TITLE : Whitebark Pine Stand Conditions after Mountain Pine Beetle Outbreaks in Idaho, Wyoming and Montana

LOCATION: Intermountain West and Northern Regions (R1-R4)

DURATION: Two Year **FUNDING SOURCE:** <Base >

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PROJECT OBJECTIVES: <What are specific project objectives?>
The primary goal is to obtain information that will be used to make recommendations and set priorities regarding restoration of whitebark pine in Central Idaho (Salmon River, Lost River, Pioneer, Lemhi, Beaverhead Mountains) and adjacent areas in Wyoming and Montana. Specific objectives to meet this goal include:
1. to determine the extent and severity of mountain pine beetle (MPB) impacts in whitebark pine stands following MPB outbreaks identified by aerial detection and other surveys
      - quantify both dead and remaining live mature whitebark pine
2. to determine blister rust status of remaining mature live whitebark pine
3. to determine health of whitebark pine regeneration in these stands
4. to determine probable stand trajectory by recording health and abundance of other species in mixed stands

JUSTIFICATION: < How does the project address Evaluation Monitoring selection criteria?>
Linkage to FHM Detection Monitoring/ FIA

Although whitebark pine has a very large range, populations are small and relatively isolated, so they are not well represented in FIA plots. This project will greatly augment the limited information available from FIA plots.

Aerial detection surveys (ADS) provide estimates of current dead trees, but are unable to provide information about remaining live trees or regeneration which is crucial to understanding future stand trends and determining restoration needs. This project will provide a valuable link between mortality estimates from aerial detection

surveys and live trees remaining following MPB outbreaks. In mixed stands, we will also record the status of other species such as SAF, Englemann spruce, and LPP which may provide additional ground truthing for ADS mortality estimates caused by SAF decline, spruce beetle, and MPB in LPP.

This project will also document levels of blister rust in remaining mature whitebark pine and regeneration which are not recorded by ADS but are also critical elements in determining future stand trajectory and restoration priorities.

This project will use and build on previously successful EM project INT-EM-08-02 by evaluating new stands more recently affected by MPB in Central Idaho, Wyoming, and Montana using similar methods.

Significance in terms of geographic scale:

Whitebark pine has a very large natural range but is in serious jeopardy especially in the Intermountain West. Recent aerial detection surveys have documented increasing whitebark pine mortality throughout central Idaho. Ground observations estimate up to 90 percent of the whitebark pine overstory has been killed in some areas.

Biological impact and/or political importance of the issue:

Whitebark pine is a crucial high-elevation tree species. Not only does it help in watershed stabilization, It plays a key role in the survival and distribution of many wildlife species. (Tomback et al 2001). Its highly nutritious seeds were once prized by Native Americans and currently provide a primary food source for nearly 20 species of birds and animals such as the endangered grizzly bear. The loss of this important species has led to steps to classify it as an endangered species in Canada, a species of concern in the state of Washington, and a sensitive species in the Northern Region. The U.S. Fish and Wildlife Service recently concluded that listing the species as threatened and endangered is warranted, but precluded by higher priority actions.

Feasibility or probability that the project will be successfully completed

The survey procedures for collecting data (FINDITS) have been used for many years to assess bark beetle losses, and will also show residual live trees. Typical regeneration surveys will also be used to determine levels of regeneration of various species and potential stand trajectory. There are enough accessible sites to allow a 2-person crew to complete the ground surveys within two field seasons.

DESCRIPTION:

a. Background: <Brief description of the project including scientific basis.>

Whitebark pine is a keystone species of high elevation ecosystems throughout western North America. It is often the only tree species capable of surviving in harsh subalpine areas, and is crucial in watershed stabilization and creating habitats that support a wide diversity of plants and animals. The old gnarled relics in remote timberline areas provide

important aesthetic values by creating high elevation vistas and providing much of the character of the alpine experience. (Schwandt 2006, Tomback et al 2001)

Whitebark pine is currently at risk in much of its natural range due to a combination of white pine blister rust, forest succession, and recent outbreaks of MPB. (Gibson et al. 2008, Keane et al 2002). Although MPB outbreaks have occurred historically in whitebark pine, the additional impacts of white pine blister rust have caused deviations far exceeding expected mortality resulting in local extirpation of some populations and threatened extinction of others (Schwandt, 2006).

While aerial detection surveys can document recent increases in MPB activity, coverage is not always complete or consistent, and surveys only record current mortality, so cumulative mortality is not always known if areas are not flown annually. However, even where annual mortality levels have been reported, a major concern has been determining the amount of live whitebark pine remaining to provide regeneration potential. Since whitebark pine depends almost exclusively on the Clark's nutcracker for natural regeneration (Tomback 2001), the loss of most mature whitebark pines in a stand may result in no regeneration if the residual live trees cannot support a nutcracker population.

The report from INT-EM-08-02 (Kegley et al. 2010) helped address this information gap by documenting what is left in various stand types following MPB outbreaks in 42 select stands throughout Idaho, Montana, and Wyoming. This project will fill in a large geographic area that was not covered in INT-EM-08-02. The information from this project will help managers understand losses and prioritize restoration efforts.

b. Methods: <Brief description of methods including data availability.>

Areas in Central Idaho and adjacent areas in Wyoming and Montana where recent MPB outbreaks have occurred will be identified from past ADS, local specialists, or other surveys. These areas will be sampled using standard FINDITS protocols that use variable radius plots for large trees and fixed radius plots for regeneration. Plots will be taken at a frequency that adequately covers selected stands.

Data collected will include: tree species, size (DBH), condition (mortality causes, and blister rust levels (for live trees)

c. Products: <Brief description of anticipated products.>

A report summarizing results for each area sampled that will describe current whitebark pine condition following MPB outbreaks as well as condition of other species sampled. It may also be possible to compare results to ADS information if available. Data will be entered into the WLIS database and compared with prior survey data to document trends over time. Results will be used to make recommendations regarding relevant restoration activities and priorities for restoration. Data will also be used to develop loss prediction models for whitebark pine.

d. Schedule of Activities: <Listing of major activities & timelines>.
Winter 2011/2012 – identify areas to be sampled; develop field protocols; hire field crew
Summer 2012 – sample areas selected

Fall/winter 2012/2013 – analyze data and identify areas to be sampled 2013; hire field crew
Summer 2013 – sample areas selected
Fall/winter 2013/2014 – analyze data and final report

e. Progress/Accomplishments: <Brief description of progress/accomplishments for multi-year projects.> see above

COSTS: < Budget estimates for each year of project.>

Year 1 FY 2012

Item	Requested 2012 Funding $	Other-Source 2012 Funding $	Description /Source for other funds
Salary - GS 4 & 5 temps, 2 person crew 13 weeks	$16,000	$8,000	8 weeks -FHP personnel to select sites, train, and guide field crew
Travel -50 days 40 days FHP	$10,000 $ 4,000	$2,000	FHP travel from base funds
Other –vehicle for crew	$ 2,000	$1,500	FHP vehicle for FHP personnel
Contracting			
Equipment			
Supplies		$ 500	Field supplies donated by FHP
Other (specify)			
FY2012 Totals	$32,000	$12,000	

Year 2 FY2013

Item	Requested 2013 Funding $	Other-Source 2013 Funding $	Description /Source for other funds
Salary - 2 person crew 13 weeks	$16,000	$4,000	4 weeks -FHP personnel to select sites, train, and guide field crew
Travel -50 days 20 days FHP	$10,000 $ 2,000	$1,000	FHP travel from base funds
Other –vehicle for crew	$ 2,000	$1,500	FHP vehicle for FHP personnel
Contracting			
Equipment			
Supplies		$ 500	Field supplies donated by FHP
Other (specify)			
FY2013Totals	$30,000	$7,000	

Literature cited:

Gibson, K.; Skov, K; Kegley, S; Jorgensen, C; Smith, S; and Witcosky, W. 2008. Mountain pine beetle impacts in high-elevation five-needle pines: current trends and challenges. USDA Forest Service, Forest Health Protection Report R1-08-020*.*

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