This program is funded by the Government of Canada
and the Province of British Columbia.

Future of Forestry Think Tank: Human Resources Session

September 19-20, 2019

North Community Campus – Quesnel, BC

(Photo Credit: City of Quesnel)

Report prepared by Erin Robinson and Taddea Kunkel, Forestry Initiatives Program, City of Quesnel

Introduction

On September 19 and 20, 2019, 60 participants from the provincial, municipal, First Nation and regional governments, along with members of the local forestry industry, non-government organizations, academic partners, union representatives, and funding organizations, convened in Quesnel to discuss the human resource needs for forestry and wood manufacturing. The event provided a space for participants to workshop the question, *"If this is the future of forestry, what does our plan for the workforce need to be?"*

This meeting was a continuation of the Future of Forestry Think Tank process that was initiated in May 2018. The Think Tank process has been a municipal-lead response to the unprecedented ecological disturbances, and the resulting socio-economic impacts in the Cariboo-Chilcotin Region. The City of Quesnel has partnered with various parties to dig deep and explore the possibilities of diversifying our forest-management practices and manufacturing opportunities to create meaningful jobs in our community, and beyond.

At the event, panelists spoke to how their perspective relates to the workforce in Quesnel and painted the picture of what the future holds and how people will need to be trained and educated accordingly. This includes a strong professional development component for the full spectrum of silviculture, including but not limited to: ecologists; biologists; registered professional foresters; forest technicians; machine operators; hand treatment crews; landscape level planning and management; ecosystem restoration and resilience; wildfire science and management; and, alternate manufacturing processes.

After the panel presentations, the speakers and attendees of the Think Tank were assigned the task of workshopping the education, training, curriculum development, and professional development that will be required for "the future of forestry". The outcome of the workshop is this report, which will function as a "roadmap" to advance funding, policies and program support for forestry-related education, skills training, apprenticeship programs and anticipated professional development in Quesnel. The North Cariboo Community Campus is uniquely situated to assist with training and education programs from the trades and labourer level (through the College of New Caledonia), as well as the academic level of advancing applied research based on theoretical models (through the University of Northern British Columbia).

Setting the Scene

Mayor Bob Simpson set the tone for the event by localizing the conversation to Quesnel, as every community is unique and will have to deal with the current economic and ecological shifts in their own unique way. Mayor Simpson spoke about the current fibre basket, with a shift from 80-100-year-old trees to 50-60-year-old trees; the different fibre profile is driving the need for innovation. To truly achieve "value over volume", Mayor Simpson maintains that we need to engage in the exercise of looking at value extraction that does not put any additional pressure on the mid-term timber supply, while adding to what already exists in Quesnel's manufacturing hub. For example, pre-commercial, commercial thinning and fuel management operations can supply fibre to the mills and the plants that are already here, while "waste-products" from the existing processes (i.e. pulp byproducts, MDF bi-products, burn-piles, etc.) can be utilized to manufacture higher value products.

Mayor Simpson spoke about how the Think Tank process is allowing us to consider the next evolution of the forest products manufacturing hub, along with the investment in the human capital needed to maximize any financial capital investments. He went on to say how the human resource component is an important part of the discussion that often gets neglected in conversations about changes to land management and manufacturing. He challenged participants to consider how the North Cariboo Community Campus can be utilized to its full extent.

The Honourable Minister Doug Donaldson was the keynote speaker for the event and provided the province-wide context and government direction for forest management and the resulting workforce trajectory. Minister Donaldson discussed the recent provincial announcement of 69 million dollars in funding being a short-term lifeline to many workers, in the form of early-retirement assistance, job-placement services, retraining programs, and special assistance for the contractor sector. The Minister maintained that the province is working to tailor programs to actual needs by listening to workers and communities through the Community Transition Response Teams.

Minister Donaldson stated that the 69 million dollars is part of a continuum of actions that are required to deal with a long-predicted rationalization of the industry driven by timber supplies that have been decimated by the mountain pine beetle infestation and wildfires. The takeaway message from Minister Donaldson's keynote speech is that a shift is needed in manufacturing to maximize value not volume. By managing forests differently, we can create more resiliency in the face of climate pressures, address carbon issues by using mass timber and engineered wood, and improve skills and training. However, in order to do this we need an action plan.

The session took place at a time when the information generated can be used to position Quesnel to benefit from current and emerging funding opportunities and policy changes. The main focus of this technical working session was to outline the deliberate steps needed in human resource development in order to respond to the long-standing and systemic issues influencing the forest sector, and help us manage through this transition period in a proactive manner.

In the following 6 sections, the recommendations arrived at during the World Café, informed by the panelist presentations, are outlined and include: Section 1 – Human Resources to Foster Ecological Resilience; Section 2 – Human Resources to Support the Solid and Engineered Wood Manufacturing Sector; Section 3 – Human Resources to Support Prefabrication; Section 4 – Human Resources to Support the BioChemical Sector; Section 5 – Curriculum Development, Training and Education, and Cultural Rebranding of "Forestry"; and, Section 6 – Next Steps and Future Directions.

Throughout the sections are the 9 recommendations and associated actions to bring the recommendations into reality. The following is a summary of the recommendations from the Think Tank proceedings; *note that numbers do not imply prioritization.*

Recommendation 1 – Enable rapid development of training for hand-treatment crews and machine operators to respond to the increasing demand for fuel management and ecosystem based management.

Recommendation 2 – Secure investments to incrementally add to the existing solid wood and engineered wood manufacturing hub for the lowest investment with the greatest return.

Recommendation 3 – Explore innovative and sustainable manufacturing opportunities utilizing the types of fibre available to us (i.e. an overabundance of dead wood and pre-commercial/commercial thin material, and fuel management material).

Recommendation 4 – Advocate for policies and regulations to accelerate the shift from traditional "stick-building" to prefabrication using more engineered wood products.

Recommendation 5 – Invest in facilities to manufacture new biochemical products that enhance integration, bolster the existing manufacturing hub, and help shift our overall economy to operating within the natural carbon cycle.

Recommendation 6 – Utilize the North Cariboo Community Campus to its full potential to train, educate, and research all aspects of a revitalized forest sector (from forest management to forest products manufacturing).

Recommendation 7 – Enable "made-to-order" programming/curriculum to fit the adaptive needs of industry, non-profits, and government to maximize job opportunities and job retention in Quesnel.

Recommendation 8 – Utilize examples from other jurisdictions that have already initiated these shifts to fast track the work of the Think Tank.

Recommendation 9 – Advance a re-branding of "forestry" to change the current stigma and attract youth to the sector.

Section 1 – Human Resources to Foster Ecological Resilience

Recommendation 1 – Enable rapid development of training for hand-treatment crews and machine operators to respond to the increasing demand for fuel management and ecosystem based management.

Actions for workforce readiness

- Carryout a forest inventory for the Quesnel TSA - LiDAR is an essential component to determine the future fiber basket including species and structure. A robust forest inventory of what's available in the Quesnel TSA will also aid in better management and better utilization of existing fibre for: pellets, biochar, bioenergy, and biochemical products. A forest inventory can also facilitate fire resistant mosaic landscapes and optimal management for fire breaks.
- Utilizing the inventory, determine near-term future fibre sources, which will be expensive to access, but are an integral part of the larger resilience strategy for ecosystem health.
- Determine where threshold of fuel management treatments and thinning operations will significantly impede disturbance flow across the landscape (both insects and fire).
- Subsidize the removal of residuals to support the value added sector and assist with fire protection.

- Initiate a long term monitoring and adaptation plan that can be dynamic (not static) and engage academia to be part of this discussion to make a continuous process of monitoring and training the next generation of researchers.
- Create curriculum for different harvester training, similar to the training centers in Finland. Courses could be set up in modules for new and existing operators. A strong ecological and forest management component would be necessary, as machine operators are carrying out stand management and need to make critical forest health decisions.
- Determine future training and education needs in the ecosystem management realm, including: all facets of ecosystem restoration of fire-maintained ecosystems and the riparian areas within them; hand and machine thinning; prescribed burning; practical experience with fire; forest health surveys; steep slope harvesting; wildfire risk assessment; tree nursery seed improvement; truck driver training; equipment operators; and simulation training, etc.
- Offer training modules for planning and layout, manual brushing, spacing, and pruning for fuel management crews.
- Develop modules for supervisor training to develop future logging contractors. For example, things like: business management, project management, bookkeeping, training in leadership skills, office skills, using tablets for maps, etc.
- Enable professional development for forest professionals around landscape evaluation and forest resilience.
- Foster the high-tech side of forestry with training in the use of: drones, robotics, artificial intelligence etc. (*note- this high-tech field in forestry may attract more youth to the sector)*.
- Enable current employees to take short courses (weekends or for a couple of weeks during breakup) on topics like: biomass procurement and handling, machine operator and forest technician training in road deactivation, technology implementation, basic forestry, sawmill operators training, etc.
- Strengthen cross-organizational synergies that will help with human resource development. I.e. ABCFP and BCWS collaborating on prescribed fire guidelines; C&C Wood Products and College of New Caledonia collaborating on tailored civil engineering modules; MLNRORD collaborating with SD 28 on high-school content; and CNC, BCWS, Industry, City of Quesnel, and FLNRORD collaborating on fuel management curriculum development.
- Create professionals that can account for the cumulative effects of forestry operations.
- Accelerate the landscape analysis and restoration project in the Quesnel TSA and ensure its part of the timber supply review process and prioritize units with higher level landscape level concerns.
- Obtain people with multi-disciplinary knowledge (i.e. climate change melded with forestry degrees); there is an identified need to hire from outside the traditional “forestry” industry sector.
- Modify the annual allowable cut to focus on what could be, not based on what the past has been.
- Learn from the past land-scape level plans (what worked and what didn’t).

Funding opportunities to advance

- Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD), Office of the Chief Forester, Northern Development Initiatives Trust (NDIT), FP Innovations, The Ministry of Social Development and Poverty Reduction - Labour Market Partnerships, new provincial funding

Section 2 – Human Resources to Support the Solid and Engineered Wood Manufacturing Sector

Recommendation 2 – Secure investments to incrementally add to the existing solid wood and engineered wood manufacturing hub for the lowest investment with the greatest return.

Recommendation 3 – Explore innovative and sustainable manufacturing opportunities utilizing the types of fibre available to us (i.e. an overabundance of dead wood and pre-commercial/commercial thin material, and fuel management material).

Actions for workforce readiness

- Assess which forest products have the greatest market potential for existing companies in Quesnel.
- Pivot the manufacturing from 80-100-year-old tight grained "old wood" to younger stands for engineered wood products (small diameter wood, dead wood).
- Explore pilot projects for more uses for small diameter wood (pre-commercial thinning and commercial thinning material), including but not limited to: wood fibre insulation, engineered products using green wood, dead wood, and deciduous.
- Determine which manufacturing and/or product streams can benefit from repeated disturbances (wildfire, insects) including volume, cost to access it and the predictability of supply.
- Retrieve merchantable dead wood as quickly as possible, while it still has some value.
- Establish a high utilization system that steers the raw material to the best end-user.
- Build on and learn from existing innovative practices underway including C&C Wood Products, i.e. laminated mass timbers, ship lap and innovative uses for aspen.
- Enable the human resources capacity for builders to compete and be creative in this field.
- Create incentives for partnerships between small operators and large forest licensees, and recognize the competitive advantage of having cooperative - "vertically integrated partnerships".
- Determine eligible areas for commercial thinning and continue with low stumpage on these areas.
- Utilize Quesnel CWPP and future Community Forest, for proposed fuel management operations close to the manufacturing hub in Quesnel for fibre opportunities and public safety.
- Advocate that the province incentivizes the tax regime, to allow the restructuring of mills/plants so they can become more innovative.

Funding opportunities to advance

- MFLNRORD, NDIT and Forestry Enhancement Society of BC (FESBC), potential for investors with a mix of private sector and public-sector investments, including: First Nations, BC Housing, FP Innovations, Western Economic Diversification Canada (WD), Canadian Wood Council, Forestry Innovation Investment, Innovate BC, The Ministry of Social Development and Poverty Reduction, etc.

Section 3 – Human Resources to Support Prefabrication

Recommendation 4 – Advocate for policies and regulations to accelerate the shift from traditional "stick-building" to prefabrication using more engineered wood products.

Actions for workforce readiness

- Initiate knowledge transfer, using examples from Europe: i.e. 1) Swedish company that prefabricates walls in a streamlined and integrated process in-house for quality control (i.e. airtightness and other factors) and 2) IKEA pre-builds houses with everything pre-installed including plumbing and electrical.
- Incentivize engineered wood products for prefabrication process - dimensional lumber is not very accurate (normally twisted), while glued laminated timber (glulam) studs are dimensionally stable.
- Integrate approaches for prefabrication by developing new programs that cross boundaries and attract students. UNBC's engineering program is the only one in Canada and is unique in its delivery, but struggles with low enrollment. Civil engineering students do not see construction as a career choice because it was not presented to them in their various programs, and they have not considered the neat possibilities. We need to integrate engineering programs, students from colleges and universities need co-op placements and internships with companies across the province that expand their knowledge of career opportunities.
- Explore other prefab opportunities for optimization of fibre include: composites, bricks, concrete building, and insulation.
- Advocate for performance-based regulations, which is not reflected in the current format.
- Explore unique niches for current modular builders as the prefabrication market has the potential to serve a large geographical region.
- Educate the consumer that modular homes are better quality than stick-built and home renovations and repairs are easier.
- Educate municipalities and consumers about the links between step-code and prefabrication.

Funding opportunities to advance

- NDIT, MFLNRORD, FP Innovations, The Ministry of Social Development and Poverty Reduction - Labour Market Partnerships, potential for investors with a mix of private sector and public-sector investments, including: First Nations, BC Housing, FP

Innovations, WD, Canadian Wood Council, Forestry Innovation Investment, Innovate BC etc.

Section 4 – Human Resources to Support the Biochemical Sector

Recommendation 5 – Invest in facilities to manufacture new biochemical products that enhance integration, bolster the existing manufacturing hub, and help shift our overall economy to operating within the natural carbon cycle.

Actions for workforce readiness

- Encourage and incentivize the investment in bioenergy industries that utilize large quantities of material and produce higher end-value products than cogeneration hog and/or pellets.
- Identify private sector parties to convene and discuss the challenges and opportunities in bio-refining production.
- Engage non-profits to invest across key economic sectors in research and entrepreneurship.
- Explore emerging markets in the bio-refining sector and assess the feasibility in Quesnel for marketing: cellulose, lignin, hemicellulose, green chemicals, bioplastics/resin, bio-composites, conductive textiles, 3D ink, biomedical (wound dressings), nanocellouse fibril films (food packing, bicycles, textile, water purification), dispersing agents, biomaterials, ceramics, emulsions, gypsum boards, soil road dust control, etc.
- Explore emerging markets in single-use packaging (containers, paper straws, bags etc.).
- Discover where the sector is going and create the long term plan but risk manage and develop a small scale operation to eventually deliver at the larger scale. ** Thinking "outside of the box" and being unique and creative is key.*
- Collaborate with Biofoundry Alliance (Laval University) to test and design new products to fill a goal or design.
- Invest in different trucks to capitalize on fibre utilization, as conventional logging trucks will not work.

Funding opportunities to advance

- MFLNRORD, Office of the Chief Forester, NDIT, FP Innovations, The Ministry of Social Development and Poverty Reduction, new provincial funding, Biofoundry, Genome BC, and BC Pulp and Paper Bio-Alliance.

Section 5 – Curriculum Development, Training, and Education

Recommendation 6 – Utilize the North Cariboo Community Campus to its full potential to train, educate, and research all aspects of a revitalized forest sector (from forest management to forest products manufacturing).

Recommendation 7 – Enable "made-to-order" programming/curriculum to fit the adaptive needs of industry, non-profits, and government to maximize job opportunities and job retention in Quesnel.

Actions for workforce readiness

- Assess the future training and education needs in the forest products manufacturing.
- Obtain virtual reality equipment for high school students to experience machine operating and forestry practices.
- Foster collaboration between School District 28 and MFLNRORD to generate students' interest in forestry.
- Tailor training and education programs in resource management specifically to local First Nations members.
- Build adaptive management into education and training to deal with the high degree of uncertainty in the current social/economic/ecological context.
- Create innovators, though education, to step up and take on new and challenging roles, and new and challenging work.
- Integrate pre-fab construction into the trades and academic process.
- Explore the opportunity with the school construction in Quesnel, as a possibility to showcase local products and generate students' interest in forestry.
- Build capacity for local/regional campuses to harness local students.
- Continue relationship building between government, industry, non-profit sector and post-secondary to develop curriculum that is relevant to the current context.
- Address vulnerabilities in the workforce including: lack of holistic training (it's often too specific); succession planning within an organization; flexibility in working hours and child care needs; adapting to what young people want and will commit to in the workforce.
- Implement exchange programs/mentorship programs in our universities and in our government.
- Co-invest in scholarships for training needs.
- Implement best training practices to serve workers with significant barriers to retraining (such as: literacy, limited skill sets, education levels, physical disability, learning disabilities, or are "aged-out") by providing hands-on/practical components to their programs, training process with skills' assessments built in, and reimagined assessments to recognize strengths.

Funding opportunities to advance

- Continue to advocate for research chair endowments or other program funding from Government of Canada, private sector, or other sources. Other potential funding source may include: CCATEC; Work BC; FP Innovations and BC Ministries (Advanced Education, Social Development and Poverty Reduction, and Jobs, Trade and Technology).

Section 6 – Next Steps, Future Directions and Cultural Rebranding of "Forestry"

Recommendation 8 – Utilize examples from other jurisdictions that have already initiated these shifts to fast track the work of the Think Tank.

- Identify the lessons we can learn from foreign examples, create a hosting environment for foreign researchers.
- Look beyond our sector for creative solutions, ask: What are others doing well? What adaptations need to be done to make them fit in a BC context?
- Determine where it makes sense to implement approaches from other parts of the world.
- Determine what changes in policy are required to implement new and novel ideas.
- Create an environment where organizations and workers can be willing to take risks; form relationships with other groups who have been successful and failed.
- Utilize pilot projects in order do trials and implement projects that take learning's from other parts of the world.
- Change our mindset around how we see our forests and the products that come out of them to think differently and adapt new approaches and technologies.

Recommendation 9 – Advance a re-branding of "forestry" to change the current stigma and attract youth to the sector.

- Change the name from forestry to "natural resource management", "carbon sequestration", or "landscape management" to help change the sometimes negative perception "forestry".
- Host an annual natural resource forum around the topic of re-branding the sector and work to highlight the innovative and important nature of the sector.
- Coordinate virtual forestry tours that allow for students to be able to walk through different landscapes. * *Note - FPInnovations is working to create these virtual forestry simulators to help with management and planning of landbases.*
- Work to gain access to woodlots for students to gain hands-on experiences.
- Include more biodiversity and biology in forestry training/silviculture.
- Educate youth about new opportunities (bio-energy composites, carbon) and use of technology in new processes.

In Summary

The Future of Forestry Think Tank: Human Resources Session, convened 60 participants and tasked them with identifying the current human resource challenges and opportunities needed to realize a new approach to the forest sector. Over the two days, the participants got to think creatively about how to manage the land base differently and how to find new and innovative ways to utilize the fibre coming off of the land.

Participants identified the need to have more adaptive curriculums that are tailored to the increasing demand for fuel management, ecosystem based management, landscape level

planning and restoration, and the construction and manufacturing sector. By utilizing the North Cariboo Community Campus to its full potential to train, educate and research all aspects from forest management to forest products manufacturing, Quesnel can create opportunities for local people as well as recruit talented people from other places.

Outcomes of this report will assist Quesnel not only advance training and education needs, but also secure investments for the existing solid wood, engineered wood, prefabrication, and biochemical manufacturing hub, for the lowest investment with the greatest return. The rationale behind using Quesnel as an incubator for this project is that the community already has a diverse manufacturing hub, with facilities that are “best in class” for milling and processing operations. These facilities provide Quesnel with a unique position, in addition the community is also home to the head offices of West Fraser Mills Ltd and C & C Wood Products. The existing capital invested in the community, human and physical, can allow Quesnel to undertake such a project. From the management of the fibre supply chain to the locations of the facilities, and the relationship with the College of New Caledonia and the University of Northern British Columbia, allow the community have a comparable advantage to that of other forestry communities.

The generated ideas surrounding alternate land management practice and manufacturing processes could be adapted to develop resilience to climate change induced disturbances and stresses. These ideas will provide guidance on how forest product manufacturing processes can be innovated to take better advantage of the kind of fibre BC’s central interior forests will provide in the future.

Appendix 1 - Panel Presentations

Topic# 1 - The Future of Forestry

Dr. Dominik Roeser, Associate Professor, Department of Forest Resources Management and Dr. Lauri Sikanen, Principle Scientist and Group Manager, Natural Resources Institute Finland discussed advancements in Climate Smart Forestry including examples from Finland where they utilize machines for small-scale salvage and pre-commercial and commercial thinning opportunities, and how this can create employment in BC. BC can learn from Europe with alternate harvesting techniques such as cut to length, processing at the stump and utilizing smaller machines with lower carbon footprint and the ability to leave a "lighter-touch" in the ecosystem.

Topic # 2 - The Future of Fibre

Tim Caldecott, Program Manager, FP Innovations, outlined the future of fibre including advancements in "zero waste" matching fibre to manufacturing**,** virtual management through digital representation and artificial intelligence and the future fibre supply and how it relates to the future workforce. By exploring advancements in the bio-economy and looking beyond our current focus on the sawlog, we can maximize value from harvest residuals and minimize waste.

Topic # 3 - The Future of Fuel Management

Mike Gash, Manager of the Cariboo Fire Centre and Jason Ward, Senior Wildfire Officer, Cariboo Fire Centre discussed area-based tenures and interface fuel management and how these relate to changes needed in the workforce. Training to enable more prescribed fires, hand treatments for fuel management and disturbance management were also discussed. BCWS Prescribed Fire Program (Wildfire service): ABCFP to develop professional burning guidance to reestablish prescribed burning. Crown Land Wildfire Risk Reduction Program (WRR): First steps identify areas of high risk and prioritize (not targeting a specific landscape). Proposed stand and landscape level fuel breaks, competitive bid.

Topic #4 - The Future Forest Worker

Taiho Krahn, Fibre Manager, C&C Wood Products Ltd, discussed the cycle of silviculture including: how it's changing and the strategies we need to pivot the sector, skill-development for machine operators, forest technicians, natural resource managers, Registered Professional Foresters, and others in the field. Taiho explained the cycle of silviculture with the planned program to reach planned objectives, however, the objectives are not changing but the environment is.

Topic #5 - The Future of Wood Manufacturing

Dr. Guido Wimmers, Chair for the Integrated Wood Design Program at UNBC, discussed strategic investment in the wood manufacturing sector, including: the BC Step Code, necessary steps to implement Clean BC and the implications for local government by 2032. Dr. Wimmers discussed

fostering the use of secondary wood manufacturing through innovative technologies including pre-fabricated and engineered wood building materials.

Topic #6 - The Future of Bio-Refining

Dr. Rahul Singh, Sector Manager, Genome BC, presented on the challenges and opportunities for advancements in: bio-energy, bio-composites bio-resins, lignin, cellulose filaments, nano-crystalline cellulose in the context of potential job creation in Quesnel. Shifting global markets present opportunities for the forest industry to offer next-generation forest bio-products to advance a cleaner and more sustainable economy.

Topic #7 - The Future Labour Force

Josh Pressey, District Manager, MFLNRORD, Barry Snowden, Resource Practices Branch outlined the current landscape management (NOT land-use planning process) and how it relates to optimal fiber recovery and utilization to realize more value and meet the demand for future forest products. The new management is informed by land-use plans, government objectives, Timber supply review and annual allowable cut, plus meaningful engagement from First Nations, community, and industry. Taking into consideration necessary changes in landscape management, fuel management, and manufacturing, MFLNRORD is in a position to collaborate with the forest industry, other employers, and educators to enable emerging careers in forestry.

Appendix 2 - The World Café

During both days, participants listened to panelist presentations on different landscape management practices from various organizations, the potential value added products, and the future of zero energy building. As the Think Tank's goal was to develop a working action plan to address our human resource needs, participants were prompted on day one to generate questions regarding what the needs were. The generated questions were then synthesized and combine to create six overarching questions that would be workshopped in the World Café.

The six meta-questions that resulted from the exercise were as follows:

1. How do we identify and implement best training practices to serve workers with significant barriers to retraining (such as: literacy, limited skill sets, education levels, physical disability, learning disabilities, or are "aged-out")?
2. What process do we need to help us identify future human resource needs?
3. How do we bring in knowledge and skills from other parts of the world?
4. How do we strengthen the public perception of forestry (i.e. rebrand the sector)?
5. How do we support and fund this training and education transition?
6. What are the gaps in our current training and education systems?

The content from the World Café session is woven throughout the Think Tank report.

Appendix 3 - Participant List

Name	Position/Company
Kyle Aben	Carbon Coordinator, City of Quesnel
Nicole Balliet	Research Project Officer, UNBC
Sharleen Balogh	Research Support Officer, UNBC
Tracy Bond	Executive Director, Baker Creek Enhancement society
Tim Caldecott	Program Manager, FPInnovations
Glenn Calder	Forest Resource Officer, Public and Private workers of Canada
Gord Chipman	Manager, Alkali Resource Management
Jason Chiu	Centre for Advanced Wood Processing, UBC
Jean Christie	Land and Resources Coordinator, Lhtako Dene Nation
Emily Colombo	Regional manager, Cariboo, MFLNRORD
Robert Cosma	Safety Officer, ?Esdilagh First Nation
Brittany Coulter	Graduate Researcher (Event Scribe)
Bryan Daly	Interim Associate Dean, TRU
Jacqui Dockray	Research Project Officer, Natural Sciences and Engineering, UNBC
Steve Dodge	Cariboo JCP Fire Mitigation Project Manager, United Way
Matt Duran	Wildfire prevention officer, BC Wildfire Service
Chris Elden	Planning Coordinator, West Fraser Mills Ltd
Colin Eves	Partner, Silva Gro Nursery
Hugh Flinton	Manager, Williams Lake Community Forest
Amanda Fouty	Resource Management, MFLNRORD
Paul French	President, United Steel Workers (Local 1-425)
Mike Gash	Manager, Cariboo Fire Centre
Diana Gerdenits	Operations Forester, SDNA
Gerry Grant	Board Member, BC Forest Practices Board
Ian Hannah	Resource Manager, MFLNRORD
Shawn Holte	Executive Director/Lead Negotiator, SDNA
Ross Hyam	Resource Manager, MFLNRORD
Doug Jamieson	Acting Associate Dean of Trades, CNC
Ray Joubert	Business Manager, SDNA
Steve Kozuki	Executive Director, Forest Enhancement Society
Taiho Krahn	Fibre Manager, C & C Wood Products
Karan Kubiski	Land and Resources Officer, SDNA
Jeffrey Lutes	Owner & Operations Manager, Silviculture Division, Blue Collar Silviculture
Felicia Magee	Director of Business Development, Northern Development Initiative Trust
Director John Massier	Electoral Area C and Vice Chair, Cariboo Regional District
Meggin Messenger	Executive Director, Strategic Initiatives, MFLNRORD
Sue-Ellen Miller	Superintendent, School district 28
Albert Nussbaum	Director, Forest Analysis and Inventory Branch, MFLNRORD
Josh Pressey	Quesnel District Manager, MFLNRORD
Renae Real	Land and Resource Specialist, MFLNRORD

Jennifer Reid	District Manager, Merritt, MFLNRORD
Dr. Dominik Roeser	Associate Professor, Department of Forest Resources Management Forest Sciences, UBC
Ben Ruether	Vice President, Communications, Energy and paperworkers union of Canada (Unifor 1115)
Mike Sakakibara	Planning Superintendent, West Fraser Mills Ltd
James Sandland	Director of Innovation, Bioeconomy & Indigenous Opportunities Branch, MFLNRORD
Dr. Lauri Sikanen	Principal Scientist, Group Manager, Natural Resources Institute (Luke), Finland.
Dr. Rahul Singh	Sector Manager , Genome BC
Harold Stolar	A/ Regional Executive Director, MFLNRORD
Bruce Sullivan	Revenue Officer, South Area, MFLNRORD
Sarah Szatmari	Administrative Officer, MFLNRORD
Christine Unghy	Integrated Investment Specialist, MFLNRORD
Jarno Valkeapää	Trade Commissioner, Finland
Jason Ward	Senior wildfire prevention officer, BC Wildfire Service
Dr. Guido Wimmers	Chair for the Integrated Wood Design Program, UNBC
Harley Wright	President, BC Community Forest Association
Sam Zirnhelt	Owner, Zirnhelt Timber Frames
Tristan Jones	Executive Assistant of the Minister's Office, MFLNRORD
Tim Renneberg	Ministerial Assistant, MFLNRORD
Tim Tchida	Owner, Summit Reforestation and Forest Management Ltd.
Councilor Martin Runge	City of Quesnel and Career Preparation Coordinator, School District 28
Barry Snowdon	Silviculture Reporting and Strategic Planning Officer, MFLNRORD
Tim Lofstrom	Principal, Quesnel Campus, College of New Caledonia
Honourable Minister Doug Donaldson	Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD)
Honourable Ravi Kahlon	Parliamentary Secretary, MFLNRORD
Mayor Bob Simpson	City of Quesnel
Amy Reid	Manager of Economic Development and Tourism, City of Quesnel
Alex Boston	Executive Director, Renewable Cities, Simon Fraser University (Event Facilitator)
Erin Robinson	Forestry Initiatives Manager, City of Quesnel
Taddea Kunkel	Forestry Initiatives Coordinator/Grant Writer, City of Quesnel

Appendix 4 - Agenda and Panelist Bios

This program is funded by the Government of Canada and the Province of British Columbia.

Future of Forestry Think Tank: Human Resources Session

Proposed Agenda for September 19 and 20, 2019

North Community Campus in Quesnel

This session will be guided by the question - *"If this is the future of forestry, what does our plan for the workforce need to be?"*

Objectives:

- Provide a space for participants to discuss: education, training, curriculum development, and professional development that will be required for future workforce readiness in the fields of: forestry, natural resource management, landscape analysis, ecological restoration, fuel management methods, and manufacturing of pre-fabricated buildings and value-added products.

- Create a roadmap to advance funding, policies and program support for forestry-related education, skills training, apprenticeship programs and anticipated professional development in various fields.

Day 1 – September 19

On the first day, the morning session will be an expert panel followed by a World Café session in the afternoon. The purpose of the panel is to set the tone for the World Café. Panelists will speak to how their perspective relates to the workforce in Quesnel. Every speaker will paint the picture of what the future holds and how people will need to be trained and educated accordingly, including a strong professional development component (i.e. for ecologists, biologists, RPFs, forest technicians, machine operators, etc.). *Participants will be responsible for setting questions for the World Café session.*

8:00 – 8:30 Registration & Breakfast

8:30 – 8:35 Facilitator Comments, Alex Boston, Executive Director, Renewable Cities

8:35 – 8:45 Welcome from Lhtako Dené Nation, Councilor Raymond Aldred

8:45 – 9:00 Welcome from Mayor Simpson, City of Quesnel

9:00 – 9:20 Keynote the Honourable Minister Doug Donaldson, FLNRORD

9:20 – 9:30 Setting the intention for the day, ground rules, and explanation of the question generation process, Alex Boston

9:30 – 10:00 The Future of Forestry – Dr. Dominik Roeser, Associate Professor, UBC Department of Forest Resources Management, and Dr. Lauri Sikanen, Principal Scientist & Group Manager, Natural Resources Institute Finland, will discuss advancements in Climate Smart Forestry including examples from Finland where they utilize machines for small-scale salvage and pre-commercial thinning opportunities, and how this can create employment in BC.

Dr. Roeser and Dr. Sikanen will outline research into improved silviculture practices, and how this relates to human resource needs.

10:00 – 10:30 The Future of Fibre – Tim Caldecott, Program Manager, FPInnovations will outline the future of fibre including advancements in "zero waste" matching fibre to manufacturing**,** virtual management through digital representation and artificial intelligence and the future fibre supply and how it relates to the future workforce.

10:30 – 10:45 Facilitated question session
Participants will have the opportunity to ask the first two panelists questions.

10:45 – 11:00 Refreshment Break

11:00 – 11:30 The Future of Fuel Management – Mike Gash, Manager of the Cariboo Fire Centre, and Jason Ward, Senior Wildfire Officer Prevention of the Cariboo Fire Centre, will discuss area-based tenures and interface fuel management and how these relate to changes needed in the workforce. Training to enable more prescribed fires, hand treatments for fuel management and disturbance management will also be discussed.

11:30 – 12:00 The Future Forest Worker – Taiho Krahn, Fibre Manager, C&C Wood Products Ltd will discuss the cycle of silviculture including: how it's changing and the strategies we need to pivot the sector, skill-development for machine operators, forest technicians, natural resource managers, Registered Professional Foresters, and others in the field.

12:00 – 12:15 Facilitated question session
Participants will have the opportunity to ask the final two panelists questions.

12:15 – 1:00 Lunch

By 12:40 folks need to have their questions submitted

1:00 – 1:15 Explanation & Structure of World Café, Alex Boston
The intention of the World Café is to workshop the gaps and needs in order to create a "roadmap" of the labour and human resources needed for the future of forestry.

1:15 – 1:30 Question Prioritization Session

1:30 – 3:30 World Café
Using the questions generated by participants, there will be 2 structured rounds of conversations during the 2-hour time-slot.

3:30 – 3:45 Refreshment Break

3:45 – 4:40 Summary of Conversation Outcomes
After the small groups, individuals will be invited to share insights or other results from their conversations with the rest of the large group.

4:45 shuttle downtown to the Billy Barker

5:30 cash bar opens in the Billy Barker Showroom

6:00-7:30 buffet dinner in the Billy Barker Showroom

Day 2 – September 20

8:00 – 8:30 Breakfast

8:30 – 8:45 Review of agenda, expectations and outcomes for the day, Alex Boston

8:45 – 9:00 Address from Chief Stuart Alec, Nazko First Nation

9:00 – 9:30 The Future of Wood Manufacturing – Dr. Guido Wimmers, Chair for the Integrated Wood Design Program at UNBC, will discuss strategic investment in the wood manufacturing sector, including: the BC Step Code, necessary steps to implement Clean BC and the implications for local government by 2032. Dr. Wimmers will discuss fostering the use of secondary wood manufacturing through innovative technologies including pre-fabricated and engineered wood building materials.

9:30 – 10:00 The Future of Bio-Refining – Dr. Rahul Singh, Sector Manager, Genome BC, will present on the challenges and opportunities for advancements in: bio-energy, bio-composites bio-resins, lignin, cellulose filaments, nano-crystalline cellulose in the context of potential job creation in Quesnel. Shifting global markets present opportunities for the forest industry to offer next-generation forest bio-products to advance a cleaner and more sustainable economy.

10:00 – 10:15 Facilitated question session
Participants will have the opportunity to ask the first two panelists questions.

10:15 – 10:30 Refreshment Break

10:30 – 11:00 The Future Labour Force – Josh Pressey, District Manager, MFLNRORD, will outline the current land management planning and how it relates to optimal fibre recovery and utilization to realize more value and meet the demand for future forest products. Taking into consideration necessary changes in landscape management, fuel management, and manufacturing, MFLNRORD is in a position to collaborate with the forest industry, other employers, and educators to enable emerging careers in forestry.

11:00 – 11:15 Facilitated question session
Participants will have the opportunity to ask the final panelists questions.

11:15 – 12:00 Large group discussion and questions
Participants will discuss education, training, and curriculum development required for workforce readiness in manufacturing.

12:00 – 1:00 Lunch

By 12:40 folks need to have their questions submitted

1:00 – 1:05 Explanation & Structure of World Café, Alex Boston

1:05 – 1:30 Question Prioritization Session

1:30 – 3:30 World Café
Using the questions generated by participants, there will be 2 structured rounds of conversations during the 2-hour time-slot.

3:30 – 4:00 Summary of Conversation Outcomes *Participants will be guided by the question: from what we heard over the last two days, what does the future of forestry hold for Quesnel and what is the roadmap needed for people to be trained and educated accordingly?*

4:00 Adjourn

Meet the Panelists

DR. DOMINIK ROESER

Associate Professor, Department of Forest resources management, UBC

Dr. Dominik Roeser is currently an Associate Professor in Forest & Wildfire Operations at the University of British Columbia (UBC) in Vancouver. Before starting at UBC, Dominik was working at FPInnovations where he, as Senior Director, managed a multidisciplinary team focused on improving the competitiveness of the forest sector and developing practical solutions to improve efficiency of forest operations and reduce the impact of wildfires in Western Canada. He has more than 17 years of experience in forest research and innovation, and has been working with industry to develop biomass supply systems to support the emerging bioeconomy both in Europe and in Canada.

DR. LAURI SIKANEN

Principal Scientist, Group Manager, Natural Resources Institute Finland (Luke)

Dr. Sikanen has been working with industrial timber supply R&D for 25 years. In 1999, he received his Ph.D. of customized wood purchases and supply at the University of Joensuu, Finland. Since 2001, he has been focusing on wood biomass for energy and international technology and knowledge transfer. In Luke and the former Finnish Forest Research Institute (Metla), he has led and participated in the consulting processes in Finland, Scotland, Germany, Italy, Russia, Iceland, and Canada.

Dr. Sikanen worked also as a professor of energy pellet research at the University of Eastern Finland between 2008-2013. Nowadays, he is an adjunct professor of Lakehead University (ON), where he was working as a visiting scholar in the fall semester of 2017.

Dr. Sikanen has around 100 publications, of which about 25 are peer reviewed, and has network on LinkedIn of over 1000 professionals.

TIM CALDECOTT

Program Manager, FPInnovations

Tim has been with FPInnovations (FPI) for 10 years and is currently the BC Provincial Leader, managing BC government relations and a research and development portfolio across the forest value chain. Prior to joining FPI, Tim worked as a management consultant in London, England, and as an agri-business manager of a UN development project in Malawi. Tim has a Master's degree from UBC in Wood Science.

MIKE GASH

Manager, Cariboo Fire Centre

Mike is a Professional Forester with over 25 years' experience, having worked the last 20 years in the Cariboo Region.

Mike has experience working for major licences in the Forest Industry both on the Coast and the Interior. Mike joined the Provincial Government in 2008 as the Regional Manager in the Cariboo for the Ministry of Indigenous Relations and Reconciliation. A move to Wildfire was made in the summer of 2018. What attracted Mike most to Wildfire is the need for large scale change in fuel management and the opportunity to be part of that change…as well as the heli flights.

Outside of work Mike and Sarah are raising their two children just outside of Williams Lake. Days off find them traveling the region in search of powder, fish, game, biking trails and exploration. Mike also owns and manages a woodlot, which gives him a different perspective to balance things.

JASON WARD

Senior Wildfire Officer Prevention, Cariboo Fire Center

Jason is a Professional Forester with 20 years of forestry related experience in government, as a consultant, and working for a major forest industry licensee. Jason has been involved with three volunteer fire departments, and is currently the Fire Chief of the Miocene Volunteer Fire Department. He has also been involved with wildfire management since 2004, starting his wildfire career as a rappel firefighter.

He has been in his current position since February 2019, and is very passionate about wildfire prevention. The prevention program he oversees in the Cariboo region consists of fuel treatment, hazard abatement, prescribed burning, fire origin and cause, FireSmart initiatives, and wildfire cost recovery.

TAI KRAHN

Fibre Manager, C&C Wood Products Ltd.

Tai Krahn has been the Fibre Manager with C&C Wood Products since the fall of 2017. His role includes forestry planning and operations, sawmill residuals sales, and capital projects. His experience includes 12 years in forestry consulting and five years in fibre procurement, and in-woods log chipping and grinding. Tai values responsibility and reliability, especially when it comes to developing and maintaining community relationships. His favourite family activities include camping, boating and snowboarding.

DR. GUIDO WIMMERS

Chair for integrated Wood Design Program at UNBC

Dr. Guido Wimmers joined the University of Northern British Columbia (UNBC) in 2014 as Chair for the Integrated Wood Design Program, and implemented the interdisciplinary approach for engineering and design of modern wood structures, combining structural engineering with building physics and modern fabrication. Guido received his Doctoral degree in Engineering Sciences and a Master degree in Architectural Engineering from the Leopold Franzens University, Innsbruck, Austria. Before coming to UNBC, he worked in multi-disciplinary teams in Austria, Germany, and Italy in research and engineering as well as architectural offices. He played a key role in the implementation of the International Passive House Standard in BC and across Canada. Guido is an internationally renowned expert in the field of energy efficient buildings, envelope design and building physics, and is an active member of several committees such as the BC Step Code committee. Having many years of industry experience, his passion is the fostering of collaboration between industry and academia.

DR. RAHUL SINGH

Sector manager, Genome BC

Dr. Rahul Singh manages the forest sector portfolio for Genome BC and supports adoption of genomics and related technologies to advance the sector. A naturalist, Rahul is passionate about BC's forest sector and is committed to working with the stakeholders to support the sector in addressing current and future challenges, particularly in climate change. Before joining Genome BC, Rahul worked as a research scientist at UBC, where his research was focused on upgradation of lignocellulosic biomass for sustainable bioeconomy. Trained in microbiology, biochemistry and genomics, Rahul has authored 20 peer reviewed research articles, delivered several invited presentations, and participated in multiple interdisciplinary and collaborative international research projects. Rahul has a Ph.D. (Microbiology) from University of Manitoba and a Graduate Certificate in invention to Innovation (i2I) from Beedie School of Business at SFU.

JOSH PRESSEY

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

Josh grew up in small town southwestern Ontario, spending much of his time fishing and biking around the countryside. His love for the outdoors led him to a Forest Technician Diploma from Sir Sandford Fleming College. While at college, he began developing his leadership skills as a youth instructor for students working on the school's woodlot, as they acquired hands-on experience in forest management. When he wasn't in class, he worked for the Ontario Ministry of Natural Resources on fish and wildlife projects. He moved to Prince George in 1997 to seek his career in forestry. Josh worked with various forestry and environmental consulting firms in Prince George, Vanderhoof and Fort St James, and developed his silviculture, Free Growing, and block and road layout skills; wildlife and habitat assessment survey abilities; and fish survey and stream assessment experience. He joined government in late 2004 as a forest technician with BC Timber Sales, and transitioned to Planning Technician, while simultaneously balancing a new family and acquiring his RPF via the ABCFP's Pupil Program. Once he achieved RPF status, he became a planner with BCTS and quickly transitioned to Resource Manager and District Manager with the Ministry of Forests in Burns Lake. Josh was co-lead for the Ministry of Forests' Engineering program review and implementation of the Resource Road program, seeking to improve user safety on natural resource roads. He successfully led the government response to the Hampton Mill explosion, affecting government policy and program changes in effect today. His government team won the Premiers Award for their accomplishments. Josh is well versed and experienced in resource management, starting formally at the age of 17. His leadership has allowed him to develop himself, his team and his partners in their careers. He is now focusing his passion in working with partners in the region to achieve the vision of vibrant, connected and resilient communities.