



2020 YEAR IN REVIEW

Forest Improvement and Research Management Branch

Ministry of Forests, Lands, Natural Resource Operations
and Rural Development



FROM THE DIRECTOR

In this brief, informal publication, the staff of Forest Improvement and Research Management (FIRM) branch share a few highlights from 2020. We are not aiming for a comprehensive review of branch operations – but rather a few highlights from each section that may interest our clients, colleagues, and stakeholders

FIRM is structured into six sections with the following key functions:

- i. Orchards:** Produce improved seed for reforestation in BC
- ii. Research Management:** Coordinate the ministry's provincial forest research program
- iii. Tree Seed Center:** Process, store, and distribute the tree seed used for reforestation of all Crown lands in BC
- iv. Forest Genetics:** Conduct forest genetics research and tree breeding
- v. Policy and Planning:** Manage the policy framework for BC's forest tree genetic resources
- vi. Business Operations:** Provide administrative support for FIRM branch and contract procurement services for the Office of the Chief Forester and Resource Stewardship Divisions.

In 2020, staff turnover remained high. Many colleagues retired or resigned (including Ann Eastman, Gary Giampa, Michael Stoehr, Ward Strong, Michael McDougall, Kathy Theobald, Denielle Weatherill, Ian Wayland, Omnia Gamal, and Justin Whitehill), many new staff joined the branch (including Jon Degner, Karen Harrison, Christine Chourmouzis, Allie Affleck, Ranjit Sangra, Angela Nagel,

and Jennifer Taylor) and many staff took on temporary assignments to sustain branch operations amid all the changes.

COVID-19 had a major impact. By late March we had suspended travel and cancelled in-person meetings. By April, those with jobs that could be done from home were working from home, and at our operational facilities we were revising work procedures and implementing COVID safety measures.



2020 was the year of social distancing (Tree Seed Centre staff)

Given the effect of the pandemic on childcare, education, the economy, and society at-large, 2020 has been a stressful and difficult year for many FIRM staff. Remarkably, and a testament to the professionalism and commitment of staff, we were still able to complete most of the high priority activities.

While society was significantly disrupted, orchard trees were unconcerned with the global pandemic and produced very large crops. Initial estimates are 9200 sacks of cones harvested from ministry tree seed orchards – enough seed for roughly 130 million

seedlings, with a sales value of \$6 million. At the Tree Seed Centre, processing of the very large 2020 cone crop will continue into the spring.

In research management, the communication blitz continued and outputs in 2020 included a video to celebrate 100 years of research, an annual report, and several articles in the BC Forest Professional magazine and the ministry newsletter.

In 2020, we continued our work on tree improvement projects focussed on increasing carbon capture (and avoiding carbon losses)

in plantations. This work was funded by the federal Low Carbon Economy Leadership Fund (LCELF) and the provincial Forest Carbon Initiative (FCI).

Only one-third of the lodgepole pine seedlings planted in BC derive from improved orchard-grown seed. In 2020, we continued grafting trees for three new, 5000 ramet, advanced generation lodgepole pine seed orchards.

In 2021, FIRM will continue to strive for excellence in the delivery of our services, operate as a well-organized team, and provide a healthy work environment. FIRM staff work at nine different locations around the province. As I visit our sites, I am struck by the pride FIRM staff take in their work and the care we take with the valuable public assets entrusted to us.

I hope you enjoy the brief, informal articles in our fourth Year in Review publication.

Patrick Martin
Director, FIRM



Keeping our distance at the Public Service Week pizza lunch (Puckle Road staff)



Selection of elite Douglas-fir (Jon Degner)



Ranjit Sangra repairing a conveyor



ORCHARDS

The most significant challenge in our work this year was dealing with the effects of COVID-19 on our people and our business. Thankfully, no one got COVID-19, and as a result we suffered no downtime and were able to maintain operations.

This year ministry seed orchards produced a heavy cone crop. The total cone volume collected set a new record, exceeding the 2019 crop by 2%. In 2020, the harvest involved more seasonal staff, higher productivity, fewer weeks of collection, and special COVID-19 safety precautions. Hats off to the hard working orchard crews who got the job done! From our orchards, 1804 hectolitres of cones were collected. Initial estimates are that this volume of cones will yield approx. 1427 kg of seed, enough to produce about 130 million seedlings.

During the harvest, COVID modifications included new, remote break stations for cone pickers and enhanced cleaning and safety protocols. Staff successfully managed over 120 30-day hires without incident. Well-maintained electronic records of activities helped new staff hit the ground running.

Domano Road washed-out at Partridge Creek, affecting access to the Prince George Tree Improvement Station (PGTIS) for four months. Emergency repair work, a joint undertaking by PGTIS and the City of Prince George, reopened the road in October.

Crown management was completed at Saanich, Skimikin, Bailey and Kalamalka. Crown management can increase cone production, reduce some diseases, improve access and picking, and reduce snow damage. Kalamalka



Remote break stations were created to reduce crowding at orchard main buildings

and Bailey completed crown maintenance on over 4,000 trees. Skimikin completed crown management on over 6,100 trees. Saanich completed crown management on Fdc and Dr orchards. Bailey continued a three-year crown management rotation on all orchards.

Infrastructure improvements continued this year. An MOU was signed with PRT-Skimikin nursery for powerline maintenance. Initial work included inspection and upgrades to transformers. Previous flood-control maintenance on Pickett Creek has been effective and we continued dialogue with ministry representatives and local landowners on possible future remediation. An irrigation infrastructure database was completed at Skimikin this fall, inclusive of newer infrastructure added to the site. This database will be expanded to all sites in 2021.

Sites were cleaned up and many old items were disposed of through BC Auction, greatly reducing rodent habitat and streamlining

mechanical repairs. Two more chipmunk manlifts were refurbished from gas and brake fluid to diesel and hydraulic. Some small capital acquisitions were made during the year including a flail mower, a small deck mower, an ATV, and 3 electric pruners. All lift operators took fall protection and fall arrest courses, and there is now an in-house staff member registered as trainer for future training needs.

The final planting of the LCELF/FCI-funded high gain coastal Douglas-fir sector of orchard #199 was completed. Site establishment was started at Cobble Hill for the LCELF/FCI white pine (Pw) and sub-alpine fir (Bl) orchards. Land clearing was completed for Pw, and the first round of roguing was completed in Bl. An existing Bl provenance trial, established at 1 m spacing, is being converted into a seed orchard. One final roguing is required.



Orchard legend Gary Giampa retired in 2020

Work continued on the LCELF/FCI-funded next generation lodgepole pine orchard in Prince George. A randomized design for the 6-block 5,000-tree orchard was completed. The orchard is designed for a systematic thinning at 16 years to a final size of 3,600 trees at 5x8m spacing. Wider spacing as the trees grow will ensure good light exposure and whole crown cone production. In 2020, staff helped graft the second third of the orchard. The initial planting was delayed one year so that the grafts would be larger prior to planting. At Skimikin, field grafting of the next generation spruce orchard #250 started, with 1/4 of the grafting complete. Infilling of field grafts for high breeding value ramets in spruce Peace River low orchard #213 was also completed.

The pest management extension highlight this year was the production and distribution of a series of pest management posters for lodgepole pine, interior spruce, and Douglas-fir. Each poster highlights the important pest and disease issues, provides guidance on monitoring and management, and contains high-quality pest images.

Pest pressure in the orchards was low-to-moderate in 2020 as anticipated, though various pests were managed in orchards throughout the province. Some notable examples include cone maggot in spruce and western larch orchards at Skimikin and Kalamalka, cone midge in western redcedar at Saanich and cone worm in Douglas-fir at Bailey.



Lots of cone sacks in 2020 (Penny May, Jonathan Walker and Kyla Seward at Bailey)



Large crews were required for the 2020 harvest

A significant strategic shift was made in the management of *Dioryctria* in interior Douglas-fir. Pheromone trapping and timed contact insecticides Pounce and Delegate were used, rather than the traditional preventative spray of the systemic insecticide Dimethoate. This new method was effective in managing *Dioryctria* and proved cheaper than the traditional approach. The new method is effective, less expensive, and poses lower health risks.

Trials for control of two major coastal orchard pests were completed at three orchard sites (Saanich, Mosaic Forest Management and Western Forest Products). Douglas-fir cone gall midge (*Contarinia oregonensis*) and western redcedar Cone Midge (*Mayetiola thujae*) are two perennial significant damaging pests. These trials focused on improving monitoring and targeting pesticide use to prevent egg laying during cone receptivity. Initial results are positive and show promise for operational management of these important pests.



A new rental tractor (Jonathan Walker at Bailey)

Despite the increased complexities and reduced in-person meetings as a result of COVID-19, 2020 was a busy and productive year. Successful harvests were completed in all orchards despite the challenges presented by COVID-19, and staff maintained a very effective safety presence during a difficult year.

Stephen Joyce
Manager, Seed Production



RESEARCH MANAGEMENT

The ministry's Research Program comprises over 70 scientists and technicians working in branches and regions across the province. This program is coordinated by the Research Management Unit within FIRM branch. The Unit provides Research Program budget management, business cycle coordination, knowledge management and outreach.

Significant achievements by the Research Management Unit in 2020 include:

- i. Initiating the first cycle of research scientist classification reviews (under the Research Scientist Achievement Review Framework, RSARF) since 2008.
- ii. Releasing the 2019/20 Research Program Annual Report.
- iii. Delivering the Research Program virtual face-to-face all-staff meeting.
- iv. Releasing a video to help celebrate the 100-year milestone since the ministry hired its first research scientist in 1921.
- v. Publishing several articles in the Association of BC Forest Professional's magazine and the DIRT ministries newsletter.
- vi. Getting the Research Program short-listed for a Premier's Award in the Innovation category.



In celebration of the Research centenary, a pin and video were produced

Also in 2020, Luisa Ramirez (MITACS post-doctoral Science Policy Integration Research Fellow) created an e-learning tool to train ministry scientists to better address the needs of policy and decision-makers. The tool and training session provide a platform where both groups can share their success stories.



The Research Management Unit is looking forward to another exciting year as we are in the process of adding a research program specialist to our team.

Francesco Cortini
Research Management Lead



TREE SEED CENTRE

As an essential service, Tree Seed Centre has continued operations throughout the COVID-19 pandemic. Physical and operational changes were completed to allow staff to work in a safe and effective manner, resulting in only minimal delays to normal service timelines. However, beginning in March all tours and visits to the Centre were cancelled.

The Tree Seed Centre saw a continuation of staff change and team building over the past year. Facilities Technician Michael McDougall retired in July and Ranjit Sangra was hired into the role.

In 2020, the Tree Seed Centre received approval and funding to expand the seed cooler/freezer and replace some of the worn-out seed processing equipment. Staff and contractors have been busy preparing for these large capital improvement projects by developing design and specification reports.

The Cone and Seed Processing team has been very busy. This year, more than 22,000 sacks of cones were collected from BC seed orchards, one of the largest crop years to-date.

The Tree Seed Centre operates with a steady and predictable annual business cycle. Below are some highlights of 2020:

- i. Withdrawal, preparation and shipping of tree seed to seedling nurseries. More than 2,500 sowing requests representing about 300 million requested seedlings.
- ii. Processing, testing and long-term storage of seed from BC cone collections with more than 70 seedlots registered on SPAR.
- iii. More than 2000 seed tests completed.
- iv. More than 30 seed collections completed and placed in long-term storage for Genetic Conservation purposes.

Michael Postma
Manager Tree Seed Centre



Geotechnical drill rig - freezer expansion preparation



Sacks of cones ready for "racking"



Worksite modifications included adding a physical barrier in the seed drying room (left) and moving a desk from the office to the plant floor (right)



FOREST GENETICS

The Forest Genetics Section had another great year that was full of change. If there was ever a year to test our resilience, this was it. We had just welcomed Allie Affleck, Jarrett Columbus, Christine Chourmouzis, and Andrew Coster to our technical teams at Kalamalka and Cowichan and were preparing for the field season when the pandemic began. In true genetics section style, we adapted. A huge thanks goes to the entire team who pulled together and supported one another. We implemented protocols and practices to make the work environment as safe as possible and without a doubt we were successful. This teamwork enabled us to stay focused, maintain business continuity and continue to deliver on our mandate.

The pandemic also forced us to explore tools to keep us connected in a beneficial and meaningful way. To that end we had our first entirely virtual annual breeders meeting that took place over a couple of days. It was such a success we are now planning to change our annual meeting to semi-annual to improve our connectivity and teamwork. We thank Ann Lockley for her support, guidance and training in the on-line meeting tools.

In October, we said goodbye to Michael Stoehr, our 28-year veteran coastal Douglas-fir breeder. We had our first virtual and physically distanced retirement celebration for him. Fortunately for the program, he was able to mentor and share his knowledge with Jon Degner who is now the next generation of coastal Douglas-fir breeder.



Screening whitebark pine for resistance to blister rust (Ward Strong)

Ward Strong, our interior pest expert, also said good-bye. Following a very successful 25-year career Ward is going to pursue his other interests. His retirement was celebrated with masks and hand sanitizer and the required physical distancing. Ward's expertise, instrumental leadership in the whitebark pine program, great sense of humour and candid perspective are already missed. A couple of other highlights include: Nick Ukrainetz, who leads the lodgepole pine program, became the team lead in the interior as well as successfully defended his PhD; and Lise van der Merwe, who has managed the coastal western redcedar breeding program for the past 3 years, successfully defended her MSc.



We learned a lot about virtual meetings in 2020



Grafts for next generation lodgepole pine seed orchards (Jarrett Columbus)

We continue to take an integrated approach to planning that has positioned us to meet our business plan objectives – despite COVID. Some of this year’s accomplishments include releasing 47 2nd generation spruce forward-selected Bulkley Valley parents to seed orchards, deploying over 2,500 grafts for the lodgepole pine orchard expansion project this year and grafting about another 6000 in preparation for next year. This orchard expansion project will provide much needed seed for future generations. The Breeding Value delivery plan for all major species was completed. This plan will help stakeholders better prepare for potential orchard development and improves the integration and efficiency of forest genetics and orchard management for the province.

The coming year will undoubtedly bring more change, and we are ready for it.

Keith Thomas
Manager, Forest Genetics



Another sunny day at the Lake (Cowichan Lake Research Station staff)



Michael Stoehr at his COVID-compliant retirement event



POLICY AND PLANNING

This year was another year of change for the Policy and Planning group. After settling into the new building at 545 Superior Street the group transitioned to working from home to maintain health and safety due to COVID-19. The transition to working remotely was relatively smooth for the Policy and Planning team, with the exception of managing the “stay-at-home” pets.

Seedling Requests

The uptake of Climate Based Seed Transfer (CBST) continued to be strong. As of December 1, 2020, 60% of seedling requests (for the 2021 sowing year) were made using CBST (Table 1). This is similar to the level of CBST use recorded at this time last year.

In 2020, our client base broadened a bit and we assisted oil and gas, wildfire recovery, and ecosystem rehabilitation clients interested in the planting of suitable seed for restoration of burned areas, right-of-ways, seismic lines, and reclamation sites.

Monitoring and Assessing Seed Use Trends, CBST Impacts, and Seed Gaps

This year, we focussed on moving from tabular CBST workbooks to time series and spatially-enabled (ARCGIS) data and tools. The intent behind this initiative was to:

- i. Increase in-house capacity for spatial analysis
- ii. Enable the monitoring and reporting of seed use trends
- iii. Assess policy implications for transitioning from GBST to CBST
- iv. Identify priority areas for further analysis
- v. Determine real versus perceived seed gaps
- vi. Support the Species Plan Tool project through the creation of spatial data and maps, including mapping of forecast seed use

Table 1: CBST Uptake for the 2021 Sowing Year¹

Funding Source Code	Agency	Million seedlings for 2021 sowing	Percent using CBST
BCT	BCTS	43.21	93%
FRP	Various	3.81	96%
FTM	FCI	25.04	81%
FTM	FFT	20.92	85%
LFP ²	Licensees	153.24	42%
Other	Various	0.78	100%
Total		248.09	60%

¹ Complete, approved and pending requests for crown land entered on SPAR as of December 14th.

² Licensee seedling requests are not yet completed for the sowing year.

Species Planning Tool Project

A new approach to the reporting of seed use information (commonly referred to as “species plans”) is underway with the development of a Species Plan dashboard tool. This is a joint initiative between the Forest Genetics Council and the Forest Improvement and Research Management Branch.

The intent is to build a prototype that can be moved in-house for maintenance and support over the longer term. An integrated ministry database and platform will ensure that the data is consistent with other applications (SPAR, RESULTS), reliable, and updateable.

Climate Action Planning

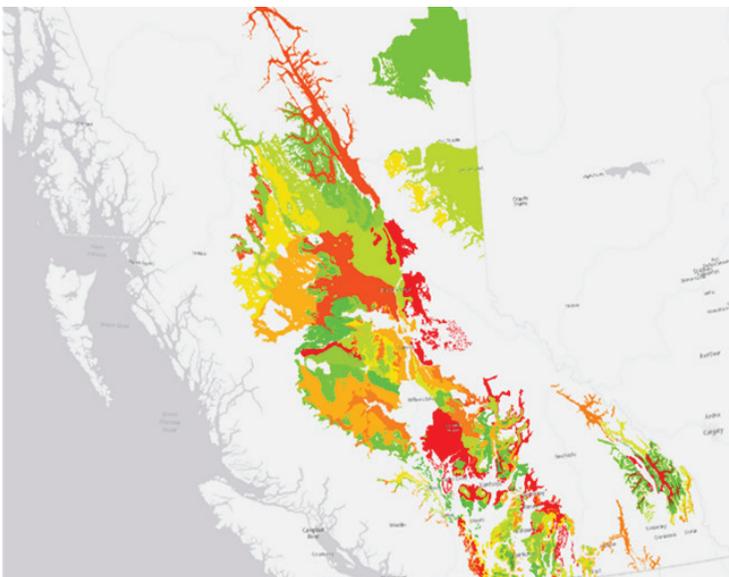
Development of a new Climate Action Plan for the Office of the Chief Forester is currently underway to align with the goals and objectives of the BC Government Climate Preparedness

and Adaptation Strategy (to be released Spring, 2021). Leslie McAuley and Taye Ayele are co-leading this initiative for the OCF division. The project is currently in the information gathering phase with key staff and subject area experts providing input on the identification of priority actions for the next five years, and beyond.

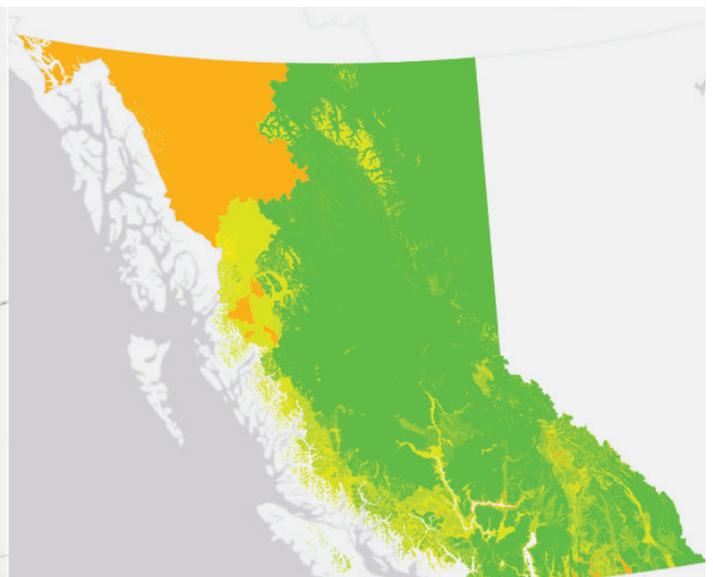
Communications, Extension and Training

Getting the word out on CBST this year included delivery of:

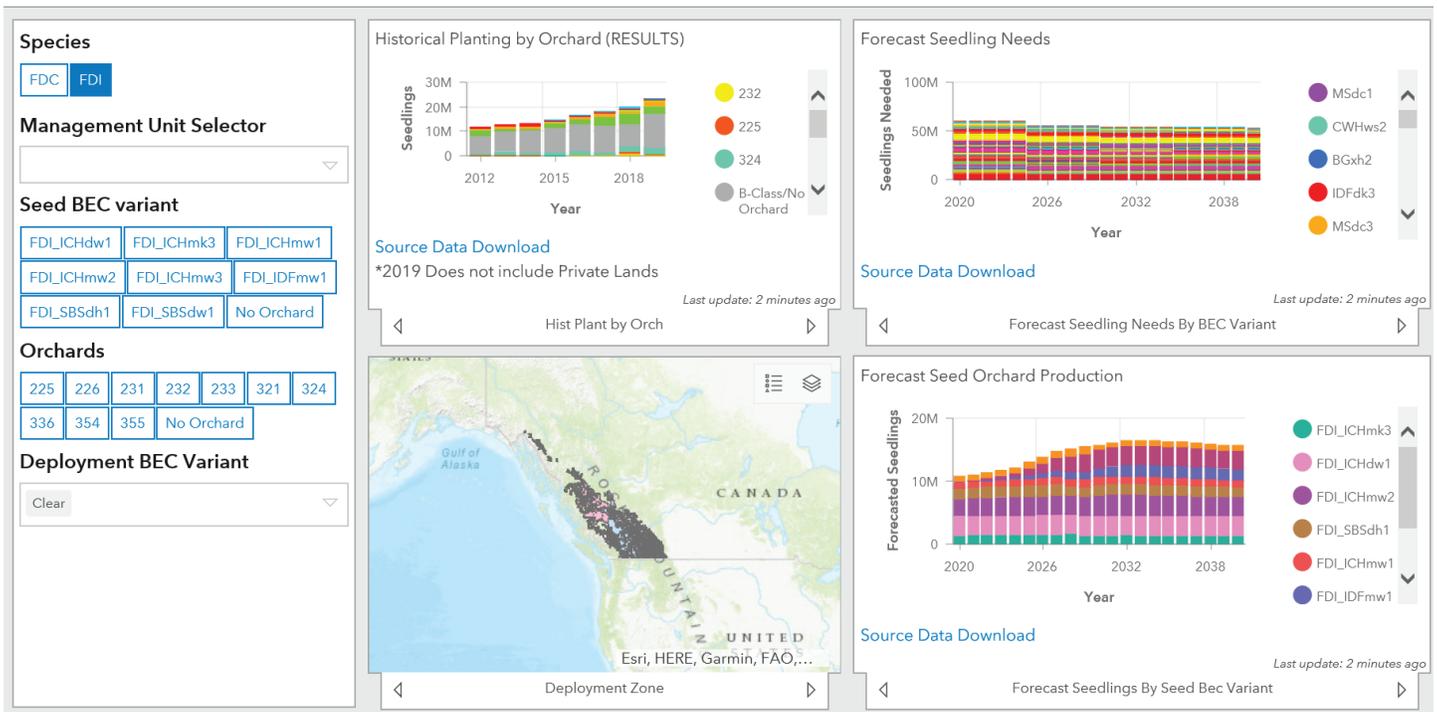
- i. Webinars and tutorials on CBST, and CBST in SPAR
- ii. One-on-one support for Seed Use alternative requests
- iii. A reconstituted CBST Science Working Group
- iv. Presentations to the Forest Genetics Council, ITAC and CTAC



Mapping the degree to which plantations conform to CBST



Mapping the adequacy of seed supply



Species Planning Tool – Dashboard [prototype, Dec. 2020]



Policy and Planning Staff

Sabina Donnelly, Seed Resource Specialist, has been very busy this year supporting SPAR, being on-point for annual seedling requests (including support of new clients in Oil and Gas reclamation and rehabilitation); and, providing GIS support for the branch. This year, Sabina became a Professional Agrologist!



Leslie McAuley, Decision Support Officer, has been focussing her efforts this year on the development of spatial enquiry and monitoring tools for use in the tracking of seed use, assessment of policy implications for transition to CBST; and, in the identification of seed supply gaps. Leslie is also co-leading the development of the Office of the Chief Forester Climate Action Plan. Leslie is currently wrapping things up as she prepares for retirement early this spring.



Kevin Astridge, Seed Policy Officer, has been focussed on the “A to Z’s” of seed use policy, including using a CBST lens in the review of Chief Forester seed use alternatives; and, keeping abreast of early policy discussions on climate-informed tree species selection (CISS) to ensure integration with CBST. Kevin is also co-leading (with Brian Barber, Forest Genetics Council), the Species Planning Tool project in the development of an online dashboard tool for viewing historical and forecast seed use, inventory, and seed production, and genetic gain information under CBST.



BUSINESS OPERATIONS

I would like to begin with a sincere thanks to the Business Operations team this year. This year will be memorable for many reasons; not the least of which is COVID-19 and the additional safety restrictions and requirements.

Through the personnel changes and abnormality that this year brought, we have many accomplishments to be proud of such as payroll management, contracts, budget preparations, development of new LAN drives, whittling away at the records management backlog, and non-stop planning (safety, orchard plans, short-, medium- and long-term plans.)

Most importantly, we stayed focused on our customers; a vast array of different individuals and groups, more than many may be aware. They include staff internal to the Branch, those needing contracts both in the Office of the Chief Forester (OCF) and the Resource Stewardship Divisions, various external groups that we deal with such as the Forest Genetics Council and the varying seed orchards through the Operational Tree Improvement Program to name just a few.

Admittedly, there were a few glitches along the way, but we persevered and got the job done with more than a few smiles.

There will surely be constant change in the year ahead but with change comes new hope, opportunity and anticipation. The Business Operations unit is Bridget Brohman, Deanna Foster, Stephanie Gillis,



The perfect mask for tree improvement work (Tanisha Hett).

Karen Harrison, Lauren Harrison, Tanisha Hett, Kelly Michelsen, Jennifer Taylor, and Darrell Wood as well as those who have recently retired or moved to new positions – Kathy Theobald, Denielle Weatherill, and Sue Wilkie.

It's been a year with many accomplishments and not a lot of time to take a breath so as we close off the year; the Business Operations unit wishes everyone a restful holiday season and a great, prosperous New Year.

Darrell Wood
Manager, Business Operations