



# Swiss Needle Cast Cooperative Research and Monitoring Plot Network



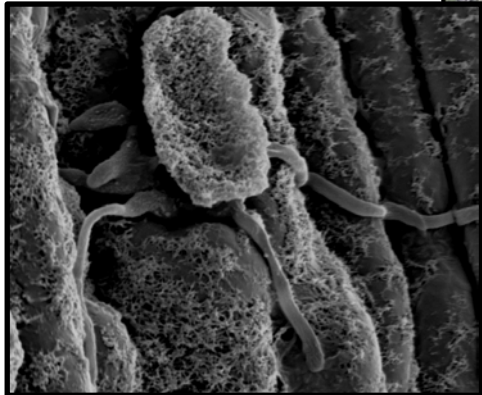
Needles infected with SNC pathogen *Nothophaeocryptopus gaeumannii*



Sparse & chlorotic crown of an SNC-infected Douglas-fir. Needle retention of 1-year.



Severely infected young Douglas-fir plantation in Tillamook.



Pseudothecial development, hyphae radiating from the stoma. David Noshad

# SNCC Members and Supporters

## Acknowledgements



Barnes & Associates, Inc.

Bureau of Land Management

Department of Natural Resources, WA

Environmental Protection Agency

Hampton Affiliates

Hancock Forest Management

Roseburg Forest Products

South Coast Lumber Co. & Affiliates



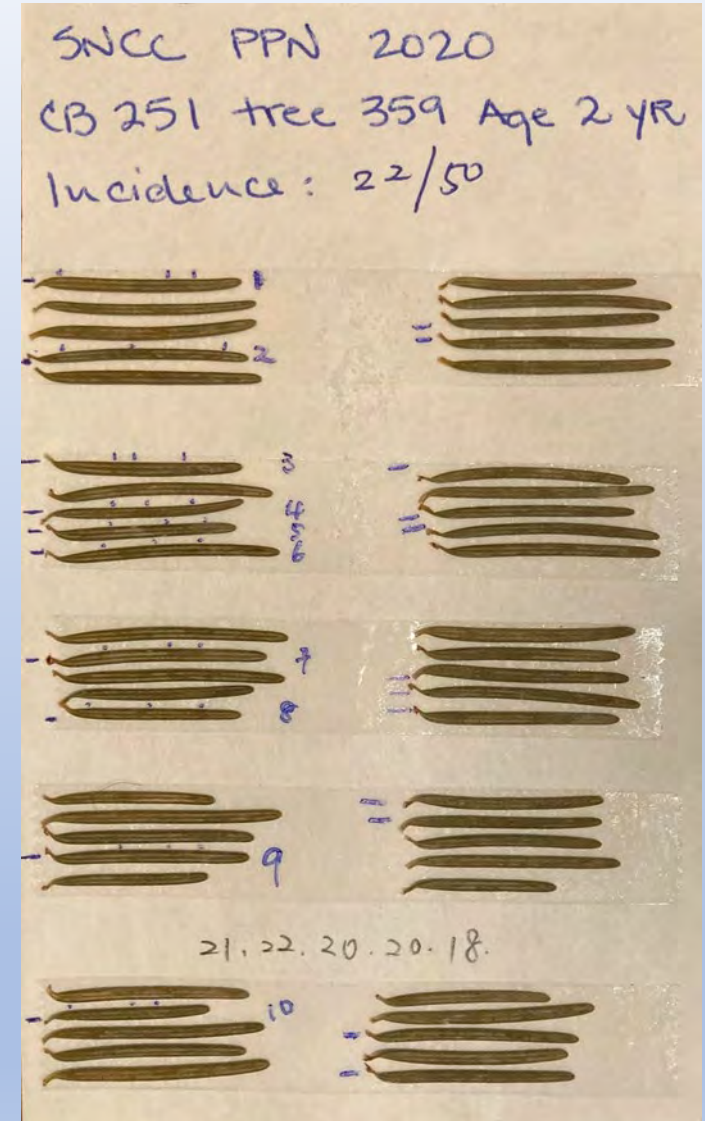


# SNCC Research and Monitoring Plot Network Recap

- Between *2013 – 2015*: 106 permanent plots in coastal OR, SW WA
- Collected: tree data (CIPS), defoliation rating, foliar samples for nutrient analysis, pseudothecial occlusion counts (for disease severity), soil samples for nutrient analysis (Hatten)
- Collected needles for further genomic analysis (SNCC collaborators: Patrick Bennett (OSU, FHP), Naomie Herpin-Saunier (Université Laval, Quebec))

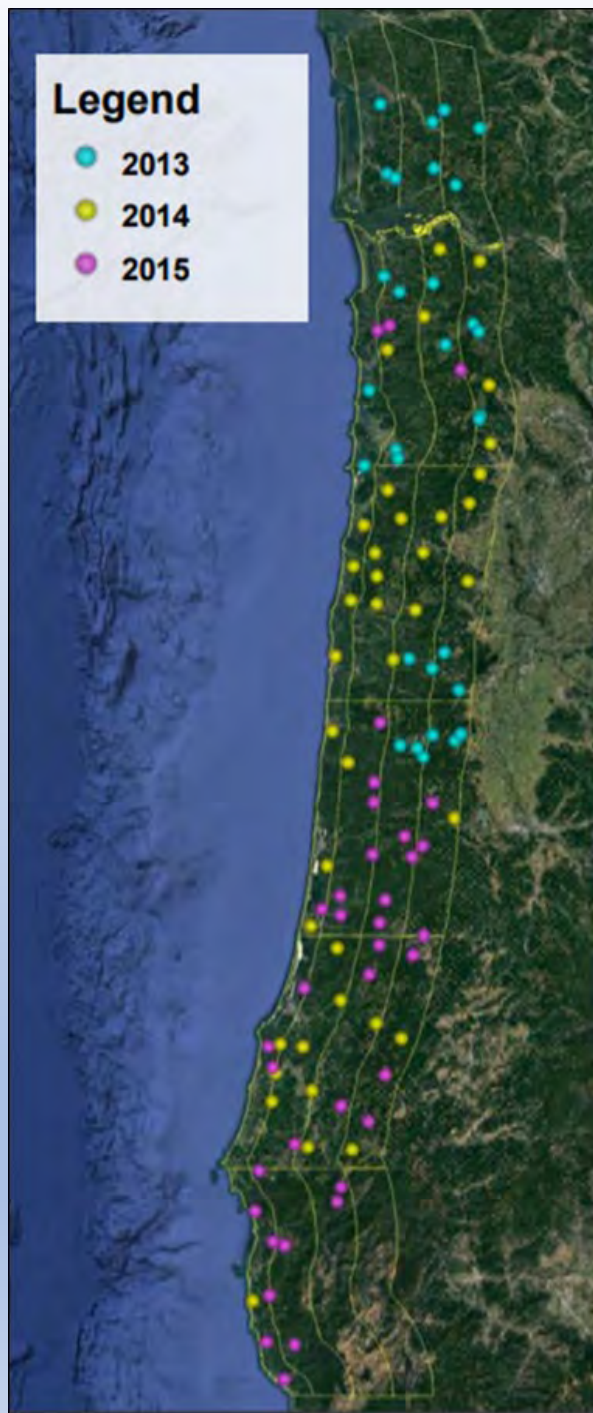
# Laboratory Methodology

- 50 needles from year-2 cohorts
- Incidence: percent of 50 needles with pseudothecia present
- 10 needles with pseudothecia:
  - measured for length (mm)
  - pseudothecial density: counting 100 stomata within three zones (tip, middle and base) on each needle and averaging to determine % pseudothecial density.
- SNC disease severity index: incidence multiplied by pseudothecial density.



# Timeline

- Fall 2013 – Began plot establishment, tree measurement
- 2014 – Foliage collection and soil sampling; Plot establishment, tree measurement
- 2015 – Foliage collection and soil sampling; Complete plot establishment, tree measurement
- Spring 2016 – Complete foliage and soil sampling
- 2017
  - 2018 – Remeasurement 1 (5-yr)
  - 2019 – Foliage collection; Remeasurement 1 (5-yr)
  - 2020 – Foliage collection; **Complete 5-yr remeasurement**
  - 2021 – **Complete 5-yr**; Foliage collection
- 2022
  - 2023 – Remeasurement 2 (10-yr)
  - 2024 – Foliage collection; Remeasurement 2 (10-yr)
  - 2025 – Foliage collection; **Complete 10-yr remeasurement**
  - 2026 – **Complete 10-yr**, Final foliage collection

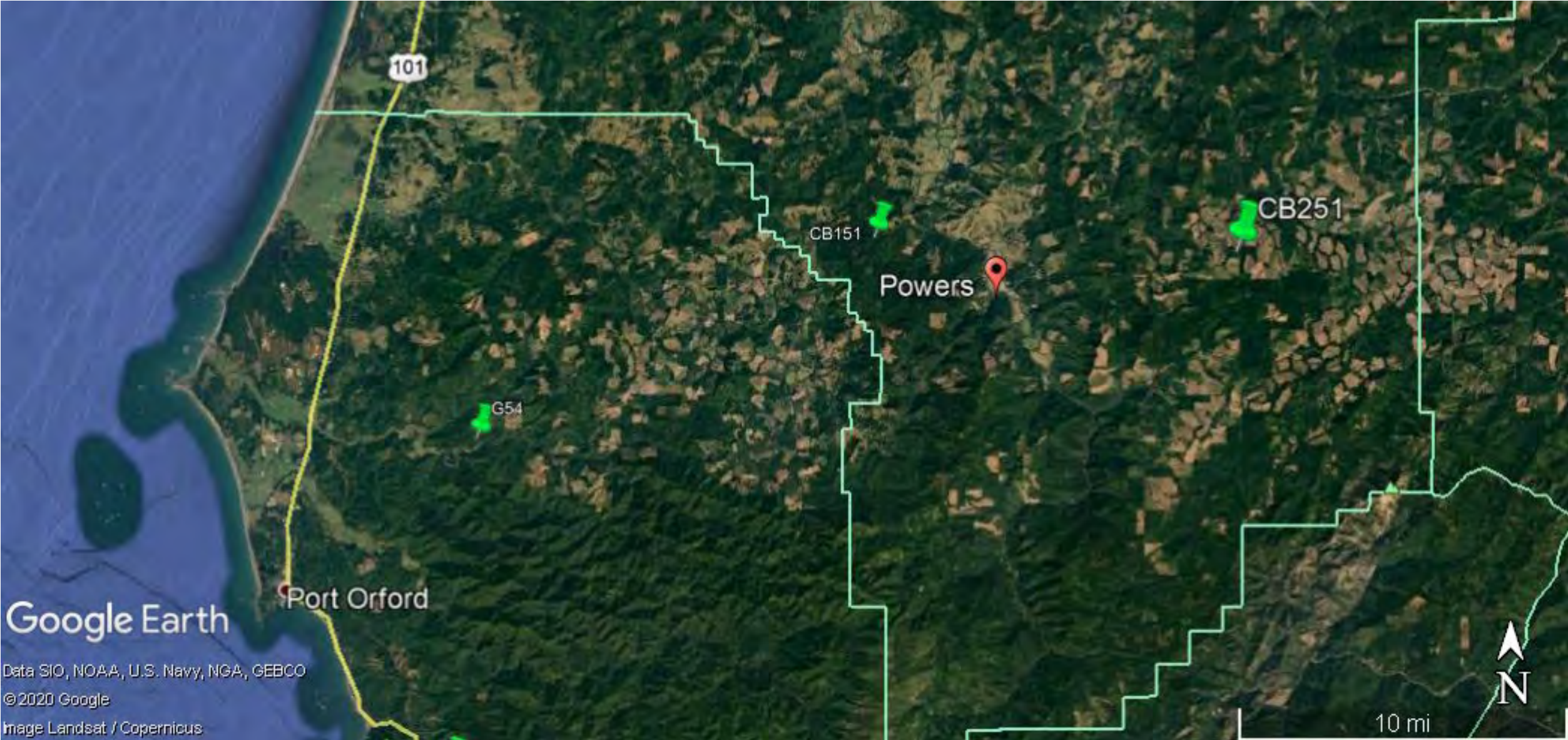


# SNC Permanent Plot Network Re-measurement 1

- 106 plots total
- 2018 remeasurement: 30 plots
- 2019 remeasurement: data from 37 plots & samples from 35 plots
- Fall 2020 remeasurement: data from 37 plots
  - Lost 2 plots: Chetco fire (southern block), PCT (northern block)
  - Spring 2021: foliage collection 39 plots

# 2020 RPN Losses

CB251 - Storm damage – broken tops





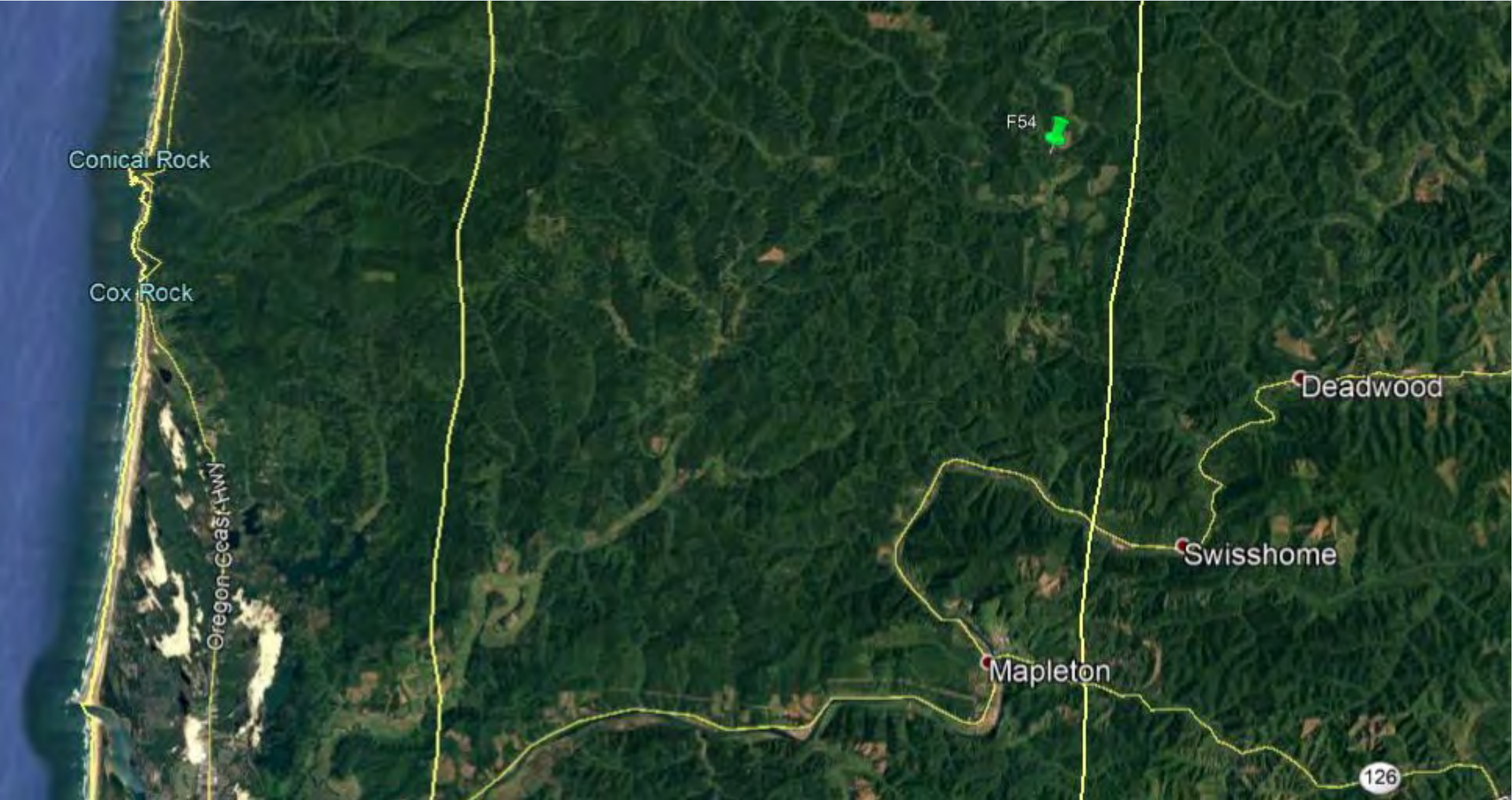






# 2020 RPN Losses

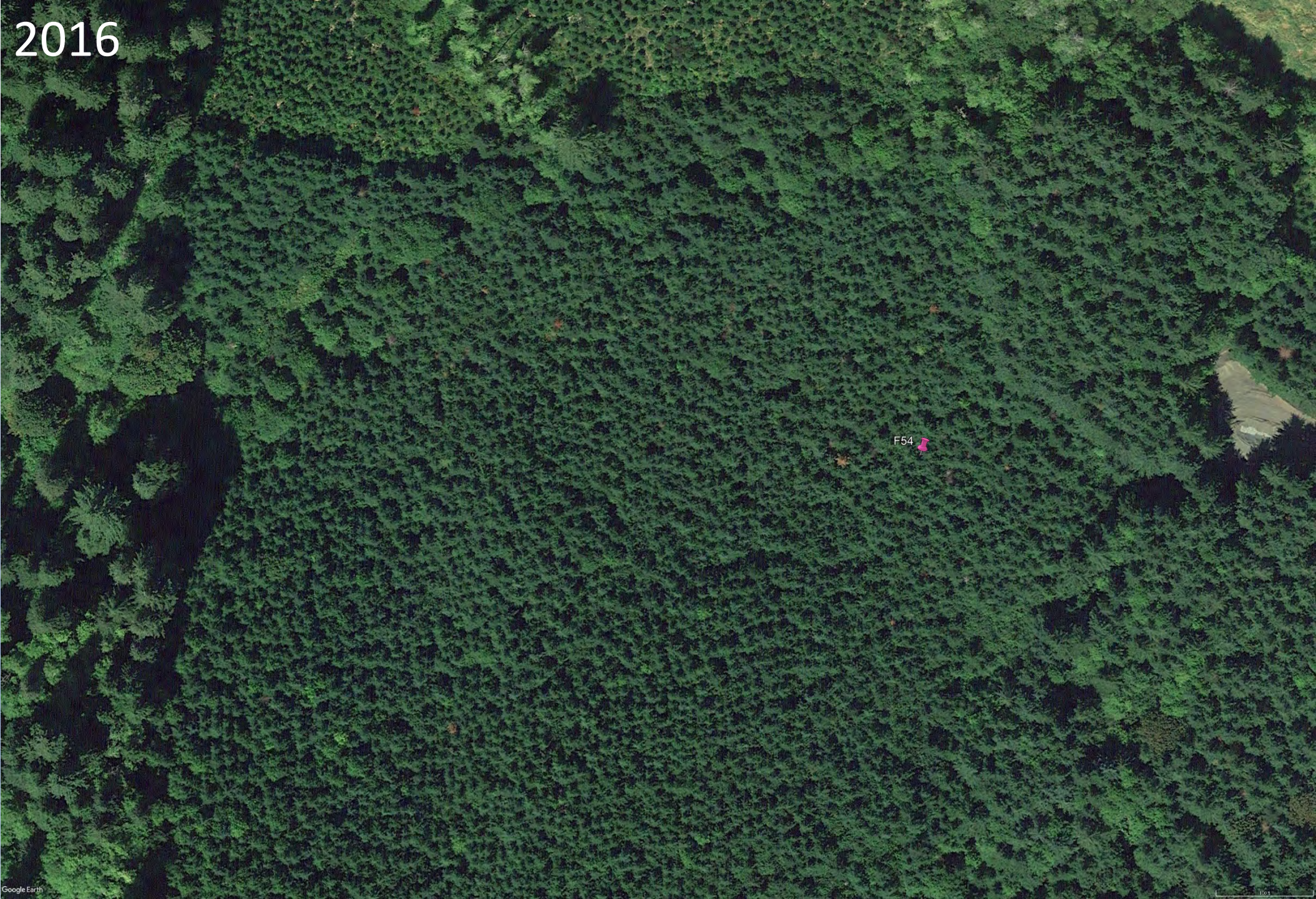
F54 – High DF Mortality similar to Coos Bay region



2013



2016



2019









# 2020 RPN Losses

## G51 – Chetco fire (NE Brookings)







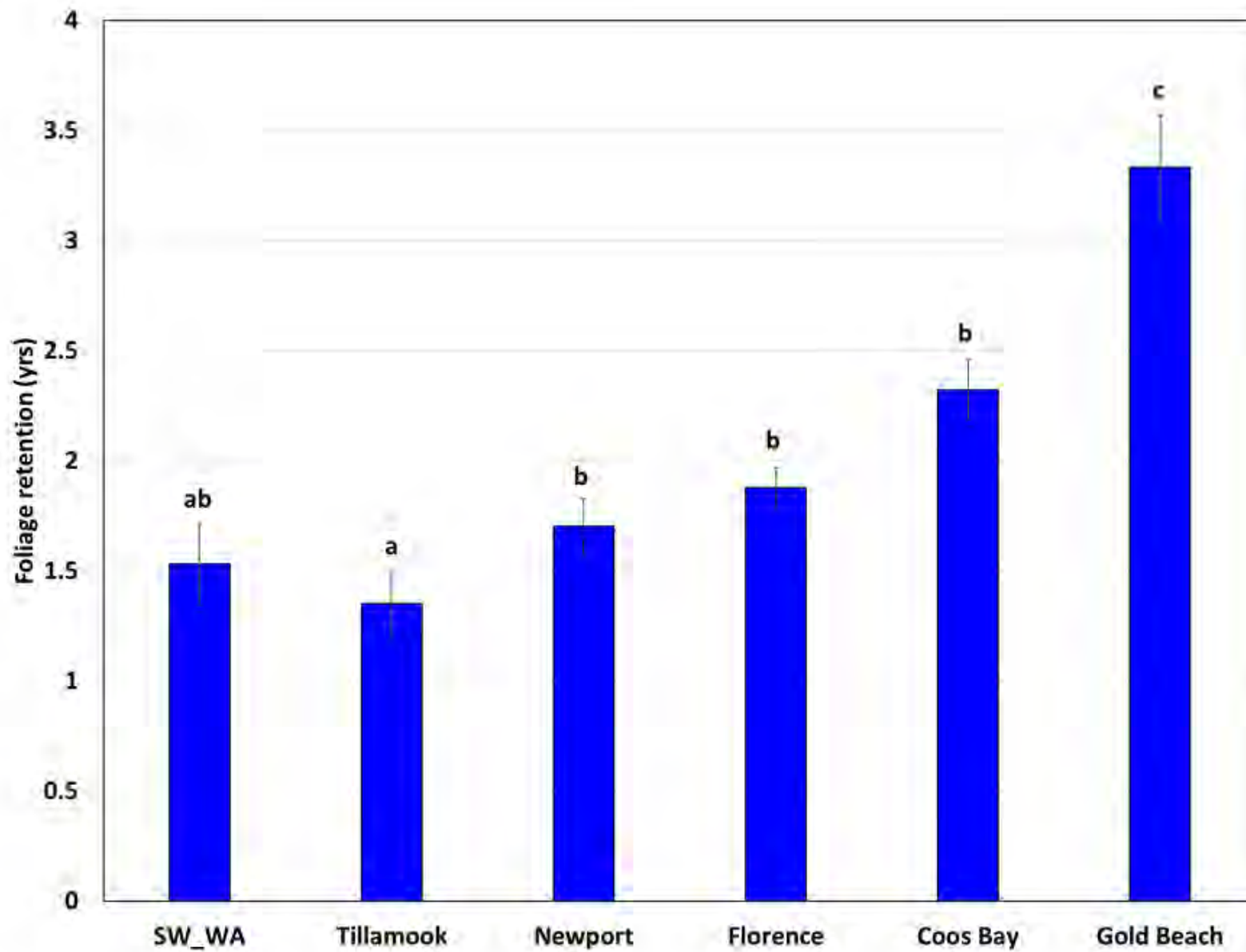


# Douglas-fir foliage retention dynamics across a gradient of Swiss needle cast in coastal Oregon and Washington.

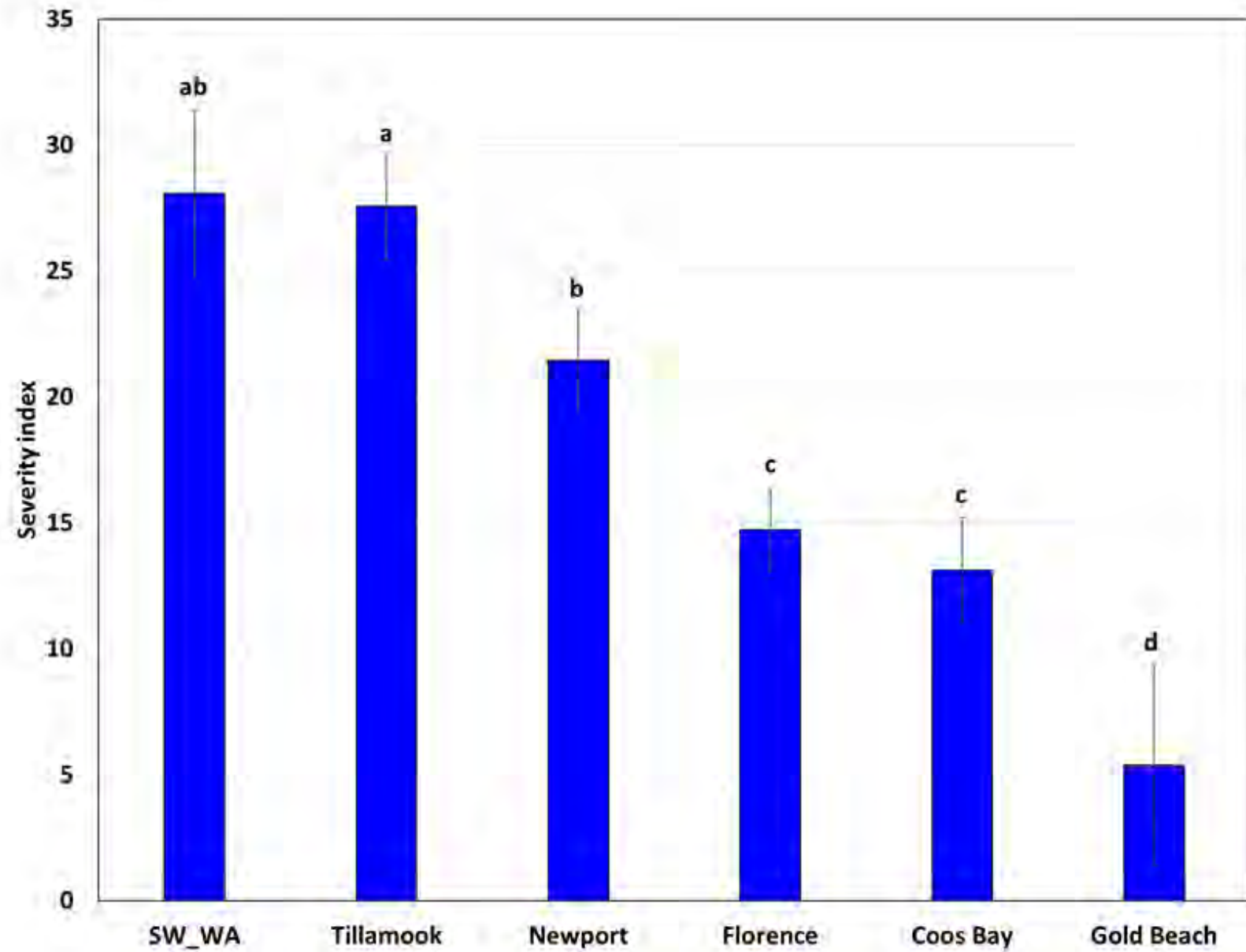
Ritóková, Mainwaring, Shaw, Lan



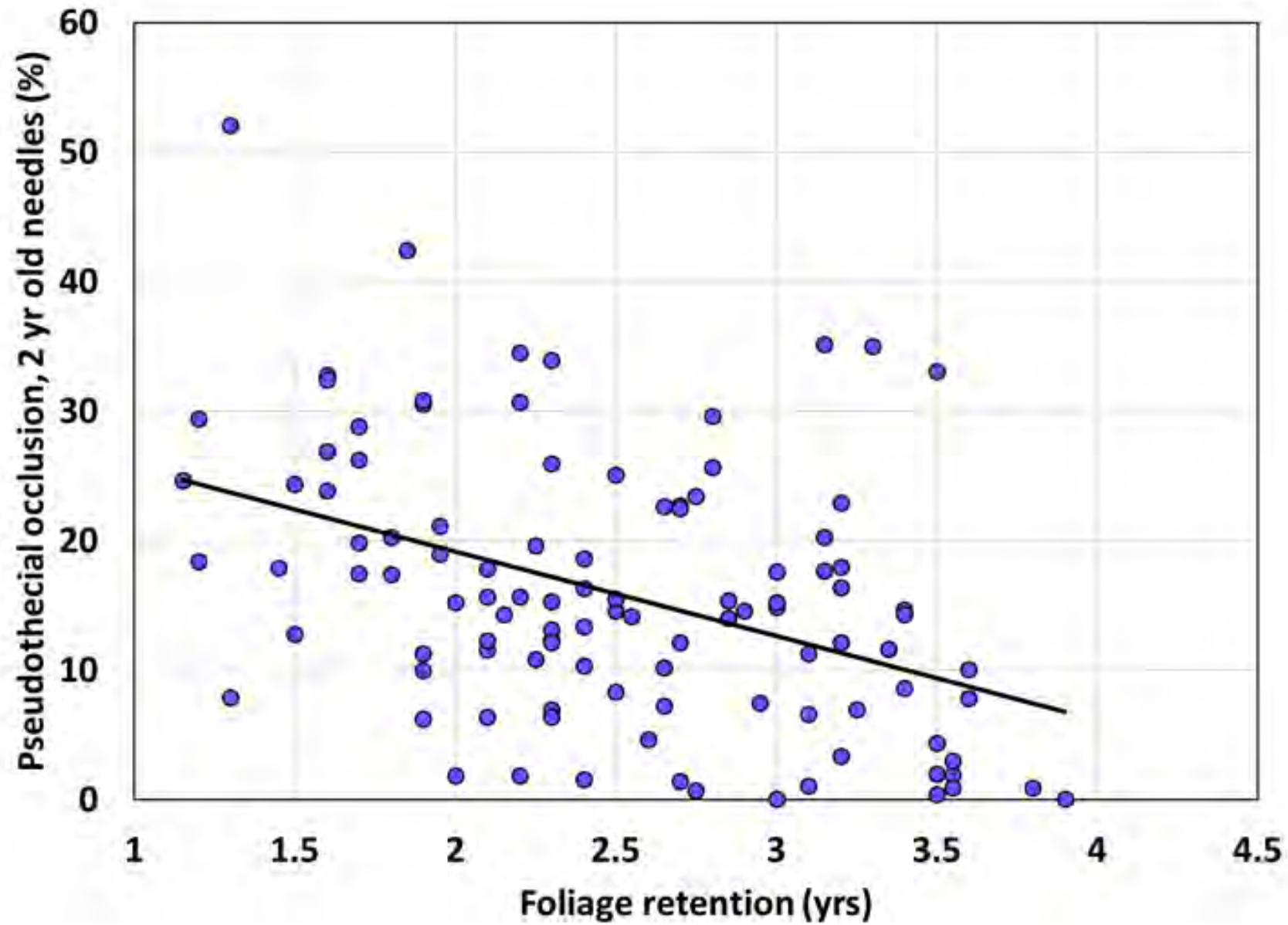
Canadian Journal of Forest Research: <https://doi.org/10.1139/cjfr-2020-0318>



Implied mid-crown foliage retention for the six coastal latitudinal zones based on an average June precipitation of 7 cm and an average January temperature of 5° C.

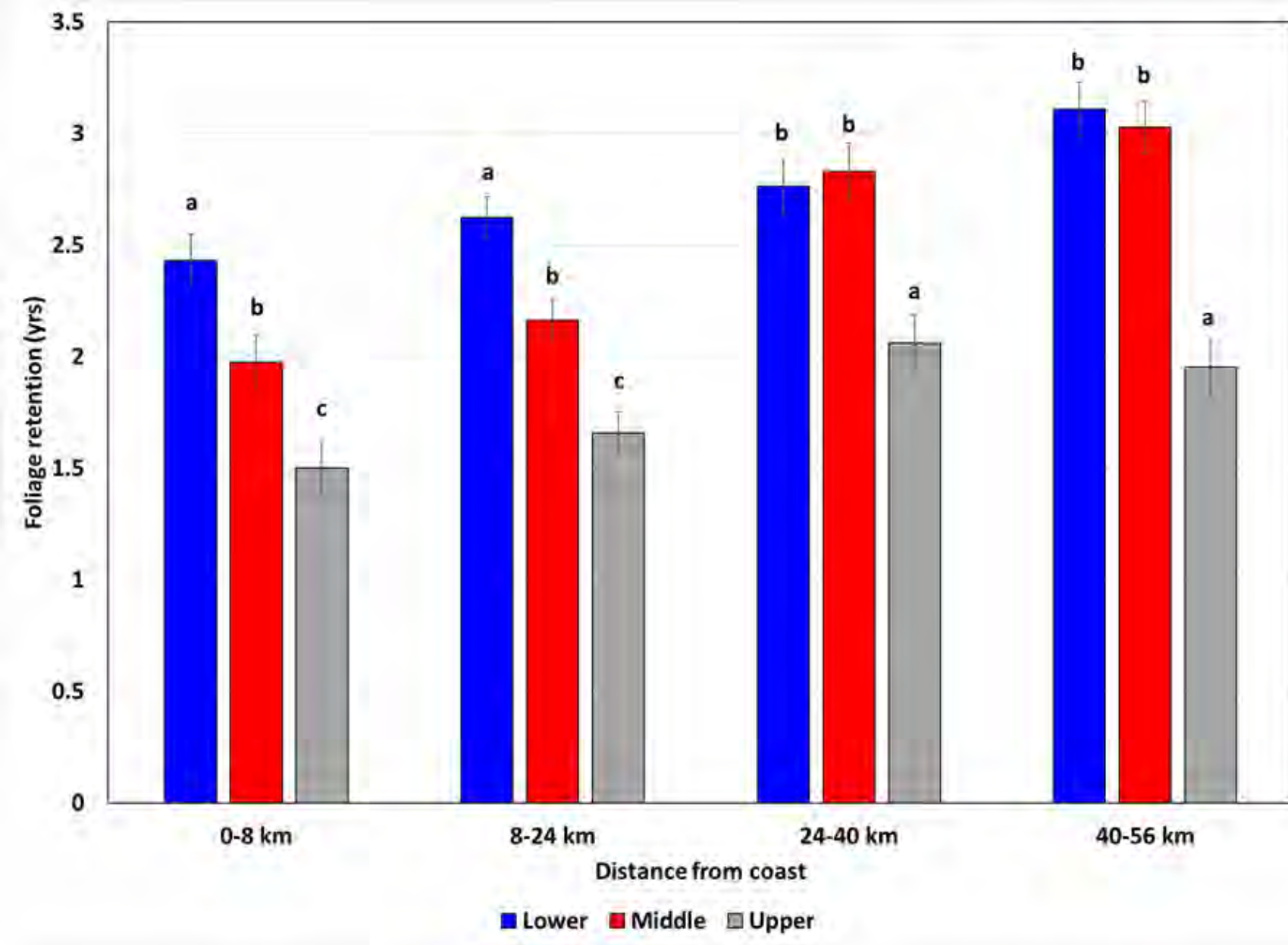


Implied disease severity ratings for the six coastal latitudinal zones based on an elevation of 100 m and an average January temperature of 5° degrees C.

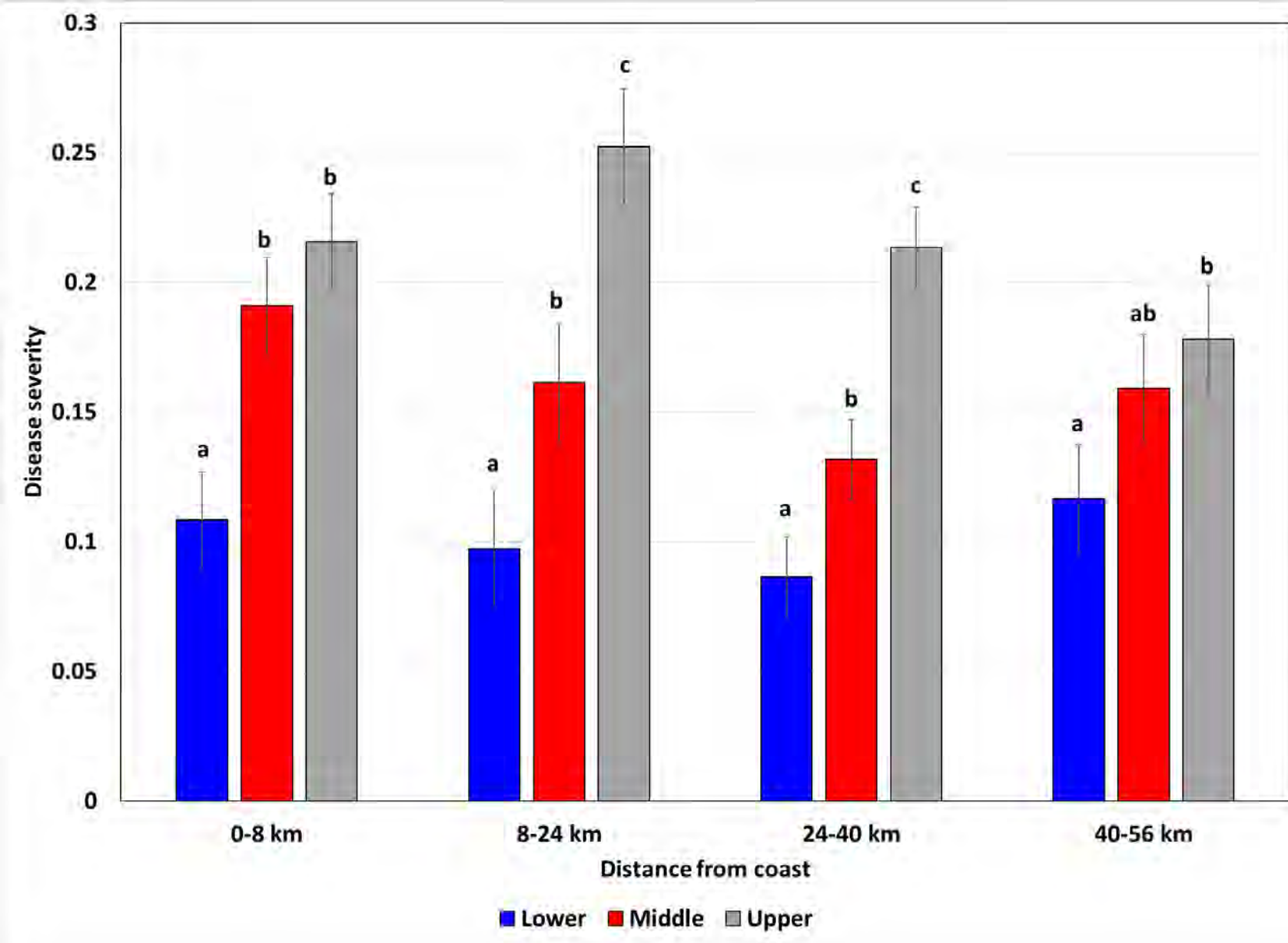


Distribution of occlusion percentage on 2-yr old needles versus the average plot-level mid-crown foliage retention (years).



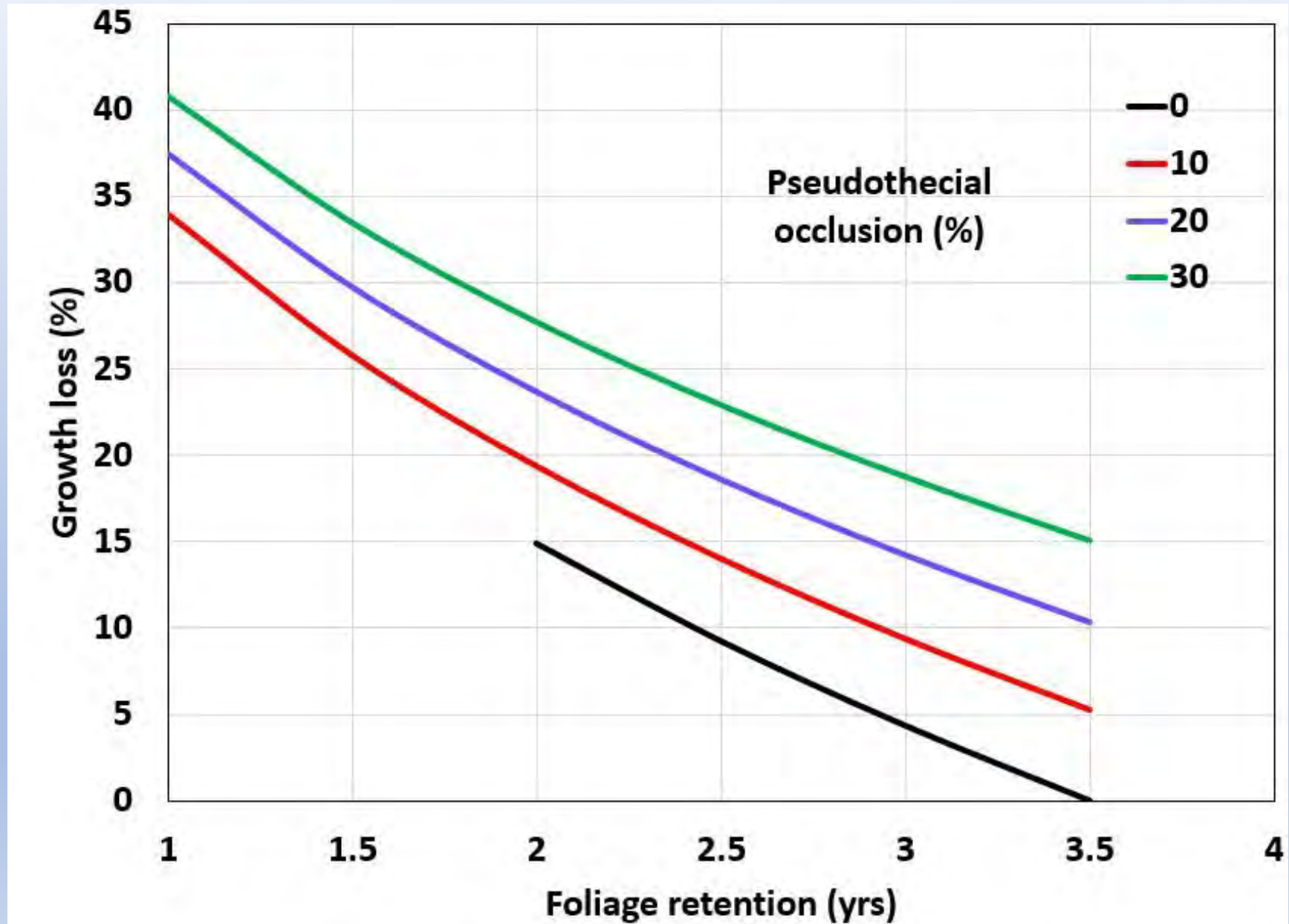


Differences in plot-level average foliage retention within the crown-thirds of trees within each longitudinal sampling zone.



Differences in plot-level average disease severity within the crown-thirds of trees within each longitudinal sampling zone.

# % Cubic volume growth loss



# Swiss needle cast summary statistics by sampling block in the Oregon Coast Range and SW Washington

SITE	ZONE	ELEV (av, m)	Foliage retention (yrs)	Disease Severity (2 yr)
<b>SW_WA</b>	8-24 km	166	1.93	25.96
	24-40 km	204	2.95	22.73
	40-56 km	313	3.05	22.63
<b>Tillamook</b>	0-8 km	256	1.78	22.32
	8-24 km	302	1.66	29.04
	24-40 km	457	2.68	13.29
	40-56 km	420	3.02	20.02
<b>Newport</b>	0-8 km	106	1.76	24.59
	8-24 km	334	2.29	18.47
	24-40 km	273	3.08	15.62
	40-56 km	263	3.16	15.73
<b>Florence</b>	0-8 km	123	1.61	20.4
	8-24 km	286	2.01	8.73
	24-40 km	263	2.79	12.73
	40-56 km	330	3.05	13.93
<b>Coos Bay</b>	0-8 km	124	2.12	18.15
	8-24 km	223	2.34	16.71
	24-40 km	285	2.61	11.61
	40-56 km	486	2.78	8.8
<b>Gold Beach</b>	0-8 km	402	2.56	9.84
	8-24 km	498	2.83	0.89
	24-40 km	753	3.3	1.57

## ZONE (Distance from coast)

0-5 miles = 0-8 km

5-15 miles = 8-24 km

15-25 miles = 24-40 km

25-35 miles = 40-56 km

