



2022

YEAR IN REVIEW

Forest Improvement and Research
Management Branch

Ministry of Forests





FROM THE DIRECTOR

In this brief, informal publication, the staff of Forest Improvement and Research Management (FIRM) branch share a few highlights from 2022. 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:

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

For the past few years, COVID-19 and wildfires were prominent issues affecting branch operations. In 2022, new challenges emerged as we faced labor shortages, inflation, and a summer of collective bargaining. In the end, through both creativity and effort we were able to avoid the worst consequences of the prevailing labor shortage. Inflation has increased our operating costs and may necessitate an increase in our seed and services prices in the future. And lastly, we were relieved when new collective agreements were reached in the fall, without significant disruption.

In 2022 we were delighted to host several tour groups of MLAs, including Minister Conroy in the spring. In addition to MLA tours, FIRM staff hosted many other groups

and provided training and extension related to seed orchards, forest genetics, seed biology, and forest research in general.

The work of the branch is capital-intensive. In 2022 we received 3-year capital funding from Treasury Board to improve equipment, facilities and infrastructure at our seed orchards and research stations. The ongoing capital project at the Tree Seed Center experienced repeated delays in permit approvals, significantly impacting the project.

Crops from the ministry's orchards were heavy in 2022. Initial estimates are 1747 hectolitres of cones were harvested from ministry tree seed orchards, containing 1100 kg of seed – enough for roughly 91 million seedlings. Faced with labor shortages, seed orchard managers blitzed local high schools, and implemented creative solutions such as bussing and selective use of contractors, to get the crop in. To help rectify longstanding deficits in lodgepole pine seed production, we completed the establishment of a new 5000 ramet, advanced generation lodgepole pine seed orchard at the Prince George Tree Improvement Station, and prepared the ground for a new comandra-resistant lodgepole pine orchard.

Staff turnover was high in 2022, as it has been for several years. Some of our colleagues left the branch in 2022 (including Tim Cardinal, Jarrett Columbus, Francesco Cortini, Hayley DeBianchi, Sabina Donnelly, Tanisha Hett, Stephen Joyce, Kyla Seward, Melody Sizer, Darrell Wood, and Fred Vroom), new colleagues joined (including Linda Campbell, Krista Copeland, Leanne DeSousa, Catheryn Fyfe, Tanis Gieslman, Bendix Hollmann, Emrys Kenniphaas, Matthew LaJeunesse, and James Sherwood), and many staff took on new assignments to sustain branch operations amid all these changes.

Among the many accomplishments in 2022 in research management, we completed the second cycle of research scientist classification reviews. This unique process helps the ministry attract and retain scientists, and motivate and reward science accomplishment.

In 2022 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).

In 2023, 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 sixth Year in Review publication.

PATRICK MARTIN

Director, FIRM



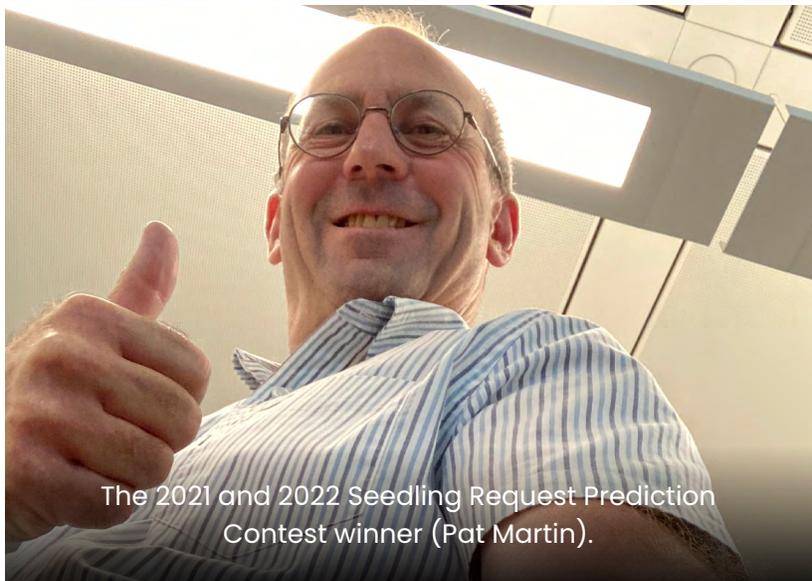
MLA Harwinder Sandu (left) and Minister Conroy (right) grafting trees at Kalamalka.



Stephen Joyce, Seed Production Manager, retired in January 2022.



Deputy Chief Forester (Albert Nussbaum) touring Saanich Seed Orchard with Kat Spencer.



The 2021 and 2022 Seedling Request Prediction Contest winner (Pat Martin).



ORCHARDS

2022 was a year of significant staff turnover in the Seed Production team. Section manager Stephen Joyce's retirement started a larger shuffle within the section. Penny May, long-term Seed Orchard Technician at Bailey Road, moved to the Genetics section. Kat Spencer stepped into the role of acting section manager. Katelyn Hengel moved to acting Kalamalka Seed Orchard Manager and new hires Tanis Gieselman and Emrys Kenniphaas took technician positions at the Kalamalka and Bailey Sites, respectively. Also, many new seasonal staff joined our team at orchard sites across the province: Sidney Fraser and Christine Malone in Saanich; Ryan Kennedy at Skimikin; Sharman Prior and Giles Talbot at Bailey; and Delbert Dilman at PGTIS. This season over 50% of staff were either in new roles or were new hires!

2022 was a bumper crop year with some of the highest cone volumes ever seen in many orchards and some younger orchards producing for the first time (one of the only positive side effects from the heat dome in 2021). From the Ministry orchards preliminary estimates are that 1,747 hectolitres (HL) of cones were collected. This harvest will yield approximately 1,100 kg of seed with a seed sales value of \$5.2 million and produce approximately 91 million seedlings.

Significant labour shortages were a barrier for cone collection in 2022. Orchard staff promoted cone picking positions at job fairs and to over 10 high school classes. Staff hired over 110 seasonal pickers to bring in the 2022 crops at Saanich and the Southern Interior orchard sites. Contract cone pickers were an effective additional resource to harvest pine crops from Prince George Tree Improvement Station and some of the Skimikin seed orchard 352 crop.

Thanks to a successful Treasury Board submission the section was able to complete many site and capital equipment improvements in 2022. Prince George completed building maintenance, mulched the powerline right-of-way and replaced power poles. Skimikin is currently installing new game fencing to protect the site from vandalism and wildlife and acquiring a new side-by-side UTV. Kalamalka completed fence line clearing for fire protection and acquired a new skid steer and implements to be shared with the genetics section. Bailey acquired a much-needed new tractor (after 5 years of renting!). Saanich installed new roofs on important pesticide and irrigation out-buildings.

LCELF/FCI-funded orchard development continued. In the next generation lodgepole pine orchard #411 for the Nechako Bulkley Valley we planted an additional 1,200 trees. We completed essential graft maintenance and winterization thanks to the help of staff from the southern interior who travelled to PGTIS for large worker-bees. To prepare for the 418 Pli comandra resistant orchard, planned for establishment in 2023, PGTIS developed 6 ha of land. At Kalamalka, the orchard 355 expansion is underway and the 850 Fdi rootstock planted this year will be grafted in spring of 2024. At Bailey staff completed rogueing of orchards 324 Fdi and 335 Pw. A portion of the space previously occupied by 335 Pw will be planted with rootstock for the expansion of 346 Py in spring of 2023. At Skimikin, staff installed irrigation, and prepared land for 351 Pw expansion. At Saanich, the planting of rootstock for orchard 416 Pw was completed.

2022 saw the continuation several Pest Management projects. Low pest numbers of both *Mayetiola* and *Contarinia* were observed in the Saanich-area orchards and as a result, no new spray trial results were obtained. In response to the surveys done in 2021, cover crop planting was initiated in a fallow area and as in-orchard trials at Kalamalka. A substantial increase in diversity and number of beneficial insects at Kalamalka was observed in the 2022 follow-up monitoring, including *Stethorus* beetles that were found despite no additional releases in 2022. The in-orchard cover crop trial provided useful insight into the challenges to establishing cover crops in existing orchards.

The Seed Orchard team demonstrated amazing adaptability in 2022 to handle many challenges and have a productive and effective year. Cone crop harvests were

successful, numerous improvements were made, and safety standards continue to be maintained and improved.

KAT SPENCER

Manager, Seed Production



Skimikin Seed Orchard crew celebration on last day of cone harvest.



Best dressed cone picker activity at Bailey Seed Orchard.



Sid Fraser collecting MGR white pine pollen at Saanich.



Worker Bee team at PGTIS reviewing graft maintenance in orchard 411.



Lunch time at the joint Ministry of Forests & University of Northern British Columbia Research Symposium at Aleza Lake Research Forest, Prince George, BC.

RESEARCH MANAGEMENT

The Research Program comprises more than 77 research scientists, technicians, co-op students, graduate students, and auxiliary personnel working in regions and branches across the province. The program is coordinated by the Research Management Unit within FIRM branch. The Research Management Unit manages the research program budget, coordinates the business cycle, manages scientific knowledge, and conducts outreach to raise the program’s profile and promote extension to forest stakeholders.

Significant accomplishments of the Research Management Unit in 2022 include:

- Completing the second intake cycle under the Research Scientist Achievement Review Framework to recognize individual Research Scientists for scientific achievement and leadership in research.
- Completed the 2021/22 Annual Research Program Report for printing and distribution.
- Completed hiring and onboarding of the new Research Program Specialist to aid the Research Management Unit in successful coordination of the research program.
- Distributed the final report from the second triannual survey of research program user

satisfaction in collaboration with BC Stats, which saw an increase of 95% in respondents being aware of the Ministry of Forests Research Program, indicative that outreach is being successful.

- Deployed a new Experimental Plot (EP) submission process for researchers with a new procedure manual.
- Showcased the 100 years of the Ministry's Research Program video at the XV World Forestry Congress in Seoul, South Korea, May 2-6, 2022, under the theme 'Building a Green, Healthy and Resilient Future with Forests'.
- Completed critical maintenance of the EP spatial layer, allowing for rapid updating and new search capabilities of historic EP's and research data records.
- Successfully convened the Research Symposium meeting with the University of Northern British Columbia (UNBC) in Prince George, BC with a focus on collaboration between government scientists and academic researchers. More than 100 ministry scientists, academic researchers and graduate students participated.
- Continued the article series in the ABCFP magazine with a piece on the Research Program's Forest of Ideas podcast in the Spring 2022 issue: "Turning the Spotlight on Forestry Researchers" and with the article "Seven Decades of Forest Genetics Research and Tree Improvement in BC" By Alvin Yanchuk, PhD, RPF and Barry Jaquish, RPF (Ret) in the Winter 2022 issue.
- Utilized the Research Program apparatus to offer the Future Forest Ecosystem Centre a funding distribution model, a pilot for temporary research portfolio funding in the future and rapid start up for groups carrying out research outside of the Research Program.
- Updated the Research Program public webpage with links to current publications and communication material and completed a major [update of the Research Program intranet website](#).
- Completed Series 1 of the podcast series – "Forest of Ideas" – where research scientists share their stories.

The Research Management Unit is preparing to build upon another successful year, and looking forward to 2023. We will keep working to leverage resources and expertise to support the ministry's Research Program while it continues to provide timely, relevant, and high-quality science for decision making.

JAMES SHERWOOD

Research Program Specialist



TREE SEED CENTER

The highlight of 2022 for the Tree Seed Centre was being one of the organizers, sponsors and a host for **“Challenges To Our Future Tree Seed Supply”** meeting in June. The 5 day long in-person meeting attracted 55 seed experts from Great Britain, Norway, Sweden, Holland, Hungary, Czech Republic, USA, and Canada. This was a multi-location meeting with stops in Sidney, Cowichan Lake, Port Renfrew, Ladysmith and Surrey. Sites toured included seed orchards, tree seedling nurseries, gardens, provincial parks, old growth stands and seed processing facilities. The focus of the meeting was cone & seed processing as a bottleneck to future global reforestation goals.

The Tree Seed Centre saw a continuation of staff change and team building over the past year. Lab Technician Melody Sizer left the public service to continue her educational studies and Bendix Hollmann was hired into the role.

The seed cooler/freezer replacement project is moving forward, we are currently at building permit phase. We are also continuing with the replacement of some worn-out equipment including the industrial process controller of the Bevco cone processing line and the addition of a touch screen human machine interface. The installation of a video camera system to capture critical points in material movement and equipment operations was also completed.

Redevelopment of the two main information systems used by Tree Seed Centre operations (CONSEP and SPAR) was initiated this year as part of the larger Forestry Suite of Applications Modernization project. Our two applications scored in the top five of Ministry systems needing redevelopment.

The Tree Seed Centre operates with a steady and predictable annual business cycle. Below are some highlights of 2022:

- Withdrawal, preparation and shipping of tree seed to seedling nurseries -- More than 2,400 sowing requests were processed. The seed shipped from the TSC in 2022 will produce about 290 million seedlings.
- Processing, testing and long-term storage of seed from BC cone collections – 2022 was a very busy year with more than 120 seedlots registered on SPAR and an anticipated 40,000 sacks of cones. As of December 15th, more that 21,000 sacks of cones from over 80 seedlots had been received onsite with the remaining balance to arrive in the new year. So far, our cone sheds have been filled three times and we are now working on the fourth fill. Also, we are processing one amabilis fir collection; it has been 20 years since we last processed this species.
- Testing - More than 3100 seed tests were completed.
- Conservation - More than 200 seed collections completed for Genetic Conservation purposes.

MICHAEL POSTMA

Manager, Tree Seed Centre



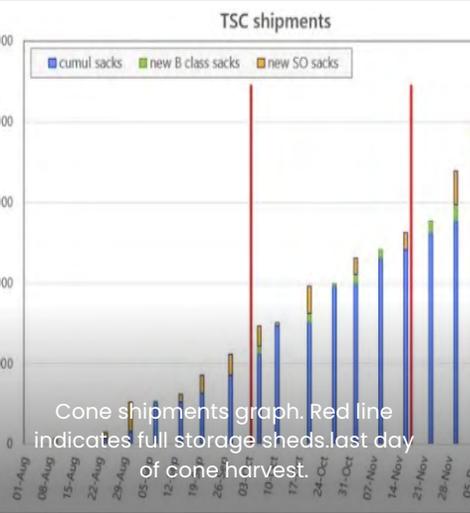
First large shipment of cones in 2022



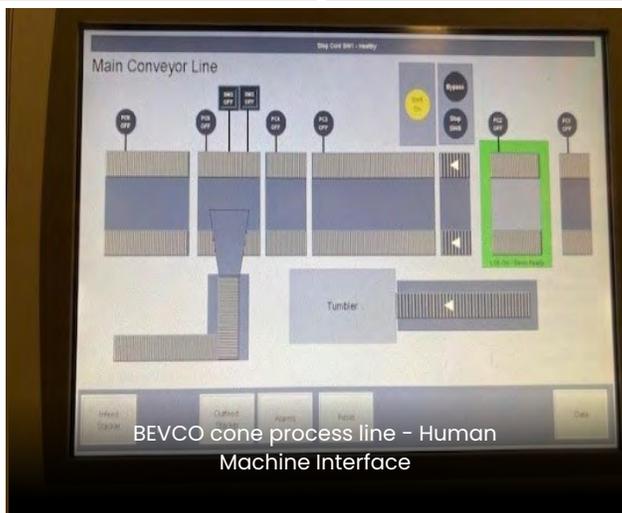
Challenges meeting dinner at the Shaw Centre for the Salish Sea.



Challenges meeting at the Tree Seed Centre.



Cone shipments graph. Red line indicates full storage sheds. last day of cone harvest.



BEVCO cone process line - Human Machine Interface

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UPCOMING SHIPMENTS

DATE	AGENCY	SPECIES/SO/SEEDLOT	#sacks	HL	Status	Pr
Aug 31	MOF 22	FDI 324 64033	500	100	com	
	"	FDI 355 64042	213	42.6	com	
	PRT	Fdi 321 64077	500	100	com	
Aug 24	VSOC	SX 247 64047	400	80	incomplete %	
Wed						
Thurs	Cypress	Ba	54196	75	15	complete
Sep 1 or 2						
Fr	VSOC	SX 247 64047	100	20	complete %	
Sep 2	"	SX 211 64044	500	100	complete	

Cone shipment arrival board.



FOREST GENETICS

After two years of Covid-19 restrictions which placed challenges on how we operated, finally we could see the light at the end of the tunnel.

This year we saw the return of travel and more in-person meetings where we reconnected with practitioners and others in the forestry community to exchange ideas and learnings. We hosted the international Western Forest Genetics Association and Canadian Forest Genetics Association meeting in June with over 40 people from BC, USA and Alberta. The Genetics Section also was able to meet in person for the first time in three years, allowing us the much-needed chance to exchange ideas, have robust discussions and interact with each other. We followed this up with a virtual meeting which was just as successful and have laid plans to make this a semi-annual event.

Changes in staffing remained a constant. The employment world went into hyper-drive this year which stressed our ability to recruit as competition for skilled people was fierce. Despite this, we were able to find very talented people to join our team. We welcomed Penny May as the Lodgepole pine Research Technician at Kalamalka Research Station. Penny will be working closely with the geneticist and team lead Nicholas Ukrainetz. On the coast, Rose Schmidt joined as the Research Technician for the coastal Western Redcedar breeding program and she will be working closely with the geneticist Lise van der Merwe. Kate Nahirnick became the permanent Nursery Manager at Cowichan and leads the growing of all our coastal research stock. We have also been very fortunate to have Dr. Fatih Temel join us for one year. Dr. Temel is a visiting scholar and scientist from Turkey and is working closely with Dr. Greg O'Neill at Kalamalka.

Despite this year’s staffing challenges, the strength of our integrated approach to planning and delivery produced many accomplishments. We completed the release of the Bulkley Valley expansion orchards which will produce much needed lodgepole pine seed to help the Province meet its reforestation objectives. We began grafting for the Comandra resistant seed orchards which will greatly help in the deployment of resistant trees on the landscape. We also made significant progress with the Armillaria screening program, and can now efficiently screen large numbers of seedlings for resistance. Our goal is to produce resistant trees faster for the breeding programs and the seed orchards. We continued to make steady progress with the new Ponderosa pine breeding program with more seed collections in the USA and BC. This has laid the foundation for a progeny test this coming year which is a significant milestone in the progression of a Ponderosa pine breeding program. On the coast the western redcedar program made great strides in genome research which will help us breed for resistance to cedar leaf blight and heartwood rot. The coastal Douglas-fir program made significant progress this year doing twice as much breeding as in 2021, and four times as much as in 2020. This has accelerated our timeline for testing by 1-2 years which means more selections for orchards and more breeding values sooner.

This has been a great year, a chance to reconnect, a chance to deliver and a chance to accomplish. We look forward to an even better next year.

KEITH THOMAS

Manager, Forest Genetics



Scion collection (not a backcountry ski trip).



It's all-hands-on-deck for the seedling lift.



The scientists in ministry's forest genetics and tree breeding program.



Kate (left), Hailey and Chris (right) at CLRS.



Germinants in a CLRS greenhouse, some with their seed coat still on.



Greg O'Neill maintaining a weather station in the Assisted Migration Adaptation Trial (AMAT).



Paige Hunter measuring water potential in lodgepole pine for a drought study.

POLICY AND PLANNING

2022 was another eventful year in the Policy and Planning section. The highlight of the year was welcoming Krista Copeland as our new Decision Support Officer. Krista brings a wealth of operational silviculture knowledge and experience to the branch. Krista joined us from BCTS where she was the Certification Standards Officer. Prior to that Krista worked in silviculture for a major licensee, spending a couple decades creating fabulous microsites for millions of seedlings and then monitoring and encouraging them to grow.

In November of this year Seed Resource Specialist Sabina Donnelly left the section to take on an exciting one year temporary assignment as a Senior Product Owner in the Forestry Suite of Applications Modernization Program. Sabina will continue to be involved with SPAR as she will be leading the modernization of the application in her new role.



Krista Copeland (left) and Sabina Donnelly (right) – Policy and Planning
“Beachcombers”

Climate Based Seed Transfer (CBST)

On August 1st, 2022 the Chief Forester announced the completion of the transition from Geographic-Based Seed Transfer (GBST) to CBST. The Chief Forester’s Standards for Seed Use were amended to remove GBST as an option, beginning with the 2023 sowing season. The Policy and Planning section have been updating guidance material to support the move to CBST. New material includes a guidance document and webinar on preparing alternative requests to the Chief Forester’s Standards, and updates to FRPA bulletin #1 (2005) on cone collection. The transition to CBST has resulted in a modest increase in alternative requests submitted to the Chief Forester as practitioners continue to adapt to CBST and the resulting changes to their seed inventories.

Species Planning Tools

In Spring of this year two new Tree Seed Planning Dashboards were released in conjunction with the Forest Genetics Council (FGC). These new on-line tools replace FGC’s Species Plans and are designed to assist persons producing and using tree seed in accordance with CBST. The Supply and Demand Dashboard (example below) provides historic planting information, projected future planting demand, and seed orchard production. This information is available by species, management unit and Biogeoclimatic Ecological Classification (BEC) variant.



The Seed Orchard Dashboard (not shown) provides both past and forecasted seed production for each seed orchard in BC. A map of the BEC variants where seed can be deployed, as well as estimated genetic gain, and contact information for each orchard, is also displayed. Maintaining and updating the data underlying these tools will be a continuing focus for the Policy and Planning section into the future.

SPAR

Several SPAR enhancements were completed in 2022, including:

- Changes to SPAR to remove GBST and complete the transition to CBST
- Creation of a seedlot search screen that helps practitioners find seedlots when considering

- applying for an alternative to the Chief Forester's Standards
- Functionality to choose up to 3 BECs when searching for CBST suitable seedlots
- Updates to funding codes for seedling requests
- Addition of fields to the seedling request form to make planning and tracking easier for SPAR users

As part of the Forestry Suite of Applications (FSA) Modernization Program work has begun on the modernization of SPAR. A significant amount of work has been completed, including interviews with SPAR users. We are excited by the opportunity this modernization provides to better serve our clients in the future. We encourage SPAR users to become engaged in the modernization project and provide the FSA team with user feedback. Upcoming user feedback sessions will be posted on the [SPAR website](#).

KEVIN ASTRIDGE

Seed Policy Officer

BUSINESS OPERATIONS

The Business Operations team made significant contributions to critical branch functions again this year. We have varied tasks including providing administrative support to the nine branch sites, developing safety and business continuity plans, coordinating payroll administration and delivering analysis and assistance in contract procurement for the Office of the Chief Forester Division (OCFD).

It was another year of staff changes, posing some challenges as staff took on additional duties and learned new roles. Throughout this time we pulled together to deliver results. Some of our achievements include:

Records Management

- Developed a LAN drive with ARCS/ORCS classifications embedded. Assisted with moving the Seed Production and HQ Policy groups onto this drive with continued work next year for HQ Administrative group

Staffing and Payroll Coordination

- Confirmed necessary salary approvals were received
- Processed 120 hires for Cone Pick alone, hiring and onboarding staff at various sites
- Managed numerous payroll issues and time sheets

Contract development and assistance

- Provided seamless service of over 200 contracts for the OCFD with one position temporarily vacant
- Updated the Business Operations intranet site, including the contract guide and key contract-related forms.

Coordination and Planning

- Provided coordination and leadership to all sections in the branch on payroll and HR procedures to ensure consistency across the branch and conformity with key government policies
- Completed AMAP 2022 for all seven sites
- Updated the Safety Management System webpage for all seven sites
- Completed Business Continuity Plans for 6 out of 7 sites
- Ensured the Conference Centre bookings and contracted services were managed as directed
- Oversaw the information collection for the SAFE audit in headquarters. Overall results for the audit were 90% compliance.

As the year draws to a close, we wish everyone a restful holiday season.

CATHERYN FYFE

A/Manager, Business Operations



Welcome back! In 2022 the Cowichan Lake Conference Center re-opened.

The view that guests at the Cowichan Lake Conference Center enjoy during their stay.



Linda Campbell joined the Business Operations team in 2022.



Kelly Michelsen, Deanna Foster, Catheryn Fyfe and Stephanie Gillis at Capital Park 2.