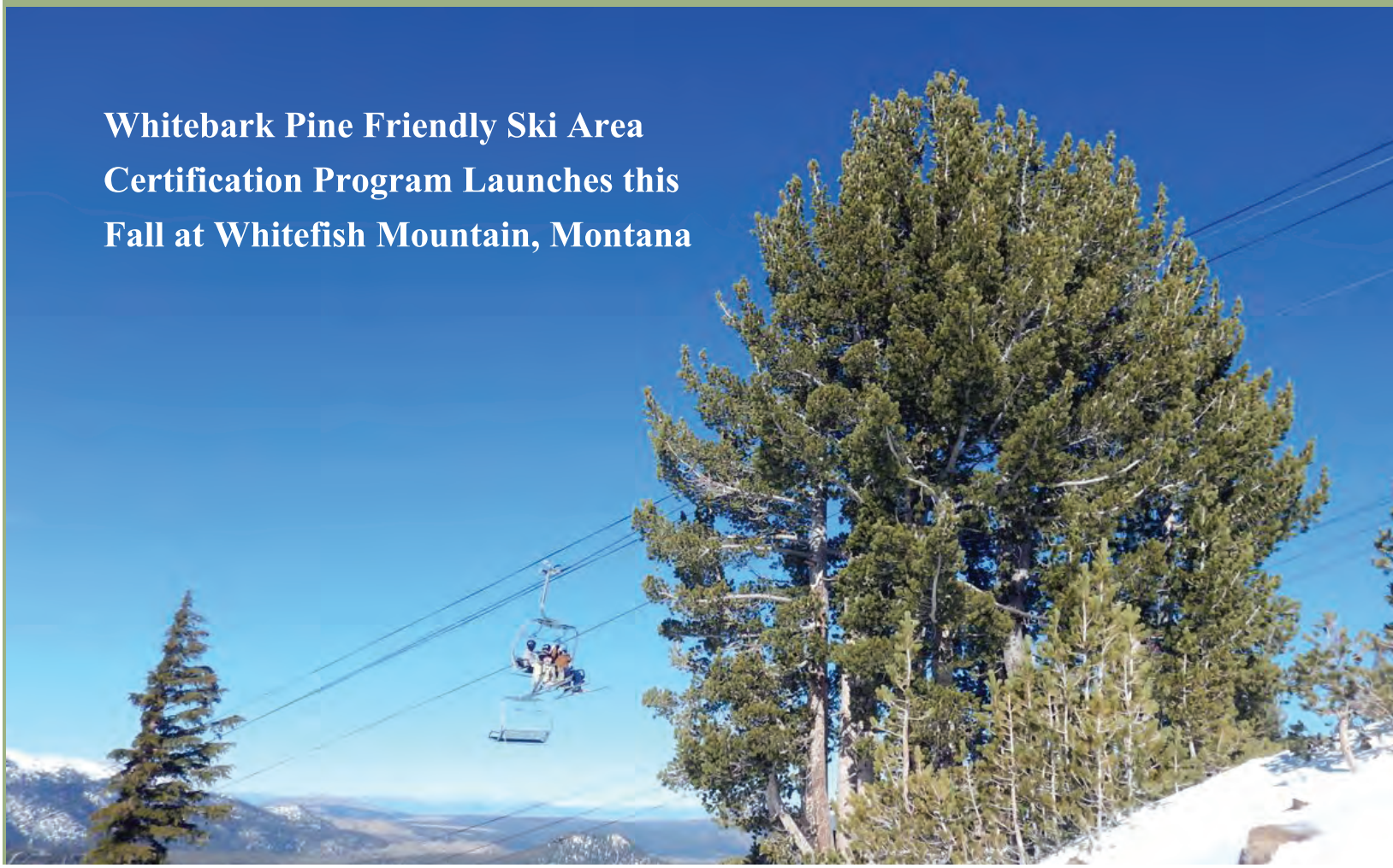
Issue No. 30: Spring 2016

nutcracker notes

JOURNAL OF THE WHITEBARK PINE ECOSYSTEM FOUNDATION



Whitebark Pine Friendly Ski Area Certification Program Launches this Fall at Whitefish Mountain, Montana

By Edie Dooley

Ski Area Partnerships Committee Chair & WPFSA Certification Coordinator

Where do most of the general public encounter whitebark pines? Ski areas! These recreational areas in high elevations allow many to encounter an otherwise remote and wilderness species. This accessibility of whitebark pines at ski areas serves as the motivation behind the Whitebark Pine Ecosystem Foundation's Whitebark Pine Friendly Ski Area (WPFSA) certification program. This

SKI continued on page 4

OUR MISSION

The Whitebark Pine Ecosystem Foundation is a science-based nonprofit organization dedicated to counteracting the decline of whitebark pine and enhancing knowledge of its ecosystems.

WHITEBARK PINE
ECOSYSTEM FOUNDATION

WHITEBARK PINE
ECOSYSTEM FOUNDATION

Inside *Nutcracker Notes*

FOUNDATION NEWS

ARTICLES

WHITEBARK PINE FOREVER
Restoration Fund Campaign

How can you help? Donate now to fund restoration projects such as:

- Plant whitebark pine seedlings
- Collect whitebark pine cones for future seedlings
- Grow blister rust resistant trees in whitebark pine seed orchards
- Protect high value whitebark pine trees from bark beetle attacks
- Remove other trees from growing whitebark pine

Go to our website whitebarkfound.org and donate NOW to Whitebark Pine Forever.

DIRECTOR'S MESSAGE - WHITEBARK & LIMBER PINE RESTORATION INITIATIVE IN THE "CROWN"

Diana F. Tomback

A major initiative is just underway to restore whitebark pine and limber pine in the Crown of the Continent Ecosystem (Crown), and the Whitebark Pine Ecosystem Foundation is one of the participants in this effort. This initiative will be guided by a "High Five" Crown-wide working group. The first organizational meeting was held in Fernie, B.C., this past March, in association with the Crown Managers Partnership, a collaboration among the different governmental jurisdictions across the U.S. and Canadian boundary. The Whitebark Pine Ecosystem Foundation has long advocated for whitebark pine restoration in the Crown.

Why this region?

The Crown of the Continent, also known as the Northern Continental Divide Ecosystem, occupies about 72,000 km2 (28,000 mile2) along the spine of the Rockies in northwestern Montana and adjacent areas across the Canadian border in British Columbia and Alberta. This geographic region is rich in biodiversity, with largely intact wildlands, and keystone and apex predators, including wolves and grizzly bears. But, this region also has the most rapidly declining, unhealthy, and least functional whitebark pine communities in all of North America. The limber pine populations in the Crown are also in poor condition.

Why are whitebark pine populations so precarious in the Crown?

This region sustained two major mountain pine beetle outbreaks—the first in the 1930s and 1940s and second in the 1960s and 1970s—which killed massive numbers of mature whitebark pine, leaving a legacy of weathered whitebark pine tree skeletons--the 'ghost forests' still standing today. Recent mountain pine beetle outbreaks have added to the losses. In 1939, *Cronartium ribicola*, the introduced pathogen that causes white pine blister rust, was first detected in western white pine in Glacier National Park, but the pathogen was found on *Ribes* spp. in the region a decade or so earlier (Mielke 1943). The Crown climate has been generally favorable for *C. ribicola* spore production, leading to the spread and intensification of infection by the pathogen for more than 75 years.

A recent survey of whitebark pine in the southern Canadian Rockies, including Waterton Lakes National Park, indicates an average blister rust infection level of 83% (Smith et al. 2013). This means that the majority of living whitebark pine has a poor prognosis. Whitebark pine cone production in this region is already low, and stand visitation by nutcrackers has become unreliable (McKinney et al. 2009, Barringer et al. 2012).

Management in the Crown region is complex, involving two countries and many different jurisdictions and land use designations, including tribal governments; Parks Canada, the National Park Service; the U.S. Forest Service and multiple national forests and wilderness areas; state and provincial parks and lands; and private holdings. The Crown Managers Partnership, composed of leaders or representatives from these various jurisdictions, has worked collaboratively on shared ecosystem management concerns for years. During this time, many whitebark and limber pine restoration activities have been implemented by several of these different entities, including planting seedlings, monitoring and inventory, identification of plus trees (potentially resistant to blister rust), cone collections, and burning and thinning projects. These efforts would greatly profit by an overarching conservation and restoration plan and shared resources.

This major organizational effort is in its infancy and under the leadership of Regan Nelson, of the Crown Conservation Initiative. The second organizational meeting will take place in White Fish, MT, in September along with our annual WPEF Science and Management Workshop.

References

Barringer, L., D. F. Tomback, M. B. Wunder, and S.T. McKinney. 2012. Whitebark pine stand condition, tree abundance, and cone

TOMBACK continued on page 23

Randy Moody

DIRECTOR'S MESSAGE

Whitebark Pine Ecosystem Foundation Of Canada

www.whitebarkpine.ca

It has been a very productive winter for whitebark pine, with a well attended workshop, some operational planning, and some very promising work materializing for recovery efforts.

From an organizational perspective, the Whitebark Pine Ecosystem Foundation of Canada was fortunate enough to be evaluated by the Columbia Basin Trust's Non-Profit Advisor Program. The results of this program are just coming in now, but we are hoping the recommendations will help us become a more effective group in the future. The results of this evaluation will be posted on our website.

The Crown Managers Partnership hosted a meeting in Fernie, BC, which was attended by many Canadians and Americans alike, with both WPEF and WPEFC co-sponsoring the event. Although I was not personally in attendance, it seems that many strategic alliances were made with numerous working groups formed in order to address whitebark pine within the Crown of the Continent. Let's hope these newly formed working groups can gain some traction and have some real impact in one of the hardest hit areas across the entire range of whitebark pine.

Dave Kolotelo and his colleagues at the Tree Seed Centre in Surrey have been working hard to bring whitebark pine into the modern era in terms of registering and tracking seeds as they do with other conifers in the province of BC. Although there are still some growing pains with how whitebark pine is registered, I advise anyone interested in deploying seed onto Provincial lands in BC to contact Dave for appropriate registration methods so the seed can be properly tracked. One bonus of registration is that your seeds are x-rayed, providing some indication of the seed quality and potential for germination; a real bonus when projecting seedlings from a given seedlot.

We were recently contacted by American Forests representative who indicated they were looking to support some whitebark pine restoration planting in Canada. Fortunately there is a small planting project planned by the Lillooet Tribal Council (LTC) next year and we were able to work the two groups together to include the contribution from American Forests. Hopefully this initiative is just the start of many to come with American Forests and the WPEFC and LTC are grateful for their contribution to the project.

And finally, some exciting news out of the Coast Mountains, the Fish and Wildlife Compensation Program is funding a small Clark's Nutcracker study being led by Ken Wright. This study will draw from methods used in the U.S. in an attempt to look at Nutcracker occupation of various whitebark pine stand types. This is the first study of nutcrackers in Canada that I'm aware of and is hopefully an indication that the whitebark pine ecosystem is finally getting the attention it needs and perhaps we can expect greater support in the future.

Whitebark Pine Friendly Ski Area Certification launches at Whitefish Mountain Resort this Fall

SKI continued from front page

program is essentially an ecolabel to indicate that a given ski area acts as a good steward of their whitebark pine population by educating the public about whitebark pines, and by conserving and/or restoring their local population. The Foundation is pleased to announce that four years after the conception of the Certification program idea, it will launch at Whitefish Mountain Resort during the annual Science and Management Meeting, September 16-17, 2016.

The certification program is designed to satisfy four goals:

- Recognize ski areas that are leading the way in whitebark pine conservation and management by heralding their efforts to the people who live and play in the mountains of western North America.
- Increase awareness among ski areas and their patrons of issues surrounding the decline and conservation of whitebark pine.
- Guide ski areas in their efforts to conserve and restore whitebark pine.

WHITEBARK PINE
FRIENDLY SKI AREA

- Provide an opportunity for ski areas and their patrons to become involved in the charge to save whitebark pine by becoming directly involved in education, conservation and restoration efforts or through monetary donations.

The structure of the certification program is a checklist with mandatory actions, as well as optional actions to provide the resorts leeway in choosing an action to best complement their unique goals and resources. The actions fall into three categories: Education, Conservation, and the combined category of Management, Restoration and Research.

Prior to starting graduate school, I had never seen or heard of whitebark pine, until I began my Master's in Forestry focused on the interaction of mountain pine beetle and white pine blister rust in whitebark pine's decline. Since I was studying the decline of the species, I took it for granted that stands I snowboarded through in Montana were filled with dead trees. For me, mountaintops covered in dead trees was the status quo.

One day, I had the nostalgic and somewhat tragic thought, "What did these mountains look like before blister rust, and before mountain pine beetles prospered at this elevation?" This question made me realize that I had never seen a healthy whitebark pine stand. Then, I wondered if mine was a typical experience; do the dead trees register to the general public as an ecological calamity? Do people think that the trees are dead because high elevations are just a tough place to live, and assume mountain tops covered in dead trees are "normal"?

SKI continued on next page

SKI continued from previous page

I worried that the people who love the high elevations might be recreating amidst the deterioration of an incredible, important ecosystem and not even realize it. I resolved to change that by creating the WPFSA ecolabel to teach patrons of ski areas about whitebark pines and their decline. I hoped awareness would create a call to action to donate and help restore whitebark pine, while at the same time incentivizing and recognizing resorts who steward the whitebark pines gracing their slopes.

Whitefish Mountain Resort in Whitefish, Montana, will be the first certified Whitebark Pine Friendly Ski Resort. Whitefish Mountain Resort has been managing their whitebark pines for years, thanks to a productive and longstanding relationship with the Tally Lake Ranger District of the Flathead National Forest. Whitebark pine cone collection at the resort started way back in 1994 under silviculturist Ed Lieser. Today, Karl Anderson oversees the program which has expanded to collection from as many as 26 trees in one year! Whitefish also has a mountaintop education center run by the Forest Service which features information about whitebark pine including live branches and cones from trees that had toppled over or were removed for safety purposes. When I asked Whitefish Mountain Resort Operations manager Chester Powell why they are working to achieve WPFSA certification, he responded, "We are good stewards of the land. That is an important aspect of our management, and we want to be recognized for that." He also explained how programs like this help build relationships so that the community trusts the resort on important decisions about land management or expansions.

Fostering relationships is a big part of what the certification will achieve. Since most ski areas where whitebark pines occur are on federal land, vegetation management within the resort must be approved by the Forest issuing the special use permit under which the ski area operates. Therefore, most resorts need to work with the Forest Service to do any of the restoration, management or conservation actions in the checklist. The WPFSA Certification Program provides structure and motivation for ranger districts and ski areas to build productive partnerships to restore and conserve whitebark pines where relationships do not already exist.

It's an exciting time for whitebark pine restoration, and interest in the program is growing organically. Within the past six months, four resorts have contacted the foundation on their own about gaining certification. This indicates that the program is fulfilling

SKI continued on page 24

Accelerating the Restoration and Conservation of Five-Needle Pines in the Crown of the Continent Ecosystem

By Regan Nelson

Crown Conservation Initiative

The Crown of the Continent ecosystem (Crown) encompasses 18 million acres along the shared Rocky Mountain region of Montana, British Columbia and Alberta. It is anchored by the Waterton-Glacier International Peace Park and extensive adjoining tracts of publically-managed lands in both Canada and the U.S. With no known extinctions, the Crown is one of North America's most intact, ecologically diverse landscapes. Yet it is also a fragmented by a plethora of boundaries and borders: with at least eight Tribes and First Nations; two countries; two provinces and one state; federal, provincial, state and private lands, conserving the ecological integrity of the shared Crown landscape is no easy feat.

Recognizing the need to manage toward a shared vision of ecological integrity at the large landscape scale, the Crown Managers Partnership (CMP) was formed in 2001 to explore partnering across international boundaries to address common ecological challenges. The CMP is a multi-jurisdictional partnership amongst federal, state, provincial, tribal and First Nation agency managers and universities. In 2014, a new partnership between the CMP and environmental NGOs, including the Crown Conservation Initiative and The Wilderness Society, was born to focus explicitly on shared conservation priorities highly threatened by rapid climate change.

This new agency/NGO partnership, called the Crown Adaptation Partnership, brings together managers and stakeholders across all jurisdictions to establish a shared understanding of climate change threats, identify effective climate change adaptation strategies, catalyze management action, and enhance shared learning through an adaptive management approach. The Crown Adaptation Partnership's priorities emerged from a 2014 workshop where multiple stakeholders identified several conservation targets of concern, including whitebark pine and limber pine.

From March 15-17, 2016, the Crown Adaptation Partnership convened a workshop, co-hosted by the Whitebark Pine

CROWN continued on next page

WPEF co-hosted a workshop March 15-17, 2016, with the Crown Adaptation Partnership called: "We Need the Needles: Coordinating Action to Conserve 5-Needle Pine in the Crown of the Continent."

CROWN continued from previous page

Ecosystem Foundations of the U.S. and Canada, called "We Need the Needles: Coordinating Action to Conserve 5-Needle Pine in the Crown of the Continent". The workshop, held at the Crown Managers Partnership Annual Forum held this year in Fernie, British Columbia, attracted ~85 participants, with 30 individuals representing Federal agencies, 14 representing Provincial/State agencies, 12 representing Tribes/First Nations, 10 representing industry, 9 representing NGOs, 3 representing Universities, and 5 community members.

The four objectives of the workshop, which were crafted by an inter-jurisdictional planning committee, included:

1. Deliver best available science and data products on the climate adaptation strategies and tactics necessary to maintain 5-needle pine in the CCE in an era of rapid climate change;

2. Discuss existing challenges and/or barriers that may be impeding 5-needle pine restoration, and develop recommendations to address these issues;

3. Catalyze a formal CCE-wide working group whose purpose is to promote the long-term viability of 5-needle pines in the CCE by sharing information, leveraging capacity and resources, and promoting 5-needle pine protection and restoration; and

4. Initiate a process to develop a CCE-wide 5-needle pine restoration strategy that identifies and prioritizes the type, amount and location of restoration activities, protection measures and monitoring that are necessary to restore 5-needle pine in the CCE.

Workshop participants were welcomed in prayer by Wayne Louie, member of the Lower Kootenay Ktunaxa Nation. Wayne is a master canoe builder who carries on the Ktunaxa tradition of constructing white pine Sturgeon-nosed canoes. A short video of Wayne building a canoe is a fascinating watch: https://vimeo.com/110410378

The workshop kicked off with a focus on the ecological and cultural significance of five-needle pine forests in the Crown. Diana Tomback gave the keynote, and was followed by an inter-tribal panel of members of the Confederated Salish and Kootenai Tribes, the Blackfeet Tribe, the Ktunaxa Nation and the Kainai Nation, who each shared stories of their nation's cultural ties to five-needle pine species. Mike Bruised Head and Tony Incashola both remembered being fed whitebark pine seeds by their grandparents, and commented on their "rich" and "strong" taste.

Workshop participants were then treated to a series of presentations that delivered best available science and data products on climate change adaptation strategies for five-needle pine. Cyndi Smith covered the status, trends and restoration approaches to five-needle pine in the Crown, Shannon Blackadder presented new data products depicting fine-scale whitebark pine distribution throughout the Crown, and Bob Keane gave an overview of the forthcoming climate change adaptation companion document to the 2012 Whitebark Pine Range-Wide Restoration Strategy and its implications for the Crown. All presentations are available for viewing at: http://crownmanagers.org/2016-forum/

Workshop participants then delved into a series of small and large group discussions to address the remaining workshop objectives. Through skilled facilitation, earnest discussion, and much shared passion, workshop participants emerged with a set of seven consensus-based workshop outcomes.

CROWN continued on next page

Courtesy Diana Tomback

CROWN continued from previous page

OUTCOME #1: CATALYZE A FORMAL "HIGH-FIVE" CROWN-WIDE WORKING GROUP: Workshop participants agreed to establish a formal "High-Five" Crown-wide working group, perhaps as a sub-committee of the Crown Managers Partnership. The purpose of the working group would be to advance collective efforts to effectively prioritize, monitor, conserve, and restore five-needle pine in the Crown.

The working group would house the various "task forces" that will deliver on other workshop outcomes. The working group will include all jurisdictions and stakeholders, and will weave cultural, ecological, economic and political factors together from the start.

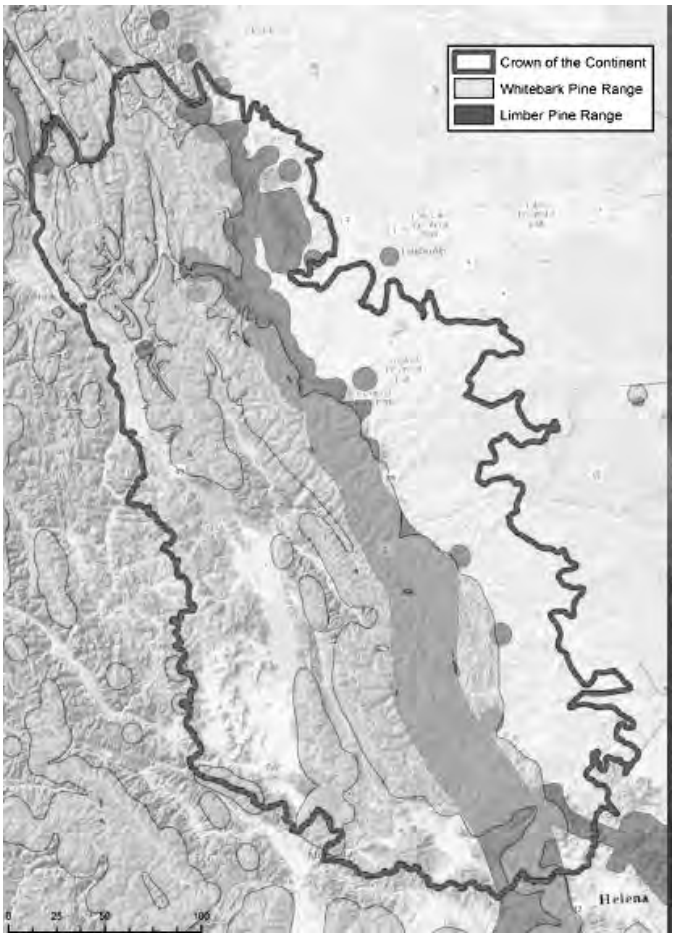
OUTCOME #2: DEVELOP A MITIGATION STRATEGY AND BEST MANAGEMENT PRACTICES TO AVOID DEGRADATION OR LOSS OF FIVE-NEEDLE PINE: While five-needle pine is not targeted for harvest, industrial development does lead to the loss and degradation of five-needle pines.

Where mitigation is required, it is typically done 'on-site' of the industrial footprint, which may or may not be the most effective way to mitigate for impact. Workshop participants expressed an interest in developing a unified mitigation strategy that could direct mitigation activities to pre-identified priority areas, even if this was 'off-site' from the permitted activity. Participants also discussed the need for detailed scientifically-based best management practices when working in areas where pines are present.

Workshop participants also discussed in great length how to ensure the new Canadian whitebark pine federal recovery rule will lead to effective conservation and mitigation, and suggested developing a training webinar targeted at industry and permit reviewers to explain the obligations of the critical habitat rule to support effective compliance.

OUTCOME #3: LAUNCH A CROWN-WIDE MONITORING AND INVENTORY DATABASE: A clear and detailed understanding of where whitebark pine and limber pine occur across the Crown, as well as their condition (tracked through time), is crucial to inform an effective landscape-scale restoration action plan.

Currently, this knowledge is fragmented: some jurisdictions



Current distribution of whitebark and limber pine in the Crown

have good occurrence and condition data, and some, including private lands, have nearly none at all. Existing data is better for whitebark, but very limited for low-elevation limber pine. Workshop participants agreed that a Crown-wide common database of stand-level occurrence was necessary to inform a Crown-wide restoration strategy.

Participants also expressed a desire for an information hub that could house the following types of information: case studies of restoration successes, failures, effectiveness levels and lessons learned; best management practices for operating in 5-needle pine; standard inventory and mapping protocols; and results of Crown-wide mapping products.

Participants also discussed the importance of expanding the footprint of long-term monitoring across the landscape, and to focus on the collection of absence data.

OUTCOME #4: DRAFT (AND IMPLEMENT) A CROWN-WIDE RECOVERY PLAN: Whitebark and limber pine are in peril, and securing these species ability to persist

across the Crown will require a concentrated and coordinated set of restoration actions.

Workshop participants expressed a desire for a Crown-wide Recovery Plan that would prioritize areas for conservation and restoration, incorporate clear guidelines for restoration where applicable (e.g. related to highly protected areas, appropriate use of fire, etc), identify mechanisms for sharing resources, opportunities for new funding, and connect to broader scale restoration priorities beyond the Crown.

OUTCOME #5: DEVELOP RECOMMENDATIONS FOR 5-NEEDLE PINE RESTORATION IN HIGHLY PROTECTED AREAS: A large amount of whitebark pine occurs in highly protected areas (in the U.S., approximately 50% of whitebark pine occurs in designated Wilderness areas). The protection level afforded to these areas can discourage or even restrict certain restoration activities.

Workshop participants discussed developing guidance for how restoration strategies in highly protected areas might best fit into a landscape scale strategy, and how existing decision-making frameworks can guide thinking about restoration in protected areas where the default alternative is for managers not to intervene, but certain thresholds or triggers for action might be developed and monitored to determine if action is truly necessary to save the species.

OUTCOME #6: DEVELOP RECOMMENDATIONS TO GUIDE PRO-ACTIVE FIRE MANAGEMENT IN FIVE-NEEDLE PINE FORESTS: Fire has both positive and negative implications for whitebark and limber pine. Regeneration of these species is closely linked to newly burned areas, and fire is important for removing competitors.

However, higher-intensity fires can kill five-needle pines, which poses a threat, particularly to important individuals (e.g. Plus trees, reproductively mature trees) and stands (e.g. climax stands). Wildland fire use and prescribed fire are important restoration tools, particularly in the Crown given anticipated increases in productivity (leading to more competition) and increases in the size and intensity of fires.

Workshop participants identified several needs, including the need to engage fire managers directly in five-needle pine restoration objectives, the need to develop common best practices for using/fighting fire in the context of five-needle pine forests, and the need to accelerate post-fire monitoring using standardized monitoring protocols.

OUTCOME #7: DEVELOP A MULTI-FACETED COMMUNICATIONS STRATEGY TO RAISE AWARENESS AND SUPPORT FOR FIVE-NEEDLE PINE RESTORATION AND CONSERVATION: Despite the imperiled status of five-needle pines in the Crown, these species do not command the same level of support and priority of other imperiled species.

Part of what will enable more vigorous conservation and restoration of these species is increased awareness and support from the public, policy makers, decision makers, industry and community stakeholders. Workshop participants identified the need for a multi-faceted communications strategy that would identify the key audiences and messages, with the goal of increasing the pace and scale of restoration across the Crown.

Participants also enthusiastically supported developing a citizen science initiative, with a smart-phone app, that could contribute data on location and health of pines, particularly on private lands.

Conclusion

A number of individuals at the workshop have stepped up to provide leadership for moving each of these outcomes forward, and post-workshop discussions are already underway. If you would like to learn more about the workshop itself, or if you would like to engage directly in the efforts to advance these outcomes, please contact Regan Nelson (regan@crownconservation.net).

The workshop co-hosts would like to gratefully acknowledge the sponsors who made this workshop possible: the Great Northern Landscape Conservation Cooperative, Alberta Environment and Parks, and the Glacier National Park Conservancy. Additionally, the Fernie Museum hosted a lovely wine and sushi social, featuring a membership drive for the Whitebark Pine Ecosystem Foundation of the U.S. and Canada. Finally, many thanks to all of the individuals whose concern and dedication to five-needle pine directly resulted in a very successful workshop.

Plastic Cone Cages - Updated Report

By Don Pigott

In the Fall 2012 –Winter 2013 edition of Nutcracker Notes (No.23), I reported on a new design of cages we had devised for protecting whitebark and limber cone cones from predation by Clark's nutcracker and squirrels. These cages proved to be easy to use, and inexpensive compared to cages previously used which were constructed out of either 1/8th inch or 1/4 inch hardware cloth. 2013 was a mast year for whitebark pine in many parts of British Columbia, notably in the Cariboo-Chilcotin area, where we caged 1632 cones on 76 trees using 304 new plastic cages.

Only three cages out of that total were damaged (1%), or had cones removed by predators. It is worth noting however, that we were also able to harvest additional cones which were not caged, from many of the trees. Similar results were acheived by Sybille Haeusler and Alana Clason who made large collections in the Smithers area of Northern BC in 2013.

The crop in 2014 was very poor and no caging was done. In 2015 there was a moderate crop at Mt Baldy near Osooyos, and cones on 14 trees were caged. Cones on each tree had both plastic and conventional metal cages installed. Over 60% of the plastic cages were damaged, mostly by squirrels. In a few cases, the squirrels physically removed not only the cones but also a short piece of the branch to which the cones were attached.

Interestingly, the 40% that were undamaged were on trees in a specific area of Mt Baldy, suggesting perhaps a lazy squirrel. (genetically inferior squirrel?) It seems that squirrels are the primary problem based on the damage to the cages (see photo 2 & 3.)

It is unfortunate that these cages have not stood up well when, cone crops are light to moderate, and there is a lot of predator pressure (primarily squirrels). We found the cages much easier to fabricate, install, pack for any distance, and were substantially less expensive.

However, the risk of seed or cone losses makes these advantages moot when we are investing a lot of time and energy to collect expensive seed for restoration, blister rust screening, or gene conservation. Back to the drawing board……..

Photos 2 & 3 - Showing squirrel damage.

Parks Canada's Whitebark Pine Geocaching Challenge

By Christy Gustavison
Waterton Lakes National Park

Geocaching is a high-tech, outdoor treasure hunting game played around the world by adventure seekers using GPS-enabled devices. Participants navigate to a specific set of geographical coordinates and then attempt to find the geocache (container) hidden at that location. Many people then share their experiences online. Anyone can use coordinates found on geocaching.com to locate caches.

In 2015, as part of its communications involving whitebark pine (legally listed as Endangered in Canada), Parks Canada initiated a whitebark pine geocaching challenge. The challenge was to find at least three of six caches located in Mount Revelstoke, Yoho, Kootenay, Jasper and Waterton Lakes national parks, and record the code word found there. Participants could then submit these code words to earn a collectible geocoin (Fig. 1).

The activity was launched in mid-July to coincide with Parks Day (3rd Saturday in July). While the caches have logged 111 visitors (Table 1), only a handful of coins have been distributed. Some of the caches are easier to reach than others, and most are accessible only during the summer season. The Banff National Park cache is located at the top of Sulphur Mountain, which is accessible by gondola, which may account for its popularity compared to other caches. Ironically, it may be almost too popular, as it has been requiring a lot of maintenance.

More information can be found online at
http://www.pc.gc.ca/eng/pn-np/ab/waterton/activ/activ8/activ8a.aspx.

GEOCACHE continued on page 25

Figure 1.

Collectible geocoin

Table 1. Number of logged visits at the six whitebark pine geocaches.

	Cache 1 GC5YEJA	Cache 2 GC5Z36G	Cache 3 GC5Z378	Cache 4 GC5Z94G	Cache 5 GC5YE1R	Cache 6 GC5Z18C
Location	Banff	Kootenay	Yoho	Waterton	Jasper	Mt Revelstoke
Logged visits	62	9	7	10	14	9

Thank you for your support in 2015. We could not kee

STUDENT - $25
Taza Schaming
Barb Gass
Cory Brown
Catherine Airey
Colin Maher
Zolton Bair
Adam McLane
Sue Phillips

WHITEBARK - $35
Helen Smith & Greg Munger
Judy Perkins
Tara Carolin
John Hamilton
Shawn & Lisa McKinney
Ward McCaughey
Steve Slaughter
Phil Farnes
Catherine Ream
Ron Mastroguiseppe
Craig Benkman
Bob Obedzinski
Cathy Cripps
Michael Murray
Ed Lieser
John Schwandt
Teresa Lorenz
Cathy Stewart
Bill Croft
Rob Mutch
Karl Anderson
Vick Applegate
Jodie Krakowski
Joyce Gould
Mary Frances Mahalovich
Edith Dooley
Mark Oswood
Lisa Acree
Tanya Murphy
Brytten Steed
Brad Jones
Charlie Cartwright
Erik Jules
Kailli Pigott
Robin Gutsell
Marilyn Darling
Kevin Lavelle
Joy & Cliff Schwab
Zoe Rushton
Anna Sala
Alana Clason
Brennan Ferguson
Ben Walker
Gerry Gray
Peter Achuff
Glenda Scott
Russell Oakes
Valerie Walker
Leonard Barnhardt
Jeremy Amberson
Brent Oblinger
Jennifer Beck
Cara Nelson
Art Zack
Sean Sweeney
Katherine Fitch
Melissa Early
Alexia Cochrane
Lindsey McIntyre
Julee Shamhart
Michael Kauffmann
Patrick Cross
Jason Sieg
Cindy Allen
John Beers
Lewis Picher
Beth Willhite
Christy Cleaver
Shannon Downey
Kella Sadler
Michael Diggles
Chris Jensen
Bruce Thompson
Jonny Nesmith

NUTCRACKER - $75
Steve & Bonnie Arno
Carl Fiedler
Glenn Koepke
Lowell Anderson
Bryan Donner
Cliff Bara
Kathy Tonnessen
Betty Kuropat
Gregg DeNitto
Jim Duncan
Bev Yelczyn
Dennis Oden
Robin Garwood
Michael Mancuso
Stephen Lahr
Robert Antibus
Janet Tangney
Joanne Vinnedge
Elena Thomas
Jeff DiBenedetto
Barbette & Jay Pansing
Kelly Burns
Avery Beyer
Cathie Jean & Jay Frederick

p Whitebark Pine in the landscape without your help.

Steve Shelly
Karl Buermeyer
Dana Perkins
Brenda Shepherd
Nicholas Nelson
Kristen Chadwick
Terrie Jain
Maegen Rochner
Meredith Webster
Henri Grissino
Frank Lang
Harry Hutchins
Raymond Prill
Hugues Massicotte
Allegra Ramey
Valerie Hipkins
David Cawrse
Ken Fisher
Steven Russell
Ken Berg
Nadine Hergenrider
Dyna Tuytel
Luke Bakken
Brent Breithaupt
Gene Lonning
Donna Martin
Mary Rugwell
Richard Tholen

DONATIONS $75-$500
Bob Keane
Diana Tomback
Ron Lanner
Liz Davy
Melissa Jenkins
Reinhard Stettler
Charles Bacon
Marcia Hogan
Faith Campbell
Vivian Birch-Jones
Penelope Latham
Rebecca Lawrence
Anna Schoettle
Wayne McCrory
American Forests
Loring Conway
Jay Dark
Mark & Tala Hopkins
Holly Kearns
Susan & Rick Neff
Judy Schutza
Ed & Janet Early
David Wood
Beth Howard
Victoria Roche
Tasha Carr
Steven Furtney
Virginia Kelly
Zachary Roehrs
Heidi Schumacher
Greg Tackett
USGS Ft. Collins Service Center

GRIZZLY LIFETIME MEMBERSHIP - $3000
Centre for Forest Conservation Genetics, UBC
Diana Tomback
Winter Sports, Inc.
Dave Kolotelo
Forest Genetics Council of BC
Kate Kendall
Alberta ESRD Forest Health Section
Cyndi Smith
Melissa Jenkins
Anna Schoettle
Waterton Lakes National Park

Thank you to these Foundations for their Generosity
Lazar Foundation- $5,000
AKC Fund, Inc.- $5,000
The Norcross Wildlife Foundation, Inc. - $900

IN MEMORY OF BOB MEANS:
Beth Howard
David Wood
Allegra Ramey
Richard Tholen
Sue Phillips
Valerie Hipkins
Diana Tomback
Victoria Roche
David Cawrse
Mary Rugwell
Tasha Carr
USGS Ft. Collins Service Center
Dana Perkins
Anna Schoettle
Virginia Kelly
Gene Lonning
Zachary Roehrs
Brent Breithaupt
Steven Furtney
Donna Martin & Randy Bruns

And, thank you for your Silent Auction Donations

Welcome New Board Members

By Cyndi Smith

Associate Director & Chair of Nominations Committee

A number of changes to the Board of Directors have taken place in the last few months. Vick Applegate resigned his Treasurer position before his term was complete, so the Board elected a temporary replacement. Glenda Scott will complete Vick's term and then can run as Treasurer when the position comes up in the election cycle in 2017.

We thank Vick for overseeing our finances for the last number of years, especially during the transition to a part-time staff person. And we look forward to working with Glenda, who is well known to many of our members from her years of work with the USFS before her recent retirement.

Board member Edie Dooley has also resigned, but will continue her involvement with the Ski Area Partnership Committee, which will be rolling out its first resort certifications this year.

The Board elected Melissa Early as a temporary board member until the position comes up for election, also in 2017. Melissa is a wilderness ranger on the Bridger-Teton National Forest, specifically in the Gros Ventre Wilderness. She is taking the lead on both the Education and Ski Area Partnership committees. While any member can be on a committee, we require that committees be chaired by board members.

John McKay has been appointed by the Board to a single 3-year term. John hails from Missoula and has an educational background in environmental law and science, and extensive experience in non-profit management and board service. John's skills will be helpful as we move the Foundation forward into Phase II … aka "life after Diana."

In early April we also ran elections for three positions to start in September 2016. Melissa Jenkins was acclaimed as Secretary, and we welcome her continued excellent work in that capacity. We also welcome two new general board members, Cathy Stewart and Mike Geisey, whom we look forward to working with. Cathy retired as the Region 1 Fire Ecologist in 2013, and Mike currently works as the Kootenai Forest Silviculturist out of Libby, Montana.

The resolution to allow non-members to be nominated for the Board was passed unanimously. Any board member who is elected must then join the Foundation before they can participate in Board decisions. This allows the Board to search out nominees from outside our normal sphere of whitebark pine enthusiasts, to bring additional skills and knowledge to the Foundation.

This was our second web-based election, which ran smoothly, thanks to our Webmaster JoAnn Grant and Staff Coordinator Julee Shamhart. Forty-two percent of our members cast ballots, which is the same percentage as last year. We would welcome suggestions on how to improve the participation rate.

Membership Report – Spring 2016

WPEF Membership since its founding in 2001 has steadily increased at a fairly constant rate. The membership report submitted to the Board of Directors in March reflects a total membership at its greatest level in the history of the Foundation for this time of year (178). Membership at the end of the past calendar year, just prior to the purge of non-renewing members, was at 217, by far the greatest amount in our history.

Maintaining a membership base for a foundation is not common. The individuals who established the Foundation chose to go this route for several reasons. Membership not only provides financial support for the education and restoration of a high mountain resource, but also allows for the networking necessary to bring the considerable expertise of the members together to meet our goals. The community of whitebark pine enthusiasts continues to grow, as evidenced by our increasing membership and the great number of individuals who attend our annual meetings in the fall.

One disappointing aspect of our membership situation is the large number of members who chose not to renew this past fall (47); many of whom had been long term members of the Foundation. The Board of Director committed to personally contact each of these folks.

We provide membership in various categories. All categories are afforded the same level of membership benefits, and differ in only the type of member and amount of contribution. The Student level allows for those enrolled in college to participate at a reduced dues rate. The Whitebark level is the standard category. The Nutcracker level allows for a greater level of contribution and an extra gift, such as a calendar or hat, is provided when the member initially joins at this level. The Institutional level allows for an entire organization to be enrolled with benefits available to all individuals at that location. The Grizzly level is the one-time, lifetime membership category.

The total number of Canadian members, mostly from Alberta and British Columbia, now stands at 36. This amount has remained steady for several years. The Board of Directors appreciates our north-of-the-border members hanging in there with the recent unfavorable currency exchange rates.

Please do not be shy about asking your colleagues, associates, and even your parents to join the WPEF! 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.

Joining or renewing by using PayPal at the web site is a quick and convenient way to maintain your membership.

Questions, comments, or suggestions about membership in our Foundation can be directed to the Membership and Outreach Coordinator Bryan Donner, at (406) 296-7145 or bryan.donner@whitebarkfound.org. Please put "WPEF" or "Whitebark" in the subject line of your e-mail.

Bryan Donner
WPEF Membership Coordinator

SCIENCE CONFERENCE

2016 Whitebark Pine Ecosystem Foundation Science & Management Conference

By Melissa Jenkins - *2016 Science Conference Committee*

One of the biggest successes of the WPEF is the annual "Science Conference". In 2016, the conference will be held on September 16th and 17th in Whitefish, Montana. A committee of folks including Melissa Jenkins, Bryan Donner, Karl Anderson, Jen Asebrook and Vita Wright are organizing this great event.

The indoor presentations on Friday, September 17, will be held at the world class O'Shaughnessy Center in downtown Whitefish, MT (www.whitefishtheatreco.org). There are over 15 talks scheduled for this indoor conference with a manager panel to end the day. There will be field trips on both Saturday and Sunday to Whitefish Mountain Resort and Glacier National Park, respectively. A presentation on the "Whitebark Friendly" ski area certification process, a tree climbing/cone collection demonstration and opportunities to view 5-needle pine trees in the stunning setting of Glacier National Park will make the 2016 WPEF Science and Management Conference an unforgettable event. Keep your eye on the WPEF website to get the latest news and register for the conference for free (http://whitebarkfound.org/?p=1519). We hope to see you there!!!

MEMBER NEWS

Dues Increase Effective This Fall

At the March 18, 2016, foundation board meeting, board members unanimously approved a dues increase effective in the fall of 2016. Members at the Whitebark Level will be assessed a $45 annual dues, up from $35. Nutcracker Members will be assessed a $100 annual dues, up from $75. All other membership categories will remain at the same dues schedule.

The new dues rates will become effective when the annual membership renewal letter is sent out, typically at the end of August or early September. New members joining up to that time will pay the current rates. All renewals of current members will be renewed at the new rates starting immediately.

The reason for the increase was the recognition by the board that the most common dues paying category (Whitebark) had not had a dues increase in nearly ten years and the second most common (Nutcracker) had never been increased. Increased operating expenses had been catching up to the current dues structure. The board is very interested in supporting more restoration efforts on the ground and are hoping increased income from these two categories will make some difference. We have noticed many members have recently been renewing their memberships at these new levels voluntarily and believe the new dues structure is consistent or lower than other similar organizations.

We hope this dues increase will not be a hardship for maintaining membership in the Foundation. The board considered the currency exchange rate situation between the United States and Canada. Please contact Membership Coordinator Bryan Donner if you have any questions or concerns.

Whitebark Pine Restoration in the Pacific Northwest

By Andy Bower
USFS Area Geneticist & Region 6 WBP Restoration Program lead

The U.S. Forest Service Pacific Northwest (PNW) Region (Region 6) has had an active whitebark pine (WBP) restoration program since the mid-2000's. The Whitebark Pine Restoration Strategy for the Pacific Northwest Region (Aubry et al. 2008) laid out a comprehensive 5-year plan to reach the goal of "a network of viable populations of whitebark pine throughout the Pacific Northwest".

The key actions prescribed included:

- collect seed for gene conservation and rust resistance screening
- assess stand conditions in priority management units
- develop plans for planting seedlings in priority management units
- continue a rust screening program with emphasis on seed zones in grizzly bear areas
- treat for mountain pine beetle in high risk management units
- develop an approach for planting seedlings in designated wilderness areas
- develop an approach to mitigate the predicted impacts of climate change
- develop a monitoring plan to track accomplishments, success of actions, and provide feedback to improve project procedures and outcomes and disseminate information.

2015 was the seventh year of implementation of the restoration strategy and while much has been accomplished and much has been learned, there is still much to do to help conserve and restore whitebark pine in the Pacific Northwest.

The long term goal of the PNW WBP program is to sustain a network of viable populations of WBP and associated species throughout the PNW; the short term goal of the program is to promote recovery of WBP in lieu of ESA listing. The implementation of the Restoration Strategy has included surveying both known and suspected WBP habitat to verify its presence and refine the distribution map; installation of permanent monitoring plots to track stand condition and health; planting seedlings in areas heavily impacted by fire or insect/disease outbreak; white pine blister rust resistance screening; vegetation management to reduce fuel loads and remove competing vegetation around high-value mature, cone-bearing trees; and cone collections for reforestation and genetic conservation.

One of the key elements of the PNW WBP restoration strategy has been collecting seed. Seeding and planting is a growing imperative to mitigate impacts of white pine blister rust, bark beetles, wildfires, and climate change. Sufficient seed stores are needed to provide seed sources to establish/sustain future generations, to accelerate increase in blister rust resistance, and to avoid federal listing. Since 2009 we have collected nearly 300 pounds of seed for reforestation as well as individual seedlots from over 800 trees for rust resistance testing and genetic conservation. Despite all of these seed collection activities, current inventories are likely inadequate relative to needs.

Since 2002, approximately 1000 individual trees have been screened for white pine blister rust resistance at the Dorena Genetic Resources Center in Cottage Grove, OR. Roughly 10% of the trees screened have shown some level of resistance and a current effort is under way to revisit all of these "winner" trees to assess their current status and the presence of cones.

A tremendous amount of time, effort, and funding has gone into identifying these parent trees that show some resistance and now we need to capitalize on these efforts by collecting cones from these trees whenever possible. Based on the results from the artificial inoculation, we expect the seed from these trees to have

PNW continued on next page

PNW continued from previous page

some level of resistance so any seed collected from these trees in the future can be used for reforestation within the seed zone in which it was collected. This will be a cornerstone of the PNW WBP Restoration Program moving forward.

Planting seedlings will be a crucial component of a successful restoration program for WBP. Since 2009 approximately 26,000 seedling have been planted on over 400 acres throughout Washington and Oregon. Many of these plantings have been opportunistic, taking advantage of excess seedlings from the rust resistance screening program, although several larger scale planting projects have been completed in areas that had previously been burned.

A key issue in projects such as these is that approximately 75% of the WBP habitat on Forest Service lands in Washington and Oregon is in congressionally designated Wilderness. Strict regulations on what is and is not allowed in wilderness, in order to preserve "wilderness character", have made it impossible to undertake any restoration plantings of WBP seedlings in wilderness to date. We have been working closely with the Aldo Leopold Wilderness Research Institute to test a forthcoming "Evaluation Framework for Restoration in Wilderness" that may allow some restoration work in the future.

Other types of "active" restoration that have been accomplished in Oregon and Washington include several thinning/fuels reduction projects. These projects while often limited in size have the potential to significantly improve existing WBP habitat and stand conditions by removing ladder fuels from around potentially vulnerable trees. By reducing fuels that would allow a ground fire to get into the crown of the tree, this will help protect these trees from being damaged or killed if a fire was to burn through the stand.

In addition, removing competing vegetation (mainly subalpine fir) will prevent the WBP from being overtopped by faster growing trees, and also reduce competition for resources such as sunlight and water. The largest of these types of projects occurred in 2014 on the Wallowa-Whitman National Forest in eastern Oregon. Approximate 50 acres received this thinning/fuels reduction treatment, and were also treated with the synthetic hormone verbenone to protect the high value WBP individuals from attack by mountain pine beetle.

Protection from mountain pine beetle has been another high priority during the current outbreak. Parts of the distribution of WBP in Oregon and Washington have experienced severe

PNW continued on page 25

Courtesy of Diana Tomback

TREASURER'S REPORT

	1/1/2014	1/1/2015	Comments
Beginning BALANCE (Checking and Savings)	$28,243.61	$48,264.54	1/2015 - 1stlBank $27,391.77 + $18,324.10 +$2,548.67
EXPENSES			
Accountant fee (Tackett)	$300.00	$300.00	
Advertizing	$400.00		
Annual Meeting		$1,084.00	
Annual State Registration	$15.00	$15.00	
Bank fees	$115.33	$53.60	
Canada Conference		$212.00	
Candian Check Return Fee		$53.00	
Employee Computer, Printer, etc		$923.52	
Employee Training		$209.86	
Employee Wages		$8,595.25	Doesn't include withholding, see below
Grant Research Contract JGrant	$510.00	$790.00	
Master Card Fee		$50.00	
Membership expenses (Donner)	$239.76	$0.00	to be Claimed in 2016
Merchandise	$0.00	$1,420.09	Calandars, bookmarks, etc.
Merchandise Clothing		$1,533.36	
Nutcracker Notes	$864.64	$2,362.42	
Operating/Mailing Expenses	$329.17	$150.34	
P.O. Box fee - Yearly	$92.00	$98.00	
PayPal fees	$110.88	$82.80	
Room rental (Annual meeting)	$324.47		
Ski Area Certs		$168.75	
Student Research Grant		$1,000.00	
Symposium Support	$1,000.00		
Tax State & Federal		$831.60	Employee Withholding plus WPEF additional Tax
Travel - Plane fares and lodging	$3,013.33	$909.55	Tomback BOD Meeting
Web Hosting Uof Co Denver	$10,223.75		
Web site WPEF JGrant	$1,803.88	$3,760.00	
Worker Comp Insurance StateFund		$414.33	
Total Expenses	$19,342.21	$25,017.47	
INCOME			
Donation Lazar Employee Salary Grant		$5,000.00	
Donation Norcross Equip Grant		$900.00	
Donation Restoration Grant AKC		$5,000.00	
Donation State Annual Registration	$15.00	$15.00	
Donation Tackett	$200.00	$200.00	
Donations	$949.00	$870.00	
Donations Bob Meams Fund		$1,635.00	
Fee Payment Donation		$59.00	
Flight Reimbursement	$502.00	$0.00	
Income Unclassified	$5,094.86	$99.00	
Interest Earned	$16.15	$21.49	
Membership	$6,109.59	$5,432.00	
Merchandise Manufacturer Refund		$45.65	
Merchandise/Symposium/Annual Mtg	$1,091.00	$2,535.25	
Other Inc	$395.00		
PayPal Memberships/Donations		$2,905.11	2905.11- 82.80(PP Fees)=2822.31 (PayPal Merch=$201)
Web Hosting UC Denver USFS	$24,990.54		
Total Income	$39,363.14	$24,717.50	
BALANCES (12/31/2014 & 12/31/2015)	$48,264.54	$47,964.57	12/2015 - 1stlBank $21,764,64 + $22,221.68+ $3978.25

Respectfully Submitted,
Vick Applegate - Treasurer

STUDENT RESEARCH GRANT

WPEF student research grant awarded for 2016

A call for proposals for the annual WPEF student research grant was released in the Spring/Summer issue of Nutcracker Notes. The proposals were reviewed by board members Edie Dooley, Bryan Donner and Cyndi Smith. MAEGEN ROCHNER, a doctoral candidate in Geography (with a specialty in dendrochronology, climate and environmental change) at University of Tennessee Knoxville, was chosen as the grant recipient for 2016. Following is a description of her project (references and additional detail may be obtained from Maegen at <mneal20@vols.utk.edu>):

Past, present, and future climate change and forest dynamics in a high-elevation whitebark pine ecosystem in Wyoming

Introduction

I propose to use tree-ring science to examine the impact of Holocene climate change on a high-elevation whitebark pine (WBP) ecosystem in the Beartooth Mountains of Wyoming. Climate warming and the resulting upward movement of tree line in some locations has exacerbated other threats to WBP in the Greater Yellowstone Ecosystem (GYE), such as the mountain pine beetle (MPB).

Historically, the threat of the MPB to high-elevation WBP forests was limited by the harsh conditions found near tree line, but warming temperatures have allowed for unprecedented infestations at previously protected sites.

The combination of warming temperatures in the western United States, infestation, and other factors is projected to lead to the elimination of WBP in the GYE. The loss of this important keystone species could lead to dramatic environmental changes in not only the GYE but across the range of the species.

Further understanding of WBP forest dynamics is essential for future management practices and conservation efforts, especially in light of ongoing climate change, because of the importance of this species as a wildlife food source and as a facilitator in the development of tree communities in harsh, high-elevation conditions. The best way to better understand how WBP forests will adapt to a warming climate is to study how they have responded in the past. The goal of this study is to investigate

Maegen Rochner, a doctoral candidate in Geography, is the 2016 student research grant recipient.

changing forest dynamics at a high-elevation site during two major Holocene climate fluctuations, the Medieval Warm Period (MWP, about AD 800 to 1500) and the Little Ice Age (LIA, about AD 1500 to 1850).

Study Area

I will sample both living and remnant WBP at Fantan Lake (FTL) in the Beartooth Mountains. The site is characterized by high-elevation (2800 to 3020 m) meadows and small islands of what look to be fairly young (< 300 years old) WBP.

Associated tree species include Engelmann spruce and subalpine fir, but WBP continues to dominate. The remains of extremely large WBP (approximately 500 to over 1,000 years old based on cross-sections taken from a few trees during a preliminary collection in summer 2015) are found throughout the area. No living equivalent to these massive trees exists at the site today, which suggests that an open forest of much older and much larger WBP once thrived at the site, but were killed by some extensive mortality event.

Hypotheses

I hypothesize that these WBP logs represent an open forest that thrived during the MWP but was killed during the coldest period of the LIA. Such aberrant warmth would explain why the unusually large remnant trees at FTL survived at high-elevation. Eventually, however, the onset of the LIA decreased growth rates in the already-mature WBP until gradual thermal degradation and the persistence of snowpack through summer months (formation of a permanent snow field) eventually killed them. I will use methods in tree-ring science (dendrochronology) to test four hypotheses.

If these hypotheses hold true, and WBP thrived during the MWP, high-elevation WBP may be more robust to increasing temperatures than current thinking suggests. Evidence from pollen and charcoal data has indicated that WBP can be resilient to warm temperatures and dry conditions, and that limiting factors might instead be disturbance (from fire or insect infestation) or competition. If this is the case, perhaps WBP will persist, given successful management of other threats, despite global warming.

Methods

I will sample 100 of the dead WBP remnants using a chain saw to extract complete cross sections of the tree trunks, and up to 200 living WBP trees in the same area using a non-destructive Haglof increment borer. Once samples have been returned to the lab, I will measure ring widths for the remnant pieces and date the floating chronology developed from these measurements against a local WBP reference chronology using statistical crossdating techniques.

Absolute dating of the remnant pieces will provide the innermost and outermost ring dates for each tree and will allow for analysis of growth rates in relation to specific years. I will measure cores from living trees starting at the outermost year (sampling year) and will determine establishment dates using standardized pith estimators when curvature of rings is identified.

I will map these establishment dates as a stem plot using ArcGIS software to identify any patterns associated with elevation or aspect. I will use ArcGIS to identify any clustering of living trees of similar ages and will plot establishment dates to identify any pulses in establishment. I will build a living WBP chronology for FTL and use it to determine climate-growth relationships, testing for correlations between ring width and climate variables, such as monthly mean temperature (MNTM) and total monthly precipitation (TPCP), obtained from the National Centers for Environmental Information (NCEI) NOAA climate divisional data.

I will choose a climate variable to be reconstructed based on the analysis of climate-growth relationships in living WBP trees, and will then use the split-sample approach to reconstruct climate on a multi-century scale. Field collection will take place in 2016, with preliminary results available by summer 2017, and final dissertation in 2018.

Expected Outcomes

Results from this study will provide new knowledge on the response of high-elevation WBP to anomalously warm and cool temperatures and will provide data for climate reconstructions that will track in more detail how Holocene climate change affected the central Rocky Mountains and GYE.

Acknowledgements

I would like to thank my supervisor, Dr. Henri Grissino-Mayer, for funding much of this research through his Faculty Development Award. I would also like to thank the staff of the Custer/Gallatin and Shoshone national forests for their collaboration.

And, I would like to extend my deepest appreciation to the Whitebark Pine Ecosystem Foundation for their support of this valuable research effort.

TOMBACK continued from page 2

production as predictors of visitation by Clark's Nutcracker. PLoS ONE 2012, 7, e37663, doi:10.1371/journal.pone.0037663.

McKinney, S.T.; Fiedler, C.E.; Tomback, D.F. Invasive pathogen threatens bird-pine mutualism: Implications for sustaining a high-elevation ecosystem. Ecol. Appl. 2009, 19, 597–607.

Mielke, J. L. 1943. White pine blister rust in western North America. Yale University; School of Forestry. Bulletin No. 52.

Smith, C.M., B. Shepherd, C. Gillies, and J. Stuart-Smith. 2013. Changes in blister rust infection and mortality in whitebark pine over time. Canadian Journal of Forest Research 43:90-96.

The passing of Senator Conrad Burns: the whitebark pine connection

Conrad Burns, an influential three-term Republican senator from Montana, died at the age of 81 on April 28, 2016. Burns led the Senate Interior Appropriations Committee and often acted in what he perceived as Montana's best interest. In his last term, Burns became embroiled in scandal from his association with the infamous lobbyist Jack Abramoff. Jon Tester, who had been president of the Montana Senate, won Burns' U.S. Senate seat in a fairly close election. Although Conrad Burns may have been a polarizing figure, there is an important whitebark pine connection with Conrad Burns that needs to be remembered, and for which we must express our gratitude.

During his third term, Senator Burns met with a small delegation from the Whitebark Pine Ecosystem Foundation--myself, Steve Arno, and Carl Fiedler—in Missoula on March 2, 2006. Our goal was to discuss the rapid decline in whitebark pine and how to obtain federal funding for restoration. We had Senator Burn's full attention for an hour. When we explained that white pine blister rust was the major reason for the rapid decline in whitebark pine, the Senator expressed his disbelief. It turns out that he had been one of the many college students employed during the summer, probably in the early 1950s, to help eradicate Ribes spp., which was the early, and largely ineffective approach to controlling the spread of the blister rust pathogen Cronartium ribicola. He remarked that all these years he had assumed that white pine blister rust was "no longer a problem." He agreed to support our effort to find funding, and I worked with his support team and spent the next year drafting several iterations of an appropriations request and enlisting the support of the Montana, Idaho, and Wyoming Congressional delegations.

But, that is only part of the story. I was charged to negotiate the appropriations request with the U.S. Forest Service, Forest Health Protection leadership. In addition, the request had to include administrative structure in the form of a technical oversight committee. We included John Schwandt, from Forest Health Protection (FHP), Region 1, as head of the technical committee. The appropriations request had strong congressional support, but to our great disappointment President Bush eliminated all "earmarks" for the 2008 fiscal year, ending this considerable effort.

Now, the rest of the story: Following the failure of the restoration earmark, Rob Mangold—then Director of Forest Health Protection—recognized the legitimate need for restoration funding and implemented the U.S. Forest Service Whitebark Pine Restoration Fund, administered in Region 1 with support from the Washington Office, as originally proposed. John Schwandt was appointed as its director. The technical oversight committee structure, as outlined in the appropriations request, was also implemented. Although funding has since declined, the Whitebark Pine Restoration Fund continues to provide the only dependable support for whitebark pine restoration projects in Region 1 and the Greater Yellowstone Area. This effort has become more critical each year as whitebark pine, highly susceptible to blister rust and decimated by the recent, large-scale outbreak of mountain pine beetles, continues to decline.

The establishment of the Whitebark Pine Restoration Fund ultimately resulted from the support and encouragement of Senator Burns.

Housekeeping and transitions

The Executive Committee and Board of Directors (BOD) have undergone several changes since the last edition of Nutcracker Notes. First of all, Treasurer Vick Applegate has recently asked to step down from his position. Vick has been a major problem-solver and go-gettter during a spurt of WPEF growth and development, including the hiring of our Staff Coordinator Julee Shamhart. I will especially miss Vick's "can-do"

attitude—he has been a pleasure to work with. But, he also has left us in very capable hands. We are fortunate to have Glenda Scott, retired U.S. Forest Service, from the Region 1 office, who volunteered to carry out the remainder of his term. Welcome aboard Glenda!

Board member Edie Dooley, now working in Portland, OR, has also stepped down from the board. Edie has headed our Ski Area Partnership initiative, which will be officially launched this fall, and she plans to continue this important work for the WPEF. Taking Edie's place on the board is Melissa Early from Jackson, who was elected by the BOD to complete the remainder of Edie's term and work and head the Education Committee.

The Board of Directors had two open board-elected positions. At the spring board meeting, we elected John McKay to one of these positions. John brings non-profit and legal expertise to the table—skillsets that will be very valuable for us. I also will mention that my final term is up as WPEF Director after the fall BOD and Science and Management meeting. Bob Keane has generously offered to come in as Interim Director as we continue our search for a Director.

Our September 16-17, 2016, WPEF Whitebark Pine Science and Management meeting in Whitefish, MT, brings us back to the Flathead Valley. We look forward to seeing our many long-term friends and supporters from this part of the Crown of the Continent.

SKI continued from page 5

a real need, and that the time is ripe for this idea. Resorts generally want to do the right thing for the environment and keep the forests defining the runs alive. Resorts also want their patrons to know about the good conservation work they are doing. Therefore, WPFSA certification is a win-win for the ski areas, the WPEF, whitebark pines, and the concerned recreationists such as myself.

Now that WPEF is certifying the first resort, and interest is growing, we need the help of the membership to engage their local resort and encourage them to earn Whitebark Pine Friendly Certification. The most work gets done when relationships between whitebark enthusiasts and ski resort personnel are forged locally. With such a large geographic range, the volunteer coordinators of the certification program are hard pressed to travel to all of the resorts to spark interest in the program. Therefore, in order to get more ski resorts on board, we need your help. Next time you hit the slopes at your home resort, take a minute to ask to speak with the operations or marketing manager and let them know that you would like them to consider gaining Whitebark Pine Friendly Ski Area.

The certification checklist can be downloaded at http://whitebarkfound.org/?page_id=1687. Hopefully, as more resorts gain certification, skiers will understand why the trees are dead, but also, will be able to identify and appreciate whitebark saplings of the next generation!

Endnote: I would like to thank those who offered encouragement and input to the design of the program including: Nora Dooley, Jeremy Amberson, Bill Shreiber, Avery Beyer, Brigid Sinram, Karl Buermeyer, Colin Maher, Melissa Early, Megan Keville, Signe Leirfallom, Michael Murry, Melissa Jenkins and Diana Tomback.

PNW continued from page 19

mountain pine beetle outbreaks in the past decade. In some of these areas, there has been almost a complete loss of trees, both WBP and lodgepole pine over 6" DBH.

While the current outbreak is waning in most areas, during the height of the epidemic, verbenone was used to attempt to protect larger, mature, cone-bearing WBP individuals within heavily infested areas. Since 2009, nearly 2500 verbenone pouches have been used on the Fremont-Winema, Deschutes, and Mt. Hood National Forests, and beginning in 2014, a new formulation of verbenone, applied as a dollop of paste directly on the tree trunk has been utilized.

Public education and outreach has also been a component of the WBP Restoration Program. Interpretive signs explaining the threats faced by WBP have been developed and installed at several high-traffic, high-visibility recreation areas where WBP is present.

Ski areas are prime areas where the general public can easily get into the high alpine and see WBP, and several ski areas have installed these interpretive panels. A multi-station interpretive trail is in the final stages of development and signs will be installed on a hiking trail at the Newberry National Volcanic Monument in Central Oregon.

The Whitebark Pine Restoration Strategy for the Pacific Northwest was developed with a 5-year planning horizon, from 2008-2013. This document has been invaluable as a guide for what information and activities are needed where throughout Oregon and Washington. The intended timeline has passed and we are in the process of revising and updating the PNW Restoration Strategy so that we can continue to protect, conserve, and restore WBP in the Pacific Northwest.

References:

Aubry, C.; Goheen, D.; Shoal, R.; Ohlson, T.; Lorenz, T.; Bower, A.; Mehmel, C.; Sniezko, R. 2008. Whitebark pine restoration strategy for the Pacific Northwest Region, 2009-2013. USDA Forest Service, Pacific Northwest Region, 212 p.

GEOCACHE continued from page 12

An additional geocaching feature is that users can submit comments. Here's what some users said about their visit to a cache:

"Made this grueling hike up to the lookout on a hot day so we could get this cache. Amazing views and I loved hearing and seeing the Clark's Nutcracker. Thanks for getting us out here."

"Plenty of Clark's Nutcrackers around to keep us company and a ground squirrel or two. Enjoyed the cache camo, then hung around the lookout for 20-30 minutes."

"Thanks for the series of caches. We enjoyed the hikes. All three were hikes that we had never done before, which is one of the reasons we love caching... going new places!"

"tftc! Whitebark pine is my favourite tree species. Lots of them in the Coast range /Chilcotin region where I live. This was the most expensive geocache I have found though, [as] I took the tram up."

SAVE THE DATE

WHITEBARK PINE
ECOSYSTEM FOUNDATION

Whitebark Pine Ecosystem Foundation's
Annual Science & Management Meeting

September 16-18, 2016
O'Shaughnessy Center, Whitefish, Montana

Title: Successes and Challenges in Managing the Jewel in the Crown of the Continent

Workshop Topics:
Whitebark Friendly Ski Areas
Effects of Climate Change
Restoration

Field Trips:
Glacier National Park
Whitefish Mountain Resort
Tree climbing/cone collection demo

Plus:
Evening Social
Silent Auction
& Poster Session

Find more information and register on the web: www.whitebarkfound.org

Show your support for
Whitebark Pine
& shop our new online store

HATS - T SHIRTS - CALENDARS

www.whitebarkfound.org

WHITEBARK PINE
ECOSYSTEM FOUNDATION
PO Box 17943
Missoula, MT 59808
www.whitebarkfound.org

WHITEBARK PINE FOREVER

Campaign to keep whitebark trees on the landscape

Donate now to our tree planting fundraising effort.

$5 to plant one tree
$1,200 to plant one acre
$6,000 to plant five acres
$12,000 to plant 10 acres

This year the Whitebark Pine Ecosystem Foundation continues our efforts to maintain whitebark pine trees on the landscape by planting blister rust-resistant seedlings, which can cost over $4 per seedling. Your contribution to this effort is very important. The more rust-resistant trees we plant, the longer we can assure whitebark pine will remain a viable species within its range.

DONATE NOW **- Visit the website www.whitebarkfound.org and donate to the restoration fund to plant an acre of rust resistant seedlings.**