Introduction

Mixed conifer forests growing east of the Cascade Mountains crest in Oregon and Washington have experienced repeated defoliation by the western spruce budworm (Choristoneura occidentalis) since the early 1980's. Significant defoliation has occurred in critical habitat of the northern spotted owl (Strix occidentalis caurina), a federally listed Threatened and Endangered species.

We currently lack quantitative information on the effects of western spruce budworm defoliation upon northern spotted owls and their habitat. Prior studies have quantified the effects of budworm defoliation on tree growth and mortality, and a couple of studies have looked at sub-watershed-scale changes in vegetative structure and composition in relation to fire hazard, but few studies have examined the relationships among defoliation, owl demography, and owl habitat at the broader landscape scale.

This study will attempt to characterize landscape-level associations and trends among western spruce budworm defoliation, vegetation conditions, northern spotted owl populations and other associated disturbance, during the period 1985-2003.

Methods

Project Boundaries

The study area was defined using GIS overlays of:

* northern spotted owl habitat.
* topographical features of southcentral Washington.

Changes in Vegetation

* Change detection analysis will be conducted using pre-defoliation (1985) and ongoing/post-defoliation (2003) satellite imagery (Landsat 5 TM).
* 200 ground sample points (0.25 acre fixed area plots) will be used to verify 2003 satellite image classifications (100 “defoliated,” 100 “undefoliated”). Sample points were generated using the Sample Points Generator (SPGen) program developed by V. Thomas and M. Downing of FHTET and R. Reich of Colorado State University. Plot measurements include number of trees, tree species, diameter (dbh), mortality, defoliation severity, and canopy cover class.

* GIS layers of disturbance (fire, logging) will be compiled and analyzed.
* Forest inventory (CVS and FIA) data will be associated with defoliation classifications.
* Defoliation impact data from 3 owl core habitat areas, collected during early, mid- and post-budworm outbreak will be assessed for stand-level changes.

Owl Populations

* Assess owl demographic information (occurrence, abundance, fecundity, survival, movement) from the study area, collected since 1985.

Trends and Associations

Evaluate associations between number of years and severity of budworm defoliation and:

* vegetation conditions.
* owl demography.
* other associated disturbance.

2006 Results

Ground Sample Points

- Ground sampling was completed on an additional 131 fixed area plots (0.25 acre) in 2006, bringing the total number of sample plots to 219.
- Ground sample points agreed with the preliminary satellite imagery-based model prediction for defoliation about 80 (79.64) percent of the time.

We currently lack quantitative information on the effects of western spruce budworm defoliation on the northern spotted owl (Strix occidentalis caurina), a federally listed Threatened and Endangered species.

- Many thanks are due to the following for their invaluable assistance with this project: the cooperators listed above, Vern Thomas, Paul Handy, Jennifer DeShong, Cara Hughes, Arpad Lazar, Dee Amick, Keith Sprengel, Jeff Moore, and Charlie Schrader. Funding for this study is being provided by USDA Forest Service Forest Health Monitoring Program.

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