



HABITAT CONSERVATION TRUST FOUNDATION

GRANT REPORT

**Restoring Whitebark Pine Ecosystems to Enhance
Subalpine Bear Habitat**

HCTF PROJECT FILE # CAT13-6-227

Second Annual Report 2012-13



PICS intern Andrew Sheriff and Smithers-based treeplanters Brent Irvine and Chris Howard prepare to plant whitebark pine seedlings on Hudson Bay Mtn, June 2012

PROJECT NAME:

Restoring Whitebark Pine Ecosystems to Enhance Subalpine Bear Habitat

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Fiscal Year (e.g. April 2012 to March 2013)

For Continuing Projects, Year 2_ of 5_

Location

Distance from a known place: 50 km southwest of Houston, BC

Lats/Longs:

Site 1: 601768E/ 5976846N

Site 2: 576397E/6001956N

Site 3: 604590E/6071795N

PROJECT EXECUTIVE SUMMARY

Seeds of the endangered whitebark pine tree (*Pinus albicaulis*) are an important source of food for grizzly bears, black bears and other subalpine wildlife species on the leeward slopes of the central BC Coast Range to as far north as Smithers, BC. Unfortunately, whitebark pine is in rapid decline due to combined effects of mountain pine beetle (MPB), the introduced disease white pine blister rust, fire suppression practices and climate change and was listed as endangered under Canada's Species at Risk Act (SARA) in 2012. The Bulkley Valley Research Centre has been studying the ecology of this species in west central BC since 2007 and began a collaborative restoration program with a variety of partners in 2011/12 with the intent of planting blister-rust resistant seedlings in areas of high value bear habitat.

Two recent wildfires (2004 Nanika wildfire within Nenikekh/Nanika Kidprice Provincial Park, 2010 Gosnell Creek wildfire just north of Morice Lake Park) were selected as initial trial sites. These burns are adjacent to salmon runs and have abundant resprouting black huckleberry but whitebark regeneration is poor. Black and grizzly bears are numerous in both areas. A third trial was established in the Wetzin'kwa Community Forest on the west slopes of Hudson Bay Mtn. in 2012. In 2012, we planted 276 whitebark pine seedlings at three sites (low, medium and high elevation) spread over 5 hectares on Hudson Bay Mtn. We also maintained and monitored the Gosnell Ck. 2011 plantings. To date we have 99% survival of 377 planted seedlings, most in good condition despite a hot, dry summer. We have direct-seeded 500 seeds (5 seeds per cache) at Gosnell Creek and Hudson Bay Mtn. and after two growing seasons have 76 live seedlings at 42 caches; these seedlings are 1-2 cm in size and experienced 11% mortality during the summer of 2012. All tree seedlings are staked and are monitored and weeded annually.

Seeds are collected from healthy blister-rust free trees when seed crops are moderate to heavy. 2011 was a moderate seed year. We caged 52 pine trees and collected 30,000 seeds at 5 sites near Smithers and Houston, BC. Half of these seeds are stored

at the BC tree seed centre for gene conservation and blister-rust screening. The other half are being used for local restoration plantings. 2012 was a very poor seed year. No seeds were collected.

We stratified 6900 seeds over the winter of 2011/12. These were sown in April 2012 at Woodmere Nursery in Telkwa, BC. Of the 5 sites only one (Kidprice Lake) produced seeds of good quality. As of April 2013 we have 904 seedlings at the nursery (14% success rate from seed). These trees will be ready for outplanting in June 2014.

With no seed collections in 2012 we focused on community outreach and expanding local partnerships to scale-up seedling production. We held 2 community events for children and families in the Bulkley Valley and strengthened existing partnerships (e.g., Office of the Wet'su'wet'en, BV Naturalists) through community activities. We also developed relationships and sought funding from corporations that carry out industrial and commercial activities in whitebark pine habitat (Wetzkin'kwa Community Forest Corp., Shell Fuelling Change, Blackwater Mine, BC Timber Sales).

ACTIVITIES/TECHNIQUE(S) AND MEASURES OF RESULTS

General Objective: To enhance habitat for grizzly and black bears and other subalpine wildlife (Clark's Nutcrackers, jays, squirrels, chipmunks and other rodents) by planting disease-resistant whitebark pine seeds and seedlings within recent wildfires and adjacent MPB-killed areas located in areas of excellent bear habitat.

Operational Objectives:

- 1) To collect viable seeds from at least 20 apparently blister-rust resistant whitebark pine parent trees in 2011 and per year over 5 years (seed production is intermittent).**

2012 was a poor seed year and we did not collect any cones. This was expected since whitebark pine does not produce collectable crops 2 years in a row. We monitored next year's cone crop and secured funds for an expanded helicopter-based cone collection in 2013.

Our seed germination and seedling production results (see below) have taught us the importance of collecting only high quality seed in good seed years. Unfortunately it is impossible to know what the cone crop will be like until after helicopter surveys and caging efforts. Our results suggest that lower elevation stands should be targeted over the more easily climbed and open-grown high elevation trees. It is possible that the warm weather of 2012 might produce acceptable cone crops at timberline elevations, provided that the summer of 2013 is also warm. Caging must be done early, however, before we actually know whether the cones will become large and mature. Since caging is so much work and cages need to be recovered, it is hard not to go back and collect the cones even if they turn out to be of poor quality. We can, however, slice the cones as early as possible to test for filled seed percentage and will do this more rigorously in 2013 to avoid expending a great deal of effort on poor quality seed.

We gave the BC Tree Seed Centre 3 seedlots of 10 parent trees each (Kidprice Lake, Jonas Creek, Eagle Pass) for gene conservation and blister-rust screening purposes. Only one of those seedlots (Kidprice Lake) was of acceptable quality for long-term storage and conservation research. We will need to replace the Jonas Creek and Eagle Pass seedlots with higher quality seeds, hopefully in 2013.

2) To successfully regenerate at least 1000 whitebark pine seedlings from seed over 5 years in high value, recently burned or MPB-killed bear habitat and protect these seedlings from competing vegetation and other damage.

From the 500 high quality non-local Mt. Sidney Williams seeds (collected in 2007 and direct-sown in 2011), we have 76 live seedlings at 42 caches alive after 2 growing seasons. The seedlings are 1-2 cm in size and experienced 11% mortality during the hot summer of 2012. The seedlings are staked and are monitored and weeded annually.

We have approximately 8000 dry seeds remaining in storage. These are poor quality, immature and mostly unfilled seeds. Our 2012 results indicate that it will be best to direct seed them in fall 2013 to allow for natural stratification since the low seed quality does not warrant the labour intensive work of artificial stratification. Monitoring and tending of these seeds will also be very low intensity because we don't expect a high level of success.

3) To successfully produce 500 – 1500 nursery-grown whitebark pine seedlings per year over 5 years (it takes 2-4 years to produce a seedling ready for outplanting).

On April 15, 2012, 6900 artificially stratified seeds were sown in styroblock containers at Woodmere Nursery. Results are as follows:

Table 1. Number and condition of seedlings at Woodmere Nursery, April 2013 from seeds collected in 2011 and stratified winter 2011/12

Seed collection area	Estimated stratified seeds	No. seedlots (parent trees)	Seed Quality	No. live seedlings (April 2013)	Success %	Mean ht. (cm)	Mean vigour	Mean colour
Hudson Bay Mtn	600	1 - 5 trees bulked	poor	0	0%	--	--	--
Ganokwa Creek	400	2	poor	1	0.3%	3.2	good	dk. green
Eagle Pass	1500	3	poor	0	0%	--	--	--
Jonas Creek	2381	9	moderate	160	7%	6.0	fair-good	green
Kidprice Lake	1485	6	good	743	52%	7.2	good	green
Total	6366	21	--	904	14%	6.6	good	green

The Kidprice Lake seeds from 900-1000 m elevation in Nenikekh/Nanika-Kidprice Provincial Park were highly successful. Their germination rate actually exceeded 52% because 2 seeds were sown per cavity and an unknown number were thinned out rather than transplanted into nearby empty cavities. The 700 seedlings from this location are growing well (now 7-8 cm tall, on average) and should be ready for outplanting in the Nanika wildfire after snowmelt in (May?) 2014.

The Jonas Creek seeds from 1200 m elevation in the Telkwa River valley had a poor success rate (< 10%). The resulting seedlings are of moderate quality (their endosperm was smaller than that of the Kidprice seedlings) but most are growing well (6-7 cm tall,

on average) because they are not at all crowded in the styroblocks. The 160 seedlings from this location should be ready for outplanting in the Gosnell Ck. wildfire after snowmelt in (June?) 2014.

The Eagle Pass and Ganokwa Ridge (Babine Mtns Park) and Hudson Bay Mtn. seeds were a complete bust. Although cone production was prolific, the cones were small and the seeds were either unfilled or immature. Out of some 2500 seeds sown we produced one late-germinating seedling that is now only 3 cm in size.

4) To successfully establish 100 (2011) to 1500 whitebark pine seedlings per year over five years within high value, recently-burned or MPB-killed bear habitat.

After two years of the project we have 370 (nursery seedlings) + 76 (direct-seeded) = 445 live seedlings from non-local seed outplanted across 5 sites at the Gosnell and Hudson Bay Mountain restoration trial areas. (222 trees/per year)

We also have ~900 seedlings from local seed in the nursery scheduled for outplanting in 2014. (450 trees/year)

And we have 8000 poor quality seeds ready for direct seeding in 2013. Of these, we expect perhaps 8 seedlings to successfully establish. (4/per year)

Adding these all up, our estimated production to date is: 676 seedlings/year. This is nicely in the mid-range of our 100 – 1500 goal ☺. Note that these are not yet “successfully established seedlings”.

5) To successfully regenerate >20 hectares of endangered whitebark pine ecosystems over a 5 year period.

Over two years we have planted and direct seeded seedlings spread over approximately 5 hectares of land at 5 sites (Joshua Rd. and Crystal Rd. sites in Gosnell Ck. wildfire; low, medium and high elevation sites on Hudson Bay Mtn.). Our planting densities are low (445 trees/5 ha = 89 trees/ha) but we select optimum microsites for planting, mimicking the patchy distribution of wild seedlings on typical whitebark pine ecosystems.

We also staked 75 naturally regenerated whitebark pine seedlings found in the understory of MPB-killed lodgepole pine at the Joshua Rd. site. These seedlings are spread over approximately 1 ha. We have removed overtopping vegetation from these seedlings and will monitor them for them for growth release and forest health. Without regular brushing these seedlings will be outgrown by subalpine fir and lodgepole pine regeneration.

So far, the establishment rate of nursery seedlings has been excellent (99%). However, the 3-4 year old UNBC stock was of unusually high quality, in huge containers and since numbers were so low we treated the seedlings with extreme care, hot-lifting them out of the container at the planting hole. The Woodmere Nursery seedlings are smaller, operationally produced seedlings in a much smaller container and will most likely be

lifted at the nursery. It is not reasonable to expect a 99% field success rate for these seedlings.

Establishment rates for direct-seeding artificially stratified and clipped seeds have been, much lower (15% for high quality seed). This result suggests that expensive, high quality seed should not be used for direct seeding. We still think that direct seeding of unstratified seeds (without intensive pre-treatment or post-seeding treatments and monitoring) is a good thing to do with lower quality seed which should not be used in the nursery or stored for gene conservation purposes.

Benefits/Risks

The greatest benefits of the project so far have been: (1) building capacity for operational whitebark pine seed production; (2) outreach and awareness of the ecological importance and threats to whitebark pine, and of our collective societal responsibility to address these threats.

Additional benefits include: (3) 5 hectares of high quality habitat restocked with whitebark pine seedlings which may one-day produce valuable seeds for wildlife, (4) one excellent seedlot in storage for gene conservation and rust-resistance screening; (5) 900 healthy seedlings projected to be ready for outplanting in 2014.

The listing of Whitebark pine as an endangered species in Canada in June 2012 has led to a tremendous increase in interest in this once-neglected tree and its importance for bears and other wildlife. Our project (one of perhaps 5 others in Canada) has played a significant role in this growing awareness. As a result of the endangered species listing, the provincial government as well as industrial and commercial operators in whitebark pine habitat will be required to engage in mitigation and restoration activities. We are doing the groundwork to make it possible for them to contribute meaningfully.

Risks & Negative side effects:

- Outplanting success may ultimately be low –our currently healthy seedlings may quickly succumb to blister rust. At least one of our planting sites (low elevation Hudson Bay Mtn.) has abundant *Ribes lacustre* (prickly gooseberry) growing nearby. Wild currants and gooseberries are the main alternate hosts for the white pine blister rust.
- Seed quality and seed germination rates may continue to be low. We may not have a good whitebark pine seed year in west central BC over the 5 years of this project. Since most of the low elevation trees died during the mountain pine beetle outbreak we have to rely on higher elevation trees to get seeds from over a wide geographic area. It is possible that these trees rarely, if ever, produce high quality seeds because they are at the upper/northern limit of the range and the weather is not ideal.
- We may have inadvertently introduced non-native weed species (*Taraxacum officinale*, *Crepis* sp., *Hieracium* sp.) into the Gosnell Creek wildfire. This is not a provincial park and such species are probably found along the access road.

- We may inadvertently disturb some wildlife during our restoration efforts. In 2011 we had to be careful not to disturb Mountain Goat calving sites above Ganokwa Canyon near the boundary of Babine Mountains Provincial Park. We arrived in the area by helicopter in early July to inspect cone crops and later installed cone cages on foot along the ridge (late July-October). We checked with BC Parks to ensure that our activities did not disturb calving and were informed that July was okay. During our fieldwork at Gosnell Creek in spring 2012 we encountered 4 grizzly bears. We have been told that they may be mating on the hills around our site at that time of year. We stayed on the road while one of the bears hiked through our planting site and it continued on its way without stopping. We need to do the planting at that time of year because the growing season is so short. We are causing much less disturbance to the bears than all of the MPB salvage logging and gas pipeline geotechnical and survey activity currently going on in the Gosnell River valley; however we are contributing to cumulative effects of human intrusion in their habitat.

Extension/Public Information/Participation/Partners

- In May 2012 we partnered with the Bulkley Valley Naturalists to host two Fun-with-Seeds sessions for school children at the Smithers Art Gallery during their “The Art of Nature” month. The focus of this extension activity was on the connections between seeds and wildlife. We used black bear, Clark’s Nutcracker and red squirrel hand puppets to engage the children in planting seeds for wildlife, along with other seed-art activities (see photo). HCTF was acknowledged in display materials. (see photo below)
- In Sept 2012 we partnered with BC Parks and the Office of the Wet’suwet’en to host a “Pines in the Park” day at Tyhee Lake Provincial Park. The event was well publicized in local media. We prepared and displayed a variety of materials describing the whitebark pine life cycle, its importance to wildlife, and distribution and threats in local parks. A group of 20 Scouts toured the display and some 30 members of the public dropped by. A representative of the Office of the Wet’suwet’en gave an introductory welcome that outlined the importance of whitebark pine on their traditional territory and traditional Wet’suwet’en foods (bannock and salmon soup) were served. HCTF was acknowledged in display materials. A photo of the event appeared in the Sept. 26, 2012 edition of the Interior News (see scanned article below)
- Sybille Haeussler and Alana Clason gave an oral presentation on the project at the Whitebark Pine Ecosystem Foundation annual meeting in Kimberley, BC September , 2012. HCTF was acknowledged in the presentation slides.
- We have prepared a comprehensive “Endangered Whitebark Pine Ecosystems of Northern Whitebark Pine in West Central BC website, hosted on the Bulkley Valley Research Centre website. The site should go live in April 2013. Support from HCTF is acknowledged in the website. See www.bvcentre.ca/whitebark. Our whitebark pine activities have also been featured on the Bulkley Valley

Research Centre's Facebook page (<http://www.facebook.com/pages/Bulkley-Valley-Research-Centre/172203722872708>)

- A May 23, 2012 article in the Smithers Interior News described our restoration activities in the context of our 2nd place win in the Volunteer Resources British Columbia photo contest (mentioned in last year's annual report). Although HCTF was mentioned as a funder during the interview it did not appear in the newspaper article (see scanned article below).
- We continued to work closely with the Office of the Wet'suwet'en (OW) in Smithers, BC as they are project partners and have a strong interest in whitebark pine conservation in the Morice area Provincial Parks and surrounding territories, communicating by email and phone. OW Resource Manager Mike Ridsdale delivered the welcome address and brought his family to our "Pines in the Park" event. Together with the Wetzinkwa Community Forest, the OW established a "Gathering Place" at Silvern Creek (near our low elevation restoration site) with a seating area and display board describing local ecosystems and cultural practices. The display board prominently features information about whitebark pine ecology using photos supplied by Bulkley Valley Research Centre members (see photo below).
- We partnered with UNBC and the Wetzin'kwa Community Forest Corporation (WCFC) to establish an accessible whitebark pine restoration trial on the back side of Hudson Bay Mountain with the mid and high elevation sites located near the Hudson Bay Mountain ski area. The locations for this trial are too accessible to be "high quality bear habitat", although bears definitely use the areas, but this trial was funded almost entirely by WCFC (rather than HCTF) and met UNBC's requirements for long-term research access (in return for them donating their seedlings). A benefit of this trial is that we will be able to use it for extension purposes and will most likely be able to develop a partnership with Hudson Bay Mountain Resort to assist in whitebark pine restoration on their Commercial Recreation Area. In addition to maintaining the 2012 trial, WCFC is interested in planting more whitebark pine within the Community Forest and may contract with us to collect seeds and produce nursery seedlings. 2013 funding not yet approved.
- BC Timber Sales is currently logging in an area of high quality grizzly and bear habitat in the Copper (Zymoetz) River drainage west of Smithers that has some live and dead mature whitebark pine mature trees and scattered regeneration. They had ribboned off a small area as a wildlife tree patch, but were not aware how much whitebark pine was present within the actual cutblock. We had a joint field trip and located more trees. BCTS staff subsequently proposed that we collect seeds and produce nursery seedlings for this and nearby cutblocks. Funding for this partnership has not yet been approved. With both WCFC and BCTS now actively considering including whitebark pine in planting prescriptions we can see that the momentum is definitely building.

- In 2012, the Bulkley Valley Research Centre (Alana Clason) partnered with the Whitebark Pine Ecosystem Foundation Canada and AMEC engineering to undertake whitebark pine restoration at the proposed Blackwater Mine on Davidson Mine Mtn. south of Vanderhoof. The first phase involved salvaging natural regeneration from within the development footprint. This represents the first mine in northern BC to actively include whitebark pine restoration as part of its development proposal. We expect the momentum to build and have begun to approach other mining corporations operating in whitebark pine habitat to support seed collection and nursery seedling production.
- In 2012, the Bulkley Valley Research Centre received \$10,000 funding for “Restoring northern whitebark pine ecosystems in west-central BC” through the Shell Fuelling Change program. We attempted to raise \$25,000 through their social media voting campaign, but ended up just behind the winners in final votes. The fund-raising campaign did help to raise the profile of our project within the Research Centre’s membership and broader social network.
- The Bulkley Valley Research Centre partnered with the Pacific Institute for Climate Solutions (PICS), based at UVic, to host an undergraduate climate change summer intern at the Research Centre from May – August 2012. Andrew Sheriff worked on whitebark pine restoration for much of the summer (see photos below) and has continued to spread the word about whitebark pine ecology, wildlife and climate change at UVic (<https://pics.uvic.ca/fellowships/internship/past>)

Photographic Record



BVRC intern Andrew Sheriff shows school children video of grizzly bear eating whitebark pine seeds at Smithers Art Gallery event, May 2012. M. Wong photo.

News Coverage 2012:

NEWS



A photo of Sybille Haeussler, right, mentoring BVRC volunteer Courtney Berdan took second place in a photo contest for volunteers.
Alana Clason photo

Volunteer photo snags second place

By Percy N. Hébert
Smithers/Interior News

It was a way of recognizing the many volunteers that help her, a way of saying thank you.

Sybille Haeussler, a forest ecologist working with the Bulkley Valley Research Centre, submitted a photo of a volunteer, Courtney Berdan, helping her in the field to the Administrators of Volunteer Resources British Columbia (AVRBC) photo contest.

The photo contest was established to recognize volunteer mentors. To be eligible, photos had to depict mentors in action, training or inspiring volunteers.

"I thought the photo was really fitting," Haeussler said of the photo of herself showing Berdan how to plant whitebark pine seedlings at her research site.

"I thought the photo encapsulated mentorship of a volunteer and an appreciation for nature."

The photo, from a tree-planting site where the Gosnell wildfire occurred in 2010, was taken by University of Northern British Columbia PhD student Alana Clason.

"I think it's just great that Sybille took the initiative to submit the photo," Clason said.

"It's a positive news story that should get out."

"We're doing this and involving so many people in the community."

The second-place finish came with \$75 in prize money. Haeussler and Clason forewent treating themselves to a nice supper with the money, in favour of adding books on the whitebark pine to the BVRC library.

In awarding second prize, the judges said the photo was "Beautifully composed, using tree branches as a framing device, shows a leader training a volunteer while they both share their passion around preserving nature."

"We smile a lot when we do this work because it's so much fun," Clason said.

Smithers Interior News, May 2012.

www.interior-news.com Wednesday, September 26, 2012

NEWS



WHITEBARK PINE AWARENESS

Alana Clason shares her knowledge and passion for the endangered whitebark pine with the Smithers Scouts during Saturdays whitebark pine awareness and celebration event at Tyhee Lake Provincial park.

Percy N. Hébert photo

Smithers Interior News, Sept. 2012



Detail on whitebark pine ecology from the Information poster at the Wet'suwet'en Gathering Place, Silvern Creek in the Wetzin'kwa Community Forest. S. Haeussler photo.



BVRC intern Andrew Sheriff inspects newly germinated Whitebark pine seedlings at Woodmere Nursery, May 2012. S. Haeussler photo.



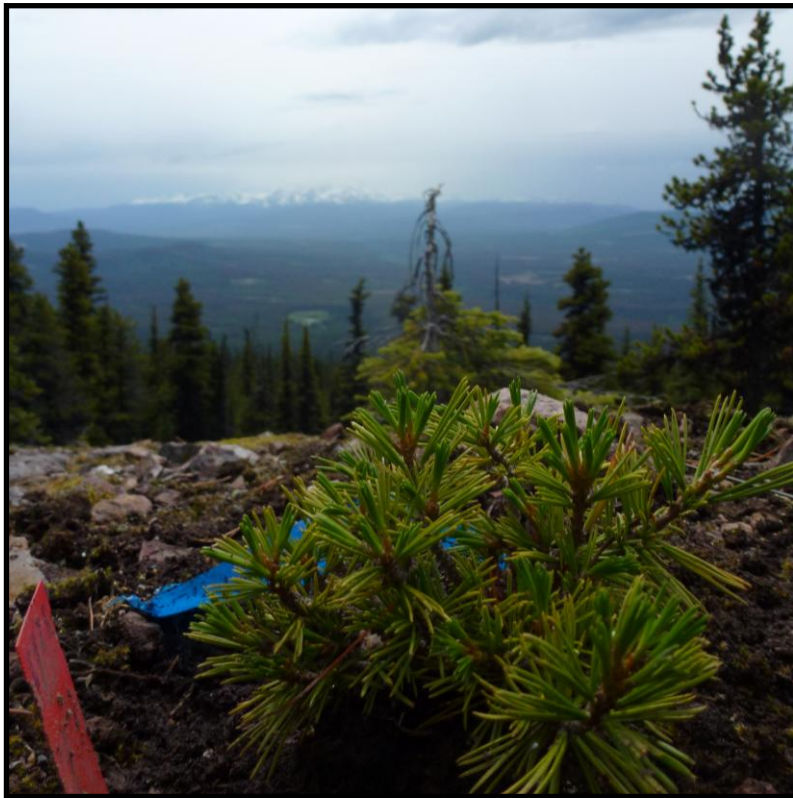
Healthy whitebark pine seedling in its second growing season at Woodmere Nursery, April 2013. S. Haeussler photo



Well-stocked (left) flats of Kidprice Lake seedlings and poorly stocked flats (right) of Jonas Creek seedlings in second growing season at Woodmere Nursery, April 2013. S. Haeussler photo.



Google Earth image showing the location of the low elevation, mid-elevation and high elevation whitebark pine restoration trial sites on the west side of Hudson Bay Mountain near Smithers. The trial was established in 2012 in partnership with UNBC, Wetzin'kwa Community Forest Corporation, Office of the Wet'suwet'en and HCTF.



Newly planted whitebark pine seedling at the mid-elevation site on Hudson Bay Mtn. June 2012. S. Haeussler photo.



Healthy whitebark pine seedling after one hot dry growing season at the low elevation site on Hudson Bay Mtn., October 2012. S. Haeussler photo.



Two 1-year old seedlings from a direct-seeded cache at the Joshua Rd. Trial site in the Gosnell Ck. Wildfire, June 2012. S. Haeussler photo.



Healthy seedling starting to flush, one year after planting at the Crystal Rd. trial site in the Gosnell Ck. Wildfire, June 2012. Note prickly gooseberry (alternate host of white pine blister rust) at top left, just prior to removal.. S. Haeussler photo.