

**FY2005 WEST COAST REGION  
FHM Evaluation Monitoring Proposal**

**PROJECT TITLE:** White Pine Blister Rust in Juvenile Western White Pine on State Lands in Washington

**PROJECT LOCATION:** Washington State

**PROJECT DURATION:** Year 2 of 3-year project

**FUNDING SOURCE:** Base EM

**PROJECT LEADER:** Daniel Omdal, Forest Pathologist, Washington Department of Natural Resources

**FHP SPONSOR:** Diane Hildebrand, Westside Service Center, (503) 668-1474, dhildebrand@fs.fed.us

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**PROJECT OBJECTIVES:** Evaluate juvenile western white pine (F2 progeny) in plantations throughout Washington to provide data on their condition (white pine blister rust severity, other disturbance agents). Use this information to better quantitatively describe their status, fine tune recommendations for restoration and management, and guide FHP and genetics programs.

**JUSTIFICATION:**

- a. *Linkage to FHM survey and plot data – the need for the project should arise from an analysis of FHM Detection Monitoring data.* White pine blister rust infections in juvenile white pine cannot be easily detected during the routine aerial survey in Washington and would likely be overlooked, if present, in FHM survey plots. However, field assessment of the juvenile western white pine resource has revealed blister rust at levels not detectable from the air, or reported in FHM survey plot data.
- b. *Significance in terms of the geographic scale, biological impact and/or political importance of the issue.* There are no current surveys that assess the incidence and severity of white pine blister rust on F2 progeny juvenile western white pine in Washington. While western white pine is not listed

as a species of concern, five-needle pines are a key species in many Pacific Northwest ecosystems and they have been significantly impacted over the last century. Active breeding programs have been established to genetically enhance western white pine for blister rust resistance in an attempt to restore this species to this region. Restoration of western white pine is consistent with the goals of the Northwest Forest Plan and the Interior Columbia Basin Ecosystem Management Project. Both of these plans place emphasis on maintaining or restoring the natural diversity and health of the northwest forest ecosystem.

- c. *Feasibility or probability that the project will be successfully completed.* There is a high probability that this project will be completed successfully. The Washington DNR Forest Resource Inventory System will provide easily accessible sites that are suitable for permanent plot establishment. Permanent plots have been established for other agents throughout Washington in a similar distribution and time frame. Data collection and analysis, as well as documentation of results, should be accomplished within the specified time frame.

#### **BRIEF DESCRIPTION OF PROJECT:**

- a. *Background:* Western white pine (*Pinus monticola* Dougl.) was once an integral part of the forest ecosystems of Washington. Due to its ability to tolerate extremes in site conditions, it was historically found interspersed throughout most vegetation zones. Around 1910, *Cronartium ribicola* J.C. Fisch., the causal organism of white pine blister rust, was introduced into western North America on infected nursery stock grown in Europe and shipped to British Columbia. From British Columbia, the disease spread to Washington causing widespread mortality throughout the range of five-needle (white) pines. White pine blister rust has become the most destructive disease of white pines in North America.

In the last two decades, the USDA Forest Service and University of Idaho have established breeding programs to genetically enhance western white pine for resistance to white pine blister rust. During this time, the Washington Department of Natural Resources (DNR) has been steadily increasing the outplanting of western white pine seedlings on state lands. In 2001, more than 200,000 western white pine seedlings were planted on state lands in Washington. Nevertheless, white pine blister rust remains a component of many forest ecosystems throughout the Pacific Northwest. A 2002 survey of western white pine saplings and mature trees in Washington revealed infection levels of up to 100% in some geographic regions. It is unknown what percentage of the white pine surveyed in this study was genetically enhanced.

High infection levels in western white pine saplings suggests that mortality due to white pine blister rust may be underestimated by excluding juvenile

white pine from these studies. It is likely that some of the planted western white pine succumb to blister rust prior to reaching the sapling stage. Much, if not all, of the western white pine that has been planted in the last five years on Washington State lands is genetically enhanced (F2 progeny). However, recent investigations of juvenile western white pine stands (less than five years old) revealed high levels of infection in some geographical regions of Washington.

- b. *Methods:* Two recently planted (2000 or later) management units containing a significant amount of juvenile western white pine (F2 progeny) will be selected from each geographic region of Washington using the Washington DNR Forest Resource Inventory System. In each of these management units, permanent plots consisting of 100 western white pine seedlings will be established. The seedlings will be visually assessed for white pine blister rust. The number and location of white pine blister rust cankers, as well as any other pertinent information regarding seedling health, will be recorded. Mortality will be recorded during plot establishment, but only live seedlings will be tagged for use in the permanent plots. These plots will be assessed for white pine blister rust for a total of three years.
- c. *Products:* Interim data and analysis will be reported in the form of a poster each year for Forest Health Monitoring work meetings. Upon completion of the project, a report will be produced documenting the performance of F2 progeny in the natural environment. This information will provide useful feedback to help guide current genetics programs. The report will quantify survivability and relative performance of juvenile western white pine (F2 progeny) in each geographic region of Washington. It will also include recommendations pertaining to restoration and management of western white pine in Washington.
- d. *Schedule of Activities:* The permanent plots will be reassessed in late spring/early summer of 2005 and 2006. Data analysis will occur during the autumn of each year and a report/poster will be provided for each annual Forest Health Monitoring work meeting from 2006 to 2007.
- e. *Progress/Accomplishments:* By August 2004, twelve permanent plots were established (two plots in each of six geographic regions) in Washington. Each permanent plot contains 100 western white pine seedlings approximately 5 years old. Each seedling was assessed for white pine blister rust. If present, the number of cankers and severity of each (based on location of the canker on the seedling) was recorded. Any other information pertinent to seedling health (drought symptoms, browse, antler rub, etc.) was recorded for each seedling. The number of dead trees encountered during plot establishment was recorded. Data entry and analysis are currently underway.

**COSTS:**

Total future costs estimated for this project are approximately \$12,900. They include:

	<b>FY '05</b>	<b>FY '06*</b>
Salary and Benefits:	\$3,150	\$3,300
Travel and vehicle:	\$1,350	\$1,400
Reporting:	\$ 850	\$ 900
Overhead:	\$ 950	\$1,000
<b>Total:</b>	<b>\$6,300</b>	<b>\$6,600</b>

\* Adjusted from FY '05 levels at 5% annual increase.