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Forest Health Impact on the TSR

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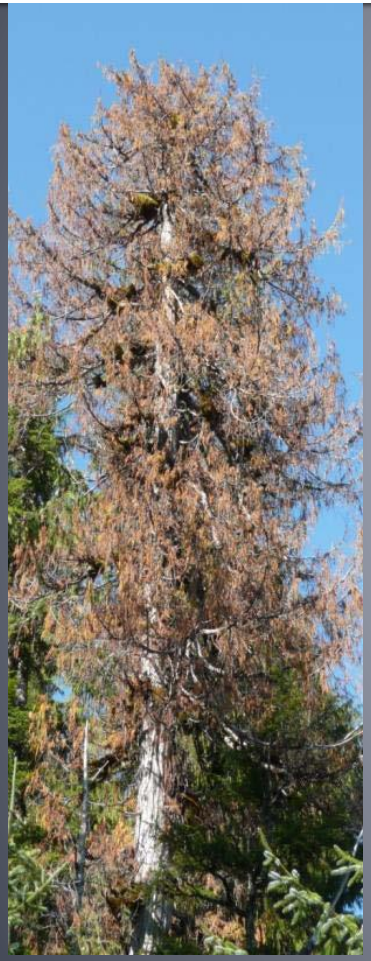
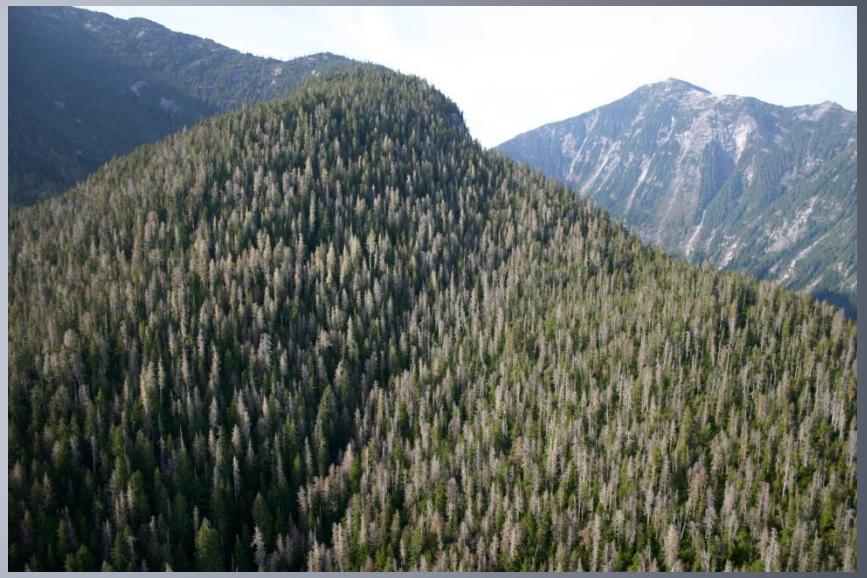
Scale matters





Some Basics

- Disease incidence – the proportion or percentage of diseased entities within a sampling unit (e.g., number of trees infected in a population).
- Disease severity – the quantity of disease affecting entities within a sampling unit (e.g., the number of infected branches on a tree).
- Disease intensity – the amount of disease present within a specific area. Disease incidence and severity are attributes of intensity.

Accounting for pest impacts

- Most broad and basic (landscape-level):
  - Unsalvaged loss estimates or non-recoverable loss estimates (NRL)
- More refined (stand-level):
  - Operational Adjustment Factors (OAF) to adjust yield estimates
- Catastrophic loss estimates:
  - One-off calculations for large scale events
- Pest-specific impact models or estimators
  - Mortality (and damage) functions

Unsalvaged loss estimates

- Required component of TSR data packages.
- Usually include losses to wind, wildfire, landslides, insects and diseases
- Data used comes from wildfire records, aerial overview surveys (AOS) and other reports
- Usually provided as a m^3/year adjustment
- Tempered by district knowledge of salvage rates for various events.
- Updated each TSR cycle

Unsalvaged loss estimates

Example, Arrowsmith TSA, 2016 TSR (proposed)

Cause of loss	Annual loss within the THLB (m^3/year)	Salvage rate (%)	Annual unsalvaged losses within the THLB (m^3/year)
Wind	N/A	25	N/A
Fire	1067	0	1067
Root Diseases	5545	25	4159
Douglas-fir Bark Beetle	7691	50	3845
Spruce Beetle	2	0	2
Western Balsam BB	32	0	32
Total	14337		9105

Yellow-cedar Decline

- Estimated cumulative loss to date across the THLB of four TSAs:
  - ~202,126 m^3
  - ~4786 m^3/yr (5 yr avg.)
- Estimated cumulative loss to date across the entire land base:
  - ~500,000 m^3

Operational Adjustment Factor 2

- Used to adjust model (e.g., TASS/TIPSY) stand volume estimates
- Usually restricted to a set of insects or diseases in a defined area
- Data is usually sourced from permanent plots (e.g., G&Y PSP, research trials) measured over decades
- Updated occasionally

Root Disease OAF2

- An OAF2 specific to the coast for root disease
- 7.5% reduction in addition to the 5% default
- = 12.5% reduction for CDF and CWHxm1 & 2 applied to all Fd-leading stands

Modelling Specific Losses

- Previously, submodels developed for use with G&Y models for root disease (ROTSIM and Root Rot Tracker) and dwarf mistletoe
- Rarely used
- On the bug side:
  - SWAT
  - PrognosisBC WSB module

Modelling Specific Losses

- Recent attempt made to model hard pine stem rusts (GRIM and CRIME)
- Developed from long-term trial data
- Used to adjust young Pl mortality rates
- Potential to account for form and defect as well

Swiss Needle Cast

- A native pathogen, SNC is being noticed more frequently in young stands on the south coast
- As climate shifts, can we expect to have the same issues with Fd as coastal Oregon?
- Can we predict the potential impact?

Swiss Needle Cast

- Oregon experience:
  - Since 1996 area affected has increased from 53,000 to 238,000 ha
  - WA adds 141,500 ha
  - No volume growth loss with 3.5 years leaf retention to 50% loss with only 1 year of leaf retention
- We are not Oregon (yet)

Questions?