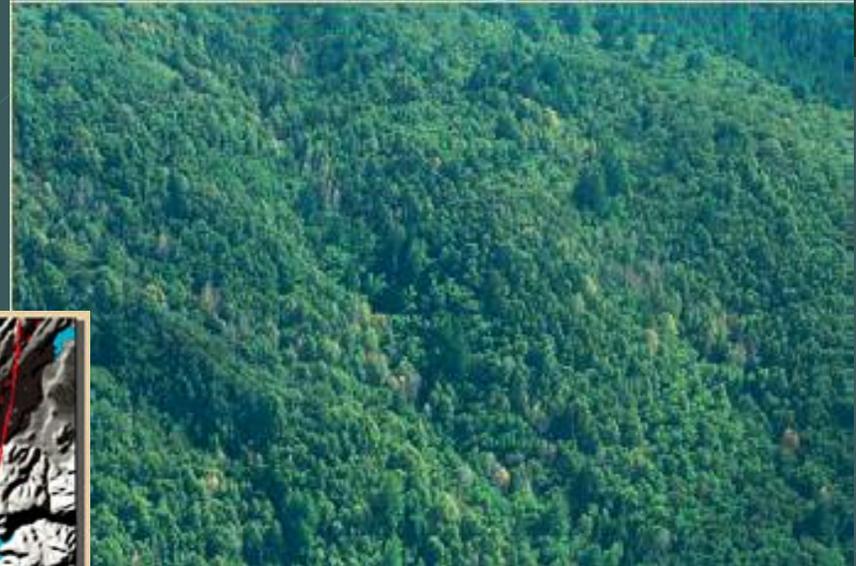
- NE – Charlie Burnham (MA)
- NC – Dave Heinzen (MN)
- SO – Don Rogers (NC)
- INT – Mike Schomaker (CO)
- **W – Karen Ripley (WA)**

- FIA National Program Leader – Andy Gillespie
- FHM National Research Work Unit – Greg Reams
- R&D VMPP Rep.- Paul Dunn
- NFS EMC Rep. – Doug Powell
- **FHTET Rep. – Vacant**

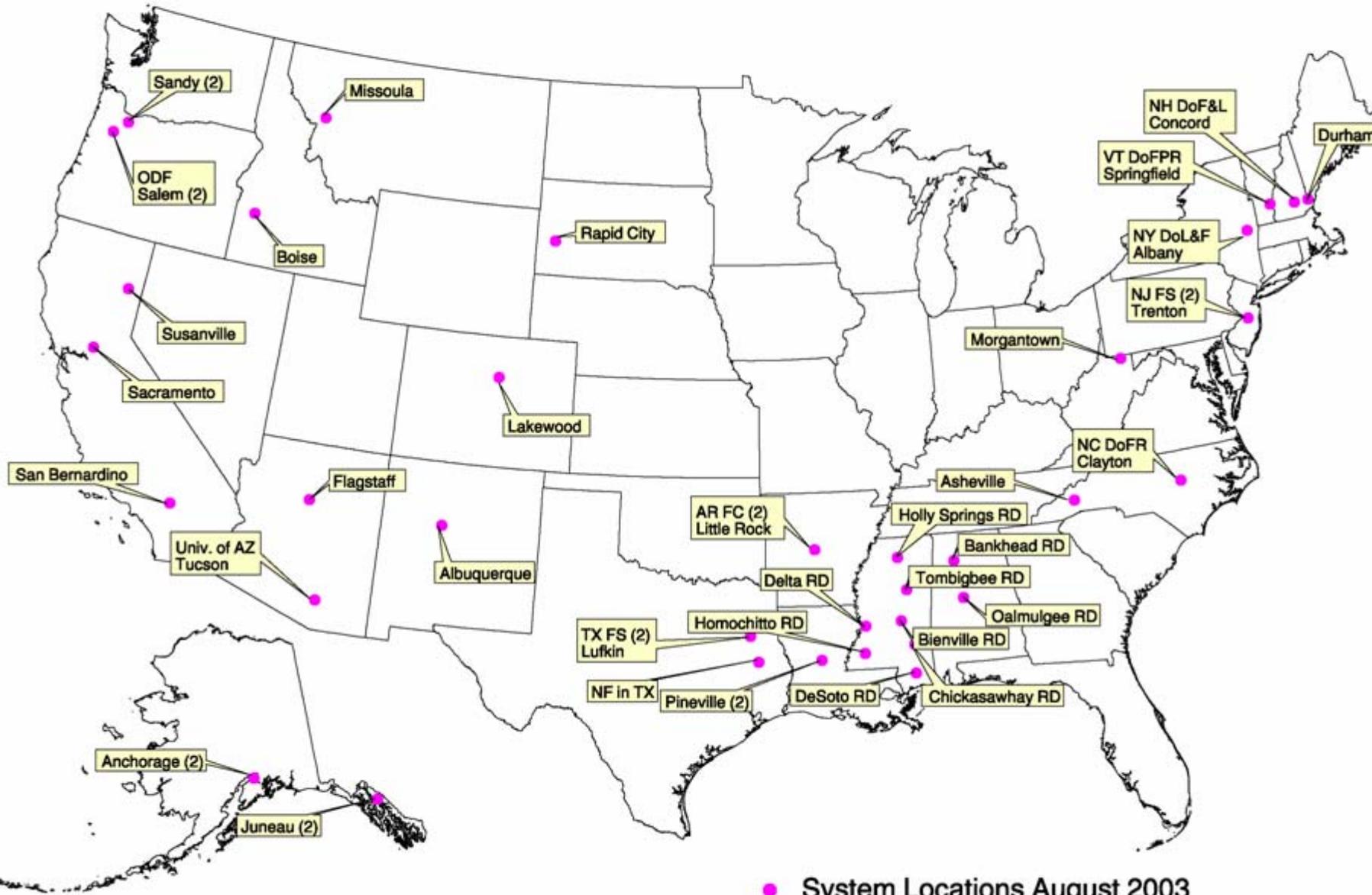
Detection Monitoring

■ Aerial Detection Surveys

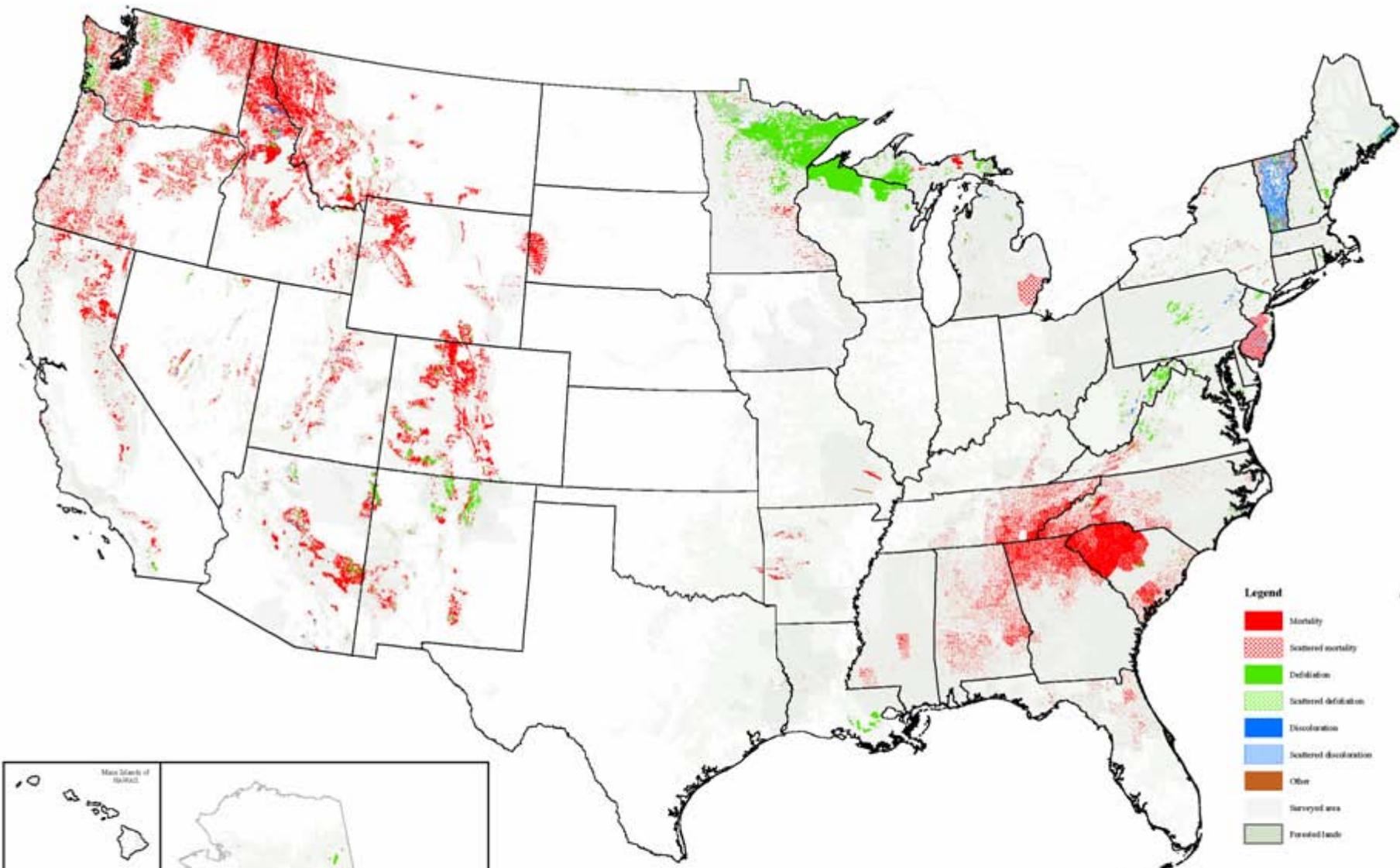
- Digital Sketch Mapping
- National Database & Map
- Real-Time Data Access
- Special Surveys
 - Pine mortality
 - Sudden Oak Death



Locations of Digital Aerial Sketchmapping Systems

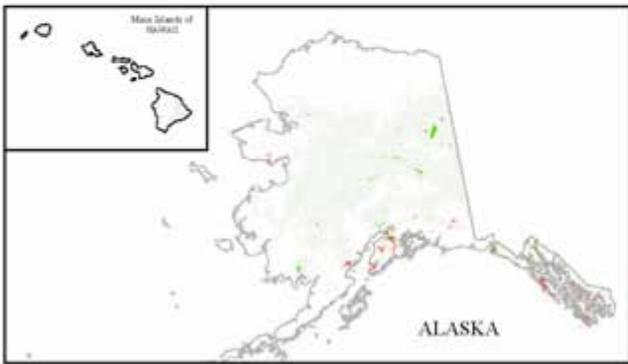


● System Locations August 2003



Legend		Affected Acres
	Mortality	6,407,000
	Scattered mortality	3,181,000
	Defoliation	13,322,000
	Scattered defoliation	2,627,000
	Discoloration	1,712,000
	Scattered discoloration	3,655,000
	Other	2,994,000
	Surveyed area	
	Forested lands	

2002 Aerial Survey
Damage Categories

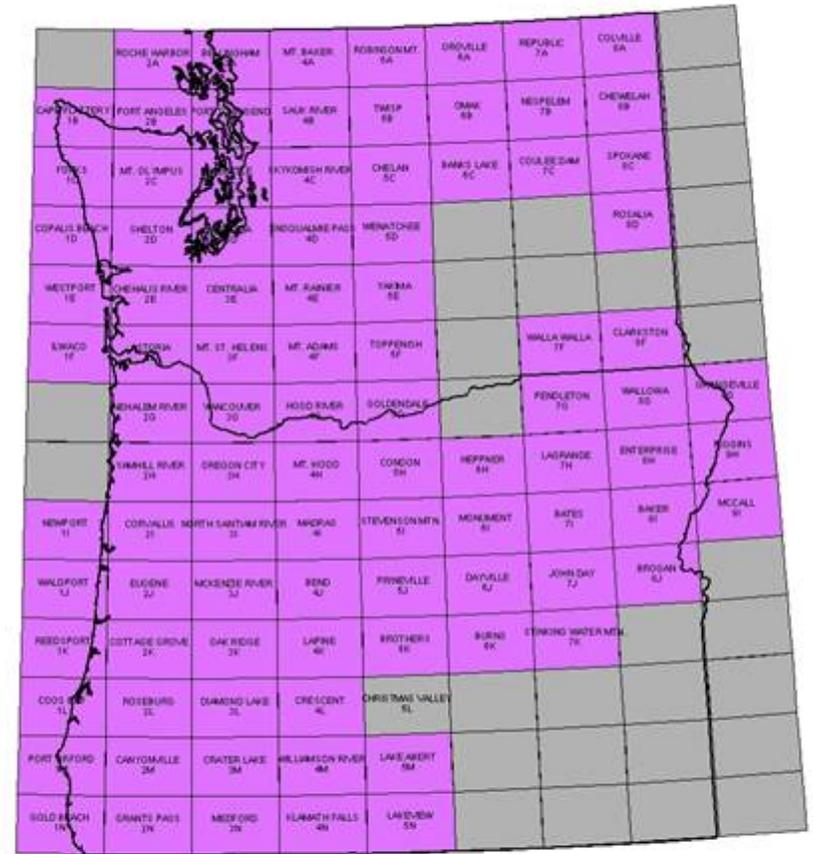


ALASKA

Aerial Survey Data Real-time Access

- FHP R6, OR DoF, WA DNR cooperative aerial surveys
- Draft survey maps uploaded to website once surveys are done
- Final maps posted after review and/or groundchecking

2003 Final Aerial Survey Data Maps Available



Regional Area Map

- Draft Aerial Survey Data .pdf Maps
- Non-Forested No Data Collected
- Survey In Progress
- Final Aerial Survey Data .pdf Maps

Pine mortality in the Southwest



Piñon pine in New Mexico - 2003

- Special aerial and ground surveys conducted in 2003 covering piñon woodlands in AZ, NM, CO, UT, NV
- 3.8 million acres of mortality



Ponderosa pine in Arizona - 2003

Photos – FHP R3

Aerial Surveys for Sudden Oak Death in CA

USDA/FS, Cal Poly – San Luis Obispo,

- Observers in fixed-wing aircraft at 1,000 to 2000 ft. above ground level
 - Mortality mapped using digital sketch-mapping system
- 10 million ac. Surveyed in 2001
 - 60 mortality polygons mapped covering 44,800 ac.
- 20 million ac. Surveyed in 2002
 - 453 mortality polygons mapped covering 150,000 ac.
- 19 million ac. Surveyed in 2003
 - Focused on high risk areas outside generally infested areas
 - 425 polygons mapped totaling 8,205 acres

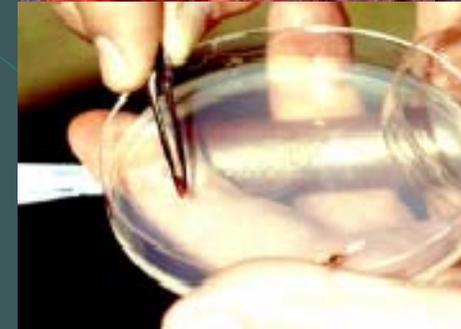


Map courtesy Jeff Mai, R5 FHP

Ground Surveys in CA

USDA-FS, CDF, CFIA, UC Berkeley, UC Davis, Cal Poly

- Field verification of aerial survey polygons
- Collect samples for PCR and culture confirmation
- Lab-confirmed SOD infections recorded in Oak Mapper
- 2001: Confirmed infestations in 10 CA counties
- 2002: Confirmed infestations in 2 new counties (Contra Costa and Humbolt)
- 2003: Confirmed infestation 15 mi. south of previously known locations in Monterey



Photos: UC Coop. Ext. Marin Co.

Oak Mapper

USDA-FS, UC-Berkeley

- Display current distribution of SOD throughout California.
- Perform geographic queries.
- Create a custom map.
- Log, report, and record occurrences of trees with possible SOD.
- Find education material on Sudden Oak Death.

www.oakmapper.org



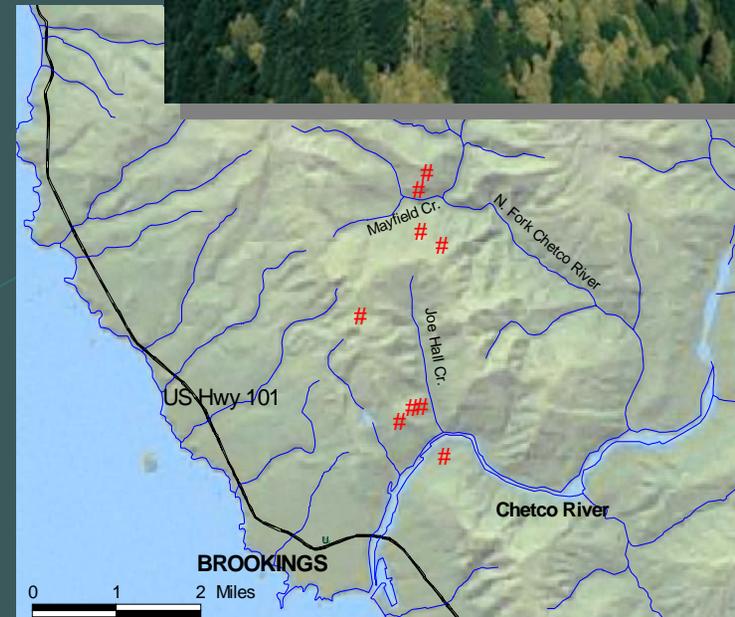
Distribution of Sudden Oak Death as of January 27, 2004



Sudden Oak Death in OR

USDA-FS, ODF, ODA, OSU

- Special aerial surveys detect SOD in 2001
- 9 spots confirmed as *P. ramorum* – totaling 40 ac.
- Eradication initiated
- 2002 surveys identified additional spots within 9 sq. mi. quarantine area
- 2003 surveyed 1.3 million ac.
 - Discovered 12 new sites near previous infestation



Eradication Treatments in OR

■ Treatment areas included infection center plus 50-100 ft. buffer

- Clearcut
- Pile
- Broadcast burning



SOD in OR

Monitoring Plots Outside Treatment Areas

- Monitoring plots established within and surrounding treatment areas
- *P. ramorum* has been found at very low levels

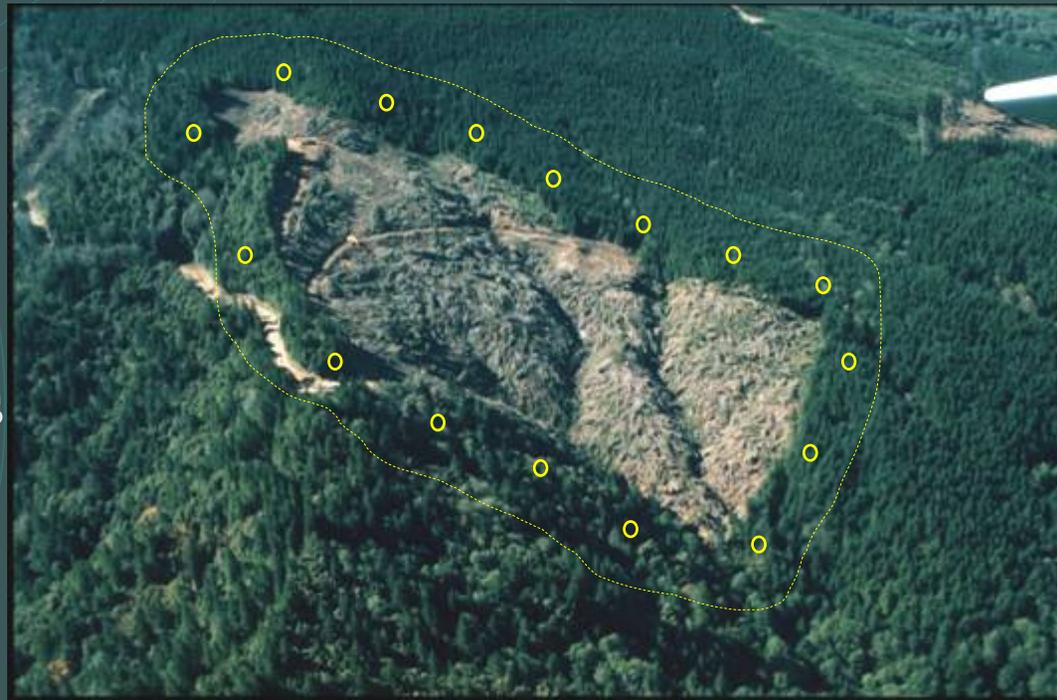


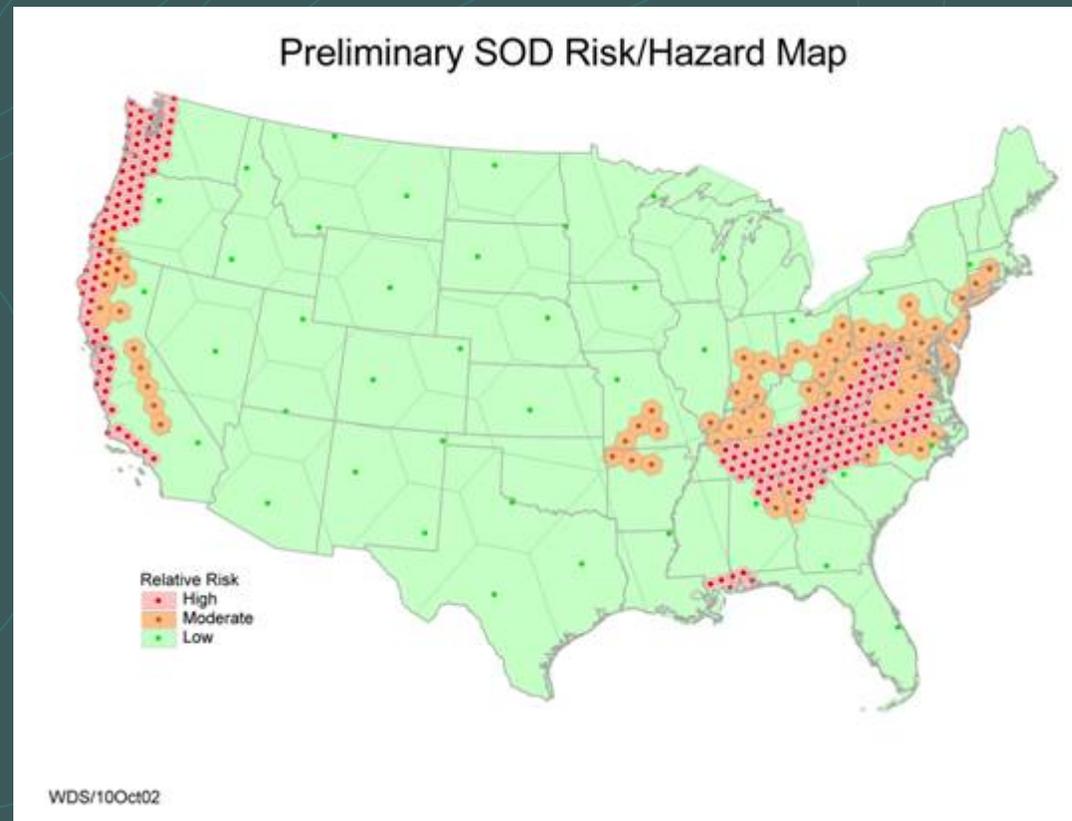
Photo courtesy A.Kanaskie, ODF

Detection of Invasives

Sudden Oak Death in the East

▣ Developed protocol for risk-based detection surveys

- ▣ Hosts
- ▣ Climate
- ▣ Pathway of introduction



Pilot Surveys for Detection of *Phytophthora ramorum* Diseases in Forests

- Cooperative surveys in WA, VA, NC, SC, GA, TN, WV, and PA for initiated in spring of 2003

- Nursery perimeter
- General forest areas

● Plans for 2004:

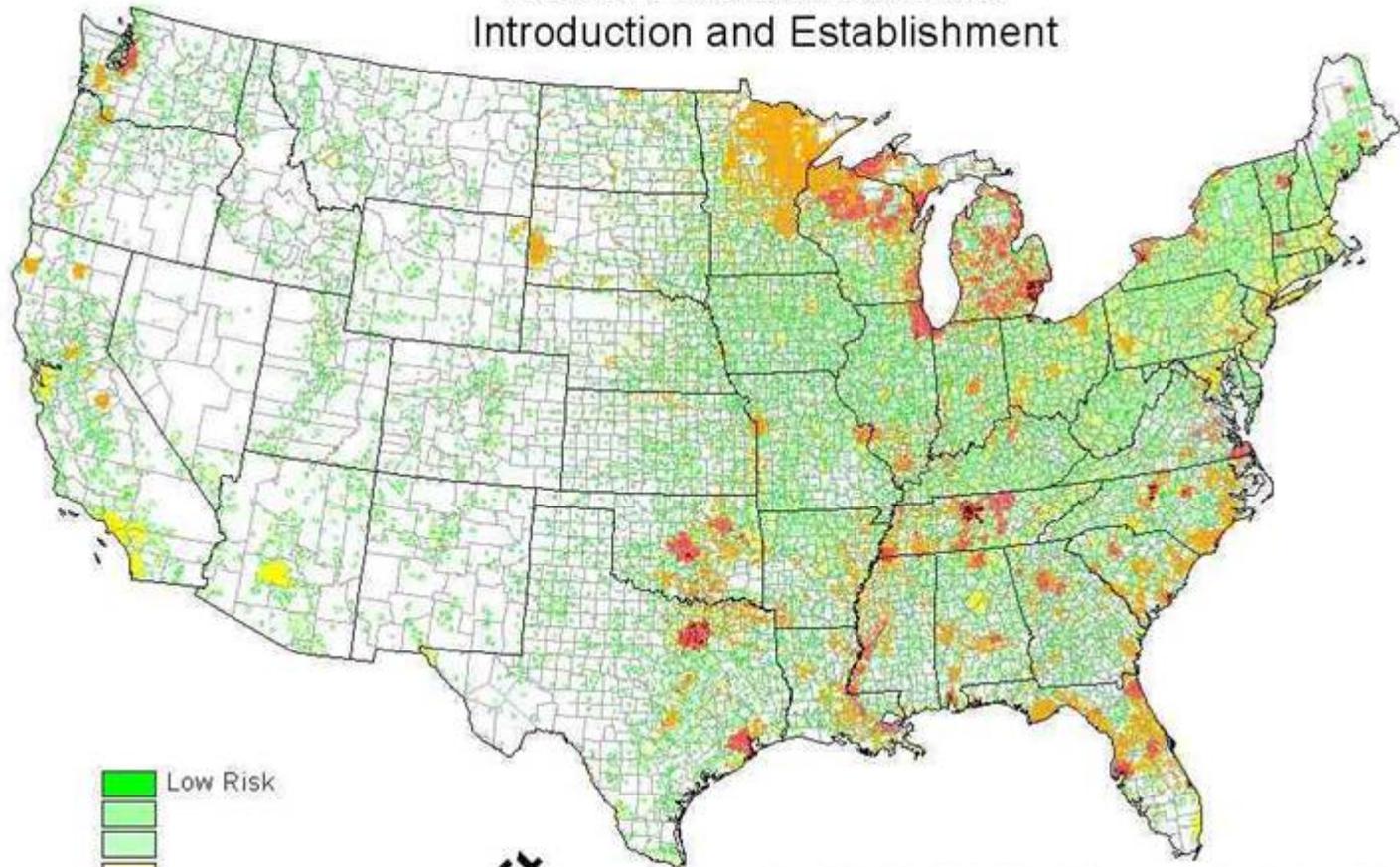
- Expand to include States with Moderate risk –
MO, AR, MS, AL, KY, IN, OH, IL, MD,
DE, NJ, NY, CT, RI, MA



Photo courtesy S.Oak, USDA FS, FHP R8

Emerald Ash Borer

Risk of Emerald Ash Borer
Introduction and Establishment



Draft
10/9/03

The risk of EAB introduction and establishment is defined as a geographic function of: preferred host range, urban ash forests, proximity of urban ash forests to natural forests, and phloem insect interceptions at U.S. ports of entry.



Evaluation Monitoring

- Determine the extent, severity, and causes of undesirable forest health changes.
- Address likely cause-and-effect relationships, identify associations between forest health and forest stress indicators.
- Identify management consequences and alternatives for reducing the effects of forest stress.
- Identify research needs.

Evaluation Monitoring Projects 2004

BASE

- White pine blister rust – INT,W
- Bark Beetles in AZ – INT
- Aspen Decline in AZ - INT
- Climate and Air Quality – NC
- Hemlock Wooly Adelgid – NC
- Soil Compaction – NC
- Poplar, Ash, Bitternut Decline - NC
- Dwarf Mistletoe - NC
- Beech Bark Disease –NC,NE
- Balsam woolly adelgid – NE
- Drought Impact - SO
- Red Oak Decline – SO
- Poor Crowns - SO
- Insects and Pathogens in HI - W

FIRE PLAN

- Fire effects & weeds-INT
- Fuels – IW, NE, NC, SO
- Fire & pests - NC
- Real time fuel moisture - NC
- Sudden Oak Death in OR – W
- Swiss Needle Cast – W
- Drought & Bark Beetles – W
- Non-native grasses in HI – W





Research on Monitoring Techniques

- Urban Monitoring
- Riparian Monitoring

Urban Forest Health Monitoring

Urban Forest Inventory

- Extend FIA sampling grid into urban areas
- Deviate from standard definition of "forest"
 - At least one acre in size
 - At least 120 feet wide
 - At least 10 percent stocked



Statewide Street tree assessments

- Modify sampling to characterize trees along public streets



Local Urban Forest Monitoring

- Design sampling for parks and special preserves



Urban Forest Health Monitoring

● Urban Forest Inventory

- 2001 - IN Pilot
- 2002 – IN, WI
- 2003 – IN, NJ, WI

● Statewide Street Tree Assessment

- 2001 – MD Pilot
- 2002 – MD, MA, WI
- 2003 – MA, MD

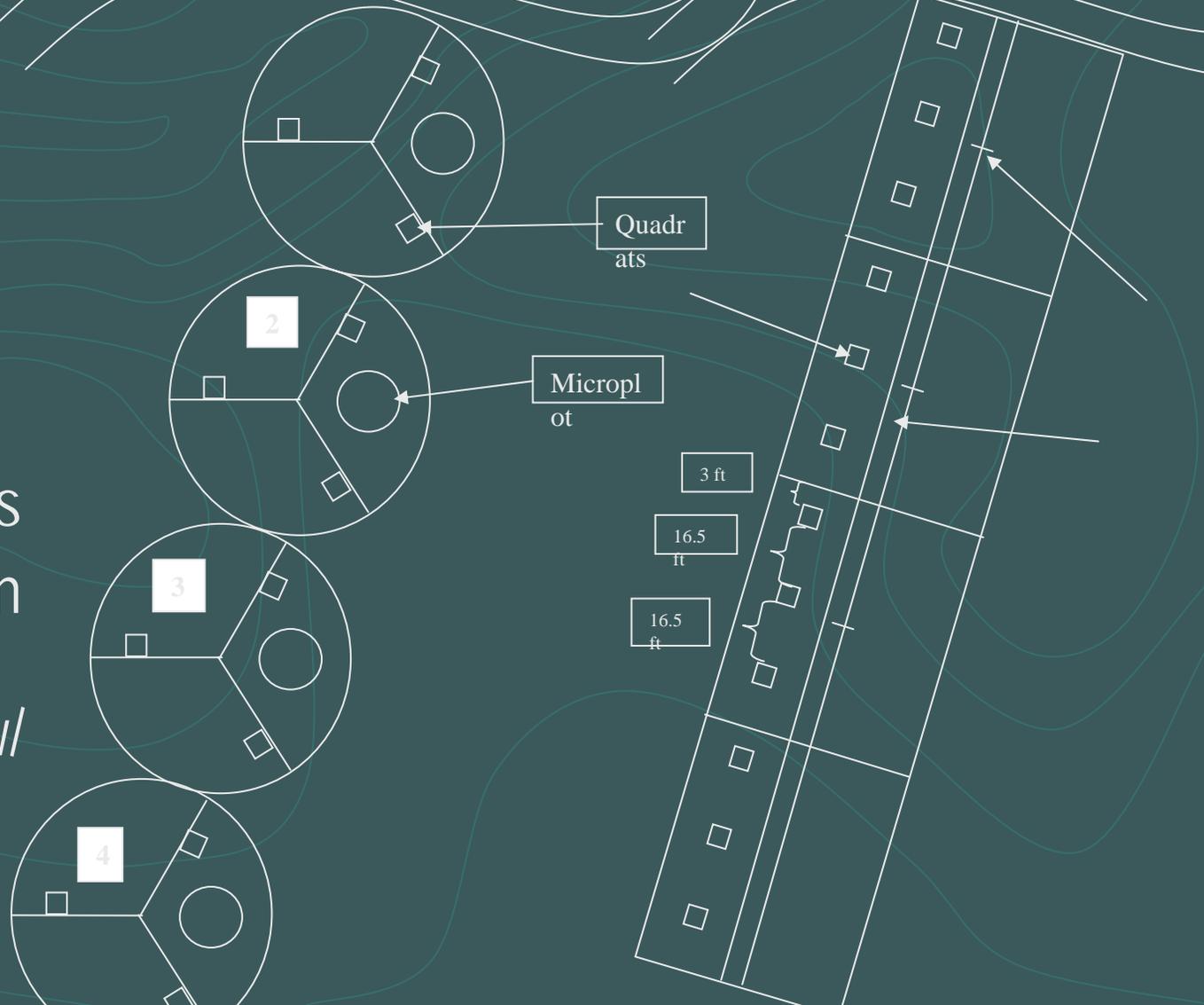
● Local Urban Forest Monitoring

- 2001 – Birmingham Pilot

Riparian Monitoring

- Test plot designs for forests associated with rivers and streams

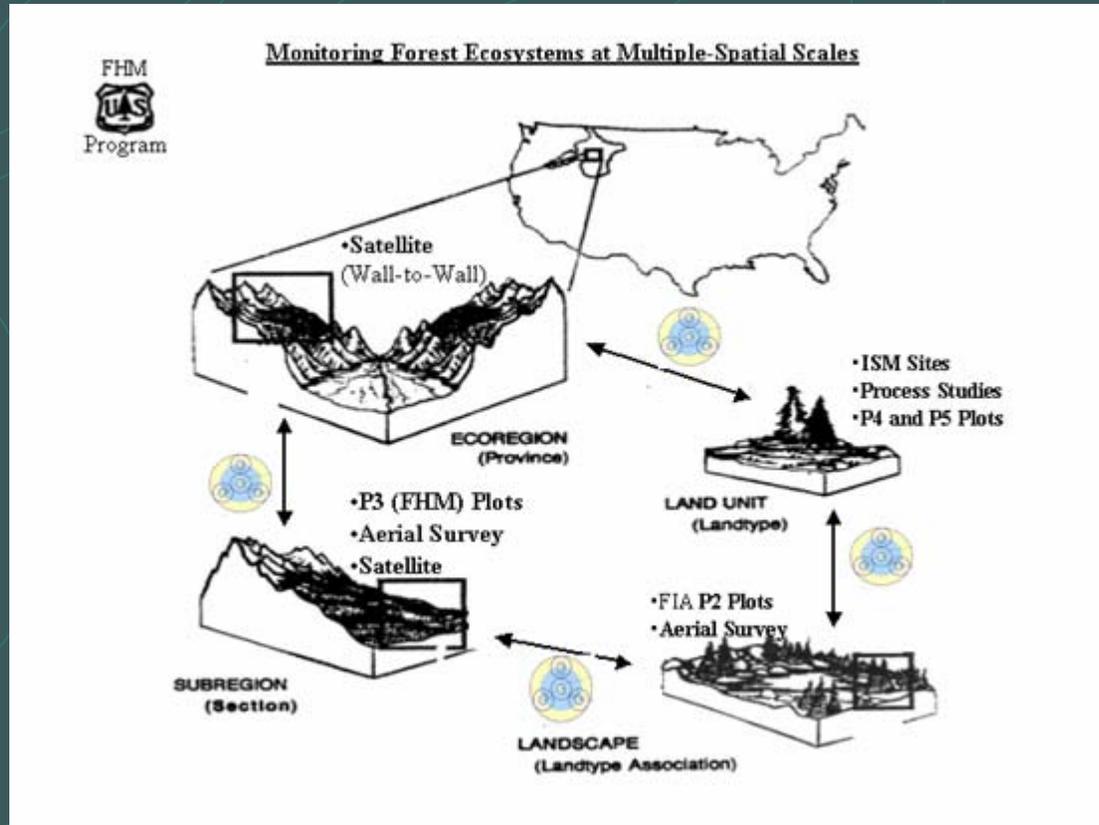
- 2003 Pilot in John Day Basin OR w/ PNW FIA



Intensive Site Monitoring

– Linking Multiple Scales

- Phase 2 – 1/6,000 ac.
- Phase 3 – 1/96,000 ac.
- Phase 4 – 1/250 ac.
- Phase 4+ - co-located with process studies

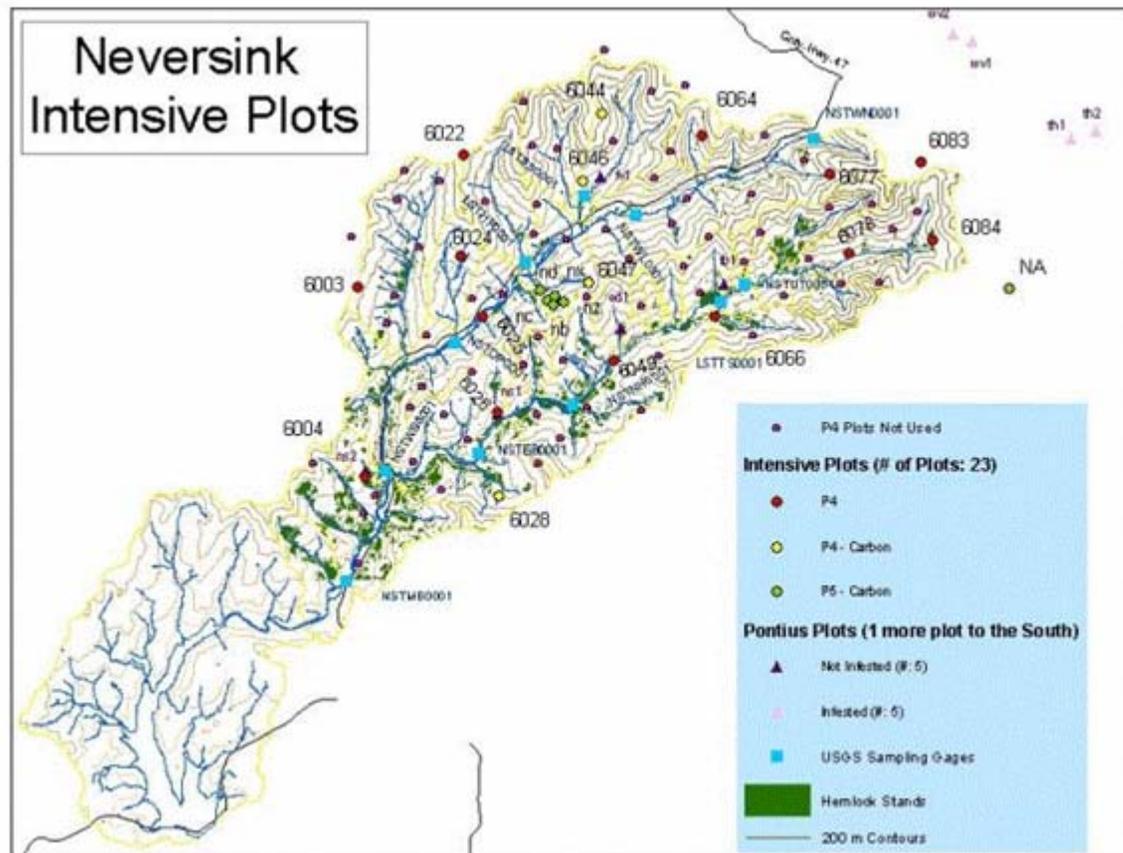


Delaware River Basin

Collaborative Environmental Monitoring & Research Initiative

CEMRI

- Water quality
- Total Carbon
- Calcium Depletion
- Invasive Species





Intensive Site Monitoring Plans

- Document DRB Pilot
- Extend concept to other locations
 - Marcell EF – NC
 - Great Basin - RM
 - San Bernardino – PSW
- Link with Experimental Forests Carbon Initiative

Reporting Highlights

National Reports

- FHM National Technical Reports
- 2003 Sustainability Report – Montreal Process Criteria and Indicators for Sustainable Forests
- Heinz Center – The State of the Nation's Ecosystems
- EPA – US/Canada Air Quality Agreement 2002 Progress Rep.

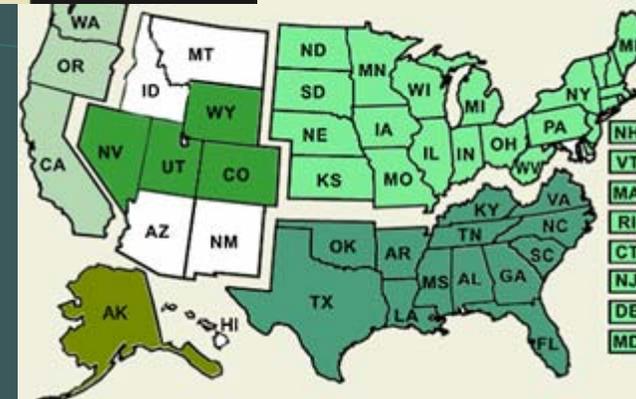
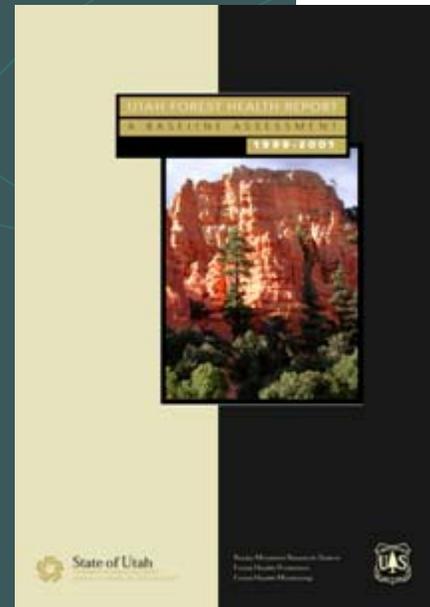
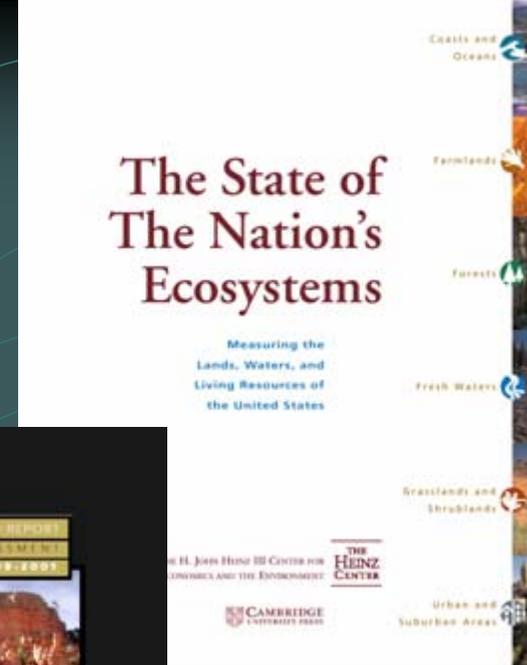
Regional Reports

- Northeast Forest Stressor Report
- Aspen Forest Cover Change in Rockies

State Reports

- Utah Baseline Report
- Forest Health Highlights

<http://www.na.fs.fed.us/spfo/fhm/index.htm>



2003 National Report Topics

Landscape Structure

- Distance to Roads
- Forest Edge
- Interior Forest

Drought – deviation from historic occurrence

Fire – extent from 1938 to 2002

Air pollution

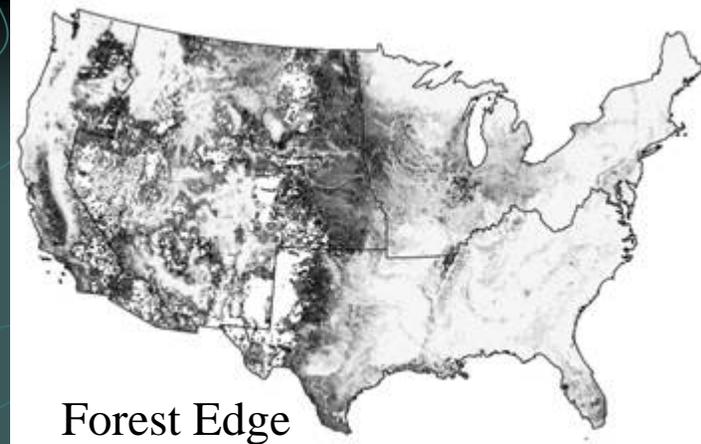
- Wet sulfate and inorganic nitrogen deposition
- Ozone-induced foliar injury

Insects and Diseases – mortality and defoliation

Forest Conditions

- Crown Condition
- Tree Mortality
- Stand Age
- Soils

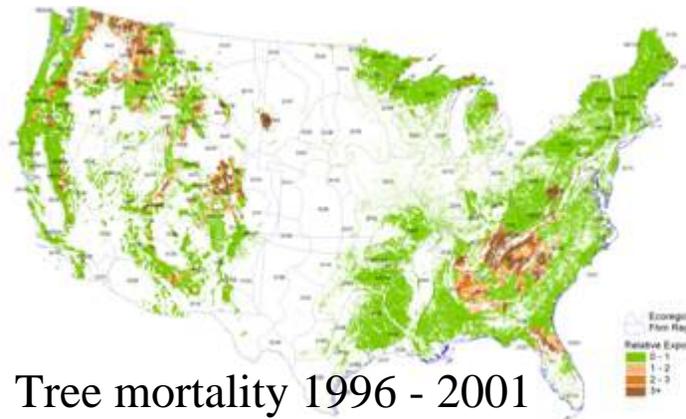
Integrated analysis of forest health indicators



Forest Edge



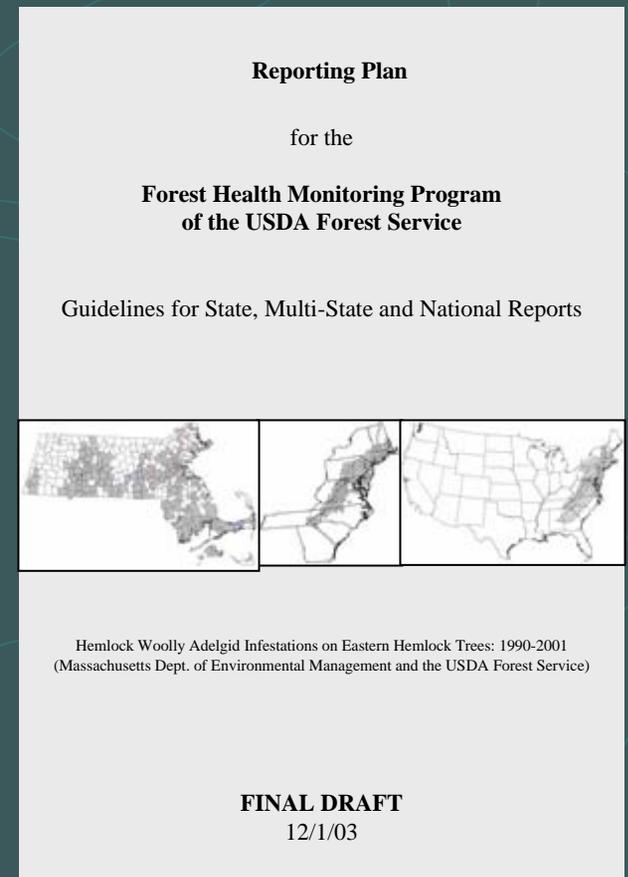
Ozone Damage



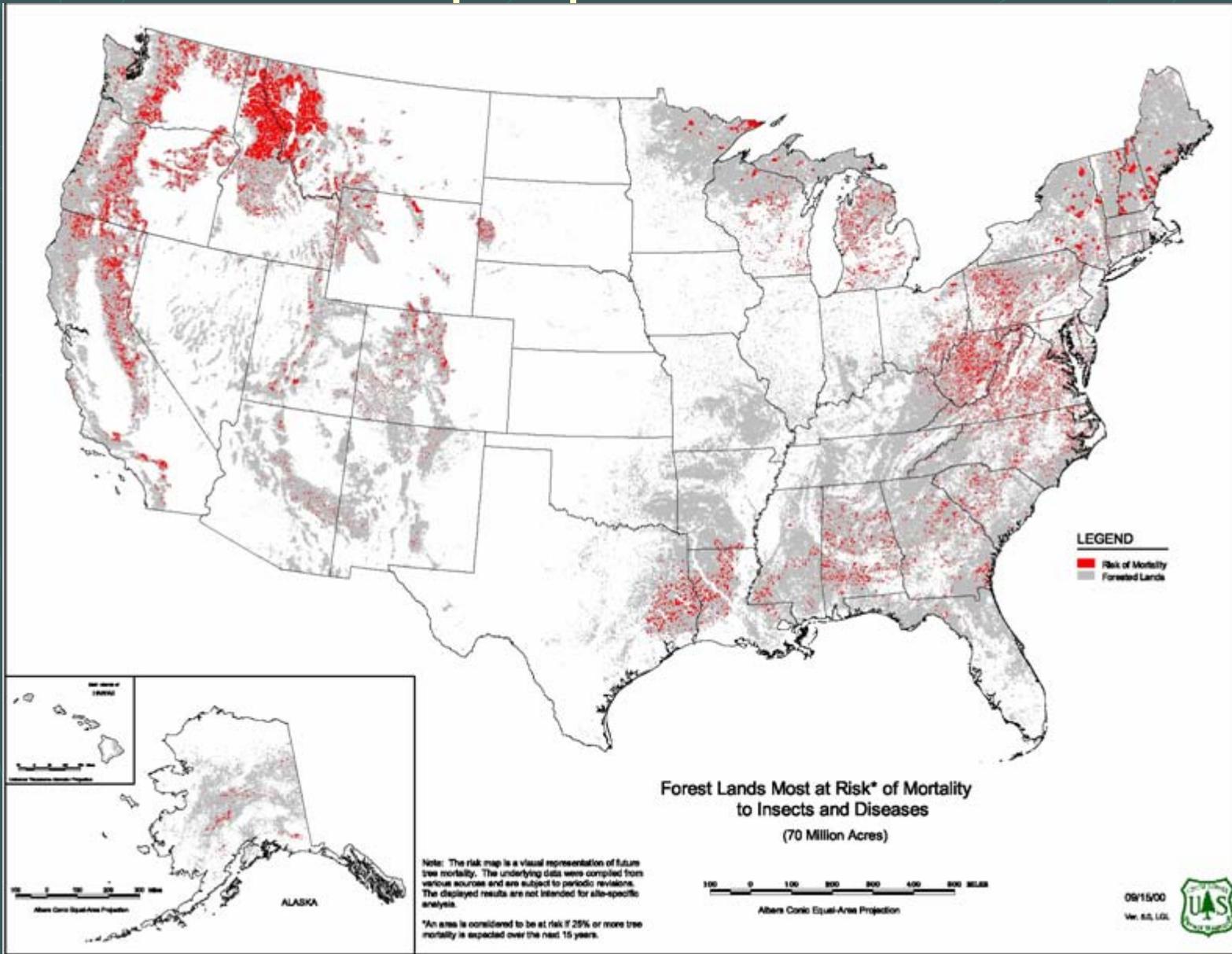
Tree mortality 1996 - 2001

Analysis & Reporting Plans

- FHM Reporting Plan – Final Draft
- Increased funding in FY 2004 to FHM Regions for enhanced analysis and reporting capabilities



I&D Risk Map Update



National Oversight Team

- Borys Tkacz – FHM:
Team Leader
- Joe Lewis – FHP
- Greg Reams – SRS
- Ross Pywell – FHTET
- Terry Shaw – R&D
VMPR
- Paul Bradford – NFS
EMC
- Andy Gillespie – FIA
- Jim Mair – OR
- Dave Heinzen – MN
- Don Rogers – NC
- Dave Cleaves –R&D
VMPR
- Mike Hilbruner – R&D
- Tom Bobbe - RSAC



Regional Team Co-Leaders

- Northeast – Jim Steinman (FHP) & Dave Struble (ME), Don Eggen (PA)
- Northcentral – Manfred Mielke (FHP) & Roger Mech (MN)
- South – Jim Brown (FHP) & Don Rogers (NC)
- Interior West – Ralph Thier (FHP) & Mike Kangas (ND)
- West Coast – Allison Nelson (FHP) & Karen Ripley (WA)

Risk Map Revision Plan

- Assemble National Oversight Team and engage partners through FHM Workgroup Meeting (1/03)
- National Team develops general revision approach (4/03)
- Assemble Regional Revision Teams (by FHM Mega region) (7/03)
- Regional Teams provide feedback on revision approach identify forest cover types and major pests to model (10/03)
- National Team decides on revision approach (1/04)
- Regional Teams identify and gather appropriate data and develop specific pest models (4/04)
- National Team reviews Regional models for consistency and comparability (5/04)
- RSAC and FIA Remote Sensing Band produce forest cover type maps based on MODIS (6/04)
- Compilation of Regional risk models into National Risk Database and Map (10/04)
- Draft National Database and Map ready for Review (1/05)
- Final National Database, Map and Report (2/06)

Future Challenges



- Stress key strengths of FHM
 - Partnership-based
 - Innovative
 - Comprehensive
 - Science-based
- Be "Real Time"
 - Timely detection, analysis, and reporting of adverse changes in forest health to facilitate effective management response
- Look Beyond the Grid
 - Look back – analyze trends, integrate diverse data sources
 - Look forward – forecast future conditions, analyze risks
 - Design new approaches for detection of invasives