

# **Restoration of Endangered Whitebark Pine (*Pinus albicaulis*) in the Wetzin'Kwa Community Forest and Environs**



**Wetzin'Kwa 2014 Community Grant  
Final Report  
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## Executive Summary

In 2012, the Bulkley Valley Research Centre and the Wetzin'Kwa Community Forest Corporation (WCFC), working closely with the Office of the Wet'suwet'en, Woodmere Nursery, UNBC, Skeena Region FLNRO and other community partners, began restoration of endangered whitebark pine (*Pinus albicaulis*) ecosystems on the slopes of Hudson Bay Mountain in and adjacent to the Wetzin'Kwa Community Forest. This report summarizes the results of the third full year of the restoration project, partially funded through a \$7,616 Wetzin'Kwa Community Grant. Accomplishments for 2014/15 include:

(1) **Restoration plantings:** low, mid and high elevation trial sites established in 2012 with seedlings from southern BC provenances, and a transitional site established in June 2014 with local seedlings were maintained and monitored. Three-yr survival of the 2012 plantings was 95% and 3rd-yr height growth averaged 3 cm. There was no further snowshoe hare or exposure damage after 2013. Seedlings at the transitional site suffered heavy mortality due to the hot, dry summer weather of 2014 and 2015. Although they were regularly watered to aid establishment, 1<sup>st</sup> yr survival was only 49%. We also watered the 2012 low elevation seedlings during the June/July 2015 drought, but these seedlings now appear to be sufficiently well established to survive without additional watering.

(2) **Rust-Resistant Nursery Seedlings:** From Sept 2014 through Feb 2015, we stratified, then nicked 19,000 seeds of which an estimated 7100 (from 14 putatively rust-resistant seedlots) were intended for use in the Wetzin'Kwa Community Forest. These seeds were sown at Woodmere Nursery in Feb 2015. As of May 2015 there were 6852 live seedlings at the nursery, of which 2111 are earmarked for planting in Wetzin'Kwa in 2017.

In September 2014 we contributed 6 additional northwest BC seedlots for blister rust resistance screening. These whitebark pine seedlots are being tested by the USDA Forest Service in an international trial at Coeur d'Alene Nursery, Idaho. This contribution increases the total number of northwest BC parent trees/families being screened for blister rust resistance to 22.

(3) **Outreach and Extension:** In 2014/15, we published one scientific paper, gave one oral presentation at a province-wide workshop, updated the project website ([www.bvcentre.ca/whitebark](http://www.bvcentre.ca/whitebark)), posted several updates on social media, published a thank you ad, and worked with a variety of provincial to local groups (professional, public, industry) to increase awareness of and participation in whitebark pine restoration activities.

Overall, accomplishments for 2014/15 met expectations, but survival of the 2014 planting was lower than hoped for due to hot, dry weather in 2014 and 2015.

## ACKNOWLEDGEMENTS

We thank the Wetzin'Kwa Community Forest Corporation and Board for continuing support of whitebark pine restoration in the Bulkley Valley through their Community Grant Program. Special thanks to Bill Golding WCFC Manager for consistent support and advice, and former Board member Marie-Lou LeFrancois for advocating tree species diversity and climate change adaptation/assisted migration research. The Office of the Wet'suwet'en, especially Mike Ridsdale, David DeWit and Francois Depey, have championed the cultural and ecological significance of Whitebark Pine and considerably raised the profile of this important non-timber tree species within traditional Wet'suwet'en territories.

Joe Wong, associates and technicians at Woodmere Nursery, Telkwa are growing the second crop of seedlings and have provided tremendous assistance throughout the project. Other important supporters include Don Pigott, Yellowpoint Propagation; Phil LePage and Dave Coates, FLNRO, Smithers; Dave Kolotelo and Spencer Reitenbach, FLNRO, Surrey Tree Seed Centre; Charlie Cartwright, Vicky Berger and Michael Moore FLNRO and Mary Maholovich, USDA (rust resistance screening); and Linda Tackaberry and Hugues Massicotte, UNBC. Additional funding support from BC Habitat Conservation Trust Foundation, BC Parks Enhancement Fund, TD Friends of Environment, and UNBC was very important.

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## Introduction

Whitebark pine (*Pinus albicaulis*) is a western North American stone pine or five-needled soft pine that reaches the northwest limits of its geographic distribution near Smithers, BC.

Whitebark pine is considered a keystone species in mountain ecosystems of western North America because of its foundational role in establishing forest cover on harsh, exposed sites, and because its large, nutritious seeds (pine nuts) are very important to subalpine birds (notably Clark's Nutcrackers), rodents (notably red squirrels) and larger mammals (notably grizzly and black bears). The tree is also culturally significant to the Wet'suwet'en and other BC First Nations who recognize its many values and harvested pine nuts for food.

Like other western pines, the whitebark pine has experienced heavy mortality from mountain pine beetles (*Dendroctonus ponderosae*), which killed most of the largest, cone-bearing trees in west central BC during outbreaks in the late 1980s and 2000s. Smaller trees at higher elevations historically escaped damage from the beetle, but as the climate warms there is an increasing tendency for high elevation populations to also be attacked. More insidiously, whitebark pines of all sizes and ages are steadily dying from an introduced Eurasian disease, the white pine blister rust (caused by *Cronartium ribicola*) that has spread across British Columbia over the past century. A third important damaging agent near Smithers is the pine leaf adelgid (*Pineus pinifoliae*) that alternates between whitebark pine and interior spruce, causing heavy foliage loss and weakening already-stressed pines to the point where they either die prematurely or fail to produce cones and seeds. Recent wildfires have contributed to losses of mature cone-bearing trees in some areas (e.g., Morice Provincial Park) while a lack of wildfire in other areas has led to gradual loss of whitebark pine through succession to more shade tolerant true fir and hemlock species.

In 2012, whitebark pine was listed as endangered under Canada's federal Species At Risk Act (SARA) due to cumulative effects of white pine blister rust, mountain pine beetle, changes in wildfire regimes, climate change and other factors (COSEWIC 2010). Provincial agencies and land tenure holders are now called upon to protect existing whitebark pine trees and to undertake restoration of damaged whitebark pine ecosystems. Newly released landscape level tree species selection benchmarks for the Bulkley Timber Supply Area recommend planting up to 1% whitebark pine on suitable sites in ESSF subzones over the next 5 years with a long term goal of 5% of total planting on dry ESSF sites (Table 6 in Mah and Astridge 2014).

The Bulkley Valley Research Centre began research on endangered whitebark pine ecosystems in 2007 ([www.bvcentre.ca/whitebark/research](http://www.bvcentre.ca/whitebark/research)) and in 2011 initiated a program of seed collections, nursery seedling production, and whitebark pine restoration and assisted migration

plantings in recent wildfires, beetle-killed forests and alpine/parkland areas ([www.bvcentre.ca/whitebark/restoration](http://www.bvcentre.ca/whitebark/restoration)). Our partnership with the Wetzin'Kwa Community Forest Corporation began in 2012 with the establishment of an assisted migration planting trial at low (1100 m), medium (1300 m) and high (1600 m) elevations using 373 seedlings grown at UNBC Prince George from seeds collected in central and southern BC, Alberta and Washington. Subsequent planting are using locally collected seeds and locally-grown seedlings from apparently blister rust parent trees. This report summarizes our accomplishments for the period July 16, 2014 to July 16, 2015.

## 2014/15 OBJECTIVES

**(1) Restoration Trials:** *To maintain and monitor the whitebark pine Restoration trial established in 2012 and 2014 at 4 locations in and adjacent to the Wetzin'Kwa Community Forest on Hudson Bay Mountain.*

**(2) Production of Rust-Resistant Nursery Seedlings:** *to stratify seeds and begin growing seedlings from local whitebark pine seeds collected in 2013;*

**(3) Outreach and Education:** *To provide whitebark pine outreach and extension services related to whitebark pine ecosystem management in the Bulkley Valley.*

## ACTIVITIES AND METHODS

### (1) Restoration Plantings

- **July 2014:** completed the 3<sup>rd</sup> overwinter assessment (recorded number and condition of live seedlings) and removal of non-crop vegetation at the Hudson Bay Mountain trial sites. We examined each tree, removed competing vegetation, invasive plants introduced in planting stock, and *Ribes* shrubs. *Ribes* (native gooseberries and wild currants) are the primary alternate host for the white pine blister rust fungus. We straightened pigtail stakes, replaced weathered flagging tape, flagged dead seedlings with yellow flagging tape, and straightened and assessed the snowshoe hare protection guards at the low elevation site.
- **July – August 2014:** because soils at the transitional site (planted June 2014) were very dry, we watered all seedlings at this site once monthly in July and August using backpack sprayers.
- **Sept – Oct 2014:** completed end-of-growing growing season measurements at the four Hudson Bay Mountain trial sites and the McBride trial site. We recorded seedling height to the base of the terminal bud; basal diameter with a caliper in 2 directions to the nearest mm (low elevation seedlings not measured due to browse guard); colour of new and old foliage (R=red, Y=yellow, G=green, YR = yellowish red, which is more red than RY = reddish

yellow, etc); vigour (dead, moribund, poor, moderate, good, excellent) and any damaging agents.

- **May – July 2015:** completed overwinter assessments (recorded number and condition of live seedlings) and removed non-crop vegetation at the Hudson Bay Mountain trial sites. WT and WL site were watered biweekly.
- **February – July 2015:** seedling data were entered and preliminary analysis of the data was conducted.

## **(2) Production of Rust-Resistant Nursery Seedlings**

- **August-September 2014:** With assistance from Dave Kolotelo and Spencer Reitenbach at the BC Tree Seed Centre, 600 seeds from each of 6 seedlots received phytosanitary certification and were shipped to Mary Mahalovich, Regional Geneticist, USDA Forest Service, Moscow, Idaho, for inclusion in an international whitebark pine blister rust resistance screening trial.
- **Sept 2014:** Stratification began for 19,000 seeds from 22 seedlots (each seedlot individually treated). Seedlots were disinfected in H<sub>2</sub>O<sub>2</sub>, imbibed in aerated running water for 24 hours, then subjected to a 1 month warm stratification (20°C). Each seedlot was rinsed (and soaked in H<sub>2</sub>O<sub>2</sub>, if needed) weekly to remove any molds.
- **Oct 2014 – Feb 2015:** Seeds were subjected to a 20 week cold stratification (refrigerated at 4°C). Seedlots were inspected and rinsed at biweekly to monthly intervals. Decaying seeds were discarded and precocious germinants were transferred to moist petri-dishes.
- **Feb 2015:** each seedcoat was hand-nicked with a razor blade to assist germination. Empty and decayed seeds were discarded.
- **Feb 2015:** Stratified and nicked seeds were sown in styroblock containers at Woodmere Nursery –labelled according to seedlot. Most seedlots were double-sown (2-per cavity) to reduce the number of empty cavities.
- **April 2015:** As time permitted, double germinants were transferred to adjacent empty cavities.
- **May 21, 2015:** The number of live whitebark pine seedlings per seedlot was counted.

## **(3) Outreach and Education**

- Project leaders Sybille Haeussler and Alana Clason engaged in a wide variety of formal and informal whitebark pine education and outreach activities throughout the year with partner organizations, professionals, industry representatives and the public. These are summarized in Results.



## RESULTS

### (1) Whitebark Pine Restoration Plantings

Four whitebark pine restoration trial sites were established along an elevational gradient in and adjacent to the Wetzin'Kwa Community Forest on the southwest side of Hudson Bay Mountain. The low (WL, 1033 m), mid (WM, 1340 m) and high (WH, 1650 m) elevation sites were planted in May 2012; the transitional site (WT, 1100 m) was planted in May 2014. The 2013 Final Grant Report ([Haeussler 2014](#)) provides full details and a map.

The seedlings planted in 2012 had two relatively moist summers (2012, 2013) to establish root growth and are beginning to put on good above-ground growth (Figure 1). Mean height growth in 2014 averaged 2.8 cm (Table 1). Early observations suggest that 2015 height growth will be considerably greater. There was no additional mortality of these seedlings during the winter of 2014/15 and there was negligible new damage to the seedlings from any cause. The low elevation seedlings have mostly recovered from the snowshoe hare clipping suffered in Fall 2013, and the high elevation seedlings have almost fully recovered from the desiccation damage they suffered in Winter 2013/14 when the snowpack was low. The mid elevation seedlings are undamaged, other than some very minor (grouse?) nibbling on the foliage. Because the soils at the low elevation site were extremely dry in the spring and early summer of 2015, these seedlings were watered biweekly (May 26, June 10, June 23 and July 8) along with the transitional site seedlings.



**Figure 1. High elevation (WH) whitebark pine seedling in July 2015 showing good 2014 and 2015 annual growth.**



*Ribes* species are abundant at the WL and WT sites and all live *Ribes* stems within the restoration sites were removed in fall 2014 and spring 2015, along with overtopping vegetation and any introduced invasive plants. There is no evidence of white pine blister rust (*Cronartium ribicola*) infection on any of the planted seedlings to date. One naturally regenerated sapling growing adjacent to planted seedlings at the WM site has several (inactive?) blister rust cankers and evidence of recent rodent chewing on the cankers, despite there being no *Ribes* nearby at this site (Figure 2).



**Figure 2. Naturally regenerated whitebark pine sapling (bottom left) growing adjacent to planted seedling (top right) at the WM (mid-elevation) site. Inset photo shows swelling from blister rust cankers and recent rodent chewing on the infected sapling. There is no evidence of blister rust infection on the adjacent planted seedling and no *Ribes* growing in the vicinity.**

**Table 1. Performance of whitebark pine seedlings planted in 2012 and 2014**

Site	Year Planted	n	Survival		Mean Height (cm) $\pm$ s.d.			Vigour <sup>†</sup> $\pm$ s.d. Oct 2014
			Oct 2014	Spring 2015	At Planting	Oct 2014	2014 growth	
WL	2012	94	96%	96%	8.0 $\pm$ 2.4	15.0 $\pm$ 6.2	4.0 $\pm$ 4.1	3.3 $\pm$ 0.7
WM	2012	93	97%	97%	6.6 $\pm$ 2.7	12.5 $\pm$ 3.7	1.9 $\pm$ 2.4	3.5 $\pm$ 0.7
WH	2012	89	93%	93%	9.6 $\pm$ 2.7	14.5 $\pm$ 3.9	2.4 $\pm$ 2.6	3.4 $\pm$ 0.7
All 2012		276	95%	95%	8.0	14.0	2.8	3.4
WT	2014	129	67%	49%	10.6 $\pm$ 2.9	11.1 $\pm$ 3.0	0.2 $\pm$ 1.0	1.8 $\pm$ 1.6
All, both yr		405	86%	80%	8.9	13.2	2.1	3.0

<sup>†</sup>Vigour classes are: 0 = dead, 1 = moribund, 2 = poor, 3 = fair, 4 = good, 5 = excellent

The transitional site seedlings were planted June 8, 2014 during hot dry weather and immediately began to experience drought-caused mortality (Figure 3a), despite being watered at planting and again in mid-June and mid-July, 2014. Survival to the end of the first growing season was 67% (Table 1, Figure 3b). Many of the seedlings were in very poor condition (moribund) and these seedlings died over the winter, bringing first year survival (as of May 26, 2015) to 49%. The seedlings were watered biweekly in 2015 (dates above) and as of mid-July there has been little additional mortality.

(a)



(b)



**Figure 3. (a) Wilted recently planted WT seedling during the July 2014 heatwave. (b) Healthy surviving WT seedling in May 2015.**



There was no new emergence and no new mortality among seedlings established from seeds cached in 2011 at the high elevation site (Alana Clason PhD project). These seedlings are 2-5 cm tall (Figure 4a). Their total biomass is still only a tiny fraction of the planted seedlings. By comparison, seedlings grown from seeds sown at the same site in 2007 (Curtis-McLane PhD project) range in size from 5 to 20 cm (Figure 4b). No blister rust was seen on these seedlings.

(a)



(b)



**Figure 4. Best examples of seedlings established from direct-sown seed (gloved hand indicates scale). (a) Cache of three 4 cm seedlings sown by BVRC in 2011; (b) 18 cm seedling sown by UBC in 2007.**

## **(2) Production of Rust-Resistant Seedlings**

Our intent was to contract out stratification of seed for nursery seedlings to the BC Tree Seed Centre or Yellowpoint Propagation, but neither organization had the capacity to undertake this labour-intensive work, so once again stratification was done in-house

All in all, the 2014/15 seed stratification was more successful and less stressful than the 2011/12 stratification. First, the seeds were cold-stored for one year rather than beginning the stratification immediately after seed extraction. This allowed 20 weeks of cold stratification (beginning Sept 2014) rather than 12 weeks (starting in Dec-Jan), which produces better germination results (D. Kolotelo and L. Tackaberry, pers. comm.). Secondly, a small refrigerator was purchased in 2014 with funds from TD Friends of Environment, permitting stratification to take place at Sybille's home office rather than at the Research Centre, allowing seeds to be checked and rinsed more easily. Finally, the 2013 seed crop had far fewer empty and more fully-ripened seeds, resulting in much less mould, fewer discarded seeds and higher germination rates than in 2011/12.

Once again, the large, high quality seeds from the Houston area had little or no mould, while those from Hudson Bay Mountain (HB, DU) and Hunter Basin (HUB) were prone to moulding. This year however, some of the Bulkley-area seedlots were fully ripened and of good quality. Both years we have found that if the seeds are easy to extract (fully ripe), have a thick red seedcoat rather than a paler, whitish seedcoat, and are heavy (filled seed with medium-large embryo) that moulds are generally insignificant. Vicky Berger at Kalamalka Nursery (pers. comm.) has had the same experience with moulds.

Although most production facilities no longer manually nick the stratified seeds (D. Kolotelo, pers. comm), we chose to do this (Figure 5) because empty seeds can be identified and discarded and filled seeds germinate better, resulting in better outcomes at the nursery.



**Figure 5. Hand nicking of 19,000 whitebark pine seeds from 22 seedlots at Skeena Forestry Consultants office, January 2015.**

In total we stratified and nicked over 19,000 seeds from 22 seedlots, of which ~8700 were allocated to the Wetzin'Kwa Community Forest with the rest reserved for BC Parks (Table 2). Most of the Wetzin'Kwa seeds were from the Bulkley and Babine Ranges near Smithers but we also included 1000 good quality seeds from the Sibola Ranges south of Houston (Smoke Mountain, Mt. Sweeney) because we have had no previous success in germinating Smithers-area seeds.

The seeds were sown at Woodmere Nursery, Telkwa in February 2015. A count of seedlings by seedlot on May 15, 2015 indicated a total of 6852 live seedlings of which 2111 are reserved for the Wetzin'Kwa Community Forest (Table 2). This tally includes ~650 seedlings from south of Houston, but ~1500 from the Smithers, the first-ever successful batch of whitebark pine seedlings grown from seed collected in local mountains!

Establishment rates (live seedlings/per 100 seeds stratified) are shown in Table 2, but we can't calculate a germination rate for each seedlot because most seedlots were double-sown (2

seeds per cell) at Woodmere Nursery, and extra seedlings were later transplanted into adjacent empty cells (if newly germinated) or weeded out (if they already had fine rootlets) (Figure 6). Because germination occurred when the nursery was busy and short-staffed, most of the extra seedlings were discarded. Thus germination rates were probably substantially higher than the establishment rates in Table 2. A few of the Smithers-area seedlots had establishment rates (64%, 69%, 40%) that were just as high as those from south of Houston, but Smithers area populations had many more poor quality seedlots (<10% establishment).

**Table 2. Numbers of seeds stratified and live seedlings produced at Woodmere Nursery in 2014/15, by seedlot.**

Seedlot Name	Provenance	# Seeds stratified	# Live seedlings	Establishment rate <sup>†</sup>	Rust-free parent tree?	Destined for
SM bulk	Smoke Mtn.	502	288	57%	No	Wetzin’Kwa
SW bulk	Mt. Sweeney	495	361	73%	No	Wetzin’Kwa
K bulk	Kidprice Lk., Nenikèkh Park	1406	580	41%	No	BC Parks
K4		2667	1138	43%	Yes	BC Parks
K6		3077	1423	46%	Yes	BC Parks
K11		2326	539	23%	Yes	BC Parks
K18		2484	1061	43%	Yes	BC Parks
Mck13	McKendrick Pass	93	64	69%	No	Wetzin’Kwa
DU1	Duthie Mine, Hudson Bay Mtn	834	239	29%	Yes	Wetzin’Kwa
DU3		937	189	20%	Yes	Wetzin’Kwa
DU5		238	88	37%	Yes	Wetzin’Kwa
HB1	Ski, Area Hudson Bay Mtn	1026	229	22%	Yes	Wetzin’Kwa
HB3		843	102	12%	Yes	Wetzin’Kwa
HB5		94	8	9%	Yes	Wetzin’Kwa
HB7		429	39	9%	Yes	Wetzin’Kwa
HB bulk		95	6	7%	No	Wetzin’Kwa
HUB1	Hunter Basin, Telkwa Mtns	367	236	64%	Yes	Wetzin’Kwa
HUB4		167	5	3%	Yes	Wetzin’Kwa
HUB7 <sup>#</sup>		294	0	0%	Yes	Wetzin’Kwa
HUB8		620	249	40%	Yes	Wetzin’Kwa
HUB11		167	7	4%	Yes	Wetzin’Kwa
Total – all sources		19,233	6852	36%		
Total – Wetzin’Kwa only		8679	2111	24%		

<sup>†</sup>This is not the same as a germination rate because seeds were double-sown in the nursery and most extra seedlings were discarded. <sup>#</sup>No seedlings labelled HUB7 were found; this seedlot had very mouldy seeds and we assume none germinated.



**Figure 6. Newly germinated HUB1 seedlot at Woodmere Nursery, April 20, 2014. At this stage double-germinants (bottom left) cannot be transplanted into an empty cell without damaging both seedlings.**

Seedlots sent to the USDA Forest Service in Idaho for rust-resistance screening are described in Table 6 of the [2013/14 Annual Report](#), but were not sent for screening until Sept 2014. Stratification of these seeds began in Fall 2014 at the Coeur d’Alene Nursery and the study is now underway, bringing the total number of northwest BC seedlots being screened for rust resistance to 22. The 2013/14 Annual report incorrectly states that 24 seedlots were to be screened.

### **(3) Outreach and Education**

The following professional and public engagement activities were completed in 2014/15. Partial contribution by WCFC to these outreach efforts is gratefully acknowledged :

- (a) Alana Clason, Ellen Macdonald (UofA) and Sybille Haeussler published a scientific article on whitebark pine ecosystems of west central BC in the journal *Ecoscience* ([Clason et al. 2015](#)).
- (b) Sybille Haeussler, Alana Clason and Phil Burton (UNBC) contributed a short article on whitebark pine decline in west central BC to a UNBC book on Cumulative Effects to be published in 2015.
- (c) Deb Wellwood interviewed Sybille Haeussler about whitebark pine ecology and posted information on her [Twitter account](#) and [blog](#).
- (d) Darren Rockliffe, a treeplanter at our McBride Community Forest restoration trial produced a YouTube video titled “[Operation Whitebark](#)”. Links to the YouTube clip were posted to the [BVRC Facebook site](#), the Whitebark Pine Ecosystem Foundation website and UNBC’s Natural Resources Newsletter.

- (e) Evidence of grizzly bear use of whitebark pine and Clark's Nutcracker nesting in BC was compiled and shared among grizzly bear and whitebark pine experts (Bruce McLellan, Wayne McCrory, Randy Moody, Paul Sanborn, Deb Wellwood, Don Pigott, Alana Clason, Brad Jones & others)
- (f) Sybille Haeussler gave a teleconference presentation on the BVRC whitebark pine restoration trials to a Whitebark Pine research workshop hosted by the Genetic Conservation Technical Advisory Commission (GCTAC) of British Columbia at UBC, May 25, 2015.
- (g) Informal advice on whitebark pine seed collection and restoration and mitigation provided to environmental consultants working on LNG pipelines (Chevron, Coastal Gaslink), the Office of the Wet'suwet'en (Mike Ridsdale), forest licensees (West Fraser – Gary Quanstrom) and others.
- (h) Review and comment on draft federal whitebark pine recovery strategy
- (i) Consultations with BV Paragliders and BC Recreation Trails and Sites regarding whitebark pine damage, mitigation and development of a demonstration site and trail at the Hudson Bay Mountain ski area (ongoing).
- (j) Fielded enquiries from CBC Nature of Things/Wild Canadian Year on potential film project involving Clark's Nutcracker and wildfires.
- (k) Updated the Bulkley Valley Research Centre's [whitebark pine website](#) to July 2015.
- (l) Placed a half-page ad in the Smithers Interior News (June 2015) thanking all of the organizations and individuals who have contributed to the success of the first 5 years of the Bulkley Valley Research Centre's whitebark pine ecosystem restoration program.



## Budget to July 16, 2015

Table 3. Project Budget

Category/Activity	Projected	Actual	Other Cash (source)	In-kind (source)	Total
<b>Human Resources</b>					
Project Mgmt: S. Haeussler (Skeena Forestry Consultants = SFC)	\$750	\$750	\$315 (HCTF)	\$192 (SFC)	\$1257
Fieldwork: N. de Leeuw (BVRC summer employee) SFC		\$ 829.16 \$1967.49	\$877.73 (CSJ) \$307.50 (HCTF)		
Total fieldwork	\$2,000	\$2796.65	\$1185.23	\$320(BVRC)	\$4301.88
Lab & Nursery Work: SFC	\$1,500	\$1376.60	\$1807.05 (PEF)	\$80(BVRC)	\$3263.65
Data entry & analysis:	\$250	\$363.88	\$526.03 (CSJ Nata)		\$889.91
Reporting & Website updates	\$550	\$810.34	\$500 (HCTF)	\$900 (BVRC)	\$2210.34
Outreach:	\$500	\$689.65	\$526.03 (CSJ Nata)	\$900 (BVRC)	\$2115.68
<b>Total HR</b>	<b>\$5550</b>	<b>\$6787.28</b>	<b>\$4859.34</b>	<b>\$2392</b>	<b>\$14038.50</b>
<b>Materials, Supplies &amp; Equipment</b>					
Field supplies	\$100	\$0	\$910.13 (UNBC, Huckleberry Mine, BVRC)	\$300 (FLNRO, BVRC)	\$1210.13
Lab supplies	\$500	\$0	\$145.24 (PEF, TDFE)	\$200 (BVRC, SFC)	
Nursery supplies	\$250	\$12.30	\$0		\$12.30
Misc office supplies	\$50	\$0	\$0	\$50 (BVRC, SFC)	
<b>Total Materials</b>	<b>\$900</b>	<b>\$12.30</b>	<b>\$1055.37</b>	<b>\$550</b>	<b>\$1605.37</b>
<b>Other Expenditures</b>					
Use of nursery	\$0	\$0	\$0	\$5000 (Woodmere)	\$5000
Use of laboratory	\$0	\$0	\$0	\$2000 (SFC)	\$2000
Web services	\$250	\$0	\$0	\$0	\$0
Thank you ad, Interior News	\$0	\$0	\$439.88 (TDFE, BVRC)	\$200 (BVRC)	\$639.88
Admin Fee (12%)	\$816	\$816			
<b>Total Other</b>	<b>\$1316</b>	<b>\$816</b>	<b>\$439.88</b>	<b>\$7200</b>	<b>\$7639.88</b>
<b>Total Costs and Expenditures</b>					
	<b>\$7616</b>	<b>\$7616</b>	<b>\$6354.59</b>	<b>\$10,142.00</b>	<b>\$23,283.70</b>

We were able to complete our 2014/15 objectives on budget and overall costs were broadly similar to those projected. Our cash from other sources was higher than anticipated because we received an additional grant from TD Friends of Environment (TDFEF), in addition to the anticipated grants from BC Habitat Conservation Trust Foundation (HCTF), BC Parks (PEF) and Canada Summer Jobs (CSJ). Expenses for Wetzin'Kwa were less than in the proposed budget because they were mainly paid for by other funders, and we were able to transfer those funds into labour, - in particular, to pay for the fieldwork involved in watering the seedlings which wasn't in our original budget.

### **Conclusions**

The Wetzin'Kwa Whitebark Pine Restoration project is proceeding successfully and on budget. The hot summer weather of 2014 and 2015 has caused lower than expected survival of the local area seedlings planted in 2014, but the seedlings planted in 2012 are well established and growing well, with no new mortality in 2014, and so far no evidence of blister rust infection.

Our biggest achievement in 2014/15 was to successfully germinate seedlings from seeds collected on Hudson Bay Mountain, as this hasn't been successfully achieved before (collections made in 2007 and 2011 did not germinate). We look forward to outplanting these and other new seedlings in the Wetzin'Kwa Community Forest in 2017 and have begun to locate suitable planting sites.

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