

TITLE: Evaluation and Monitoring of Whitebark Pine for Blister Rust in the Frank Church River of No Return Wilderness Area

LOCATION: Frank Church River of No Return Wilderness Area; Payette National Forest

DURATION: Year 1 of 3-year project **FUNDING SOURCE:** Base Plan

PROJECT LEADER: Lauren Fins, Department of Forest Resources, College of Natural Resources, University of Idaho, Moscow, ID 83843-1133, Phone: 208-885-7920; email: lfins@uidaho.edu

PROJECT OBJECTIVES:

1. Survey and evaluate whitebark pine populations in the Frank Church WA for incidence of white pine blister rust and mountain pine beetle
2. Monitor changes in incidence of white pine blister rust between 2005 and 2007 (possibly longer term, depending on funding)
3. Evaluate and monitor whitebark pine mortality from blister rust and bark beetles over the study period
4. Evaluate, monitor and compare whitebark pine reproduction in unburned, old burns and recently burned plots
5. Collect and archive population samples of cones/seeds for long-term genetic conservation and potential future restoration
6. Collect cones/seeds for testing for blister rust resistance levels and mechanisms
7. Collect cones/seeds for breeding for blister rust resistance

JUSTIFICATION: By virtually all measures of population vigor, whitebark pine is declining throughout its range. Much of the observed mortality is attributed to blister rust, some to mountain pine beetle. The decline and possible loss of whitebark pine is likely to have a domino effect on high elevation forest communities where their seeds are a critical food source for birds and mammals, and the trees provide soil and habitat stability in environments too harsh for most other tree species to survive. To date, whitebark pine populations in the Frank Church River of No Return Wilderness Area have not been included in evaluations or efforts to monitor the incidence and spread of blister rust, nor have they been included in studies of genetic variation or blister rust resistance testing. On a recent reconnaissance trip, we confirmed the presence of blister rust on whitebark pine in the Frank Church Wilderness Area. We believe that it is imperative to include these remote populations in the effort to formally evaluate and monitor whitebark pine populations for incidence and spread of blister rust, and mortality due to rust and mountain pine beetle. In addition, to hedge against potential loss of these populations, seed samples should be archived for gene conservation and tested for levels and types of blister rust resistance.

DESCRIPTION:

- a. **Background:** Whitebark pine is a high elevation conifer with a "competitive edge" in harsh environments. While it often occurs in mixed stands with subalpine fir and lodgepole pine, whitebark pine out-competes other species on high ridges with poor soils and cold temperatures. As the only North American pine with wingless seeds and cones that remain closed even after they mature, whitebark is unique. Its closed cones, with their large, heavy, nutrient-laden and calorie-rich seeds, provide a critical food source for a variety of animal species, including Clark's nutcrackers, pine squirrels and brown bears (in some parts of its range).

White pine blister rust, an exotic disease that was introduced into western North America in 1910, first appeared on whitebark pine in Idaho in 1938. The species is highly susceptible to the rust, which can kill susceptible trees within a few years of infection, although some infected trees may continue to live for many years. Genetic resistance to blister rust has been found in whitebark and other five-needle pines, but only in low frequencies. In addition to the risk of death from blister rust, mountain pine beetles tend to be attracted to trees that are infected with blister rust.

The continued spread of and mortality from blister rust, increasing losses from beetle infestations and the ever-present possibility of stand-replacing fires, all combine to threaten the long-term viability of this high elevation keystone species. Thus, it is critical to assess, monitor and collect seed samples (for long-term gene conservation and possible ecological restoration) across the entire range of the species.

- b. **Methods:** We plan to assess and monitor the incidence and extent of blister rust and mountain pine beetle in 3 separate populations of whitebark pine in the Frank Church RONR Wilderness Area. The University of Idaho Taylor Ranch will be used as the "base camp" for this study. Two students, one graduate and one undergraduate, will be involved in the field work, which will involve travel with pack animals to the remote, high elevation areas where whitebark pine populations can be found. Populations will be selected to the north and south of Big Creek. We will generally follow protocols for plot establishment and monitoring developed by the Whitebark Pine Ecosystem Foundation but will conduct the study in accordance with the Research Guidelines expressed in the Wilderness Plan for the Frank Church RONR Wilderness Area.

In year 1, permanent plots will be established in each population. The target number of plots is 10 per population. Markers will be small and placed in low visibility locations. Plots will be identified by GPS as well as mapped using more traditional methods. In years 2 and 3, cones will be protected and later collected. Seeds will be extracted from the cones and archived for potential future use in genetic conservation efforts in the event of population losses. Additional seeds will be archived for future testing for rust resistance and potential use in a rust

resistance breeding program. These genotypes will be particularly useful if entire whitebark pine populations are lost to rust, beetles and/or fire.

Data collected will include tree size and location, incidence of blister rust, location of cankers, tree condition, incidence of mountain pine beetle, regeneration counts, occurrence of other tree species and predominant understory species. Analyses will compare rust incidence and mortality from rust or beetles between years. We will also compare regeneration numbers and types in burned and unburned areas. Potential adjunct studies might involve assessment of changes in frequency of rust resistant genotypes over time, and/or differences among populations and years in incidence of bird and squirrel sightings as related to changes in population size and vigor in the whitebark pines.

c. **Products:** Annual reports will be written and sent to the USDA Forest Service. We will present results of this work at a meeting of the Whitebark Pine Ecosystem Foundation and write a manuscript for publication.

d. **Schedule of activities:**

Year 1: Establish plots in 3 populations; collect baseline data; preliminary analysis and summaries of data

Year 2: Cage developing cones in 1 population; collect data in permanent plots; collect mature cones; conduct analysis comparing data from year 2 to baseline

Year 3: Cage developing cones in 2 populations; collect data in permanent plots; collect mature cones; conduct analysis comparing year 3 to baseline and year 2; present results at professional meeting; write manuscript for publication

COSTS:

	Item	Requested FM EM Funding	Other Source Funding	Source
Year 2005				
Administration	Salaries and Fringe	\$29,665 \$5,590		
	Travel	\$6,350		
Procurements	Supplies and OE	\$1,500		
	Overhead	\$13,578		
TOTAL REQUESTED		\$56,683		

Funding for years 2 and 3 is projected to be similar to year 1.

Date: Wed, 14 Jul 2004 18:19:01 -0700
From: Lauren Fins <lfins@uidaho.edu>
Subject: (Fwd) Frank Church Wilderness research
To: lfins@turbonet.com
Reply-to: lfins@uidaho.edu
Organization: University of Idaho
X-Mailer: Pegasus Mail for Windows (v4.12a)
Priority: normal

----- Forwarded message follows -----

Date sent: Tue, 06 Jul 2004 10:00:07 -0600
From: Patty Bates <pbates@fs.fed.us>
Subject: Frank Church Wilderness research
To: lfins@uidaho.edu

Hi Lauren - enjoyed our quick meeting last week. Here's the direction from the Frank Church River of No Return Wilderness Plan regarding research. I think your proposal can be designed to meet this direction. Let me know if you have any trouble opening/viewing the document. (See attached file: FC_Plan.rtf) The Forest surrounding the

Taylor Ranch is managed by the Krassel Ranger District, Payette National Forest. Contact information is:

Quinn Carver, District Ranger
Krassel Ranger District
PO Box 1026
500 North Mission Street
McCall, ID 83638
(208) 634-0600

Another contact there would be Clem Pope, the wilderness manager.

The coordinator for the Frank Church River of No Return Wilderness is Ken Wotring. He might also know of any/all research projects going on in the wilderness.

I anticipate EM grant requests should be out sometime in late summer.

I'll make sure a copy makes it to you. Let me know if there's anything else I can help you with, PATTY

(Embedded image moved to file: pic17363.gif)

----- End of forwarded message -----

Lauren Fins
Professor of Forest Genetics
University of Idaho
Moscow, ID 83843-1133
Phone: 208-885-7920

FAX 208-885-6226



-156



FC_Plan.rtf



pic17363.gif

XVII. Research

A. Background

The Wilderness Act recognizes that scientific values in wilderness and the gathering of information regarding their use and enjoyment is an appropriate activity in wilderness. Scientific study of the wilderness is also a purpose articulated in the Wild and Scenic Rivers Act. The FC-RONR Wilderness' vast array of diverse ecosystems, topography, geology, fire history, wildlife populations, and cultural history provides an excellent tapestry for study and observation in a near-natural environment. There has been considerable research activity in the past; more is expected in the future. The University of Idaho maintains a wilderness research center on the 65-acre Taylor Ranch in lower Big Creek. The University uses this facility for a wide range of wilderness-related research. The CIWA specifically provides that management shall encourage scientific research into man's past use of the wilderness and the Salmon River corridor (Section 8(a)(3)(A)).

B. Desired Future Condition

Wilderness-dependent research will continue following the intent of the Wilderness Act. The wilderness resource will continue to be shaped by natural forces and processes, while providing an opportunity to further the state of our knowledge of ecosystems and social aspects of wilderness management.

C. Goals

1. Wilderness and its ecosystems will continue to be valuable as benchmarks. The benchmarks provide a basis where managers and scientists can better understand and compare natural processes and systems.

D. Objectives

1. Provide for and encourage scientific study that:
 - a. Depends on the wilderness setting or upon natural systems not readily found outside wilderness.
 - b. Seeks to explain or understand ecosystems found in wilderness or resolve wilderness management problems to provide managers with knowledge needed to better manage wild lands.
 - c. Is conducted in a non-obtrusive manner consistent with preserving the wilderness character and minimizes conflicts between wilderness users and researchers.

E. Standards and Guidelines

General

1. Research projects that benefit the protection objectives of the FC-RONR Wilderness will be given highest priority. (S)
2. Research projects not dependent on wilderness will be directed to alternative areas outside the wilderness. (S)

3. Research methods that temporarily infringe on the wilderness resource should be limited or restricted, with the adverse effect(s) mitigated to the extent possible. (G)
4. All proposed research structures will be analyzed through the Minimum Requirements Analysis process. If approved, these research structures shall be situated and constructed to be as unobtrusive as possible. (S)
5. Data collected for management purposes, such as use figures and resource inventories, should be made available to scientists for research purposes. (G)
6. The use of helicopters and fixed-wing aircraft for research purposes outside of public airstrips will be analyzed through the Minimum Requirements Analysis process. (S)
7. Aircraft use, including helicopters, outside of the public airstrips should be considered only when other methods are not possible and not appropriate for the research objectives. If aircraft use is approved, time of day, season of year, elevation, route of flight, and location of landings will be considered to minimize impacts. (G)
8. Research projects must be approved by the Forest Supervisor and authorized by special use permit. (S)

Research Proposals

1. Proposed research projects will be evaluated on a case-by-case basis by the managing unit as to the project's desirability, priority, and compatibility. Project proposals that extend across administrative boundaries will be jointly reviewed with a coordinated response. (S)
2. Research projects on wildlife and fish resources, recreational use, human carrying capacities, cultural resources, and methodologies for monitoring ecological and sociological carrying capacity, will be permitted in the Wild River corridor. (S)
3. Written research proposals should be submitted to the Forest Service at least 6 months before anticipated fieldwork. (G)

Specimen Collection

1. No personal flora or fauna collection is permitted. Collections are for scientific or educational purposes only, dedicated to public benefit, and may not be used for personal or commercial profit. (S)
2. All collections for scientific purposes must be approved. (S)
3. No archaeological or vertebrate paleontological materials may be collected. Upon location of any historical or archaeological remains, fieldwork will cease and the site shall be reported immediately. No disturbance of such a site is permitted. (S)

Marking Samples and Locations

1. Measuring and recording methods must be sensitive to the generally undisturbed character of the area and leave as few signs of disturbance as possible. Field measurements in the FC-RONR Wilderness will follow the

guidelines in the Forest Inventory and Assessment and Wilderness Program MOA, namely:

- a. The practice of painting or scribing trees will not be used. Instead, marked nailed tags will be used.
- b. Marking tags/nails may be used minimally, if painted an approved color, and faced away from obvious trails and roads.
- c. Tags/nails may only be used at the base of the tree. Markers may not protrude from the ground more than one inch.
- d. Flagging may not be attached to the marker.
- e. Any flagging used to facilitate entry and exit from the plot area will be removed upon completion of the plot measurements.
- f. Boring or drilling will be done on representative non-tally trees and only when absolutely necessary to estimate site, age, or growth.
- g. Destructive sampling will not be done.

Site Condition

1. All refuse associated with field operations will be removed from the site and returned to the condition in which it was found, except as authorized by the project work plan. (S)
2. Soil disturbance is prohibited, except as specifically authorized in the project work plan. (S)
3. Temporary markers, such as flagging, may not remain in place for more than one week when study teams are not present on a site. (S)
4. Paint, or similar semi-permanent markers, may not be applied to rocks, plants, or other natural surfaces. (S)

Taylor Ranch

From: "Lauren Fins" <lfins@uidaho.edu>
To: "Daniel Robbins" <robb6655@uidaho.edu>
Cc: "Jim and Holly Akenson" <tayranch@direcpc.com>
Sent: Tuesday, February 01, 2005 5:02 PM
Subject: Re: Daniel Robbins

Hi Daniel,

Yes, I remember you.

I did get the grant for the study on whitebark pine in the Frank Church Wilderness Area so we will be looking for people to work on the project.

You have at least 3 possibilities to be able to work on the whitebark pine project in the Frank Church Wilderness Area. There may be others.

One possibility is to develop your own proposal for a small independent research project that would be based in whitebark pine habitat and submit it to Holly and Jim Akenson for the Taylor Ranch summer program. Jim and Holly will be here in mid-February - see Cheri in the Dean's office for the schedule and for when you would have to submit your proposal. They also have lots of good ideas about small research projects that might be conducted as add-ons to the blister rust/fuels project. I know you're interested in wildlife, so there may be some projects associated with the movement of Clark's Nutcrackers up and down the mountain and the timing of predation on the cones in that area. A comparison of numbers of sitings might be interesting depending on the numbers of mature whitebark pines that are left in a population.

Another possibility is that you could apply for a Berklund Undergraduate Research Award (deadline is February 17). See Diane Holick for guidelines for applying.

You could apply to Jim and Holly to do an internship at the Taylor Ranch, with specific interest in helping on the whitebark pine monitoring project. I'm going to meet with them when they get here to work out details, but we don't have this all worked out yet.

I hope this helps.

Lauren

----- Original Message -----

From: "Daniel Robbins" <robb6655@uidaho.edu>
To: "Lauren Fins" <lfins@uidaho.edu>
Sent: Sunday, January 30, 2005 7:56 PM
Subject: Daniel Robbins

> Hello Lauren,

2/8/2005

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From: "Lauren Fins" <lfins@uidaho.edu>
To: "Patty Bates" <pbates@fs.fed.us>
Cc: <tayranch@direpc.com>
Sent: Friday, January 14, 2005 12:27 PM
Subject: Re: Fw: 3400; 2005 Functional Assistance Request; REPLY DUE MARCH 4, 2005

Hi Patty,

I believe the paperwork for the grant is in the pipeline. Pam Bell told me she handled our part, so we should see the grant and budget numbers set up soon.

Thanks for sending the letter about services provided by the Boise Field Office. I suspect we will be able to take good advantage of the aerial survey service. That would be terrific. I'm going to forward your letter to Holly and Jim Akenson. I'll need to talk with them about what surveys they already have on hand and what we'll need.

What would be really useful would be photos and maps of where the burns occurred and their dates, and a good record of where the whitebark pine distribution is. (I'm not sure whether there are good records of the latter.)

Thanks again.

Lauren

On 14 Jan 2005 at 8:48, Patty Bates wrote:

Date sent: Fri, 14 Jan 2005 08:48:51 -0700
From: Patty Bates <pbates@fs.fed.us>
Subject: Fw: 3400; 2005 Functional Assistance Request; REPLY DUE MARCH 4, 2005
To: lfins@uidaho.edu

Good morning Lauren -

We sent out the grant paperwork to the University (c/o Ted Mordhorst who is our contact from grants and contracts there) last week, so things should be in motion to get the funding out to you. One question I have for you is whether or not there is any assistance you might need in the study? Following is a call letter that describes a few of the services our forest health protection folks can offer. If you think any aerial survey work, mapping, GIS work or field trips/assistance might help in your Frank Church WBP regeneration study, please let me know. While this call letter is written more towards Forest's needs, the forest health protection folks are interested/available to help out on your study.

PATTY

Patty Bates

1/18/2005

File Code: 3400
Route To: (1900), (2200), (2300), (2400)

Date: January 13, 2005

Subject: 2005 Functional Assistance Request

To: Forest Supervisors, R-4 Idaho

REPLY DUE MARCH 4, 2005

The Boise Field Office of Forest Health Protection (FHP) provides assistance concerning entomology, plant pathology, and pesticide-use issues to all Federal land managers in southern Idaho. Additionally, we provide technical assistance, information, and training relative to biological control of noxious and nonnative invasive plants. We plan to offer our standard FHP training sessions, which include insect and disease recognition, insect and disease management, introduction to biological control of invasive plants, and hazard tree/vegetation management in recreational areas during this next year. The location and number of these sessions will depend upon requests from the field. We also have the ability to offer "hands-on" training in GIS, FVS-pest model use, data visualization and remote sensing. Our services include:

1. Aerial surveys to detect and monitor forest damage/mortality.
2. Functional assistance to detect, evaluate, and analyze insect and disease impacts on forested resources, which includes field assistance, planning, and interdisciplinary team participation.
3. Forest insect and disease prevention, suppression, and restoration project development, review, and funding.
4. Training and other information needs related to forest insects and diseases.
5. Technical assistance and training relative to collecting, releasing, and monitoring biological control agents used to manage noxious and nonnative invasive plants.
6. Technical input and review of Forest Plan revisions and landscape analyses.
7. Technical assistance and information related to pesticide use, storage, disposal, and applicator certification.
8. Technical assistance in developing needed technology relative to management of forest and rangeland insects, pathogens, and noxious and nonnative invasive plants.