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

Carmanah floodplain
Kitlope floodplain
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)

Kitloope vs Carmanah

Percent Change in Volume

Decay Class

1 2 3 4 5 total
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
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
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