

TITLE: Effects of western spruce budworm defoliation on the northern spotted owl and its habitat in southcentral Washington

LOCATION: The east slopes of the Cascade Mountain Range in southcentral Washington, including portions of the Gifford Pinchot National Forest, Yakama Indian Reservation, Mt. Baker-Snoqualmie National Forest, and intermixed private lands.

DURATION: Year 1 of 2-year project **FUNDING SOURCE:** Base

PROJECT LEADER: Beth Willhite, Forest Health Protection, 503-668-1477, bwillhite@fs.fed.us

COOPERATORS:

Wildlife Biologist: Vince Harke, US Fish and Wildlife Service (USFWS) (pending administrative approval)

Wildlife Biologist: Gina King, Yakama Indian Nation (YIN) (pending administrative approval)

Remote Sensing Specialist: Jim Ellenwood, Forest Health Technology Enterprise Team (FHTET)

GIS Specialist: Julie Johnson, Forest Health Protection(FHP)

Inventory Analysis Specialist: Jeff Reis, US Forest Service (USFS)

Private Industrial Forest Landowner: The Campbell Group, *contact: Dave Wasgatt* (pending administrative approval)

Other potential cooperators not yet confirmed include Washington Department of Natural Resources (WADNR), Gifford Pinchot National Forest, Mt. Baker-Snoqualmie National Forest, Olympic National Park

PROJECT OBJECTIVES:

The objective of this project is to investigate the subregional, landscape-level effects of western spruce budworm (*Choristoneura occidentalis*) defoliation since 1985 on northern spotted owl (*Strix occidentalis caurina*) populations and on spotted owl habitat by analyzing relationships among defoliation, changes in habitat, and trends in owl demography.

JUSTIFICATION:

Linkage to FHM Detection Monitoring

Annual cooperative insect and disease aerial detection survey records indicate an ongoing western spruce budworm outbreak in southcentral Washington since 1985. Similarly, FHM CVS/FIA ground plots in this region have recorded budworm defoliation during this period. Although these surveys have detected and documented this major disturbance, they generally are not adequate to fully evaluate the extent and severity of disturbance effects upon two primary management concerns in this area: the habitat of species associated with late-seral forests, and northern spotted owl populations.

Significance in terms of the geographic scale

This project covers a large, biologically significant sub-region of the range of the northern spotted owl. Disturbance events in the project area are typical of those occurring in other portions of northern spotted owl habitat that occur along the east slopes of the Cascade Mountain Range in both Washington and Oregon.

Biological impact and/or political importance of the issue

This project addresses important, complex, and oftentimes controversial issues regarding the northern spotted owl, which is a federally listed Threatened and Endangered (T&E) species, including issues surrounding management of eastside Northwest Forest Plan (NFP) Late Successional Reserves (LSRs) and Habitat Conservation Areas (HCAs), eastside mixed conifer forest health and sustainability, and the scale and severity of effects of native defoliator outbreaks upon extensively-managed and intensively-managed forest stands.

Feasibility or probability that the project will be successfully completed

There is a high probability that this project will be completed. It utilizes existing datasets for owl demography, vegetative inventory, budworm defoliation (incidence and intensity), and satellite imagery. It has the support of the USFWS, the FHTET remote sensing unit, and key land managers.

DESCRIPTION:

a. Background: Late Successional Reserves were created by the 1994 Northwest Forest Plan to provide habitat for the northern spotted owl and other species associated with late successional forests. Forests affected by the NFP on the “eastside” of the Cascade Mountains crest typically are dense, multilayered, mixed conifer forests having a large component of true firs. These forests developed from a previously more open, earlier seral condition during the past century as a result of fire suppression and selective logging of seral species. The same features that make these eastside mixed conifer forests suitable owl habitat (dense, multiple canopy layers, high levels of dead wood) also make them highly susceptible to habitat degradation and loss as a result of frequent mid- to large-scale disturbances caused by defoliators, bark beetles, and fire. To date, very few studies have examined the effects of western spruce budworm defoliation upon owl habitat, and those studies that have been undertaken were conducted on federal lands at the scale of individual LSRs (e.g. Hummel (2003) examined changes in fire hazard associated with budworm defoliation based on data collected in a Research Natural Area in the Gotchen LSR on the Gifford Pinchot National Forest, Maffei and Eglitis (late 1990’s) looked at changes in vegetative structure and composition on two LSRs on the Deschutes National Forest). This project will examine the functional effects of western spruce budworm defoliation at a broad landscape scale, including all forestland (federal, state, tribal, and private ownerships) covered by the NFP within the sub-regional project area. It will evaluate defoliation-associated changes in forest vegetative cover resulting from crown degradation, tree mortality, and logging that has occurred in response to the outbreak since 1985, and owl response to defoliation in terms of demography (survival, reproductive rates, occupancy, movement).

b. Methods:

Vegetation analysis units will be defined by layering boundaries of 1) Northwest Forest Plan land management designations lying east of the Cascade Mountain crest, applicable aerial survey reporting areas, and polygons of western spruce budworm defoliation since 1985 over satellite images generated by LANSAT Thematic Mapper (30m resolution). Rule-based intersections of defoliation polygons will be used to define defoliation categories (e.g. areas with 4 or more consecutive years of defoliation) for spatial analysis. Satellite images representing pre-outbreak (1984) and current (2004) vegetative conditions, and possibly one intermediate outbreak year, depending on the results of owl demographic data analysis, will be used to evaluate changes in vegetative conditions (percent cover) in the study area between 1984 and 2004 resulting from tree mortality and logging. Ground-based inventory plots (CVS/FIA) will be used to characterize mortality, percent cover, tree density, and species composition throughout the study area. In addition, budworm impact plots taken in 1999, 2000, and 2001 in three 125-acre owl cores (nesting, roosting, forage habitat) in the Gotchen LSR will be remeasured in 2005 to describe, on a local scale, changes attributable to budworm defoliation and associated events. Owl demographic data collected in the region since 1985 (e.g., the 1987-1989 radio-telemetry study, the ongoing Spotted Owl Demographic Study) will be correlated chronologically with defoliation data and vegetative data to gain deeper insight into interactions among budworm defoliation, vegetative change, and owl responses.

c. Products: GIS layer with labeled pixels showing change categories, color maps depicting change by defined categories, owl core tree data from 2005 ground survey, synthesized data in the form of a report

d. Schedule of Activities:

March-May 2005 – acquire satellite imagery

March-August 2005 - compile databases for project (CVS/FIA, owl demography, etc.)

June-August 2005 – conduct ground work – ground verify remote sensing signatures, collect owl core tree data

September-February - analyze satellite imagery, owl demographic data, vegetative inventory data

February-May – complete final report

e. Progress/Accomplishments: N/A

COSTS¹:

	Item	Requested FHM EM Funding	Other-Source Funding	Source
2005				
Administration	Salary	10,000		
	Overhead	1,900		
	Travel	1,000		
Procurements	Contracting	15,000	7,500	FHTET
	Equipment	500		
	Supplies	1,800		

2006				
Administration	Salary			
	Overhead			
	Travel			
Procurements	Contracting	5,000	2,500	FHTET
	Equipment			
	Supplies			

¹Cost estimates are based on the following:

Satellite Images: 3 @ \$600.00 each = \$1,800

Summer survey/signature verification crew: salary 2 people for 2 months = \$120/day x 2 = 240/day x 40 days = \$10,000

Travel for summer crew = per diem for 2 people for 5.5 days @ \$182/day = \$1,000

FHTET = \$15,000 (2005), matching funding by FHTET = \$7,500 (2005)

= \$ 5,000 (2006), matching funding by FHTET = \$2,500 (2006)

Overhead assumed at 19% = \$10,000 x 0.19 = \$1,900

Equipment = \$500