

**TITLE:** White Pine Blister Rust in Juvenile Western White Pine on State Lands in Washington - CONTINUING PROPOSAL -

**LOCATION:** Washington State (WA)

**DURATION:** Year 3 of 3-year project    **FUNDING SOURCE:** Base EM

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**PROJECT OBJECTIVES:** Evaluate juvenile western white pine (F2 progeny) in plantations throughout Washington to provide data on their condition e.g. white pine blister rust (WPBR) 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:** This project addresses the Base Evaluation Monitoring criteria “Insects and diseases – deviations from expected damage levels.” WPBR resistant seedlings are expected to survive in the field. Recent informal assessments of juvenile western white pine revealed higher than expected survival rates. This project also potentially addresses Fire Plan Evaluation Monitoring Criteria because mature western white pine is considered fire resistant. Increasing western white pine abundance in mixed conifer forests could also be part of a long-term strategy to restore fire resistance.

*Linkage to FHM survey and plot data – the need for the project should arise from an analysis of FHM Detection Monitoring data.* WPBR infections in juvenile white pine cannot be detected during the routine aerial survey in Washington and would likely be overlooked, if present, in FHM survey plots. However, field assessment of juvenile western white pine has revealed WPBR at levels not detectable from the air, nor reported in FHM survey plot data.

*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 WPBR 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 have been significantly impacted by WPBR. Active breeding programs have been established to genetically enhance western white pine for WPBR 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 natural diversity and health.

*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, analysis, and documentation of results should be accomplished within the specified time.

#### **DESCRIPTION:**

**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 (WPBR), was introduced into western North America on infected nursery stock grown in Europe and shipped to British Columbia (BC). From BC, the disease spread to Washington causing widespread mortality throughout the range of five-needle (white) pines. WPBR 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 WPBR. 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, WPBR remains a component of many forest ecosystems. 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 management units containing a significant amount of genetically enhanced juvenile western white pine will be selected from each DNR Region (6), therefore twelve sites will be selected.

Permanent plots consisting of 100 western white pine seedlings will be established on each management unit, therefore twelve permanent plots will be established.

The seedlings will be visually assessed for WPBR cankers. The number and location of WPBR cankers, along with any other 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 plot.

Plots will be assessed for WPBR each year, for a total of three years.

**c. Products:** Posters at 2005, 2006 and 2007 work meetings. Final report prepared for Internet publication and fact sheet prepared for FHM in 2007.

**d. Schedule of Activities:**

2004: Site selection, year one of data collection, poster at 2005 work meeting.

2005: Year two of data collection, poster at 2006 work meeting.

2006: Year three of data collection, final report published on Internet, poster at 2007 work meeting, FHM Fact Sheet submitted.

**e. Progress/Accomplishments:**

2004: Twelve sites have been selected in five DNR Regions. Plots were established and initial measurement taken. Poster presented at 2005 work meeting.

2005: Nine additional sites have been selected and initial measurements taken. Second measurement will be completed on initial twelve plots in 2005. Poster will be presented at 2006 work meeting.

2006: Third measurement on twelve plots and second measurement on nine plots. Poster will be presented at 2007 work meeting.

2007: Third measurement will be taken on nine plots. Final analysis and report preparation.

**COSTS:**

	Item	Requested FHM EM Funding	Other- Source Funding	Source
<b>YEAR 2006</b>				
<b>Administration</b>	Salary, Ben	4300	4300	DNR
	Overhead 18.2%	1080	1080	DNR
	Travel	1270	1270	DNR
<b>Procurements</b>	Contracting			
	Equipment	200	200	DNR
	Supplies	150	150	DNR
		7,000	7,000	