

Ecological Effects of Disturbance in Northern Temperate Rainforests

Paul Alaback¹

Abstract

- The distinctive coastal rainforest climate of Southeast Alaska and adjacent coastal British Columbia leads to a lack of significant fire disturbances, low nutrient availability in terrestrial ecosystems, low solar and thermal energy, and limitations to understory vegetation development as contrasted with drier, or more southerly regions.
- On well-drained sites on gentle slopes long-lived trees and small-scale gap dynamics dominate disturbance regimes resulting in structurally complex and biodiverse forest ecosystems.
- Varied geological structures, and glacial history have combined to create a complex physiographic template across the region which results in a mix of geomorphic, snow, and stand-replacing windthrow disturbances on steep slopes and in wind-exposed terrains.
- Historical patterns of logging contrast with other disturbance types at both local stand scales as well as at landscape scales often creating long-term losses of biodiversity in the most productive forest and stream ecosystems.
- Principles from disturbance ecology derived from studies of historical patterns offer many insights to processes that maintain biodiversity in these rainforests which could be applied to both timber harvest and restoration treatments.
- Climate change will likely effect patterns of disturbance, and ecological responses to disturbance. Historical patterns suggest that forests maintained by gap-dynamics may be more resilient to these changes than those subject to stand replacing disturbances such as clearcut logging, and catastrophic windthrow.

¹ Department of Forest Management, College of Forestry and Conservation, University of Montana, Missoula, MT 59812. Email: palaback@forestry.umt.edu