Learning from light harvest entries in the Date Creek Research Forest

Erica Lilles, PAg
Stephen Chipman, RPF

NORTHPAC FORESTRY GROUP

British Columbia
Ministry of Forests

GITXSAN HUWILP GOVERNMENT

“Maintain 70% Structure and Function”

Gitanyow Lax’yip Land Use Plan

Table 7. Forest Conditions within Ecosystem Network Buffers

- Continuous forest cover
- Small discontinuous canopy gaps
- ≥70% structure and function[3] retained, including large, old trees, snags, and coarse woody debris
- Multi-canopy levels, multi-aged forest
- In conjunction with the forested core, maintain interior old forested conditions ≥200 metres in width (for the Cranberry and Kispiox only)
- 0% permanent road access, except where, for ecological or economic reasons, no other alternative is possible.

Bulkley TSA LRMP: “The guideline for management within landscape corridors is to maintain 70 per cent of the existing structure and function of the forest”

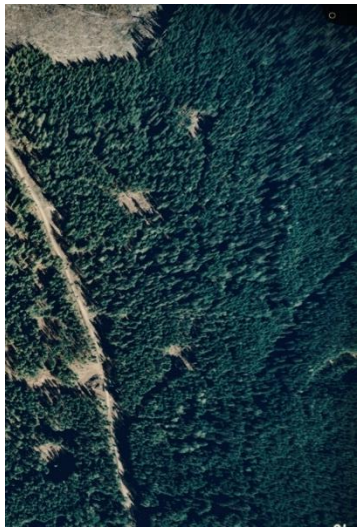
Lakes South SRMP “Maintain over 70% of the Crown forest land within a landscape corridor”

Morice TSA LRMP for Telkwa Caribou Herd Recovery area: “Overall, 70% structure and function”.

Date Creek Overview

4 stands with light harvest treatments






Outline

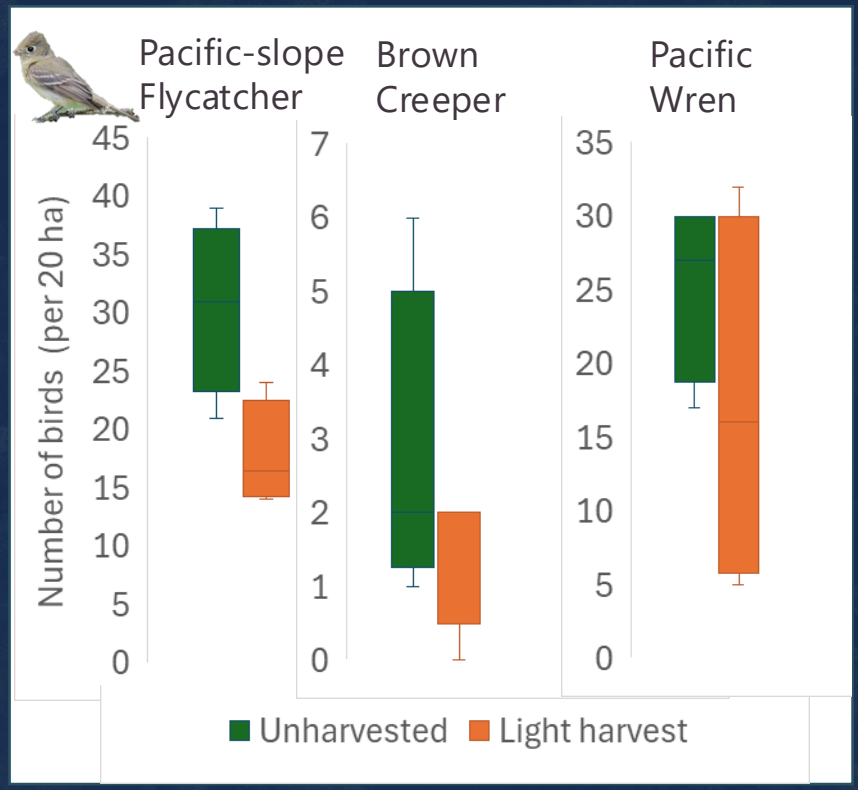
- First harvest goals, methods and results
- Second harvest
  - Goals for research and Gitxsan stewardship
  - Challenges of operating in the ICH
  - Modern mechanized methods
  - Operations
  - Evaluation
- Future work
- Innovation lessons learned

First Harvest

- 1992
- Hand-felling with skidding by horse and/or skidder
- Highly labour intensive
- “Light touch”

First harvest successes

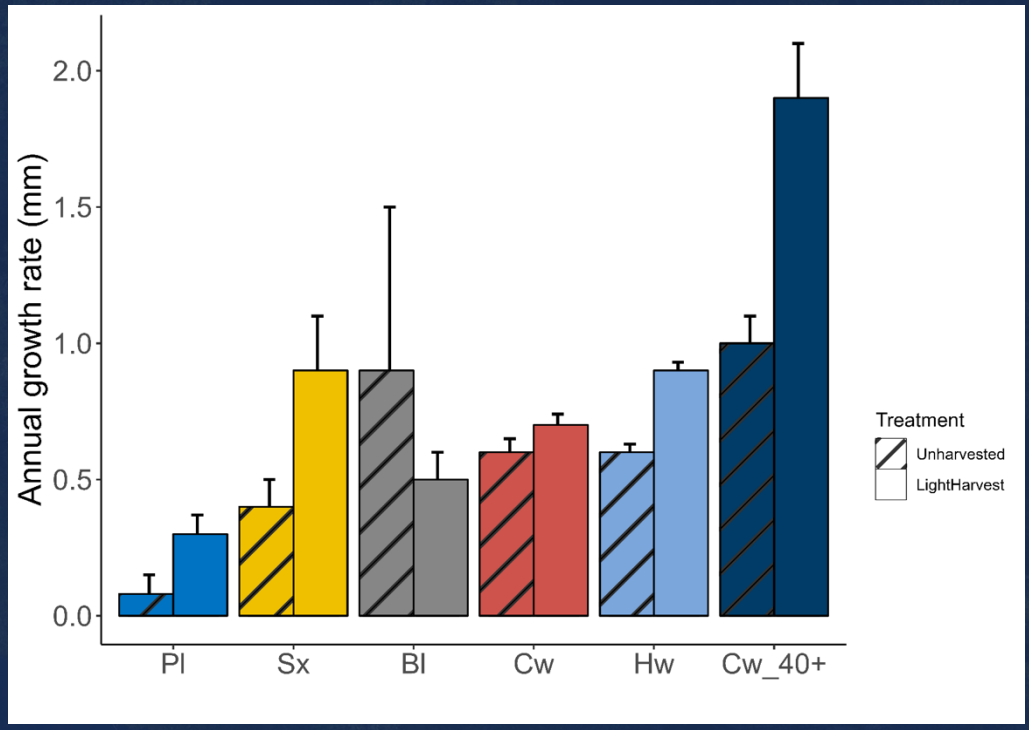
- Forest-interior dependent birds reduced in abundance but still present[1]
- Marten habitat maintained as measured by CWD[2]
- Aesthetics

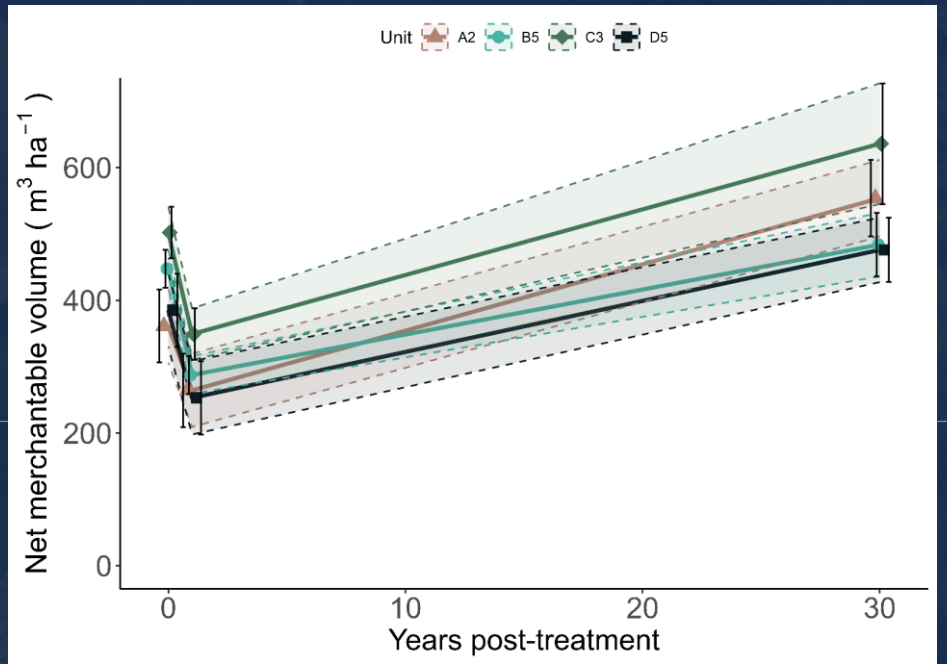


[1]Price et al. 2020. Long-term response of forest bird communities to retention forestry in northern temperate co
Ecol. Manage. 462: 117982.
[2]Farnell et al. 2020. The effects of variable retention forestry on coarse woody debris dynamics and concomitant
American marten habitat after 27 years. Can. J. For. Res. 50: 925–935.

First harvest successes

- Retained trees had faster growth and lower mortality than in unharvested stands[3]
- Western redcedar had impressive release rates for larger trees[3]
- Timber volume and carbon stores[4] were essentially recovered within 30 years





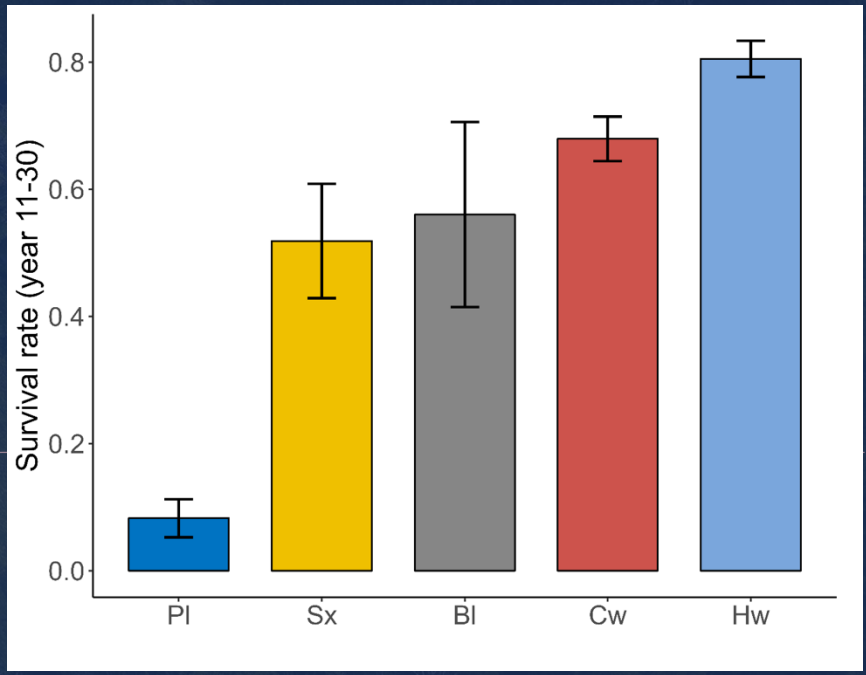
[3]Lilles et al. 2026 Stand development over 30 years after partial-cut harvesting in a northern interior temperate rainforest: capturing stand and individual tree dynamics through empirical studies and modelling. *Submitted to* Can. J. For. Res.

[4]Dymond et al. 2025. Reducing logging intensity in north temperate rainforests for climate and economic benefits. For. Ecol. Manage. 597: 123163.

First harvest challenges

- Horse-logging was expensive
- Understory light level limited height growth
- Level of safety and ergonomics

	Clear-cut	60% removal	30% removal
Layout ($/m3)	$0.65	$2.67	$4.66
Falling ($/m3)	$3.47	$5.81	$9.71
Skidding ($/m3)	$3.59	$7.51	$14.58
Total ($/m3)	$7.73	$15.99 (×2.1)	$28.95 (×3.7)



Thibodeau, E.D., Krag, R.K., Hedin, I.B. 1996. The Date Creek Study: Productivity of ground-based harvesting methods in the Interior Cedar-Hemlock zone of British Columbia. FERIC.

Second harvest goals

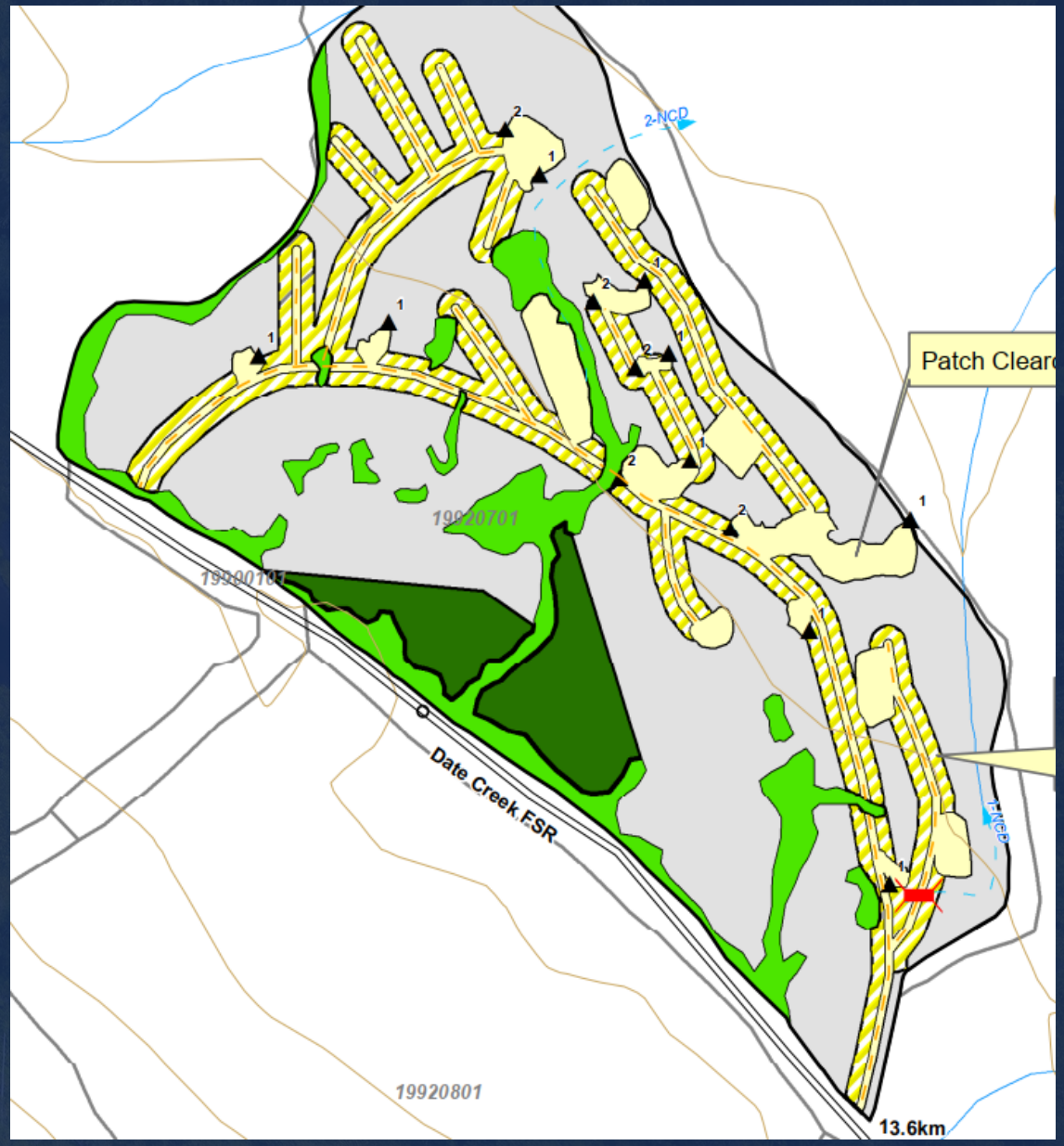
- Demonstrate operationally realistic alternative silviculture system that leaves future options
- Maintain integrity of the experiment
- Harvest design builds on past research
  - To manage cedar
  - To sequester carbon
  - To manage gaps – *femelschlag*
  - To maintain forest interior dependent species
- Establish WTPs around cultural and wildlife features
- Track costs to continue economics research
- No pile burning and no “messy” logging

Second Harvest Operations

- 2025 Summer
- Adaptive Layout
- Safety oriented
- Cut to Length Harvest system (CTL)
- Value Added through multiple log sorts to multiple destinations
- Operational Efficiency vs maintaining stand structure values
- Focus on cedar retention

Layout considerations

- Management of Ribbon
- Trail layout
- Patches vs Trails vs selection zones
- Target species retention
- Machine capabilities
- Future harvest planning



Safety management with a CTL System

- Challenges of minimizing damage to leave trees and being able to handle the cut tree
- Not creating new hazards for future workers and guests
- Abating hazard trees as they are found
- Not creating machine traps on slopes or wet areas
- Machine capabilities of handling the trees and logs with the terrain

Right log, right place, Right time

Multiple Log sorts, across multiple Species

- Cedar – Small/ Medium/ Large
- Spruce/Pine/Lasio Balsam – Small/ Medium
- Spruce/Pine – Peelers
- Hemlock/Amabilis Balsam Small/ Medium
- Hemlock/Amabilis Balsam Large – Export
- Low grade wood – Pellets vs Pulp

Bush Sorting Plan

We require bush sorts as follows

Sort #1 Prince Rupert (Tidal) - Logs cut to the follow specs to be decked and delivered together

a) Hemlock Long logs 8.8m longer 12"+, max 5% shorter then 8.8m(29') (+12" tops only)

b) Spruce Long Logs 18"++ top size - Butt cutts only

c) Amabilis Balsam 6" plus

Sort #2 Spruce Peelers - See WF Peeler Specs - 25'4" and 17' to 10" top

Sort #3 Westfraser - Quesnel Spec -Spruce/Pine/Balsam - See WF QC card for Diameter sorts. Lengths below.

Sort #4 Kitwanga - Hemlock <12" Butts to 4.5" tops

Sort #5 Kitwanga - Hemlock 12-18" Butts - Target 12" plus tops for long log Export lengths. Fall down to this sort.

Sort #6 KITWANGA - Cedar Small sort under 10" Butts, Minimum top Size to 4.5" - No Butt Flare, if flare is larger put in medium sort

Sort #7 KITWANGA - Cedar Medium 10"-18" Butts

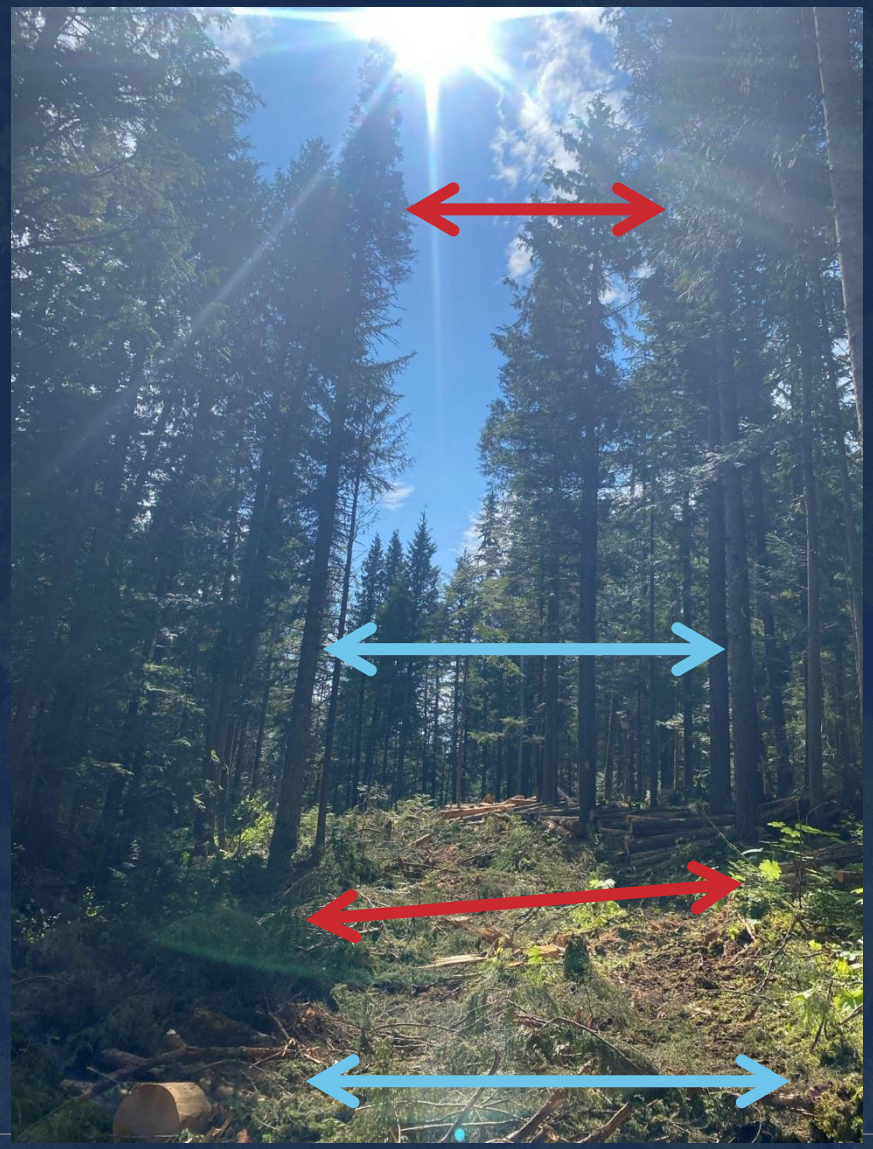
Sort #8 KITWANGA - Cedar Large - Over 18" Butts

Sort #9 Firewood - Dry spruce/pine that does not meet any sawlog specs. Cut to Long log legnths.

Sort #10 Drax- Pulp - Decidous & CnS Hemlock - Or Canfor Pulp - Confirmed at prework meeting for which block - CTL ONLY

Trail widths –different perspectives.

Use of Gate trees



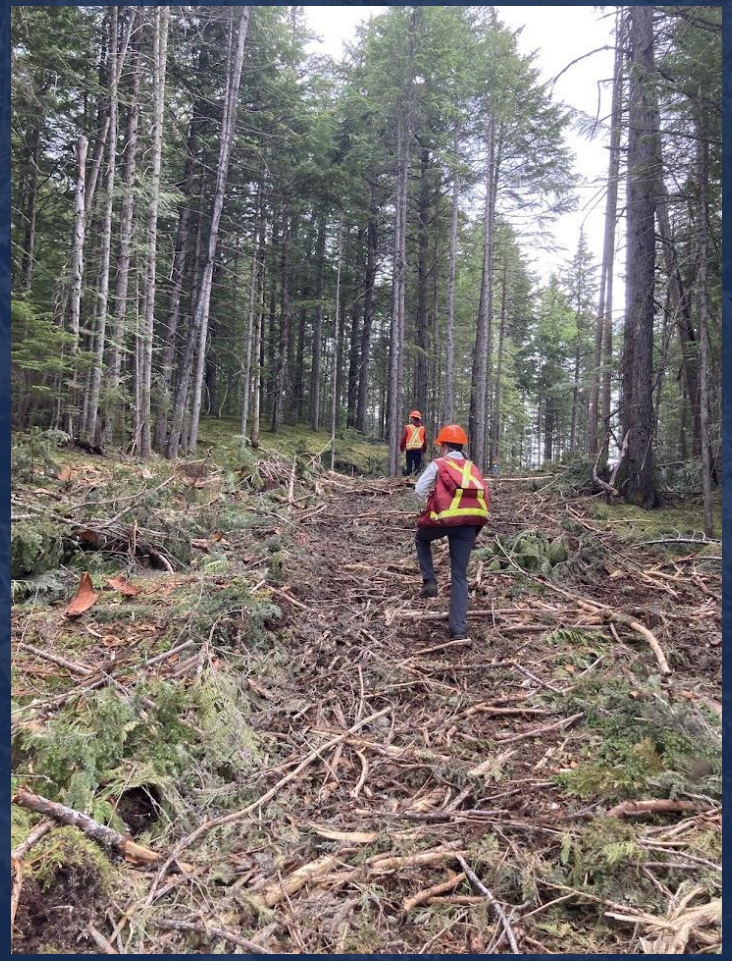
Different ways to measure

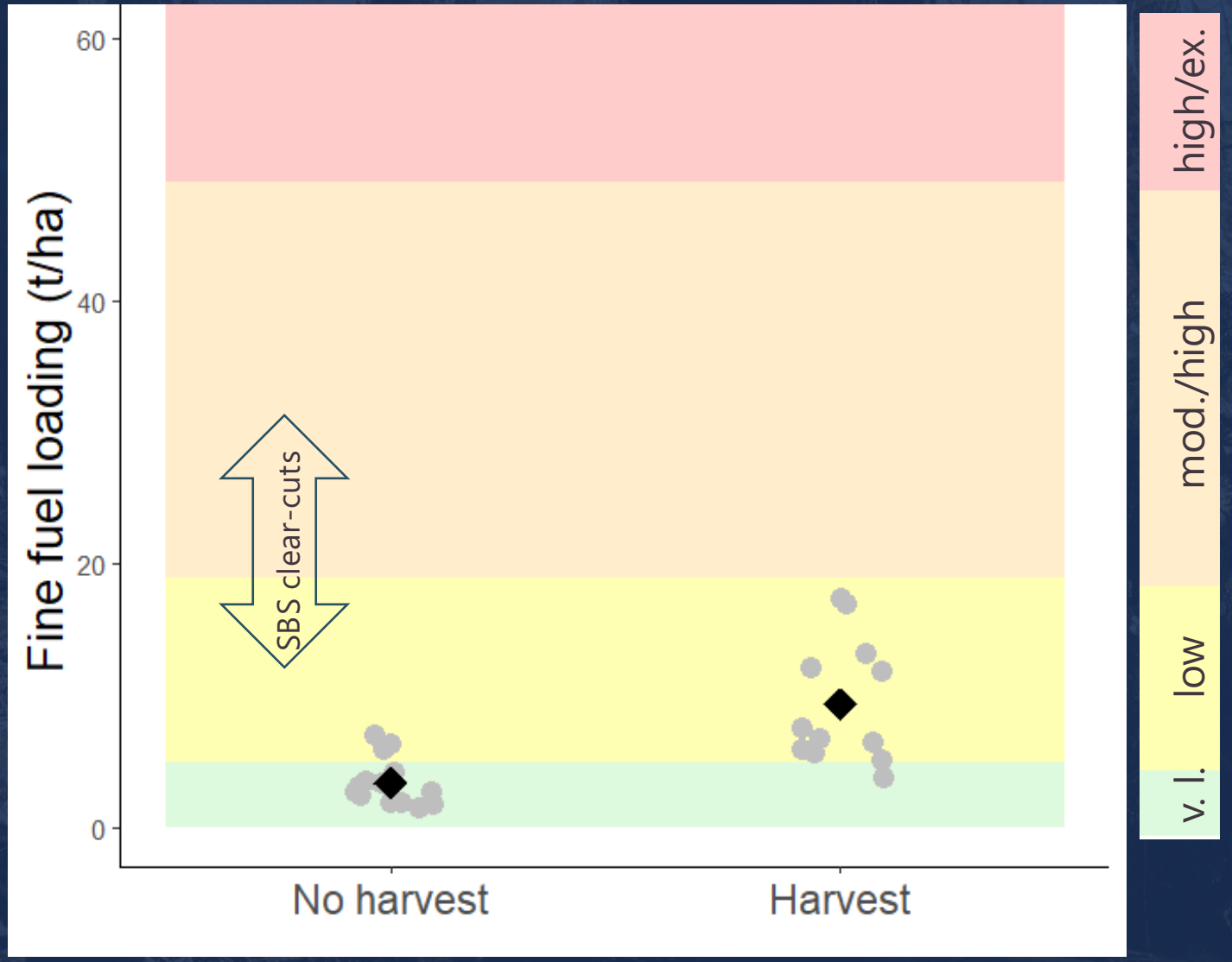
- Width of machine travel
- Width of Cut stumps
- Width of final spaced trees
- Width of live crown

Processing at the stump – no burning but how is fire risk affected?

Second harvest operations

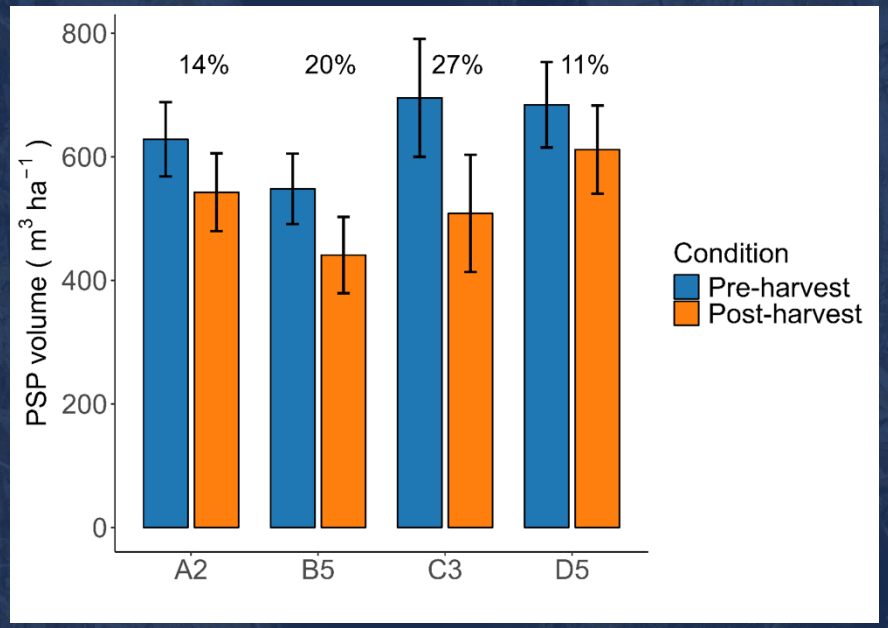
Fine fuel increase after light harvest

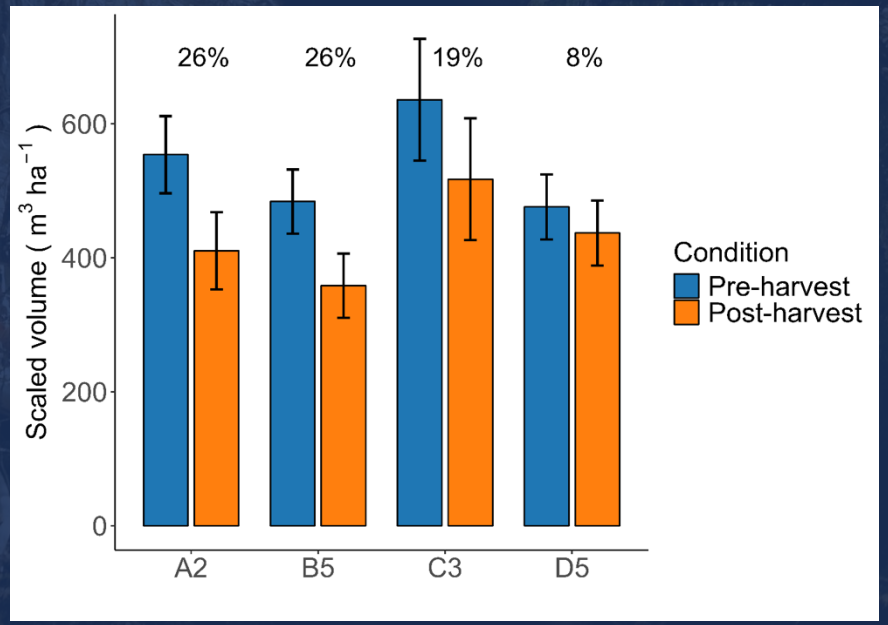




Second harvest evaluation

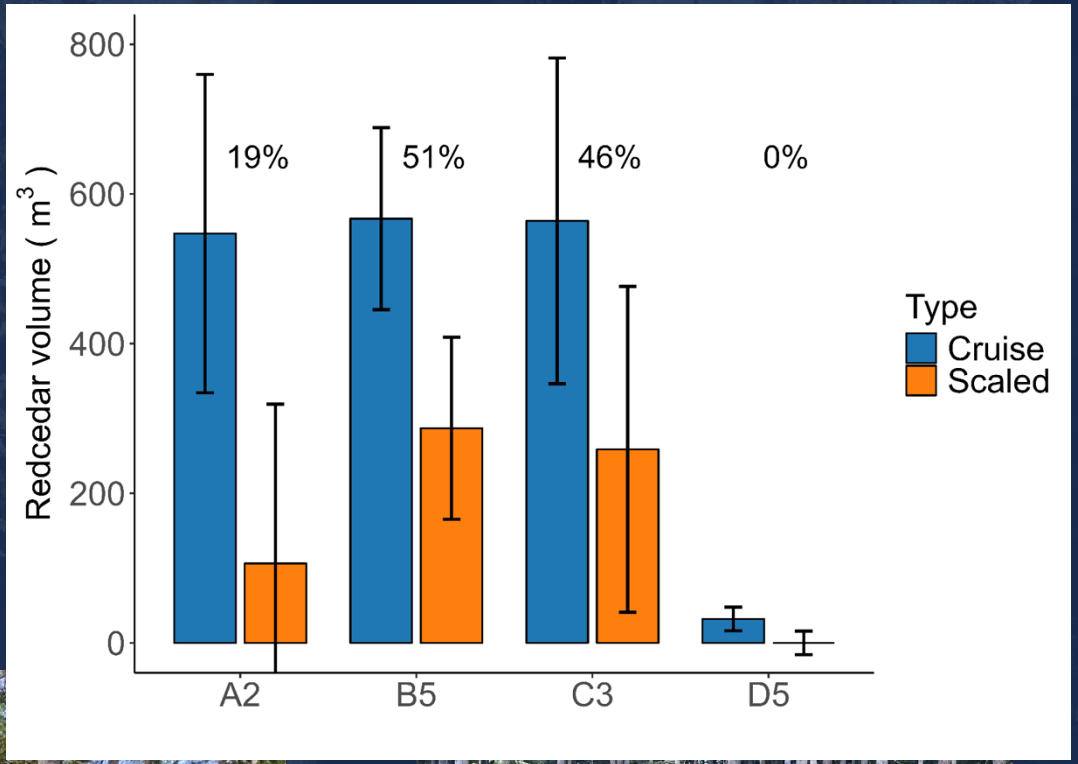
Volume change after light harvest

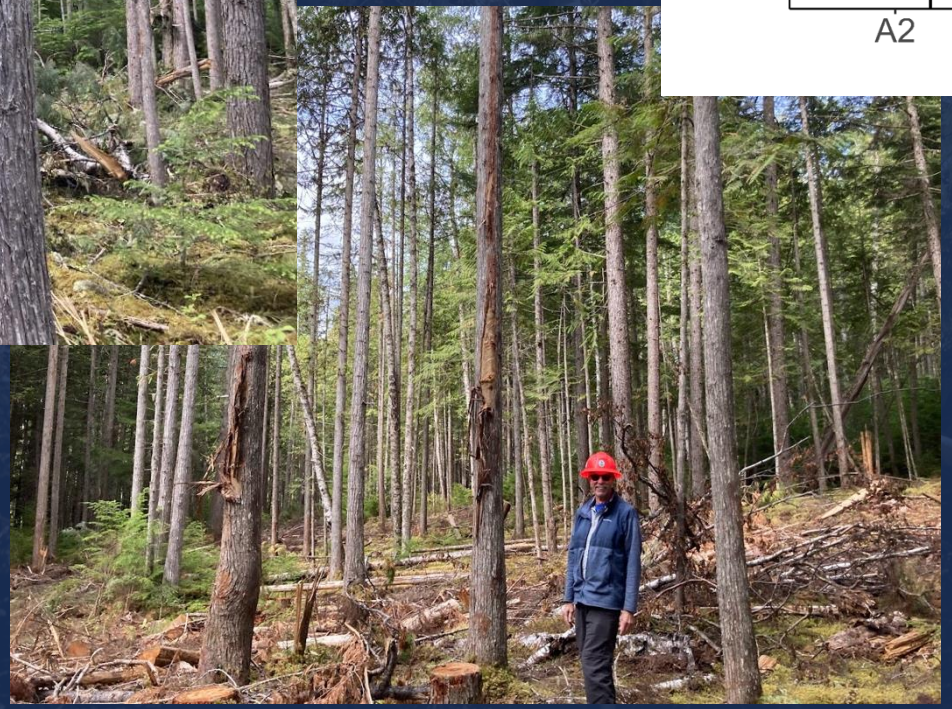




Second harvest evaluation

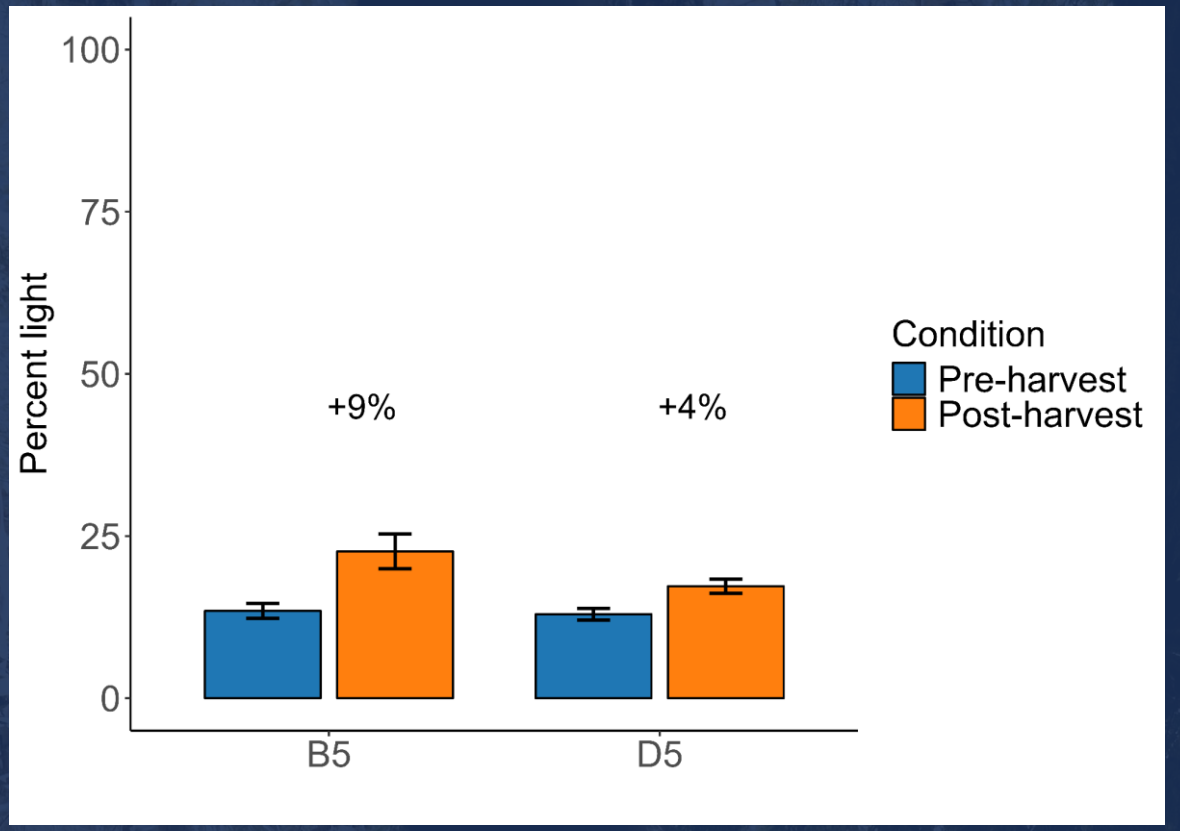
Cedar retention





Understory light

- Light increased 4-9%
- Likely higher variability in light compared to first harvest
- First harvest increased light from 12% to 16%



Second harvest evaluation

Interior forest

- Bigger openings are more efficient operationally but worse for forest-interior organisms
- Some opening size creep could be planned for in future projects

Second harvest evaluation

Expanded gaps

- Of 34 research gaps with tagged trees, 16 were expanded (3 harvested)
- Of 203 tagged trees in those gaps, 18% were damaged and 20% were killed by harvest
- Many un-tagged trees also remain healthy

Second harvest evaluation

Selection Zone

- Most challenging operationally
- Large heavy hemlock nearly too big
- Best results between two parallel skid trails

Second harvest evaluation

Second harvest evaluation

Continuing research

- Complete remeasurements
- Monitor damaged trees
- Regen assessments to determine planting need
- Monitor redcedar release with dendrometers
- Monitor fine fuel decay
- Outreach – come see for yourselves!

Future work

If we can do this so can you

- Team building across cultures, disciplines and organizations takes time and effort
- *Femelschlag* relatively simple operationally
- Within emerging teams, extra communication and supervision around trail widths and selection zones needed for the best outcome

Innovation lessons