2024 Forest Health Report

Oregon Board of Forestry

September 2024

ODF Forest Health Unit




Gabi Ritokova	**Christine Buhl**	**Wyatt Williams**	**Sean McKenzie**
Pathology	Entomology	Invasive species	Aerial survey

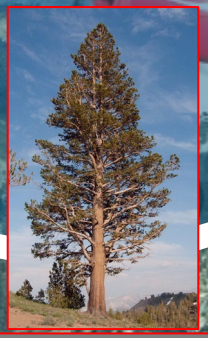
Objective: Diagnosis and management guidance for biotic and abiotic forest stressors for public and private landowners statewide. Monitoring of forest conditions using aerial, ground, and remote sensing surveys. Development and implementation of integrated pest management practices.

http://tinyurl.com/ODF-ForestHealth

GEOGRAPHY

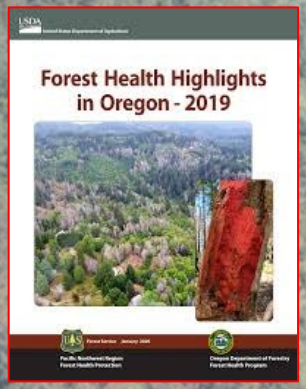
INFERRED AGENT

VISUAL CUES



HOST SPECIES

Aerial Survey - What We Do



Technical Bulletins

Conference Presentations

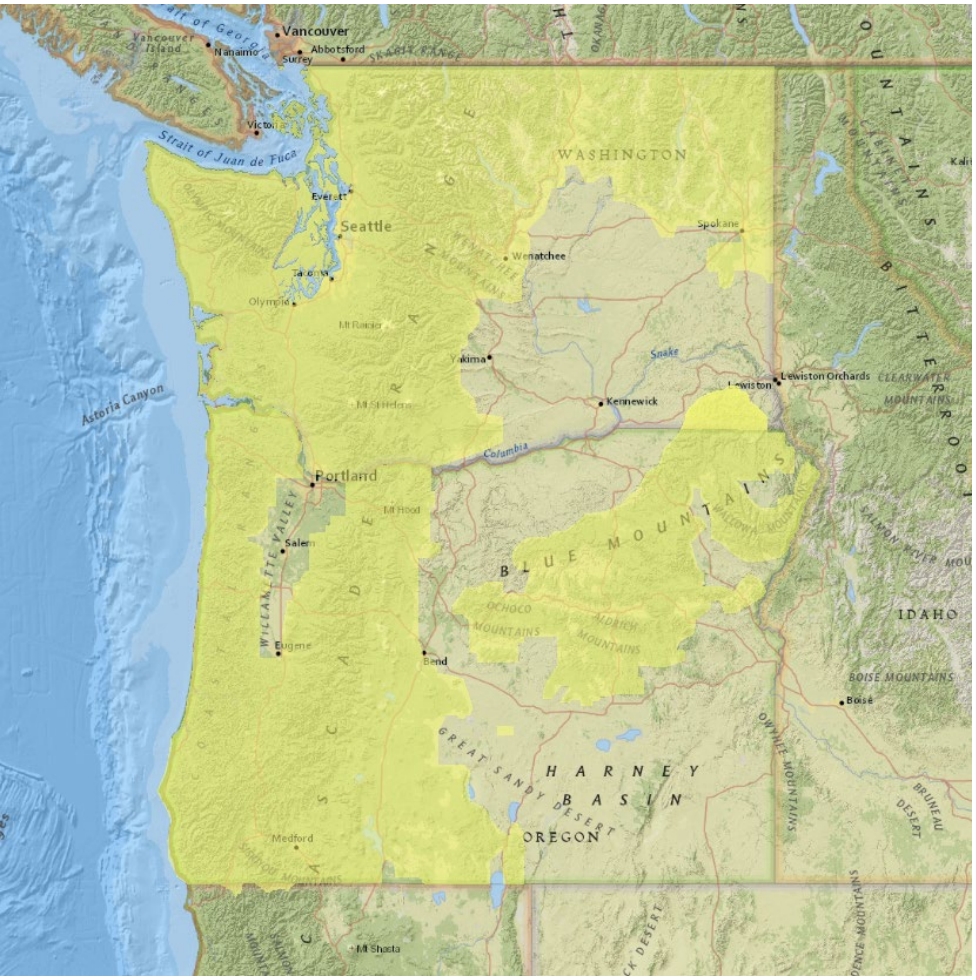
Scientific Research

Forest Restoration/Silvicultural Prescriptions

Why We Do It

What Do We Survey?

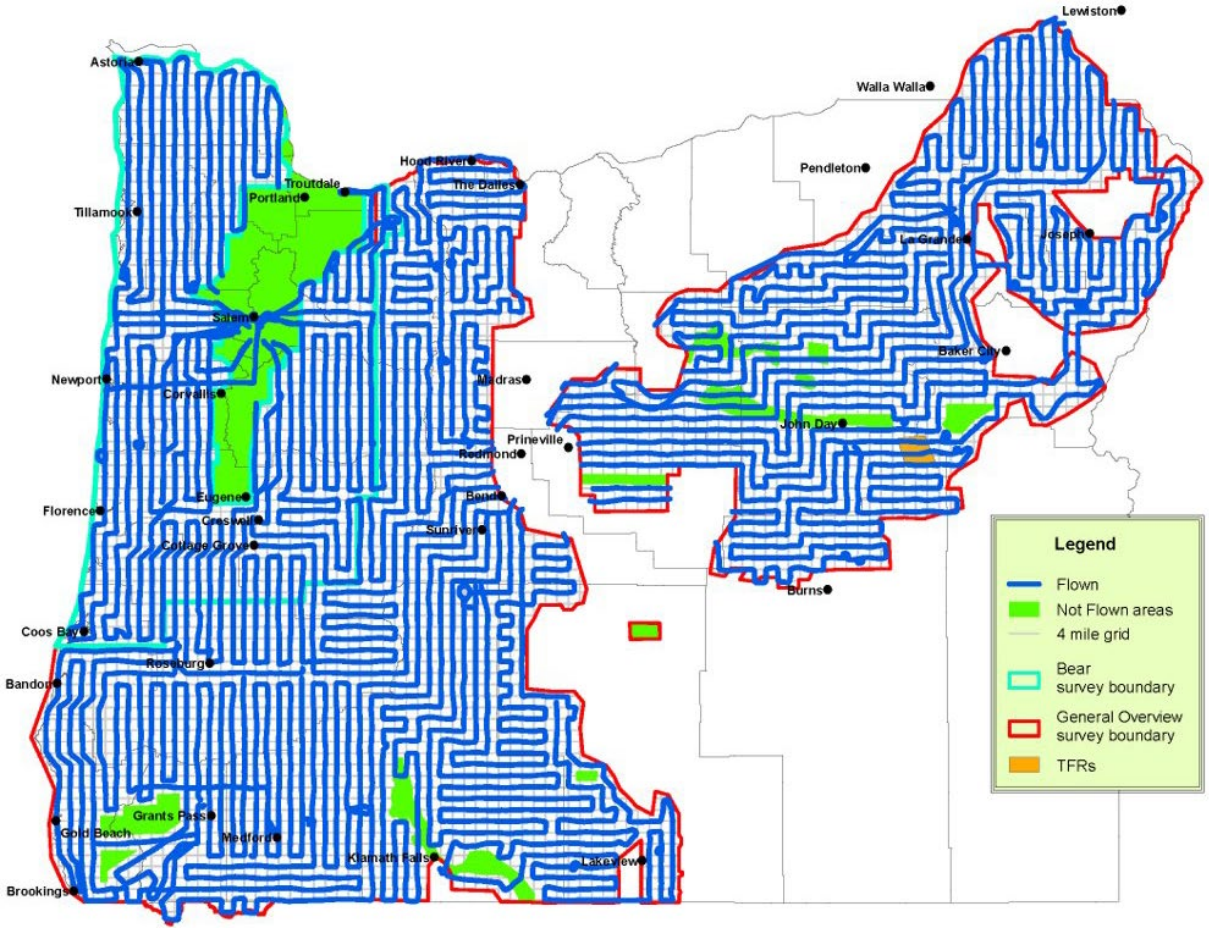
Frequency	Name	Target	Timing	Duration	Observation distance
Annual	General survey	All agents	June – September (annual)	50 hours (NW) + 20 hours (SW)	4 mile grid
Even years	Swiss needle cast	DF along the coast	Late April - May	30 hours	2 mile grid
4x per year	Sudden oak death outliers	Tanoak near Brookings	Late June – July	1 day	1mile grid + helicopter
Special surveys as needed	As needed				



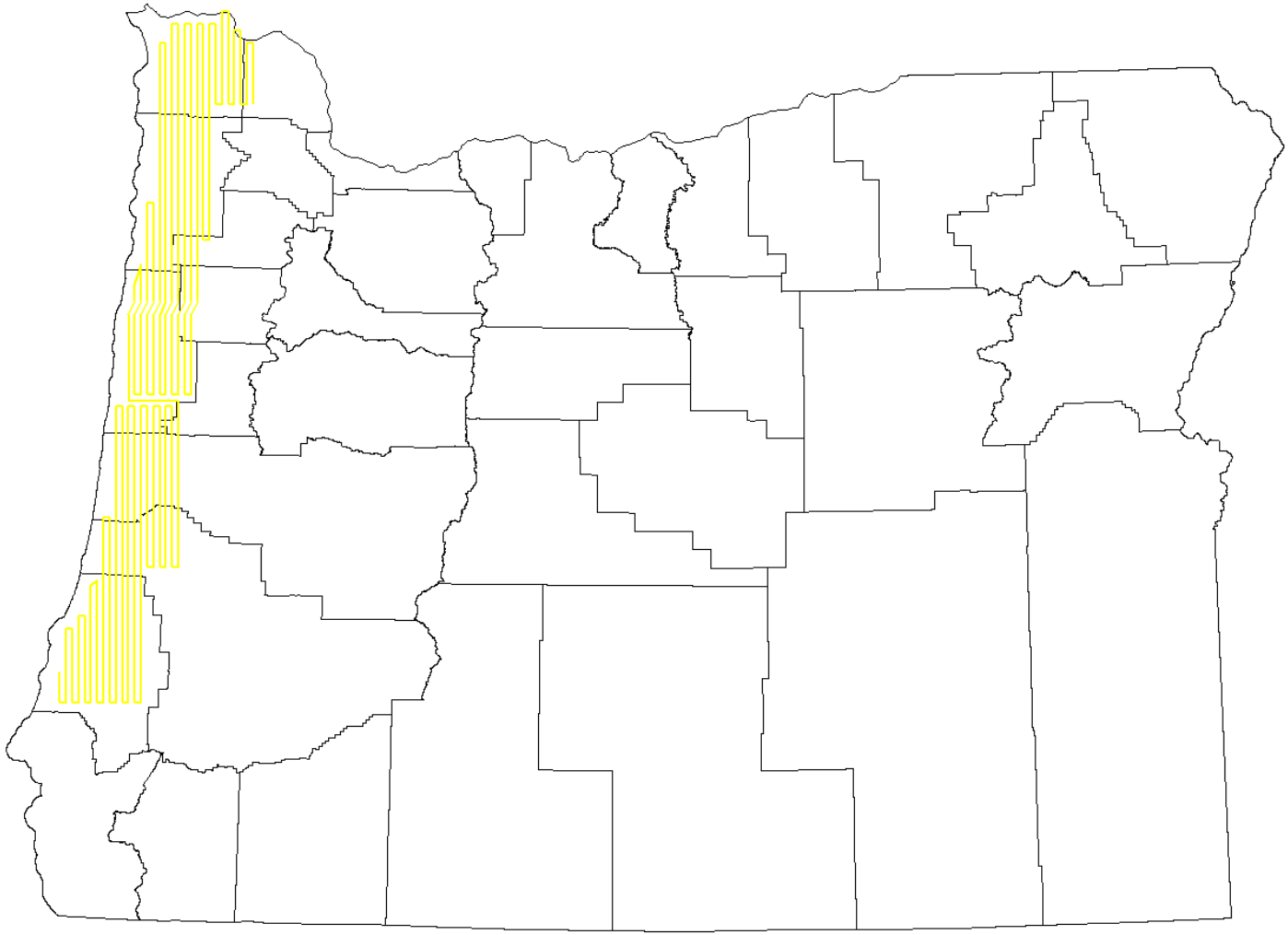
Which Forests in the Pacific Northwest Do We Monitor?

- ~47,000,000 acres in the of forested land annually
- ~28,000,000 acres in Oregon alone!

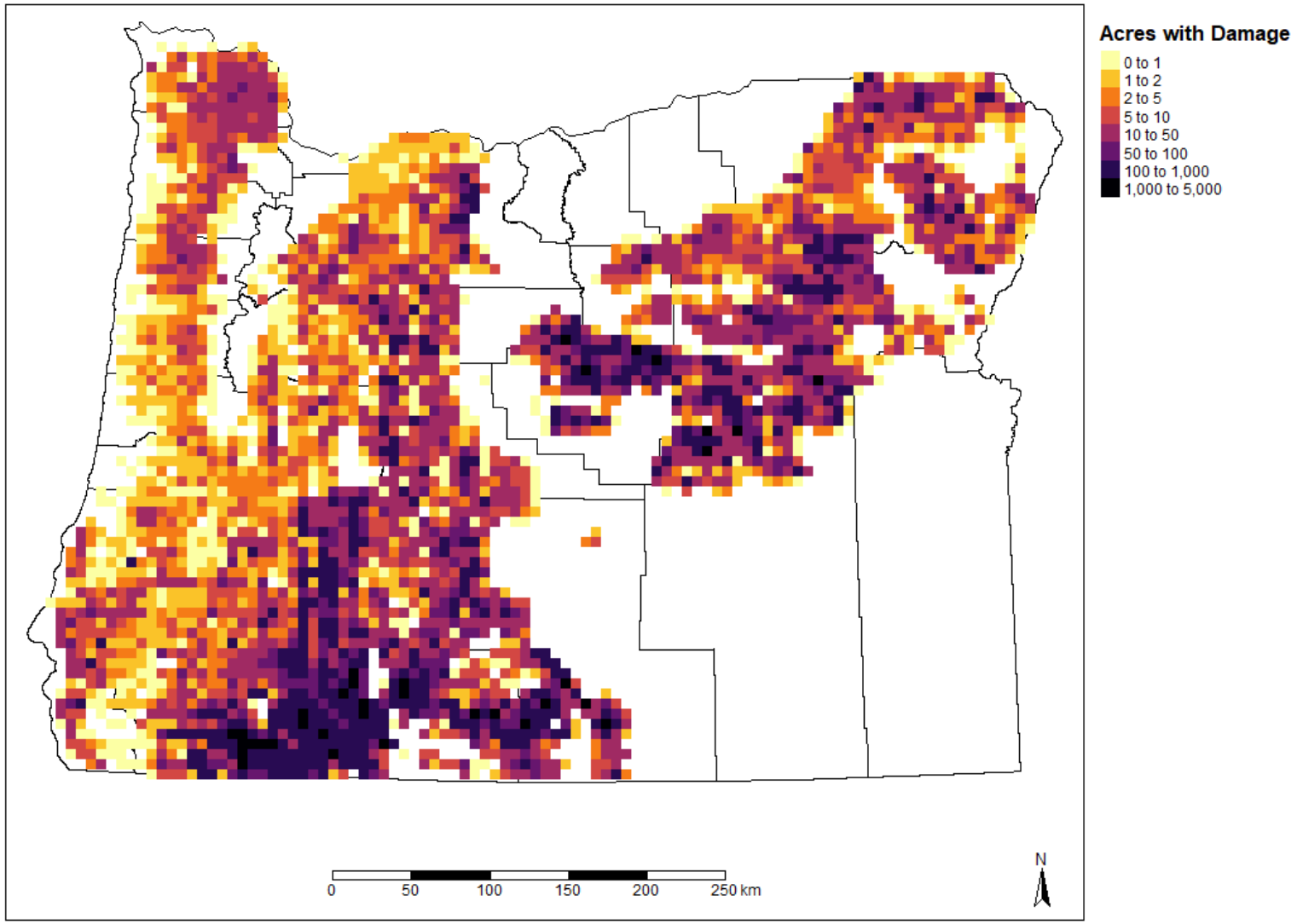
Where Do We Fly? – General Survey



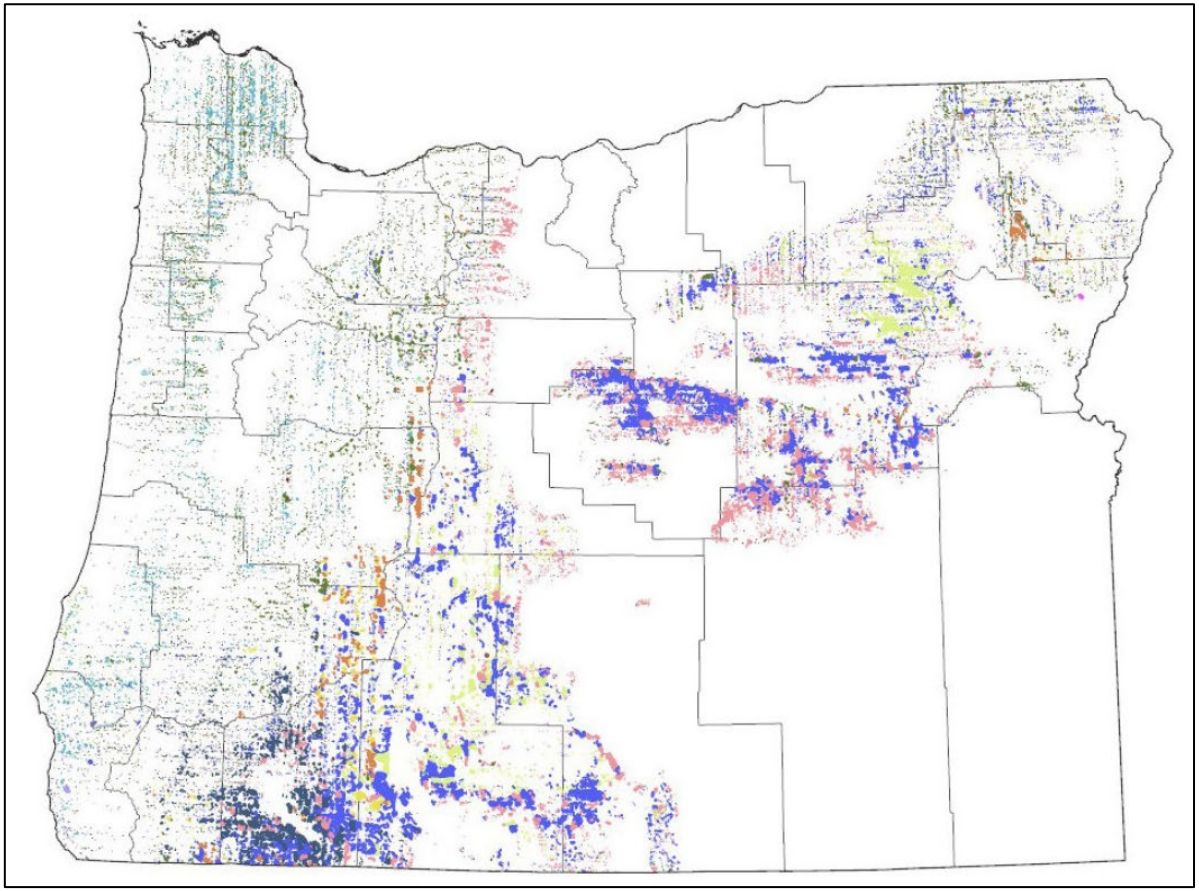
Where Do We Fly? – Swiss Needle Cast Survey

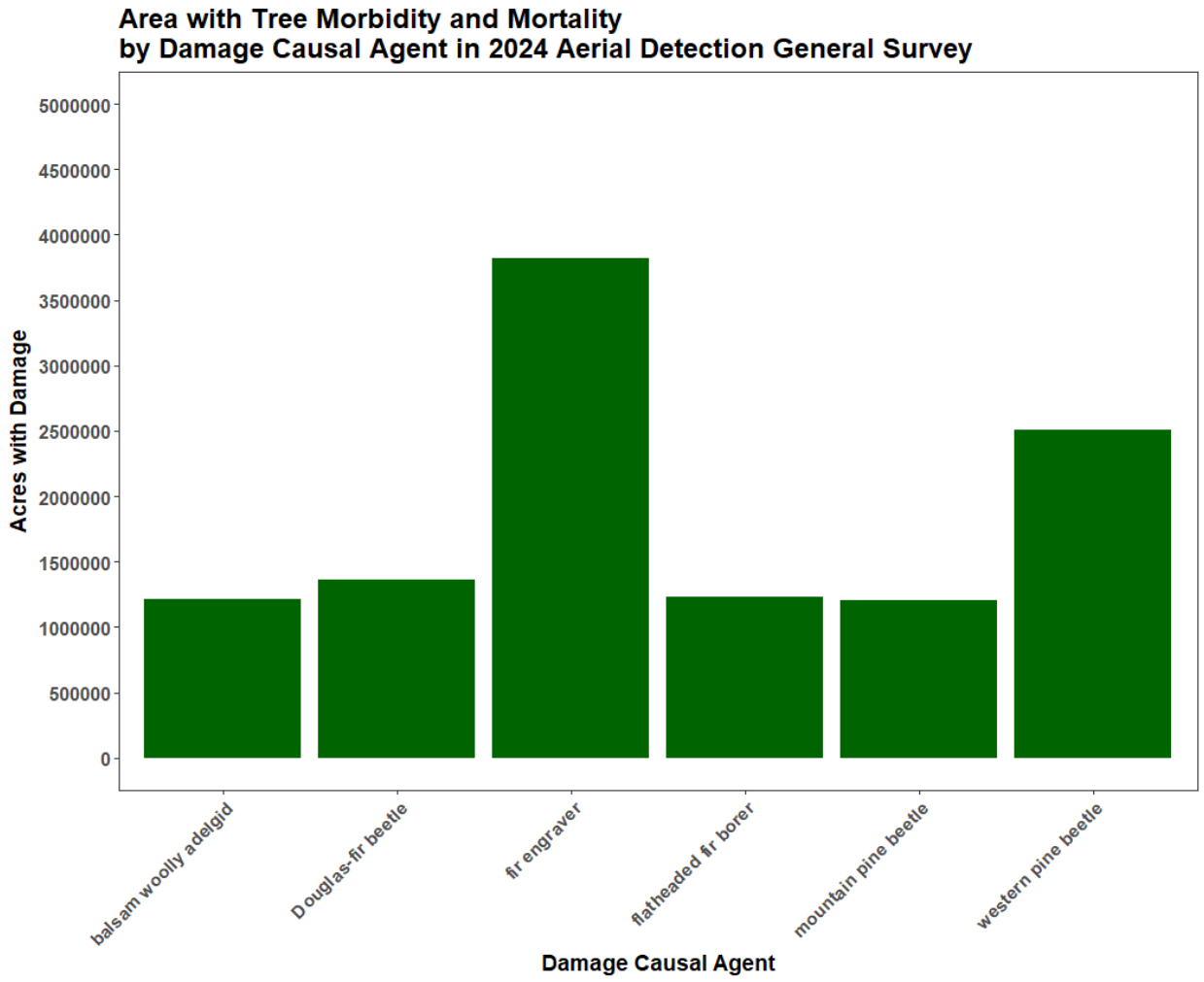


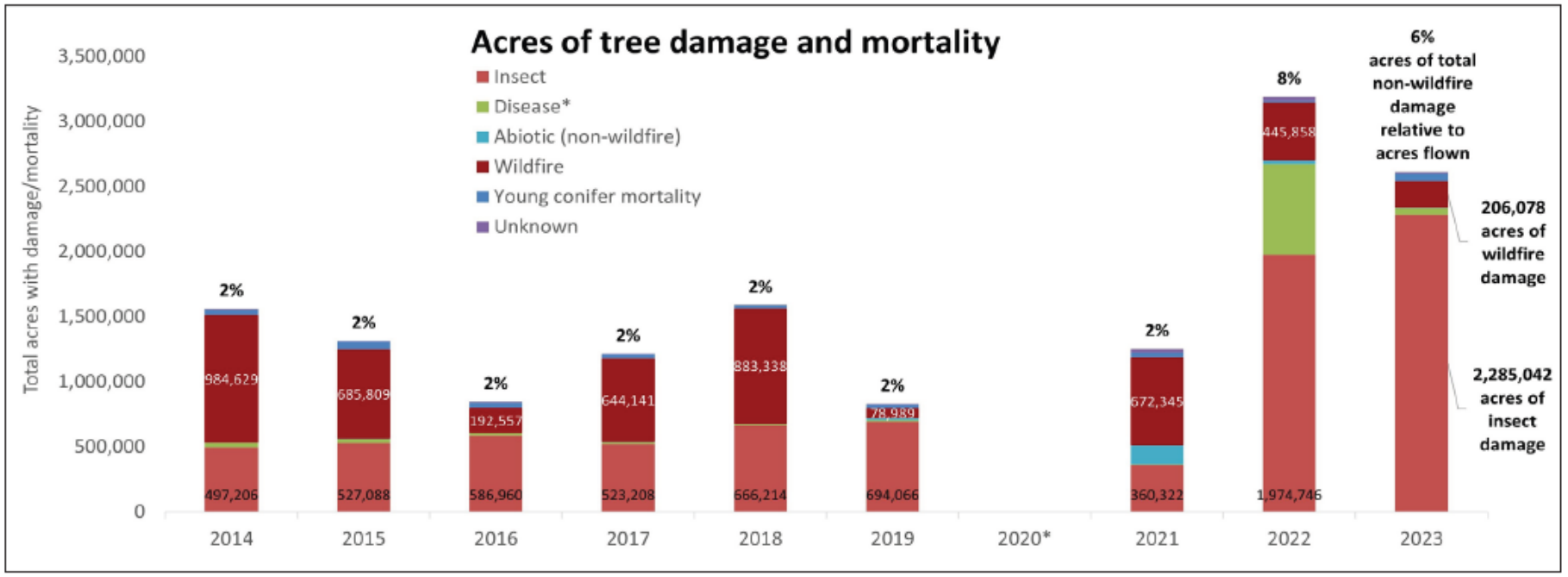
Distribution of Damage Mapped from 2023 Aerial Detection General Survey



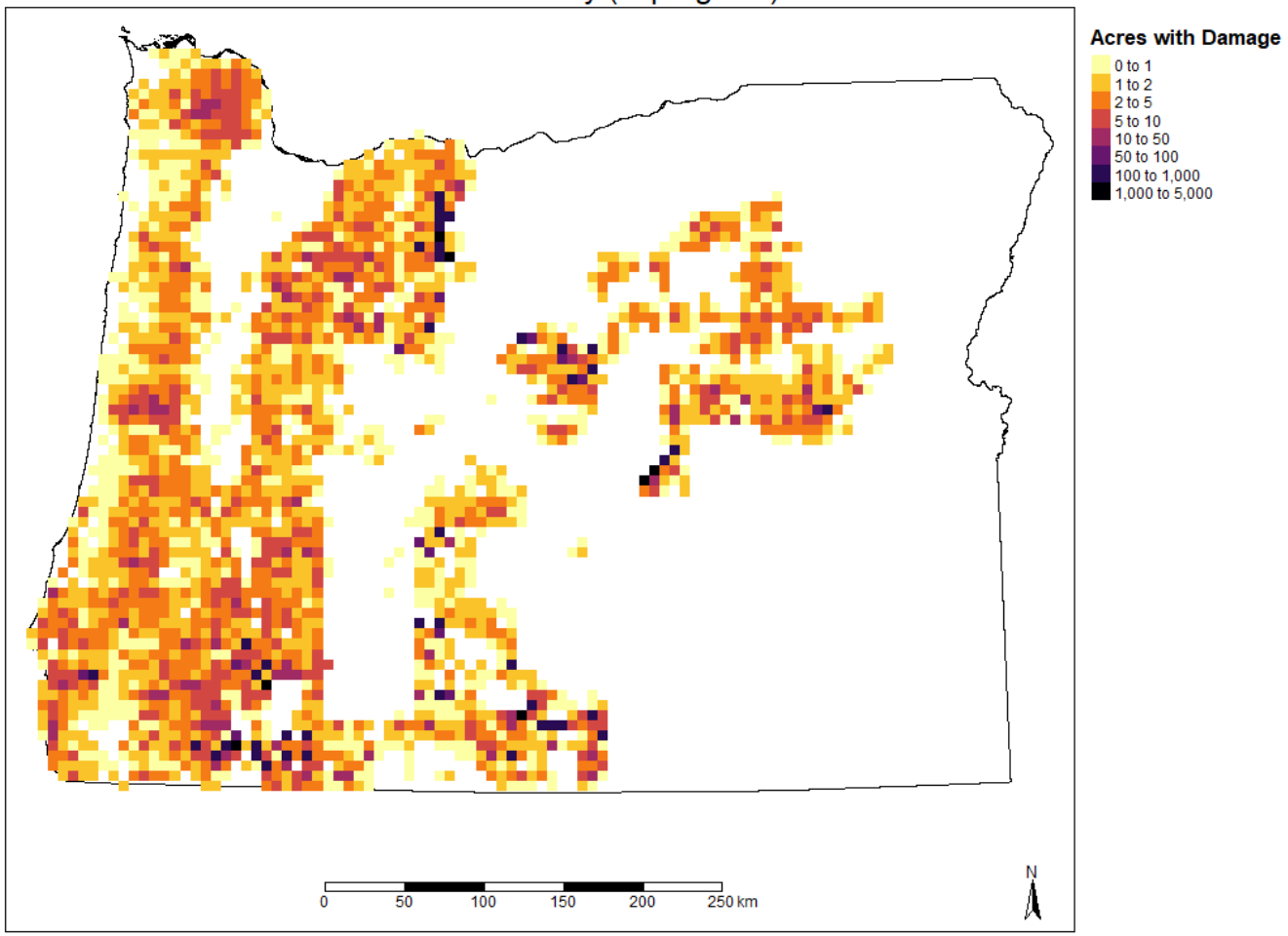
2023 AERIAL DETECTION SURVEY
DAMAGE CAUSAL AGENT SPATIAL DISTRIBUTION



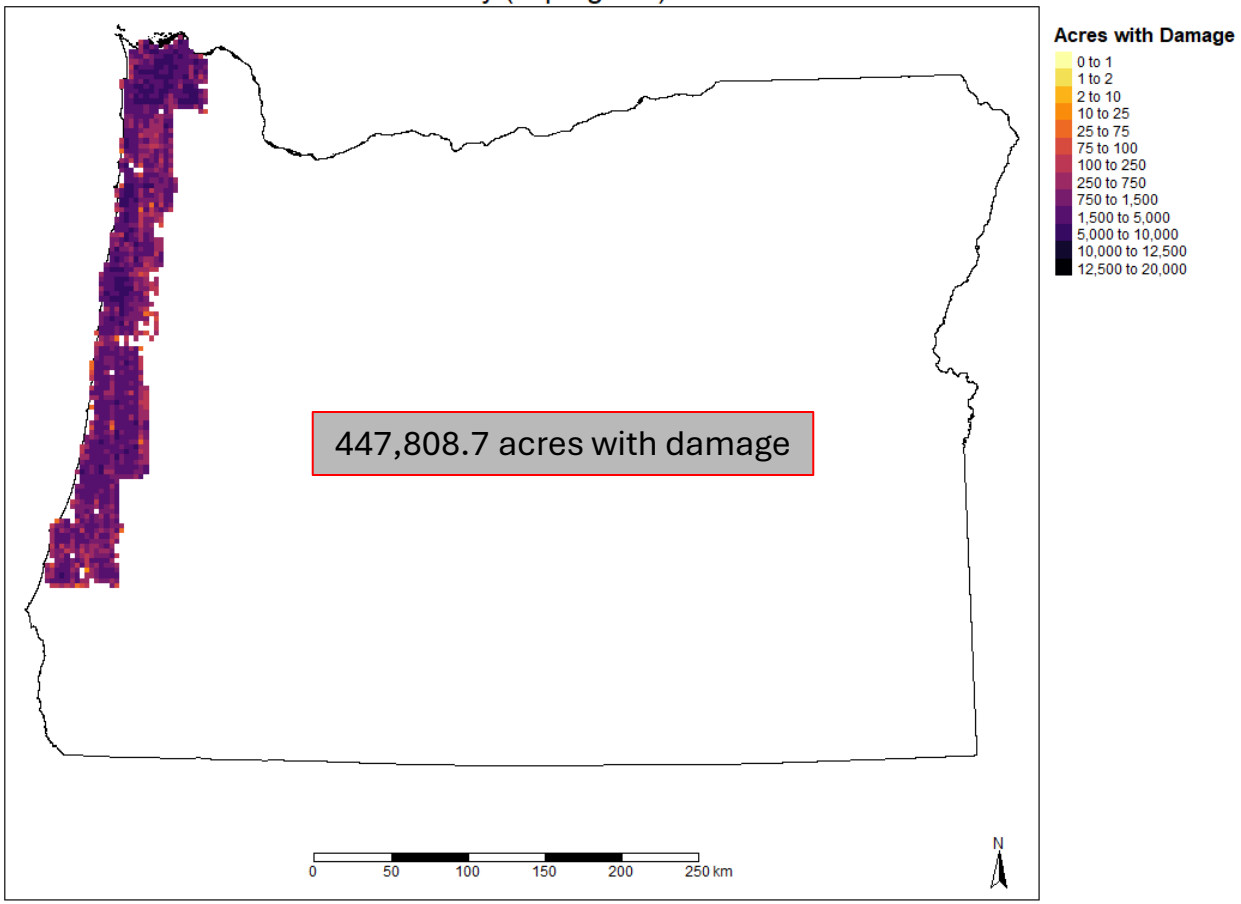

Area with Tree Morbidity and Mortality
by Damage Causal Agent in 2024 Aerial Detection General Survey
Acres with Damage
5000000
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
balsam woolly adelgid
Douglas-fir beetle
fir engraver
flatheaded fir borer
mountain pine beetle
western pine beetle
Damage Causal Agent


Acres of tree damage and mortality
Insect
Disease*
Abiotic (non-wildfire)
Wildfire
Young conifer mortality
Unknown
Total acres with damage/mortality
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2014
2015
2016
2017
2018
2019
2020*
2021
2022
2023
2%
2%
2%
2%
2%
2%
8%
6%
984,629
497,206
685,809
527,088
192,557
586,960
644,141
523,208
883,338
666,214
78,989
694,066
672,345
360,322
445,858
1,974,746
acres of total non-wildfire damage relative to acres flown
206,078 acres of wildfire damage
2,285,042 acres of insect damage

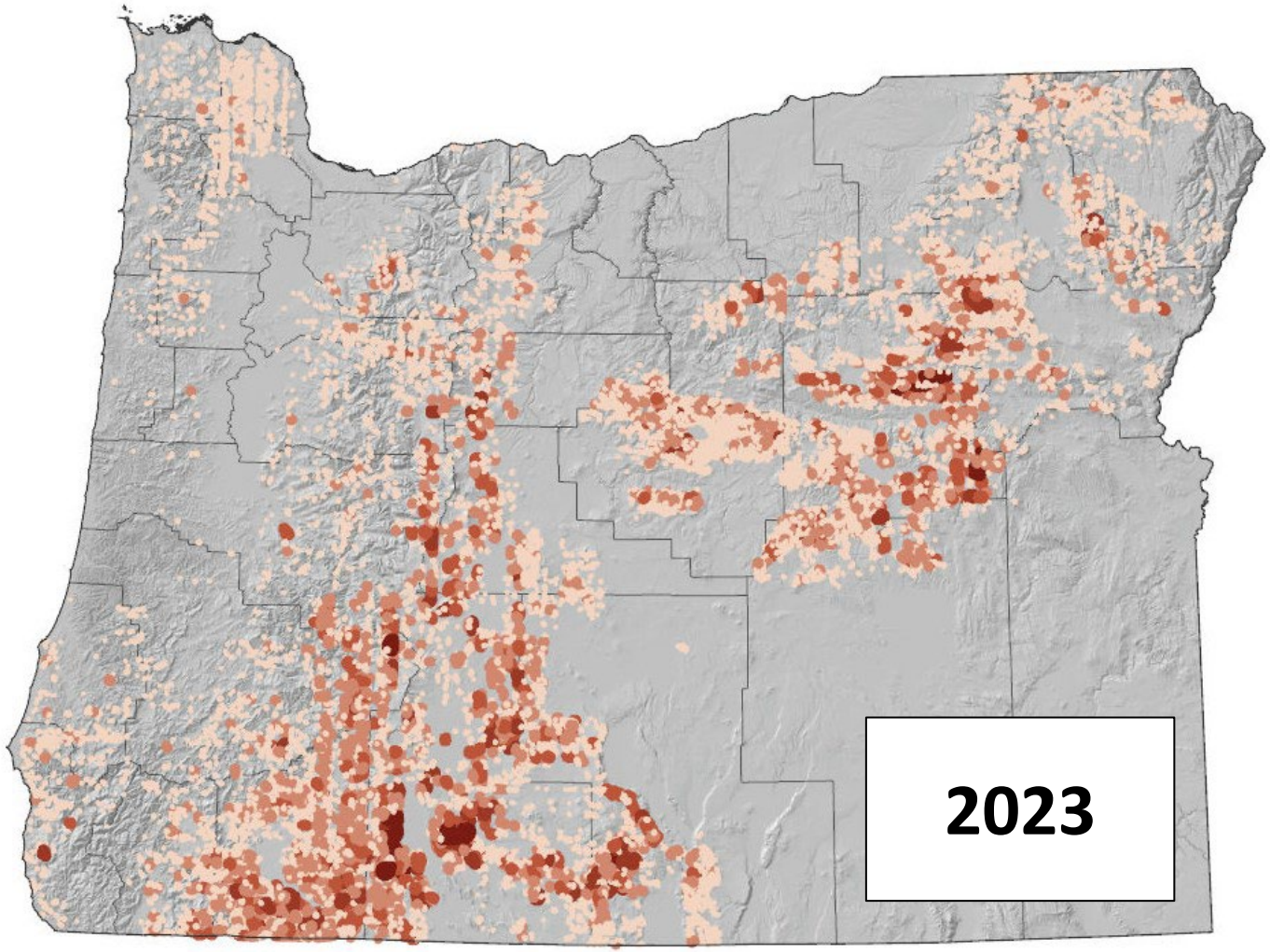
Preliminary Distribution of Damage Mapped
from 2024 Aerial Detection General Survey (in progress)



Preliminary Distribution of Damage Mapped
from 2024 Swiss Needle Cast Survey (in progress)



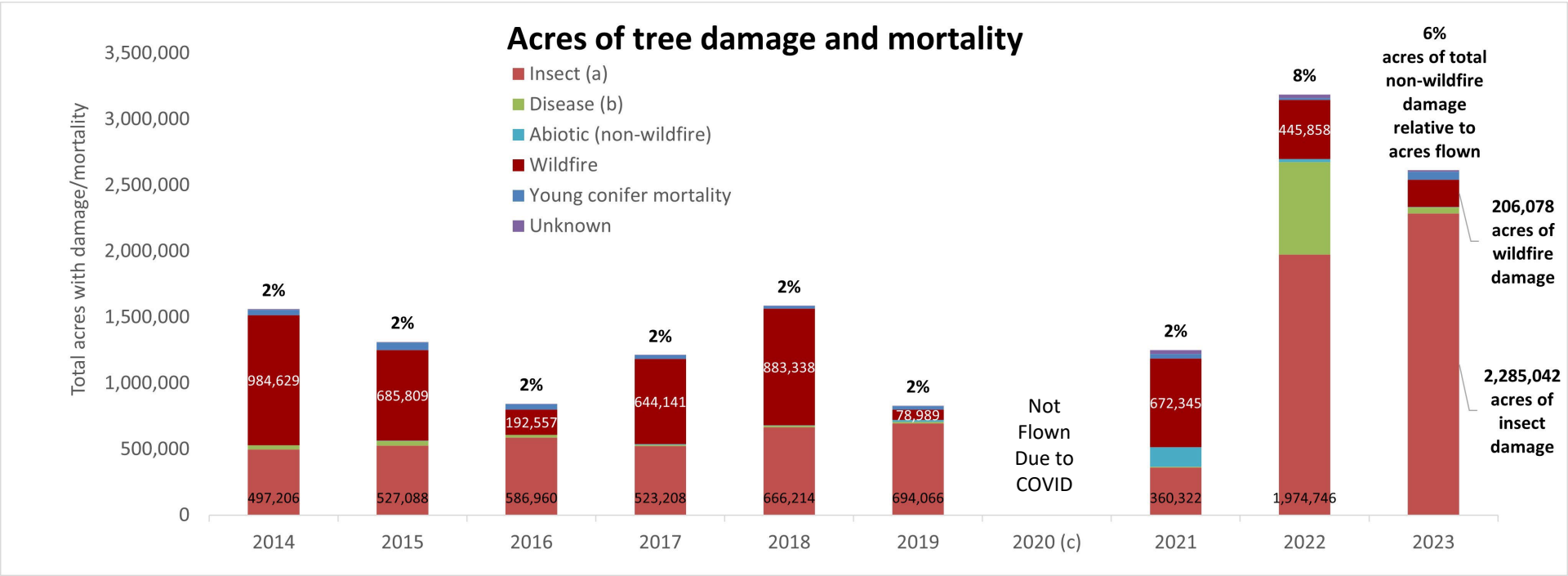
Aerial survey of tree damage/mortality



2023 and prior Forest Health Highlights reports

Aerial survey of tree damage/mortality: trends

- 2023: historic levels of forest mortality
- Insects (often preceded by drought or other stress) lead the majority of direct and indirect damage and mortality. Agents such as diseases are not comprehensively captured.

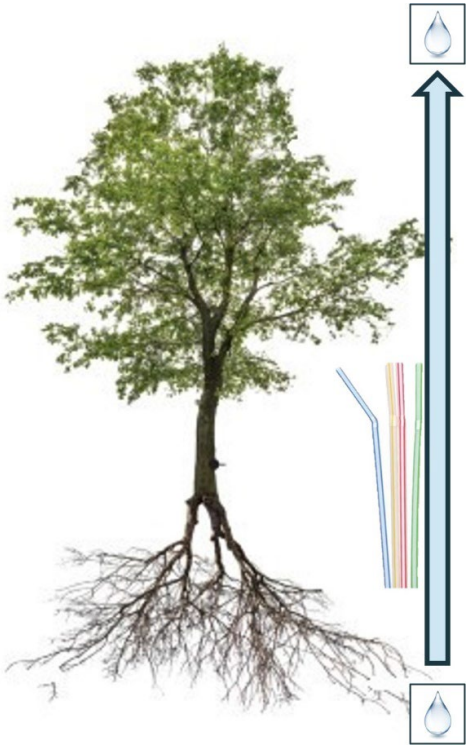


Statewide reduced tree resilience due to drought

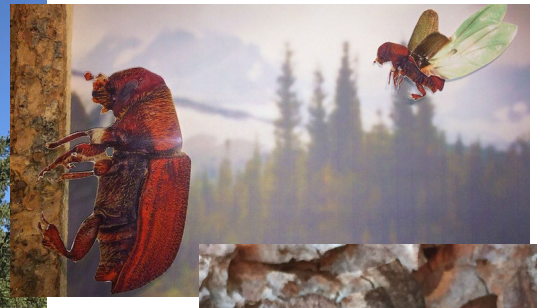
Examples:

- Large parts of Douglas-fir range becoming fringe habitat, resulting in drought stress + native Flatheaded fir borer attack
- True fir range shrinking due to a complex of drought stress, mild winters, exotic established Balsam woolly adelgid
- Large-scale ponderosa pine mortality due to a complex of drought + native pine-attacking bark beetles
- Western redcedar mortality along entire range from drought

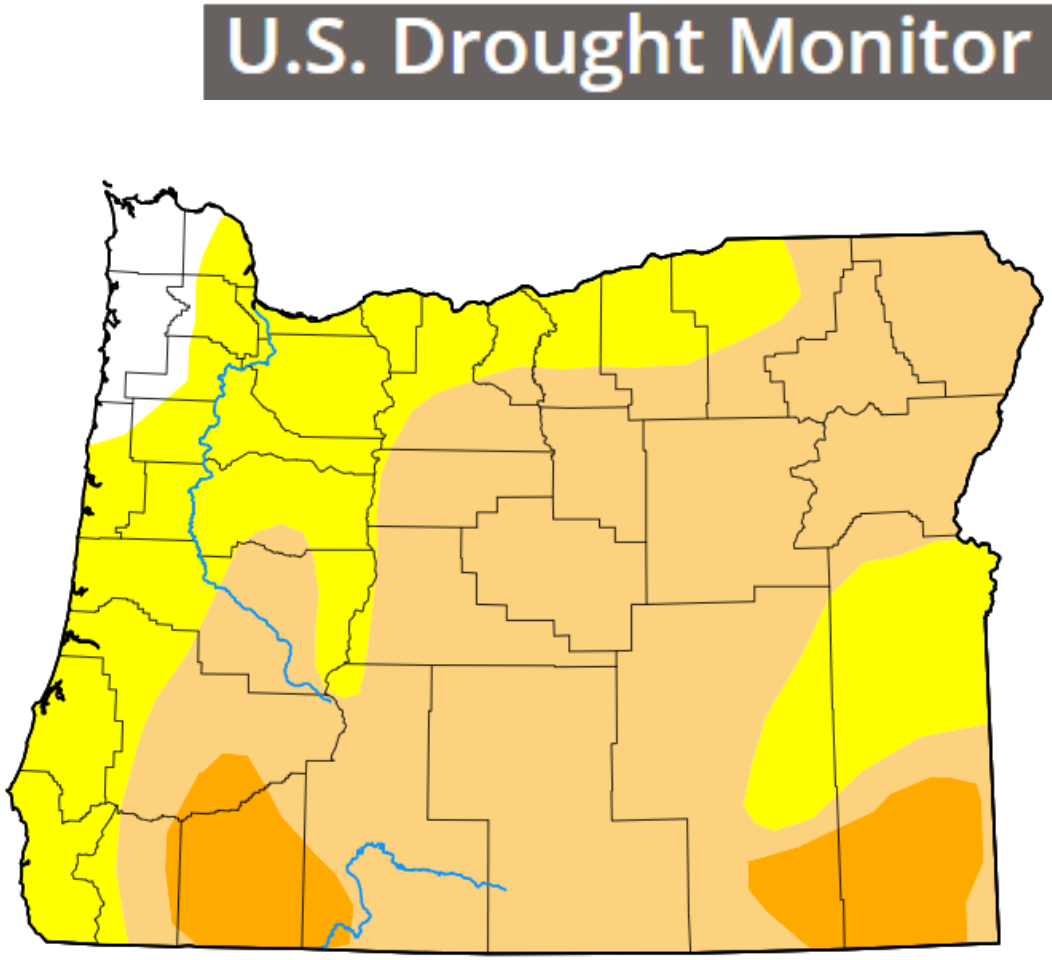
Drought impacts on trees



- Kills fine roots → interrupts moisture uptake
- Vascular embolism → interrupts moisture translocation
- Leaf stomata closure and premature leaf drop → reduces photosynthesis
- Reduced defenses (e.g., sap = a mechanical and chemical barrier)



(Climate Change) Drought - current status



Map released: Thurs. August 29, 2024

Data valid: August 27, 2024 at 8 a.m. EDT

Intensity

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

Authors

United States and Puerto Rico Author(s):

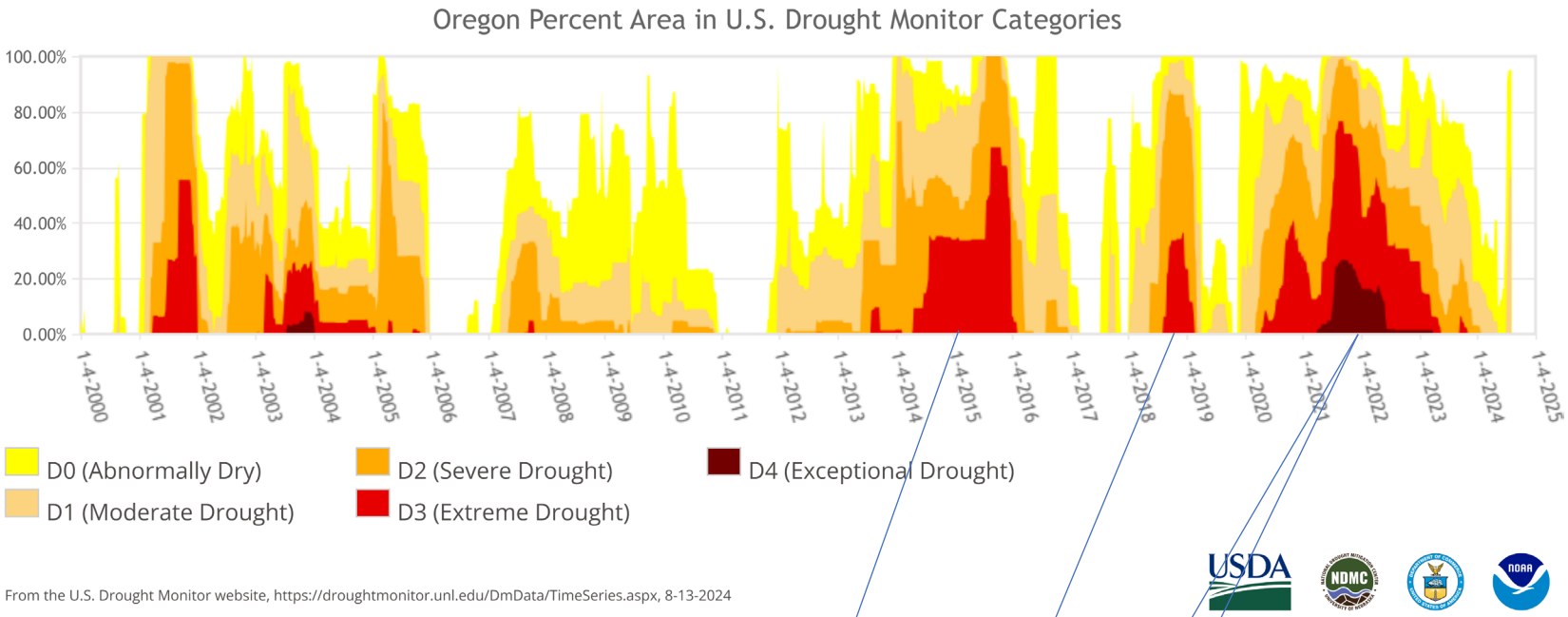
Richard Heim, NOAA/NCEI

Pacific Islands and Virgin Islands Author(s):

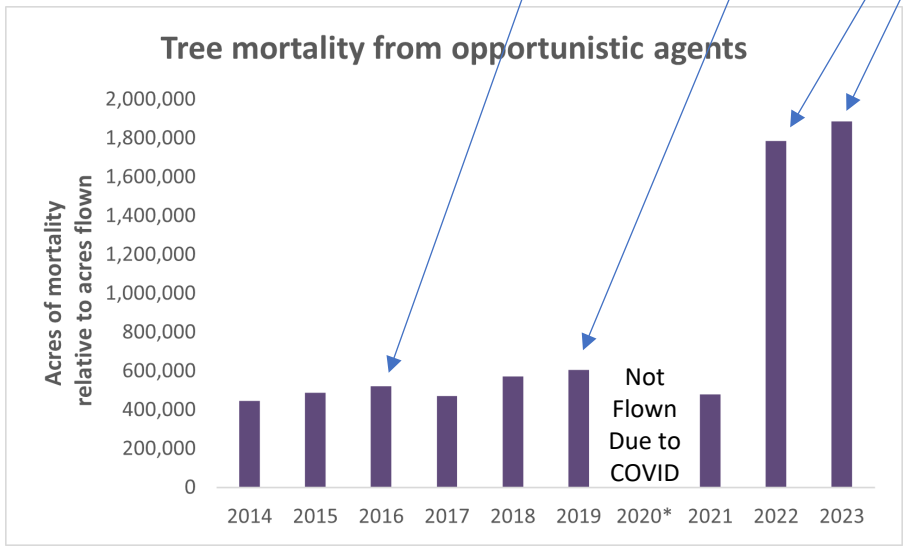
Curtis Riganti, National Drought Mitigation Center

OWRD monthly drought report: https://tinyurl.com/drought-report-email

(Climate Change) Drought - trends



From the U.S. Drought Monitor website, https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx, 8-13-2024



Increase in damage observed following intense and/or long drought periods

Drought Resources

- Drought fact sheet

- Forthcoming ODF guidance document on creating climate-resilient forests from seed selection to stand maintenance
- Forthcoming pest risk tool to determine current and future pest risk



Mediterranean oak borer (MOB)

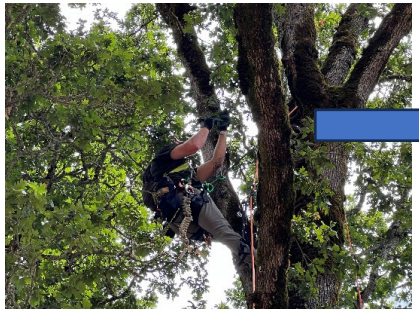
Dieback of a section of crown such as a whole branch

- Pale boring dust (frass)
- Black-stained branched galleries cutting across sapwood

Report a potential pest!
Oregon Invasives Hotline

MOB: Current efforts

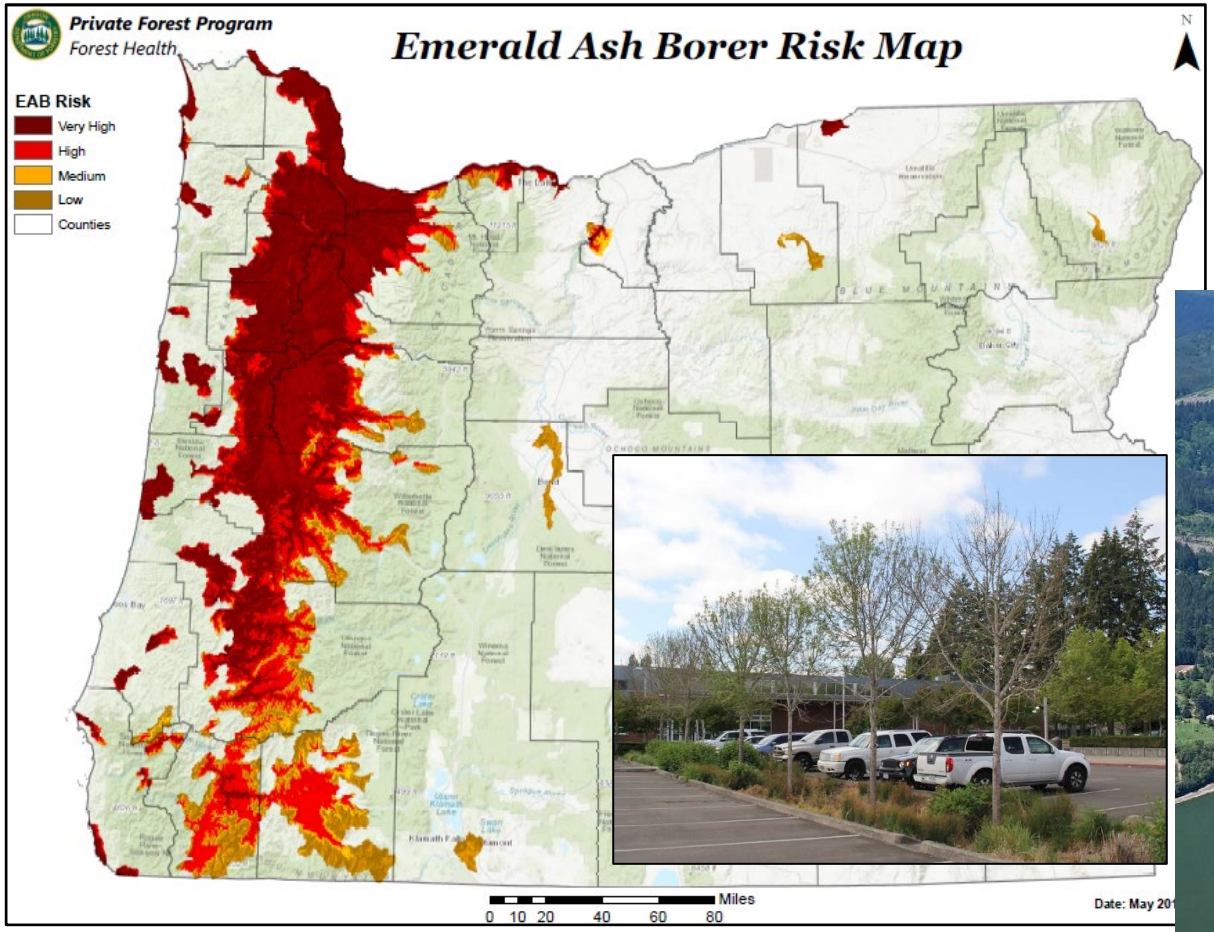
- Determining presence, concentration, pathways:
  - >100 traps set
  - >800 oaks inspected →
- Understanding the biology:
  - Emergence monitoring identified active adults year-round
  - Fungal associations
- Testing management strategies:
  - Semiochemical repellence trapping
  - Preventative irrigation to increase resilience
  - Preventative insecticide + fungicide
  - Burial of infested material (CA partners)
- Outreach on detection and management

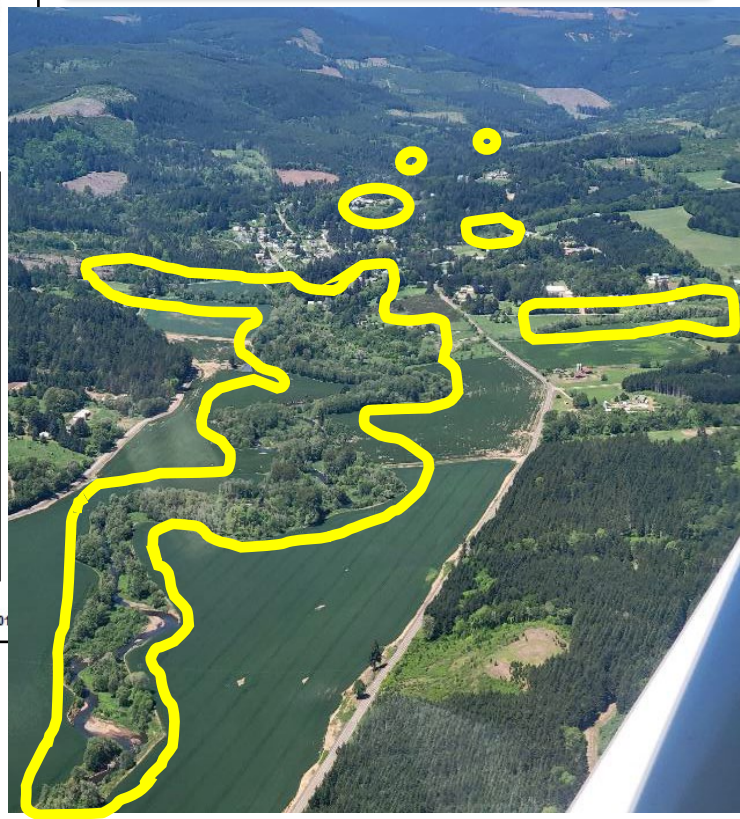


Emerald ash borer (EAB)

- Green adults get all the attention…
- It's the larvae that kill by tunneling and girdling trees
- Most of North American ash species (n=16) have no defense
- EAB has caused billions of dollars in losses and control measures
- **First detected in Forest Grove, 2022**

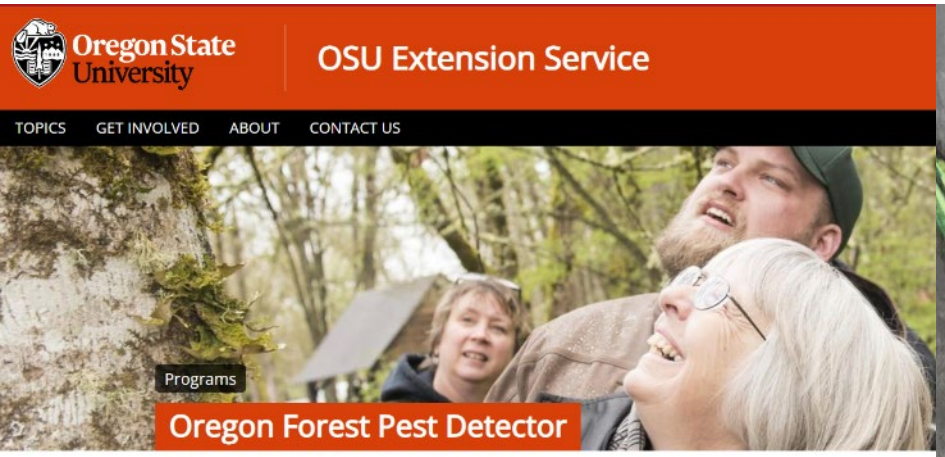
Ash in Oregon

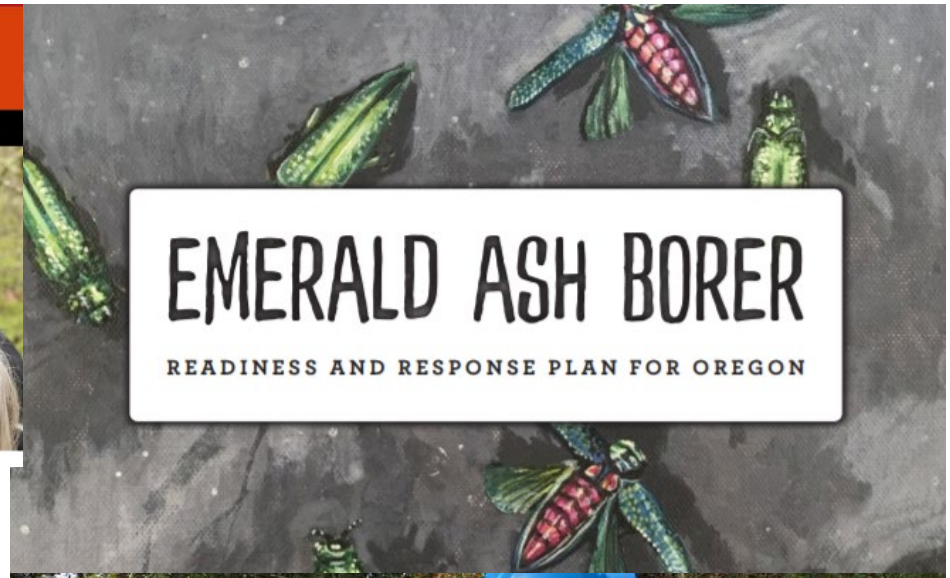


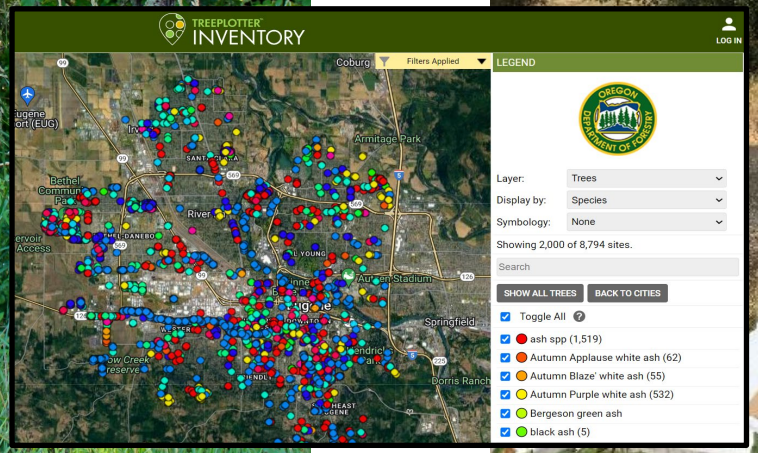


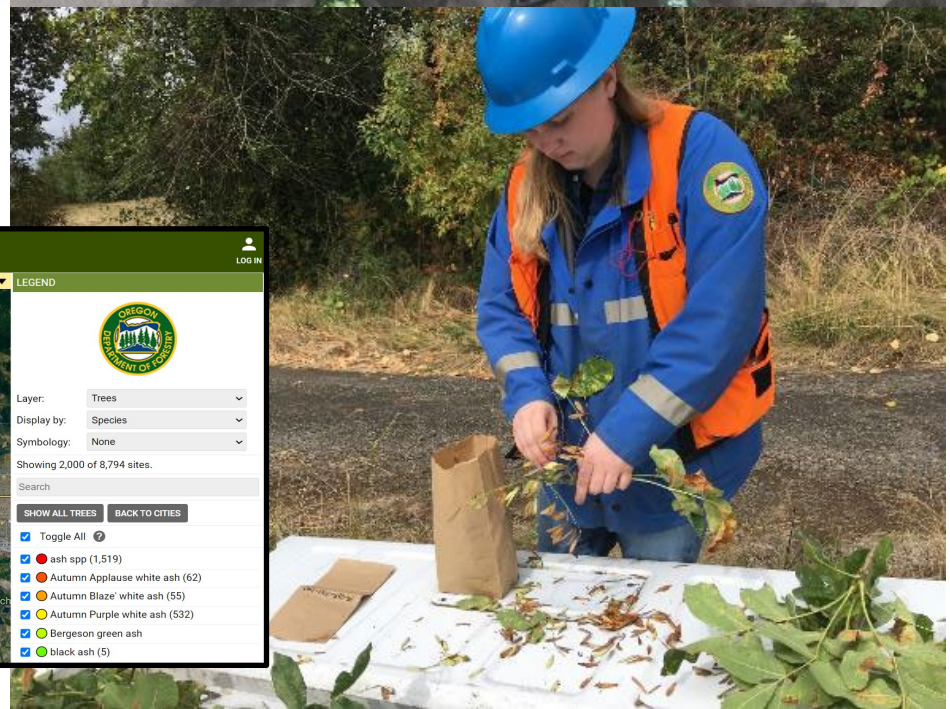
- Riparian areas in low valleys
- Urban trees

What have we done to prepare for EAB?









Current:

Oregon ash forest, Marion Co.
Oregon Dept. Forestry

Expected:

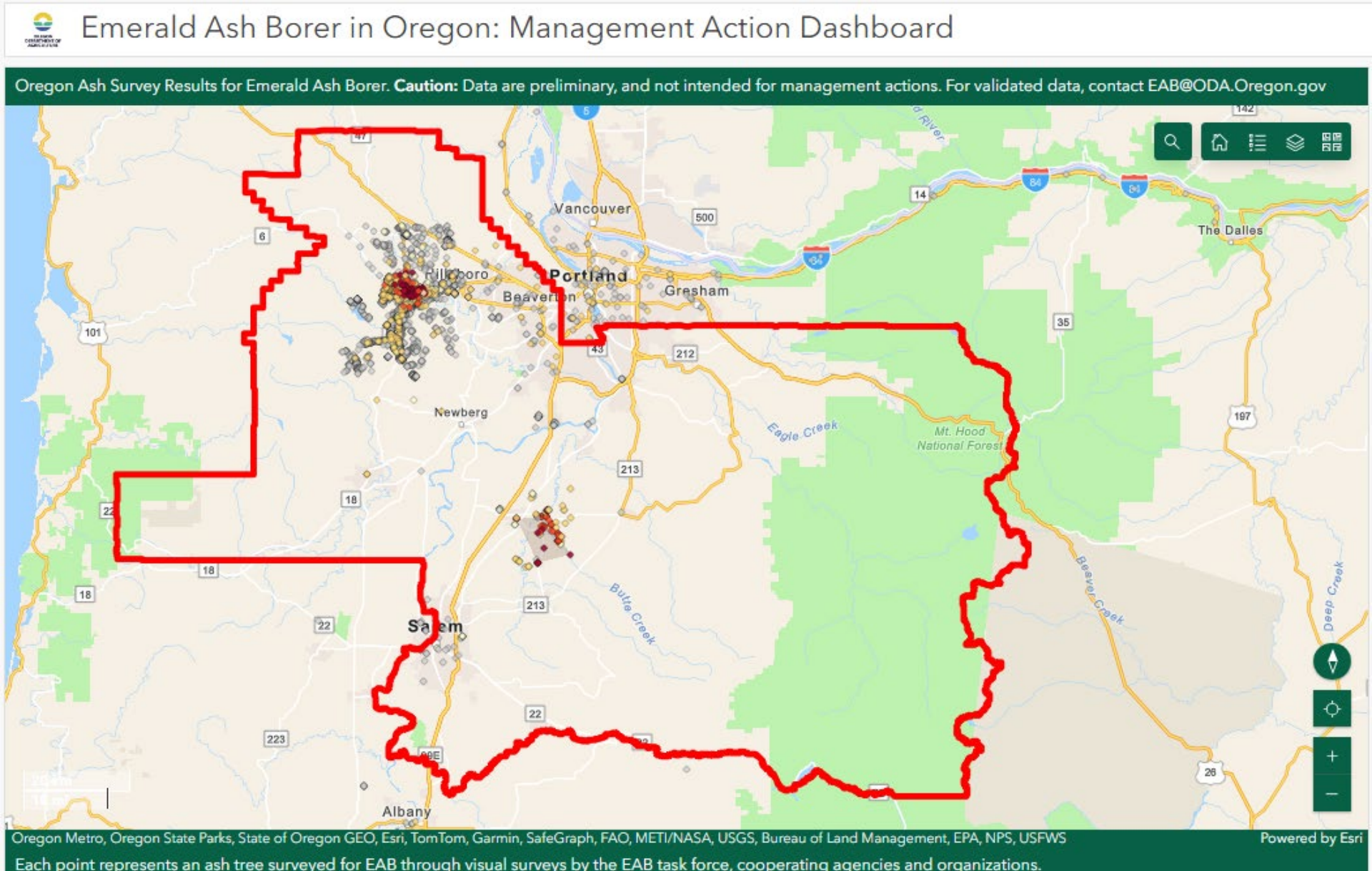
Dead/dying black ash
Virginia Dept. Forestry

EAB invasions are costly to urban forests

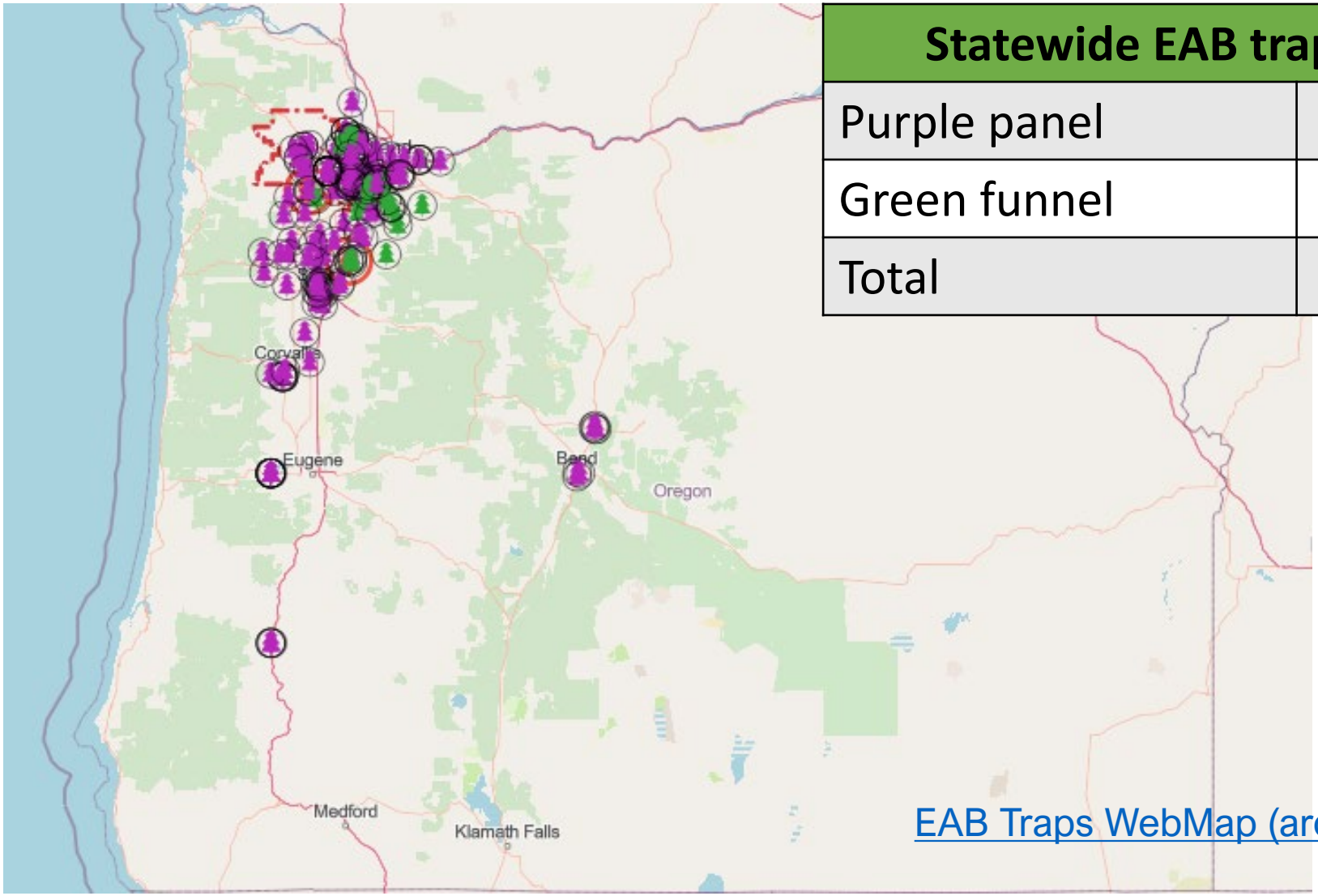
Federal government Expenditures	Local government Expenditures	Household Expenditures	Residential Property Value Loss	Timber Loss	Total
$92M	$1.7B	$760M	$830M	$130M	**$3.5B**

Aukema et al. 2011. PLoS one.

EAB current status in Oregon



ODF coordinates a statewide trap survey

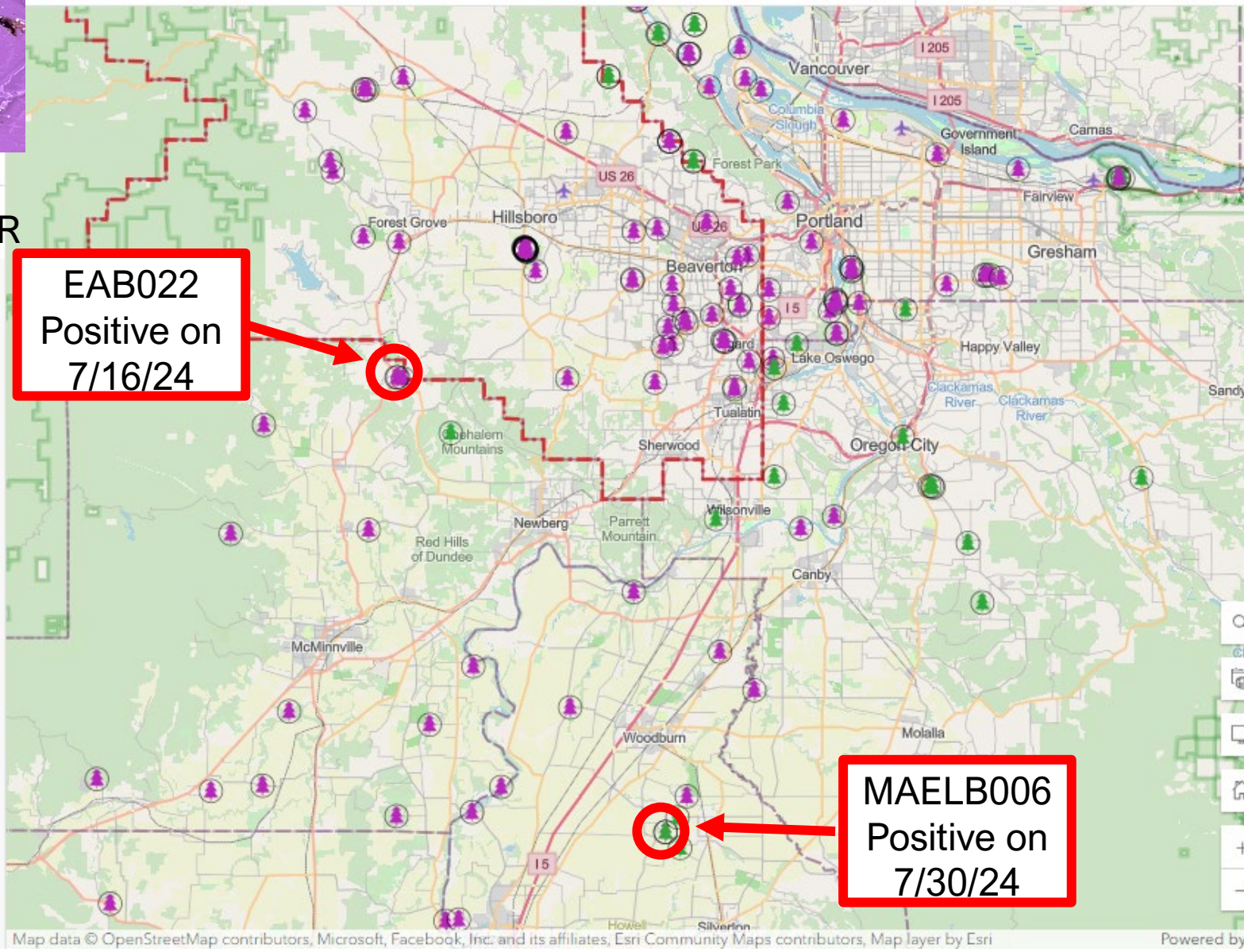


Statewide EAB traps	
Purple panel	169
Green funnel	28
Total	197

EAB Traps WebMap (arcgis.com)

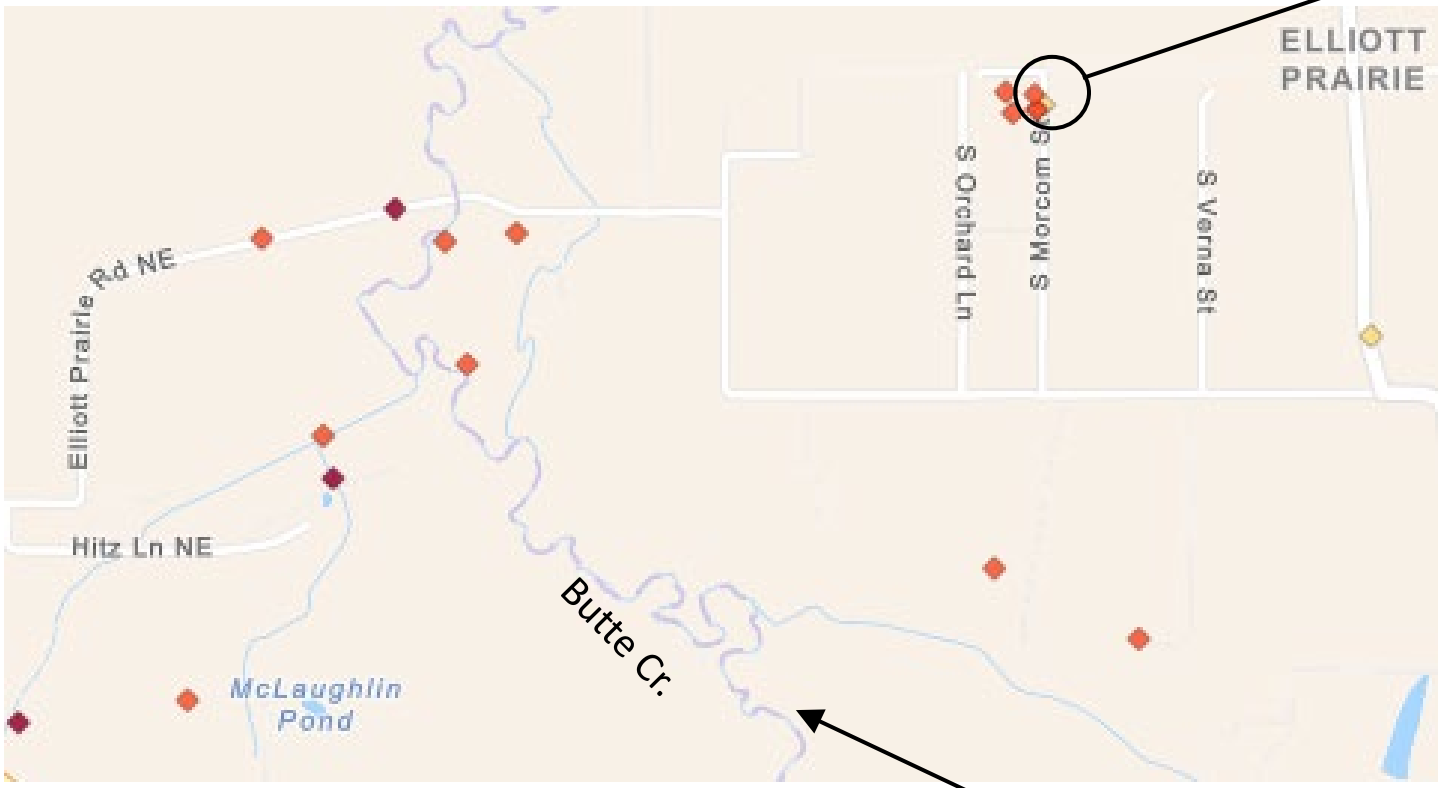
Positive traps in 2024

EAB on trap
Near Gaston, OR



New report from trained observer

Jul 16 report



Clack/Marion
county line

Scenes from Butte Creek area

Scenes from Butte Creek area

- **State quarantine**
  - Ash wood
  - Hardwood firewood
- **Exceptions:**
  - Wood treatments
  - Seasonal timing

OREGON DEPARTMENT OF AGRICULTURE FACT SHEETS AND PEST ALERTS

EMERALD ASH BORER QUARANTINE ALERT

OREGON DEPARTMENT OF AGRICULTURE

WASHINGTON, YAMHILL, MARION, CLACKAMAS COUNTIES, OREGON

A permanent quarantine is now in effect. Emerald ash borer (EAB) has been confirmed in three new counties, triggering an expansion of the quarantine. Tree materials of ash, olive, and white fringe tree, must remain within quarantined counties (Washington, Yamhill, Marion, Clackamas). Wood waste must be processed accordingly and disposed of.

Quarantine Boundary Map: *Quarantine applies to all of the infested counties, including federal, state, commercial, and private lands.*

Regulated Ash, Olive, & White Fringe Tree Materials

- Nursery stock
- Scion wood
- Bud wood
- Logs
- Roots and branches
- Stumps
- Green lumber
- Chips and mulch
- Firewood of hardwood species

Quarantine Exceptions

- Nurseries or groups that have a formal compliance agreement with ODA
- Seeds and leaves
- Processed lumber kiln dried, free of bark and material 1 inch below bark.
- Finished wood products without bark, including furniture, baskets, and baseball bats

Treatment Options for Regulated Materials

- Live plant material is eligible for complaince agreements with ODA if one of the following conditions is met:
  - Diameter at the base of the plants is less than 0.75 inches
  - Plants were grown in a screenhouse approved by the ODA
  - Plants have been properly treated with an approved insecticide
- Debark wood and remove at least 1 inch of underlying wood
- Grind or chip to 1 inch or less
- Heat wood to a minumum of 160°F for at least 60 minutes
- Bury under at least 12 inches of topsoil
- Incinerate wood materials
- Secondary processing to produce wood by-products (i.e. paper)
- Other methods specified within a complaince agreement with ODA

April 1 - September 30

Avoid felling ash, olive and white fringe trees, including branches,and stumps. Hazardous trees can be mitigated at any time. Chip or process as soon as possible on site. Avoid moving any woody material.

October 1 - March 31

Conduct tree removal and pruning during this time period. Transport trees and parts of trees to a facility within the quarantine zone where it will be processed before April 1st.

For more information please visit www.OregonEAB.com,
To suscribe to the EAB email list visit ODA.FYI/subscribe
For questions please email us at EAB@oda.oregon.gov or call 503-986-4636
Oregon Department of Agriculture • 635 Capitol St NE, Salem, OR 97301 • 1-800-525-0137

August 2024

ODF's continued response to EAB

- EAB Task Force (led by ODA)
- Outreach to Oregon's Communities
- Survey and monitoring of EAB
- Training landowners, governments, industry, etc.
- Quarantine awareness, firewood
- Genetic screening

Japanese cedar longhorn beetle

- Detected in Portland, 2023
- Since 1997, pest in eastern U.S.:
  - Arborvitae (Thuja occidentalis)
  - Eastern red cedar (Juniper virginiana)
- Potential hosts in Oregon:
  - Junipers (3 species)
  - Western red cedar (Thuja plicata)
  - Port-Orford-cedar and Alaska cedar?
  - Incense cedar, redwood?
  - Other ornamentals?

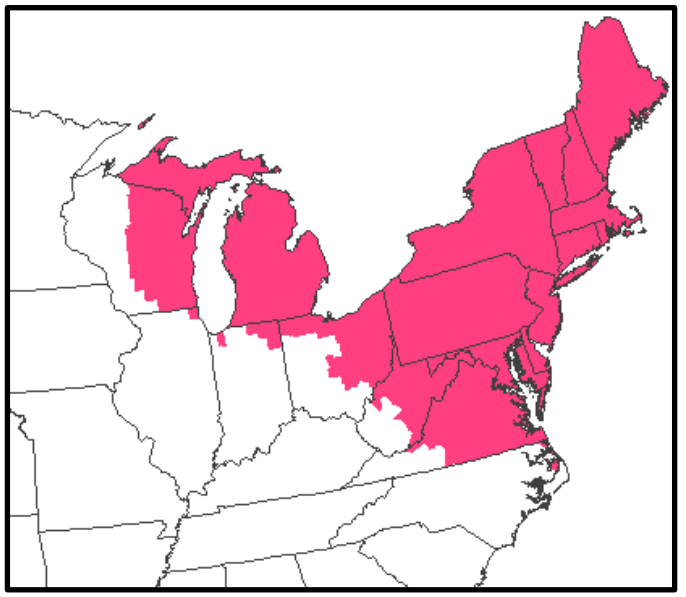
Pest Outlook: Unknown

Spotted lanternfly

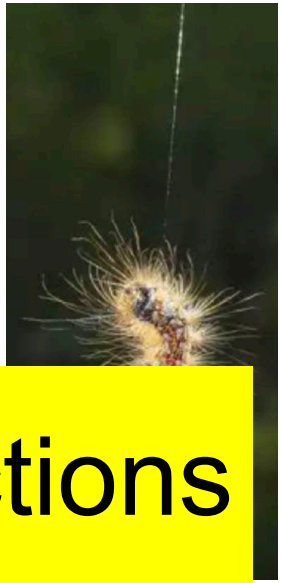
- Over 100 known host plant: tree of heaven (noxious weed), grape, hop, apple, maple, poplar, walnut and willow
- Introduced to U.S. 2014, now in 14 eastern states. Detected in Oregon in 2020
- Kills by sucking sap; excrement leads to sooty mold, stunting plant growth

Pest Outlook: Nuisance, crops

Spongy Moth Complex



- Several species
- 500+ host species, including Doug-fir
- Great tools for early detection
- Ongoing introduction pressure



Pest Outlook: continued introductions

Phytophthora austrocedri

- Highly invasive in UK (common juniper), Argentina (Chilean cedar)
- 2024: plant nursery Will. Valley
- Potential hosts in Oregon:
  - Junipers (3 species)
  - Western red cedar (Thuja plicata)
  - Port-Orford-cedar and Alaska cedar?
  - Incense cedar, redwood?
  - Other ornamentals?

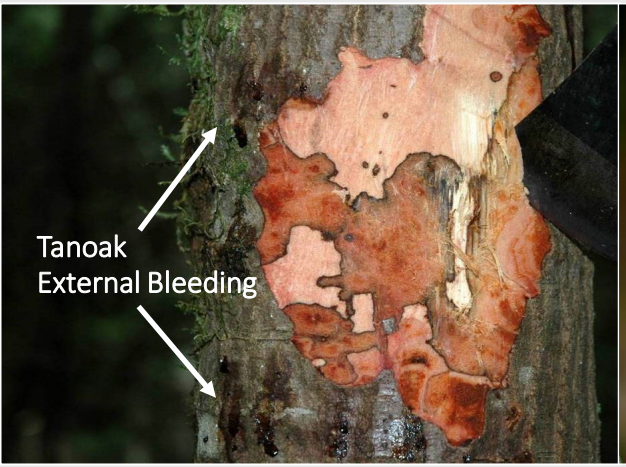
Pest Outlook: High alert

Sudden Oak Death (SOD)

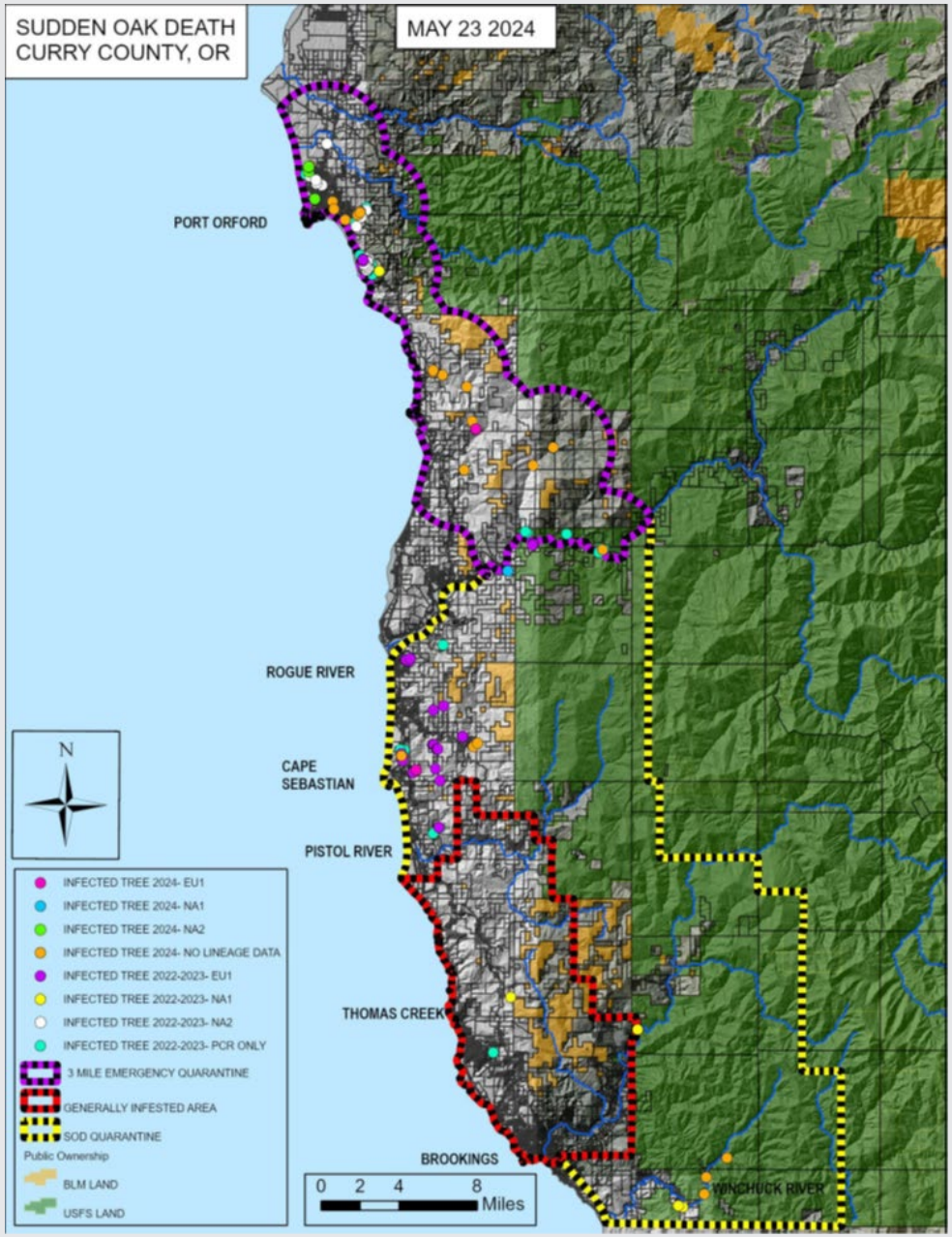
Caused by *Phytophthora ramorum*

Tanoak (*Notholithocarpus densiflorus*) is the key host species

- Tanoak is readily infected and killed by *Phytophthora ramorum* and is the main spore producer
- It may take months or years for an infected tree to die
- Many plant species (>100) infected; only when near infected tanoak

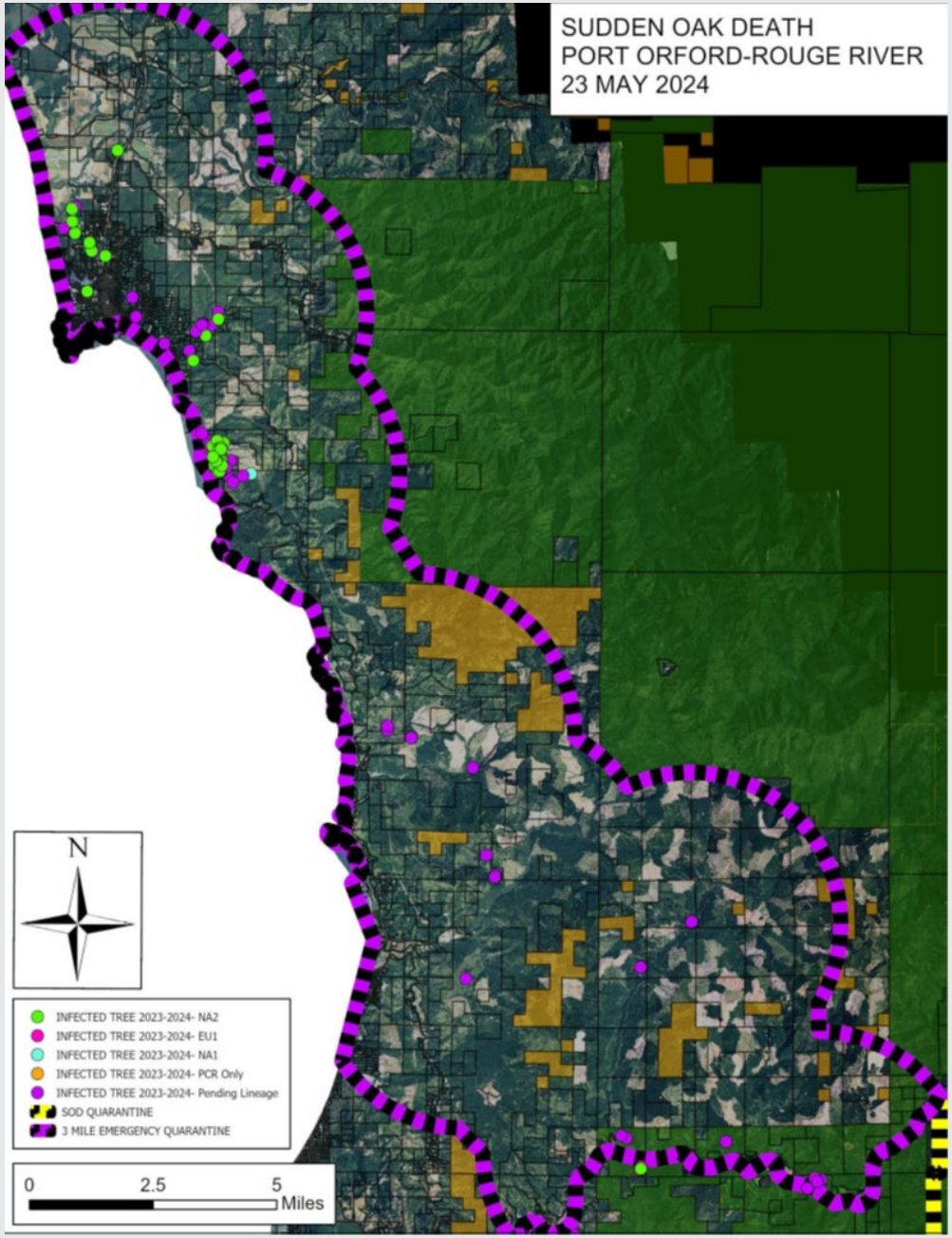


Sudden Oak Death in Oregon



- Collaboration: ODF, ODA, US Forest Service, BLM and OSU
- The interagency slow-the-spread program continues
  - Treated: 9,000 + acres
- New detection of SOD outside state quarantine:
  - Humbug Mountain

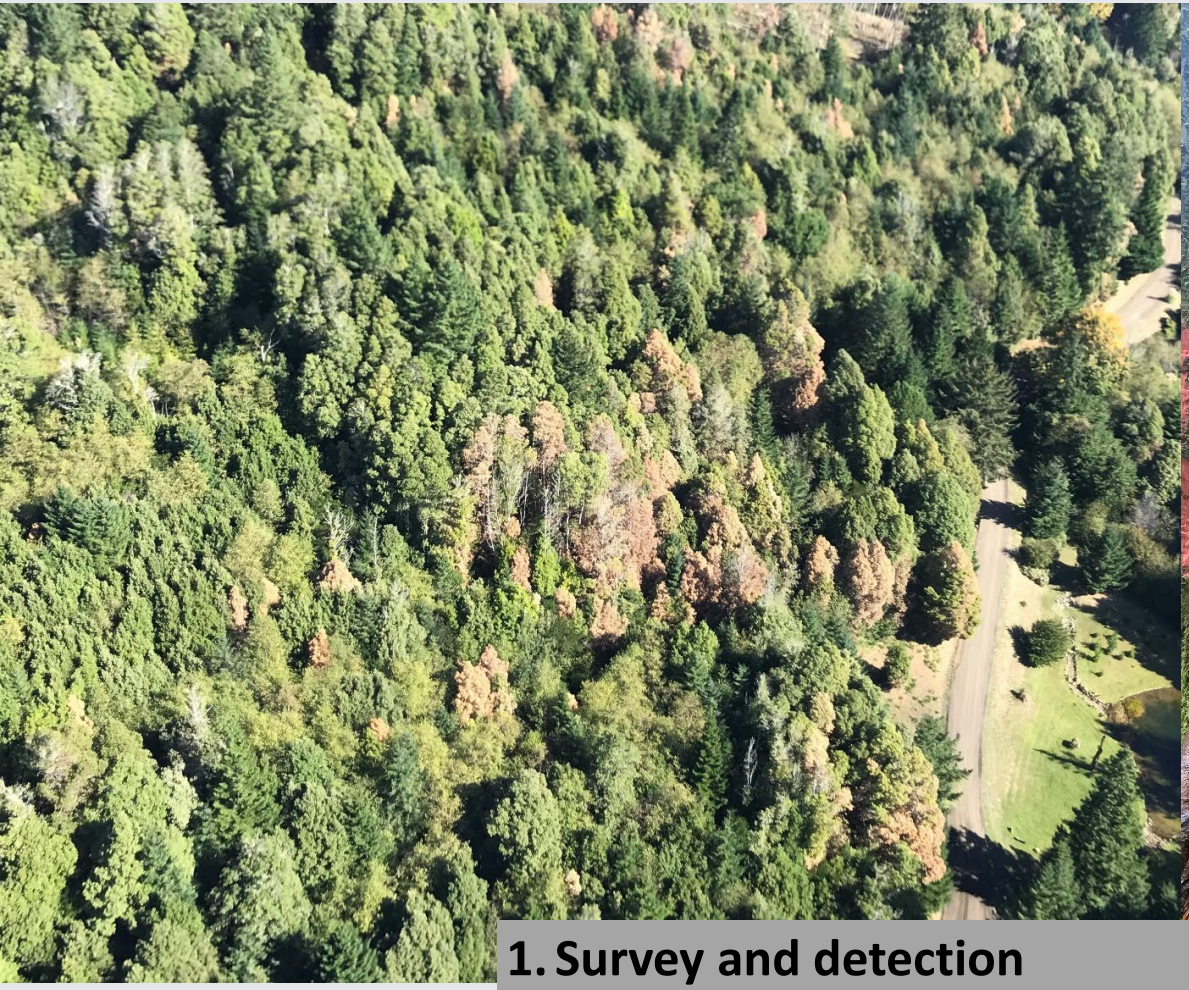
SOD in Humbug Mountain



SOD found 1.5 miles south of Port Orford

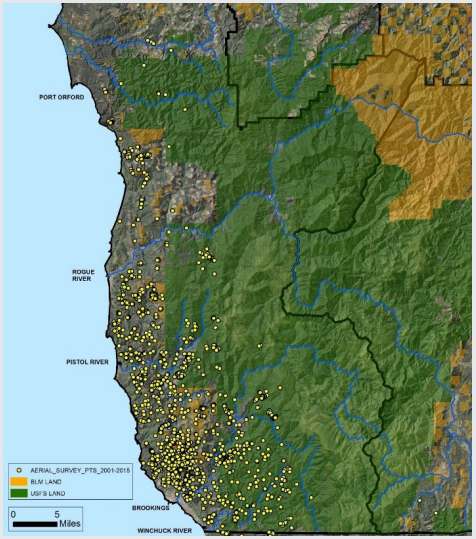
- Trees sampled by SOD forester in December 2022
- 8 new infested sites outside of Quarantine
- Infected trees were submitted to ODA and USDA APHIS for confirmation of *P. ramorum*
- New detections triggered expansion of Emergency Quarantine – to 148 sq miles

Sudden Oak Death Program in Oregon



1. Survey and detection
2. Delimitation of infected sites
3. Treatment of infected sites
4. Regulation / education
5. Monitoring / research

Survey and detection



Early Detection: Aerial Surveys with ground checks

- Recently dead (brown foliage) trees only.
- Four helicopter surveys and one fixed-wing survey

OREGON DEPARTMENT OF FORESTRY

Delimitation, treatment of infected sites

- Cut, pile, and burn tanoak.
- Larger treatment areas (300-600 ft buffer) most effective
- No cost to private landowners where treatment is required by quarantine rule, but no compensation for loss.

Economic Implications

1,200 jobs and $57.9 million in annual wages at risk per year (Highland Economics et al. 2019)

Impacts to cultural practices with great historic and traditional meaning—acorn gathering, materials for basket weaving, hunting—are already compromised by SOD

Reduced rural residential property value; loss of real estate transaction revenues

Sudden Oak Death Economic Impact Assessment

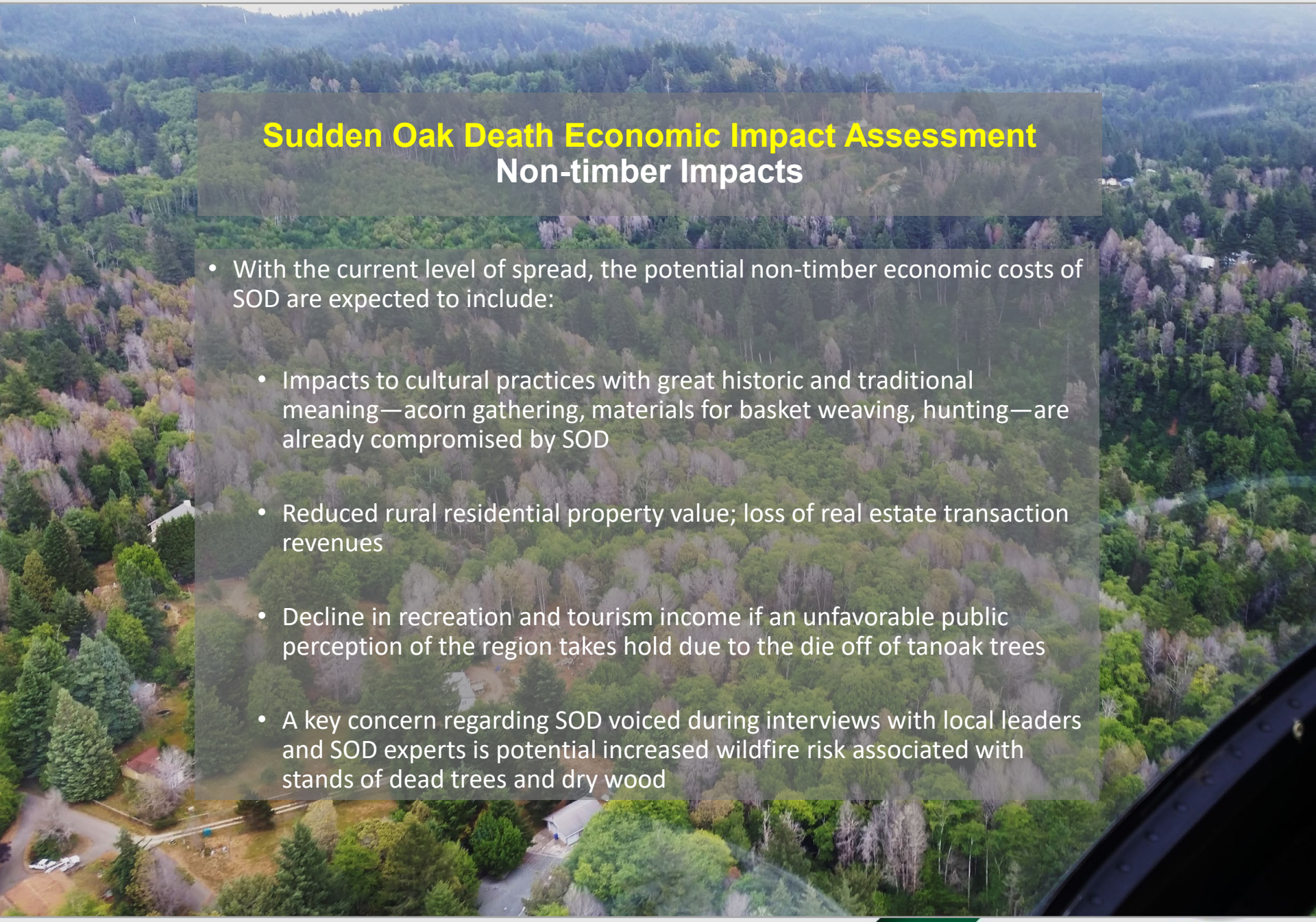
- The assessment examined timber-based economic impacts:
  - Since the discovery of SOD in 2001 up until 2018
  - Potential future economic impacts from 2019 through 2038, for the four-county region of Coos, Curry, Douglas, and Josephine County.
    - Under three scenarios:
      - Halting current treatment regime
      - Current service level
      - Focused EU1
- The assessment also examined non-timber impacts, many of which are hard to quantify in economic value.
  - These included:
    - Property values
    - Ecosystem Services
    - Cultural values
    - Wildfire risk

Sudden Oak Death Economic Impact Assessment
Timber Impacts

- Current Impacts
  - No detectable job and wage losses from 2001-2018

Funding SOD treatments for a total cost of $30 million over the next 20 years could offset loss of 1,200 jobs by 2028 and $580 million in wages over the course of 10 years.

  - If the Oregon SOD treatment regime were terminated as of January 1, 2019, impacts might occur as SOD expands to Coos County, which could happen as soon as 2028 (could be offset to 2038):
    - Sanctions on southwest Oregon timber exports by China, Japan, and/or Korea
    - Loss of 1,200 jobs related to timber export; $57.9 million in annual wages
    - Reduction of timber harvest by 15%
    - Decline of rural residential property value



Sudden Oak Death Economic Impact Assessment
Non-timber Impacts

- With the current level of spread, the potential non-timber economic costs of SOD are expected to include:
  - Impacts to cultural practices with great historic and traditional meaning—acorn gathering, materials for basket weaving, hunting—are already compromised by SOD
  - Reduced rural residential property value; loss of real estate transaction revenues
  - Decline in recreation and tourism income if an unfavorable public perception of the region takes hold due to the die off of tanoak trees
  - A key concern regarding SOD voiced during interviews with local leaders and SOD experts is potential increased wildfire risk associated with stands of dead trees and dry wood

How are invasive pests getting here?

1. Live plant trade (~70% of species)
2. Wood packing material (~25% of species)

Liebhold et al. 2012

Inspections at ports of entry

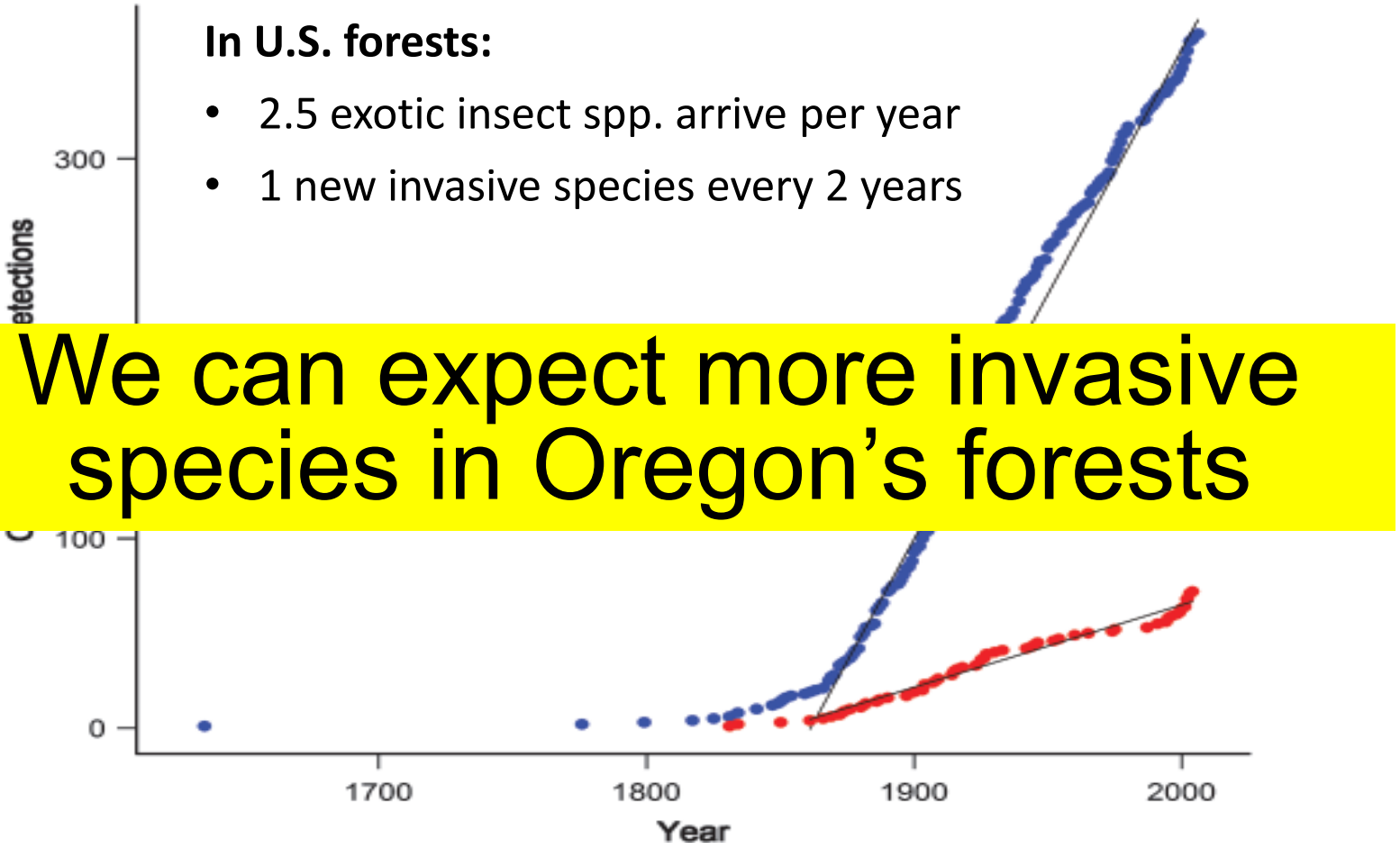
- Regulated by USDA Animal and Plant Health Inspection Service
- Shipments inspected at stations at 17 ports
- ~3 billion live plants in 100,000 shipments imported per year
- **About 3-12% of shipments have live insects/pathogens**

Data from just 24 key plant genera in 2009 at Ports of Entry

	Standard "quick" inspections	Quality control inspections
Total shipments	24,781	996
Infested shipments	810	118
Infested rate	3.3%	11.9%

Liebhold et al. 2012

Despite safeguards, invasions continue



We can expect more invasive species in Oregon's forests

Blue = All non-native forest insects
Red = Invasive forest insects and disease

Aukema et al. 2010.

Questions?