

# Mind the Gap: Developing ecologically based guidelines for creating gaps in forest thinning on the Olympic Peninsula

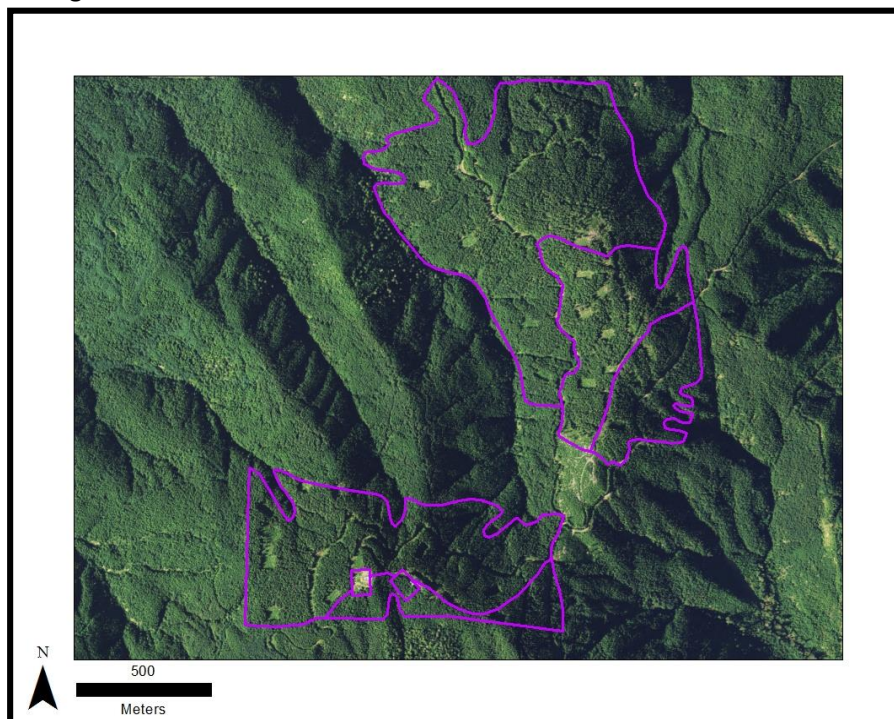
Daniel Donato

Washington State Dept. of Natural Resources, HCP & Scientific Consultation Section, PO Box 47014, Olympia, Washington 98504-7014 [daniel.donato@dnr.wa.gov](mailto:daniel.donato@dnr.wa.gov), Phone (360) 902-1753, Fax (360) 902-1789

## Summary

Declines in habitat provided by structurally complex old-growth forests in the Pacific Northwest have prompted the exploration of strategies to promote structural diversity in young managed stands. These treatments commonly involve variable density thinning and creation of canopy gaps to accelerate the development of late-successional type structure – e.g., variable light environments, vertical and horizontal heterogeneity, and understory development. However, these treatments are often conducted without a quantitative reference (target) condition, making success difficult to define or measure. The Washington Department of Natural Resources (DNR) has been implementing gaps within variable density thinning treatments in and around the Olympic Experimental State Forest (OESF) for the past two decades, and regional managers have expressed uncertainty as to how silvicultural gaps can best emulate the gap structures of old forests (size, shape, pattern).

This study will combine remote sensing and field data to better link silvicultural gap treatments with the late-successional forests they aim to emulate. The study will be conducted in three phases: i) a retrospective study of prior gaps created over 10 years ago, to capitalize on the learning opportunity afforded by a decade of ecosystem response; ii) an observational study of natural gap structures in primary mature and old-growth forests, to establish critical reference information; and iii) a replicated silvicultural experiment to test novel gap treatments (informed by the structures found in primary forests) within a variable density thinning treatment. Responses to be tracked include tree recruitment, understory vegetation response, branching/crown responses, decadence (dead wood) creation around edges, and post-treatment dynamics of gap contraction and expansion (e.g., blowdown). Results from the study will lend immediate relevance to objectives for providing structural diversity and habitat in managed forests.



**Figure 1.** Example of gaps (light green rectangles) implemented within variable density thinning units (purple outlines) in the OESF, ~14 years ago. The canopy openings provide some variability in a landscape otherwise dominated by relatively uniform-canopied second-growth in the competitive-exclusion phase.