Issue No. 33: Fall 2017

nutcracker notes

JOURNAL OF THE WHITEBARK PINE ECOSYSTEM FOUNDATION

Litterfall in Whitebark Pine Forests after Mountain Pine Beetle

Photo courtesy of Rob Mutch Ecosystem Photography

By Chris Stalling

Introduction

Conventional wisdom in fire management maintains that stands in which trees were rapidly killed by insects, disease, or fire will have increased future fire hazard because the dead foliage and fine woody material in the canopy is highly flammable (Axelson et al., 2009; Hicke et al., 2012), and, when this material falls to the ground, it creates heavy fuel loads that could result in faster fire spread and greater fire intensities (Gara et al., 1984; Jenkins et al., 2012). There is little doubt that the dying and dead needles are more flammable than green needles because of lower moistures and higher flammability (Jolly et al., 2012), but these needles only remain in the canopy for a short time. Of greater importance may be the rate at which the dead canopy

LITTERFALL 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*

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.

Cyndi Smith

INTERIM DIRECTOR'S MESSAGE: UPDATES FROM THE BOARD ...

I want to thank Diana Tomback for her leadership of the Whitebark Pine Ecosystem Foundation since its inception. Her professionalism and passion have been a guiding light in the world of whitebark pine. Fortunately, Diana is staying involved with the WPEF as our Policy and Outreach Coordinator, where she can concentrate on establishing partnerships, collaborations, and relationships for the purpose of education, conservation, and restoration of whitebark pine.

I will concentrate on managing the Foundation itself. Elsewhere in this issue, Diana will report on the very recent National Whitebark Pine Summit, a strategic planning session for range-wide restoration, which is an ongoing collaboration with American Forests and the U.S. Forest Service.

We had a very successful annual science meeting in Jasper, Alberta, in mid-September. We were hosted by Brenda Shepherd, Park Ecologist in Jasper National Park, who was supported by members of WPEF-Canada. Attendees enjoyed a varied program that included presentations on restoration and recovery actions, genetic resistance, climate change and grizzly bear use of whitebark pine. Enthusiastic bidding during the Silent Auction ensured that we again raised sufficient funds for our Student Research Grant … see articles on both in this issue.

A few months ago the WPEF was approached by the Community Food Co-op in Bozeman, MT, searching for a partner to help them offset carbon dioxide emissions from their business operations. They were interested in projects in the Greater Yellowstone Ecosystem, and subsequently donated $5,000 to plant rust-resistant seedlings. Liz Davy, chair of our Development Committee, will be exploring other opportunities with the Co-op to expand our activities in the Bozeman area. This is a great example of the kind of partnerships that we are pursuing.

This summer a few of our board members and staff led or co-led wilderness hikes to whitebark pine areas. They partnered with the Montana Wilderness Association and the Great Old Broads for Wilderness. Unfortunately, the hike with the MWA was cancelled, probably due to the fires and smoke in the area.

These events are opportunities to educate hikers about the ecology of whitebark pine and threats to its survival, and to possibly attract new members to the Foundation. We encourage all of our members to seek out such opportunities in their own areas … please contact our Executive Assistant, Julee Shamhart <julee.shamhart@whitebarkfound.org>, with your ideas.

Our Board of Directors is happy to finally announce that we now have liability insurance for board members and for volunteers, such as those leading hikes. We had been pursuing this for a couple of years and feel much better now in asking members and others to undertake volunteer activities on our behalf.

I also want to thank Bob Keane for stepping in as Interim Associate Director. The WPEF Board has to work hard this coming year to fill these two interim positions during this exciting period in our organization, and we welcome all suggestions.

BOARD NEWS

Fall Election News: What's Happening on the Board of Directors

By Cyndi Smith, Interim Director & Chair of Nominations Committee

The spring elections brought about a few changes to the board of directors (BOD) in 2017:

- Rob Mangold was elected as a general board member; Rob recently retired from a 30-year career with the US Forest Service, and brings a wealth of knowledge with him to the Board
- Liz Davy was re-elected as a general board member and continues as chair of the Development Committee
- Glenda Scott was re-elected as Treasurer
- After a one-year hiatus, Michael Murray (who reached his 9-year term limit as a general board member in 2016) was elected Membership & Outreach Coordinator

We thank the other candidates who ran, but were unsuccessful in being elected: Joe Adamski and Scott Smith (who had served a one-year temporary vacancy on the BOD).

The Foundation is at a critical juncture, with a number of board members recently reaching their term limits. As per the Foundation's bylaws, our founding Director, Diana Tomback, reached her term limit (9 years) in 2016. As the board was unable to recruit anyone to fill the position, Diana stayed on as Interim Director in 2017. Following the fall 2017 BOD meeting, I have agreed to be Interim Director for 2018, but we continue to seek a highly motivated volunteer to lead the Foundation during this exciting phase of our existence. Also in 2016, Bob Keane, another founding member, reached his term limit. Bob is staying involved, though, as editor of Nutcracker Notes. He has also agreed to be Interim Associate Director until a replacement is found.

We are seeking nominations to fill the following positions on the WPEF board of directors (BOD):

- Director
- Associate Director
- General Board Member

These new members would start serving on the BOD in October 2018. Nomination forms are available in this issue of Nutcracker Notes (pg 24) and on the Foundation's website: www.whitebarkfound.org, along with a list of responsibilities for each of the positions. Nominations close on 1 February 2018. Please consider running for one of these positions, or nominating someone else – nominees do not have to be members of the Foundation, but if elected would have to join. Your active participation is critical to keeping the Foundation relevant to the general membership. If you have any questions about any of the positions or the nomination process, please contact me at cyndi.smith9@gmail.com.

An Interview with Board Member Robert Mangold

Who are you and what are your interests? My name is Robert (Rob) Mangold and I am recently retired from the US Forest Service after 30 years of hard labor. Just kidding- really a great outfit. I also worked for the Bureau of Indian Affairs and Crown Zellerbach Corporation. At the Forest Service (FS) I finished my career as the Station Director at the Pacific Northwest Research Station, in Portland. Before that, I was the National Staff Director for Forest Health Protection in the Washington, DC, office for 12 years. I'm a geneticist by training with a Ph.D. from Oregon State University.

What piqued your interest in whitebark pine? When I was Director of Forest Health Protection, it was brought to my attention in the early 2000s, the problems of whitebark pine and other five-needle pine species due to blister rust, bark beetles and climate change. This species, whitebark, is a keystone species and with restoration being a

MANGOLD continued on page 22

WPEF Board Member Robert Mangold

LITTERFALL continued from front

material accumulates on the forest floor to increase surface fuel loadings and fire hazard. The dead foliage and woody material may fall quickly and create surface fuel conditions that could foster wildfires of high intensity and severity. What is needed is an in-depth analysis that describes the rate of fuel deposition and subsequent accumulation after severe disturbance events.

In this study we measured annual deposition (litterfall) rates of six fuel components during a 5-10 year period in order to understand fuel deposition and accumulation dynamics on northern Rocky Mountain ecosystems. The full study monitored four forest types on 15 sites in Montana and Idaho in which 3 major disturbances, severe wildfire, Douglas-fir beetle (*Dendroctonus pseudotsugae*), and mountain pine beetle (*Dendroctonus ponderosae)*, resulted in at least 70% mortality.

Post-disturbance monitoring methods (Keane 2008b) were used in this study to measure fuel conditions because it is considered a reliable method for describing temporal fuel changes (Busing et al., 2000) on forested sites. In this article I discuss findings from the 3 whitebark pine (*Pinus albicaulis*) sites located in Idaho near Ketchum and Challis.

These whitebark pine (WBP) sites were established after severe mountain pine beetle (MPB) events and are located at elevations ranging from 1,429 m to 2,828 m. Galena Summit, near Ketchum, was established in 2007 following MPB disturbance resulting in 100% mortality; Twin Peaks 1 and 2, near Challis, had mortality estimated at 80% and 70%, respectively, at the time of establishment in 2009.

Figure 1. Litter trap used for collecting woody and non-woody material.

Methods

Six surface fuel components are recognized in this study. Freshly fallen leaves and needles from trees, shrubs, and herbaceous plants were categorized as Foliage while all other non-woody material, such as fallen cones, bark scales, lichen, and bud scales, are lumped into one fuel category (Other). The woody material was sorted into four diameter classes commonly used in fire behavior and effects models (Fosberg, 1970; Rothermel, 1972; Reinhardt et al., 1997).

The smallest size class was 1 hr fuels, woody material with diameters less than 3 mm. Branches with diameters between 3-25 mm are 10 hr fuels and large branches with diameters ranging from 25-75 mm are 100 hr fuels. For analysis, 1, 10, and 100 hour fuel classes were combined and categorized as fine woody debris (FWD). Logs, downed woody fuels greater than 75 mm in diameter, are referred to as CWD and define the 1,000 hr fuel component; CWD does not include snags or stumps (Hagan and Grove, 1999).

We use the term litterfall to describe the process of fuel deposition for all fuel components for simplicity and the devices used to measure fuel deposition are referred to as litter traps (figure 1).

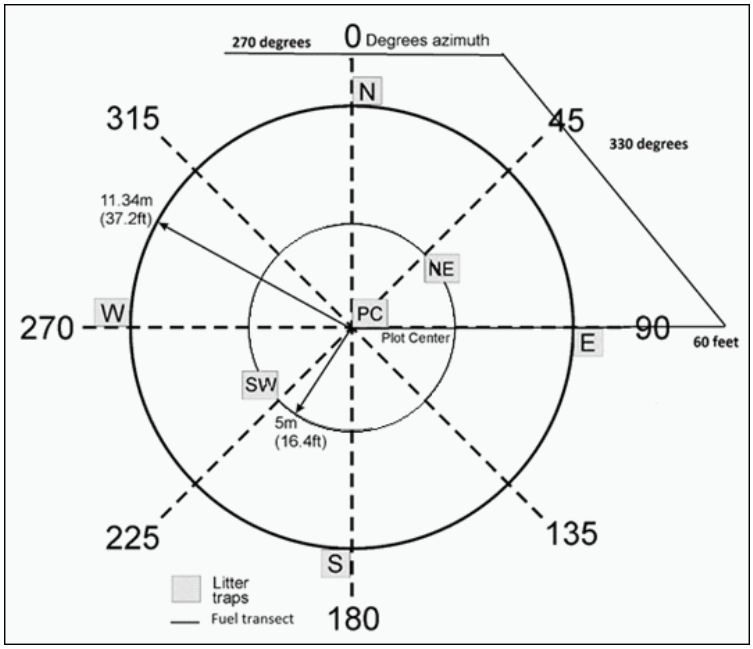


Figure 2. Plot layout showing littertrap and fuel transects on each study site.

Litter traps are 1x1 meter wooden frame (inside dimensions) with 2x9 cm boards with coarse grid hardware cloth tacked on the bottom of the frame to allow water drainage and to minimize losses from accumulated material due to decomposition and wind. Plastic screen was added on top of the hardware cloth to prevent fine material from falling through the hardware grid and also to facilitate litter collection. Seven litter traps were installed on each site within the circular plot boundary using the pattern shown in figure 2.

Each site was visited twice a year, generally during the spring after snow melt and fall prior to snowfall. During each visit, all material in each litter trap was transferred to heavy paper bags and transported to the lab for analysis. Woody fuel particles that lay partially out of the trap were cut directly at the trap border as defined by the inside dimension of the trap boards. If CWD fell over the litter trap, the large and small diameters at which the log crossed the trap, along with the log length across the trap, were measured on the site and measurements were recorded directly on the sample bag.

Annual litterfall rates (kg m-2 yr-1) were computed by dividing the total amount of accumulated material in each trap for the entire time period by the number of days in that time period; then we multiplied this daily rate by 365 to obtain an annual rate. Annual litterfall time series were evaluated using box and whisker plots (Sokal and Rohlf, 1981) to summarize temporal changes for FWD, CWD, foliage, and non-woody (Other) fuel classes by forest type/disturbance combination. Data were analyzed using generalized linear mixed models (GLMM's) to test for significant year-to-year differences in litterfall rates by disturbance agent. Although CWD was found rarely in litter traps, we decided to include the group to mark its absence (other sites did have trace amounts of CWD).

Results and Discussion

Dry weight of Foliage collected on all WBP sites was consistently and significantly highest in the first and second collection years following disturbance, while non-woody (Other) and FWD fuel components displayed high variability. The box and whisker plot for Galena Summit (figure 3) is representative of trends seen on all 3 WBP sites. Since CWD was not found in the litter traps, no change in deposition rates were indicated for the large fuel class during the entirety of this study. Statistical analysis supported the observed trends shown in the box-whisker plots in which Foliage fuel components were significantly higher in the first 1-2 years following severe disturbance in the Foliage data. However, GLMM analysis showed there

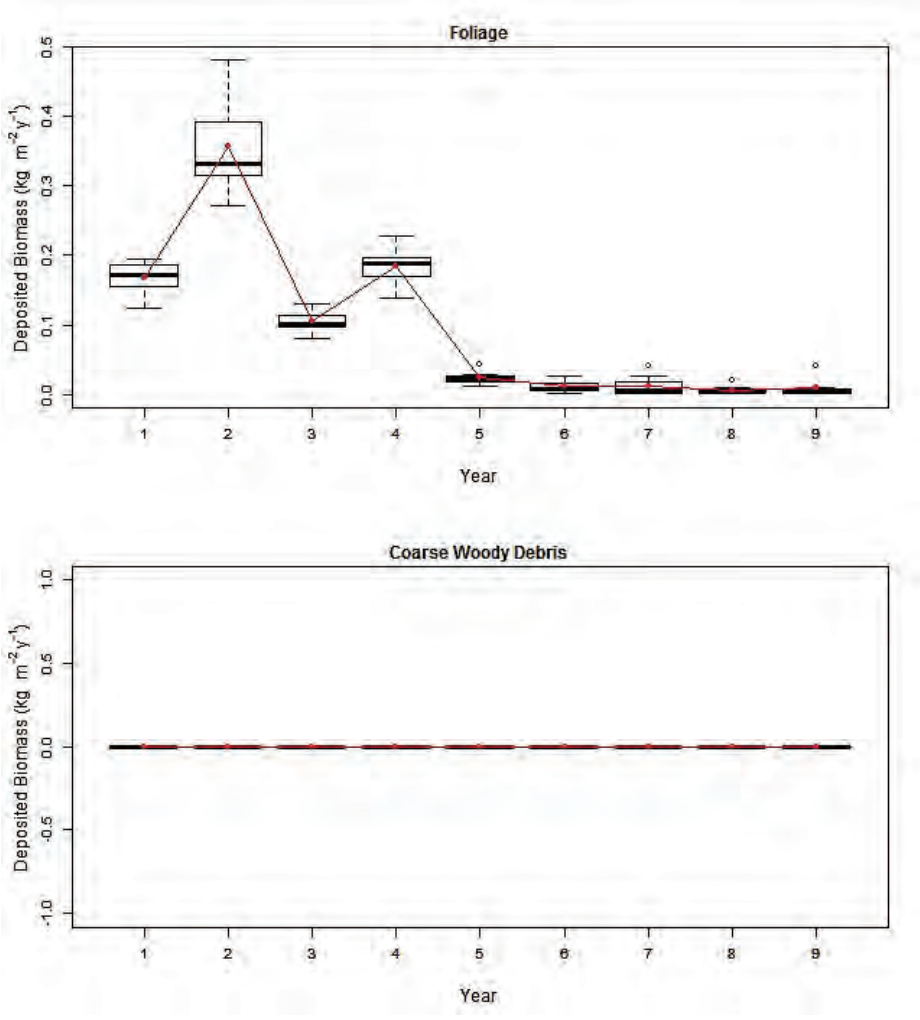


Figure 3. Annual deposition (kg m-² y-⊠) of foliage, fine woody debris, course woody debris, and other fuel components for Galena Pass study site. The lower boundary of each box is the first quartile (25th percentile), the upper boundary is the third quartile (75th percentile), and the line within the boundary box represents the median of the distribution. The upper and lower error bars are the 10th and 90th percentile and the circles above the error bars represent outlying values. A red line represents the average of the distribution. X-axis reflects years since disturbance.

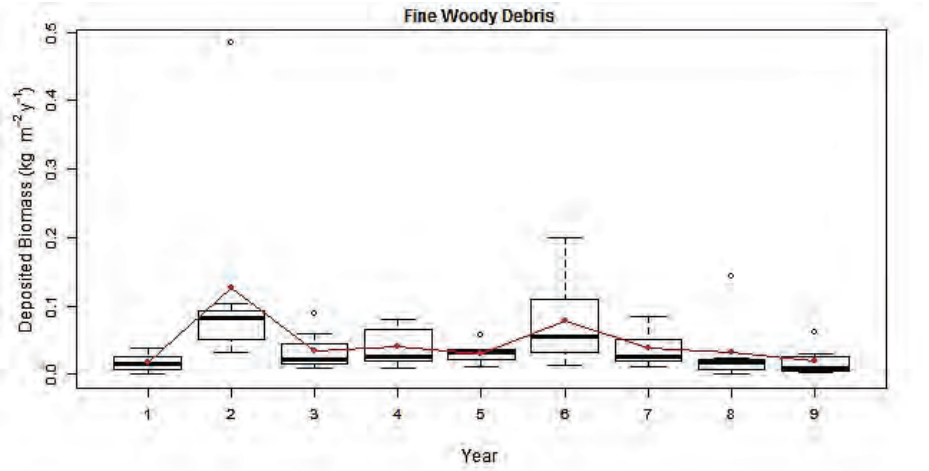
was no difference in FWD, Other, or CWD fuel components measured bi-annually during this study.

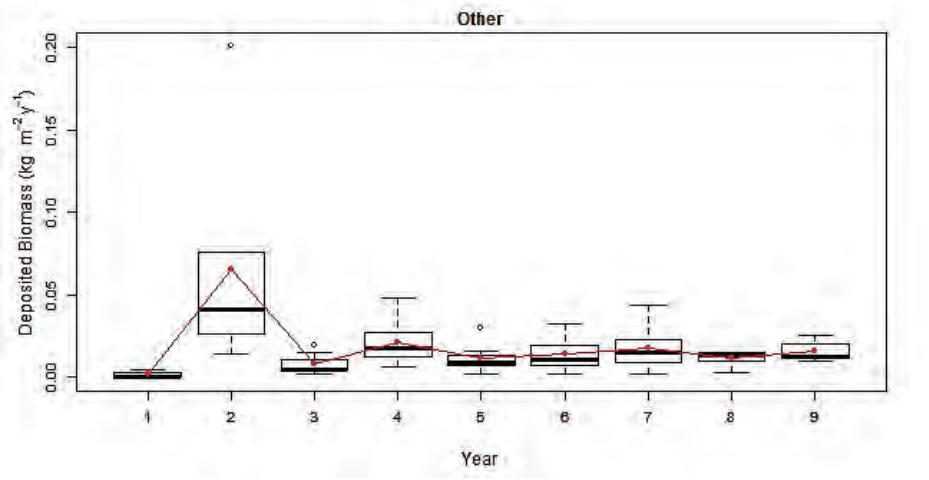
Other studies of forest beetle influences on stand conditions have shown that the time required for needle loss following beetle outbreak tends to take place 1- 3 years following disturbance along with notable changes in other fine fuels (Jenkins and others, 2012); generally, a period of 20 or more years must pass before substantial amounts of dead trees begin to fall to the ground (Jenkins and others, 2008). In this study we found that canopy foliage followed a similar pattern, falling from canopy to floor in 1-2 years. No large branches or logs were found in our litter traps in the nearly 10 year period of monitoring these 3 whitebark pine stands. This follows with the findings from Keane (2008a) in which foliage, fine woody litterfall, and other canopy material are highly correlated but there is no significant correlation with large woody fuels.

There are some aspects of this study that should be considered when interpreting results. CWD deposition rates were measured differently than FWD rates. CWD rates were measured using the littertraps in the first part of the study, but in 2010 we switched to measuring logs on the entire plot because we were getting little CWD material in the littertraps.

As we continue to monitor fuel loadings, we will analyze age data from the logs to determine when each log fell and then tag each log to record deposition dates. There are only a few sites to represent MPB in the WBP forest type, making statistical analysis difficult and interpretation confusing. However, this problem is mainly because of the lack of suitable study sites and the high cost of semi-annual sampling across such a large study area. While results from this study are lacking sampling and statistical rigor, we feel that the results are still informative for fire management.

Canopy foliage and fine woody material are supported in the canopy for a relatively brief period of time. During the decade following disturbance, heavy surface fuel accumulation was not observed on whitebark pine forest types. Our findings indicate that fire hazard on WBP stands following MPB disturbance may introduce considerably less risk than conventional wisdom might imply.





References

Axelson, J.N., Alfaro, R.I., Hawkes, B.C., 2009. Influence of fire and mountain pine beetle on the dynamics of lodgepole pine stands in British Columbia, Canada. Forest Ecology and Management 257, 1874-1882.

Busing, R., Rimar, K., Stolte, K.W., Stohlgren, T.J., Waddell, K., 2000. Forest health monitoring. Vegetation pilot field methods guide. Vegetation diversity and structure down woody debris fuel loading. In. USDA Forest Service, National Forest Health Monitoring Program, Washington, D.C., USA, p. 54 p.

Fosberg, M.A., 1970. Drying rates of heartwood below fiber saturation. Forest Science 16, 57-63.

Gara, R.I., Littke, W.R., Agee, J.K., Geiszler, D.R., Stuart, J.D., Driver, C.H., 1984. Influences of fires, fungi and mountain pine beetles on development of a lodgepole pine forest in south-central Oregon. In: Baumgartner, D.M., Krebill, R.G., Arnott, J.T., Weetman, G.F. (Eds.), Lodgepole pine: the species and its management.

LITTER continued on page 9

Effects of Two Consecutive Wildfires, Rough and Pioneer, during one season within the Cache Creek Whitebark Pine Restoration Project Area of Lowman Ranger District, Boise National Forest, Idaho

By Keith Wilson, Silviculture Technician, Boise National Forest

Wildfire and Project Background

On August 9, 2016, the Rough Fire burned through approximately 71 acres of the 157-acre Cache Creek Whitebark Pine Project area located on the Lowman District of the Boise National Forest. The Rough Fire burned with moderate intensity throughout most of the 71 acres with an approximate 60% mortality to whitebark pine.

On August 31, 2016, the Pioneer Fire burned through the Cache Creek project area. On that day the Pioneer Fire made a 30,000-acre run and exhibited extreme fire behavior. This is a preliminary report discussing the effects that both fires had on the Cache Creek Project area. Definitive conclusions would require more field review.

The Cache Creek Whitebark Pine Restoration Project was initiated to reduce competing vegetation and fuel hazards around existing whitebark pine, protect cone producing whitebark from mountain pine beetle attack and encourage natural whitebark pine regeneration. The treatments included the following:

1. Cut subalpine fir and lodgepole pine less than 14 inches DBH

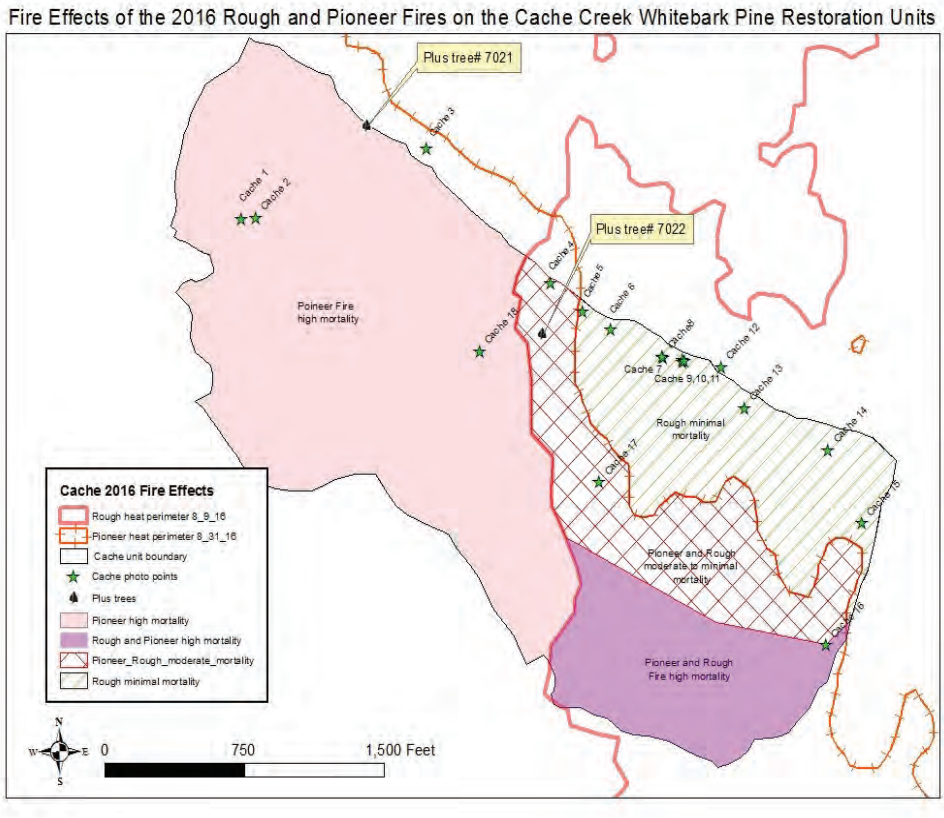
2. Girdle and prune subalpine fir and lodgepole pine between 14 and 20 inches DBH.

3. Slash treatment included a combination of hand piling and hand pile burning.

Initial implementation occurred during the FY11 season with treatment #1. Slash was hand piled in 2011 then burned in the fall of 2012. Girdling was scheduled to occur in 2012 but the project was not completed as the contractor defaulted on the contract. Girdling did not occur until the summer of 2015.

Observations Post-Fire

On October 4, 2016, a post fire field trip was conducted to the Cache Creek



Project area by employees of the Boise National Forest with three main objectives:

1. To determine what effects the two fires had on the Cache Creek Restoration units.

2. Whether or not the project treatments had a positive, negative or no effect on stand survival during the two fires.

3. To determine if we have been done something differently or additionally with our treatments to increase stand survival during the fires.

The majority of the Cache Creek unit experienced high mortality. Mortality in these areas was close to 100%. The walkthrough revealed that there is approximately 35-45% survival of whitebark pine in the locations within the Cache Creek Project area that had been pre-burned by the Rough Fire prior the Pioneer Fires arrival. Whitebark pine survival included trees of cone-bearing age along with sapling and seedling sizes.

The Southeast corner of the Cache Creek Project area within both fires' perimeter suffered high mortality as a result of having the highest pre-thinning density. There were also a large amount of down heavy fuels on the ground due to the thinning.

One item of concern was the possibility that the previous year's pruning and girdling activities increased fire activity within the unit. The girdled trees that had survived the fire did not appear stressed by the girdling process at the time. The needles were green with very little evidence of desiccation. While many girdled trees were burned in the fire, it seems unlikely that they contribute the fire's extreme behavior that day. They probably would have contributed to the fire hazard the following fall.

Cache 1 location on map facing southeast. This photo is indicative of locations that were not pretreated by the Rough Fire.

Conclusion

It appears that when the Pioneer Fire reached the Rough Fire boundary, it burned hot for approximately 800 feet into the previous burn, then dropped to the ground and consumed some of the remaining fuels. It eventually ran out of available fuel and ceased advancing into the rest of the unit contained within the previous burn.

The portions of the Cache Creek units that were not pretreated by the Rough Fire experienced the highest mortality from the Pioneer Fire with survival often less than one percent. On the other hand, the areas "pretreated" by the Rough Fire experienced an estimated survival of 40%.

Observations

• Thinning and pruning alone will probably not stand up to the severe conditions the project area experienced on August 31 when the Pioneer Fire came through.

• Treated stands may survive a low to moderate severity burn.

• The girdled trees from the season before may not have increased fire intensity within the treated area but will probably do so the as the trees begin to die.

• The areas within the restoration unit that had the highest stand density prior to thinning and girdling appeared to suffer higher mortality rates due to the increased amount of heavy fuels left on the ground post treatment.

Mitigations

• Broadcast or jackpot burn on a more frequent schedule within whitebark pine project areas to significantly increase survival during low to moderate intensity fire events.

• Torch individual girdled trees when appropriate to reduce short term post treatment fire hazards.

• Reduce the fuel load adjacent to the treatment unit to create a buffer against moderate and severe fire events.

• Remove as much of the heavy down woody fuels during thinning treatment activities to reduce fire intensity and severity.

Cache 6 taken inside the Rough Fire perimeter facing southeast. This photo reflects increased survival within the Rough Fire Perimeter.

It is also important to note that most of the soils throughout the Cache Creek Whitebark Pine Restoration area were not significantly impacted from high severity fire. In many places, grasses and forbs were already beginning to return to the project area.

LITTER continued from page 6

Washington State University, Spokane, WA, pp. 153-162.
Hagan, J.M., Grove, S.L., 1999. Coarse woody debris. Journal of Forestry January, 6-11.

Hicke, J.A., Johnson, M.C., Hayes, J.L., Preisler, H.K., 2012. Effects of bark beetle-caused tree mortality on wildfire. Forest Ecology and Management 271, 81-90.

Jenkins, M.A., Hebertson, E., Page, W., Jorgensen, C.A., 2008. Bark beetles, fuels, fire and implications for forest management in the Intermountain West. Forest Ecology and Management 254, 16-34.

Jenkins, M.J., Page, W.G., Hebertson, E.G., Alexander, M.E., 2012. Fuels and fire behavior dynamics in bark beetle-attacked forests in Western North America and implications for fire management. Forest Ecology and Management 275, 23-34.

Jolly, W.M., Parsons, R.A., Hadlow, A.M., Cohn, G.M., McAllister, S.S., Popp, J.B., Hubbard, R.M., Negron, J.F., 2012. Relationships between moisture, chemistry, and ignition of Pinus contorta needles during the early stages of mountain pine beetle attack. Forest Ecology and Management 269, 52-59.

Keane, R.E., 2008a. Biophysical controls on surface fuel litterfall and decomposition in the northern Rocky Mountains, USA. Canadian Journal of Forest Research 38, 1431-1445.

Keane, R.E., 2008b. Surface fuel litterfall and decomposition in the northern Rocky Mountains, USA. In. USDA Forest Service Rocky Mountain Research Station, Fort Collins, Colorado, p. 22.

Kramer, C.Y., 1956. Extension of multiple range tests to group means with unequal numbers of replications. Biometrics 12, 307-310.

Reinhardt, E., R.E. Keane, Brown, J.K., 1997. First Order Fire Effects Model: FOFEM 4.0 User's Guide. In. USDA Forest Service, p. 65 p.

Rothermel, R.C., 1972. A mathematical model for predicting fire spread in wildland fuels. In, Ogden, Utah, p. 40.

Sokal, R.R., Rohlf, F.J., 1981. Biometry. W.H. Freeman and Company, San Francisco, CA USA.

BLM Planting Party, June 2017

Teamwork Makes the Dream Work: Group Effort Contributes to Whitebark Pine's Success in Montana BLM

The Bureau of Land Management's Dillon Field Office (DFO) has been involved in whitebark pine management for nearly a decade. The 2010 petition to list the tree on the endangered species list is where it all started.

"We knew it was out there, we just didn't realize the extent of it within our Field Office," Forester Emily Guiberson recalls. The DFO manages almost 150,000 acres of forested lands located in southwest Montana. "Once we trained our eyes to differentiate whitebark from limber pine, we really started looking for it."

Initially, foresters began looking for live, cone-bearing trees that could be protected with Verbenone. Plans quickly changed when a simple question and a photo of cones sent to the regional geneticist in regards to cone ripeness yielded the response to "GET THOSE CONES!" The threat was extreme as the DFO was in the peak of the Mountain Pine Beetle (MPB) epidemic for the area- with no end in sight- just acres of trees that stood to be lost. Any tree that appeared to be thriving under the threat of MPB and blister rust was targeted for protection and cone collection.

Since that first season, the DFO has managed to collect multiple times from 7 different sites. "The goal is that we have seed from as many places as possible in our office so that in the event of a fire or massive die off, we have local seed to put back to the site. We plan to continue to collect as long as the trees are putting on cones."

Each summer the trees that were initially chosen have been revisited and protected with Verbenone. Each site has been monitored both on an individual tree and stand level through the outbreak and detailed notes about the overall cone crop, insect and disease observations, photos, etc. are taken. A task that is becoming less of a priority as the beetle populations continue to return to more endemic levels.

The DFO is constantly searching for new ideas that will help promote the success of the species and, with the beetle decline, they have been able to shift from reactive to more proactive management. "I'm always looking to make us a deal!" Guiberson says with a smile, "Often, the nursery ends up with excess seedlings, for one reason or another. Most offices pass because there are too few to put into a planting contract when it's only a couple hundred at a time. That's when I swoop in and get us the remaining trees!"

Early last spring an email went out from the Coeur d'Alene Nursery offering up excess seedlings that would be looking for homes. "I was able to get us all of the trees available from 2 different seed

zones, about 1,200 in total." The seedlings were all 3-year old seedlings and plans quickly began forming to get them planted into an area that had burned the previous summer in a wildfire. "Being a smaller agency, we have had to be very opportunistic. This wasn't something we had planned for, but when I had confirmation we got the trees, I just started calling people and asking for help."

Unlike their larger counterpart, the Forest Service that almost exclusively utilizes large scale planting contracts, all of the BLM whitebark plantings to date have been completed in house. "The planting itself is a logistics nightmare, the sites are at high elevations so we are always fighting with snow and weather, not to mention that we area also in bear country. It can be expensive to contract and its very physical, so some may feel that the bang for the buck is not there with that small of an amount."

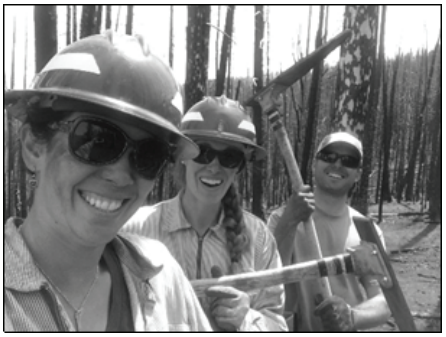
"By keeping the project in house, we have been able to keep our costs down and I think those are the best opportunities for us to get out our message about why it's important work. When we take someone out of their everyday job and up to the top of a mountain where we are planting these trees and I guarantee they care about what they were doing by the end of the day. Message received!"

On a beautiful day in early June, 19 people, from 4 different field offices came together to help. The group comprised mostly of foresters but also included a wildlife biologist, a GIS specialist, a range specialist, a Chicago Botanical Intern as well as biological technicians and a fisheries technician. Everyone loaded up all of their gear and made the bumpy hour plus trip into the site via UTVs. After a quick demo of the dos and don'ts of planting, everyone was off. The group was able to successfully plant all 1,200 trees in roughly 3 hours. "I was shocked we got them all in the ground so fast! I honestly thought it would take us 2 days to get done, but everyone was so excited to be there and we all just made it happen," says Guiberson.

Ken Reed, State Office Forestry Lead for the BLM Montana- Dakotas inspects one of the seedlings to be planted.

Guiberson believes that the teamwork the BLM often uses to complete projects is something unique to the Montana program. "We have helped each other out with so many different projects over the years, we have all really learned a lot from those experiences." Montana BLM has 4 field offices within the state that have forestry programs, each office averages 2 permanent foresters on staff. "We have a much smaller program than our sister agency, the Forest Service. We have to be more resourceful to get work done because there are fewer of us, which means that we call each other a lot for help."

With DFO leading the charge, the other offices are following by also getting involved in collaborative groups and are planning for collections, protection, inventory and planting. Several are also certified tree climbers, so when the cone crops are big, the offices help each other complete that task as well. "It's been a great way to get us all on the same page with whitebark pine conservation."



Foresters Emily Guiberson (Dillon), Ashley Durham (Dillon), and Michael O'Brien (Butte) stop for a quick photo.

Chicago Botanical Intern Stella Rose Scheel plants her first Whitebark Pine Seedling.

Whitebark in Grand Teton National Park. By Bob Keane. 2017 WPEF Calendar.

Special Report: National Whitebark Pine Restoration Plan and Summit

By Diana F. Tomback - Policy and Outreach Coordinator, WPEF

In summer 2016, the Whitebark Pine Ecosystem Foundation (WPEF) in partnership with American Forests approached the U.S. Forest Service with a bold idea: We proposed developing a collaborative inter-agency strategic rangewide restoration plan for whitebark pine. Although Keane et al. (2012) had previously published a general rangewide restoration plan which emphasized methods (RMRS-GTR- 279), we would take the concept to the next logical level—the development of a geographic plan that focused on prioritized areas ("core areas") for restoration.

The draft concept for the restoration plan was well-received, and the final agreement to pursue the plan was forged in spring 2017. We are grateful to the Washington Office of the Forest Service for their support of our shared vision, and particularly to Deputy Chief Leslie Weldon. Our key collaborators in this effort are David Gwaze, Forest Service National Silviculturist; Bob Keane, U.S. Forest Service Rocky Mountain Research Station; and, Eric Sprague, Director of Conservation for American Forests.

The major rationale for this plan was the continuing decline in whitebark pine from an unprecedented combination of threats—widespread damage and mortality from invasive white pine blister rust, mountain pine beetle outbreaks, altered fire regimes, and climate change. In 2011, the U.S. Fish and Wildlife Service had designated whitebark pine as a candidate species under the U.S Endangered Species Act (ESA). The agency determined that listing was "warranted but precluded" by funding and other priorities, but will finalize their evaluation of whitebark pine in early 2019. Whitebark pine was listed in 2012 as "endangered" under Canada's Species at Risk Act. If listed in the U.S., whitebark pine would be the most-widely distributed forest tree under ESA protection, with over 75% of the U.S. distribution on Forest Service lands.

The process for developing the restoration plan includes outreach and collaboration with all agencies with a portion whitebark pine's distribution

under their jurisdiction. The agencies include the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish & Wildlife Service, and Native American tribes. We believe that this planning approach and the restoration plan itself will produce realistic restoration goals, focus and champion efforts, engender cross-agency cooperation, and facilitate federal and NGO fund-raising efforts for restoration. At this time, we estimate that the process of acquiring and assembling data and writing the plan is likely to require at least 18 months, but the timeline will be finalized with input from our agency collaborators.

Vision:

Components of the restoration plan

The restoration plan is based on components illustrated in Fig. 1. The fundamental building blocks of the plan will be geographic areas ('core areas') nominated for restoration within whitebark pine's range by agencies, e.g., Forest Service regions, national parks, tribal lands.

The criteria for nominating core areas may be consistent across some agencies or vary by unit within jurisdictions for others. Examples of important criteria for selection of certain geographic areas include: climate change refugia based on modelling efforts, areas important for snow retention and watershed protection, areas of high mortality from blister rust or mountain pine beetle, areas of relatively healthy whitebark pine, or areas of high recreational value.

Nominated areas within each jurisdiction will be prioritized as number 1 to 3, with 1 indicating first priority for restoration. We are proposing that nominated areas represent roughly 20 to 30% of whitebark pine's range within any jurisdiction. Given the fact that nearly 40% of whitebark pine's range occurs under some wilderness designation, we are suggesting that nominated areas include some wilderness lands.

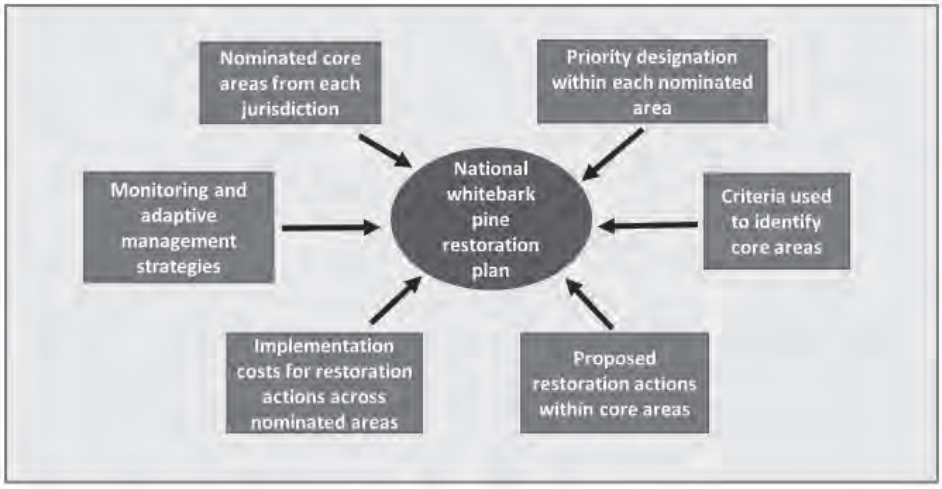


Figure 1. Components of the plan.

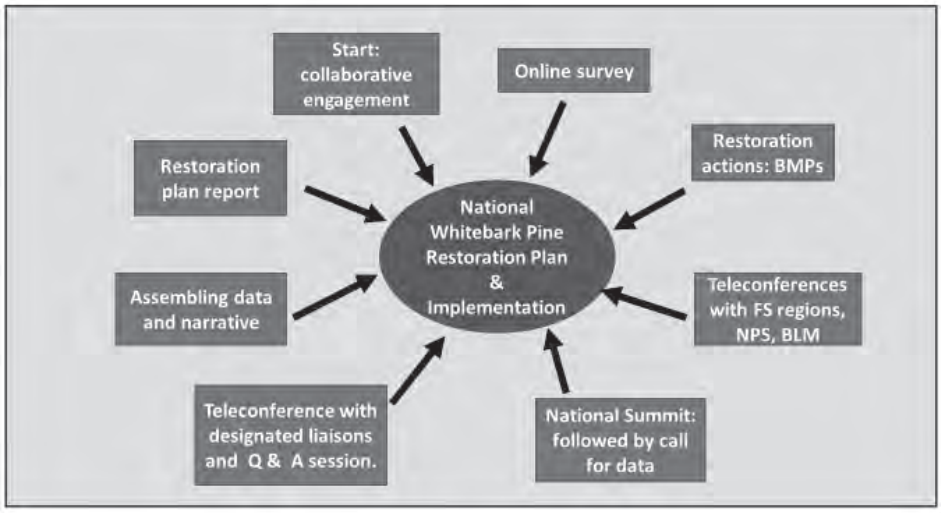


Figure 2. Steps in the Process

For all areas nominated, agencies will provide the criteria used, describe the restoration actions required, and provide a rough estimate of implementation costs. Their proposed restoration actions will also require measures of success and a monitoring and adaptive management substrategy.

We anticipate that the synthesized restoration plan will be published in two forms: as a U.S. Forest Service General Technical Report, with maps, figures, and narrative, plus on-line database; and as a public outreach and educational report by American Forests.

Developing the restoration plan

In late spring 2017, the restoration planning process and request for collaboration was announced in a letter from Deputy Chief Leslie Weldon and sent to high level administrators across agencies as well as to personnel who had responsibility for whitebark pine within federal agencies and tribal governments. Additional preliminary steps led by the WPEF included an online survey hosted on our website, a workshop to discuss and refine management actions, and hour-long conference calls with key regional personnel in the Forest Service and the National Park Service (Fig. 2).

PLAN continued on page 22

WPEF's Whitebark Pine Ski Area Certification

By Mike Giesey, Chariman of the Ski Area Partnership Committee

Chances are the first whitebark pine you experienced was at a ski area in western North America. Maybe you didn't notice that gnarly old weathered tree was a whitebark pine? Or that those silver-gray tree "skeletons" on the horizon were dead whitebark pine? The normal person may not have noticed, but maybe you did and that is why you are reading this journal!

Whitebark pine is a very unique tree species. As you may have read in other sections of this journal or on our website, they provide many benefits like maintaining snowpack, providing habitat where other trees and plants can get established in a harsh environment, and producing a very nutritious food source for bears, squirrels, birds, foxes, and many others.

These trees have the ability to grow in some of the harshest conditions, with very long dry periods, very short growing seasons, extreme winds, and onerously deep snowpacks. Whitebark pine has evolved under a unique relationship with a bird (Clark's nutcracker) who depends on whitebark pine for food and, in return, disperses the large, wingless whitebark pine seed to aid in regeneration.

Who doesn't respect a tree that does all that? Well, the sad part of this story is that whitebark pine are in serious decline due to a non-native fungus (whitepine blister rust), native bark beetles (mountain pine beetle), altered fire regimes, and changing climate - which has negative effects on all of the above.

Whitebark Pine Ecosystem Foundation to the rescue! The Whitebark Pine Ecosystem Foundation was created by scientists and land managers who saw the decline of whitebark pine early and decided to do something about it. One of the many things the Whitebark Pine Ecosystem Foundation is doing is educating people on the importance of whitebark pine to the high elevation ecosystems, and the threats to whitebark pine existence.

What better place to do this than where many people experience whitebark pine – on a ski hill. The Whitebark Pine Ecosystem Foundation has created a certification program to encourage ski areas to conserve and restore whitebark pine. The Whitebark Pine Friendly Ski Area (WPFSA) certification program was launched in 2016 when

Whitefish Mountain Resort was the first ski area to be certified. This event coincided with Whitebark Pine Ecosystem Foundation's annual fall conference and allowed many of our members and supporters to see firsthand the work Whitefish Mountain Resort has done to conserve and restore whitebark pine.

We are currently working with Grand Targhee Resort and the Yellowstone Club to get them certified and we are actively seeking interest from other ski areas.

The intent of this certification program is to:

• Recognize ski areas that are leaders 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.

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

• And, ultimately, preserve and manage for whitebark pine so that high elevation recreationists can enjoy the many benefits of whitebark pine

The education component has two main focus areas: educate the public and educate ski area employees and managers. Public education would involve programs such as incorporating whitebark pine education as part of existing summer nature walks or snowshoe outings, identifying some whitebark pine within the ski area with signs, and displaying a whitebark pine education poster in a prominent area.

Education and awareness for ski area employees would aid in their understanding of whitebark pine habitat so they can share that with the public, and education and awareness for ski area managers would assure that decisions on ski area expansion or ski trail maintenance would be made with full consideration of whitebark pine. Assistance provided by the Whitebark Pine Ecosystem Foundation to ski areas seeking certification includes:

• Serves as a resource for ski areas to clarify and provide advice about checklist points, and provide any information on ecology, conservation, and management

• Provides regional contacts (i.e. Government agency experts, Whitebark Pine Ecosystem Foundation board members) that are capable of assisting resorts with their efforts to meet WPFSA certification requirements

• Provides a general informational poster about the WPFSA Certification Program and a certification plaque

• Creates a WPFSA web page on Whitebark Pine Ecosystem Foundation's website which will explain the program and house links to participating ski area's WPFSA pages.

Do you have a favorite ski area with whitebark pine? Please send us contact information. Do you want to know more about this program? Please visit the Whitebark Pine Ecosystem Foundation website at www.whitebarkfound.org and contact us at ski_whitebark_friendly@whitebarkfound.org

Wood Carving: Clark's nutcracker and kerosene lantern

By Dieter Golze, wood sculptor

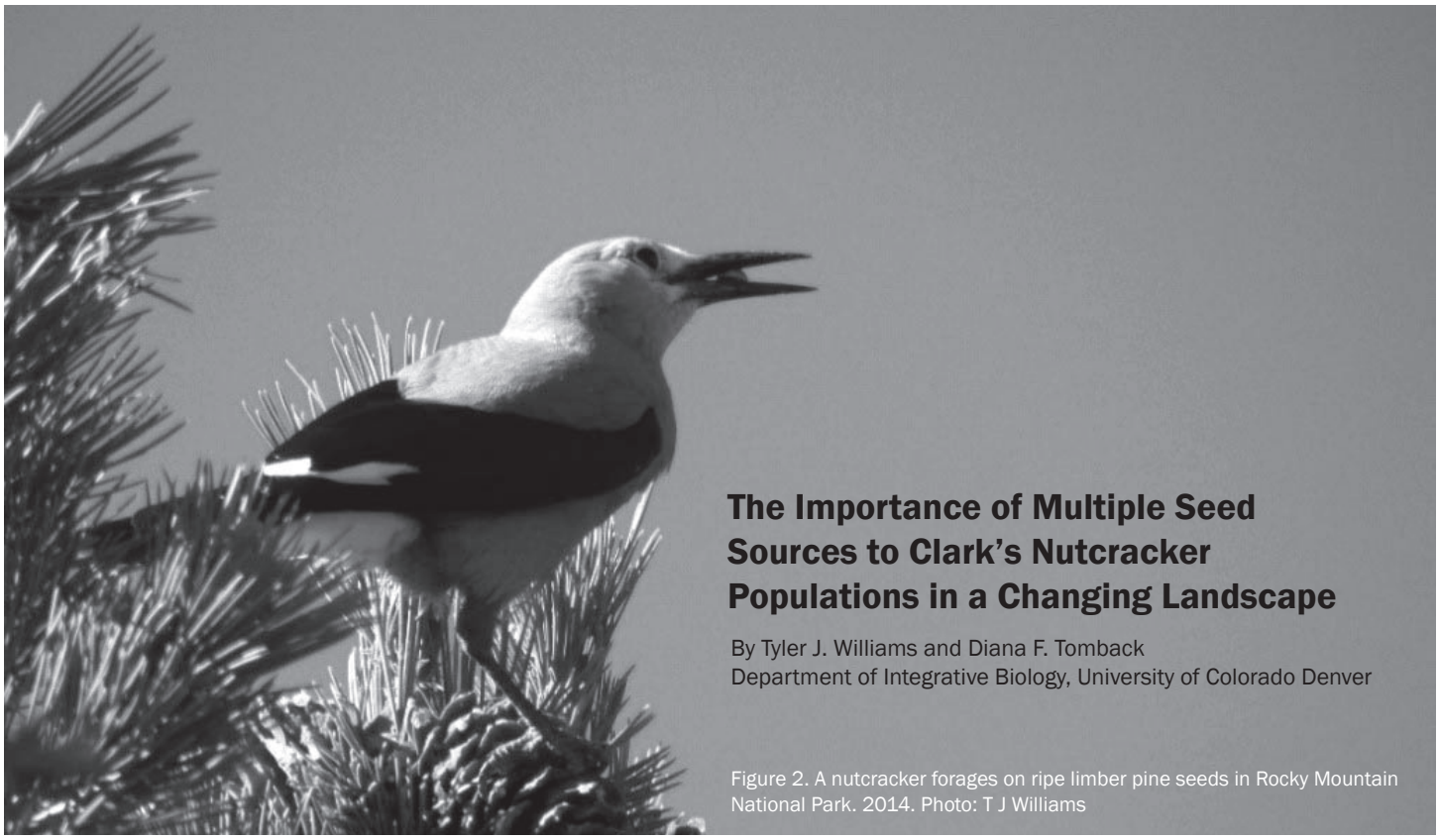
Clark's Nutcrackers have had a special spot in my heart from the first time I saw one many years ago in Lake Louise. Both my wife and I are bird nuts to be sure. When I do a carving, I don't target a show as such or to please some judge. I do a piece for my own gratification. That carving has been in my sketchbook for over twenty years. In the process of carving this piece, I did not feel comfortable with the amount of reference material I had on plumage appearance, especially the tail, nor could I find the proper lantern to use as a model. We even went to Lake Louise armed with a bag of trail mix to get a close up look at the bird. One accepted my offering immediately with a bunch of laughing Japanese tourist snapping photos. He would not let me touch his tail though. Every time I tried, he'd bite me and fly off, only to come right back for more. Eventually in an antique shop I found the lantern I wanted.

The story behind the composition was from an account I read about nutcrackers being fed by miners in the days of pick and shovel mining in the Kootenays. In the Kaslo river valley, there were many small silver mines serviced by a narrow gauge railroad. The adits were always illuminated by lanterns, in this case railroad lanterns, because they were widely available. When the men came out for their lunch, the Nutcrackers were waiting to steal food from them. Of course, the miners always shared even though they had hardly enough to eat themselves. Now I don't know whether a nutcracker ever actually sat on a lantern, but it makes for a better composition than to have him just sitting on a rock.

Work in progress, left. Completed sculpture to the right.

I'm pleased with the way the piece turned out, which is not always the case. To make the lantern took longer than to carve the bird. This happens to me a lot because I like my work to tell a story, so the base or habitat can be quite elaborate.

Bio: Wood sculptor Dieter Golze was born in Germany in 1943. In 1952 he came to Canada with his family. As a youngster, he spent many watchful hours in the shop of a French Canadian wood carver, little knowing that his future was in the making. For health reasons he was forced to give up a successful career in aviation, and in 1987 his love for wildlife and his knowledge of wood and tools led him in the footsteps of his early mentor.



The Importance of Multiple Seed Sources to Clark's Nutcracker Populations in a Changing Landscape

By Tyler J. Williams and Diana F. Tomback
Department of Integrative Biology, University of Colorado Denver

Figure 2. A nutcracker forages on ripe limber pine seeds in Rocky Mountain National Park. 2014. Photo: T J Williams

Background and Objectives

Pines with large, wingless seeds are an important food source for Clark's nutcrackers (*Nucifraga columbiana*). Nutcrackers preferentially forage on the seeds of whitebark (*Pinus albicaulis*), limber (*P. flexilis*), southwestern white (*P. strobiformis*), and pinyon pines (*P. edulis and P. monophylla*) (Tomback 1998). These seeds provide high energy rewards relative to foraging effort. When seeds are ripe, nutcrackers may travel more than 30 km to harvest and scatterhoard seeds in caches of about 1 to 15 seeds (Vander Wall and Balda 1977, Tomback 1978, Lorenz and Sullivan 2009). Seeds in caches not retrieved by nutcrackers may germinate, leading to tree recruitment.

Despite this apparent food specialization, nutcrackers are opportunistic in their use of conifer seed resources, particularly after preferred seed sources are depleted. Nutcrackers will eat and cache the winged seeds of other conifer species, which are usually small in size. These seed sources include ponderosa (*P. ponderosa*), Jeffrey (*P. jeffreyi*), sugar pine (*P. lambertiana*), the Rocky Mountain (*P. aristata*) and Great Basin bristlecone pines (*P. longaeva*); and, Douglas-fir (*Pseudotsuga menziesii*) (Giuntoli and Mewaldt 1978, Tomback 1978, Torick et al. 1996, Lorenz and Sullivan 2009, Murray and Tomback 2010,Tomback et al. 2011, Schaming 2016).

These latter seed sources may be important for sustaining nutcracker populations during poor cone crops of pines with large, wingless seeds. But, the high elevation, five-needle white pines (whitebark, limber, southwestern white, sugar, and bristlecone pines) are declining, the result of mortality from mountain pine beetle (*Dendroctonus ponderosae*) outbreaks, fire suppression, climate change, and especially the spread of white pine blister rust (pathogen *Cronartium ribicola)* (Tomback and Achuff 2010, Tomback et al. 2011).

Along the Front Range of the Colorado Rocky Mountains, limber pine is a staple nutcracker food source, because it is the only widespread large-seeded pine (Critchfield and Little 1966). Ponderosa pine and Douglas-fir are also widely-distributed in this region, but it is unknown to what extent nutcrackers depend on these small, winged seed sources. We selected Rocky Mountain National Park (RMNP) as our study area to examine the relative use of limber pine, ponderosa pine, and Douglas-fir to nutcrackers. Specifically, for each of the three forest types, our objectives were to determine the effects of magnitude of cone production and timing of cone ripening on the inter- and intra-annual patterns of nutcracker visitation. For the purpose of this short paper, we are presenting only a few basic results. Data are currently undergoing further analysis, and we anticipate submitting a paper to a peer-reviewed journal in early 2018.

Methods

Field work was conducted from early June through October 31 for three years, 2014-2016, capturing the full phenology of cone ripening each year. We selected three to five study stands each of limber pine, ponderosa pine, and Douglas-fir distributed throughout the eastern slope of RMNP. We established a single virtual transect through each stand, ranging in length from 300 to 1000 m. Each year, we visited each transect once to estimate cone production for each forest type, using a distance sampling protocol (Buckland et al. 2001). During the period of cone ripening from August to October, during two to seven visits each year we conducted focal behavior surveys as well as point count and occupancy surveys for nutcracker seed use and visitation.

Results

Seed production varied each year of the study as a result of asynchronous mast years among conifer species (Fig. 1). Cone production for limber pine occurred every year, but did not vary significantly across the study. A large cone crop for ponderosa pine occurred in 2015, and a mast cone year for Douglas-fir occurred in 2016. Limber pine seeds ripened in late August, with cones beginning to open in early September. Ponderosa pine and Douglas-fir cones began to open in late September or early October—a month later.

Each year of the study, we observed nutcrackers to forage first on the relatively small cone crop of limber pine beginning in mid to late August (Fig. 2). Nutcrackers then transitioned to harvesting ponderosa pine seeds in 2014 and 2015 and to Douglas-fir seeds in 2016 (Fig. 3). Ripening phenology affected the temporal patterns of nutcracker visitation intensity, increasing within stands as cones ripened and then declining. Inter-annual differences in visitation appear to be affected by cone density, with greater visitation of forest types during years of higher production.

Discussion

The results support the assumption that limber pine is a staple seed source for nutcrackers in RMNP. We observed nutcrackers eat and cache limber pine seeds during all three years of this study. The seeds ripen a month earlier than ponderosa pine or Douglas-fir, and provide an energetically-rewarding food source at a time when nutcracker seed caches made the previous fall may be depleted. During the two years of cone production in ponderosa pine—a moderate crop and a mast crop—nutcrackers transitioned from limber pine seeds to eating and caching ponderosa pine seeds. Nutcracker abundance in ponderosa pine stands was especially high during the mast year. In contrast, nutcrackers used Douglas-fir seeds only during its mast year in 2016. This conifer produces the smallest and least energetically-rewarding seeds of the three species studied. Nutcrackers may use this species more sporadically and mainly during the infrequent years of high cone production (Hermann and Lavender 1990).

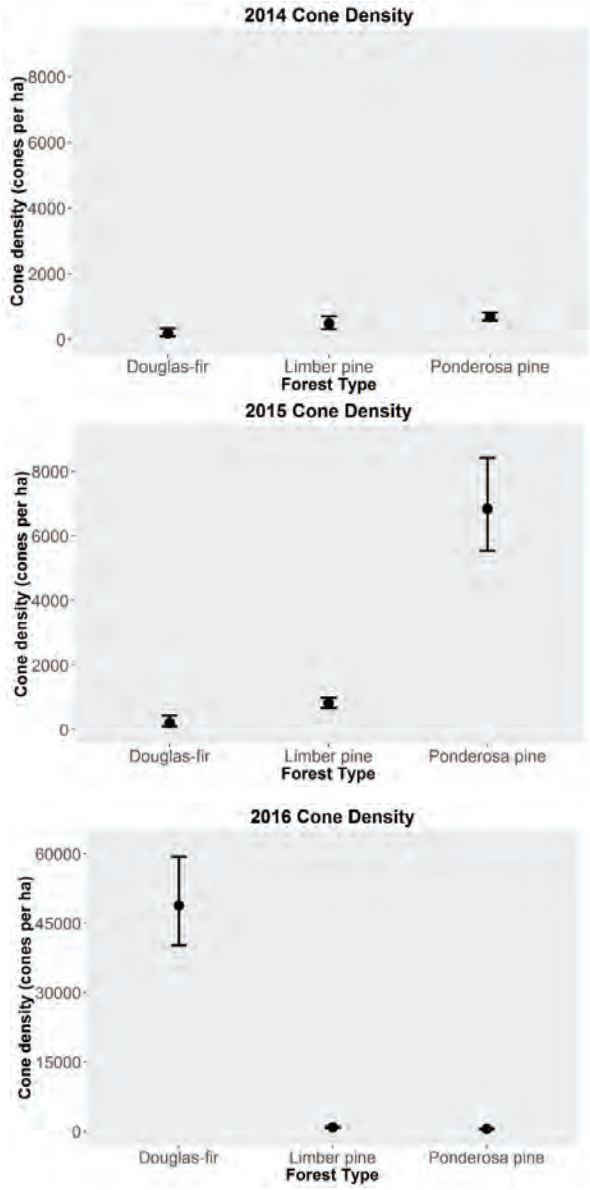


Fig. 1. Estimated cone densities for each year of the study. Filled circles indicate point estimates; errors bars indicate 95% confidence intervals. All estimates were calculated by program Distance (Thomas et al. 1998). The Y-axis scale for 2016 is larger.

White pine blister rust is spreading in Colorado, and the first infected limber pines were detected in Rocky Mountain National Park in 2009 and 2010 (Schoettle et al. 2011). Unfortunately, the ongoing spread of white pine blister rust in this region will likely cause a decline of limber pine in the near future. With less limber pine seed energy available on the landscape, the RMNP nutcracker population's carrying capacity will likely decline. However, the combined food energy provided by ponderosa pine and Douglas-fir may support a smaller nutcracker population over time, despite a gap in seed availability in late summer.

SEED continued on page 23

STUDENT RESEARCH GRANT

Call for proposals for 2018 Whitebark Pine Student Research Grant

The mission* of the Whitebark Pine Ecosystem Foundation (WPEF) is to "promote the conservation of whitebark pine and other high elevation five needle white pine ecosystems through education, restoration, management, and research." In support of this mission, the WPEF is offering a research grant of $1000 to an undergraduate or graduate student (MS or PhD) conducting research and writing a thesis on whitebark pine**.

Relevant areas of research include, but are not limited to: threats to whitebark pine, including mountain pine beetle, white pine blister rust, successional replacement, and climate change (only in whitebark ecosystems); interactions with wildlife, such as Clark's nutcracker or other birds, red squirrels and grizzly bears; restoration strategies for whitebark pine, including both field operations and nursery seedling production; ecosystem level impacts of whitebark pine die off; and, social or policy aspects of whitebark pine decline and restoration, including wilderness issues.

Monies will only be awarded for travel expenses for field work, or consumable research supplies. Grants shall not be used to buy equipment that will be used beyond the duration of the project (and thus would be retained by the lab in which the student works).

Your research submission must include a:

1. Short (**two single-spaced pages** at most, not including references) proposal covering:
   a. Background, objectives and justification for the research,
   b. A description of the study plan and methods, including expected dates of work described,
   c. Measures of success and expected outcomes of the research, including expected completion, and
   d. A brief explanation of how the money will be spent.
2. Resume or CV, including your contact information and academic affiliation.
3. Letter of recommendation from your research advisor.

Grant recipients are encouraged to present their research findings at a subsequent WPEF annual science meeting and are expected to publish a research summary in our bi-annual journal *Nutcracker Notes*. All applicants are encouraged to join WPEF and the grant recipient will receive a free subscription to *Nutcracker Notes* for one year.

Please send application materials (electronic only) to cyndi.smith@whitebarkfound.org by February 1, 2018.

---

*More detail on the mission, goals and objectives of the WPEF can be found at whitebarkfound.org.

** While the WPEF is concerned about all five-needled pines, we are focusing this grant just on whitebark pine.

Silent Auction 2017 Raised Over $1,100 for Student Research Grant

By Cyndi Smith, Interim Director, WPEF

You did it again!! The Silent Auction held during the science meeting at Jasper, Alberta, on September 21st, 2017, was very successful, raising $1,112 (USD; $1,440 CAD). The auction ran throughout the meeting, and concluded during the evening social at the Sawridge Hotel and Conference Centre. The Board of Directors is again dedicating the 2017 auction funds to the Student Research Grant, which is a competitive process that awards an annual grant worth $1000 USD towards a student's whitebark pine research. The WPEF has distributed $5,000 in research grants to students since 2012. Your donations and purchases have made this happen!

The Board of Directors would like to thank Joanne Vinnedge and Laura DeNitto for running the Silent Auction with skill and enthusiasm. We know that they had a few helpers at various times, including our Treasurer, Glenda Scott.

We would also like to thank both the donors (including a couple that were anonymous) and purchasers, some of whom donated and purchased more than one item:
10 Tree
Adrian Batho
Adventure Cycling

2017 SCIENCE CONFERENCE

The Leading Edge: Jasper 2017 Whitebark Pine Science and Management workshop

Parks Canada played a key role in celebrating Canada's 150th birthday. Jasper National Park in Alberta's northern Rocky Mountains rolled out the red carpet for five-needle pine enthusiasts to share the latest and greatest in research, restoration, and policy, focusing especially on northern dynamics and issues. Diana Tomback gave a very well-attended public talk on the importance of whitebark pine.

A total of 91 people registered for the one day workshop, with attendees from across the west and even beyond the range of the charismatic and threatened five needle pines. Agencies from Canada and the USA were represented, as well as a great turnout of keen individuals and students, including an entire restoration class from Lakeland College brought by their instructors. All of the presentations are posted on the WPEF website.

Despite a snow dump earlier in the week requiring some quick adjustments, the two days of field trips and the annual general meeting also had great participation featuring a discussion of best management practices, a tree climbing demonstration, an interpretive hike focusing on monitoring in Jasper National Park, and restoration projects in limber pine ecosystems.

The silent auction raised enough funds for next year's WPEF student award. The USA and Canadian board reports showed how dedicated volunteers could leverage limited budgets to support impressive accomplishments in science, policy, and management. In particular, the local organizers, especially Brenda Shepherd and the Parks Canada crew, went way above and beyond to make this another terrific meeting! Our sincere thanks to them.

We hope to see you all next year at beautiful, historic Stanley, Idaho.

Jodie Krakowski, Joanne Vinnedge, and Brenda Shepherd

---

continued from previous page

Alberta Government
Amy Gannon
Barb Gass
Blakey Lockman
Bob Keane
Bonnie Hoage
Brad Jones
Brenda Shepard, Parks Canada
Bryan Donner
Charles Scallia
Cheyenne Lund
Chris Harris
Cyndi Smith
Darci Bennett
Dave Coates
Diana Tomback
Eliot McIntire
Eve Meng
Fran Iredale
Glenda Scott
Gregg and Laura DeNitto
Jasper Park Lodge
Joanne Vinnedge
Jodie Krakowski
Julien St Amand
Karly Savoy
Kelli MacConnell
Ken Wright
Kendra Kozdroski
Kevin Hoekstra
Kim Dohms
Laura DeNitto
Liz Davy
Luiz Drummond
Maegen Rochner
Mark Sherrington
Melissa Jenkins
Michael Murray
Michelle Giesey
Mike Giesey
Patagonia Outlet, Dillon MT
Peter Achuff
Robin Gutsell
Ross Vennesland
Sandy Kegley
Sarah Leraux
Steve Arno
Sybille Haeussler

2018 SCIENCE CONFERENCE

Whitebark Pine Ecosystem Foundation 2018 Science and Management Meeting in Stanley, Idaho

We are excited to announce the 18th annual WPEF workshop on Thursday September 20, 2018 in Stanley, Idaho. An enthusiastic committee including Dana Perkins, Carl Jorgensen, Angel Saavedra and Laura Lowrey are organizing the event with program help from the Northern Rocky Fire Science Network.

SAVE THE DATE:
September 20-22, 2018
Stanley, ID

The workshop will showcase the latest news, science, and management tips for practitioners, students, educators, the public, and others with an interest in dwindling five-needled pines to be held at the Stanley Community Center.

There will be field trips September 21 and 22 to recent wildfire areas that will demonstrate management struggles and successes with treatments in the BTIP zone (non-grizzly bear focused efforts).

Preview the field trip by reading Keith's Wilson's article chronicling his observations following the 2016 Pioneer wildfire burning through treated areas.

An additional fun hike to a lake with whitebark will be planned.

Of course there will be the usual opportunity for improving cross-border networks, but the view of the mountains surrounding Stanley, Idaho, is one of a kind.

Keep your eye on the WPEF website to get the latest news and register for the conference for free (http://whitebarkfound.org).

We hope to see you there!!! If you are interested in giving a presentation, please email laurallowrey@fs.fed.us

PLAN continued from page 13

Field trips from the National Whitebark Pine Summit in Missoula, Montana, November 2017.

In the meantime, American Forests spearheaded the organization of the National Whitebark Pine Summit: Strategic Planning for Range-wide Restoration, which was held November 7-9, 2017, at the Hilton Garden Inn, Missoula, MT. The Summit hosted more than 100 attendees from all relevant federal agencies, including members of the transboundary, inter-agency Crown of the Continent High Five Working Group.

The presentations at the Summit highlighted steps in the strategic plan development and data assembly, as well as related topics including management actions, restoration costs, and restoration in wilderness areas. Time for questions and break-out sessions also provided opportunities for discussion and feedback. The anticipated next steps in the planning process will be the formal requests for both whitebark pine distributional data and nominated core area data.

Next steps

In response to feedback from the Summit, we will provide an opportunity to solicit input from designated contact personnel from the various agencies through teleconference calls in late January. This feedback will help us refine the process for data requests and determine how much time is reasonable for data compilation by agencies before we send out formal calls for data and announce the timeline for data delivery.

We also anticipate that a coarse distribution map and data files for whitebark pine will be made available to all agencies by mid to late January, as well as maps developed by Forest Health Protection showing levels of risk for white pine blister rust and mortality from mountain pine beetle.

No one has previously attempted restoration planning at this geographic scale and across multiple agencies and tribal jurisdictions: We are breaking new ground. The most important feedback we received from the National Whitebark Pine Summit was a strong indication of support for this effort, and for insuring the future of whitebark pine rangewide.

MANGOLD continued from page 3

major thrust of the agency, we knew it needed our attention. We took an active interest in what we could do in our federal role in Forest Health Protection and concluded gene conservation was our main interest. Other groups were handling restoration, but nobody was focused on saving seeds for the future. I funded the first collections of whitebark pine and its five-needle cousins for the sole purpose of gene conservation—not seeds for restoration planting. Having been the rust-breeding geneticist at the Dorena Gene Resources Center, I knew resistance breeding and subsequent outplanting of resistant seedlings was the main way we were going to keep this species in the ecosystem. With the advent of a changing climate, it is going to be important to have stored genotypes in the cooler to help reconstitute decimated populations. I'm happy to see the gene conservation effort continuing and spreading to the other 5-needle pine species.

Why did you decide to be a board member? In retirement you get to choose where you spend your time for the first time in your life. So, it was a very intentional to set my sights on the Whitebark Pine Ecosystem Foundation. I have worked with WPEF for the last 15 years and the group does very important work. Restoration efforts focused on a single species have done amazing things, for example, the work on redwoods, longleaf pine and American Chestnut. I hope I can make a difference for whitebark pine.

What is a book or movie that changed your life? So that would be The Big Lebowski. I knew if I didn't get my act together I would end up like the Dude and never get paid to work in the woods.

What do you do when not working on whitebark pine? I have an ongoing love affair with the state of Oregon and would like to drive every road in the state…. I'm halfway there.

SEED continued from page 18

During the course of our study, nutcrackers were present during all times of the field season within all study stands of limber pine, ponderosa pine, and Douglas-fir, albeit at lower incidence when seeds were not available. This occurrence indicates that nutcrackers regularly use all forest types in various ways and not just for seed foraging. However, in the case of Douglas-fir stands, nutcracker detections remained relatively high throughout our fieldwork. It is possible that nutcrackers prefer Douglas-fir forests as habitat for non-foraging purposes, such as roosting and nesting. Mewaldt (1956) observed nutcrackers to nest in Douglas-fir trees in Montana, and Schaming (2016) has observed nutcrackers in Wyoming preferentially include Douglas-fir forests within their breeding season home range. Tree density is often relatively high within these forests, and they are located at lower elevations in RMNP; this could offer protection from intense winds and solar radiation. Because nutcrackers can travel long distances, they may regularly visit multiple forest types for different purposes.

Acknowledgments

We are grateful to the Rocky Mountain Conservancy for awarding TJW the Bailey Research Fellowship in 2015 and to the Denver Field Ornithologists for awarding TJW a Research, Education, and Conservation Grant in 2015 and 2016. We thank Rocky Mountain National Park staff, especially Paul McLaughlin and Scott Esser, for their help with logistics and permitting. The research was conducted under the University of Colorado Denver IACUC protocol #88314(06)1c. We are also indebted to the 16 volunteers who helped with data collection over the course of the study.

Literature Cited

Buckland, S. T.; Anderson, D. R.; Burnham, K. P.; Laake, J. L.; Borchers, D. L.; Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, New York.

Critchfield, W. B.; Little, Jr., E. L. 1966. Geographic distribution of the pines of the world. Miscellaneous Publication 991. Washington, DC: U.S. Department of Agriculture Forest Service. 97 p.

Giuntoli, M.; Mewaldt, L. R. 1978. Stomach contents of Clark's Nutcracker collected in western Montana. The Auk. 95: 595-598.

Hermann, R. K.; Lavender, D. P. 1990. Pseudotsuga menziesii (Mirb.) Franco. Douglas-fir. In: Burns, R. M.; Honkala, B. H., tech coord. Silvics of North America, volume 1, conifers. Agriculture Handbook 654. Washington, DC: USDA Forest Service. 527-540.

Lorenz, T. J.; Sullivan, K. A. 2009. Seasonal differences in space use by Clark's Nutcrackers in the Cascade Range. The Condor. 111(2): 326-340.

Mewaldt, L. R. 1956. Nesting behavior of the Clark nutcracker. The Condor. 58(1): 3-23.

Murray, M. P.; D. F. Tomback. 2010. Clark's Nutcrackers harvest sugar pine seeds from cones. Western North American Naturalist 70 (3):413-414.

Schaming, T. D. 2016. Clark's nutcracker breeding season space use and foraging behavior. PLoS ONE. 11(2): e0149116. https://doi.org/10.1371/journal.pone.0149116

Schoettle, A. W.; Goodrich, B. A.; Klutsch, J. G.; Burns, K. S.; Costello, S.; Sniezko, R. A.; Connor, J. 2011. The proactive strategy for sustaining five-needle pine populations: An example of its implementation in the southern Rocky Mountains. In: Keane, R. E.; Tomback, D. F.; Murray, M. P.; Smith, C. M., eds. 2011. The future of high-elevation, five-needle white pines in Western North America: Proceedings of the High Five Symposium. 2010 28-30 June, Missoula, MT. Proceedings RMRS-P-63. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 376. http://www.fs.fed.us/rm/pubs/rmrs_p063.html

Tomback, D. F. 1978. Foraging strategies of Clark's Nutcracker. Living Bird. 16: 123-161.

Tomback, D. F. 1998. Clark's nutcracker (Nucifraga columbiana). In: A. Poole, ed. The Birds of North America Online, Species Account Number 331. Cornell Laboratory of Ornithology, Ithaca, NY.

Tomback, D. F.; Achuff, P. 2010. Blister rust and western forest biodiversity: Ecology, values and outlook for white pines. Forest Pathology. 40: 186-225.

Tomback, D. F.; Achuff, P.; Schoettle, A. W.; Schwandt, J. W.; Mastrogiuseppe, R. J. 2011. The magnificent high-elevation five-needle white pines: Ecological roles and future outlook. In: Keane, R. E.; Tomback, D. F.; Murray, M. P.; Smith, C. M., eds. 2011. The future of high-elevation, five-needle white pines in Western North America: Proceedings of the High Five Symposium. 2010 28-30 June, Missoula, MT. Proceedings RMRS P-63. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 376. http://www.fs.fed.us/rm/pubs/rmrs_p06 3.html

Torick, L. L.; Tomback, D. F.; Espinoza, R. 1996. Occurrence of multi-genet tree clusters in "wind-dispersed" pines. American Midland Naturalist. 136(2): 262.

Vander Wall, S. B.; Balda, R. B. 1977. Coadaptations of the Clark's Nutcracker and the pinyon pine for efficient seed harvest and dispersal. Ecol. Monogr. 47: 89-111.

Nominations for 2018 Whitebark Pine Ecosystem Foundation Board Elections

Our bylaws dictate that elections are to be held every year for various positions – this way there is always a rotation of experienced Board Members and Executive Committee officers and we would never face a complete turnover of officers and the uncertainty that could ensue. Please consider running for one of these positions!

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 March or April in Missoula, MT, and the second is in conjunction with the annual WPEF science meeting and field trip in mid-to-late September somewhere within the range of whitebark pine. To find out more about the duties of these positions, please refer to the back of this form, or contact one of us.

Cyndi Smith
Interim Director: cyndi.smith@whitebarkfound.org

Bob Keane
Interim Associate Director: bob.keane@whitebarkfound.org

Nomination Form – Whitebark Pine Ecosystem Foundation

Nominations are being sought for the following three (3) positions, to begin serving on the Board of Directors in October, 2017. All positions are for a 3-year term:

- Director
- Associate Director
- Board Member

RULES:

- All board members can serve up to 3 terms consecutively [Bylaw E(h), E(i) and F(a)].
- A nominee to the BOD does not have to be a member of the WPEF, but voting privileges on the BOD are restricted to members in good standing [Bylaw E(c)], so once elected the nominee must become a member.
- Any nomination must be made by 2 members in good standing [Bylaw F(b)(i)], and consented to by the signature of the nominee; signatures can be on one form, or on separate forms.
- **Only one nomination per form**. If you need more forms, please copy this one, or download another one from our website <www.whitebarkfound.org>.
- Send nominations by mail [Box 17943, Missoula, MT, 59808], E-mail melissa.jenkins@whitebarkfound.org.
- Complete nominations must be postmarked/dated no later than **01 Feb 2018.**

We, the undersigned, nominate _____ for the position of

DIRECTOR ___ ASSOCIATE DIRECTOR ___ BOARD MEMBER ___ [please check ONE only].

Nominator #1: _____ _____ _____
Signature | Print Name | E-mail address

Nominator #2: _____ _____ _____
Signature | Print Name | E-mail address

Nominee: _____ _____ _____
Signature | Print Name | E-mail address

continued on next page

continued from previous page

The purpose of the Board of Directors (BOD) is to make decisions affecting the general membership of the WPEF. This includes making policy, deciding on major spending, or solving major problems concerning the organization.

1. Responsibilities of the Director:

General

- Oversight of all WPEF activities
- Oversee fund raising and 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, upon authorization by Board of Directors

Specific

- Call board meetings twice a year; develop agendas for board and annual members meeting
- Call for host/location for annual science and members meeting
- Propose and call for initiatives meeting WPEF mission
- Follow potential leads for fund raising and WPEF mission

2. Responsibilities of the Associate Director:

- Take over duties of the Director if he/she is incapacitated
- Facilitate BOD and Executive Committee meetings
  - Serve as time-keeper
  - Keep order and facilitate discussion from all board members
- Serve as the Chair of the Nominating Committee
  - Oversight of board member terms and status
  - Solicit nominations, prepare a list of candidates and create a ballot
  - Advise newly elected BOD members and thank outgoing BOD members
- Serve as Chair of the Proposal Evaluation Committee
  - Prepare any request for proposals as approved by the BOD, such as the Student Research Grant
  - Convene a committee to evaluate each proposal and prepare a recommendation to the BOD for approval
- Serve as Chair of the Bylaws Committee
  - Prepare proposed Bylaw changes for BOD review and vote
  - Once approved by BOD prepare Bylaw changes for membership vote

3. Responsibilities of a general board member:

- Attend all BOD meetings (in person or via conference call)
- Attend all WPEF annual meetings
- Chair at least one Committee or Working Group
- Organize annual meetings as appropriate
- Perform fundraising as needed
- Participate in other WPEF tasks and activities when appropriate

Check out the “Researching Whitebark Pine” Story Maps with ESRI

ESRI story maps are excellent interactive communication tools designed to visualize and present content to the general public.

“Researching Whitebark Pine” is a story map introducing the ecological dilemma surrounding Whitebark Pine populations in North America. By navigating through the multiple tabs, the content is presented with the use of maps, pictures, videos and text segments for a visualized, easy understanding.

The introductory tab shows the extent of Whitebark pine populations in North America with a quick ecological overview of the species.

A multitude of related research projects including a climate change impact analysis (WBPCC), a growth analysis (WPGA), a thinning project (Daylight) and restoration (RWPE) are presented in individual tabs showing their respective study sites and a short explanation.

Note: This Story Map is under development and the link will be provided in the next Nutcracker Notes.

Show your support for Whitebark Pine & shop our online store

HATS - T SHIRTS

www.whitebarkfound.org

PO Box 17943
Missoula, MT 59808
www.whitebarkfound.org

WHITEBARK PINE
ECOSYSTEM FOUNDATION

Partners with Community Food Co-Op Bozeman

Whitebark Pine Ecosystem Foundation is partnering with Bozeman Food Co-Op to restore whitebark pine to the ecosystem. The Co-Op is donating 2,500 rust resistant seedlings to plant in the Millie Creek Fire south of Bozeman, Montana. These seedlings cost $5,000 and will be planted in 2018 in a small area burned in 2012; 10,000 acres of whitebark pine burned in this particular fire.

This project is part of the WPEF's Whitebark Forever Campaign and Bozeman Food Co-Op "We are Still In Campaign" for climate change. The Co-op Board indicated, "The purchase of these seedlings will help us offset carbon dioxide from our business operations and provide important habitat for grizzly bears, elk, deer, and other native species."

"We are very excited about this partnership as it will open doors for us," said Liz Davy, WPEF Development Committee Chair.

DONATE TO WHITEBARK FOREVER and we can:

- ***~ Match the efforts of Bozeman Food Co-Op***
- ***~ Double the number of seedlings planted in this fire***
- ***~ Restore disease resistant trees to the Greater Yellowstone Ecosystem***

COMMUNITY CO-OP FOOD