

Issue No. 11: Fall/Winter 2006

Nutcracker Notes

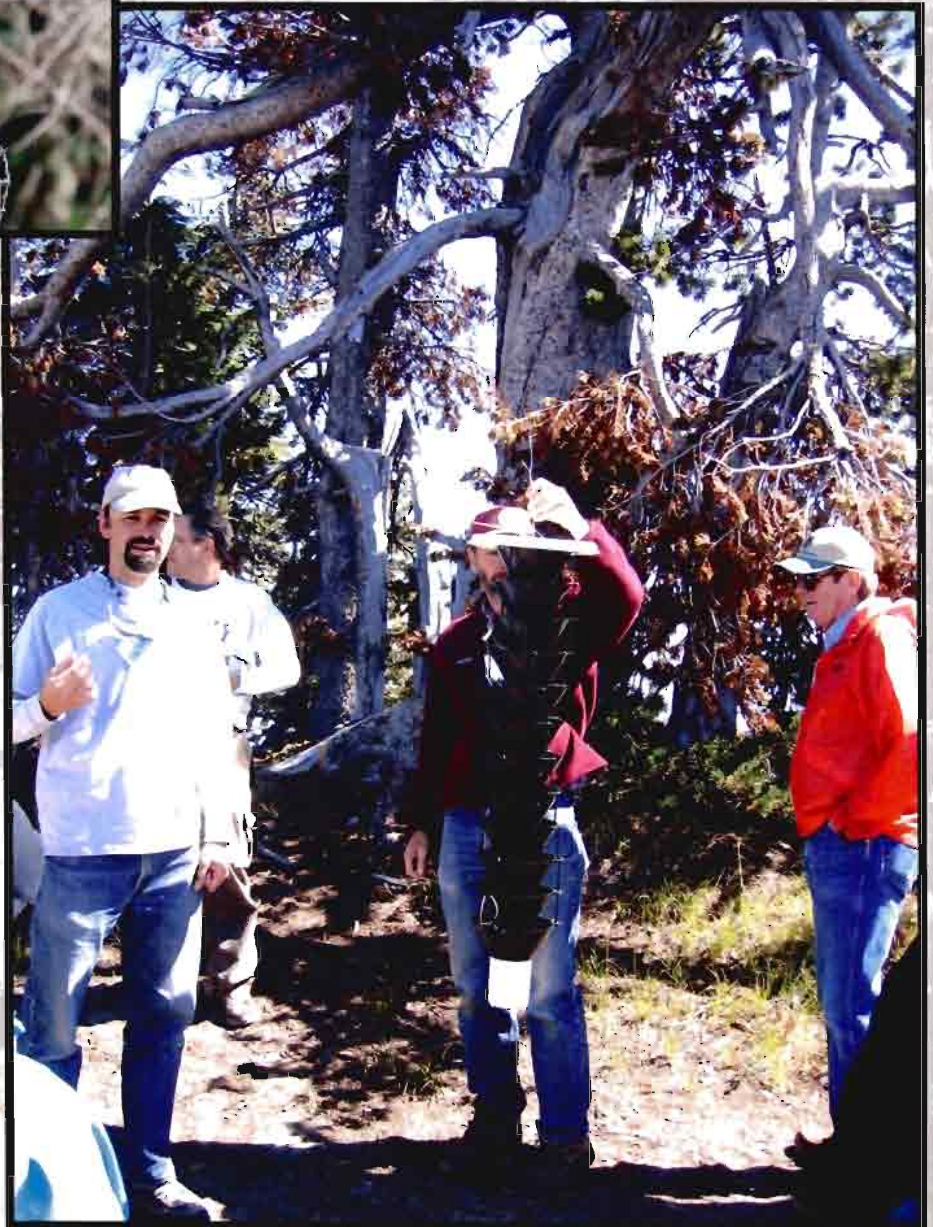
Whitebark Pine Ecosystem Foundation



Gray Jay.
Dan Strickland photo



Clark's Nutcracker.
Teresa Lorenz photo



Whitebark pine field trip to Crater Lake N. P. Lindgren funnel trap baited to lure mountain pine beetles. Richard Sniezko photo

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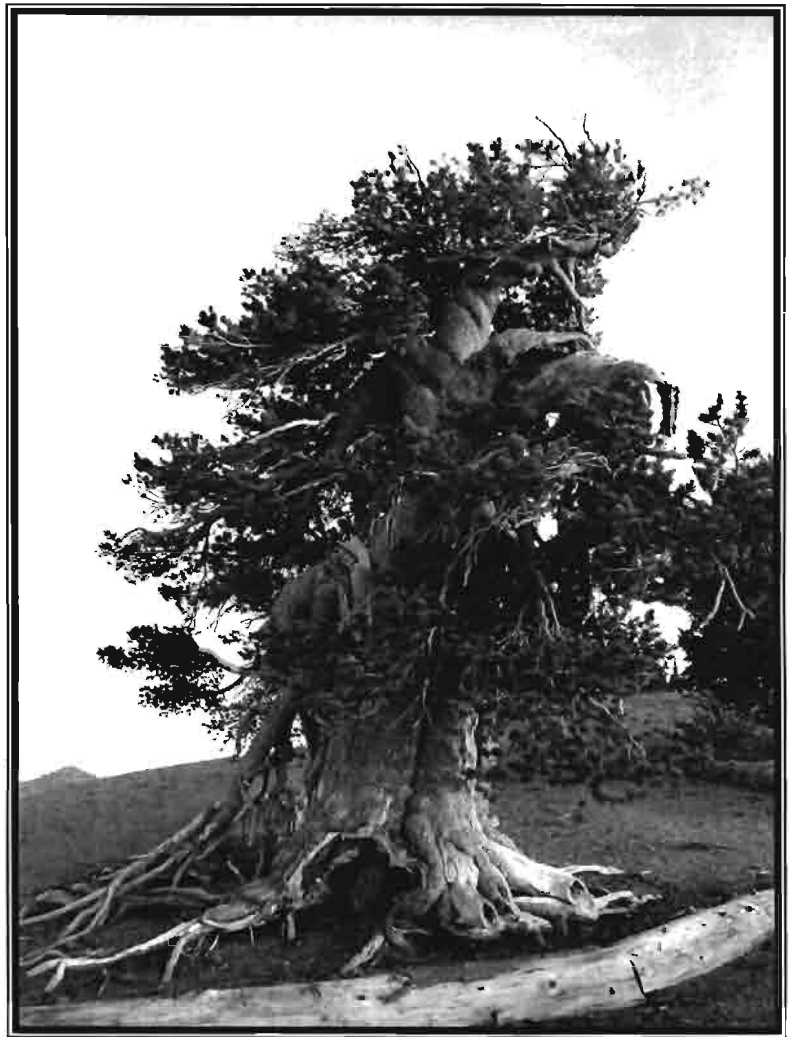
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Ancient whitebark pine on the rim above Crater Lake.
John Schwandt photo



Whitebark pine cone.
John Schwandt photo

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Director's Message



Diana F. Tomback

Restoration funding and the next step

Whitebark pine produced a good cone crop throughout much of its range this past summer, and anecdotal reports suggest that many parks and national forests have collected cones for restoration planting. There are also reports of inaction due to lack of funding, a recurrent theme over the years. We will know shortly whether some measure of help is on the way: The House and Senate will be voting on the 2007 proposed Interior Appropriations budget, which includes funding in the Forest Service budget specifically for whitebark pine restoration in Montana, Idaho, and Wyoming.

Since submitting the initial funding request, the Whitebark Pine Ecosystem Founda-

tion (WPEF) has been working with the Washington, D. C., staffers for Senator Conrad Burns (R-Montana), Chairman of Senate Interior Appropriations, and seeking information from agency officials to determine a workable whitebark pine budget. The final request we submitted is for \$800,000, divided between Forest Health Protection and the National Forest System. We believe that there is good support for whitebark pine restoration from the Congressional delegations from all three states, and we are told that the outlook is optimistic.

Receiving the funding is only a start. Having a plan to use the funding efficiently and productively is the next concern. In our federal funding application, the WPEF proposed that a technical committee be formed to advise the Forest Service on the use of the funding. This committee is composed of representatives from agencies with whitebark pine oversight, including the National Park Service and various branches of the Forest Service; the WPEF has a seat at the table as well. John Schwandt, Forest Health Protection, has been asked to form this committee, and an organizational and strategy meeting is already scheduled for late November.

4 Range-wide report on the status of whitebark pine

As many of you know, John Schwandt just finished a special assignment to the Washington, D.C., office of Forest Health Protection as Whitebark Pine Coordinator. (See John's article in this issue for details.) His final report, "Whitebark pine in peril: a case for restoration," was just published (R1-06-28). The timing of the report is fortuitous, and underscores the very real needs for restoration funding. We anticipate working in partnership with John.

Funding from The National Arbor Day Foundation and Y2Y

I am pleased to report that the WPEF received a grant of \$24,190 from The National Arbor Day Foundation (TNADF) last summer to jumpstart our next whitebark pine restoration initiative—a joint WPEF-TNADF venture. We are charged to leverage this contribution in order to fund several on-the-ground restoration projects. One way that we can grow this initial amount is through our new Whitebark Pine Restoration Fund. I urge every member to consider contributing to this fund at least once this year. Even if our federal funding request is successful for Montana, Idaho, and Wyoming, additional funds raised by the WPEF demonstrate to the public and legislators that there is public support for whitebark pine, and allow us to target restoration projects outside these three states.

In May, 2006, the WPEF as non-profit partner was awarded \$20,000 from the Yellowstone to Yukon Conservation Science Grants program in support of the research proposal "Connecting ecological processes to whitebark pine restoration" by Carmen Wong, doctoral student, and Lori Daniels, her advisor at the University of British Columbia. We sent the funding on to Carmen and Lori, and have since heard rumors of Carmen's hard work this past summer in several national parks in the Canadian Rockies.

Carmen is one of eight Ph.D. candidates in the Americas to be named a 2006 Canon National Parks Science Scholar, for which she received a generous scholarship to aid her "innovative research on scientific problems critical to national parks."

Annual meeting, Sun Valley Area

Board member Dana Perkins did a splendid job organizing WPEF's Annual Meeting in Hailey, Idaho (see accompanying story). The meeting included an excellent science session on Friday, September 29, and a fun and instructive hike at Galena Summit on Saturday. The weather cooperated beautifully, and we thank the Challis office of the Bureau of Land Management for co-sponsoring this invigorating get-together.

Pacific Coast meeting

Our thanks to Ellen Goheen for organizing the highly successful symposium, "Whitebark pine: A Pacific Coast Perspective," August 27-31, 2006, at Southern Oregon University in Ashland, Oregon (see her article in this issue). The symposium was well attended and very informative—expanding our knowledge of the status of whitebark pine and other five-needled white pines in the West. The field trip to Crater Lake National Park illustrated the inroads that blister rust has made in the Pacific Coast region, and underscored the need for proactive restoration strategies.

WPEF Board Changes and Elections in 2007

Because of other obligations, Ward McCaughey has resigned as Associate Director. We have greatly benefited from his years of service. At the fall board meeting, board member Cyndi Smith was chosen to finish out Ward's term until a replacement is elected on the cycle stated in the bylaws. This action has created a vacancy on the Board of Directors, which will be filled temporarily with nominations from the board.

Now that the national mid-term 2006 elections are history and we see that the country has survived, it is time to focus on the *really important* first-ever elections for WPEF officers and board members (see accompanying insert). We urge members to consider nominating themselves or colleagues who are concerned about the future of whitebark pine and are willing to devote some time and energy to this worthy cause! ■

WPEF's 2006 Meeting Held in Idaho

Dana Perkins

Upwards of 45 people attended the Whitebark Pine Ecosystem Foundation's Sixth Annual Meeting at the very nice Community Campus in Hailey, Idaho, on September 29-30, 2006. On Friday participants heard ten presenters who covered a wide range of topics related to whitebark and limber pine ecology. A list of those presentations is at www.whitebarkfound.org under the annual meeting link. The Community Campus was a great venue, complete with coffee bar, and meeting coordinator Leslie Gough who helped us with last minute needs. Many thanks to the Idaho office of the USDI Bureau of Land Management for co-sponsoring the meeting and to BLM employees David Howell and Antonia Hedrick who designed the announcement brochure and meeting banner (see photo onback cover).

Saturday's field tour began at Galena Summit and climbed above the 9000-foot level on the divide separating the Salmon River and Big Wood River. Professor Denis Norton, formerly of the University of Arizona and now consulting geologist in Stanley, Idaho, presented a geologic overview of this spectacular area. He explained how continental plate movement, volcanic activity, formation of granite batholiths and glaciology had created and sculpted the granite Sawtooth Mountains and sedimentary Boulder and White Cloud mountains surrounding us. It was a warm day with good conditions for prescribed burning; thus we viewed the whitebark pines, through a light smoky haze.

We explored the varied whitebark pine communities growing along the lofty ridge. Mountain pine beetles have been killing large trees here and there, including many beetle "hits" this season. Mortality was patchy, and unfortunately the beetles haven't run out of susceptible hosts here yet. Carl Jorgenson of Forest Health Protect, Boise, and Donovan Gross, master's student at Utah State University, discussed mountain pine beetle and whitebark pine interactions with plenty of examples nearby. White pine blister rust was observed on several trees and participants were able to ask questions of pathologists John Schwandt and Holly

Kearns. Clark's nutcrackers were flying in the groves and harvesting seeds from the 2006 cone crop. Several extensive squirrel middens were observed. We concluded our field trip with lunch and our annual business meeting on rocky volcanic ridge top with a 360-degree view. Warm weather made for a delightful day in the whitebark pines near tree-line. ■

Preview of WPEF's 2007 Annual Conference: Lincoln, Montana, September 28-30

It is not too early to be thinking about attending WPEF's Annual Conference next September—only 10 months away. More details will appear in the next issue of Nutcracker Notes, due out next May; but here is a sneak preview.

Lincoln is a very small outdoorsy town nestled among stately old ponderosa pines, at the head of the Blackfoot River just west of the Continental Divide. It is located on Highway 200 half-way between Missoula and Great Falls—each 80 miles distant—and is about 60 miles from Helena. Lincoln is surrounded by the Helena National Forest, and the Lincoln District, headed by Ranger Amber Kamps, is enthusiastically co-hosting our Whitebark Pine/Limber Pine Science and Management Conference.

Bob Keane (rkeane@fs.fed.us) will be bringing together a slate of interesting scientific and management-oriented presentations for the indoor sessions to be held Friday, September 28th at the Community Center in "downtown" Lincoln. People interested in giving a presentation are invited to contact him. Two splendid local day hikes will be offered. One of these (see cover photo) ascends into a fascinating mixed stand of whitebark and limber pines on "Flexicaulis Ridge" in the Red Mountain Research Natural Area. A second trip visits limber pine with some whitebarks squarely atop the Continental Divide at Lewis and Clark Pass, an undeveloped area that looks much the same as it did in 1806 when Meriwether Lewis's small party crossed the Great Divide here on his return trip to Saint Louis and the frontier of civilization.

Lincoln's restaurants and cafes have long been known for their uniquely great food.

6 Several motels are available in Lincoln at moderate rates. See the community's web site (www.lincolnmontana.com) for information about the community, accommodations, and area attractions. Please mark your calendar and save the dates so you can join us. ■

WPEF Membership Growing Bryan Donner

The Whitebark Pine Ecosystem Foundation is possibly unique for a "foundation" in that dues-paying membership is a facet of the organizational structure. When WPEF was established, the board of directors determined its twin aims would be the support of restoration activities and whitebark pine ecology education. A membership goal was seen as helpful for education outreach and for raising funds to support restoration efforts.

An important aspect of WPEF membership is supporting the administrative activities of the foundation. Annual dues have historically paid for annual operating expenses with some left over for restoration work. Most restoration work to date has been funded with grants and donations. As all foundation staff are volunteers, the WPEF is very efficient using dues and donations for direct support of foundation activities.

As of November 1, 2006, the WPEF has 142 members. This is an all-time high. Membership has grown steadily over the last five years with an annual increase of about fifteen to twenty percent. A significant membership base attests to the credibility of our organization when we apply for grants to aid in our mission. Please consider recruiting a friend or colleague today.

The board established different categories of membership to recognize different levels of support. The category with the largest number of members is at the Whitebark level (\$25 annual dues) with 105. The Nutcracker level (\$75) has 20 members, the Institutional members (\$150) come in at 9, there are 7 student members (\$15), and one member at the Grizzly level (\$1000).

Membership is comprised of individuals and organizations from all across North America. States with the most members are Montana (68), Idaho (24), and Oregon (14). We are glad to have 8 members from Canada. Some of our members reside in states outside the range of whitebark pine, including Colorado, Kentucky, Michigan, Minnesota, New Mexico, New York, and Tennessee.

The foundation's web site at www.whitebarkfound.org has a complete discussion of the different membership levels and forms for initial membership and renewal. Questions, comments, or suggestions about membership in our foundation can be directed to the foundation's Membership and Outreach Coordinator, Bryan Donner, at (406) 863-5408 or reindeer@centurytel.net. Please put "WPEF" or "Whitebark" in the subject line of your e-mail. ■

WPEF's Restoration Projects: Progress Report

In the Fall-Winter 2004 issue of *Nutcracker Notes*, the Whitebark Pine Ecosystem Foundation published a request for whitebark pine restoration proposals. In September 2005 the WPEF awarded a total of \$16,000 to the two most highly ranked restoration proposals that we had received. The following is an update on these projects.

Clearwater National Forest

The Powell Ranger District was awarded a grant for \$10,000 to cage, collect and produce whitebark pine seedlings for operational planting. The proposal was submitted by Vicki Edwards, Fuels Planner, but carried out by Mark Klinke, Forest Culturist.

There was a small WBP cone crop in 2005, so no activity occurred during that field season. In July, 2006, the Powell District selected two areas to make their WBP cone collections. Collection criteria for both areas included selecting whitebark pine trees with good form and vigor that were free of white pine blister rust and mountain pine beetle. At least 20 trees were to be selected from both areas.

In the Blacklead collection area 24 trees were selected and 306 wire mesh hardware cloth cages were installed over 586 cones. At Beaver Ridge 28 trees were selected and 393 cages were installed over 885 cones. A total of more than 25 pounds of seeds was collected, and there was an average of 2600 seeds per pound.

During the first week in September the cages were removed and the cones were collected -- between 3 and 4 bushels of cones were collected from each area. The cones are being cleaned and processed at the USFS Nursery in Coeur d' Alene, Idaho. Depending on the seed yield, they will stratify and sow some or all of both seed lots this winter and have whitebark pine seedlings ready for out-planting in the fall of 2008. Seedlings will be grown for 2 years at the Western Forest Systems Nursery in Lewiston, Idaho.

Nearly all WPEF grant dollars were spent on salaries for District personnel to climb, cage, and collect the whitebark pine cones. Any unspent funds will be used to purchase seedlings. This grant will allow the District to restore whitebark pine to high elevation sites that have recent experienced high intensity wildfires.

Flathead National Forest

The Flathead National Forest was awarded a grant for \$6,000 for a proposal directed by Silviculturist Ed Lieser. Through the 2006 field season the Flathead National Forest had spent approximately \$2500 of these funds. These funds were used to collect cones from whitebark pine trees in the vicinity of previously identified "plus" trees, showing little damage from rust or other agents. The Forest used congressionally appropriated funds for the identification of plus trees and subsequent cone collection. While in the vicinity, and in conjunction with this work, Forest crews were able to identify additional cone-bearing whitebark pines and collect additional cones. Forest Service personnel identified about 25 plus trees in two new, accessible locations, and another site was eliminated for lack of plus trees. The cones collected were delivered to the Coeur d' Alene Nursery, where they will be processed to produce seedlings for out-planting. ■

Pacific Coast Conference Breaks New Ground

Ellen M. Goheen, Plant Pathologist,
USFS Forest Health Protection,
Central Point, Oregon

The conference **Whitebark Pine: a Pacific Coast Perspective** was held in Ashland, Oregon August 27-31, 2006 to provide a forum for sharing information on whitebark pine and other high elevation five-needle pines occurring in California, Oregon, Washington, and British Columbia. Conference sponsors were the Crater Lake Natural History Association, Crater Lake Institute, Whitebark Pine Ecosystem Foundation, USDI National Park Service, and USDA Forest Service. Eighty-three people registered, and almost all attended all four days of the conference.

Diana Tomback opened the conference on a warm Sunday evening with a public presentation "Whitebark Pine Ecosystems: their ecological importance and future outlook. Why all the fuss?" On Monday, fourteen invited speakers described the issues and concerns regarding whitebark pine and other high elevation pines in the region. These included an overview of the species and the threats it faces, the ecology of whitebark pine in Pacific Coast ecosystems, status as we currently know it in the region, particular influences on whitebark pine success and survival such as wildlife relationships, fire history, white pine blister rust, bark beetles, and climate change, and restoration strategies that are emerging for the Pacific Coast region.

A photo contest was held and it turned out that the winning photos, taken by Sandy Kegley, John Schwandt, and Michael Murray had all been taken at Crater Lake National Park. Monday evening ended with a spirited discussion of "Perspectives on Restoration in Wilderness" led by Doug Scott, Policy Director for the Campaign for America's Wilderness.

Tuesday was a glorious day and Crater Lake National Park was the setting for an excellent field trip that showcased white pine blister rust impacts, mountain pine beetle pheromone research, cone collection techniques, and even

8 an active wildfire just working its way into whitebark pine territory. On Wednesday and Thursday, twenty-five contributed papers and posters discussed surveys and studies done in the region. This included the latest information on white pine blister rust biology, bark beetle control, restoration projects and strategies, surveys results and methodology, climate modeling, nursery culture, and genetics.

The conference's success was apparent in the networking and new contacts it produced among the participants, who are located across a broad geographic area. Conference participants expressed a keen interest in maintaining an ongoing research and assessment program here in the Pacific Northwest, expanding that program to include working with colleagues in the Rocky Mountains, increasing the level of awareness among the public for the challenges facing our high elevation ecosystems throughout the West, finding partners with similar concerns, and working in a variety of capacities to maintain and restore these valuable ecosystems.

Abstracts from presentations will be available online at <http://www.fs.fed.us/r6/nr/fid/wbpine/> and a proceedings with extended abstracts will be available electronically this winter. ■

A Perspective from the Pacific Coast Conference

Gregory J. Ettl, College of Forest Resources,
University of Washington, Seattle

[Editors Note: The author agreed to provide this synopsis of the Pacific Coast whitebark pine conference held recently at Ashland, OR. The undated references cited come from abstracts of papers presented at the conference. See the article by Ellen Goheen for details of the conference and location of on-line abstracts.]

The conference addressed our knowledge of the ecology and threats to whitebark pine (*Pinus albicaulis*) and other high-elevation 5-needle pines in British Columbia, Washington, Oregon, and California, as well as the potential for maintaining and restoring pines in the face of these threats.

Whitebark pine is found in the upper subalpine zone from the Coastal Mountains of southern British Columbia southward through the Cascades and Sierra Nevada. It is often restricted to exposed ridges or drier sites in the rain shadow of the Coastal Mountains in British Columbia and Washington Cascades (and locally in the Olympics) due to persistent snowpack and competition from subalpine fir (*Abies lasiocarpa*) and mountain hemlock (*Tsuga mertensiana*). Whitebark pine is also an occasional, minor component of moist subalpine sites and mixed subalpine forests at somewhat lower elevations, particularly where harsh soil conditions or disturbance allows it to get established at least temporarily despite competition from several subalpine conifers.

Whitebark pine populations are typically isolated on high peaks and ridges, therefore forming a series of mountain island populations across the landscape. The Oregon Cascades, Klamath Mountains, and Sierra Nevada show increasing importance of additional white pines in high-elevation forests including western white pine (*Pinus monticola*), foxtail pine (*Pinus balfouriana*), Great Basin bristlecone pine (*Pinus longaeva*), and limber pine (*Pinus flexilis*). There has been less attention paid to the ecology of these species, but Shoettle et al. make an excellent case for proactive surveys in these ecosystems.

Whitebark pine in the Pacific region is threatened by climatic change, fire suppression, mountain pine beetles, and white pine blister rust. Blister rust is often cited as the greatest overall threat (Tomback); however interactions between drought stress, mountain pine beetles, and increased fire frequency or intensity, are presumed greater threats than blister rust in some cases. Blister rust is common throughout the Pacific Northwest, generally decreasing toward eastern Washington and south through Oregon and into California. Lower infection levels may be related to lower transmission rates on drier sites or to a more recent arrival of rust on these sites.

Blister rust is widespread but infection levels are extremely variable throughout the Pacific range of whitebark pine. Infection rates averaged about 42 percent (range 0-100 percent)

across Washington and Oregon (Doede et al.). A 30 percent infection rate was noted as bole cankers in British Columbia (Zeglan), and an average of 12 to 14 percent infection was reported in California (Kliejunas and Dunlap; Maloney and Dunlap). Blister rust has spread south into the central Sierra Nevada and is generally more common west of the crest of the Cascade Mountains (Shoal) and Sierra Nevada (Kliejunas and Dunlap).

The threat of mountain pine beetles has often been considered low in the Pacific range of whitebark pine because of lower incidence of lodgepole pine which serves as the major host. However, extensive mountain pine beetle outbreaks have been noted recently in British Columbia (Zeglan; Campbell & Carroll), and 75 percent of all whitebark pine stands in California show some mountain pine beetle activity (Maloney and Dunlap). There is concern that whitebark pine is now serving as a primary host to mountain pine beetles throughout its range and that an increase in temperature from climatic warming will exacerbate this problem (Bentz and Schen-Langenheim). Much of the Pacific range of whitebark pine is threatened by climatic warming, as whitebark pine is found at the top of many peaks, with a 70 percent decrease in suitable land projected for whitebark pine on the landscape by 2030 in response to climatic change (Warwell et al.).

Verbenone is a hormone emitted naturally by mountain pine beetles, and when a tree is occupied by a large number of beetles (beetle habitat is full), the hormone level increases, directing beetles to seek an alternative tree. Synthetic verbenone has been used to reduce the impact of beetle attacks and holds promise as a means of reducing mortality of whitebark pine from this source (Kegley and Gibson, and Progar).

Considerable energy has been devoted to growing whitebark pine nursery stock (Riley and Coumas), as a first step towards restoration. Some of the first out-plantings of seedlings occurred in 2005 near Baker City, OR (Schwandt et al.) and there is hope that this process can

help maintain whitebark pine on the landscape. The Dorena Genetics Resource Center is in the process of screening a large number of whitebark pine families for genetic resistance to blister rust, and the initial screening results demonstrate some natural resistance (Sniezko et al.). There is still uncertainty as to variation in resistance in relation to source inoculum (Kegley et al.).

I presented a model that examines the population biology of whitebark pine as a means of integrating the threats to whitebark pine and projecting populations into the future. We used field data to create a spatially explicit metapopulation model for Mount Rainier National Park using RAMAS GIS (Ettl and Cottone 2004). Our model predicts a rapid decline in whitebark pine in the park, with the population falling below 100 individuals in 148 years.

Natural progression of white pine blister rust throughout whitebark pine communities puts the species at risk of local extinction without human assistance. Propagation and planting of resistant whitebark pine hold the best prospects for maintaining whitebark pine in the Pacific Northwest. The spread of blister rust suggests a similar fate for all 5-needle high-elevation pines, and gaps in our knowledge of these systems should be addressed in preparation for the arrival of blister rust.

Ettl, G.J., and N. Cottone. 2004. Whitebark pine *Pinus albicaulis* in Mt. Rainier National Park, USA: Response to blister rust infection. In H. R. Akçakaya, M. A. Burgman, O. Kindvall, C. C. Wood, P. Sjögren-Gulve, J. S. Hatfield, and M. A. McCarthy (editors), *Species Conservation and Management: Case Studies*, Pp. 36-47. Oxford University Press, New York, N.Y. ■

10 Distinguishing Clark's Nutcrackers from Gray Jays

Diana F. Tomback

In the mountains of the western United States and Canada, the ranges of gray jays (*Perisoreus canadensis*)—also known as Canada jays and camp robbers—and Clark's nutcrackers (*Nucifraga columbiana*) overlap, making identification a challenge for "non-birders." Of course, when it comes to whitebark pine fieldwork, we are often interested in confirming that the pine's hard-working, seed-dispersing nutcracker associates are around. As we lose whitebark pine to blister rust and mountain pine beetle, there is a distinct possibility that nutcracker populations will decrease regionally.

The similarities between the two birds include size (nutcrackers from beak tip to tail tip are only about 2 cm longer); light gray body plumage; black beak, feet, and eye; and dark wings and tail, and the tendency to travel in pairs or small flocks, so it is easy to understand some confusion. There are, however, a few notable differences: The wings of the nutcracker are solid black (sometimes slightly brownish) with a conspicuous white wing patch on the trailing edge. The tail has central black feathers and outer white feathers. The head, back, and underparts of the nutcracker are light gray. In flight, the nutcracker catches your attention with contrasts—light gray body, and flashy black and white wings and tail.

In contrast, the gray jay's entire back, wings, and tail are dark gray, including the back of the head and nape; the face is light gray, matching the underparts. For the Rocky Mountain subspecies, the crown of the head is light gray, but the Northwestern subspecies has a dark crown and nape and slightly darker back and wing plumage. The nutcracker body plumage is comparatively flat and sleek, and jay plumage is visibly soft and fluffy. The beak of the nutcracker is long and pointed, whereas the gray jay's beak is short and blunt. Nutcrackers often fly well above the forest canopy; their wings are comparatively longer and adapted for maneuverability and rapid flight over long distances. Gray Jays have short, broad wings and a relatively long tail, and fly within or just above

the forest canopy; they remain within a territory much of the year.

These two species can easily be distinguished by their vocalizations alone. Gray jay calls are typically soft and reedy whistles or cackles. The typical nutcracker vocalizations are loud and raucous, often consisting of three *KRAAS*—either grating and drawn-out or rapid and sharp. Both birds actually have a broad vocal repertoire, but you need to spend time near them to hear the rarer calls.

A final similarity and difference: Whereas most WPEF readers are aware that the nutcracker caches seeds in the ground, contributing to whitebark pine regeneration, few may know that gray jays also cache food. Their unusually large salivary glands help them store food in trees. They make food, such as captured larvae, into sticky boluses and literally "glue" these to trees, on pine cones, on conifer needles, in bark fissures, and on twigs. They remember the locations of these caches, and retrieve them during the winter when other food is scarce. Gray jays are fascinating birds in their own right, but are overshadowed by the accomplishments of their distant relative the Clark's nutcracker. ■

Restoration Burn Conducted in Northern Idaho

Art Zack, Gail Aschenbrenner West, and Dan Myers, Idaho Panhandle National Forests, Coeur d'Alene

In late September 2006, the Bonners Ferry Ranger District of the Idaho Panhandle National Forests completed a 1,030 acre prescribed burn that was the last major phase of a multi-year project to restore whitebark pine communities in part of northern Idaho's Selkirk Mountains. The impetus for this project is the alarming mortality of whitebark pine in the northern Selkirks, which contain the largest and most continuous whitebark pine population remaining in Idaho north of the Clearwater River.

Background

Whitebark pine grows in some of the harshest environments capable of supporting forests, and provides important and unique eco-

system functions in those areas. In recent decades, whitebark pine has suffered dramatic range-wide declines due to the combined impacts of the introduced white pine blister rust, fire suppression, and outbreaks of mountain pine beetles. Until recently, whitebark pine had been suffering a slow decline in the Selkirks due to blister rust and fire exclusion, but had largely escaped major beetle epidemics. In late summer 1999, Forest Service aerial surveys discovered a rapidly building mountain pine beetle outbreak in the Selkirks that was accelerating whitebark pine mortality. Forest Health Protection specialists installed monitoring plots in the outbreak area. By 2003, across all the plots, an average of 62 percent of the whitebark pine was dead, and almost two-thirds of those had been killed by mountain pine beetle within the previous two years. There has been substantial additional mortality since 2003.

In response to the dramatic decline in whitebark pine, the Idaho Panhandle Forests decided to prioritize a whitebark pine restoration project while there was still sufficient natural seed source to be successful. Project goals included: restoration and maintenance of resilient, self-reproducing whitebark pine forests consistent with the historic range of variability; reintroduction of fire to provide opportunities for whitebark pine regeneration, to reduce fuel continuity, and to maintain other ecosystem functions; and providing for wildlife habitat diversity.

The project was complex because it was largely in roadless country highly valued and heavily used for backcountry recreation, and large parts of the area are considered habitat for grizzly bear, lynx, or caribou habitat. Approximately 11,000 acres were originally identified with some potential for whitebark pine restoration. After detailed environmental analysis of all the resource values and trade-offs, 1,700 acres were chosen for possible treatment at this time.

Prescriptions were designed to reduce competition from subalpine fir and spruce, and to provide opportunities for natural regeneration of whitebark pine, with the primary objective of returning whitebark pine to its historical abundance. The 1,030 acres burned will provide favorable seedbeds for the natural regeneration

from nearby whitebark pines that have survived decades of exposure to blister rust. Restored whitebark pine will resume its historical functions by eventually furnishing seeds as a food source for Clark's Nutcrackers, squirrels, grizzly bears, and many other birds and rodents; by indirectly supporting a prey base of Canada lynx and fishers; and by providing habitat for numerous species of migratory birds.

Treatments

Restoration treatments began in 2005 and 2006 by slashing approximately 25 to 50 percent of primarily small subalpine fir in six treatment areas scattered across ridges of the northern Selkirk Mountains near Ball Lake, Big Fisher Lake, Farnham Ridge, Russell Peak, Burton Peak, and Cutoff Peak. Targeted trees, less than 5" dbh, were slashed in irregular patches of two- to five-acres and left on the ground to create fuel beds for surface burning. No whitebark pines were slashed. No slashing occurred adjacent to live, mature whitebark pines. An additional smaller area is scheduled for slashing next year to release existing young whitebark pines from competition.

No fire lines were constructed. Burn units were primarily on south or west aspects and employed ridgelines, aspect changes, and other natural features as barriers to fire spread. The prescribed burn was implemented on September 29, 2006. Fuel moistures prior to ignition were 16 percent or more for 10-hour fuels (sticks 1/4 to 1 inch thick), while fuel moistures for the older, down decadent fuels were less than 6 percent. The spot weather forecast predicted temperatures up to 67 degrees F, up-slope/upvalley winds 3 to 6 miles per hour, and relative humidities of 33 to 35 percent throughout the burning period. The last measurable rain prior to ignition had fallen 10 days earlier.

Two helicopters were used for aerial ignition, dropping ping-pong ball igniters. The six burn units were ignited along ridgelines and then fire was applied downslope in horizontal strips ("strip head fire"). Firing began at noon and was completed by 2:00 p.m.

Four of six units burned well, creating several large openings in each, and a mosaic of

12 numerous small patches for natural regeneration. Two units did not burn as well, but did create small, scattered canopy openings. The fires stayed well within prescription boundaries, and the adjacent mature whitebark pine that had survived the beetle outbreak still remain to provide a natural seed source. It appears that adequate natural seed source remains. Follow-up regeneration surveys and monitoring will verify that.

Costs for the multi-year whitebark pine restoration project, including helicopter operations in slashing/burning, were approximately \$165,000. Funding was largely provided by a mixture of Forest Health Protection and Fuels programs.

In summer 2007, Idaho Panhandle National Forest employees will begin monitoring the whitebark pine treatment areas. Within the burn areas, it is expected to take several years for adequate whitebark pine natural regeneration. If treatments are successful, restored whitebark pine will continue to fill its role in these harsh, high-elevation environments by reclaiming its dominance and trending forest composition and natural fire regimes toward more historic conditions.

Acknowledgments

This project's success depended on teamwork. Credit goes to Ranotta McNair (Forest Supervisor), Mike Herrin (District Ranger), and Tom Martin (Forest Silviculturist); Bonners Ferry District Silviculturists Pat Behrens and Don Gunter; Lydia Allen, Pat Cooley, and Maridel Merritt for the Environmental Analysis; Kirk Westfall and Dan Myers for planning and implementation; Bonners Ferry District saw and fire crews for hard work on the ground; and Forest Health Protection Specialists Carol Randall, Sandy Kegley, and John Schwandt for critical advice. ■

Special Assignment: Assess Whitebark Pine

John Schwandt, Pathologist,
USFS Forest Health Protection,
Coeur d'Alene, Idaho, Field Office

I just spent the last 16 months on a special whitebark pine assignment for the Washington Office of Forest Health Protection. This was a result of a prior study that showed all five-needled pines (white pines) were at risk (Samman et al. 2004). My job was to:

- Compile a range-wide health assessment of whitebark pine
 - Compile restoration strategies for managers
- Describe information needs and challenges to restoration

This was a challenging assignment, but I found a great number of resource specialists from several agencies that shared data and experiences with me and my final report, *Whitebark Pine in Peril: A case for restoration* (Schwandt, 2006), is a tribute to their generosity. Copies are available from my office (e-mail: jschwandt@fs.fed.us).

Summary of Results

Although there has been no range-wide systematic health assessment for whitebark pine, many surveys have found that this species is in peril in much of its range. (Whitebark pine has disappeared from as much as 98% of its potential habitat in northern Idaho.) This is due to a combination of several factors including white pine blister rust, competing vegetation, fire, and bark beetle outbreaks. All of these factors may be exacerbated by climate changes.

White pine blister rust is a primary concern because this introduced disease has radically altered historical regeneration pathways by quickly killing small trees as well as causing mortality or reduced cone crops in large trees. Infected trees have been found in all but the very southern tip of its range in the southern Sierra Nevada in California. Although surveys have found wide variation, infection levels are generally lower in drier habitats, and blister rust continues to spread and intensify. Hopefully additional permanent monitoring plots will help to explain this variation as well as provide additional information on spread, intensification, and mortality rates.

Fortunately preliminary testing has found

some trees have natural resistance to blister rust, and efforts are underway across the range to find trees without blister rust to test for resistance. However, we know very little about the genetic basis for rust resistance or its frequency within a population. Resistance testing is essential but is a difficult task since much of the whitebark is in remote areas with limited access, and cones must be caged during the summer to protect the seed from Clark's nutcrackers and squirrels.

Although whitebark pine is largely dependent on fires to create planting sites and reduce competing vegetation, especially in the Rocky Mountains, wildfires have burned entire populations in some remote areas. Fire suppression in some areas is preventing the natural role of fire and accelerating conversion to competing vegetation. Therefore, prescribed fire and wildland fire are key tools for restoration and need to be encouraged where ever possible.

The urgency for restoration in some areas has been increased by recent outbreaks of mountain pine beetle which has killed thousands of mature trees, some of which may carry natural resistance to blister rust. Although mountain pine beetle is a native insect and outbreaks in the past have been documented (Perkins and Sweetnam, 1996), the current outbreaks have been more intense due to warm winters which have reduced beetle mortality and have allowed beetles to complete their life cycle in a single year rather than two years (Logan and Powell 2001). However, pheromones are being developed and are showing promise of protecting high value individual trees.

It is clear that without active management, losses will continue. However, we can change this trend by implementing restoration strategies that will:

- accelerate selection of natural blister rust resistance
- promote natural regeneration in areas with low levels of blister rust
- prevent bark beetle attacks on plus trees or other valuable individuals
- reduce competing vegetation

Managers need to select and prioritize these strategies based on stand conditions, whitebark pine health, and management objectives. The ultimate goal of restoration is to increase the proportion of trees with natural resis-

tance that will survive in the presence of blister rust. Successful restoration will take a long time and will require range-wide, coordinated multi-agency efforts with a long-term commitment. However, if we can foster enough rust resistant whitebark pine in an area, it may be possible for natural processes to eventually resume restoration. Therefore it is critical that implementation of restoration efforts be given high priority by land managers. I hope that the summary of restoration strategies in my report (Schwandt 2006) can be used to encourage these efforts and that funding for whitebark pine restoration will become a reality. If additional funding does appear, we will need to demonstrate accomplishment and find collaborative projects that will leverage these dollars to accomplish even more.

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Collecting A Whitebark Snag for Visitor Center Display

Jane Kapler Smith, Fire Sciences Laboratory,
Rocky Mountain Research Station,
Missoula, MT

An educational display entitled “Whitebark pine forests—High country tapestry of life” is being assembled at the Montana Natural History Center (MNHC) in Missoula. It will include a whitebark pine snag and several animal specimens (two grizzly bears, a Clark’s nutcracker, and a red squirrel), arrayed in front of a large photo of whitebark pine habitat.

Collection of the whitebark pine specimen turned out to be quite a challenge. We had to locate a snag that showed the beauty of aged wood and the crown structure of whitebark pine, but it had to fit into an indoor space 13 feet wide and 15 feet high. We had to find the specimen in a place where removal was acceptable and practical, and we had to get it from the collection site to the Natural History Center without breaking it apart.

The closest whitebark pines to Missoula are on Point Six, a rocky summit a few miles north and rising more than 4,500 feet above the city. Fortunately for us, Point Six has excellent road access because it is part of the Snow Bowl ski area and hosts a huge National Weather Service satellite receiver. The area accessed by the road is on the Lolo National Forest where harvesting specimens is permitted. On June 21st, when deep snowdrifts still blocked the last half-mile of road, Steve Arno and I went searching for the perfect snag—beautiful, small, and close to the road.

“Small” turned out to be the most challenging aspect of selection. Hundreds of snags towered above us as we explored the hillsides around Point Six, but the smallest were 25 to 30 ft tall. To fit one of these under a 15-foot ceiling, we could either cut off the top and lose its intricate branching and lichen garlands, or we could cut off the bottom and have a specimen that resembled a very tall, dead bush. We marked several snags but were undecided about which could be collected safely and removed with the crown intact.

A later field trip with John Waverek and Gary Lynam of the Lolo National Forest

confirmed that the marked specimens were on National Forest land and that removal was acceptable. On this trip, we located a cluster of snags standing among live subalpine firs within the “V” of a road switchback. They were small relative to the rugged sentinels originally considered, but they would be imposing when displayed alone, indoors.

How can you drop a snag without shattering its crown? This problem stalled the project until August, when Martin Cook, a tree surgeon from Able Tree Service in Missoula, agreed to do the work. September 7 was selected as “collection day.”

We decided to collect four snags in hopes that at least one would arrive at the Natural History Center unbroken. Martin and his assistant drove to the snag location with a pickup and their 25-foot trailer equipped with a long-armed grapple loader. They set up cables between live trees to secure each snag, cut and lowered it gently to the edge of the road, wrapped the bole to protect the bark from the grapple, then loaded it onto the truck. They secured the load with webbing rather than cables and chains (again protecting the wood), then drove slowly back to Missoula to minimize bumps and breakage. Damage to the snags was minimal. They arrived intact, with bark unscarred and most of their chartreuse lichens still in place.

Gabrielle Sivitz, the Natural History Center’s display manager, is now working to secure the most dramatic of the four collected snags inside the Center. She will also include portions of the other snags, a large, hollow whitebark pine log, and squirrel midden material. Wendy Smith, graphic designer for KLB Exhibits, Inc., is finishing the floor plan and completing the graphics. Text was written last winter and reviewed by several members of WPEF. We are still seeking funds to produce the graphics once design is complete, but we hope to have the display completed by the end of January, when it will be ready for a visit from WPEF members to inspect during a break at their winter board meeting. If you’re interested in progress of the exhibit or want to visit the Natural History Center on your own, please do! It is open Tuesday through Friday from noon to 5:00 and Saturday from noon to 4:00, and is located at 120 Hickory Street, near McCormick Park, south of the Oranger Street Bridge in downtown Missoula. ■

Survey of Whitebark Pine at Crater Lake National Park

Carrie Wittmer, Asst. Professor
Oregon Institute of Technology, Klamath Falls

Visitors from around the world congregate year-round at Rim Village in order to gaze in wonder at the stunning beauty of Crater Lake at Crater Lake National Park in Oregon. During the summer months, they stroll along the promenade from West Rim Drive up to the historic Crater Lake Lodge. Thousands of photographs of the lake are framed by the crooked, bent, and wind-whipped boughs of the 5-needled whitebark pines. These trees cling to the northern aspect of the stone wall built by the Civilian Conservation Corps in the 1930's and some hang precipitously out over the caldera rim. Clark's nutcrackers croak and cry overhead to each other as they pick at cones high in the trees for seeds. Whether visitors recognize the trees as whitebark pines or not, the trees (and the birds) are an integral part of both the historic and aesthetic beauty of the visitor's experience.

Whitebark pines at Crater Lake National Park, however, have been impacted by the combined effects of fire suppression, mountain pine beetles, dwarf mistletoe, and white pine blister rust. Infections and spread of the non-native blister rust are of special concern. Land managers predict that without comprehensive management intervention, whitebark pines face "continuous decline, functional extinction, and local extirpation" (Kendall & Keane, 2001, p. 237). Because whitebark pine is considered a keystone species for subalpine ecosystems, the loss of these important trees may also cause population declines for other species.

As outlined in the "Status of Whitebark Pine in Crater Lake National Park" by Murray and Rasmussen (2003), one of the key components of managing and mitigating whitebark pine loss, both at Rim Village and in the entire park, is mapping and monitoring the park's trees. Toward this end, a survey was conducted in July, 2006 to assess and map both the live and dead whitebark pines at Rim Village.

Over three days of surveying, each whitebark pine along the 2700-foot promenade at Rim Village was assessed and recorded in a spread sheet. (Because of the dangers involved in

scrambling down the side of the caldera, whitebark pines on the steep slopes of the Crater Lake caldera were not inventoried.) Rim Village trees were recorded as either alive or dead; location was noted using a GPS device; height, diameter, maximum and minimum crown widths, live crown ratio, height to live crown, and number of cone clusters were measured and recorded. A photo was taken. Inactive and active blister rust cankers and other damage to the tree were recorded.

Of the 124 trees found along the promenade 71 percent were alive and 29 percent were dead. Of the total number of whitebark pines along the promenade, 19 percent of the trees were infected by white pine blister rust, indicated by either active cankers, stem swelling and orange football-shaped aecia, or by blistering caused by old cankers. This infection rate compares with the 20 percent infection rates found in the park-wide survey of whitebark pines in 2003 (Murray & Rasmussen).

Monitoring and mapping whitebark pines at Crater Lake is only part of an overall management plan to mitigate the impacts on this species. Two other essential components to preserving whitebark pine's long term viability are fire use and propagating rust-resistant trees.

Because of its clear mission "...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (National Park Service Organic Act, 16 U.S.C.1.), the National Park Service is in a good position to use fire to preserve and restore whitebark pine ecosystems. Fires can reduce competition from other trees species but also provide preferred seed caching areas for Clark's nutcrackers. Crater Lake National Park is currently experimenting with fire use to restore the park's ecosystems which are evolutionarily adapted to periodic burning from lightning ignitions. The Bybee Fire Complex is the first "fire use" fire being allowed to burn inside the park. It started in July 2006 and eventually expanded to 2,900 acres.

Additionally, in 2003, whitebark pines at Rim Village were assessed for resistance to blister rust. Ten trees with few or no blister rust cankers were identified and their cones were

16 harvested in late September. The seeds are being germinated at the USDA Forest Service's Dorena Tree Improvement Center near Cottage Grove, OR. The seedlings will be tested for resistance to blister rust, and hopefully resistant seedlings can be transplanted back into the park, or seeds from resistant trees can be used to regenerate the seedlings in white-bark pine habitat.

It is uncertain in this case whether human efforts can ultimately reduce damage from white pine blister rust. However, if nothing is done, whitebark pines at Crater Lake National Park and in many other locations likely face disastrous decline in the not-very-distant future. Hopefully, as a result of well-designed monitoring, research, and restorative management, whitebark pines will continue to frame visitor photographs of Crater Lake well into the future. ■

Dave Campbell Earns Chief's Award



Dave Campbell (at left in photo), District Ranger on the West Fork District of the Bitterroot National Forest recently received the first National Wilderness Fire Management Award from Dale Bosworth, Chief of the USDA Forest Service. Dave is a member of WPEF and a

strong proponent of returning fire to whitebark pine ecosystems. The Chief's National Wilderness Awards recognize those who have made outstanding improvements to public service, championed new techniques or ideas in wilderness stewardship, and who have made significant overall improvements to the wilderness resource.

This award is made in recognition of Dave's leadership in the application of wildland fire use on both the Selway-Bitterroot and the Frank Church River of No Return Wildernesses. Dave has actively promoted wildland fire use, including use of lightning fires in the whitebark pine ecosystem. He is recognized nationally as a fire management leader. He collaborated with the University of Montana to field test innovative

new techniques to monitor wildland fires, coordinated with the Montana Department of Environmental Quality to monitor air quality in the Bitterroot Valley during fire seasons, and worked with outfitters and guides to mitigate disruptions to their businesses from wildland fire use. He initiated a well-publicized celebration for the 30th Anniversary of the first wildland fire event (prescribed natural fire), which occurred at White Cap Creek on the Selway-Bitterroot Wilderness. ■



FIG. 10.—*Pinus aristata*: a, seed.

Historic First Election for Whitebark Pine Ecosystem Foundation

As noted in the Spring/Summer 2006 issue of *Nutcracker Notes*, the first-ever bylaws for the WPEF were approved by the membership. With the ratification of the bylaws, a number of actions are now set in motion for the Foundation, and one of the most critical actions is the election of Board Members and Executive Committee officers.

Board members and officers commit to working collectively to advance the business of the WPEF and the conservation and restoration of high elevation pines. This includes attending two board meetings per year, one of which is usually in early March in Missoula, MT, and the second is in conjunction with the annual WPEF science meeting and field trip in late September. To find out more about the duties of these positions, please refer to the back of this form, and/or consult the WPEF Executive Handbook on the website www.whitebarkfound.org.

Diana F. Tomback, WPEF Director

Nomination Form – Whitebark Pine Ecosystem Foundation

Nominations are being sought for the following four (4) positions, to begin serving on the Board of Directors in September, 2007:

- Director – 3-year term
- Secretary – 3-year term
- Board Member – 2-year term
- Board Member – 2-year term

RULES:

- All board members can serve up to 3 terms consecutively, i.e. 9 years in a row for executive committee (Director, Secretary) and 6 years in a row for general board members [Bylaw E(h) & E(i)].
- All nominees must be members of the WPEF in good standing [Bylaw F(b)(iv)].
- Any nomination must be made by two members in good standing [Bylaw F(b)(i)]; signatures can be on one form, or on separate forms.
- Any nomination must be signed by the nominee, indicating consent [Bylaw F(b)(i)]; this signature can be on the same form as a nominator, or on a separate form.
- Only one nomination is allowed per form. If more forms are needed, they may be copied or downloaded from our website <www.whitebarkfound.org>
- Nominations must be mailed, postmarked no later than **February 01, 2007**, to the Whitebark Pine Ecosystem Foundation, P.O. Box 16775, Missoula, MT 59808.

We, the undersigned, nominate _____ for the position of Director ____, Secretary ____, Board Member ____ [please check the ones that apply].

Nominator #1: _____
Signature *Print Name*

Nominator #2: _____
Signature *Print Name*

Nominee: _____
Signature *Print Name*

The purpose of the Board of Directors (BOD) is to make decisions affecting the general membership of the WPEF. These decisions include matters of WPEF policy, initiatives, finances, and problem-solving.

1. Responsibilities of the Director of the WPEF

General

- Oversight of all WPEF activities
- Interface with external constituencies on matters relating to WPEF & whitebark pine
- Oversee fund-raising & public relations
- Participate in meetings; make presentations at important events relative to WPEF mission
- WPEF will provide reimbursement for activities that are of impact to WPEF and not funded by external sources, including airfare to BOD meetings twice per year

Specific

- Call and lead board meetings twice a year
- Develop agenda for board meeting and for annual members meeting
- Propose and call for initiatives meeting WPEF mission
- Follow potential leads for fund-raising and initiatives

2. Responsibilities of the Secretary

- Serve as the Election Official for all voting activities
 - Notify membership of each ballot
 - Collect and organize all completed ballots
 - Report to the BOD on election results
 - Store all ballots and results & compile a report on voting activities for newsletter
- Maintain WPEF bylaws and handbook
 - Record any changes as approved by the BOD
 - Update the bylaws or handbook
 - Post changes to website and newsletter
 - Create a ballot if changes to bylaws are warranted
- Record all activities of the Executive Committee and BOD
 - Attend BOD meetings and record minutes; record e-mail votes
 - Compile a record of all e-mails, letters, and web postings

3. Responsibilities of a general member of the WPEF Board of Directors

Members of the WPEF Board of Directors (BOD) that are NOT members of the Executive Committee have the following responsibilities:

- Attend all BOD meetings
 - If it is impossible to attend, the BOD member must notify the Chair of the Executive Committee as to their absence
 - Attendance can be in person or via a conference call
- Attend all WPEF annual meetings
- Participate in WPEF activities when appropriate
 - Form Working Groups
 - Organize annual meetings
 - Volunteer for Evaluation Committee
 - Perform fundraising as needed
 - Other tasks as needed



Whitebark pine restoration burn in northern Idaho—
see article on page 10. Art Zack, USFS photos



Helicopter used to ignite the burn.

6th Annual Meeting Whitebark Pine Ecosystem Foundation Hailey, Idaho

Bureau of Land Management
www.id.blm.gov

Whitebark Pine Ecosystem Foundation
www.whitebarkfound.org

Banner designed by Antonia Hedrick for September 2006 meeting.

Field trip to Galena Summit.
Donovan Gross, Utah State
University, discussing mountain
pine beetles at
a study tree with a beetle
emergence trap mounted on it.
Cyndi Smith photo



Loading whitebark snags for display.
See article on page 14.
Jane Kapler Smith photo