Recommended Management Strategies to Gauge the Level of Impact in Your Stand and Develop Appropriate Silvicultural Strategies

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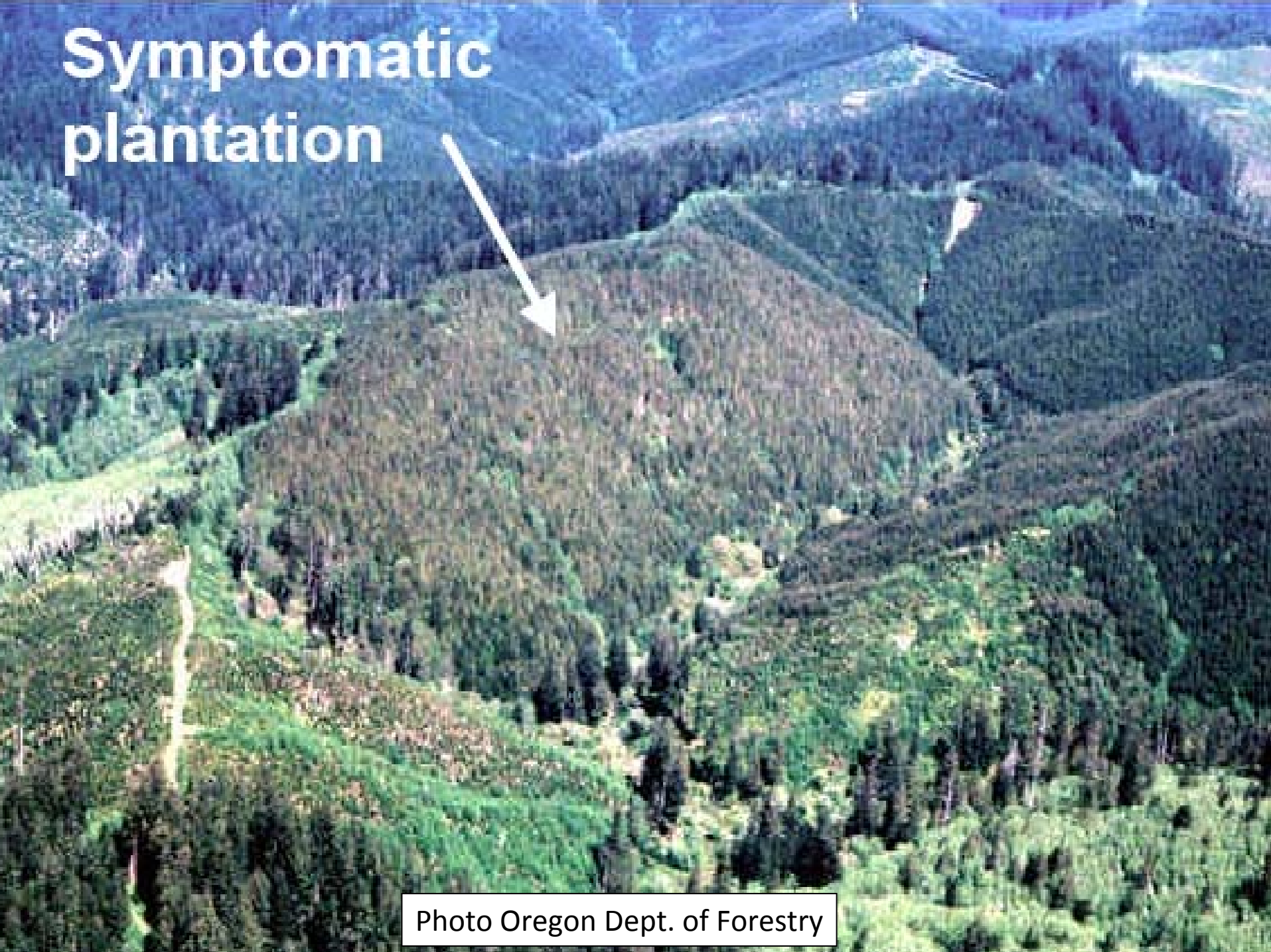
Gauge the Level of Impact in Your Stand

- Qualitative Estimates
  - Visible Stand Symptoms
  - Aerial Survey
  - Disease Severity Models
- Quantitative Estimates
  - Needle Retention Average for Stand
  - Stand Impact Assessment Tool (includes increment coring)
  - Growth modeling from measured data

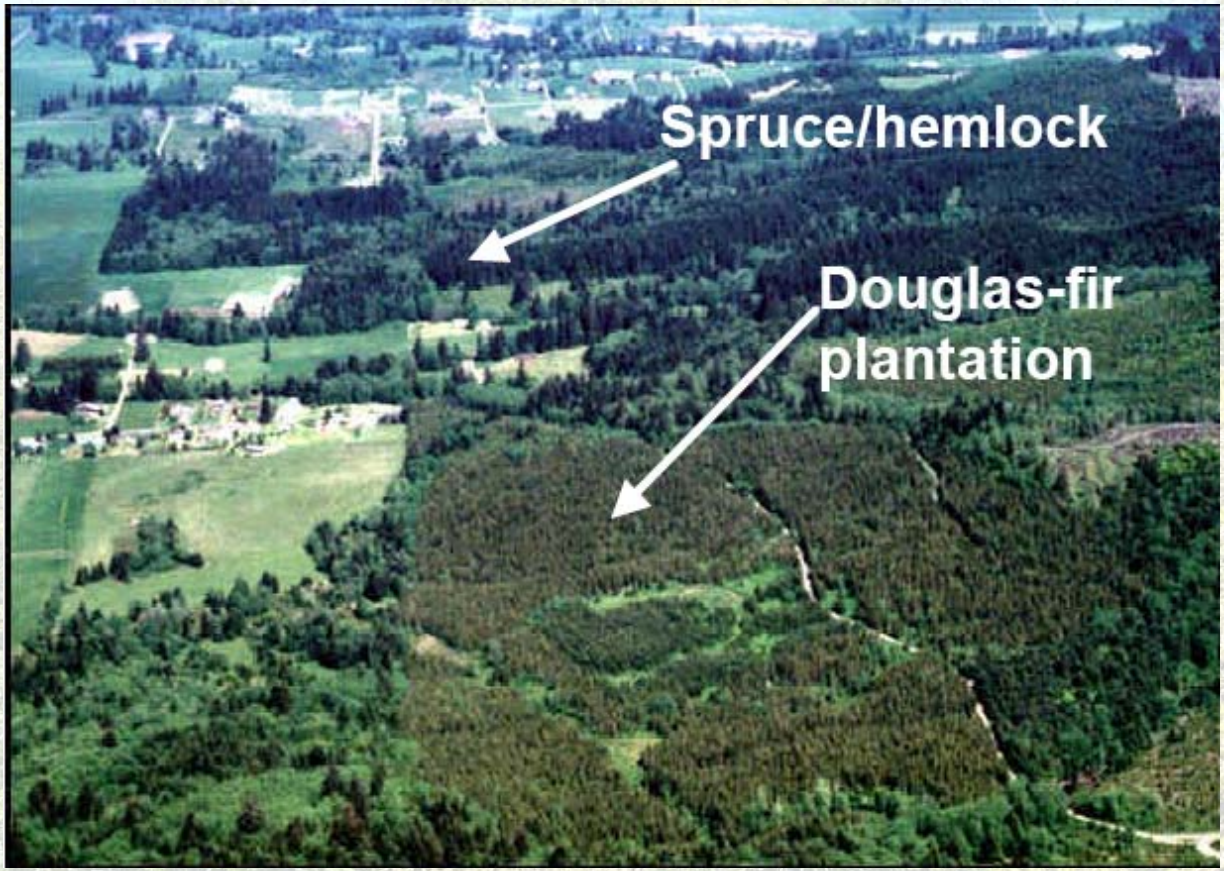

Douglas-fir
Hemlock
Hemlock

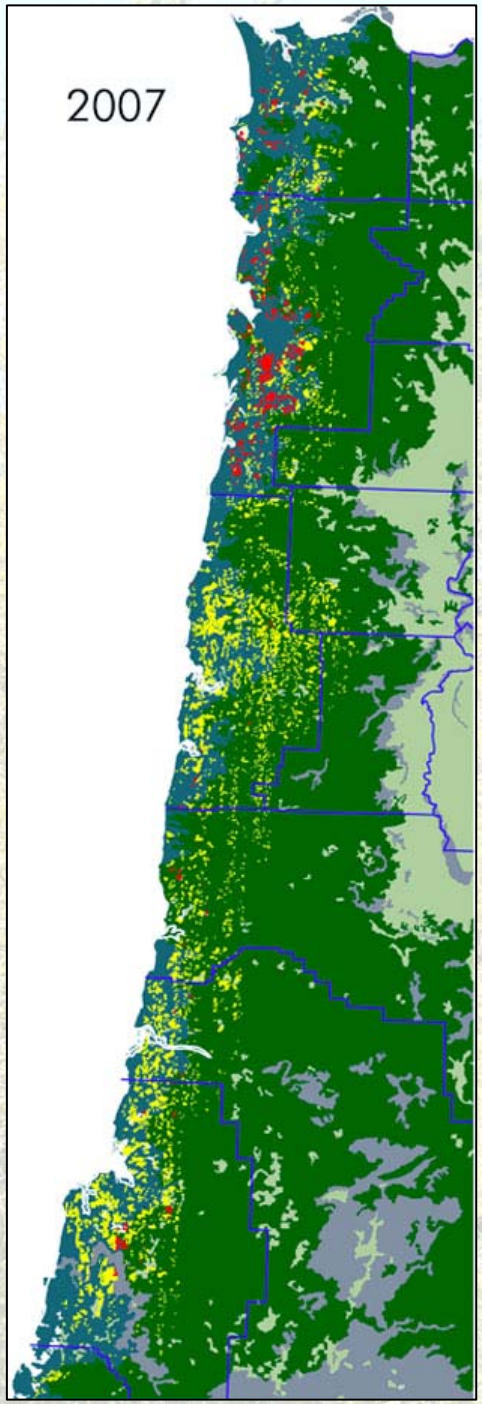

Symptomatic plantation
Photo Oregon Dept. of Forestry

Visible symptoms of the stand


Hemlock,
green
Douglas-fir,
yellow

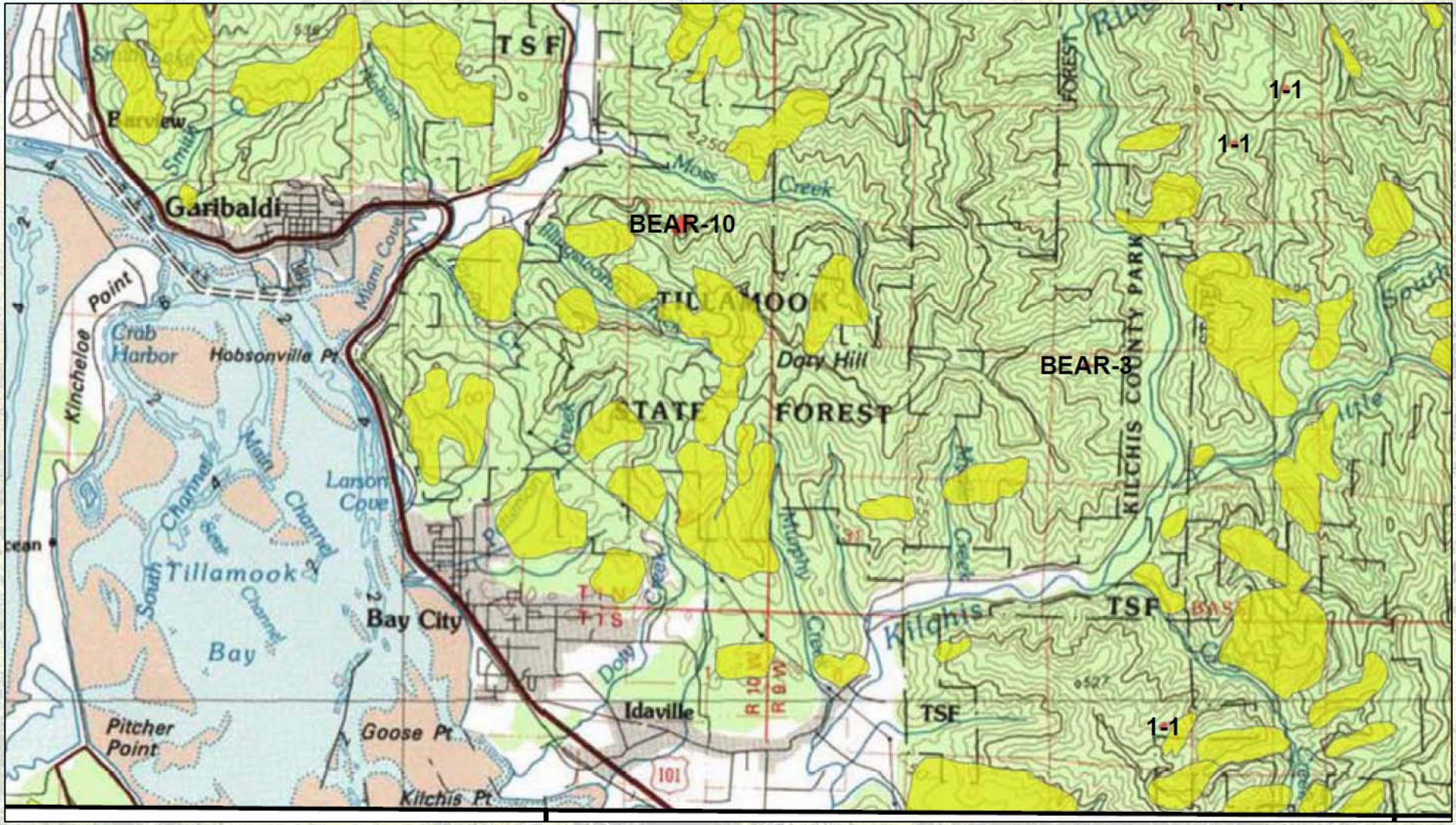
Aerial Survey

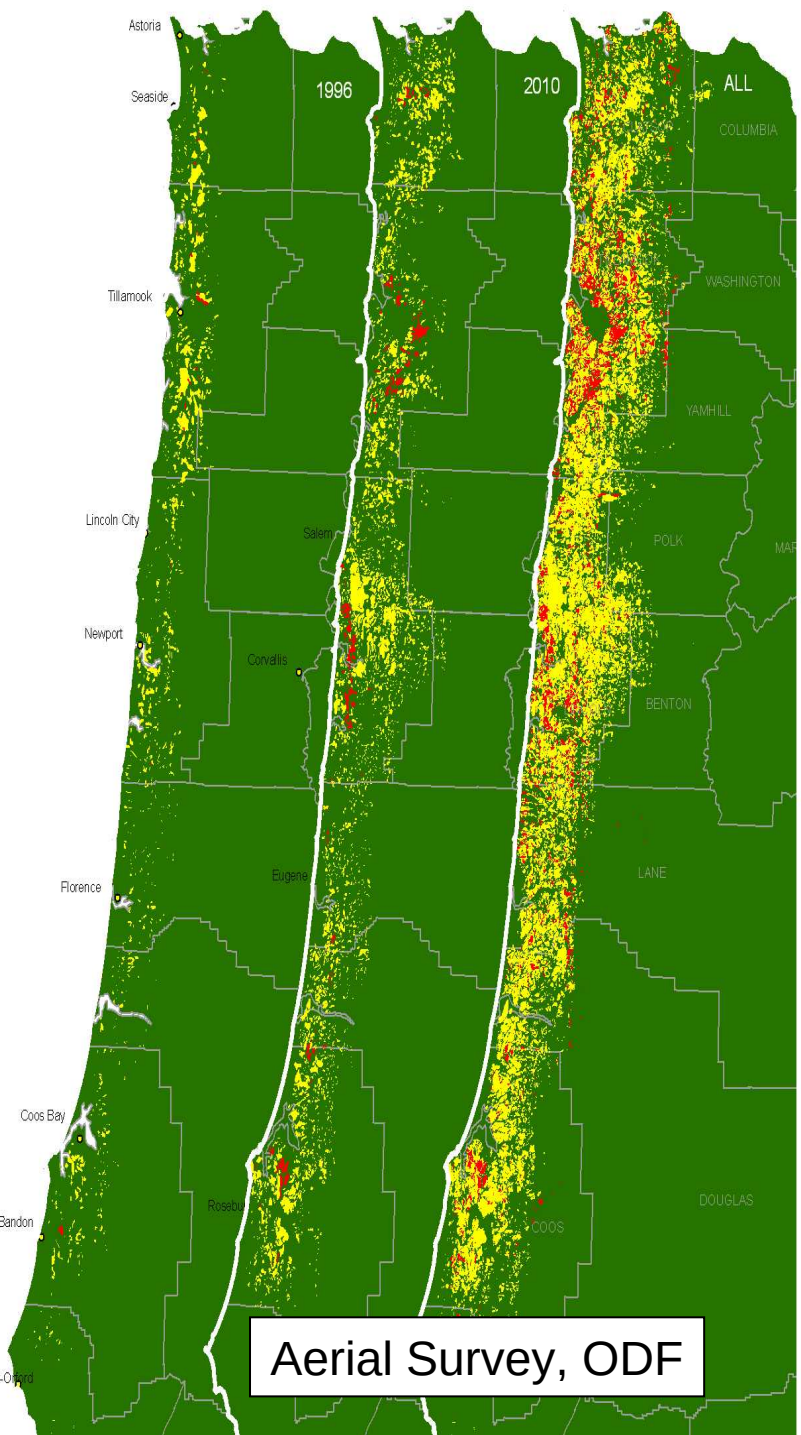


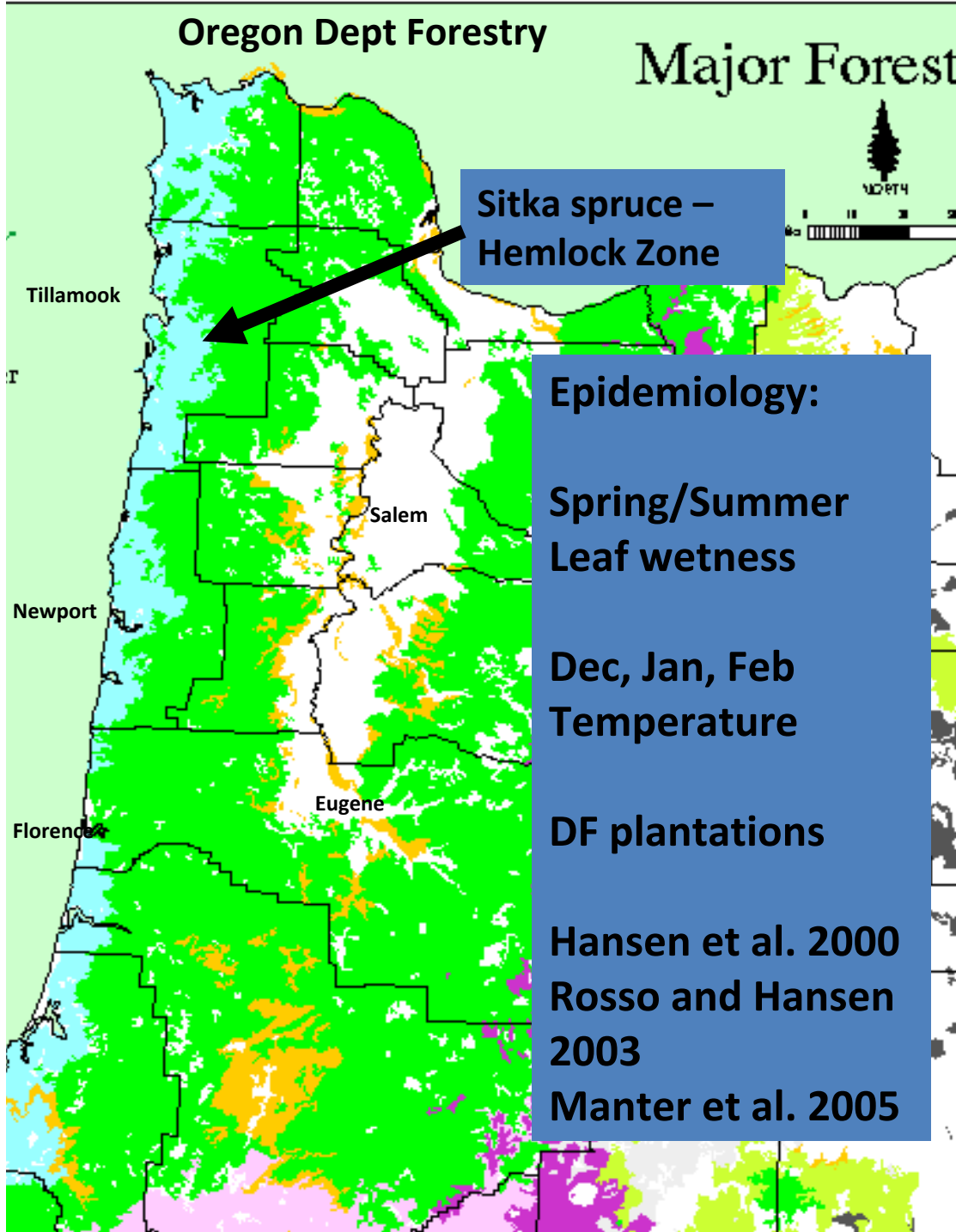


Figures from Oregon Dept of Forestry

Aerial Survey Data published annually on more detailed 1:100,000k maps (yellow is SNC):
http://www.fs.fed.us/r6/nr/fid/as/quad09/index.shtml




Astoria
Seaside
1996
2010
ALL
COLUMBIA
Tillamook
WASHINGTON
YAMHILL
Lincoln City
Salem
POLK
Newport
Corvallis
BENTON
Florence
Eugene
LANE
Coos Bay
Roseb
DOUGLAS
COOS
Bandon
Aerial Survey, ODF


Oregon Dept Forestry
Major Forest
Sitka spruce –
Hemlock Zone
Tillamook
Salem
Newport
Eugene
Florence
Epidemiology:
Spring/Summer
Leaf wetness
Dec, Jan, Feb
Temperature
DF plantations
Hansen et al. 2000
Rosso and Hansen
2003
Manter et al. 2005

Needle Retention Map from Greg Latta

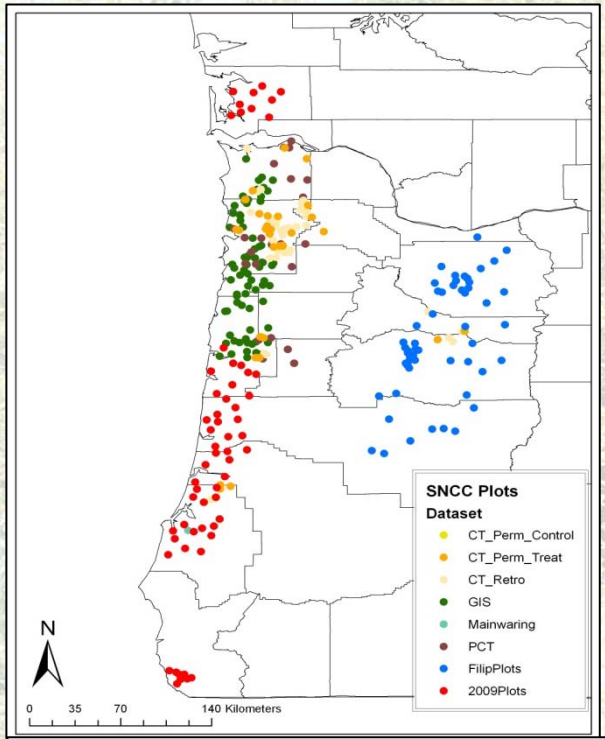
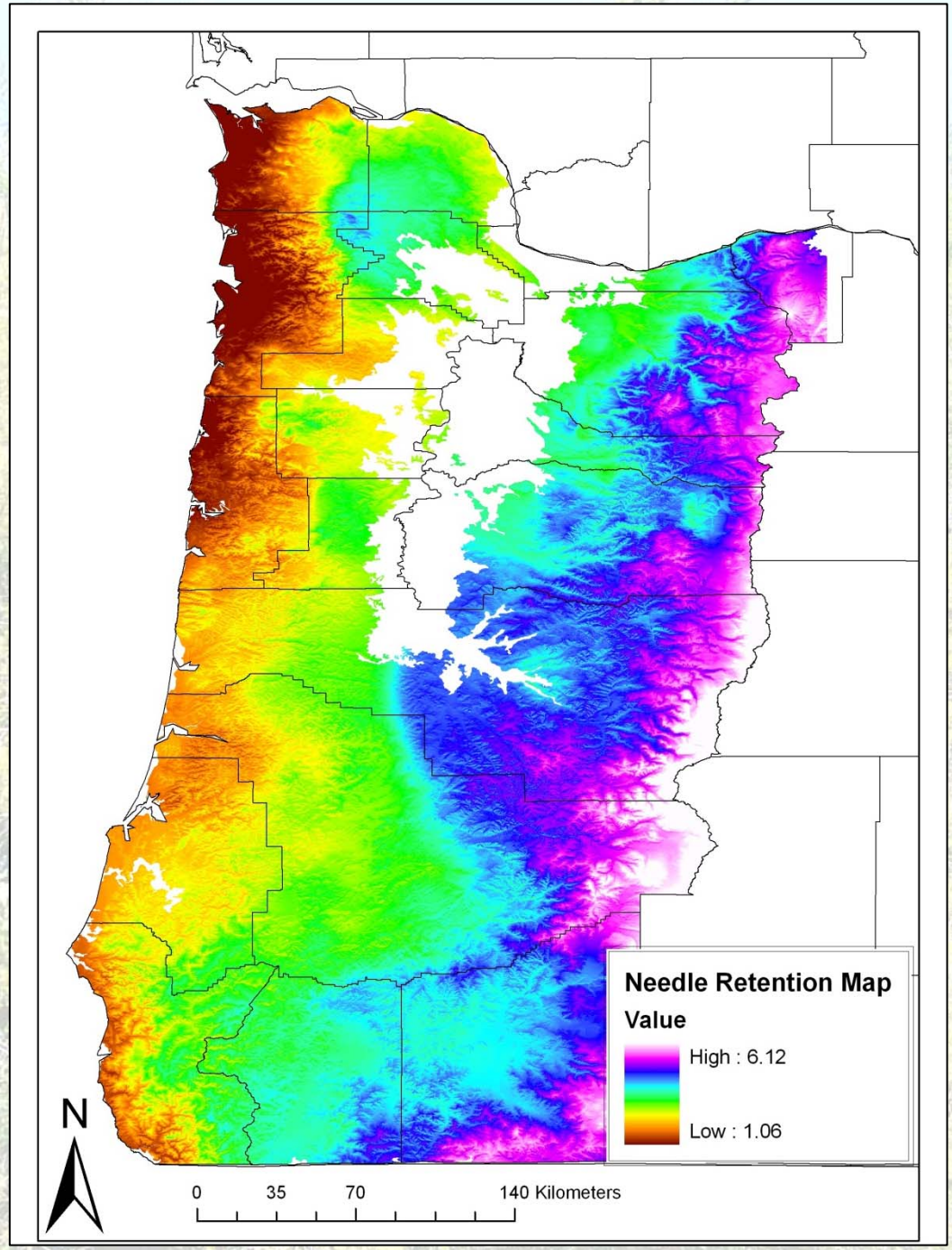


Figure 1. SNC Plot Location

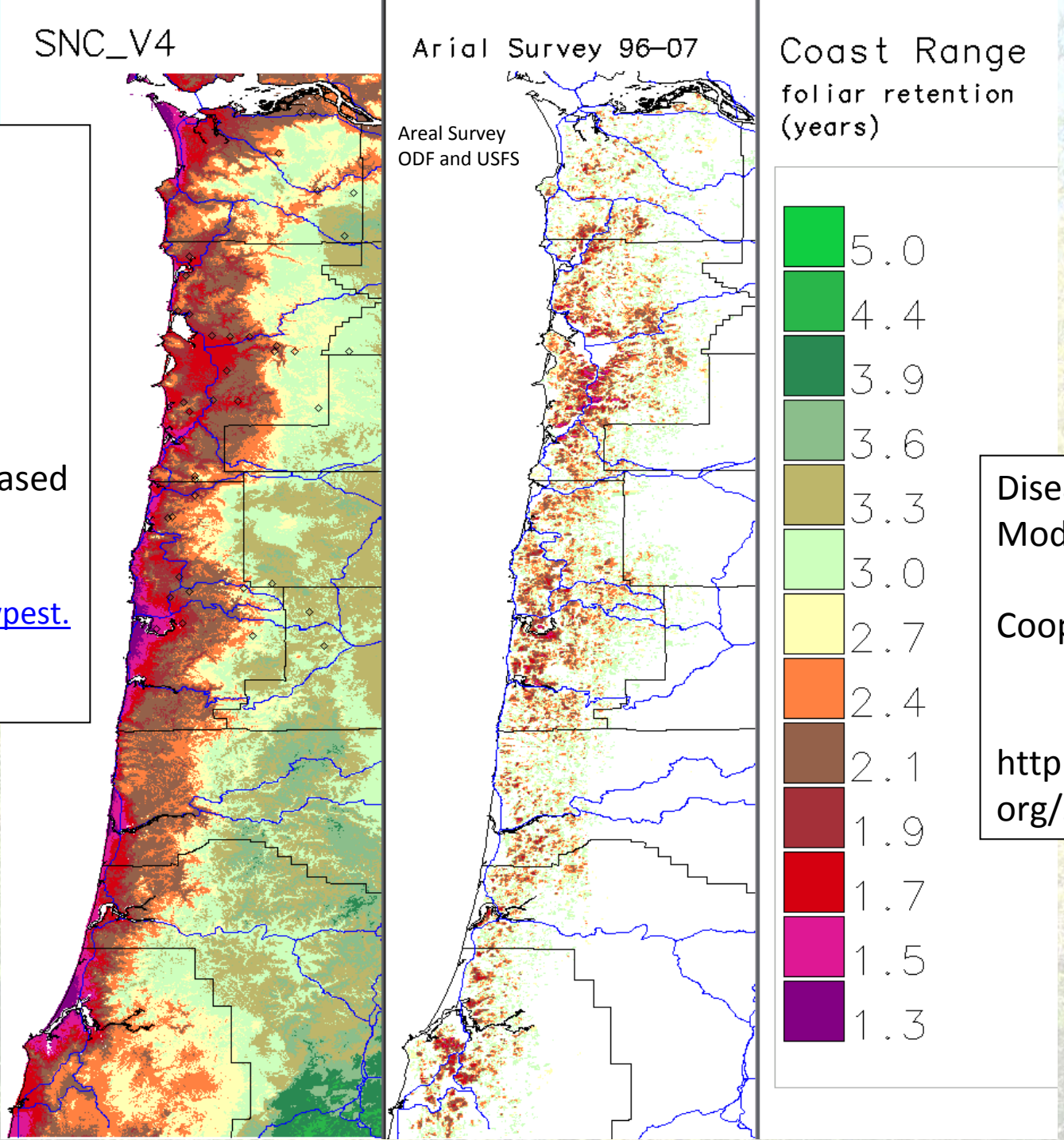


Coop and Stone Model

Needle retention

Climate based

http://pnwpest.org/snc/



Disease Severity Model:

Coop and Stone

http://pnwpest.org/snc/

Swiss Needle Cast Model Prototype 2007 - Mozilla Firefox

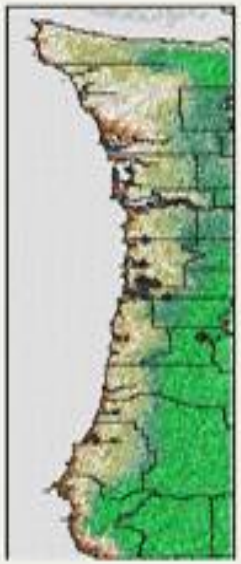
File Edit View Go Bookmarks Tools Help

http://pnwpest.org/snc/ Go

Swiss Needle Cast Model Prototype 2007

- **Download PDF of Progress Report Draft prelim_maps1.pdf**
- **Review the GIS data layers that can be viewed, downloaded (both lat-long and UTM and now SHAPEFILES - July 21, 2007) and analyzed in GRASSLINKS.**

Left side: full selec-tion of available map layers and options	Right side - shortcut with mostly preselected options



GRASSLinks GIS Web interface to maps of SNC survey data and models:

Select layers, overlay, mapsize, region, and "GO"

Query only raster layer #1

Avg July RH 1996-2006 downscaled to 200m res.

Query only raster layer #2

SNC survey data converted to needle retention (yrs x 100)

Main (only visible) Raster Layer

SNC climate based model - needle retention (yrs x 100)

Overlay Shade relief NW USA Mapsize 680 (ht in pixels) Region

N. Oregon coast range

GO

Coop and Stone

Quantitative Estimates

- **Needle Retention Average for Stand**
- **Stand Impact Assessment Tool (includes increment coring)**
- **Growth modeling from measured data**

Quantitative Estimates of SNC Impacts:

Average Stand Foliage Retention

As a Rule, Healthy Foliage Retention is 3 yr +

Growth Impact Study

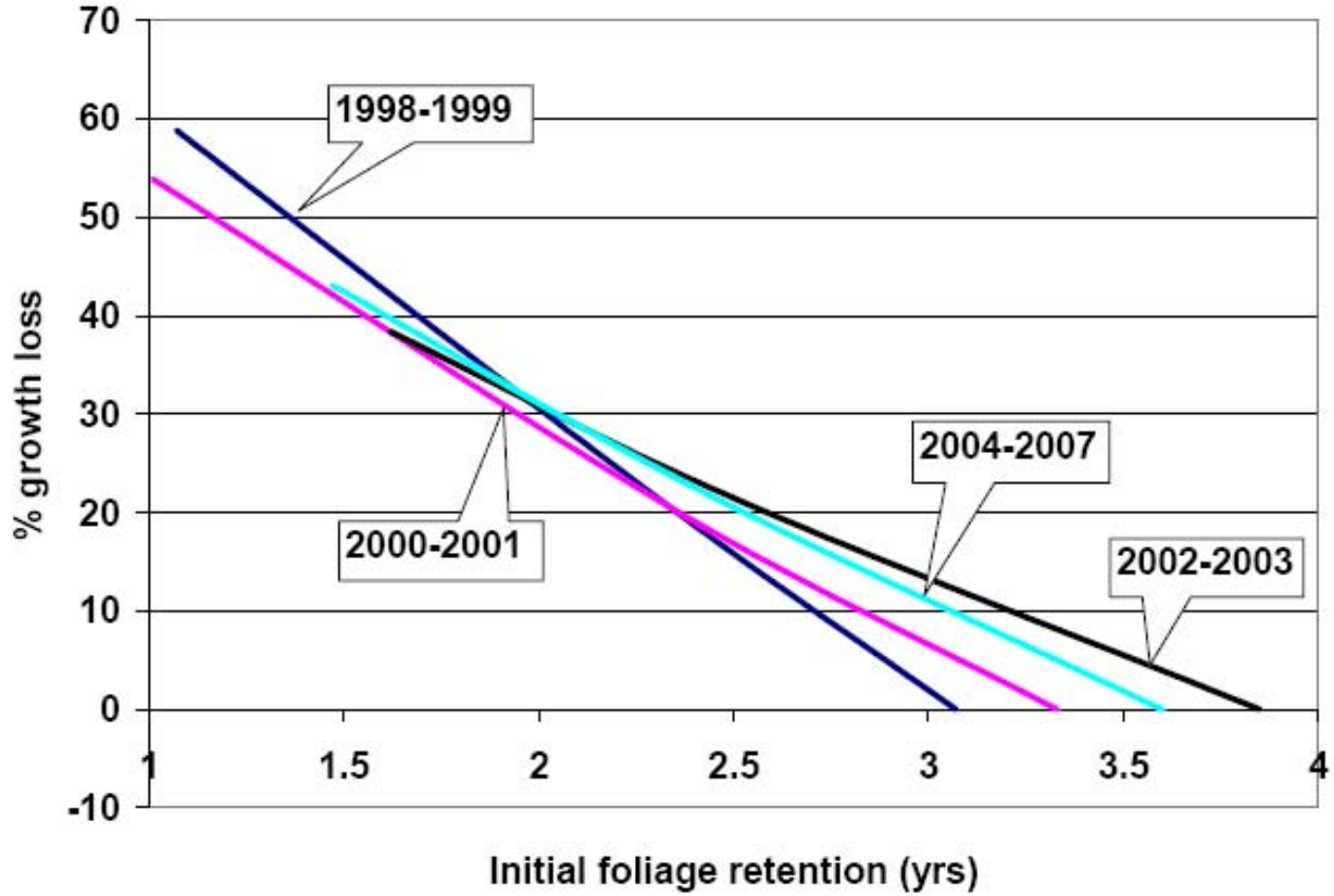


Figure 3. Implied relative growth losses for the four GIS growth periods. Ranges of foliage retention represent those measured at the start of each growth period.

http://www.cof.orst.edu/coops/sncc/Stand%20Growth%20Assessment%202.81.xls - Windows Internet Explorer

http://www.cof.orst.edu/coops/sncc/Stand%20Growth%20Assessment%202.81.xls

File Edit View Insert Format Tools Data Go To Favorites Help

http://www.cof.orst.edu/coops/sncc/Stand%20Grow...

A1

OSU Oregon State University
College of Forestry

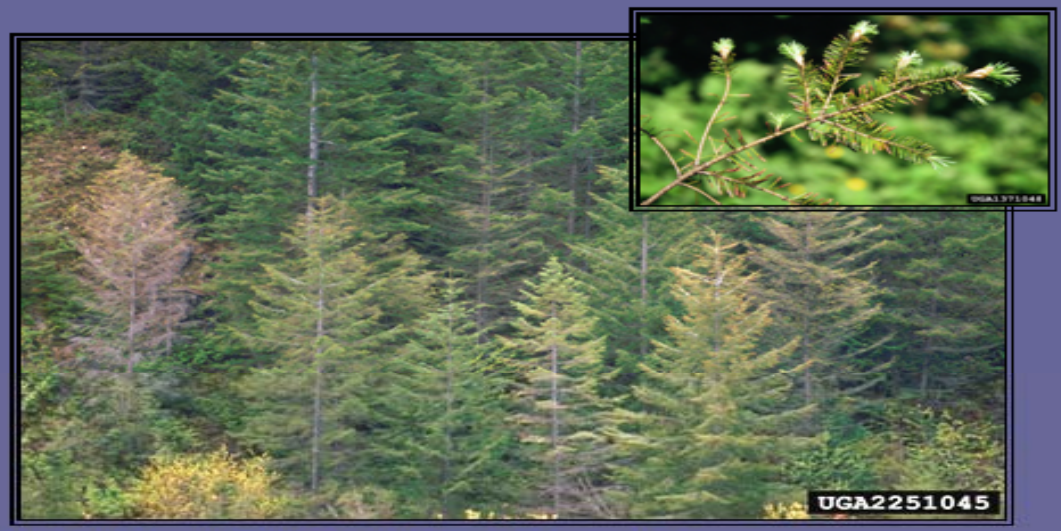
Stand Growth Assessment Tool

Introduction and Procedures

Data Entry and Report

Calculate Site Index

Close Program



For questions or additional information contact Doug Robin with Oregon Department of Forestry or Doug Mainwaring with Oregon State University

Spreadsheet based tool.

Developed by OSU and Oregon Dept. of Forestry.

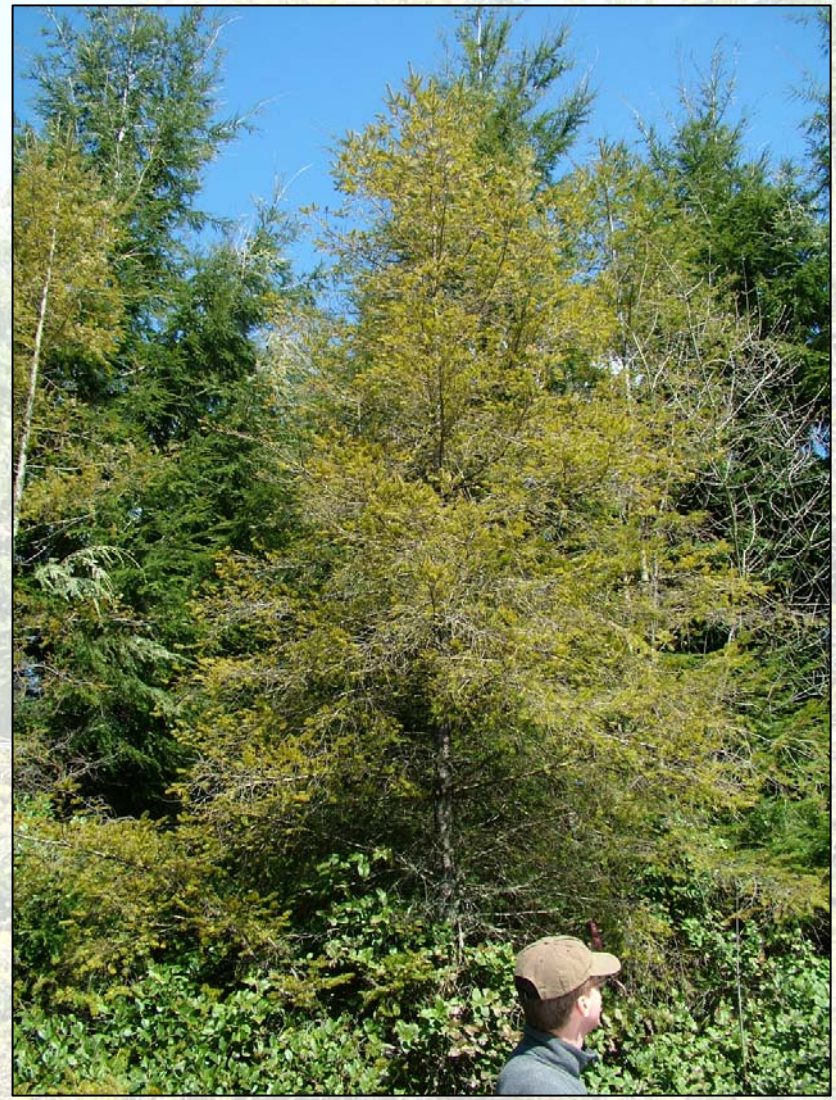
Stand growth assessment tool if available at the SNCC website:
http://www.cof.orst.edu/coops/sncc/index.htm

Measure the stand! Compare measured to predicted growth.

Develop Appropriate Silvicultural Strategies

- **Integrated Pest Management**

- **IPM is a common sense approach**
- **Thresholds are set for action based on knowledge of impacts**
- **Monitoring of pest distribution, abundance, severity and tree growth impacts form the basis for setting thresholds.**
- **Prevention/control through sivliculture.**
- **Long-term Planning**



SNCC Role In IPM

- **SNCC and Partners are Monitoring:**
  - **Annual Aerial Survey**
  - **Cascades Plot Network**
  - **Growth Impact Study Plot Network**
- **SNCC and Partners have developed tools to assess thresholds:**
  - **ORGANON Model SNC Adjustment**
  - **Stand Assessment Tool**

Monitoring

- Annual Aerial Survey
- Growth Impact Plots in NW Oregon
- Cascades plots
- New evolving networks

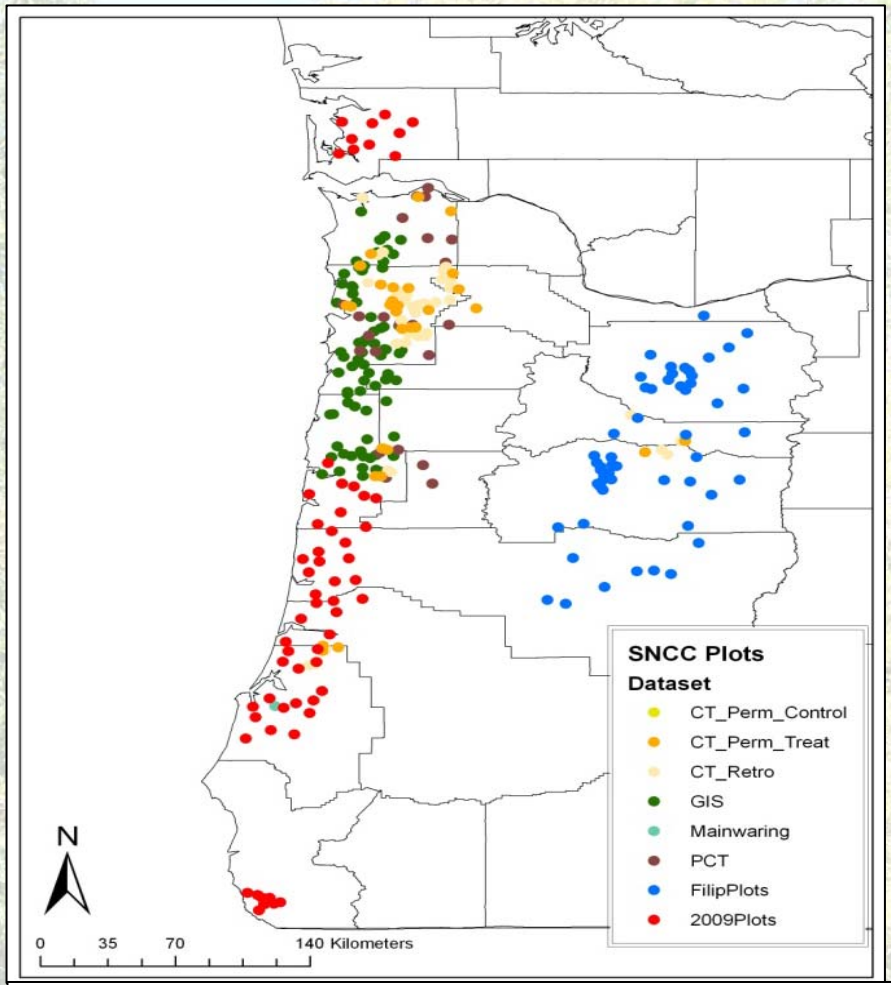
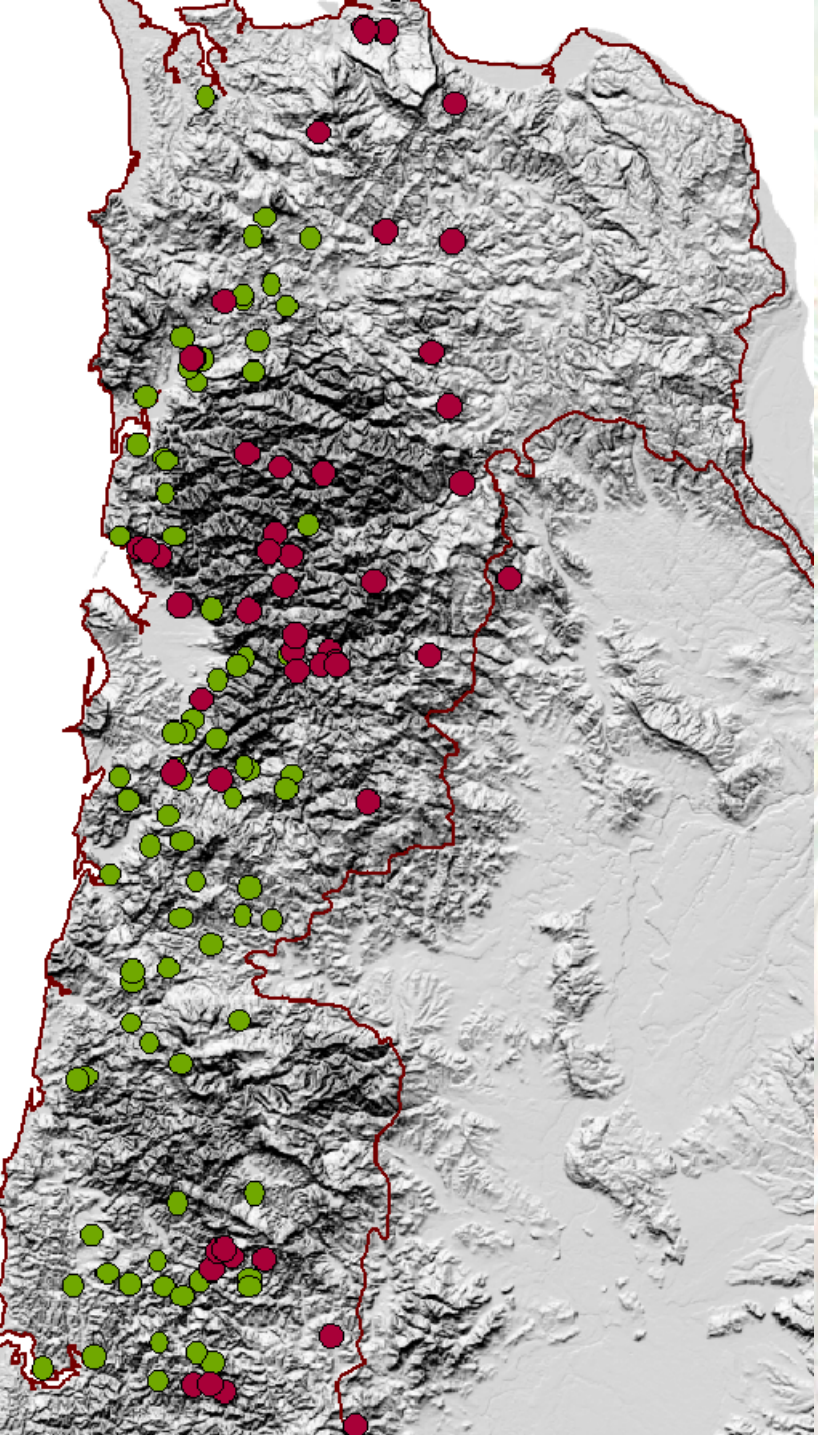


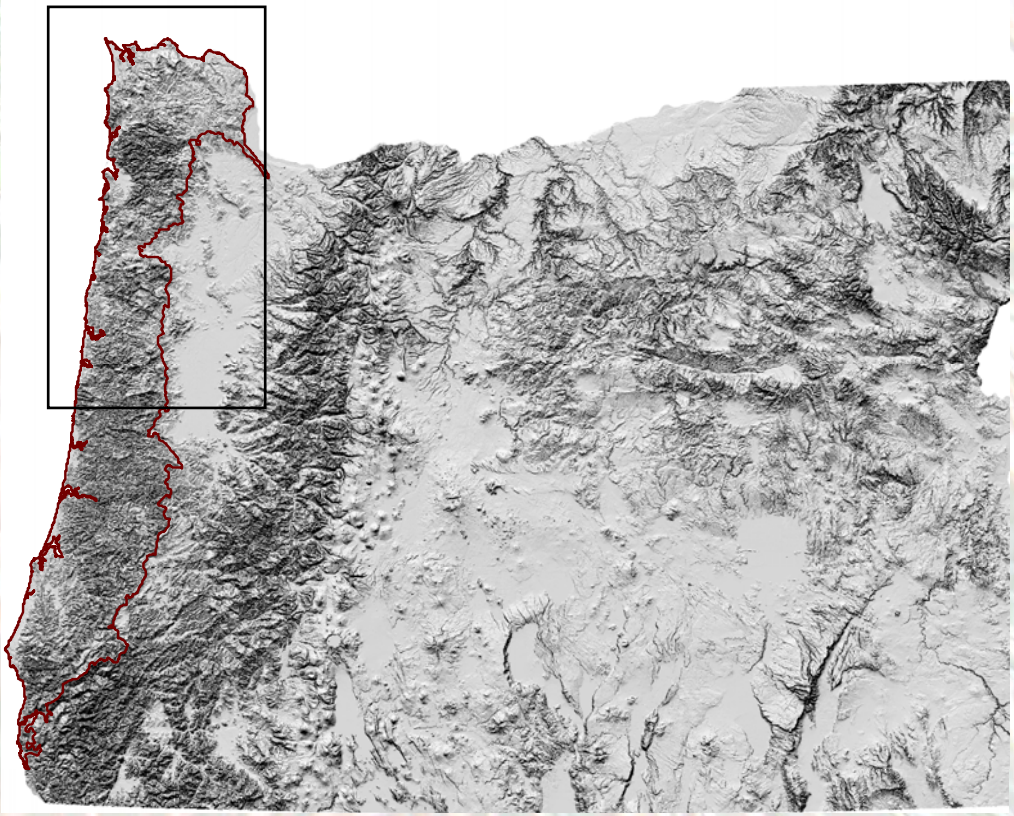
Figure 1. SNC Plot Location

Swiss Needle Cast Growth Impact Plots in Oregon. Maguire and Mainwaring.

Established 1998
Balanced with aerial survey to assess real impacts.

Red = Pre-commercial Thinning Study
Green = Growth Impact Study





SNCC Research Program has determined silviculture and control options:

- Prevention and Control:
- Chemical Control
  - Possible but not recommended
- Silvicultural Control
  - No negative impacts on disease

Typical Foliage Disease Plantation Management Recommendations Do Not Reduce Disease, Nor Do They Increase Disease, in the Zone of the SNC Epidemic.

- Canopy drying techniques don’t work.
- Thinning has no effect on disease, negative or positive.
- Vegetation Management has no effect, negative or positive.
- Pruning not recommended due to foliage removal.

Silviculture: Fungicides

- **Fungicides are effective at protecting leaves from fungal colonization. Chlorothalonil based fungicides (Bravo 720, Daconil Weatherstik).**
- **This only protects current year foliage.**
- **Spray must occur annually, sometimes twice a year.**
- **For forestry, this is not economical.**
  - **Also these fungicides can impact aquatic systems.**

http://www.mistsprayers.com/

Silviculture: Fertilization

- **Fertilization with N is not recommended.**
- **Excess nitrogen in leaves may enhance disease.**
- **Much of the western Oregon Coast Range is already very high in N.**
- **Other soil amendments have been recommended to ameliorate high N (calcium).**
- **We are currently anticipating some important research results from Doug Maguire/CIPS Beyond N Study.**
- **This is an important silvicultural question that remains un-answered.**

http://www.mf-bc.com/upimg/urea_b.jpg

Alternative Silvicultural Strategies

- Mixed Species
- Alternate Species
- Rotation Length
- Uneven-aged management
- Old-growth on Federal Land

Silviculture: Mixed Species Management

- **Mixed species management may protect against heavy losses.**
- **Does not ameliorate disease.**
- **Low Severity**
  - **needle retention 2.6-3.5 yrs**
  - **Local seed sources only**
- **Moderate Severity**
  - **needle retention 1.5 - 2.6 yrs**
  - **Douglas-fir < 50% of regeneration planting**
- **High Severity**
  - **needle retention < 1.5 yrs**
  - **Douglas-fir < 20% of regeneration planting**

Recommendations from Greg Filip et al. 2000

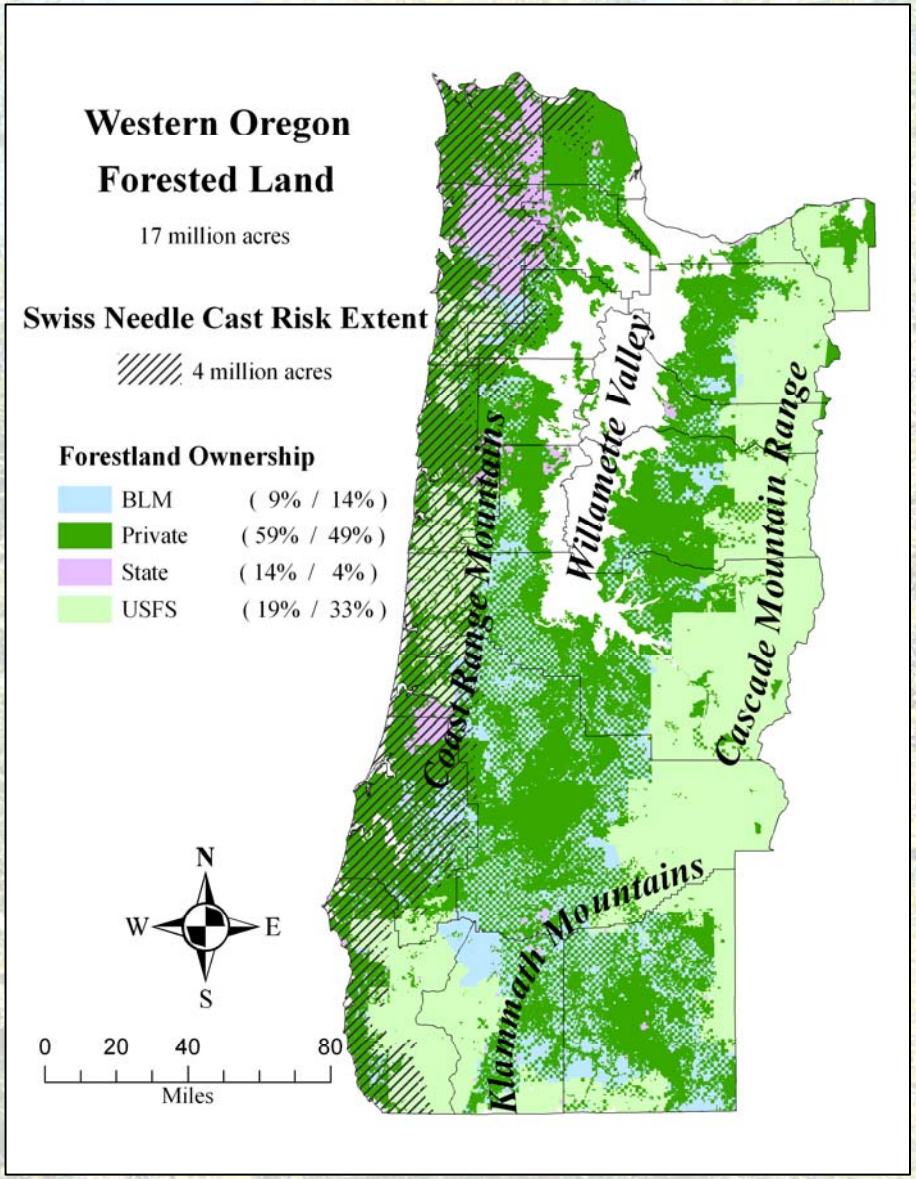
IPM: Landowners

- Landowners need to:
  - Determine in-house economic thresholds for management actions
  - Use existing silvicultural techniques as economical
  - Join the SNCC and NW Tree Improvement Coop!

Integrated Pest Management for Swiss Needle Cast in the Epidemic Area

Long Term

- Maintenance of monitoring program:
  - Aerial survey
  - Cascades plots
  - Growth Impact Plots
- Tree Improvement collaborations with NW Tree Improvement Coop
  - Progeny trials on the South Central Coast and North Coast (Trask)
- Continued research
- Economic and market assessments
- Continually improving disease severity models



The Swiss Needle Cast Cooperative

http://www.cof.orst.edu/coops/sncc/index.htm

- **The Swiss Needle Cast Cooperative is laying the foundation for landowners to manage their lands effectively.**

Thank You!