

## **Experience with variable retention harvesting in coastal British Columbia: relevance for southeast Alaska**

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### **Abstract**

The variable retention (VR) approach to forest harvesting has become widespread on forest lands in coastal British Columbia (BC), including the retention silvicultural system with specific defining criteria. Variable retention maintains structural diversity of forests—an important element for conservation of biodiversity. Although the terms variable retention and retention system have not been used in management plans and prescriptions for the Tongass National Forest (TNF), alternatives to clearcutting and retention of structural attributes have been implemented in recent years. The current Land and Resource Management Plan for the TNF allows even-aged, two-aged and uneven-aged systems to be used. Long-term retention of structure is intended to produce future forest stands that more closely resemble conditions following natural disturbances, thereby maintaining greater diversity of habitat for a variety of organisms. Stand-level retention can be an important component of a forest management strategy that seeks to balance ecological, social and economic objectives; however, conservation of biodiversity likely requires both landscape-level and stand-level reserves.

Many of the forest ecosystems in coastal BC are similar to southeast Alaska, so the experience of implementing VR in BC over the past decade is relevant to the TNF. The following findings and conclusions from BC may apply to stand-level retention in the TNF:

- The landscape context determines what is necessary or appropriate for stand-level retention in relation to biodiversity conservation goals.
- It is not practical to precisely mimic or emulate natural disturbance patterns.
- Riparian networks are a governing factor for retention patterns.
- Wind damage is a significant challenge for dispersing stand-level retention, making clearcutting with reserves the most viable option for some sites and landscapes.
- Monitoring findings for several groups of species indicate that group or aggregated retention can achieve a lifeboating function for some organisms, with a positive correlation between patch size and species survival
- Retention has potential long-term benefits for enhancing structural diversity of future forests.
- Growth impacts on forest regeneration increase with greater dispersion of single trees or small groups.

- Public visual preferences conflict with ecological goals and operational needs. An emphasis on group or aggregated retention rather than dispersed retention is supported by safety, cost-efficiency and habitat values, but people prefer dispersed approaches.
- Variable retention harvesting can be done safely across a wide range of forest types and terrain using a variety of logging and silvicultural systems; however, costs are an issue, particularly with cable yarding systems.

There are many factors to be considered when choosing stand-level practices to meet social, biological and economic goals. The final choice represents a balance among complementary and competing objectives. As such, it is not possible to determine precise and optimal figures for the proportion of different silvicultural systems, the amount of retention in each cutblock or the spatial distribution of retained aggregates or single trees. Nevertheless, such standards must be chosen based on the best available information, theoretical concepts and practical considerations. Because there is much we need to learn, an adaptive management approach is necessary. The Alternatives to Clearcutting (ATC) study established between 1995 and 2005 in the Tongass NF is an excellent experimental framework for applying an active adaptive management approach. Monitoring the implementation and effectiveness of various approaches to stand-level retention will help scientists and managers assess the achievement of biodiversity conservation goals.

**Key Words:** Variable retention, retention silvicultural system, biodiversity, old growth forests, adaptive management, ecological forestry, ecosystem-based management