

Developing a permanent plot network for long term, spatial evaluation of old-growth dynamics in the coastal temperate rainforest



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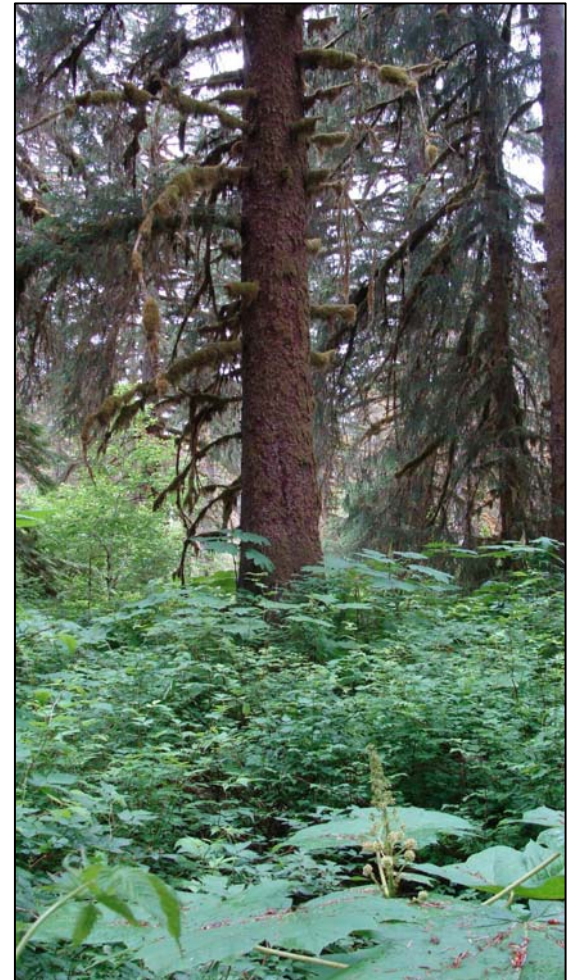
Why study old-growth spatial complexity and dynamics in the coastal temperate rainforest?

- Relatively little is known about old growth forests...
 - Latitudinal contrasts
 - Higher elevation and “non productive” ecosystems
 - Stand or landscape dynamics
 - Old growth dependence
 - Disturbance characterization across scales
- Planning for ecosystem representation, conservation areas
- Evaluating managed systems
- Understanding climate change
- Carbon accounting and modelling



What do we want to study (to start)?

- Comparative structure, composition, function
 - Species diversity and biomass
 - Species distribution
 - Dynamics
 - Tree recruitment, growth, and mortality
 - Coarse woody debris decay



Kitlope (I. Giesbrecht)

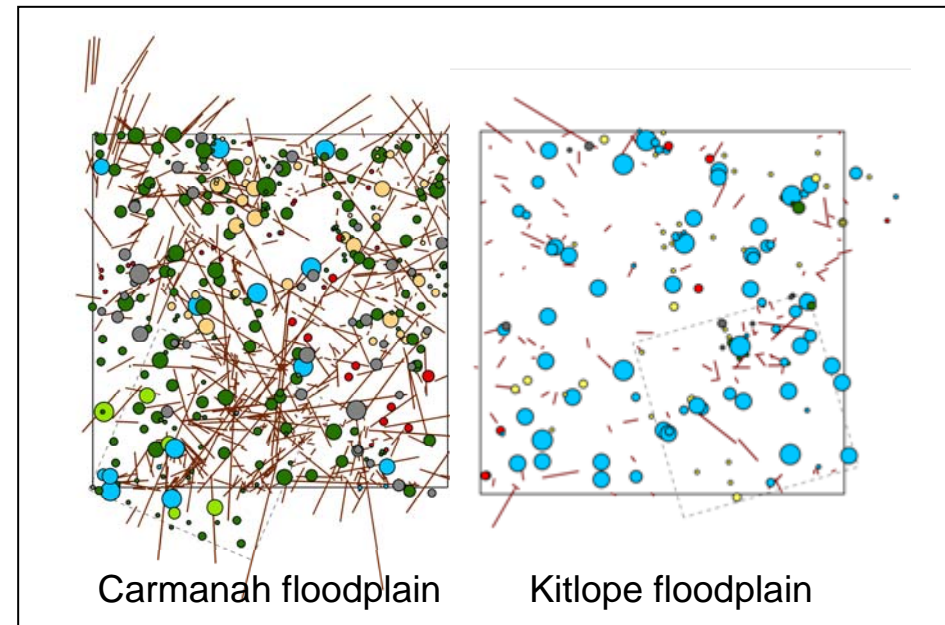
Measuring & Classifying Trees, Snags, CWD

- dbh, height (length)
- species
- decay class



What do we want to study (to start)?

- Spatial patterns (of these characteristics)
 - Comparisons across site types and regions
 - Comparisons over time

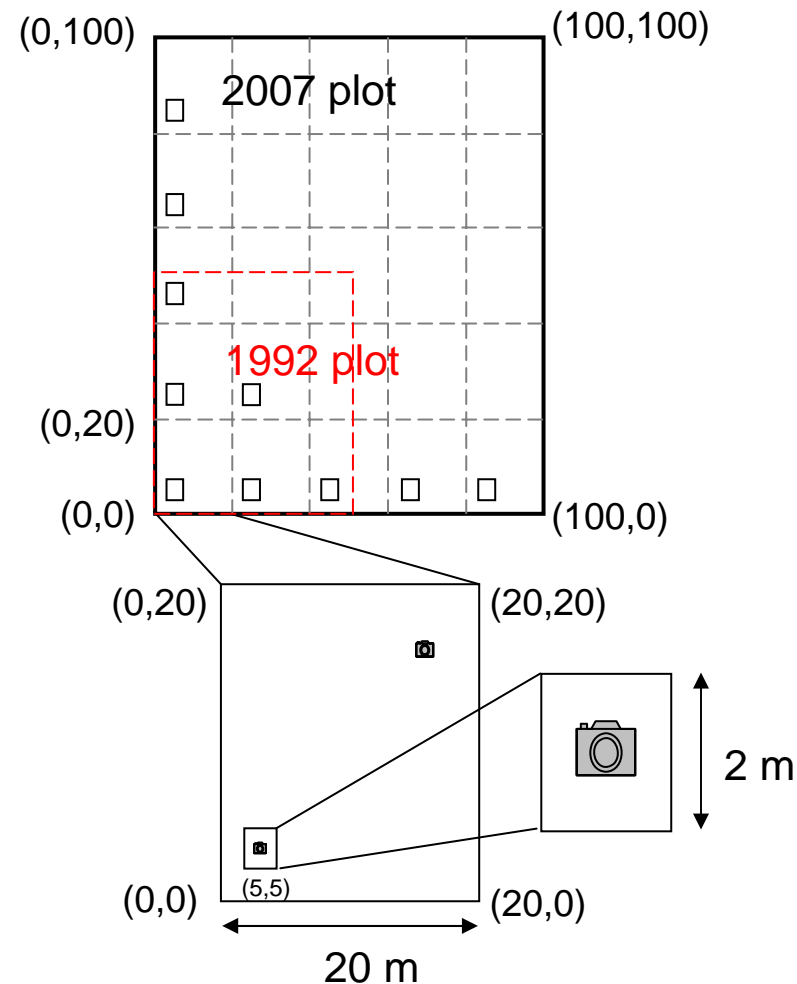


Mapping

- locations for trees, snags, cwd

What is the best way to study these characteristics?

- **Permanent sample plots**
 - vs. chronosequence studies
 - vs. one-time measurements
- Many smaller plots (e.g., EMAN 20x20) vs. **larger (≥ 1 ha) plots**
- Counts and densities vs. **explicit spatial mapping**



Where do permanent plots already exist ? – some BC sites

Tahsish-Kwois

- 1 floodplain, 1 upland plot
- wetter CWH vm1

Pacific Rim

- 1 upland plot
- wetter CWH vh1

Bamfield

- 1 upland plot
- wetter CWH vh1

Carmanah

- 1 floodplain
- wetter CWH vh1

Kitlope

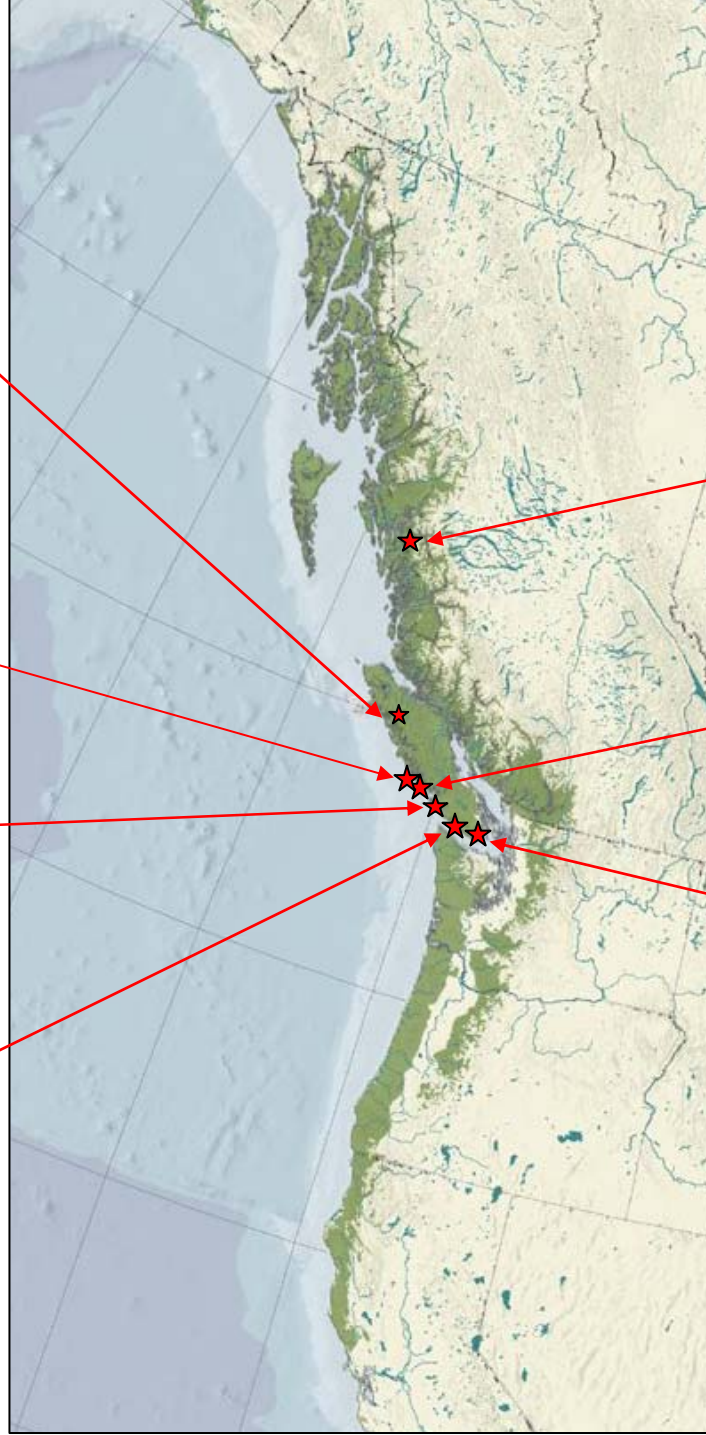
- 1 floodplain, 1 upland
- wetter CWH vm

Clayoquot

- 1 floodplain plot
- wetter CWH

Rocky Point

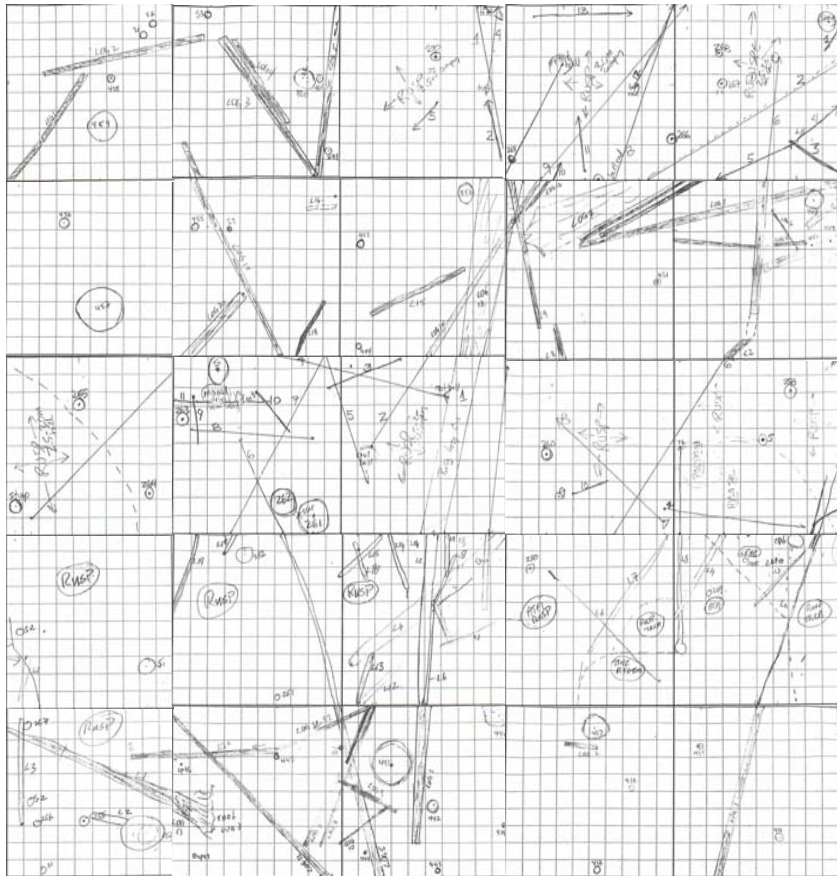
- drier CDF mm



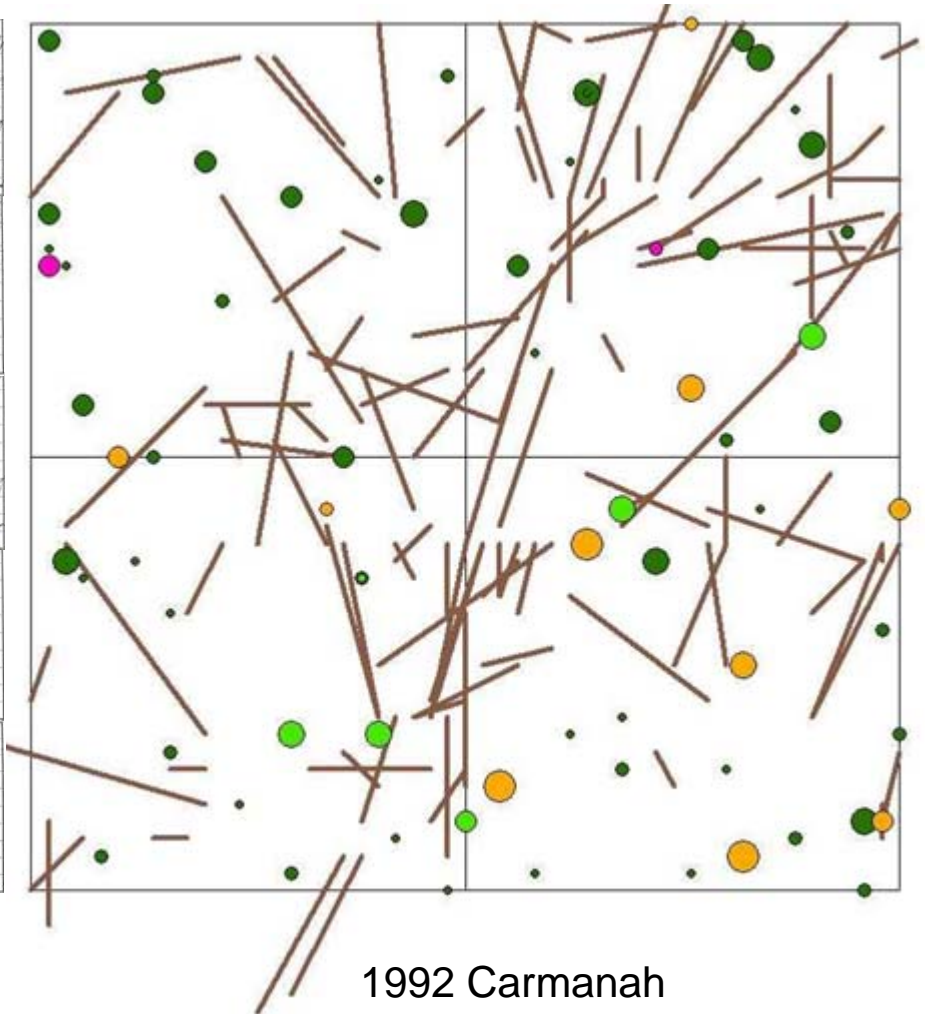
Where do permanent plots already exist – outside BC?

- USDA FS plots (including Alaback plots in AK; relevant for comparison along latitudinal gradient)
- Wind River Canopy Crane site
- US LTER sites (not too many relate to coastal temperate rainforest)
- Other international plots
 - demonstrated utility of large stand-mapped plots for ecological understanding and methodological development
 - Changbai (boreal China)
 - Barro Colorado (tropical systems)
 - Mexico (high elevation forests)



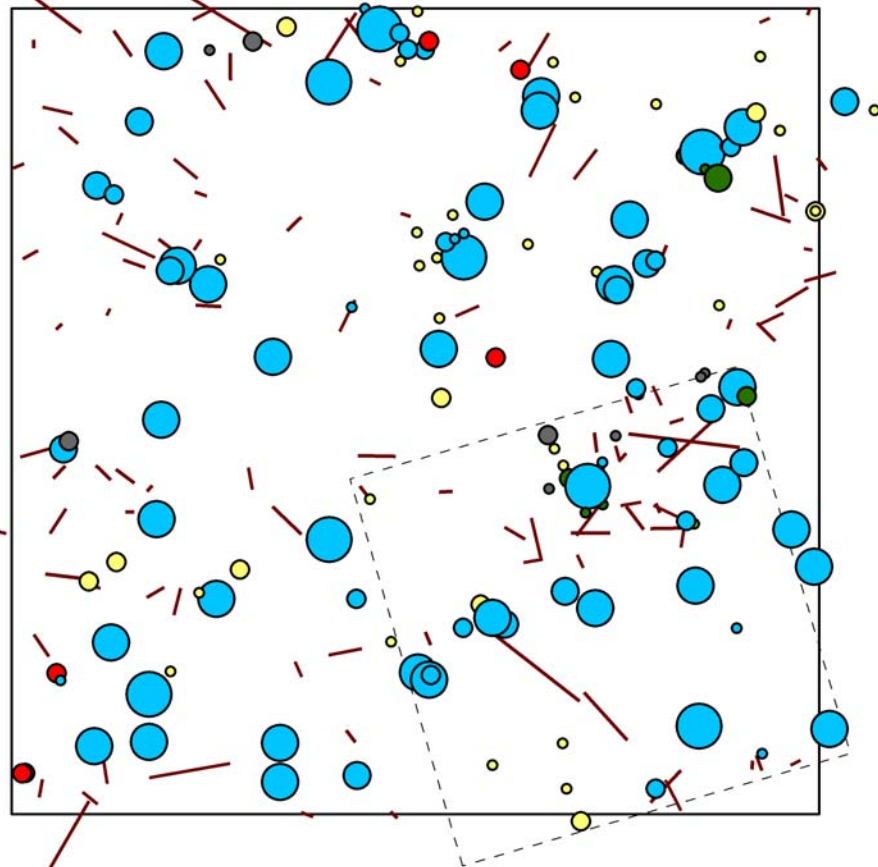


1992 Carmanah
sketch map

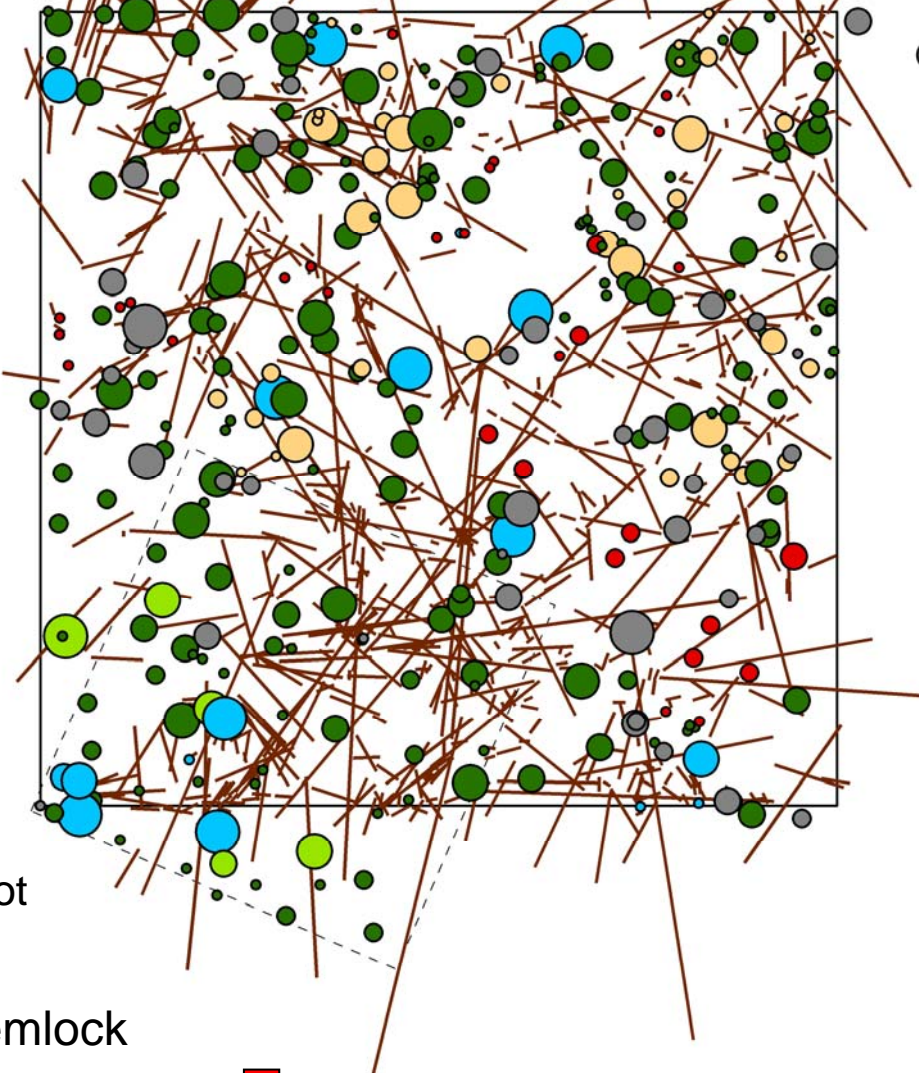


1992 Carmanah
digital map

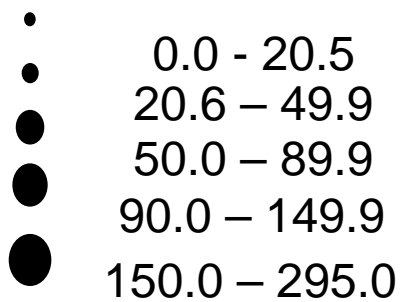
Kitlope Floodplain 2008



Carmanah Floodplain 2007



DBH (cm)



--- Historical plot

— CWD

■ Western Hemlock

■ Western Redcedar

■ Pacific crab apple

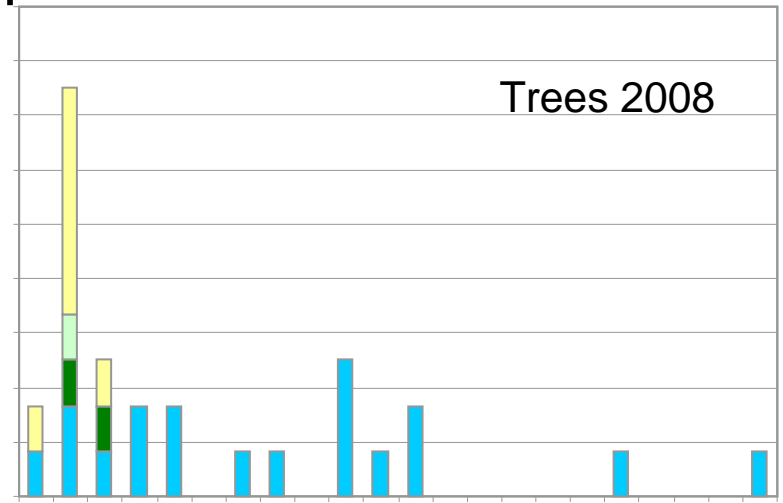
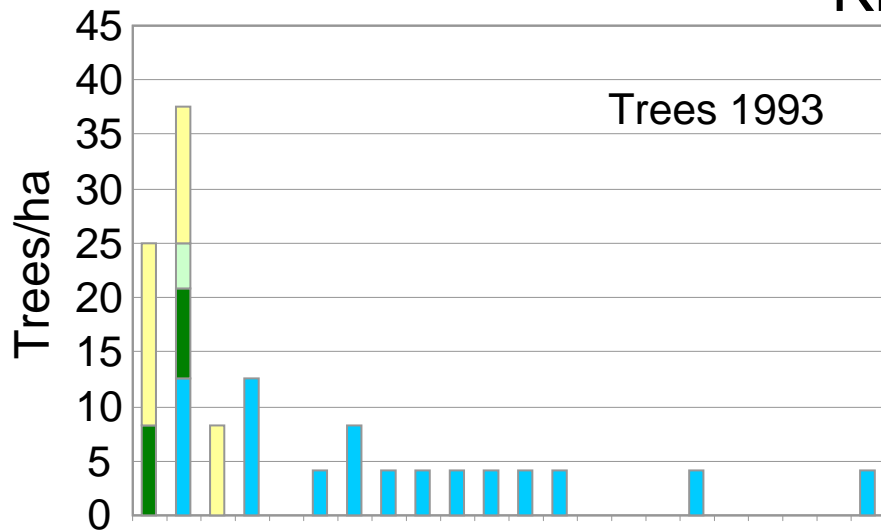
■ Amabilis Fir

■ Red Alder

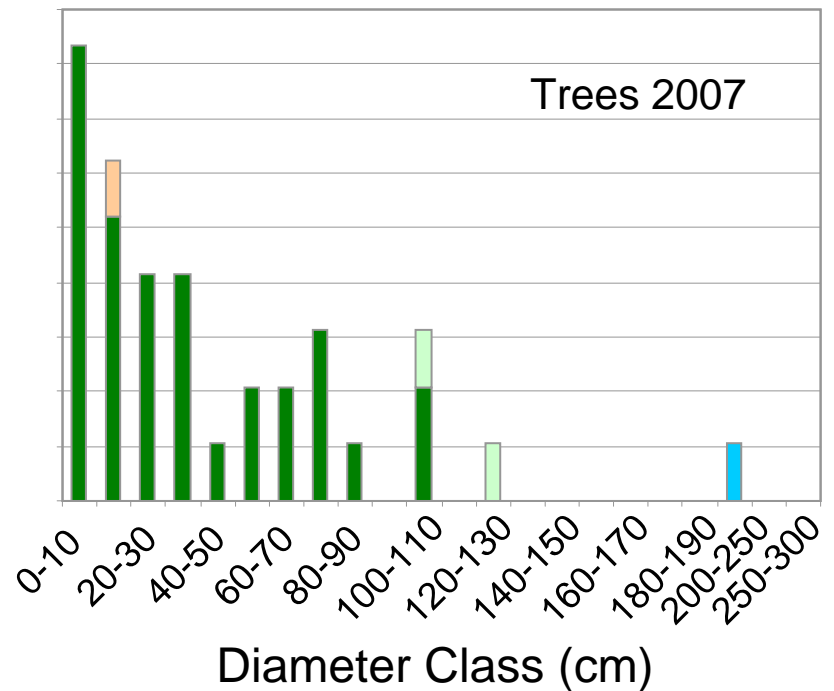
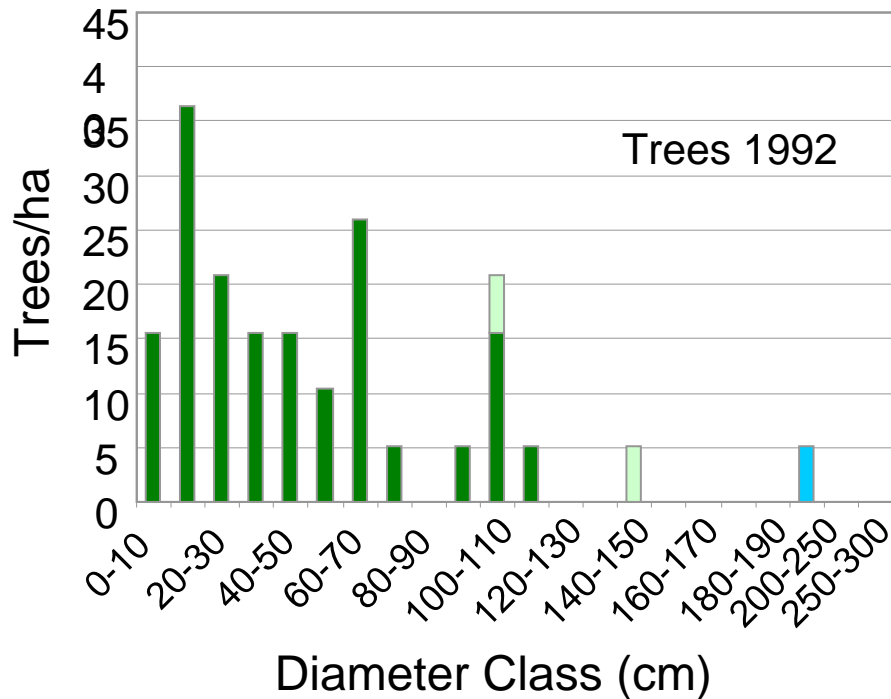
■ Sitka Spruce

■ Unknown

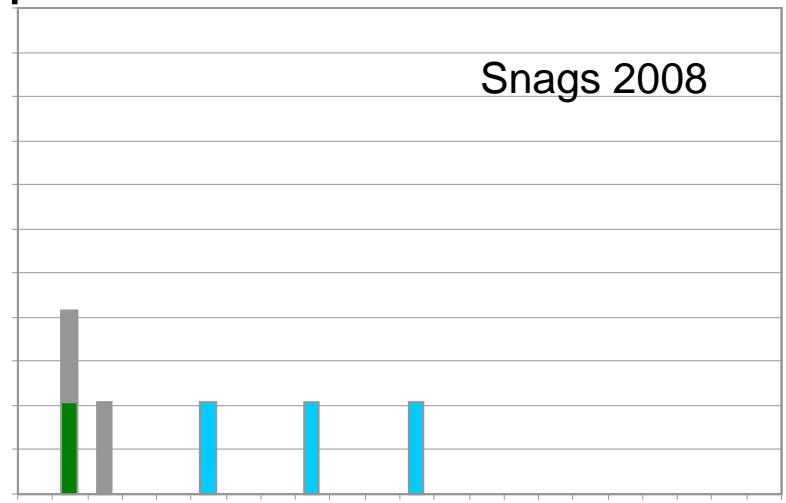
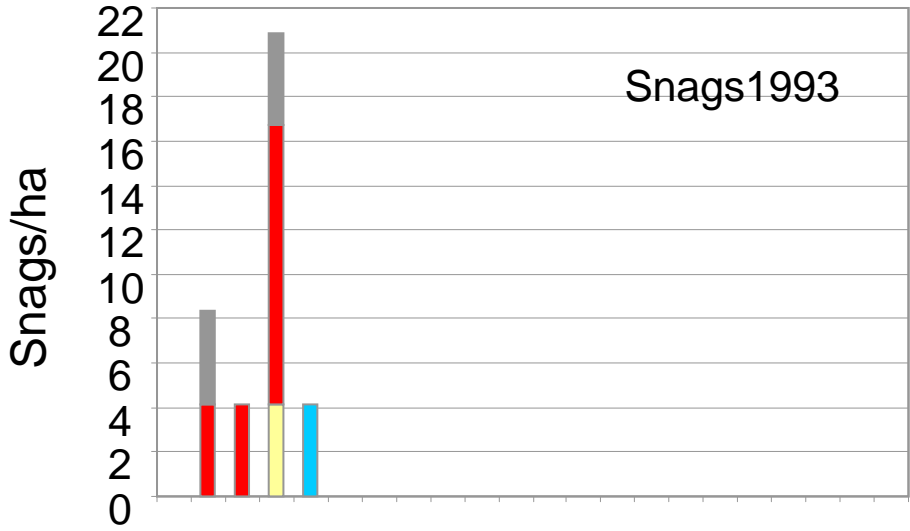
Kitlope



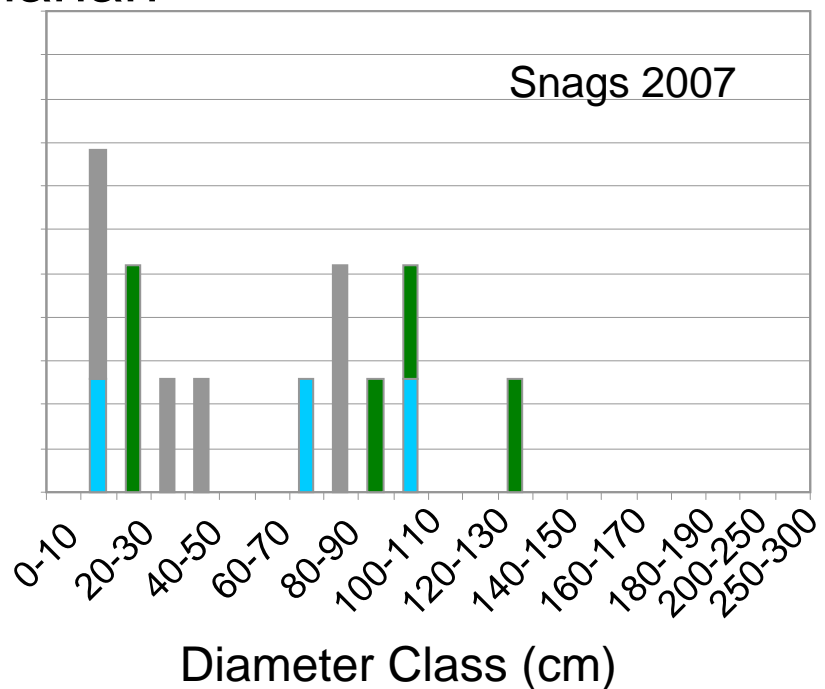
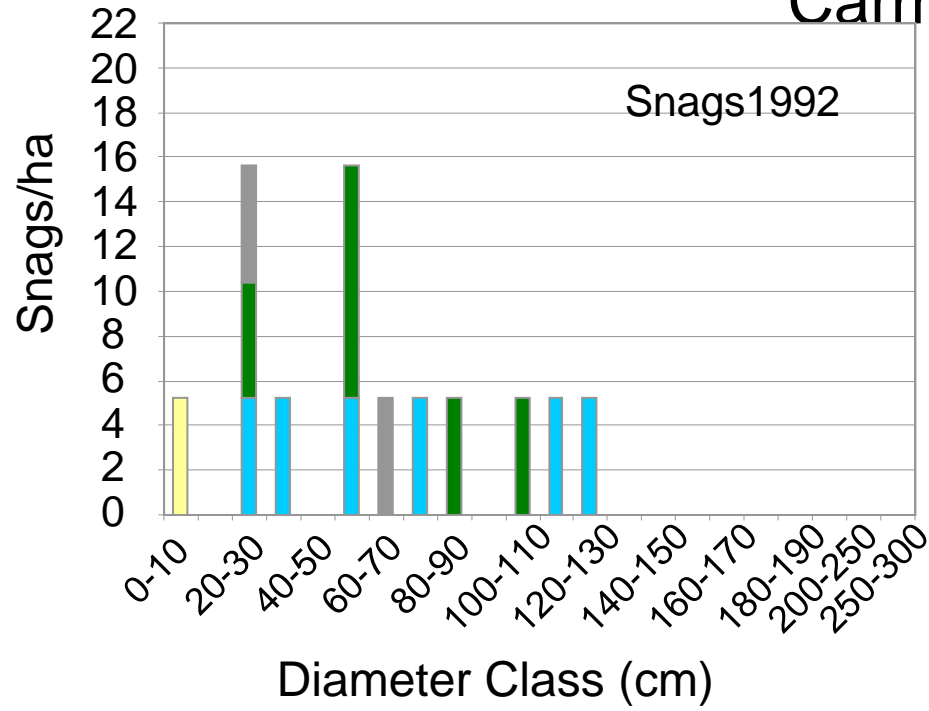
Carmanah



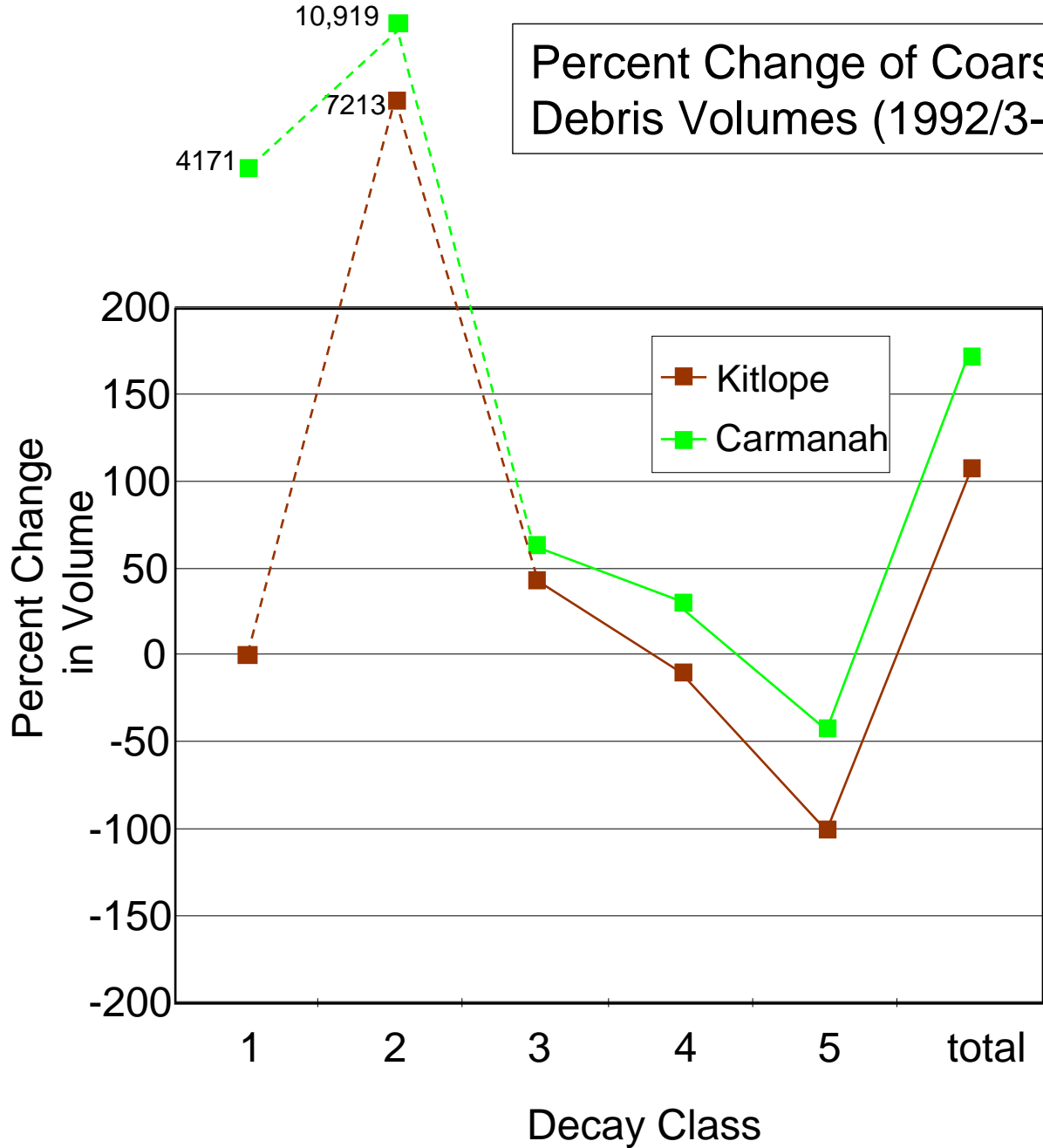
Kitlope



Carmanah



Percent Change of Coarse Woody Debris Volumes (1992/3- 2007/8)



Future plans

- Larger (> 10 ha) stand-mapped plots
 - collaborators T. Trofymow (CFS) & F. He (U of Alberta)
- Landscape-level LIDAR context
 - collaborator G. Fraser (U Vic)
- Within-stand (finer-scale) dynamics
 - Structure-light-regeneration relationships
 - CWD classification (decay classes)
 - Gap dynamics: infilling, expansion, ingrowth rates
 - Repeat photography, seedling counts



(I. Giesbrecht)

Why establish plots in protected areas?



- Long-term security
- Contributes to understanding effectiveness of current protected areas
 - What is representative and at what scales
 - Provides inventory
 - What must then be accounted for/managed for in the rest of the land base?
- Infrastructure and support from an additional agency for research and management

What are the challenges of establishment in protected areas?

- Park Use Research Permit
 - Cumbersome and lengthy process
 - Ongoing development of process for coordinating with FN land claims and access rights
- Can't do as much “invasive” sampling as might want to
 - Soil pits, tree coring, plant collection
- Public awareness and perceptions
 - Need for good extension to park users
 - Concerns re: vandalism on the plot



Acknowledgements



- Haisla First Nation – Kitlope Valley
- Kitamaat Village Council
- BC Parks
- Parks Canada
- Paul Alaback and field crews (1992/3)
- Field crews (2007/8)
- GIS crew (ILMB and MFR)