

The Health of Oregon Forests

David Shaw

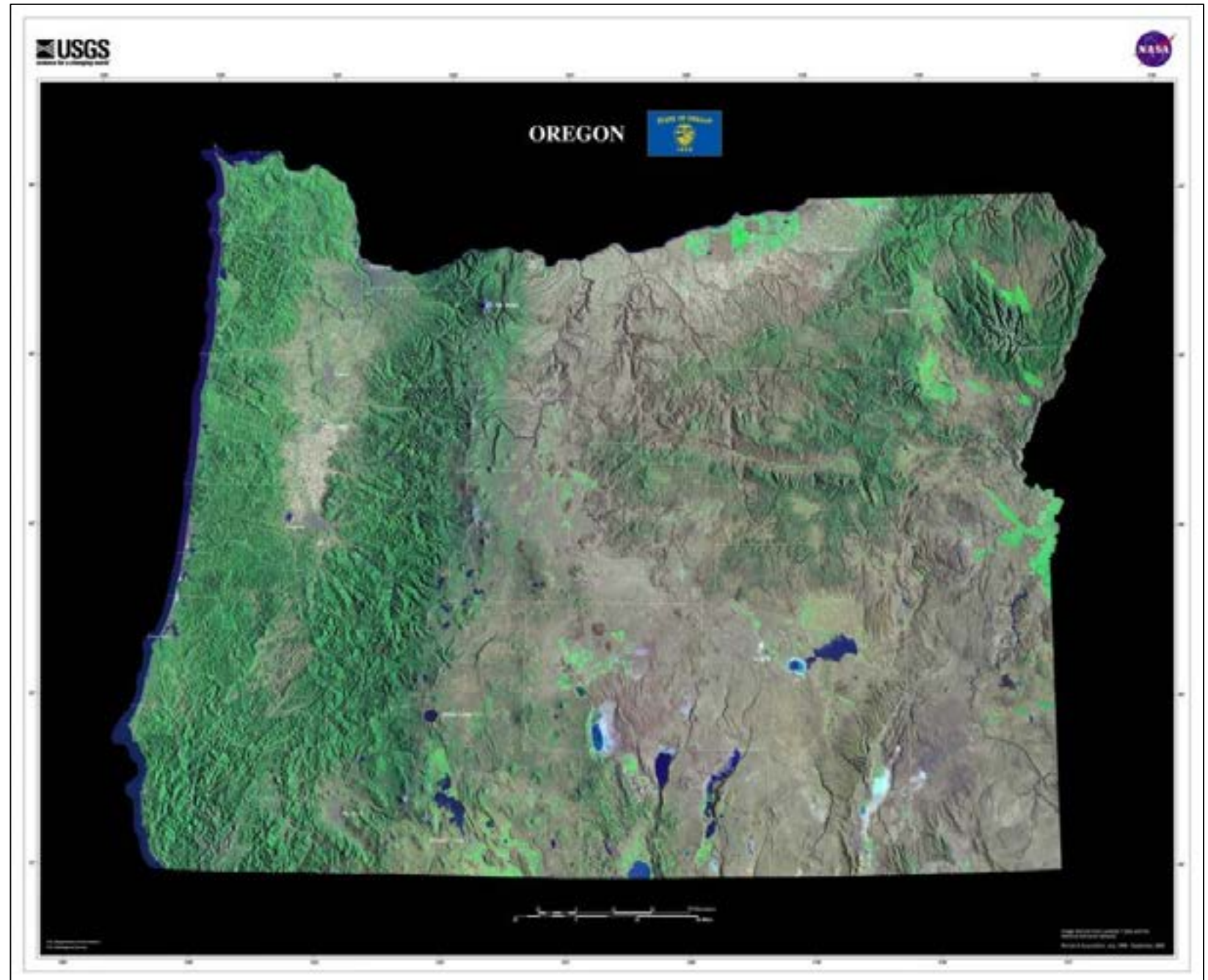
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Forest Health Defined

- Well, that isn't very easy.....
- It is personal
- You define forest health based on your experiences and instincts.
- Individual tree health
- Forest health



Mt. Pine Beetle mortality in lodgepole pine, Freemont-Winema NF

Scientific attempt at an objective perspective

- Growth (economic) losses to plantations and managed forests from biotic and abiotic factors.
- Extent and severity of outbreaks, epidemics, droughts, fires etc.
- Tree mortality: annual rate
- Changes in Net Primary Productivity and carbon sequestration
- Biodiversity losses



Port Orford Cedar mortality from POC root disease

Data from Forest Inventory and Assessment 29,195,481 acres of forests in Oregon

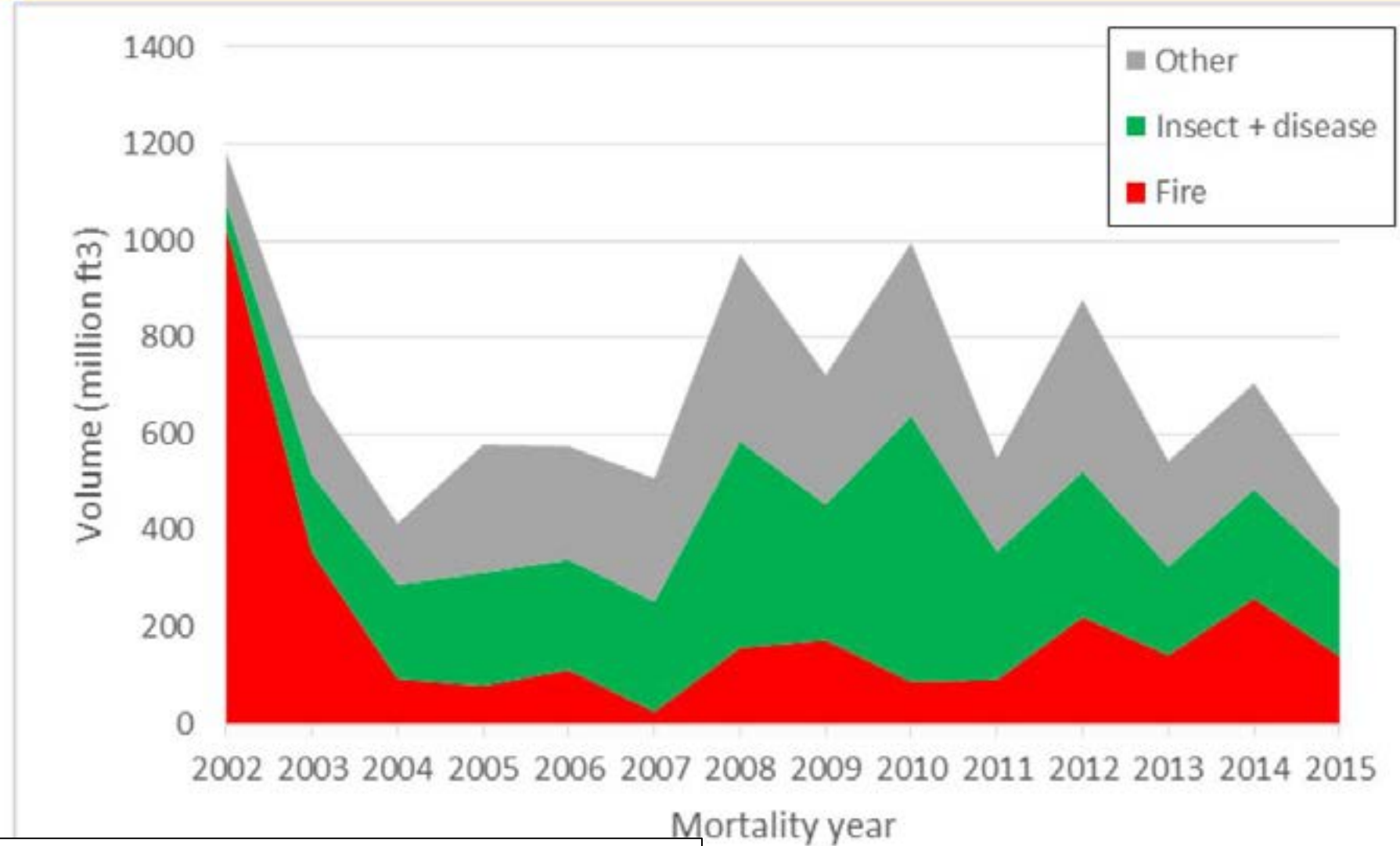
Trees - **Percent**

- Live 9,674,000,000
- Mortality/yr 171,000,000-**1.8%**
- Cut/yr 40,000,000-**0.4%**



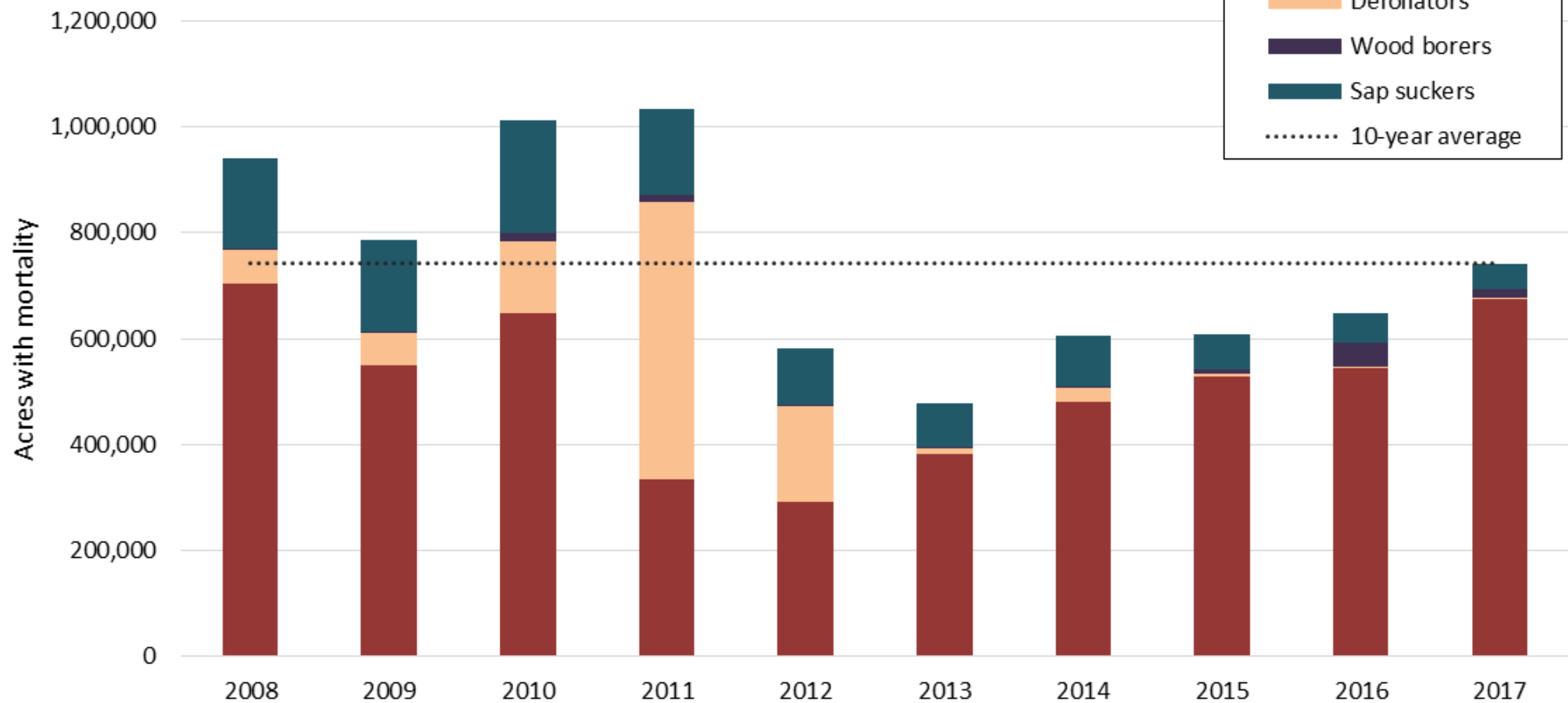
Severe Swiss needle cast near Tillamook, Oregon

Timing and cause of mortality



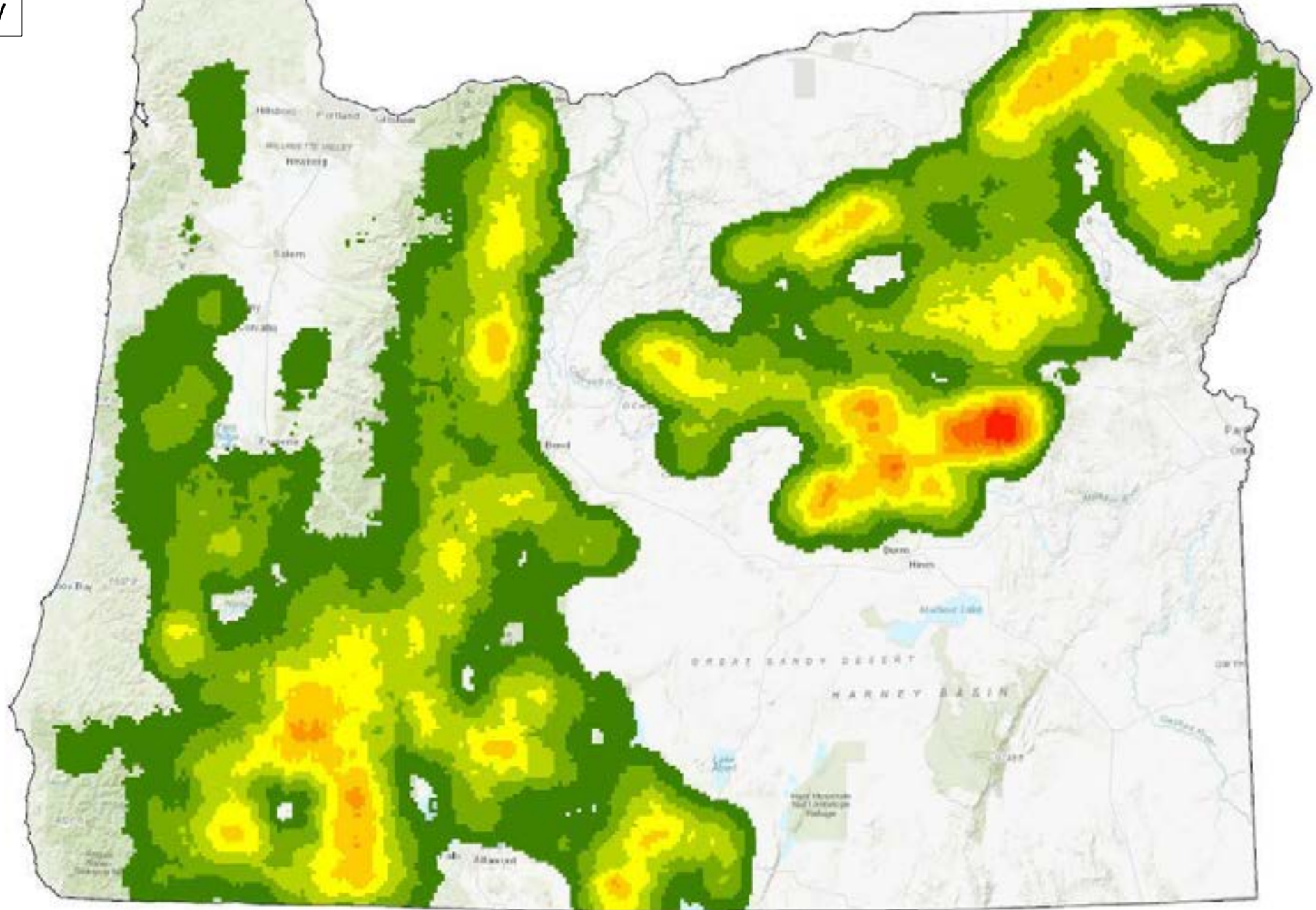
Andy Gray, USFS, FIA Analyst from Forest Health Conference

Forest Insect Damage



Christine Buhl,
OR Dept. Forestry

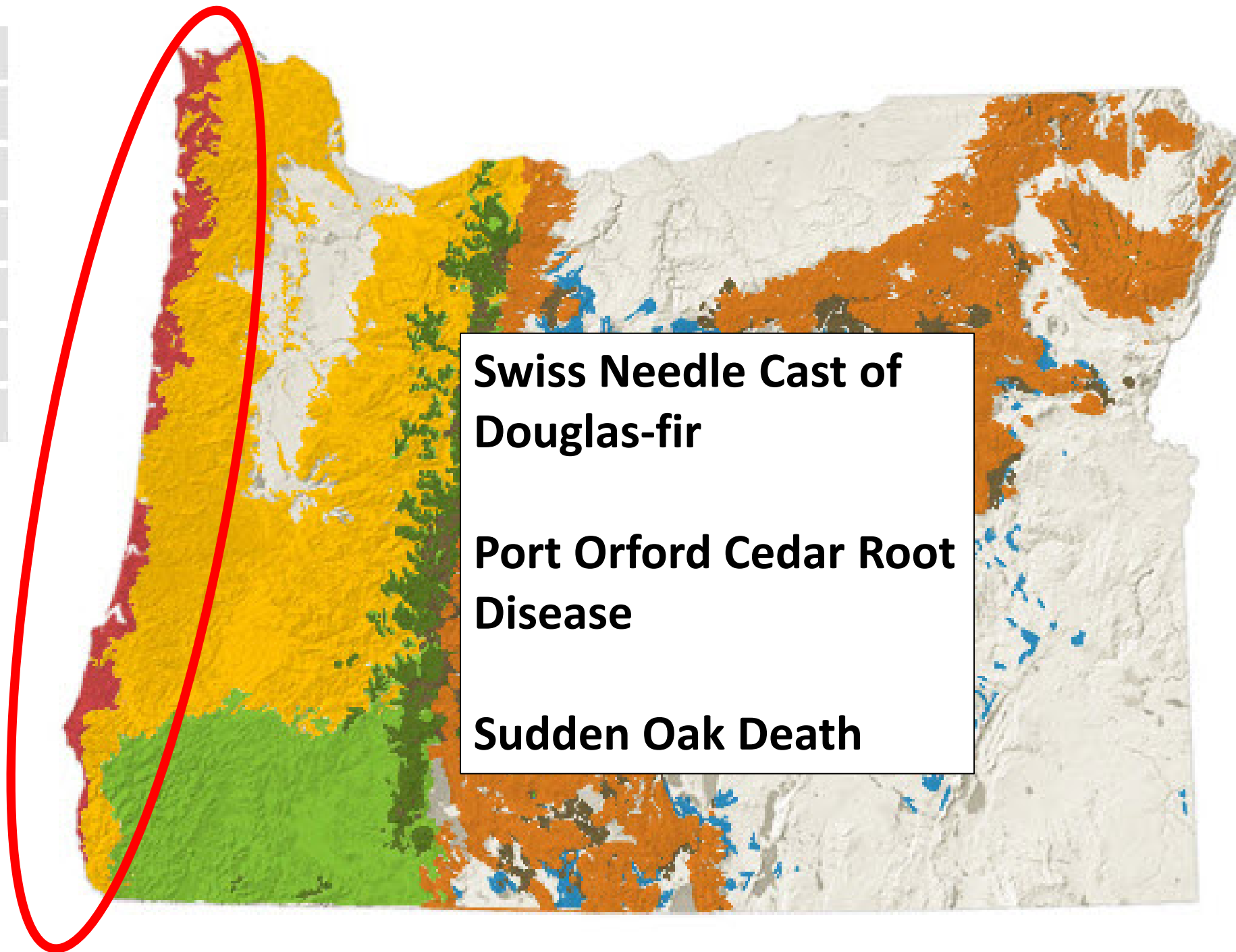
2017 Insect Intensity Map





Oregon Department
Of Forestry Map

Coast and
Coast Range
Forests



Visible symptoms of the stand (photo Rob Flowers, ODF)



1996



SMC SYMPTOMS
 Moderate
 Severe

2004



SMC SYMPTOMS
 Moderate
 Severe

2013



SMC SYMPTOMS
 Moderate
 Severe

2014

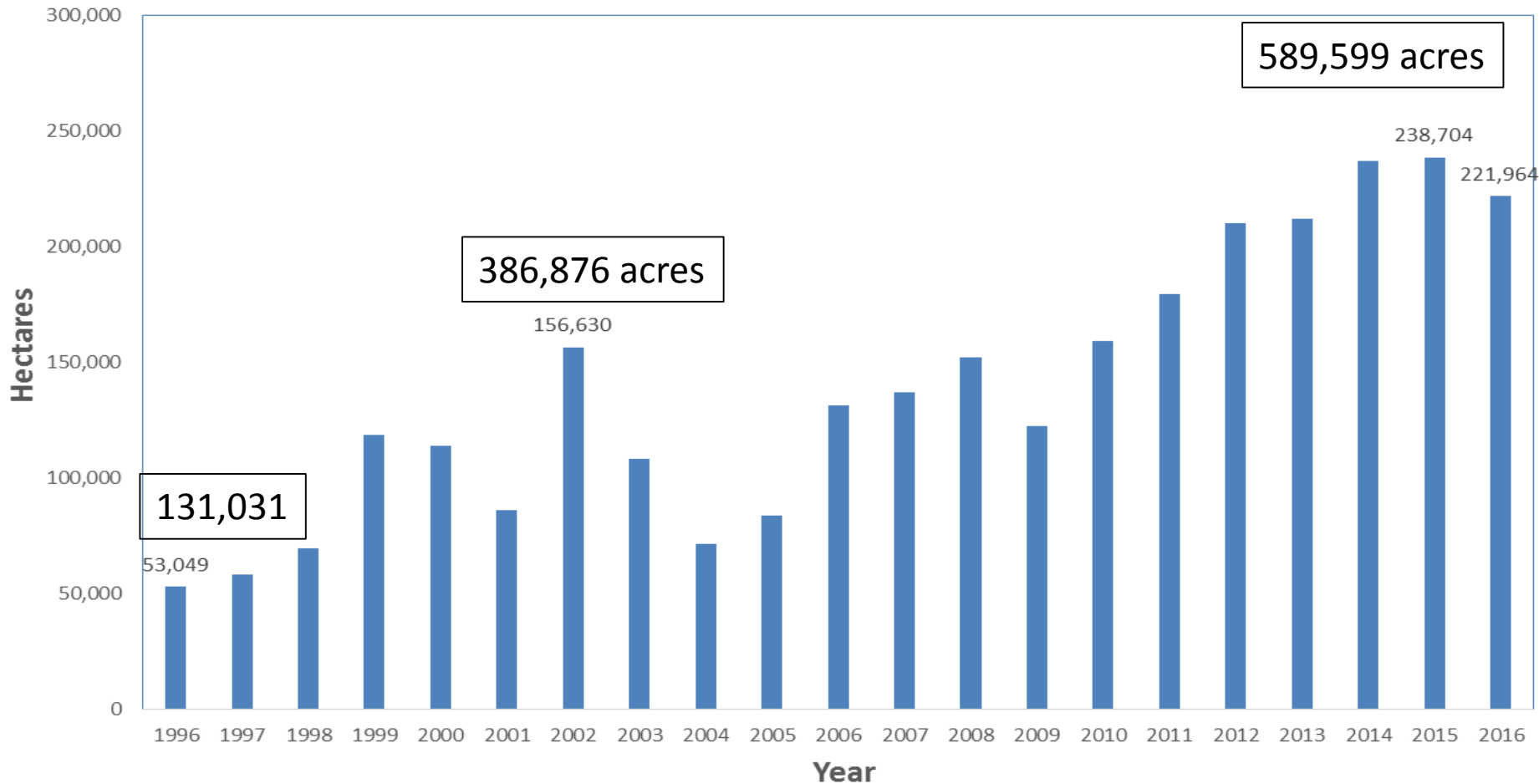


SMC SYMPTOMS
 Moderate
 Severe

Swiss Needle Cast in Oregon
2016 = 548,251 acres

Cooperative Aerial Survey
ODF/USFS FHP 1996-2016

Area of Douglas-fir forest with Swiss needle cast symptoms, 1996-2016



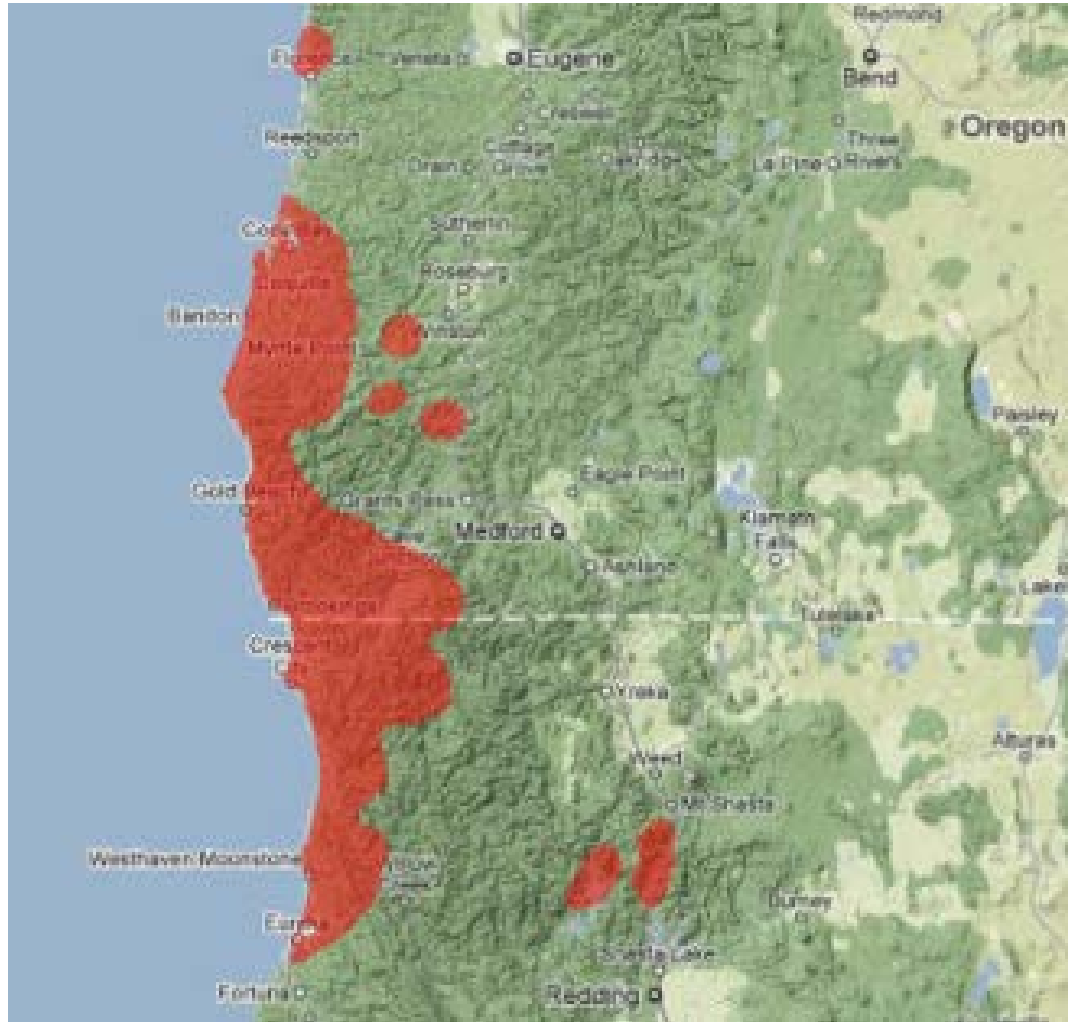
SNCC Website: <http://sncc.forestry.oregonstate.edu/>



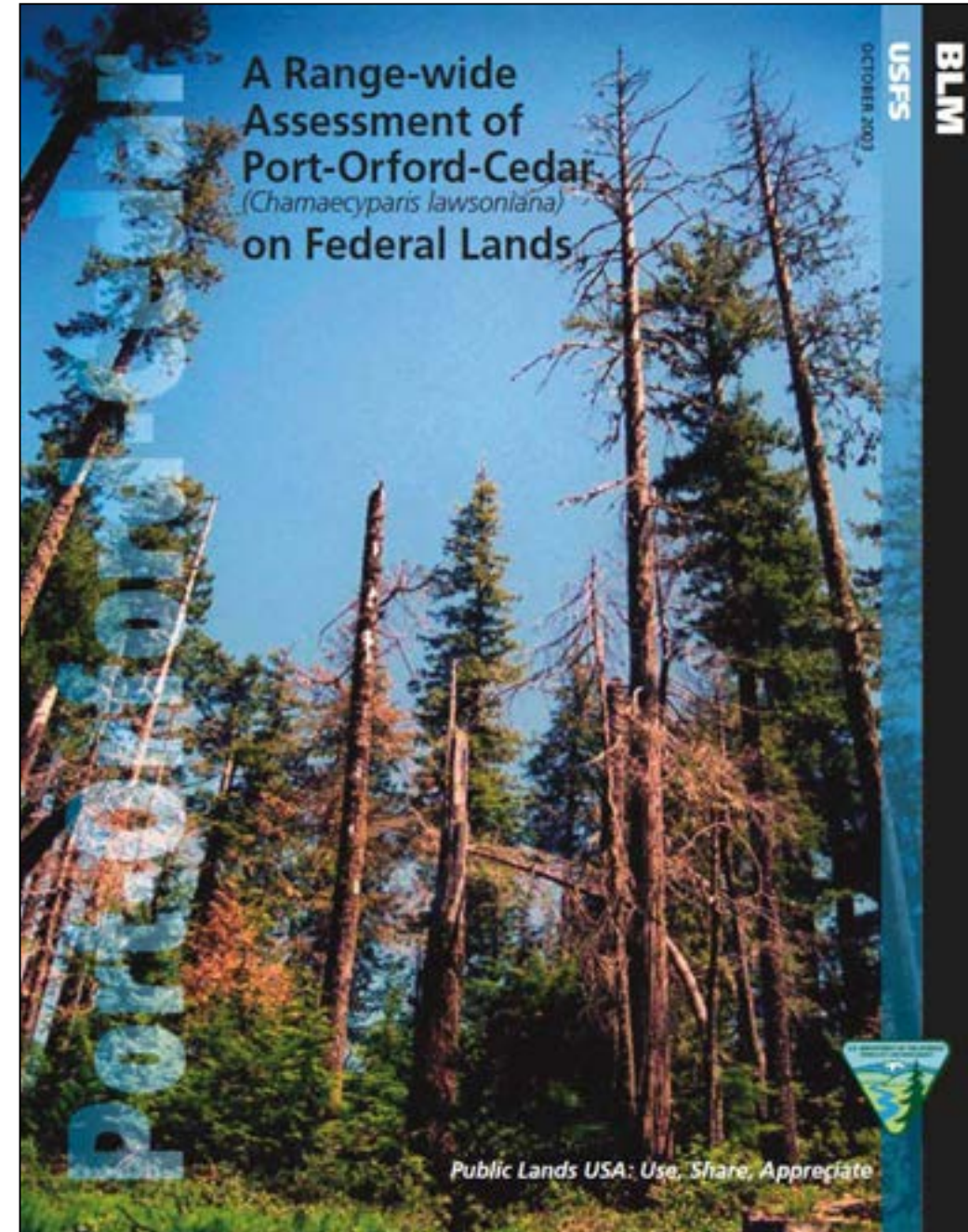


Cut, pile, and burn tan oak, BLM

Range of Port Orford Cedar



From: South Slough National Estuarine Research Reserve website



SPRUCE-HEMLOCK

DOUGLAS-FIR

MIXED CONIFER

SUBALPINE

JUNIPER WOODLANDS

LODGEPOLE PINE

PONDEROSA PINE

Oregon Department
Of Forestry Map

Westside Valleys
Dry Interior, and
Klamath and
Siskiyou Mts.

Douglas-fir mortality and dieback

Grand fir mortality

Associated with Drought

**Flat headed fir borer (a Buprestid wood borer)
Especially in the south, but also in Valley**

**Douglas-fir beetle northern region and higher
elevation**

Fir Engraver in grand fir/white fir

U.S. Drought Monitor West

October 6, 2015

(Released Thursday, Oct. 8, 2015)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	25.71	74.29	57.06	42.43	26.44	7.62
Last Week 9/29/2015	22.77	77.23	57.81	42.42	26.50	7.62
3 Months Ago 7/7/2015	22.40	77.60	61.14	43.04	18.67	7.26
Start of Calendar Year 12/30/2014	34.76	65.24	54.48	33.50	16.68	5.40
Start of Water Year 9/29/2015	22.77	77.23	57.81	42.42	26.50	7.62
One Year Ago 10/7/2014	31.51	68.49	55.52	35.65	19.95	8.90

Intensity:

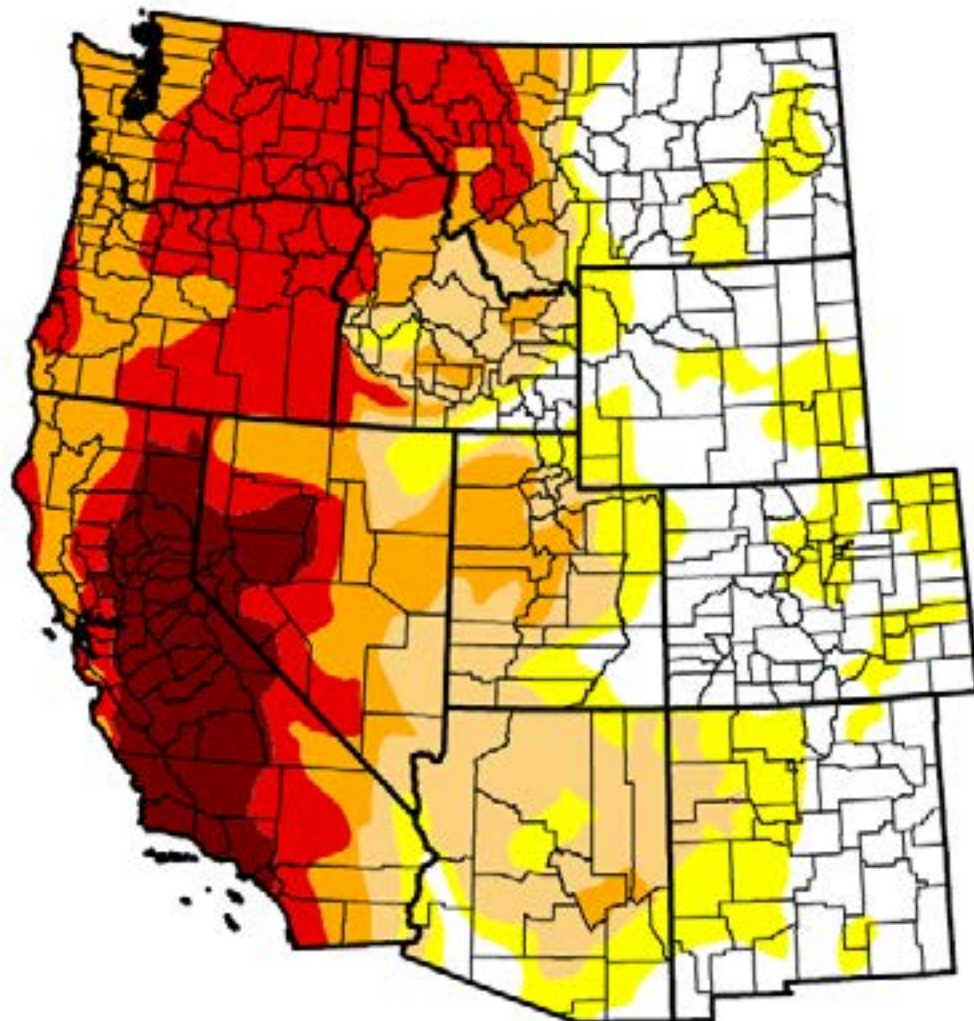
 D0 Abnormally Dry	 D3 Extreme Drought
 D1 Moderate Drought	 D4 Exceptional Drought
 D2 Severe Drought	

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

David Miskus

NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>







**Flatheaded fir
borer** in
Douglas-fir,
(*Phaenops
drummondi*,
Coleoptera:
Buprestidae)



“Classic” flatheaded fir borer mortality pattern of Douglas-fir. Edges and among oaks. Photo: Bill Schaupp

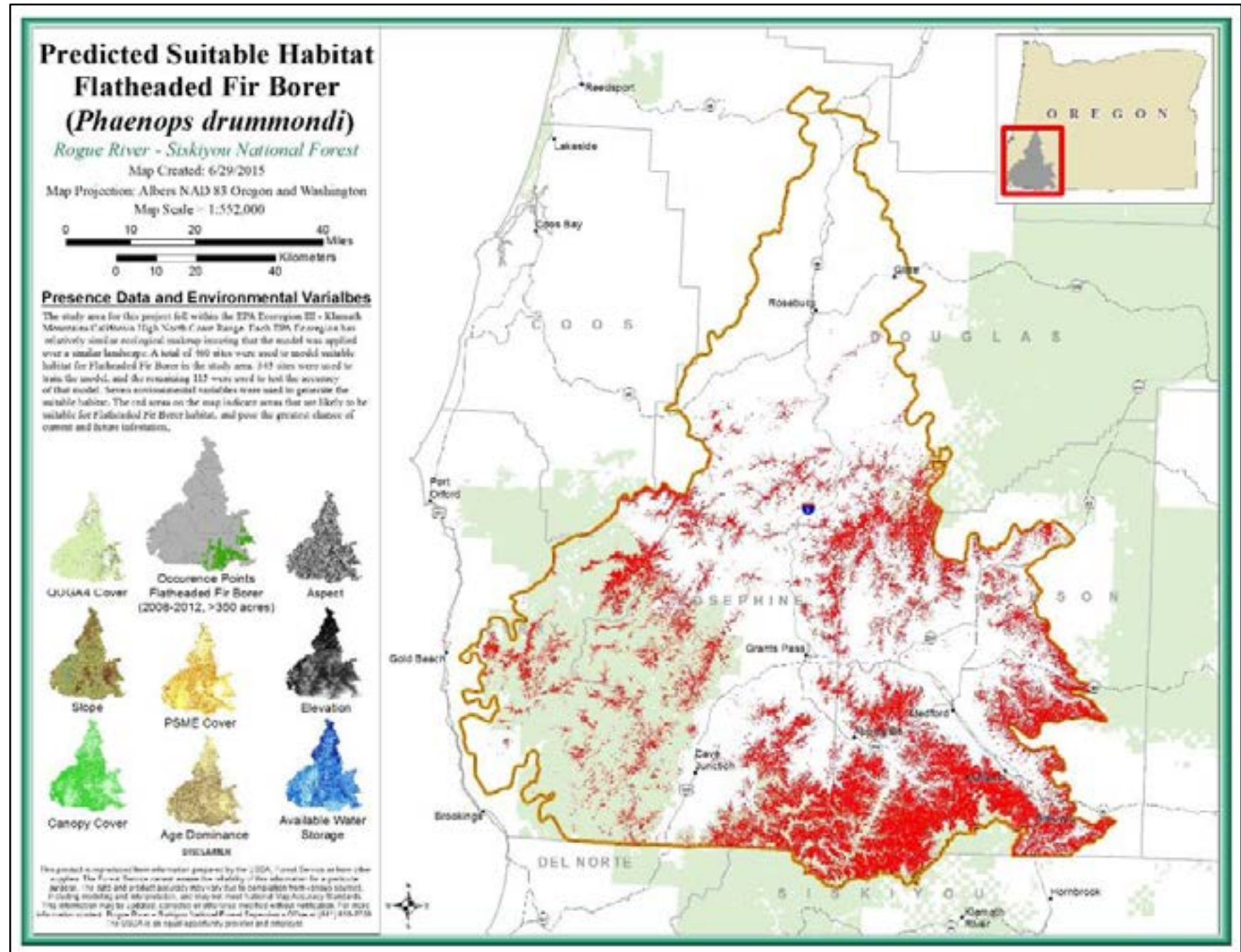
B. Schaupp, USFS

Risk Map for Flatheaded Fir Borer in Southern Oregon (Klamath Mts.)

Max Bennett, OSU FNR Ext.

Associated with:
Ann. Precip < 40 inches
Elevation 1,500-3,500ft

NOT:
Aspect
Heat Load index
Slope position
Slope
Density Canopy Cover
Age





SPRUCE-HEMLOCK

This map shows the distribution of various forest types in the Cascade Montane High Elevation Forests. The map is color-coded according to the legend: Spruce-Hemlock (dark red), Douglas-Fir (yellow), Mixed Conifer (green), Subalpine (dark green), Juniper Woodlands (blue), Lodgepole Pine (brown), and Ponderosa Pine (orange). The map shows a complex pattern of these forest types, with a large area of Subalpine forest in the center and a large area of Ponderosa Pine forest on the right. A red line is drawn across the map, starting from the top left, curving around the top right, and then curving around the bottom left.

DOUGLAS-FIR

MIXED CONIFER

SUBALPINE

JUNIPER WOODLANDS

LODGEPOLE PINE

PONDEROSA PINE

Oregon Department
Of Forestry Map

Cascade Montane
High Elevation
Forests

Snowpack and drought

True fir mortality

Balsam woolly adelgid in subalpine fir...serious

Fir engraver, silver fir beetle

Warmer winters: reduced snowpack

- In Montane forests, snowpack is the lifeline
- Without snowpack, many trees will suffer
- Summer water stress increases
- Noble fir, pacific silver fir, Mt. hemlock, subalpine fir

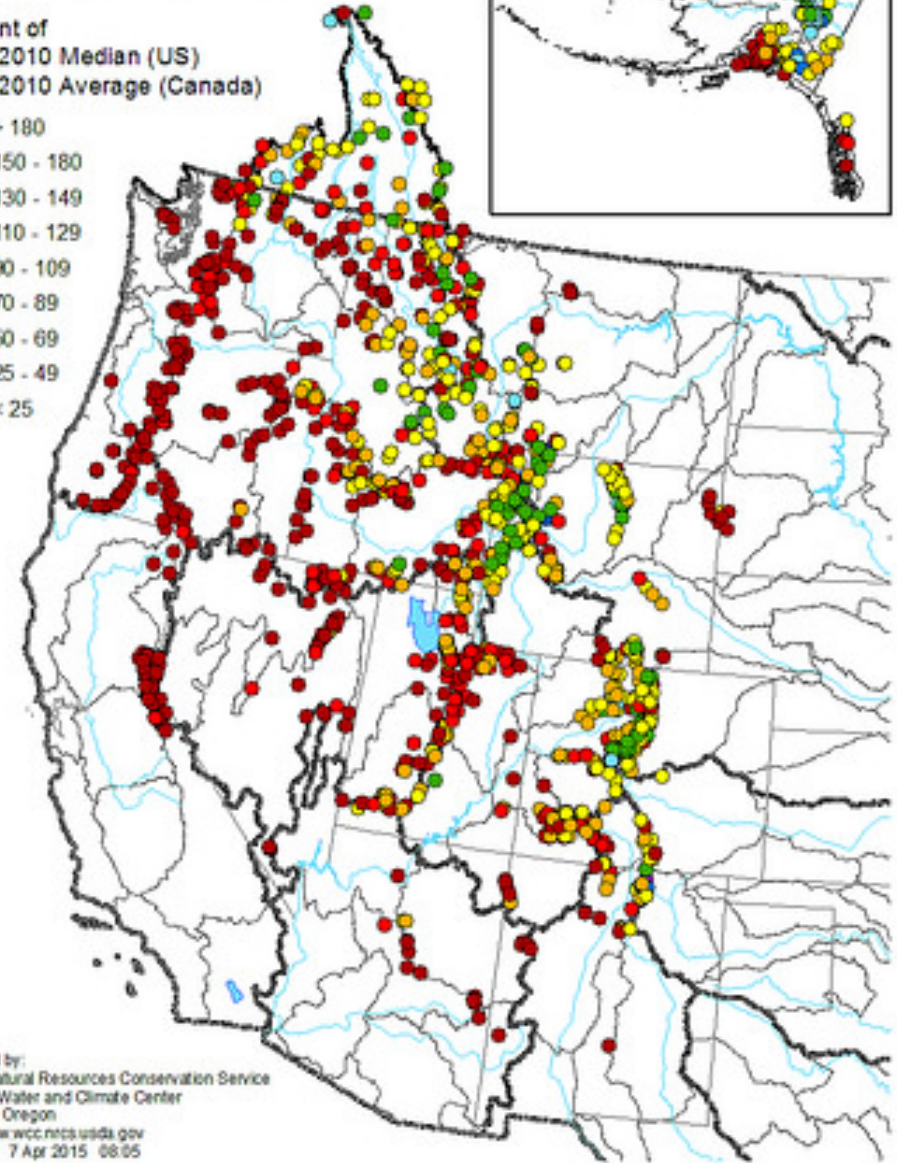
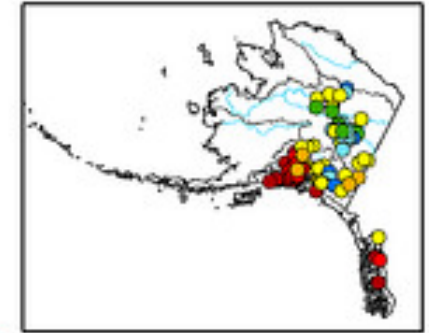
Mountain Snowpack as of April 1, 2015

Percent of
1981-2010 Median (US)
1981-2010 Average (Canada)

- > 180
- 150 - 180
- 130 - 149
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- 25 - 49
- < 25

USDA

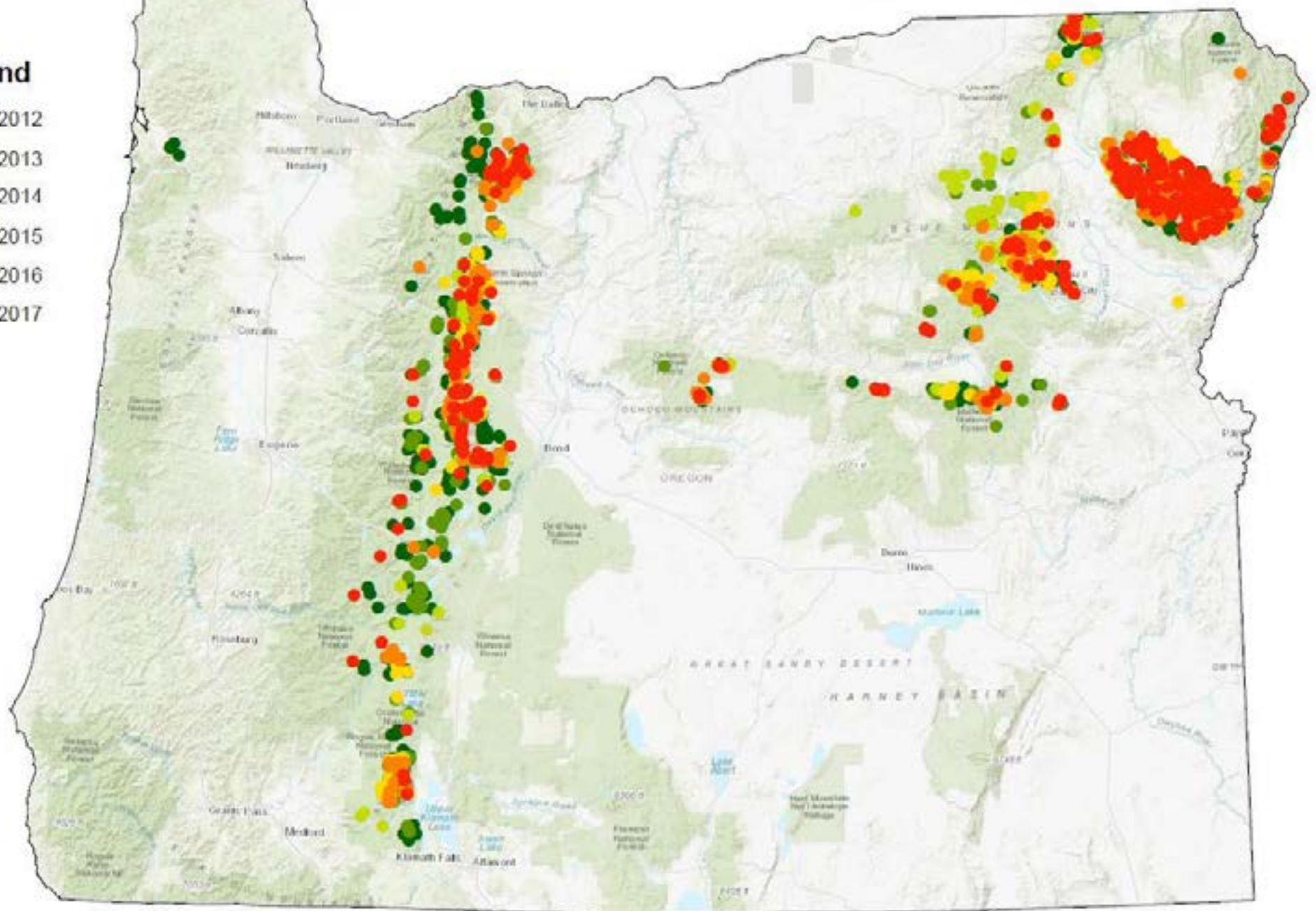
Prepared by:
USDA Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>
Created: 7 Apr 2015 08:05



5 Year Balsam Woolly Adelgid

Legend

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017



Balsam woolly adelgid
mortality in subalpine fir,
eastern Oregon





SPRUCE-HEMLOCK

The map shows the distribution of various forest types across the East-side Cascades. The legend on the left identifies eight forest types: Spruce-Hemlock (red), Douglas-Fir (yellow), Mixed Conifer (green), Subalpine (dark green), Juniper Woodlands (blue), Lodgepole Pine (brown), and Ponderosa Pine (orange). The map itself shows a complex pattern of these forest types, with a red line indicating a specific boundary or area of interest.

DOUGLAS-FIR

MIXED CONIFER

SUBALPINE

JUNIPER WOODLANDS

LODGEPOLE PINE

PONDEROSA PINE

Oregon Department
Of Forestry Map

East-side Cascades

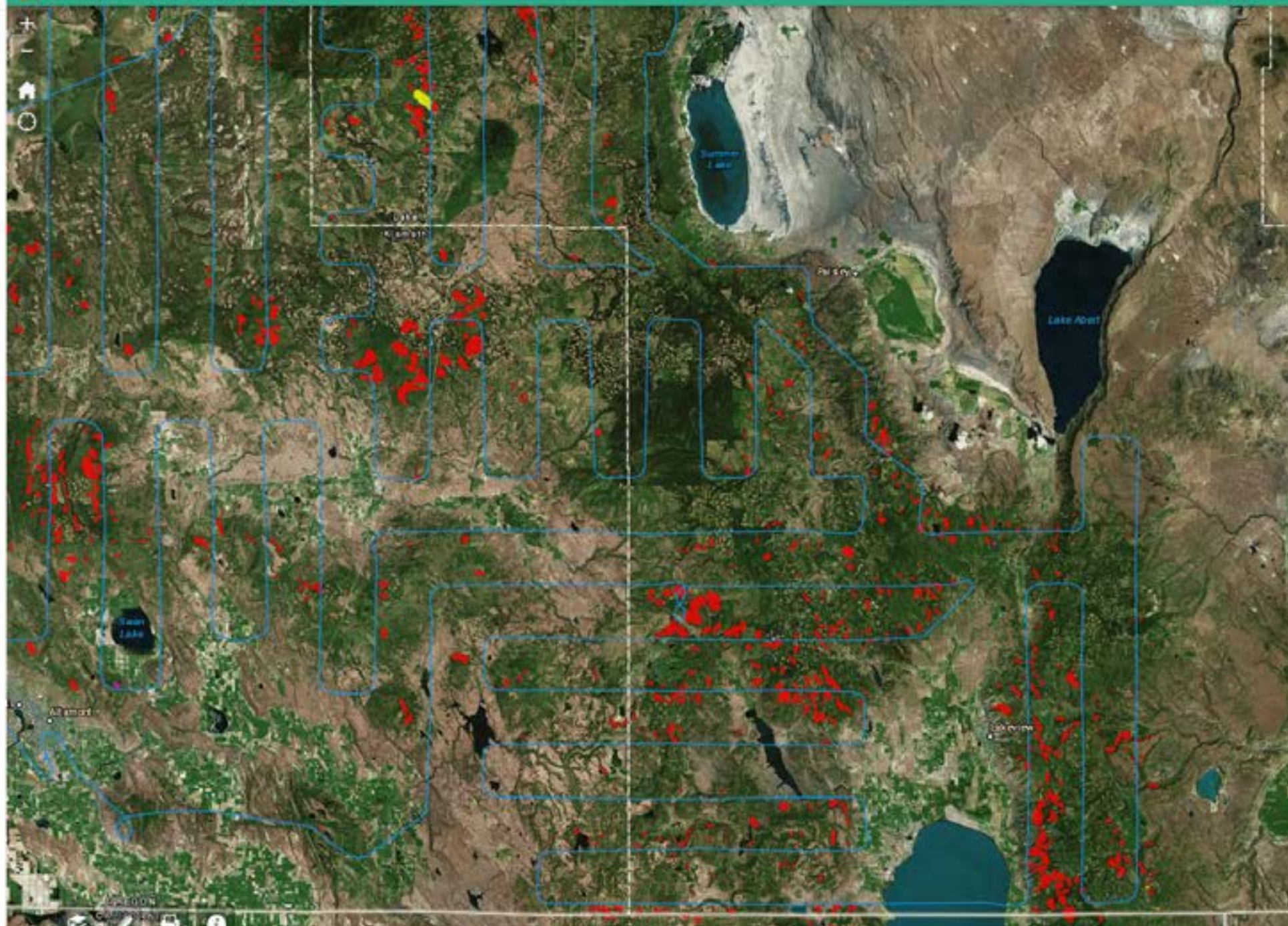
Pandora Moth in Ponderosa and lodgepole pine

Fir engraver in grand/white fir

Mt. Pine Beetle in lodgepole and other pines

Western Pine Beetle in Ponderosa

- 📌 Bookmarks Toolbar
- 📌 Bookmarks Menu
- 📌 Other Bookmarks



MPB Outbreak



Pandora
moth

photos from
Randy Henry

2-yr life cycle

Major
defoliation in
second year.





A map of Oregon showing the distribution of various forest types. The map is color-coded according to the legend. A red circle highlights a region in the eastern part of the state, encompassing areas colored orange (Ponderosa Pine), brown (Lodgepole Pine), and green (Subalpine).

SPRUCE-HEMLOCK

DOUGLAS-FIR

MIXED CONIFER

SUBALPINE

JUNIPER WOODLANDS

LODGEPOLE PINE

PONDEROSA PINE

Oregon Department
Of Forestry Map

Ochoco, Blue,
Wallowa Mts.

Western pine beetle in Ponderosa pine

Mt. pine beetle in lodgepole and other pines

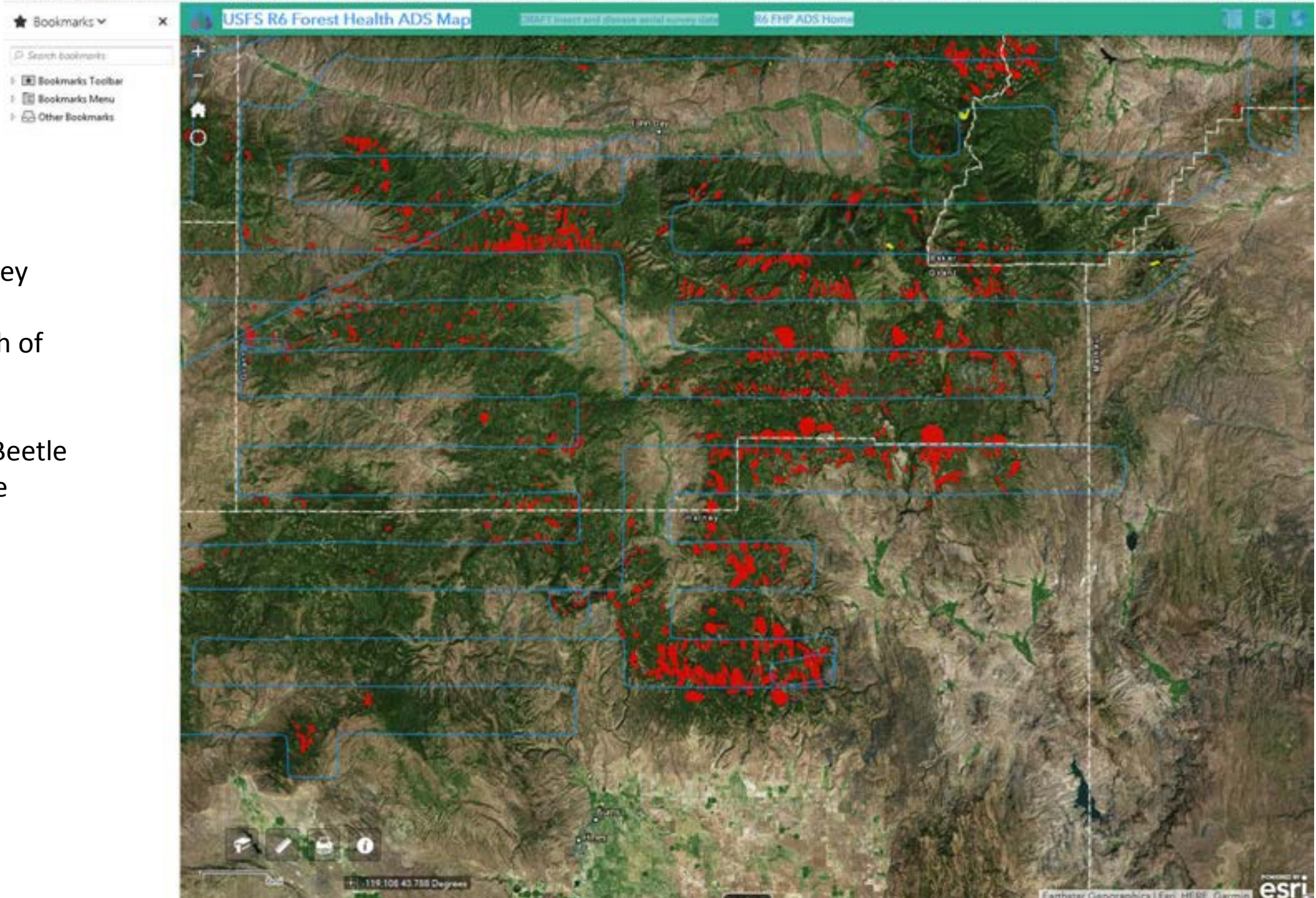
Balsam woolly adelgid in subalpine fir

White pine blister rust in whitebark pine

2017 Aerial
Detection Survey

Mortality South of
John Day

Western Pine Beetle
Mt. Pine Beetle
Fir Engraver



Lodgepole and Ponderosa Pine

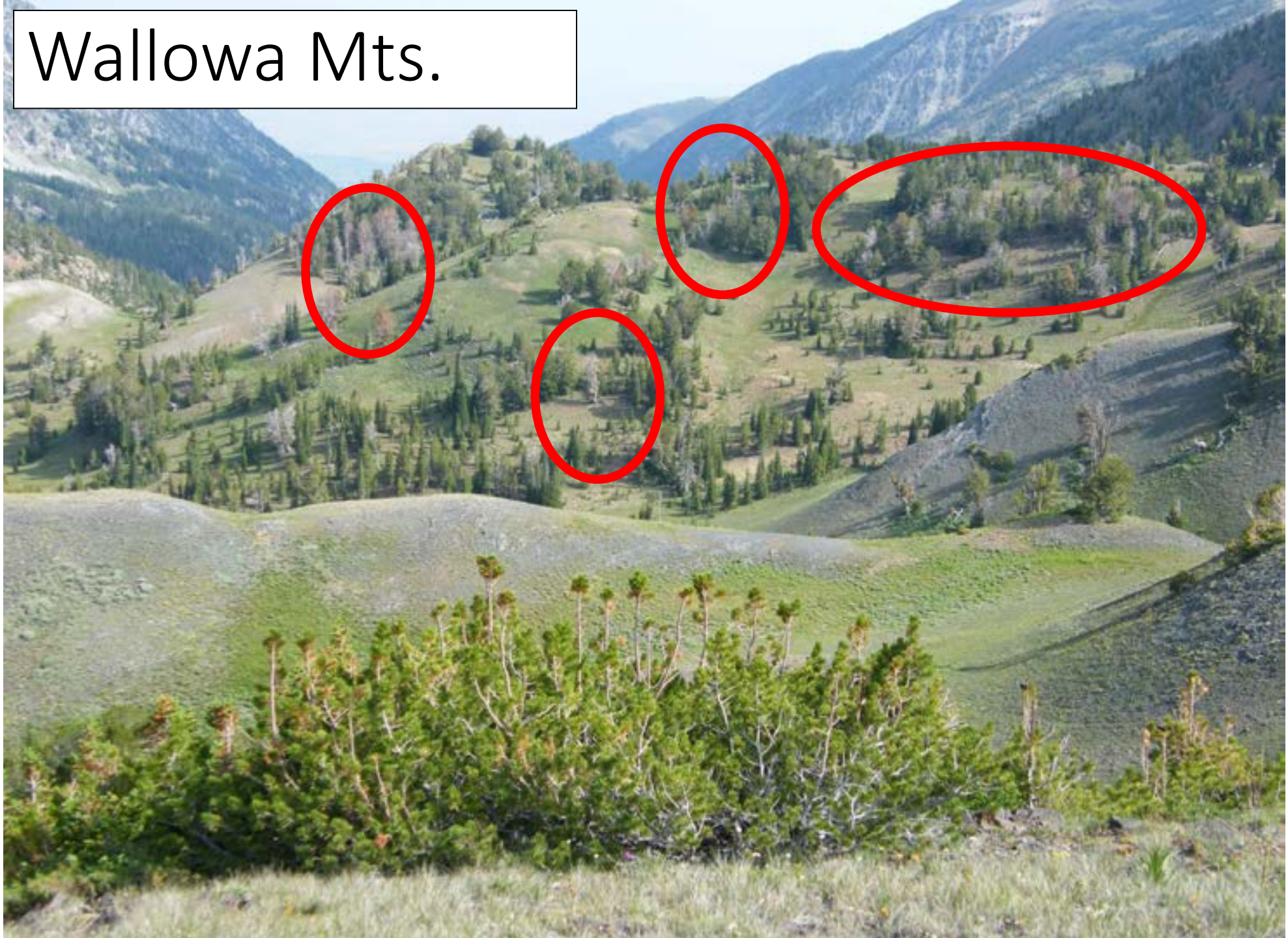


White Pine Blister Rust

In Whitebark
Pine at high
Elevation.



Wallowa Mts.



Remember: Not
all insects and
fungi are bad!

- Dead trees make important wildlife habitat
- Tree death is normal
- A healthy forest has a healthy amount of disease!



Fire a

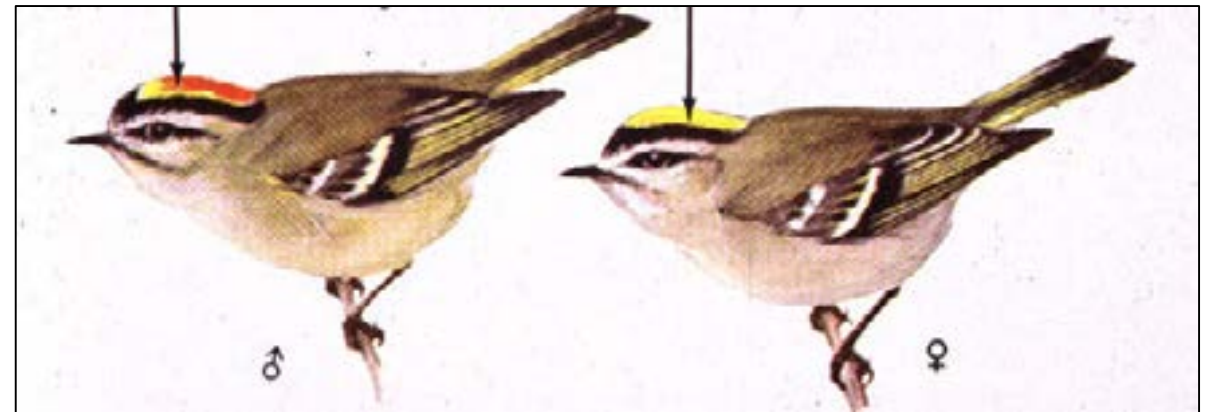
- Obvi
- Every
- Is thi
- Impa
open



Resiliency is dependent
on biodiversity:
Keep all the pieces



Hermit Warbler



Kinglets

Biodiver

Average % Parasitism

Fig. 4. Average

Miller-Pi



Oregon State
UNIVERSITY

cinellae.