United States
Department of Agriculture

Washington State
Department of Natural Resources

Forest Service
Pacific Northwest Region

Forest Health Highlights In Washington – 2002

Balsam Woolly Adelgid Eggs
Image UGA2252066b
http://www.forestryimages.org

August 2003

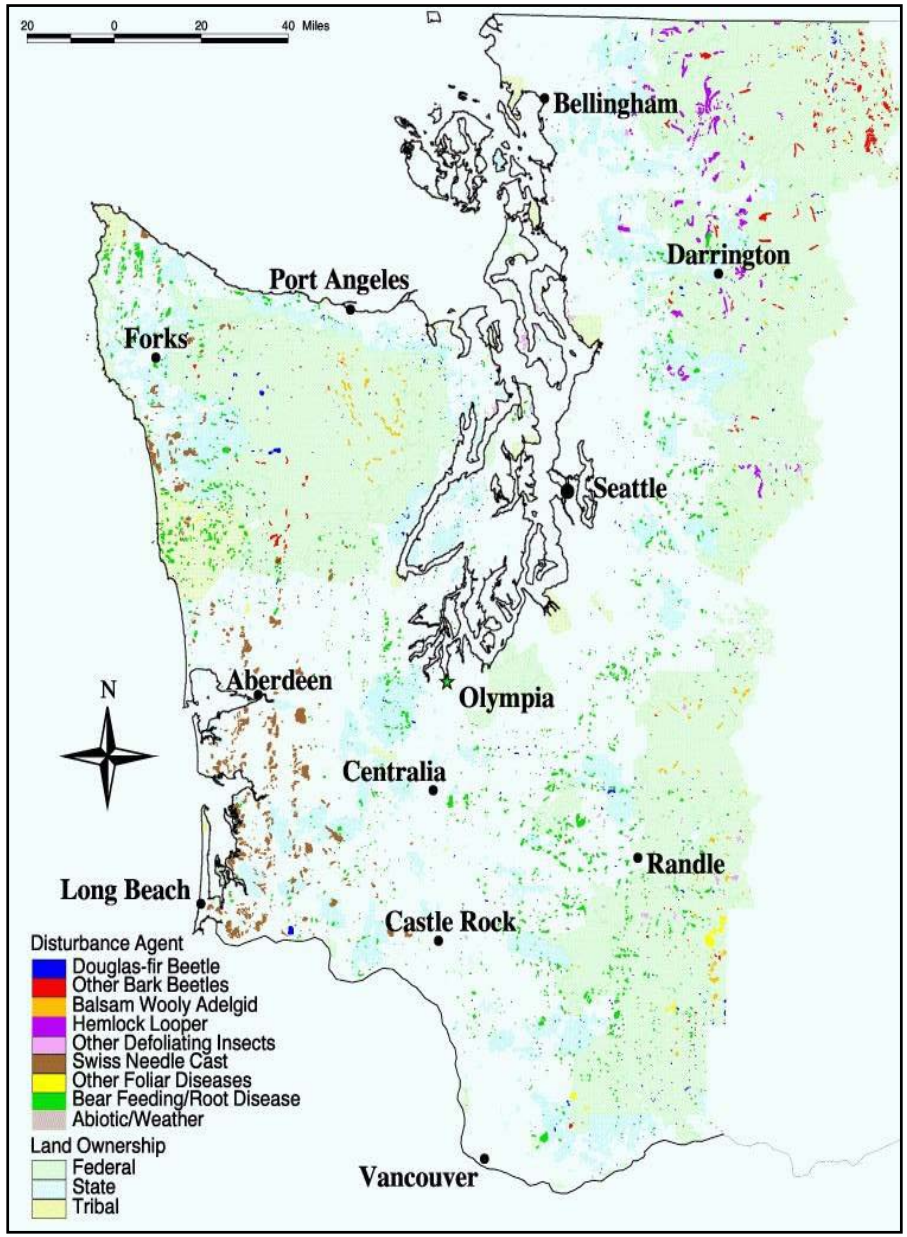

Figure 1 – Western Washington forest pest conditions 2002

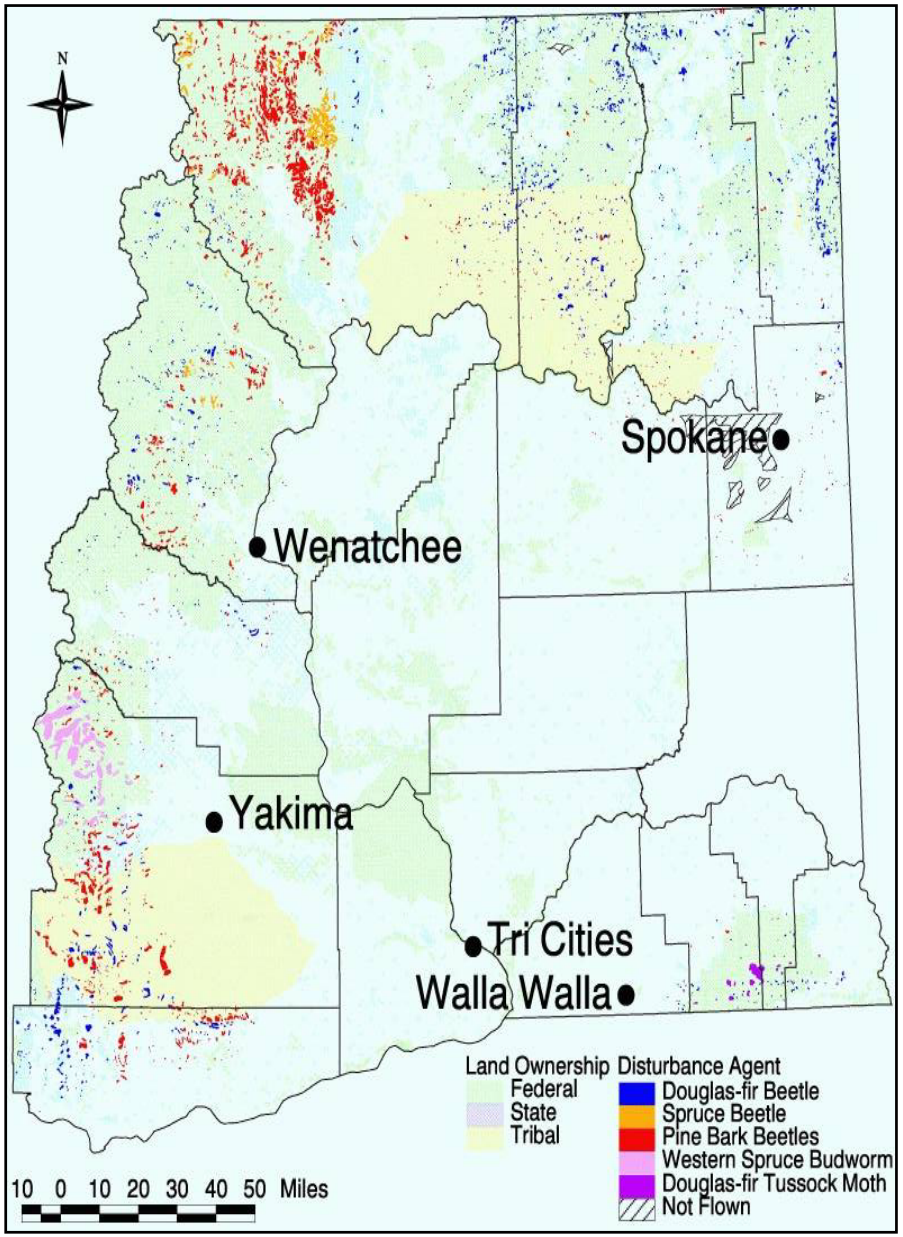

Figure 2 – Eastern Washington forest pest conditions 2002

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Introduction

Washington has about 21 million acres of forest land. In 2002, approximately 1.8 million acres contained trees killed or defoliated by forest insects and diseases. Over 1.84 million mature trees died. Typically, only a small fraction of the average number of trees present on each acre (several hundred) die in any given year, but an excess of approximately ¼ dead trees per acre indicates elevated levels of insect and disease activity.

Major damage agents active in Western Washington (Figure 1) included:

- Defoliation by hemlock looper caterpillars in Whatcom and Skagit counties;
- Swiss Needle Cast foliage disease of Douglas-fir along the Pacific coast;
- Balsam woolly adelgid (an exotic twig feeding aphid) in high elevation fir forests.
- Black bear damage is also widespread throughout the state.

Eastern Washington (Figure 2) tends to have higher levels of forest insect activity due to a drier climate and abnormally crowded trees (due to fire suppression and past harvesting practices).

Major damage agents include:

- Douglas-fir beetle in Pend Oreille, Stevens, Ferry and Klickitat counties;
- Western spruce budworm in Yakima County. In many areas (Klickitat county), Douglas-fir beetle is killing trees that were weakened by defoliation.
- Pine and spruce beetles in Okanogan County.

With the exception of Balsam Woolly Adelgid, these are native insects behaving within the severe end of their basic ecological roles. The high intensity of insect and disease activity, persistence of the outbreaks, and concurrence of so many outbreaks across the land indicates forest conditions that favor the insects and diseases (crowded trees, stressed by dry conditions).

Aerial Survey

For more than fifty years, an aerial survey has been flown to record insect and disease conditions throughout Washington State. The aerial survey is flown at 90-120 mph about 1,500 feet above ground level. Two observers (one on each side of the plane) look out over a two-mile swath of forestland and record the location and the number of recently killed or the severity of currently defoliated trees they see.

A newly implemented digital sketchmapping system allows us to be more consistently accurate in locating areas of forest damage on a GPS referenced electronic map base. (Figure 3)

Figure 3 – The sketchmapper operates the software via the touchscreen. Photo by USDA Forest Service.

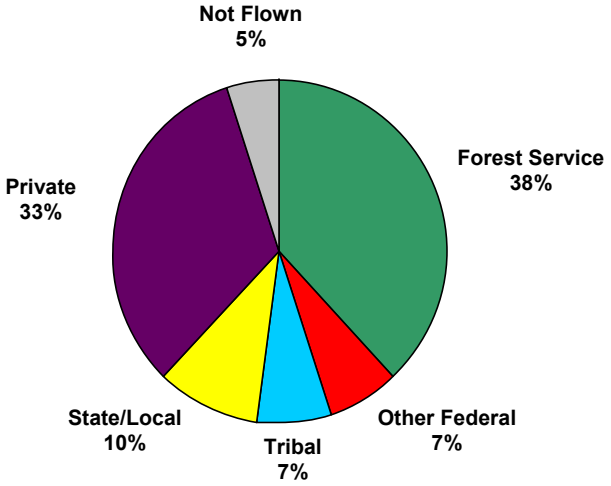


Figure 4 – Forested acres in Washington surveyed by air in 2002 by land ownership category.

The 2002 fire season was relatively mild in Washington, but the myriad fires in Oregon, California and elsewhere created smoky and hazy conditions that hindered survey efforts.

Drought Conditions

Washington State has been experiencing summer drought conditions for the last five years. (Figure 5) In 2002, it stayed abnormally dry until well into November, with July thru October being the driest on record for some areas. Additionally, the winter of 2000-2001 was the driest on record for Washington.

The west coast of the United States has been experiencing a weak El Niño event for the 2002-2003 winter season which, as predicted, started out drier than normal. However, as this event dissipates our climate should return to a more normal seasonal pattern.

If the 2003 growing season experiences continued drier than normal conditions, another busy forest disturbance year is likely.

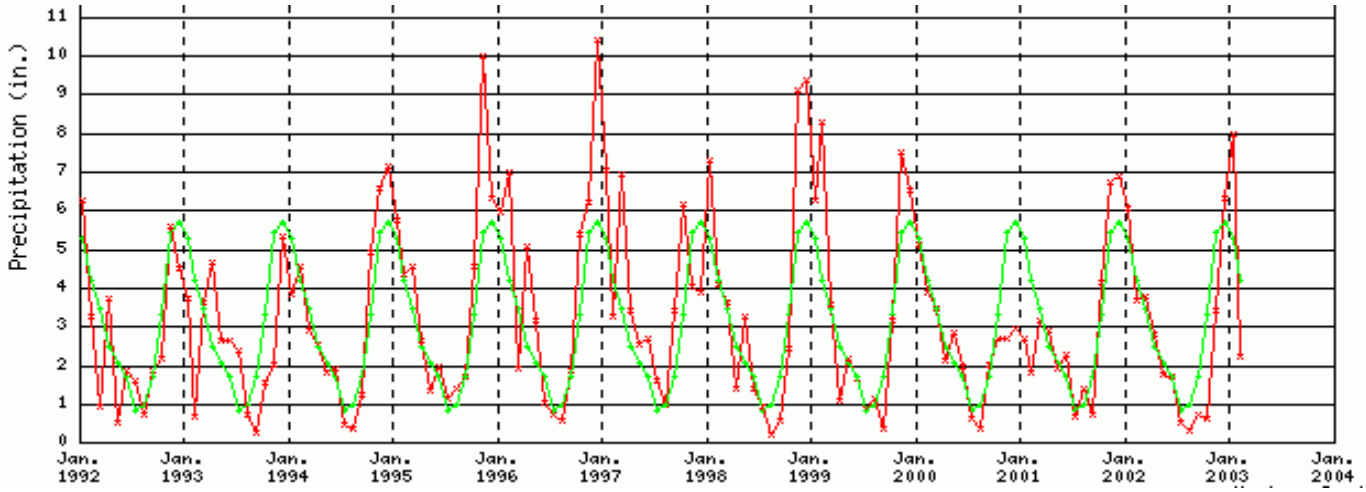


Figure 5 – Average (green line) and actual (red line) monthly precipitation observations for the State of Washington as reported by the Western Regional Climate Center, 1992-2004.

Forests in eastern Washington are generally overstocked with more fir and less pine. These overstocked conditions stress host trees and can make them more susceptible to pathogens in times of drought. Additionally, the mild winter weather of the last several years increases the winter survival rate of insect pests.

Insects

Mountain and Western Pine Beetle

Pine bark beetle populations continue at epidemic levels in many places. Following a fire, lodgepole pine naturally regenerate into dense even aged stands. As these forests mature, mountain pine beetle populations surge. They eventually kill every tree greater than 5.5 inches in a stand. This sets the stage for another fire and the cycle repeats. The eastern slopes of the North Cascades currently show the most activity as the outbreak of recent years continues to spread west into higher elevation areas. (Figure 6)

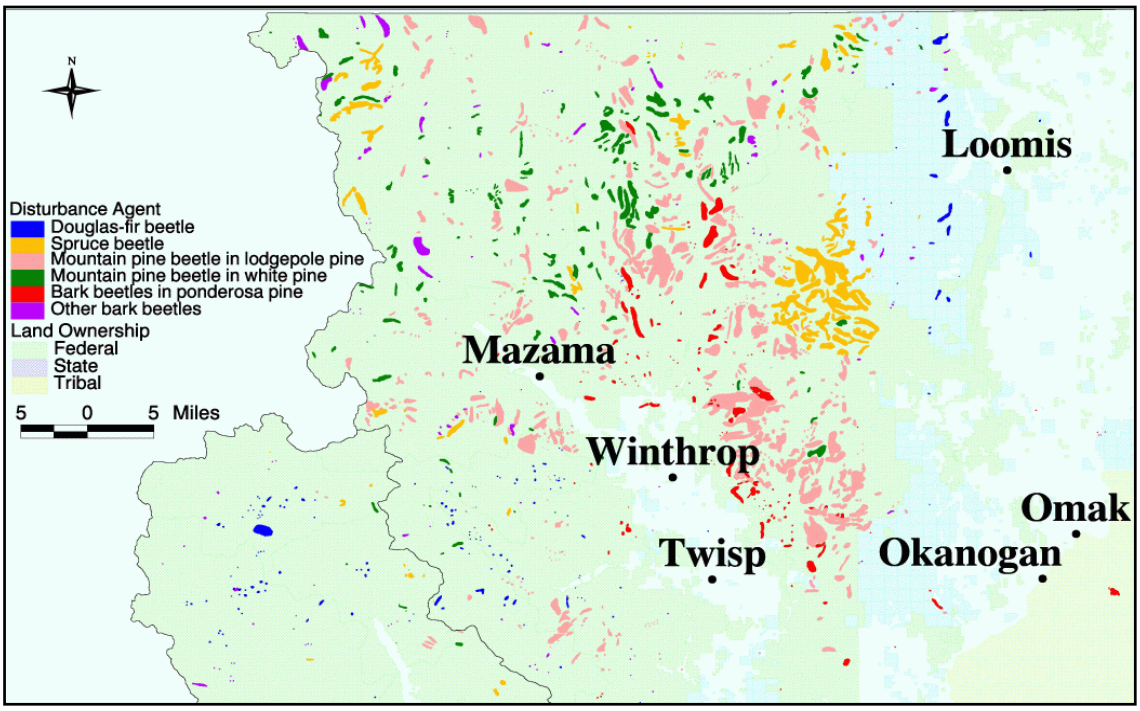


Figure 6 – Disturbance Agents in Washington eastern slopes of the North Cascades, 2002

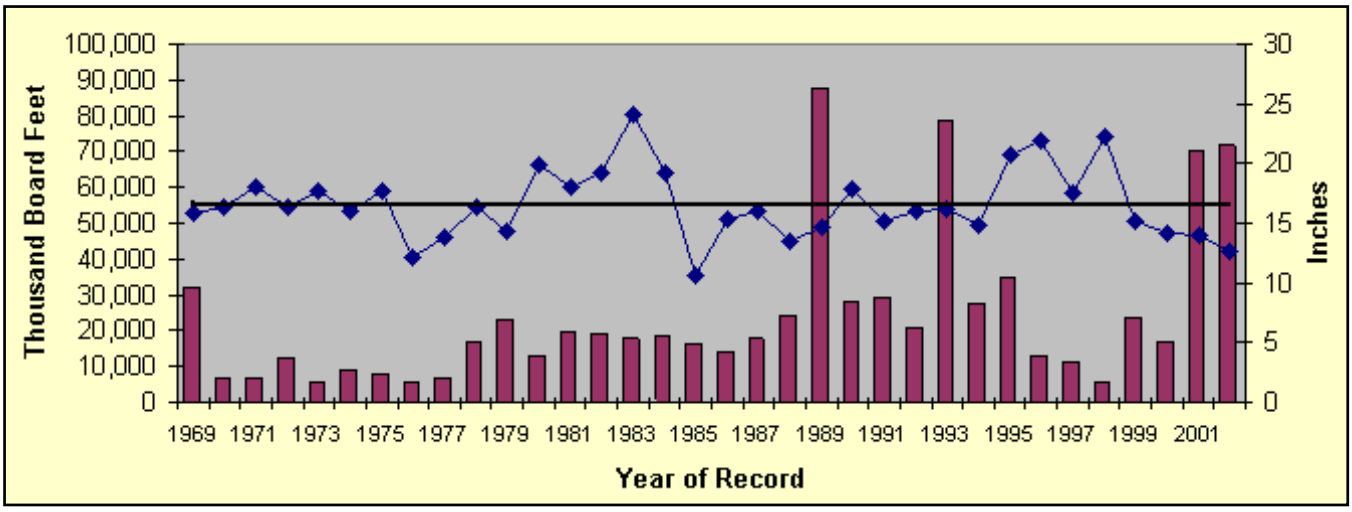


Figure 7 – Historical Mountain Pine Beetle activity in Washington State.

Another marked increase in beetle activity in whitebark pine occurred in 2002. These alpine trees have been weakened by white pine blister rust for many years, and the current high populations of mountain pine beetle in adjacent lodgepole pine, drought conditions and favorable host age and size characteristics put whitebark pine at risk. (Figure 7)

Douglas-fir Beetle

Although down again from previous years, Douglas-fir beetles continue to kill large numbers of mature Douglas-fir in Spokane, Pend Oreille, and Stevens counties where tree breakage from the ice storm of 1997-98 followed by drought conditions have kept beetle populations high.

Douglas-fir bark beetle populations have also increased to epidemic levels south and west of Yakima where years of repeated defoliation by western spruce budworm and drought have weakened host trees. In many areas this defoliation has been so severe that top kill has occurred and very little foliage remains on the tree. This makes detection difficult from the air and often results in an underestimate by the survey. (Figure 8)

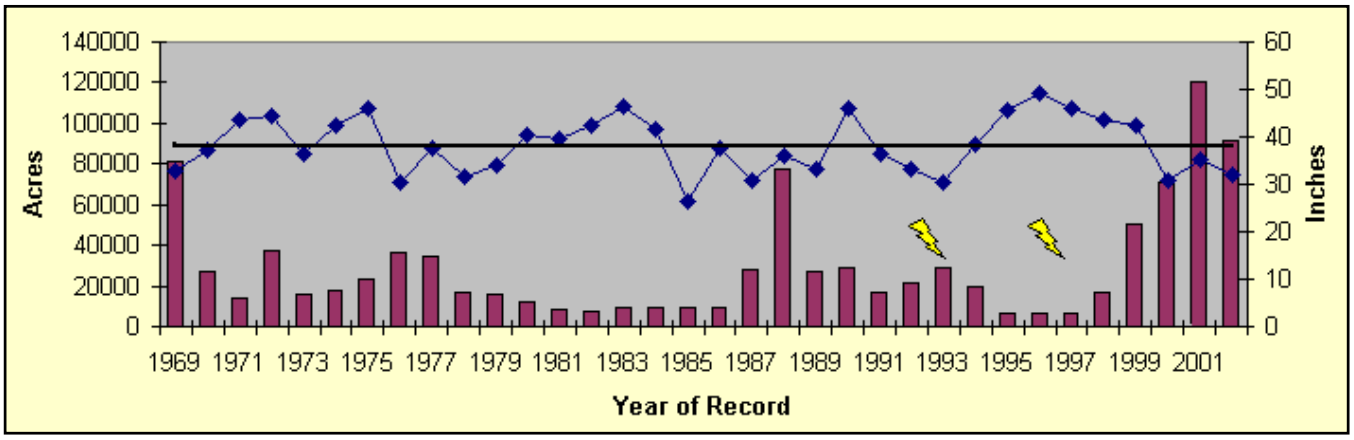


Figure 8 – Historical Douglas-fir Bark Beetle Activity in Washington State.

Spruce Beetle

A truly impressive spruce beetle outbreak is centered on Tiffany Mountain north of the Methow valley on the Okanogan National Forest. Spruce often dominates riparian areas where they help filter out water impurities and provide shade to help lower stream temperatures. Since it may take two years for this species of bark beetle to complete its life cycle, it takes longer for beetle populations to build into an outbreak situation. However, when an outbreak does occur, mature spruce can be all but eliminated in the affected area. This current outbreak drastically increased in severity from the previous year, and will likely subside next year due to the depletion of suitable host trees. (Figure 9)

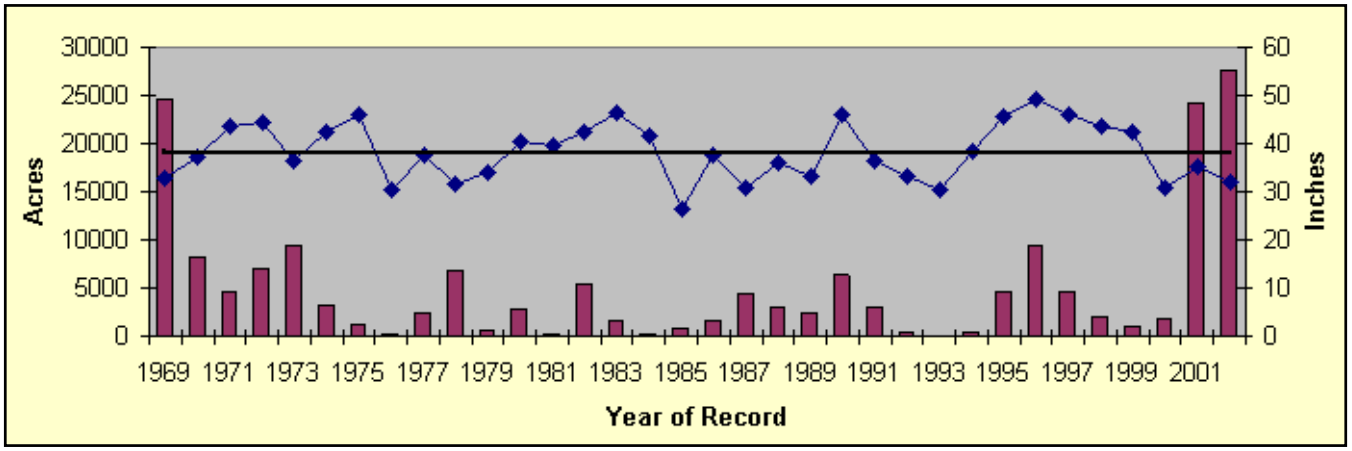


Figure 9 – Historical Spruce Bark Beetle Activity in Washington State.

Fir Engraver Beetle

Drought conditions and widespread defoliation of host type fir trees in eastern Washington have also resulted in increased activity by the fir engraver beetle. True fir can not tolerate severe or prolonged drought stress or defoliation. Even if not killed outright, they become very susceptible to root disease and bark beetle attacks.

Citrus Long-horned Beetle

This exotic beetle can kill a variety of important deciduous trees in Washington. It is a close relative of the Asian long horned beetle, which has wreaked havoc in New York and Chicago. Two separate accidental introductions in Tukwila and Lacey from imported bonsai trees have spurred fast and intensive action by the Washington State Department of Agriculture.

Approximately one thousand trees were removed outright in a Tukwila neighborhood in 2002 and at least 1500 more were chemically treated to insure that this potentially highly destructive pest does not become established here.

Western Spruce Budworm

The budworm outbreak near Mt. Adams appears to have collapsed! The only area that showed severe defoliation this year was in the Bumping Lake area east of Mt. Rainer. Only 58,000 acres were reported as being defoliated, down from 236,000 acres in 2001 and 383,000 in 2000. Many more areas of light defoliation were not mapped because it is very difficult to detect lightly defoliated trees from the air in smoky conditions. (Figure 10)

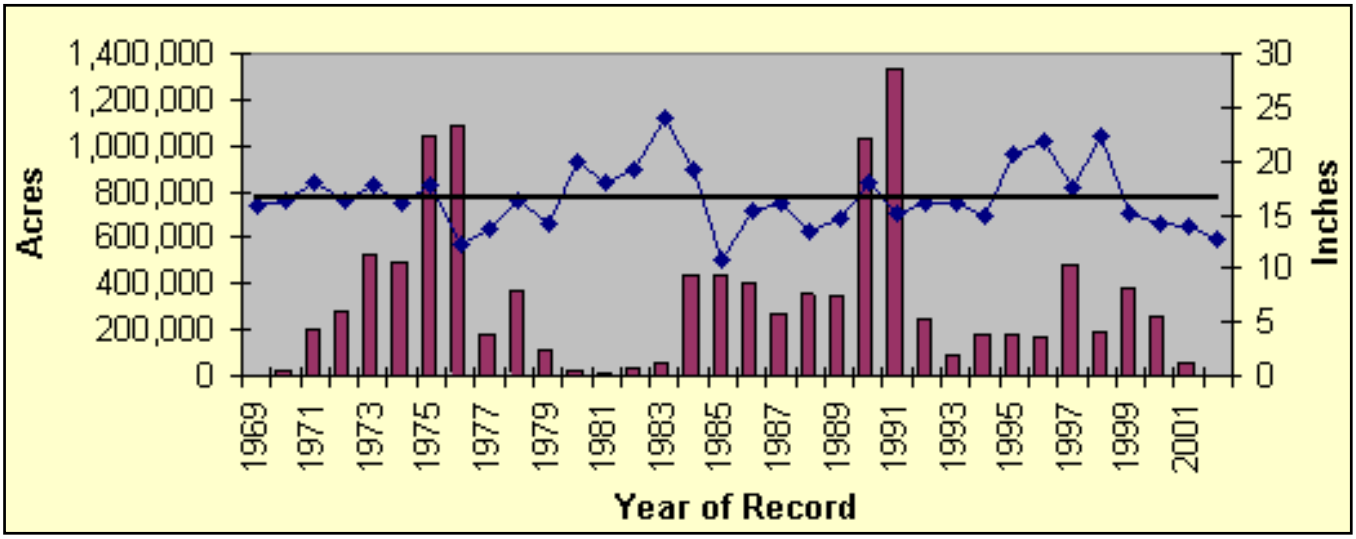


Figure 10 – Historical Western Spruce Budworm defoliation in Washington State.

Pheromone trap counts indicate that defoliation will again occur in 2003 in the Rattlesnake area north of Rimrock Lake and the North Fork of the Ahtanum Creek, south of Rimrock Lake.

Douglas-fir Tussock Moth

Washington Department of Natural Resources monitors about 190 pheromone trap sites to detect population trends for this important defoliator of Douglas-fir and grand fir in eastern Washington. (Figure 11) Trap catches peaked in 1998 and areas of severe defoliation started appearing in the summer of 1999. Suppression projects undertaken in 2000 and 2001 were largely successful and now most trap catches are back down to normal. About 7,000 acres of defoliation attributed to DFTM were recorded in Washington for 2002, down from about 24,000 acres in 2001.

One place that still showed large catch numbers was Tekoa Mountain in southeast Spokane County. This area again showed some defoliation activity as predicted by various monitoring techniques in the summer and fall of 2001.

Idaho has been experiencing extreme and widespread defoliation as well. In adjacent parts of north-central Idaho, large-scale defoliation continued and Dimilin was used for tussock moth suppression on 30,000 additional acres. All these populations appear to currently be in decline.

Figure 11 – Douglas-fir Tussock Moth larva; Photo by USDA Forest Service, www.forestryimages.com

Western Hemlock Looper

The hemlock looper outbreak east of Mount Baker again spread considerably, and scattered defoliation, often severe, showed up sporadically from Baker Lake southward. Hemlock looper and phantom hemlock looper defoliated approximately 35,000 acres in 2002, up from 17,000 acres in 2001. Most of the heaviest damage was on federal lands in the North Cascades.

Historically, this insect only reaches epidemic levels in old growth, multi-canopy forests since it prefers to lay its eggs in mosses and lichens that hang from these older trees. (Figure 12) However, areas of second growth, single canopy forests were affected during this outbreak.

The aerial survey recorded large areas of scattered hemlock mortality in areas where hemlock looper has been active in previous years. (Figure 13)

Figure 12 – Hemlock Looper larva; Photo by USDA Forest Service, www.forestryimages.com

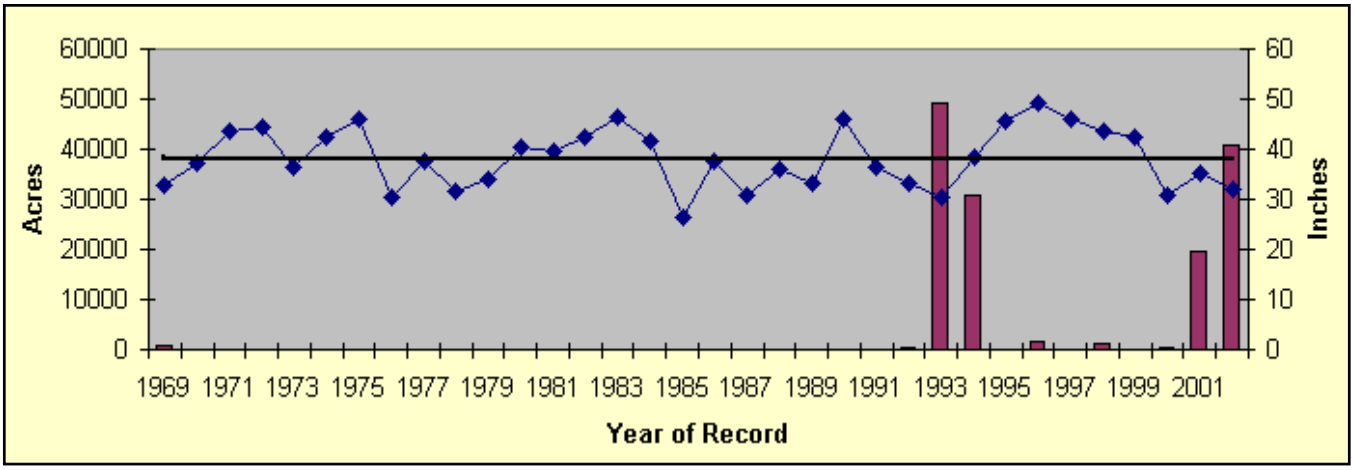


Figure 13 – Historical Hemlock Looper activity in Washington State.

Gypsy Moth

The 2002 season caught the fewest gypsy moths in Washington in twenty-three years. The 2002 trapping program caught only 17 moths, down from 33 in 2001. Most were single-catches and will continue to be monitored. At least two life stages (i.e. adult-and-larva or adult-and-egg mass etc.) of the insect must be found before an area is considered for eradication efforts. In 2002, only adults were found. Recent eradication projects in the Crown Hill area of north Seattle and near the town of Vader in Lewis County were successful!

The gypsy moth gets its common name from its habit of laying its eggs on the smooth surfaces of things of human origin such as the wheel wells of automobiles, outdoor furniture and ship containers. This allows the insect to spread huge distances as our mobile society goes about its business.

Other Defoliators

Tent caterpillars were abundant in central Puget Sound (South Whidbey Island, Kingston, and Vashon Island). Alder was their main host.

The San Juan Islands experienced an outbreak of western oak looper, a very similar species to western hemlock looper. A variety of trees and understory plants are affected. The main host, white oak, is expected to survive the defoliation without damage, but interspersed conifers may be more heavily impacted. This outbreak population appears to be in decline.

Diseases

White Pine Blister Rust

This exotic disease chronically infects five needle pines such as our western white pine and whitebark pine. (Figure 14) Its inexorable progression appears to have weakened whitebark pine in several areas to the point that mountain pine beetle is now successfully attacking and killing large numbers of trees. This is of special concern since these alpine trees are very slow growing, almost irreplaceable and crucial to healthy watersheds. Additionally, a broad scattering of western white pine mortality was observed, but was not captured during the survey because it did not meet the minimum threshold of groups of five trees or more.

Figure 14 – White Pine Blister Rust; Photo by Robert L. Anderson, USDA Forest Service, www.forestryimages.com

Sudden Oak Death

This newly discovered species of Phytopthora is actively killing large areas of live oak and tanoak in California. It has also been discovered in southern Oregon where efforts are underway to eradicate it and stop its spread northward. While our Oregon white oak is not affected, Pacific madrone, huckleberry, rhododendron and Douglas-fir among many others, are susceptible hosts. This disease has not been detected in Washington.

Swiss Needle Cast

Attempts to map hot spots of this coastal foliar disease of Douglas-fir this year had limited success. (Figure 15) Since the presence of this fungus is ubiquitous, judgment must be used in placing discrete polygons, and standardization between observers is a challenge.

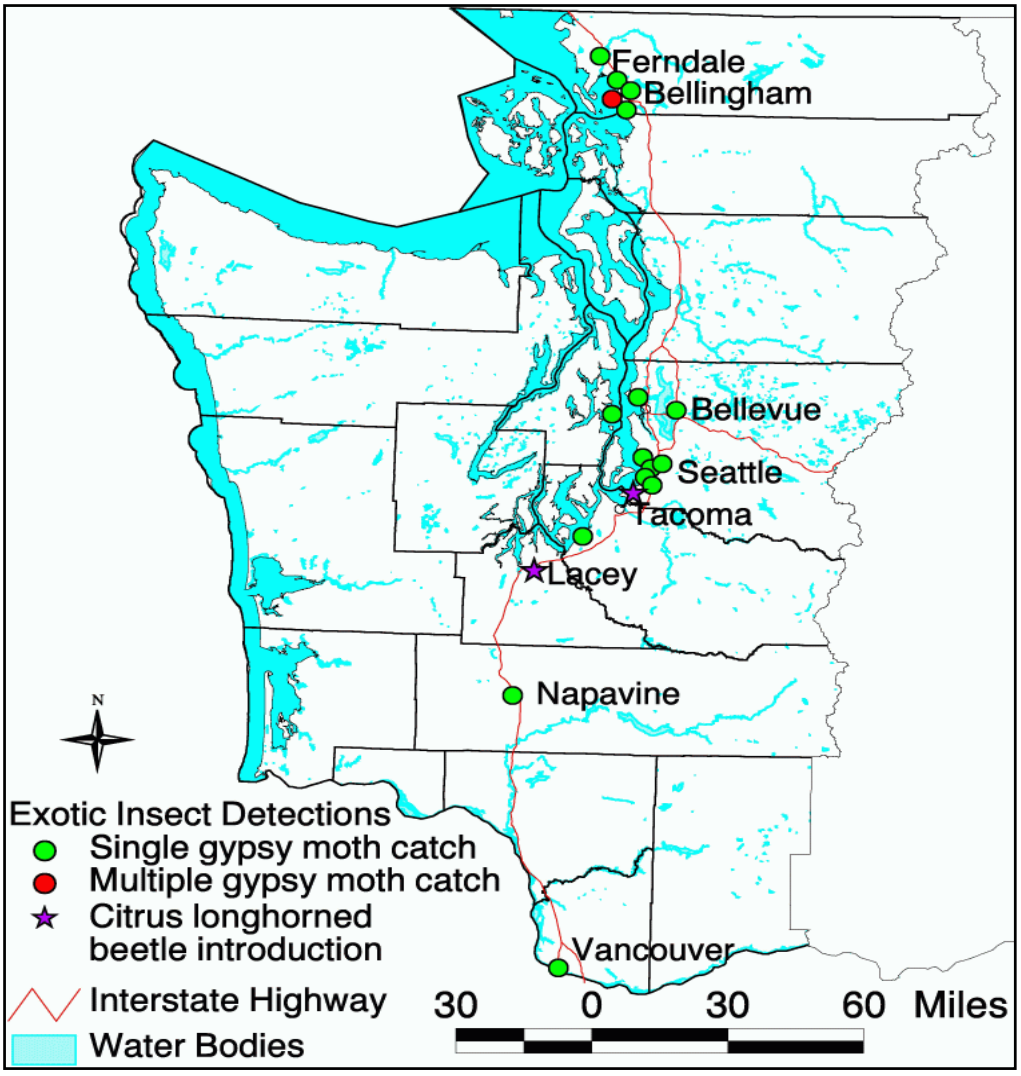
Figure 15 – Douglas-fir tree damaged by Swiss needle cast (right) and healthy tree (left). Photo by Oregon Department of Forestry.

Other Damage

A sharp increase in bear damage (Figure 16) was seen this year with 112,500 acres of damage recorded up from 38,100 a year ago. Some of this observed mortality is likely a result of root disease and/or drought, but it is a significant increase. Bear populations have been increasing since use of dogs and baiting for control purposes have been banned.

Figure 16 – Bear damage; Photo by USDA Forest Service, www.forestryimages.com

Figure 17 – Exotic insect detections in Washington State in 2002.



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