OFFICE OF THE CHIEF FORESTER

2020–21

INNOVATION, BIOECONOMY AND INDIGENOUS OPPORTUNITIES BRANCH

BRITISH COLUMBIA

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

INDIGENOUS FOREST BIOECONOMY PROGRAM

and

INDIGENOUS FORESTRY PROGRAM

ANNUAL REPORT

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1. Executive Summary

Through the Office of the Chief Forester, the Innovation, Bioeconomy and Indigenous Opportunities branch (IBIO) delivers two programs that support increased economic development and participation in the forest sector by Indigenous people. BC's Indigenous Forestry Program (IFP) has provided support to Indigenous partners for over a decade and funds projects in the areas of forest management, workforce training, and production of conventional forest products such as sawn lumber. This support has been expanded through the Indigenous Forest Bioeconomy Program (IFBP), now in its second year, which provides targeted support for Indigenous partners to create new bioproducts fueling the revitalization of BC's forest sector.

The IFP and IFBP exist to support Indigenous communities to unlock the full suite of economic, social and environmental benefits from their participation in the forest sector with partners across BC through specific project support. Today, the forest sector in BC faces many challenges such as high operating costs, significant forest disturbances, and an increasingly competitive global forest products market. These challenges make both programs essential to ensuring that Indigenous communities are supported to navigate these challenges and thrive as full participants in the natural resource sector.

Projects delivered over the 2020-21 cycle by the IFBP include the development and manufacture of high value bioproducts such as essential oils, tannins, or birch water, as well as looking at new forest fibre supply chain models to change how forestry in BC supports bioeconomy development. As the IFP provides support for foundational forestry activities such as expanding a small mill, further projects through the IFBP can be complementary, such as utilising the mill residuals for new applications. The IFP in 2020-21 supported the creation of tools to empower an Indigenous community to manage the risk of wildfire, a business viability assessment for a new manufacturing opportunity, and operational harvest diagnostics to keep an existing First Nations forestry company competitive.

In the 2020-21 project cycle, the two programs:

- Delivered 27 projects: 11 through the IFBP, 16 through the IFP
- Collaborated on these projects with 19 distinct First Nations and 2 Indigenous-owned businesses
- Created 32 new jobs: 13 through the IFBP and 19 through the IFP and maintained 16 through the IFP
- Supported projects with the potential to create over 110 jobs through the IFBP and 76 jobs through the IFP

These numbers capture a snapshot of the impacts of these programs but do not provide the full story. To give an insight to the impacts on less easily quantifiable benefits such as supporting cultural values and self-determination, project descriptions are provided in the rest of the report, organized by geographic location.

The foundational funding for the IFBP is provided through the *Coast Forest Sector Revitalization* initiative and this year funding for the program was expanded through the *New Forest Economy*. The IFBP is guided by the goal, principles and objectives of the Indigenous Forest Bioeconomy Framework which was developed through collaboration and engagement with numerous First Nations and Indigenous organisations. The IFP also follows these principles and shares some of the objectives. As part of implementing the *B.C. Declaration on the Rights of Indigenous Peoples Act* and the Truth and Reconciliation Commission Calls to Action, the Ministry's Indigenous Forest Bioeconomy team takes a collaborative approach to identifying and pursuing project opportunities that reflect Indigenous interests. As the programs focus on specific on-the-ground projects they are an embodiment of reconciliation in action. The two programs aim to remove as many barriers to participation as possible by engaging with potential participants early and breaking down larger projects into distinct phases to fit within the constraints of a fiscal year. The nature of novel product development by the IFBP leads projects in this report to fall across the project development scale that moves from scoping to commercialisation and scale-up. The focus of these projects also covers a range of bioproducts.

2. Introduction

First Nations in BC are increasingly active participants in forestry activities that provide both economic opportunity and community sustainability. BC's Indigenous Forestry Program (IFP) has supported this development for over a decade through partnerships with over 100 Indigenous communities and/or organisations in forest sector economic development. The IFP funds projects in the areas of forest management, workforce training, and production of conventional forest products such as sawn lumber. This support is being expanded through the implementation of a new Indigenous Forest Bioeconomy Program (IFBP), now in its second year, which provides targeted support for Indigenous partners to create new bioproducts fueling the revitalization of BC's forest sector. As part of implementing the *B.C. Declaration on the Rights of Indigenous Peoples Act* and the Truth and Reconciliation Commission Calls to Action, the Ministry's Indigenous Forest Bioeconomy team takes a collaborative approach to identifying and pursuing opportunities that reflect Indigenous interests.

Forest bioeconomy development is based on using forest biomass as the key input for producing consumer goods and/ or industrial products or bioproducts while displacing petrochemical-based products throughout our economy. A forest bioeconomy uses a broader lens than conventional forestry to consider a wide range of product and resource development opportunities beyond conventional products like lumber, or pulp and paper products. The overarching goal is to maximize the value of forest biomass and within the context of a forest bioeconomy. Value is viewed as a holistic measure that encompasses: environmental values such as sustainable forest management and the production of environmentally friendly forest bioproducts, economic values such as profitable revenue streams from the manufacture and marketing of these bioproducts, and social values such as addressing community infrastructure needs and providing job opportunities for communities around the province in forest operations, manufacturing, high-tech design and production applications, and artisanal applications.

The foundational funding for the IFBP is provided through the *Coast Forest Sector Revitalization* initiative, which was expanded this year with additional funding from the *New Forest Economy*. The 2020-21 annual report marks the second iteration of a compendium of projects delivered as part of both the IFP and the IFBP. This report aims to describe the key activities, outcomes and impacts of both programs and is expected to evolve in the coming years.

2.1 Indigenous Forest Bioeconomy Framework

The Indigenous Forest Bioeconomy Framework guides project development within the IFBP and aims to provide another platform for Indigenous-centric opportunities in the natural resource sector by responding to a community's interests and needs through collaboration and partnerships. The principles, goals, objectives, and economic development pathway reflected in this Framework are the result of engagement and collaboration with numerous First Nations across the province over the last couple years. The principles and parts of the objectives of this framework also guide the work of the IFP. As we continue to work with First Nations on Indigenous forest bioeconomy opportunities we will continue to improve and refine this Framework.

Goal, Principles and Objectives

The Framework has one overarching **goal**: To promote the development of forest bioeconomy opportunities that respect and support Indigenous community culture, values, and traditional territories.

To achieve this goal, the Framework adopts the following **principles**:

i. Support is provided in addition to and independent of negotiated treaty or non-treaty agreements (i.e. a collaborative approach not directly tied to government to government agreement processes);

ii. Supports reconciliation objectives, constitutional and historic obligations but is not an alternative to land claim negotiations;

iii. Recognizes and prioritizes Indigenous values, traditions, and knowledge;

iv. Supports Indigenous community and/ or Indigenous business driven projects designed to meet community needs while also supporting regional economic development opportunities;

v. Supports collaboration with industry and business, as well as across ministries and agencies to meet common objectives; and

vi. Considers and supports Indigenous community capacity development.

The goal is supported by three objectives:

Objective 1: Identify and prioritize bioeconomy opportunities

a. Engage with Indigenous communities to identify opportunities and priorities
b. Develop action plans to realize priorities with relevant partners

Objective 2: Develop bioeconomy opportunities

a. Generate community-based employment and businesses
b. Build capacity for diversification and scalability

Objective 3: Increase participation in the natural resource sector

a. Prioritize clean tech and innovative projects that contribute to sustainability in natural resource management
b. Foster Indigenous entrepreneurship and participation in the natural resource sector

Economic Development Pathway

The Framework uses a community/ culture-centric and strength-based approach through an economic development engagement pathway. The model can be described as a holistic view of interconnectedness and collective process of inquiry and decision-making to encourage harmony and empowerment within natural resource economic development opportunities. The Framework supports Indigenous communities' governing their own economic activities to build a self-sustainable community.

2.2 Policy Context

The assistance that the IFP and IFBP provide supports Indigenous economic development in targeted areas. The IFBP supports the development of a forest bioeconomy which creates new opportunities for using residual fibre to manufacture cutting edge products that help drive forest sector revitalization. This marked the second year of IFBP projects, with funding for this program coming through the *Coast Forest Sector Revitalization* and the *New Forest Economy*. Both programs focus on specific on-the-ground projects, and as such are an embodiment of reconciliation in action furthering the implementation of the *B.C. Declaration on the Rights of Indigenous Peoples Act.*

Projects such as the Indigenous BioHubs delivered through the IFBP in the Province-wide category focused specifically changing the supply chain logistics to increase forest biomass capture, a key component under innovation identified in the *Canadian Council of Forest Ministers Forest Bioeconomy Framework for Canada*. New harvest operations models are needed to facilitate increased capture of, and access to, forest biomass to meet current and future demand while harvest levels continue to decrease. Working with Indigenous people as key partners in the forest bioeconomy supports the first pillar of this framework.

The *Clean-Tech Innovation Strategy for the B.C. Forest Sector 2016-24* identifies the need for the viability of new products and clean technologies to be demonstrated to enhance the value chain and advance the BC forest sector. Projects found in the Province-wide section of this report do this by exploring new products such as tannins extracted from tree bark or the use of milling residuals to create new engineered wood products. Both the IFBP and the IFP also support the goal of this strategy to create resilient and prosperous forest-based communities in partnership with First Nations.

Bioeconomy development and expansion through the IFBP climate action by increasing the utilisation of carbon stored in forest biomass and displacing carbon intensive alternatives. The CleanBC priority of helping communities reduce dependence on diesel and switch to bioenergy is facilitated through combined heat and power projects.

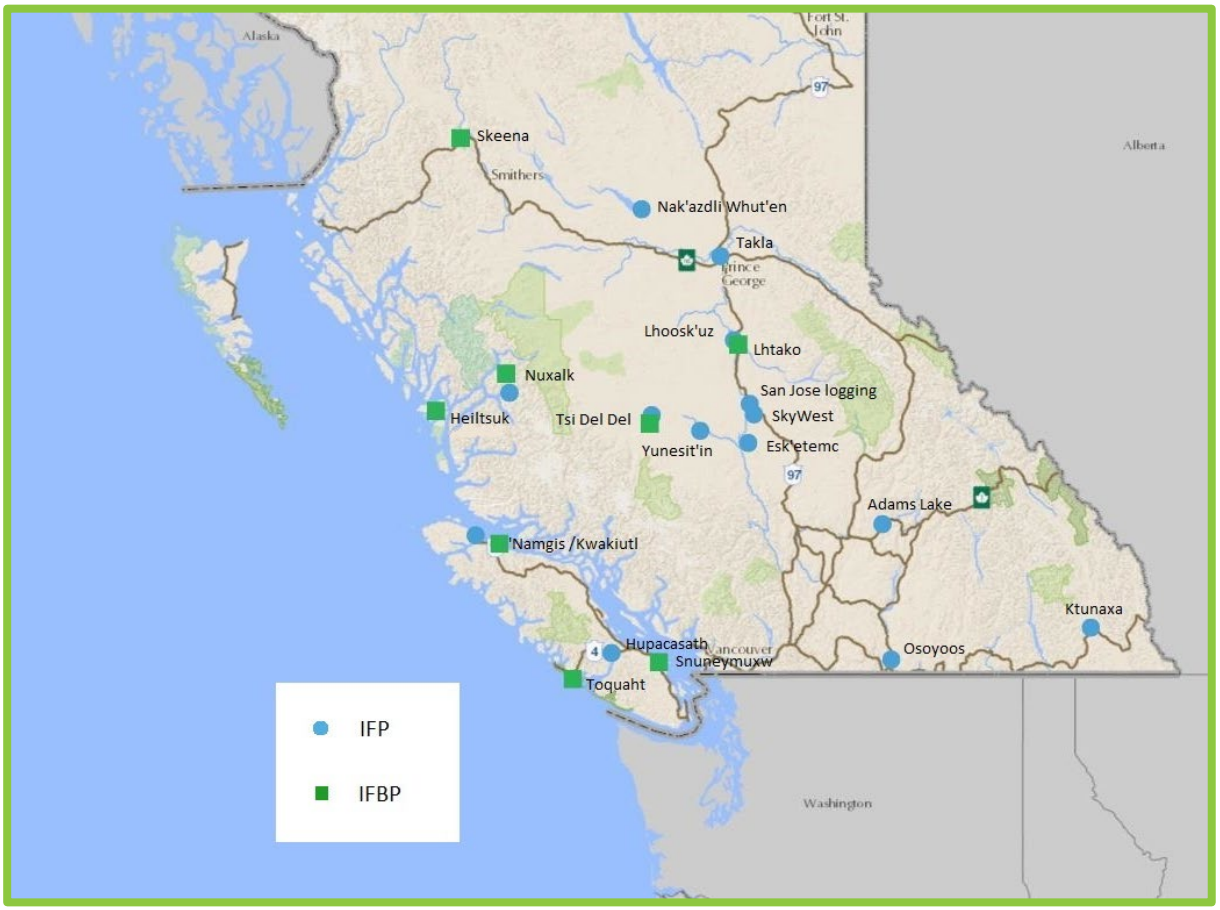
2.3 Report Format

Following the executive summary in Chapter 1 and a description of the IFBP and IFP in Chapter 2, this report describes the projects completed in 2020-21. In Chapter 3, a summary of our aggregated project statistics provides an overall picture of impacts of both programs this year. Chapters 4-7 describe each project in detail, based on where they are located. Chapter 4 details projects on the Coast, Chapter 5 in the South, 6 in the North, and 7 Province-wide. Each project description provides a description of what each project is and how the project came about, an overview of the community context, and project outcomes.

3. Summary of Projects

This section provides a summary of all activities supported through both the Indigenous Forest Bioeconomy Program (IFBP) and the Indigenous Forestry Program (IFP). Individual projects are described in Chapters 4 to 7.

3.1 Geographic Distribution



3.2 Community Engagement

The COVID-19 pandemic created a challenging landscape for community engagement and project implementation in 2020-21. Despite these challenges, the two programs engaged with 30 different Indigenous communities and 22 different Indigenous organisations across B.C. over the course of the 2020-21 project cycle, and successfully delivered 27 projects through the IFP and IFBP. While the program staff normally prioritise face-to-face meetings in the community to establish and build strong relationships with project partners, this year most engagement with communities was done using phone calls, e-mails, and web meetings.

In January and February 2021, the Innovation, Bioeconomy and Indigenous Opportunities branch hosted its first two-part Indigenous Forest Bioeconomy webinar. Speakers included project partners, a project delivery specialist, and a member of the Indigenous Forest Bioeconomy team. The two events were well attended with over 50 attendees, including both District and Regional FLNR staff, and representatives from Indigenous communities across BC. New connections resulting from the webinar are expected to lead to several new projects through both the IFP and IFBP in the 2021-22 delivery year.

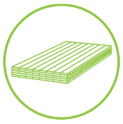
3.3 IFP: Project Categories

Limited to the projects within the Indigenous Forestry Program which supports projects in the following categories.

5	1	2	2
Foundational Forest Products 	Training / Capacity 	Forest Management 	Forest Operations 

3.4 IFBP: Range of Bioproducts

This includes projects both within the Indigenous Forest Bioeconomy Program which supports the development of bioproducts, and the Indigenous Forestry Program which supported several bioeconomy projects once the IFBP was fully subscribed for 2020-21. The table below provides a summary of where all the projects fall within the bioproduct categories. Generally, bioproducts on the left of the table are lower value compared to bioproducts on the right.

8	3	7	3	4	2
Bioenergy 	Biomass Supply Transformation 	Conventional Bioproducts 	Non-Timber Forest Products 	Biochemicals 	Advanced Biomaterials 

Note that some projects spanned several bioproduct categories and therefore are counted in multiple categories.

3.5 IFBP: Project Development Scale

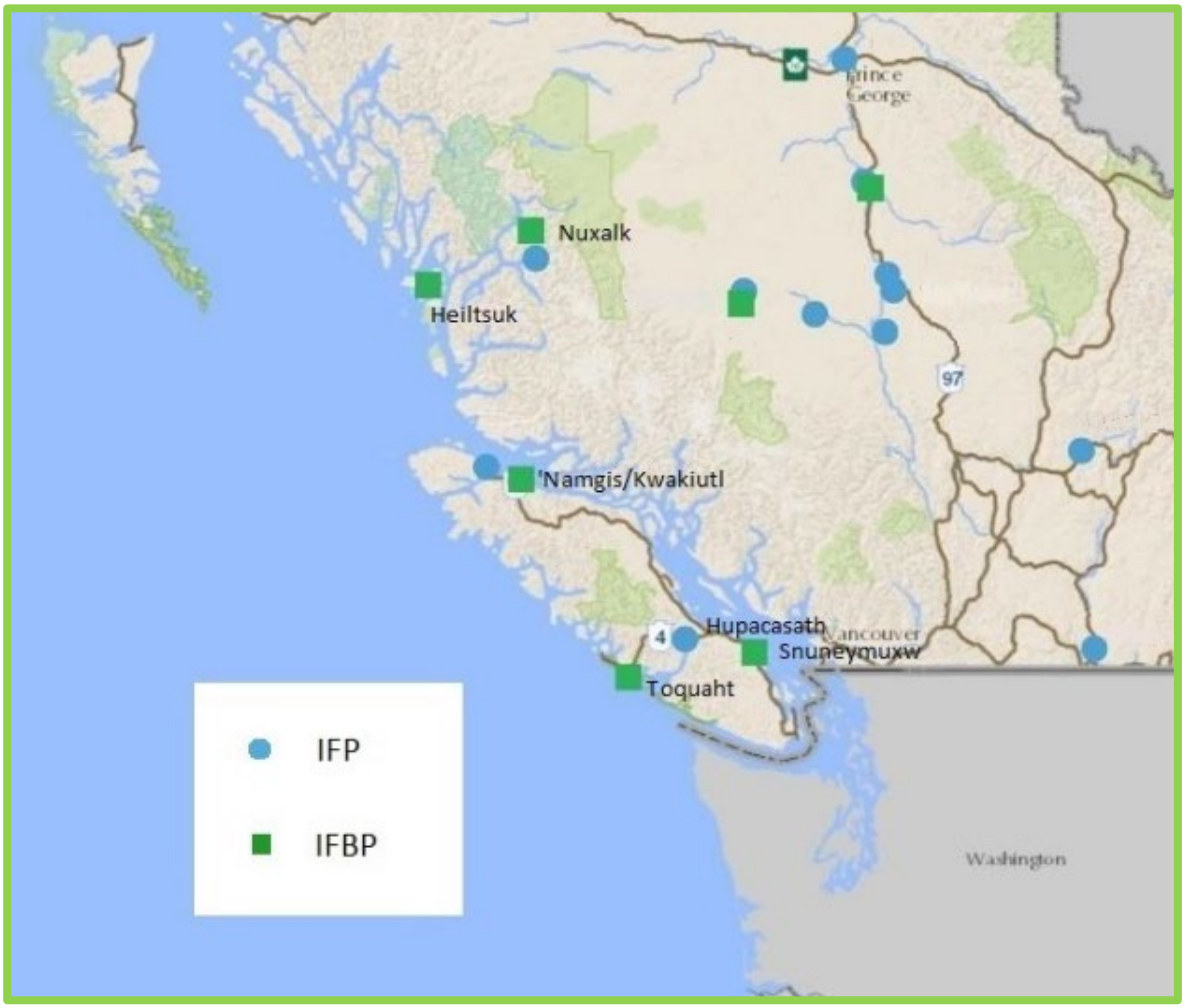
The table below highlights, generally, where on the project development scale bioeconomy projects supported by Indigenous Forest Bioeconomy Program and Indigenous Forestry Program (used once the IFBP was fully subscribed) fall this year. To be able to support initiatives that develop new products over several program cycles, projects are generally broken down into phases. Usually projects move one or two phases up the scale over a project cycle. However, it can be both possible and desirable for projects to move down the development scale and back up as they add new manufacturing capabilities or expand the range of bioproducts they produce.

7	6	3	1	0	1	3
Scoping (Research) 	Assessment (Feasibility) 	Testing/pilot (Prototype) 	Validation (Performance) 	Demonstration (Proof of concept) 	Commercial-ization (Implementation) 	Scale-up (Expansion) 

3.6 Employment

Indigenous Forest Bioeconomy Program	13 Jobs Created	110+ Potential Jobs in Development	
Indigenous Forestry Program	19 Jobs Created	76 Potential Jobs in Development	16 Jobs Maintained

4. Coast Projects



4.1 Indigenous Forest Bioeconomy Program - Coast

4.1.1 Bioeconomy Roadmap, Heiltsuk Nation, Bella Bella, BC

The Heiltsuk Nation has been operating a small-scale sawmill for several years. They have experienced challenges to both competitive participation in the forest sector as well as local development. To diversify their operations and increase their capacity to advance community projects the Nation is seeking information and direction to develop bioeconomy opportunities. Building upon past projects and the data produced on their existing operations and local capacities, an analysis has provided a comprehensive suite of options for the community to consider. These options were designed to advance in collaboration with community development priorities to synergize and create a more fulsome embodied impact on the community. Some of the options identified included: optimizing the existing sawmill, a dryland sort, housing and renovation, firewood, shake and shingle, modular homes, bioenergy and an eco village. The roadmap included specific steps to addressing the socioeconomic and financial considerations associated with each option. Additional information or further exploration may be provided based on the preferred direction of the Nation.

Community Context

The Heiltsuk are a coastal Nation based in Bella Bella and the surrounding area with an approximate population of 1600. The Heiltsuk Nation has been steadily increasing their Nation-led business opportunities. By aligning their economic development goals with their community needs and prioritizing that method in their government-to-government discussions, they are advancing the important work of Haíłcístut, "To turn things around, and make things right again." For many years, the community has not benefitted in a sustainable or meaningful way from their natural resources and are actively working to shift that paradigm to benefit their current and future members.

Project Outcomes

All the options identified have considerable potential to provide local high-quality employment opportunities for local community members. In addition to the economic implications, there also exists a tangible awareness of supporting and complementing existing social development programs mostly associated with the community's housing needs. These options are developed to be economically and environmentally sustainable to reflect the Nation's priorities and values.

Many of the business options identified have the potential to proceed in tandem or to support one another in some way. How the Nation chooses to proceed will be a matter of internal discussion, but it is expected that the Heiltsuk Nation will continue to engage with the program and their partners to advance these initiatives.

4.1.2 Biomass Opportunities Scoping, Kwakiutl and 'Namgis, Northern Vancouver Island, BC

A consortium of interested parties in Northern Vancouver Island including Atli Resources, the Economic Development arm of the 'Namgis First Nation, the Kwakiutl First Nation and the Regional District of Mount Waddington, have come together to pursue value-added opportunities in their forest operations. A priority of all parties is to implement fibre processing capacity on Northern Vancouver Island, and they have identified this as an opportunity to work together. Some of the identified options include firewood, salvage/secondary harvest, pulp chipping, various composting methods, shavings/specialty use products, wood cants, fire logs and briquettes, pellets, greenhouses, and a suite of additional ancillary options. As a part of this biomass sprint assessment, various tools and methods were presented for the partners to be able to continue to generate data and perform analyses to best make informed decisions on which option(s) they wish to pursue. One example is a Biomass Extraction Costing Tool, this will allow field teams to generate information based on specific cut blocks. The consortium will likely move forward with some of the easiest to implement options before building up to pursue more resource intensive projects.

Community Context

The Kwakiutl and ‘Namgis are First Nations, with Traditional Territories spread across Northern Vancouver Island, Alert Bay, and along and the surrounding coastal areas, have always served as stewards of their lands. They both remain active in creating new paths forward in resource development for their memberships through innovation and collaborative partnerships. Both Nations manage variable and evolving tenures that they are looking to leverage for paths forward in establishing a local bioeconomy. Projects such as this provide the Nation with additional support in implementing their economic development goals and advancing their sociocultural initiatives.

Project Outcomes

The Nations are well aligned to collaborate on significant bioeconomy projects that support local employment and increase fibre utilization in the region. The revenue generated from these projects will allow for further expansion and support for community-based programming in numerous areas.

The Nations, communities, and stakeholders on Northern Vancouver Island are deeply committed to identifying opportunities to establish a local bioeconomy and make the most out of their forest resources. There has been building sociopolitical interest in addressing and closing gaps in forestry for several years. The data produced during this assessment will provide the identified partners with more direction and resources with which to move forward.

4.1.3 Firewood Business Implementation Analysis, Kwakiutl First Nation and ‘Namgis First Nation, Northern Vancouver Island, BC

This is the follow up project phase from the scoping study undertaken by the same partners above. Firewood production was identified in the scoping study to be an easily and cost-effectively implementable option, and therefore it was decided to move forward with a business plan for this option. The business plan determined where the optimal location of two parallel firewood operations, how many staff would be required at each operation, what the production layout would be along with what equipment would be required, how financing should be structured, and when the venture could generate a positive operating cash flow.

Community Context

See 4.1.2 for this information.

Project Outcomes

The two firewood operations, once implemented, could:

- Employ three staff at each facility (six FTEs total);
- Generate positive operating cash flow within a reasonable time frame;
- Be financially viable on a stand-alone basis; and,
- Utilize fibre currently being burned in slash piles or otherwise being left at the harvest site.

In addition to creating a value-added opportunity for their existing operations, this project will allow for more full-time employment for members and support other community led ventures.

The next steps for this project are to take the business plan back to leadership for approval to move forward. Following this, financing will need to be secured through a combination of grants, internal capital, and debt financing. Once that is done, implementation of the business plan can start with one of the two proposed sites and expand from there as cash flow allows.

4.1.4 Great Bear Rainforest Essential Oils, Nuxalk Nation and Metlakatla First Nation, Bella Coola, BC

The Great Bear Rainforest Essential Oils (GBREO), a joint enterprise between the Nuxalk and the Metlakatla, produces conifer essential oils produced using milling residuals, and sustainably harvested tree branches. Their specialty essential oils have a unique and appealing brand story unique to this region. Building from previous project success supported by this program, GBREO has decided to expand its line of products, launch a new marketing campaign, and build greater digital infrastructure to boost sales. They have successfully positioned themselves to participate in new markets and broaden their reach to maximize their impact and increase their generated revenue. This collaborative effort has brought community priorities of sustainable business and positive local impact into their economic development planning.

Community Priorities

Both the Nuxalk and the Metlakatla are located in coastal BC in a region known as the Great Bear Rainforest. The Metlakatla, meaning 'saltwater pass' in Sm'algyax, the language of the Coast Ts'msyen (Tsimshian), are located 5km north of Prince Rupert. The Nuxalkmc, the Nuxalk people, largely reside in the communities of the Bella Coola valley, roughly 500km south of Prince Rupert.

Project Outcomes

Being able to offer a sustainably sourced, culturally relevant, and high-quality product has allowed the involved nations to diversify their revenue streams and promote the unique story of the region. This operation has provided steady employment for local members and provided an opportunity to recapture residual fibre to advance a sustainable business model. GBREO has also been able to integrate operations to support local initiatives such as The Wood Co-op, a social enterprise that produced wood display units for marketing.

The work performed over the course of this project leaves the company well positioned to increase their brand awareness and use marketing to launch their new products. In moving towards building a robust brand that promotes the cultural values instilled in their product, the Great Bear Rainforest Essential Oils company is expected to continue to build momentum and find success.

4.1.5 Bioeconomy Implementation Plan, Toquaht Nation, Ucluelet, BC

The Toquaht First Nation is actively exploring options to diversify their forestry operations and bring new additional opportunities to their community. Having identified community-centered, socioeconomic impact driven, opportunities as being a priority, the Nation has engaged with the program to specifically explore potential bioeconomy projects. Multiple options were identified for the Nation to consider, including: a dryland sort, sawmill expansion, small cabins, firewood, shake and shingle, chipping, bioheat, combined heat and power, and other potential products generated from residuals. Each of these options is presented with potential synergies with one another and/or existing operations and will provide direction for on-going economic development planning. Additional information and further investigation on specific bioproducts may be provided upon request and at the direction of the Nation.

Community Context

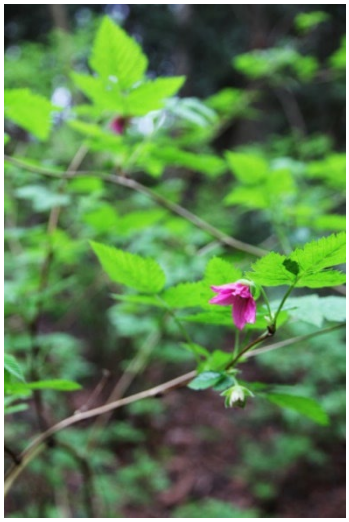
The Toquaht ("people of the narrow beach") are a Nuu-chah-nulth nation residing in western Barkley Sound, near the town of Ucluelet, on the west coast of Vancouver Island. Most of the Toquaht members are reported to live in various urban centres, but the community of Macoah, meaning "house on the point," is still home to many families. Along with several other Nuu-chah-nulth nations, the Toquaht signed the Maa-nulth treaty on 1 April 2011 which affirmed their self-governance and they have since been working to create value-driven approaches to economic development on their territories.

Project Outcomes

Each of the outlined business ventures and options for diversification will provide quality employment options for local residents and will contribute to the economic vitality of the region. By thoroughly examining how each of these options might integrate with existing operations, the Nation is positioning itself to maximize the utilization and potential value of their forest resources. Each of the options provided were outlined specific to the socioeconomic context of the Toquaht Nation to provide information and direction for future development.

4.2 Indigenous Forestry Program - Coast

4.2.1 Kleekhoot Gold - Big Leaf Maple Syrup Expansion, Hupacasath First Nation, Port Alberni, BC



Kleekhoot Gold is one of several independent business ventures of the Hupacasath First Nation (HFN) located in central Vancouver Island on their traditional territories in the Alberni Valley. Their focus is an all natural, high quality, syrup that is locally produced from the big leaf maple trees that are exclusive to the west coast of British Columbia. Since it's inception in 2015, HFN has invested over $300k in Kleekhoot Gold to bring this high-value novel product to highly receptive markets and has been showcased by the media for its unique story and culinary appeal. To meet demand and grow the business, Kleekhoot Gold needed to expand their operation by increasing their harvest and production capacities. This was accomplished by transitioning to a still with over triple the capacity (30 gallons to 100 gallons), replacing and retrofitting the harvest transport vehicle and operational mechanisms to better suit their increased production needs, and upgrading worn or unusable production equipment.

Community Context

The Hupacasath are comprised of three distinct tribes, the Muh-uulth-aht, Kleh-koot-aht and Cuu-ma-as-aht (Ahahswinis), which had amalgamated for sociopolitical reasons prior to European contact and continue to thrive as active stewards of their 229,000 km^2 Traditional Territory. The population is reported to be around 230 members, with approximately half residing in community, and a significant percentage belonging to the '35 and under' demographic. This has helped shape the Nation's approach to planning and economic development, which has seen significant investments in Nation owned and led businesses, sustainable recreational tourism initiatives, natural resources development and hydroelectric projects. These businesses and projects are designed to integrate the values and priorities of the local communities while building capacities and creating opportunities for the generations to come. Kleekhoot Gold, as one of several companies currently active in the Nation, is an award-winning initiative ('Environmental Business of the Year', 2017) that continues to grow and provide employment and value-added opportunities for their membership.

Project Outcomes

By accessing the Indigenous Forest Bioeconomy Program, Kleekhoot Gold was able to add 1 new full-time position and 4 seasonal positions (TBC). The increased revenue from this expansion will provide more opportunities for growth, training, and potential research and development for new products.

Kleekhoot Gold is a 100% Indigenous-owned business that supports its membership in demonstrating a successful, sustainable, economic enterprise. This stage of expansion allowed the company to tap an additional 600 trees, increase their storage and production capacities, further develop two extraction sites, and ensure that both quality and safety standards are maintained to provide their customers with a high-quality product.

4.2.2 Totem Sawmill Diagnostics, Nuxalk Nation, Bella Coola, BC

The Totem Sawmill in Bella Coola has been operated by the Nuxalk Nation for many years and has been integral in their participation in the forest sector. Like most small sawmills, the long-term viability of the operation requires careful management of the production levels. To ensure the long-term success of the business, an expert assessment was undertaken to identify how to meet production targets that ensure the operation is sustainable. The scope of this project included delivering a comprehensive business review, log profiling and mill optimization study to provide operators with a fulsome overview of where and how improvements could be made. This also included an evaluation of the log supply, developing a product portfolio, and identifying potential new revenue streams. The result of the overall work indicated that once key performance metrics are fulfilled the operation has a very encouraging outlook.

Community Context

The Nuxalk Nation, located in Bella Coola, have been working at developing a new approach to participating in the forest sector that focuses on bringing sustainable enterprise to the forefront. Having long been active in natural resource industries, the community is looking for innovative options that provide high-value opportunities for their new and existing businesses. Being a remote coastal community, they have encountered challenges to being able to participate equitably in the forest sector and are taking steps to provide more high-quality employment and training initiatives for their membership.

Project Outcomes

The mill has provided 6 full time positions over the last year with the potential to employ more local members as the business improves and expands. The operation allows the nation to utilize local timber for their housing program which works to address a significant need for their membership. Increased milling capacity will provide additional opportunities for the Nation to provide training, mitigate challenges presented by their geographic location and support community projects and meet planning objectives.

Based on the recommendations made at the completion of this project it is possible for the Totem Sawmill to optimize and expand their operation incrementally to meet commercial demand and community needs. Additional production capacities will produce more local employment opportunities for their membership and allow the nation to increase the value of their forest resources.

4.2.3 Cedar Cant Proforma, Nuxalk Nation, Bella Coola, BC

The Nuxalk and Yunesit'in explored developing a joint venture with the to advance their respective value-added forestry operations. Through their Totem sawmill, Nuxalk would provide cedar cants to Yunesit'in's mill in Horsefly B.C. for further processing. This project focused on the economic feasibility of this proposed partnership and outlined how discussions might move forward. Upon completion the information showed that it was not in the best interest of either business to continue to look at the cedar cant joint venture. The analysis did provide a series of recommendations to Nuxalk on improvements that could be made to their existing milling operations. Once implemented these changes would significantly increase the operating capacity and allow the business to be economically competitive.

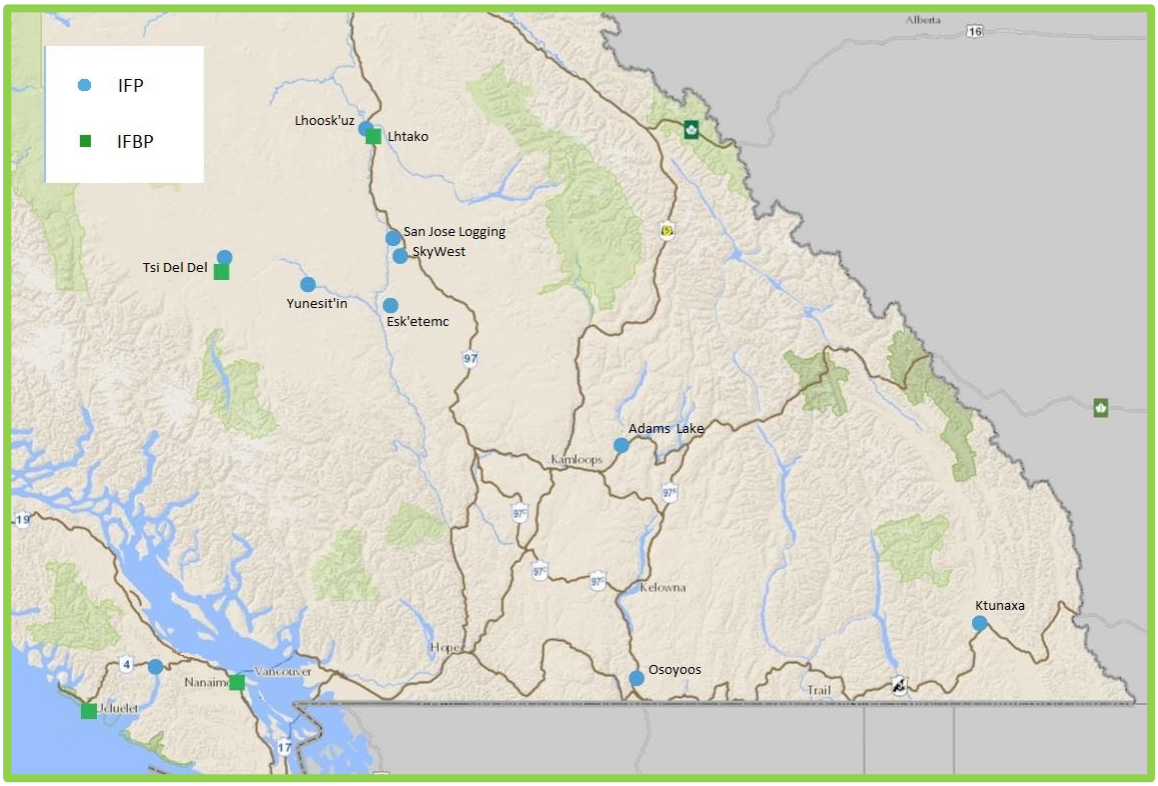
Community Context

See 4.2.2 for this information.

Project Outcomes

No jobs were created as a result of this project but potential impacts on Nuxalk's milling operations may come as an indirect result of information provided by this report. Totem Sawmill is 100% Indigenous-owned business with the potential to increase profitability based on recommendations made as a result of this project.

5. South Projects



5.1 Indigenous Forest Bioeconomy Program - South

5.1.1 Biomass Utilization Scoping Study, Lhtako Dene Nation and Nazko First Nation, Quesnel, BC

This scoping study was initiated to define and rank project opportunities in consideration of the amount of available biomass and based on their alignment with the short- and long-term objectives of the Nations. Based on the findings and analysis throughout this study, the project team has produced an array of potential opportunities, including integrated manufacturing centres that could combine milling, bioenergy, and other bioproducts, for Lhtako Dene Nation, Nazko First Nation, the City of Quesnel, and the surrounding region. It can be shown that there are a few potential projects with a promising economic viability in consideration of the availability fibre, current market, and potential for industry engagement. Ultimately, a decision on the best opportunity to progress needs to be formed collectively and cooperatively based on the objectives and priorities of the Nations and stakeholders.

Community Context

The forest industry has been foundational to the community of Quesnel for many years. However, the impacts of fire, insects, and historic harvest levels, combined with the changing harvest profile in a declining annual-allowable-cut, present significant challenges. The Indigenous peoples of the region, the Lhtako Dene Nation and Nazko First Nation, are concerned and have expressed their aspirations and strategic priorities for managing these dwindling forest resources while stimulating economic development in their communities. In addition, the City of Quesnel has developed an economic transition strategy to weather the storm. To augment the strategy and continue to make strategic investments for community resilience and sustainability, the Quesnel Forestry Initiative was founded in

2019 with the mission of finding innovative ways to utilize the available fibre and types of manufacturing potential already here, to explore using Quesnel as an incubator for alternate forest management and innovative manufacturing, and to map out strategies to match manufacturing to the types of fibre available from the land base. Collectively, the Nations and the City of Quesnel envision opportunities for new bio-products, uses for underutilized waste streams, and ways to extract value from supply chains that will stimulate and sustain the forest industry for future generations.

Next Steps and Future Opportunities

Forest bioeconomy development in the Quesnel area will allow for diversification of the forest sector, thereby increasing the resiliency of the communities. These ventures, once implemented, will both create jobs for locals and generate revenues for the communities. These business models effectively will 'do more with less', and in so doing mitigate the forestry challenges faced by the area.

The next steps for this project will be to continue open and transparent discussions with Lhtako Dene and Nazko to better understand community goals, financial limitations, and economic and social aspirations. With these key parameters, the options identified in the study can be compared, and eventually one or more of the options can be implemented.

5.1.2 Satellite Re-Load Yard Trials, Tŝideldel First Nation, Williams Lake, BC

This project is complementary to the province wide BioHubs project described here. It had been intended to serve as a pilot study of the satellite reload yard model and provide credible data for harvest costs, operational cost savings at the harvest site, and other synergistic benefits and drawbacks to the model. Satellite reload yards move the processing and sorting of trees harvested from the harvest site to a secondary location. Trees are transported whole, or with only a top removed, to the site. This results in increased fibre recovery for every tree harvested, reduced phase congestion at site, potential safety benefits, and reduced need for slash pile burning. Tsi Del Del operates a harvest contractor business and had agreed to serve as the implementors of the trial along with researchers from

FPInnovations. Unfortunately, weather shutdowns prevented the trial from being completed during the 2020-21 fiscal year. All work in this year was for the logistics to implement a trial and will serve as a basis for future pilot trials, hopefully in the 2021-22 fiscal year.

Community Context

The Nenqayni Deni of the Tŝideldel First Nation, formerly known as Alexis Creek, is a community of the Tsilhqot'in that is located approximately 177 km west of Williams Lake, B.C. Part of the Tsilhqot'in National Government, Tŝideldel First Nation works collaboratively with the other member nations to advance issues important to their membership. Given the particularly challenging wood profile in the area, local nations are looking towards evolving opportunities for residual biomass to support their forestry operations. This is providing much needed revenue to further develop new and existing businesses in ways the reflect the nations' active management of their land base. Training and employment initiatives are focused on building capacity for members to be able to access growing opportunities in the sector.

Next Steps and Future Opportunities

The primary benefits of satellite reload yards would be:

- Reduced phase congestion at the harvest site
- Increased safety
- More fibre from every tree harvested captured
- Reduced slash pile burning and decreased carbon emissions
- Additional jobs for every tree harvested by providing additional fibre for further processing

The next steps for this phase of the project will be to move forward with the pilot trial once environmental and financial conditions are favourable, hopefully in the 2021-22 fiscal year.

5.2 Indigenous Forestry Program - South

5.2.1 Cedar Shim Business Viability Assessment, Adams Lake Indian Band, Chase, BC

The Adams Lake Indian Band (ALIB) has been actively working to identify and develop sustainable economic development opportunities utilizing their community held forest resources. They were recently approached by a private cedar shim mill operator who expressed interest in selling their operation to the community who would have the consistent wood supply that the current owner had experienced challenges in sourcing. A full review of the financial and operational documentation was reviewed to assess the economic viability of the mill. Additionally, the mill was further assessed to map out potential additional costs and potential investments. Adams Lake is now reviewing the findings of the report to determine whether they wish to further evaluate the opportunity and potentially purchase the mill.

Community Context

The Adams Lake Indian Band is a part of the Secwepemc Nation and is one of the nine member communities of the Shuswap Nation Tribal Council (SNTC). ALIB holds a woodlot, woodland licence and a cedar hemlock non-replaceable forest licence and are active in government-to-government discussions to expand their role in managing resources on their territories. The community has ongoing harvest, silviculture and other resource management activities and are looking to continue to advance their initiatives to provide more employment opportunities to their membership.

Project Outcomes

Creating additional business opportunities that provide local employment and generate revenue for the Nation will allow for additional programming and new ventures to be considered. The challenges to participating in forestry in this region may be approached from different angles with an expanded operation and increased capacity.

If the Adams Lake Indian Band decide to move forward with purchasing the operation, they will likely have the opportunity to integrate it with their other operations and resources to increase efficiency and provide a stable supply of wood. It is projected that the operation would create 6 new jobs and potentially $4.6M new capital investment

5.2.2 Fuel Load App Development, Esk'etemc, Alkali Lake, BC

Alkali Resource Management (ARM) Ltd work on behalf of the Esk'etemc communities to provide a wide array of services related to forest management. To provide forest technicians and membership with the data and resources that they need, ARM initiated a project in 2020 to map out methods for sampling fuel environments specific to the local area Making this information accessible and versatile was of the utmost importance so as to easily help users prioritise treatment for those stands with the potential of supporting the most intense wildfire behaviour wildfire behaviour and establish best practices for forest management. Using data and information from work conducted last year they began developing a digital application to provide real-time information related to the current treatment status and extant fuel load of a particular stand on the land base. Utilizing a photo sampling guide and integrated location and LiDAR data, testing various functions in the field provided researchers with a functional beta version to present to the community. Members recognize the value of this project as an important tool in forest management and indicated their interest in continuing to advance its development. The next phase of this project will produce a fully operational virtual platform that can quickly and efficiently provide calculations and other pivotal information for fuel load and wildfire management.

Community Context

The Secwepemc community of Esk'etemc is located approx. 50km from Williams Lake and has been working towards increasing their own value-driven approach to participating in the forest sector. In addition to the fuel load app project, they have been concurrently advancing a virtual community forest project that has digitized about 15,000 ha of their land base. Both projects are complementary and increase the membership's ability to access their forest resources for socio-cultural and economic purposes while providing land managers the tools they need to mitigate fire risk.

Project Outcomes

Wildfires can have significant negative impacts on the communities at their interface. In addition to loss of lives and infrastructure, air quality, heat, stress, and trauma can all be negative consequences of significant fire events. This fuel load app empowers members of the community, in addition to forestry staff, to identify where the greatest risk is in relation to community and make informed management decisions to mitigate risks to their community. This phase of the project resulted in the creation of five FTEs for the duration of the work.

As a prevention tool, this fuel treatment decision support tool assists fuel managers in prioritizing fuel treatment areas. As a wildfire response tool, recognizing forest stands with a high potential for volatile fire behavior can aid fire managers in strategizing fire operation plans. A photo load sampling method provides a quicker method of evaluating a fuel environment in untreated or treated stands to determine if fuel loads are within acceptable limits. The digital forest allows faster, and better resource decision making and helps quantify and capitalize on other non-timber forest products.

5.2.3 Biomass Boiler Upgrade for Nupqu Native Plants Nursery, Ktunaxa Nation Council, Cranbrook, BC

The Nupqu Native Plants Nursery (NNPN) cultivates as many as 80 native plant species and specialize in seed collection and propagation to be able to provide customized revegetation that reflects the biodiversity of the selected site. Local collection and propagation of native plants provide clients with a trustworthy seed source, allows for niche ecosystem selections, increases survival rate, genetic variation, and biodiversity, and ultimately leads to increased environmental sustainability. In order to be more cost and energy efficient, and to allow staff to begin propagation cycles a full two months earlier, NNPN required an upgrade to their heating system. This resulted in the procurement of a Heat Master Boiler System that uses local logging wastes as a fuel and eliminates the use of propane. This will allow for a longer growth cycle, increased revenue, and better position the company to provide services uninterrupted by the winter months.

Community Context

The Nupqu Native Plants Nursery (NNPN) is one of several enterprises operated by the Nupqu Resource Limited Partnership (NRLP) which is owned by the communities of the Ktunaxa Nation, ʔaq̓am, ʔakisq̓nuk, yaqan nuʔkiy, and Tobacco Plains. The suite of companies provides a diverse set of natural resource management consulting and contracting services that are rooted in the communities' robust stewardship principles. With their headquarters located just outside the ʔaq̓am community north of Cranbrook and a second office located in downtown Fernie, NRLP

can provide a wide range of integrated environmental services. The Nupqu Native Plants Nursery is the only operation of its kind in the southeast region and has successfully partnered with a wide array of clients to provide high quality products that enhance the local ecosystem.

Project Outcomes

The Nupqu Native Plants Nursery is a 100% Indigenous-owned company. With the recent addition of a new heating system and an extended growing season they expect to add up to 3 new full-time positions to be made available to local members.

Many of businesses run by the Nupqu Resource Limited Partnership are focused on providing environmental management services within the Ktunaxa Traditional Territories. By closing identified gaps and lengthening the propagation cycle, the Nupqu Native Plants Nursery will be able to provide more jobs to their membership and potentially increase sales. The projected increase in revenue $250k will allow the company to do what they do best – grow.

5.2.4 Combined Heat and Power Implementation and Bioeconomy Roadmap, Lhoosk'uz Dene, Klusklus, BC

The Lhoosk'uz Dene Nation are working towards developing sustainable energy initiatives to facilitate the community's transition away from a long-term reliance on petrochemicals to generate electricity. This step in a multi-phased project built on an initial feasibility study and delivered a front-end engineering design (FEED) study. The findings of which identified next steps that would better position the community to secure energy alternatives and pursue economic development opportunities. This phase of the project also included the procurement of a Volter combined heat and power (CHP) unit, training members to operate CHP systems and developing industrial capacities to support future business ventures. As a part of this on-going relationship, the program was also successful in supporting the community in securing additional funding to significantly advance their work in sustainable energy and alternative biofuel options.

Community Context

The Lhoosk'uz Dene is a southern Dakelh Nation with a close and longstanding relationship with the neighbouring Tsilhqot'in Nations who work together to advance the interests of their collective memberships. As an off-grid community, Lhoosk'uz Dene has long relied on fossil fuels for heat and electricity which has created limitations on their ability to participate economically. With the recent challenges in forestry including mountain pine beetle and catastrophic wildfires, the community has chosen to pursue projects that support the use of forest residuals and create immediate employment options for local workers.

Project Outcomes

The number of full-time employment opportunities will vary depending on which business ventures the community chooses to move forward with. Currently, community planning and infrastructure development are being mapped out with the additional funding that has recently been secured. The social, economic, and environmental impacts of energy security for this community are considerable and are expected to yield significant results over the next 12 months.

This project focused specifically on supporting Lhoosk'uz Dene in advancing their sustainable energy initiatives to provide better options for their membership. Any future businesses that may come out of this growing infrastructure is expected to increase the membership's ability to participate competitively in the local economy.

5.2.5 Commercial Thinning Program Planning, Osoyoos Indian Band, Osoyoos, BC

Osoyoos Indian Band (OIB) requested an analysis of its First Nations Woodland License (FNWL) for the potential of partial harvesting and commercial thinning. Commercial thinning is an intermediate harvest where the merchantable wood removed from a stand and is sufficient to cover the costs of the harvest. If implemented under the right conditions, this thinning treatment increases the resources available to the remaining trees in a stand and can result in an increased rate of growth for those trees. Partial harvest is a partial harvest of a stand sufficient to at minimum cover the cost of the harvest. This study identified and quantified the blocks suitable for implementation of a partial harvesting and commercial thinning program. Additionally, the study outlined the full process including layout and implantation of the program, providing recommendations for these phases.

Community Context

The Osoyoos Indian Band has been acting in forest management for more than 10 years. With a partner, they have been managing a woodlot license and a non-replaceable forest licence with an average of over 250,000 m^3 of timber harvested annually. In the interest of supporting additional sustainable forest management practices, they would like to explore the possibility of implementing a partial cutting program. These silvicultural practices could be more suitable for prescriptions focusing on cultural values, ecosystem restoration, and sensitive wildlife habitat management.

Next Steps and Future Opportunities

Changing the disturbance regime pattern from full openings to partial openings can support other forest management objectives, such as recreation, wildlife habitat, visuals, desirable understorey plant communities, or wildfire mitigation. In small forest management areas, it also improves the flow of timber being harvested.

The next step for this project will be to plan in what order the suitable stands will be either thinned or partially harvested, followed by layout and harvest of the stands.

5.2.6 Contractor Diagnostics, Tŝideldel, Cariboo Region

Tsi Del Del Timber Development Limited Partnership was formed by the Tŝideldel First Nation in 2013 to manage the Nation's forest tenures and provide direction on opportunities to expand and improve operations. The challenges presented by factors including low volume yields and distance to markets, have limited the company's ability to compete. In addition to Tsi Del Del Timber Development Ltd, the other businesses and partnerships being managed by the community are working in conjunction to provide employment opportunities for its membership. The venture undertakes harvesting and delivery of local timber developed by the Tsi Del Del Timber Development Limited Partnership. The company is committed to advancing the Nation past the limitations and challenges of the existing timber profile. As such, Tsi Del Del has engaged experts on multiple occasions to perform operational diagnostics to identify areas for improvement and optimization. This has allowed the company to make incremental changes and

cultivate long-term and sustainable growth. The operational recommendations of the assessment are projected to increase revenue and continue to strengthen the business.

Community Context

See 5.1.2 for this information.

Project Outcomes

Providing Tŝideldel First Nation with direction and support in optimizing their forestry operations will allow for stabilization and growth of their businesses. The recently completed diagnostic will provide new or continued employment for 10 positions and increased revenue will allow for future expansion.

Tŝideldel First Nation is actively diversifying and optimizing their forestry operations to be more agile and to develop more value-added options. Currently, their businesses are taking action to increase their profitability and look forward to expanding in the future.

5.2.7 Lumber Spray Booth, Yunesit'in, Cariboo, BC

Yunesit'in Leading Edge is a value-added milling facility that was purchased in 2020 as part of the community's "forest to frame" approach to business development. This venture has the capacity to produce a wide array of high-quality products using locally harvested timber and provide employment opportunities and training to its membership including positions specifically for local youth. Having recently made the acquisition, Yunesit'in is looking to expand their finishing capacities to provide staining and painting consistently as a part of their manufacturing process. Currently, Leading Edge is completing this aspect of their business manually but will be unable to meet increased demand or continue to grow their engaged market. Having been successful in securing additional funding and procurement contracts, conducting a feasibility assessment focused on this element of the business provided the company with direction on how best to strategize and expand their operations. Different options were identified for two of their primary production areas based on what product standards needed to be met: a temporary finishing facility for their plaque business and a spray booth to accommodate siding production. Custom stain siding is not currently readily available in the area and this addition would provide the business an advantage**.**

Community Context

The Yunesit'in Government is located approximately 114 km west of Williams Lake and is one of the six communities that collectively form the Tsilhqot'in National Government (TNG). Together the TNG and its representatives from each community continue to serve as stewards of their Traditional Territories and work to pursue economic development opportunities and advance community-led initiatives. By integrating their value-driven approach to

business into their economic activities, the Yunesit'in Government is creating opportunities to utilize their natural resources while adding value and jobs.

Project Outcomes

This expansion of the established business is expected to add 5 new jobs to their existing staff with up to a third of total positions being held by women. Yunesit'in Leading Edge leadership are also attuned to the challenges being experienced by their youth and have already taken action to provide their younger members opportunities to access training and employment.

Yunesit'in Leading Edge is fully owned by the First Nation and will continue to identify opportunities to expand and produce high-quality, value-added, wood products to bring to market.

5.2.8 San Jose Logging Data Connectivity Trials, Indigenous-owned Business, Williams Lake, BC

Operational forestry companies are actively turning to new and emerging technologies to make their operations more efficient and profitable. San Jose Logging, a multigenerational family-run and Indigenous-owned enterprise, have engaged with the program to identify opportunities to incorporate additional digital infrastructure to support their operations. The scope of this project was focused on mapping out and evaluating how best to utilize the available local area cell network, optimize data transfer speeds and reliability, broaden the coverage areas, and provide a more seamless ability to provide real-time monitoring of harvest operations. By analyzing the existing network coverage and testing/incorporating a series of signal boosters, repeaters, FPDats, and communication devices, researchers were able to provide specific range and speed metrics and identify gaps and blind spots. This allowed for a coverage increase of 10km from the existing tower, stable video communication, and numerous other processes to be performed in the field to increase operational agility. This will allow the contractor to ensure that equipment is operating at peak performance and troubleshooting can be done quickly. Increasing operational capacities in this area specifically will allow the company to increase productivity and remain competitive.

Community Context

San Jose Logging is based in Williams Lake where forestry has played an integral part in the local economy for many years. Many rural Indigenous communities throughout B.C. experience challenges with consistent digital infrastructure and would benefit from increased local connectivity. The work performed over the course of this project, and any subsequent improvements to the digital infrastructure in the area, has the potential to significantly improve regional connectivity.

Project Outcomes

San Jose Logging currently operates with a team of about 35 people and have successfully provided high-quality employment in the region for decades. By pursuing technological advancements in this area positive impacts benefits are expected for local operators in the industry as well as the nearby communities.

The outcome of this project has significant implications for the residents of the area as well as other forestry operations. Connectivity is of the utmost importance in developing vibrant and resilient rural and remote communities. But first and foremost, increased connectivity in remote areas would allow local companies to improve optimization and fibre recovery to support additional economic development opportunities.

5.2.9 SkyWest VR Crane and Truck Configuration, Indigenous-owned Business, Williams Lake, BC

Skywest Environmental Inc. is an award winning full-spectrum operational natural resource contractor that provides the equipment and specialized expertise to support a wide variety of resource management projects. Their provincial base is in Williams Lake B.C., with an additional office in Edmonton A.B., and offers fire smart, salvage, load hauling services and more. In order to provide the highest quality services specific to the local area and the challenges presented there, Skywest Environmental Inc. has accessed the program and taken steps to explore potential areas for optimization. One option that was identified was a self-loading truck with a virtual reality control mechanism to allow the crane operator to safely navigate difficult terrain and increase the economic viability of smaller load sites. To assess the necessary steps and specifications required to implement this option this project included a full evaluation and provided preliminary designs, performance metrics, and additional operational options.

Community Context

The owner of Skywest Environmental Inc., Jay Camille, is a member of the community of Dog Creek in the Stswecm'c Xgat'tem First Nation and actively works to bring a value-driven approach into his company. He recognizes the importance of the youth in his Nation seeing themselves represented by successful businesspeople and endeavors to bring training and employment opportunities to the local communities.

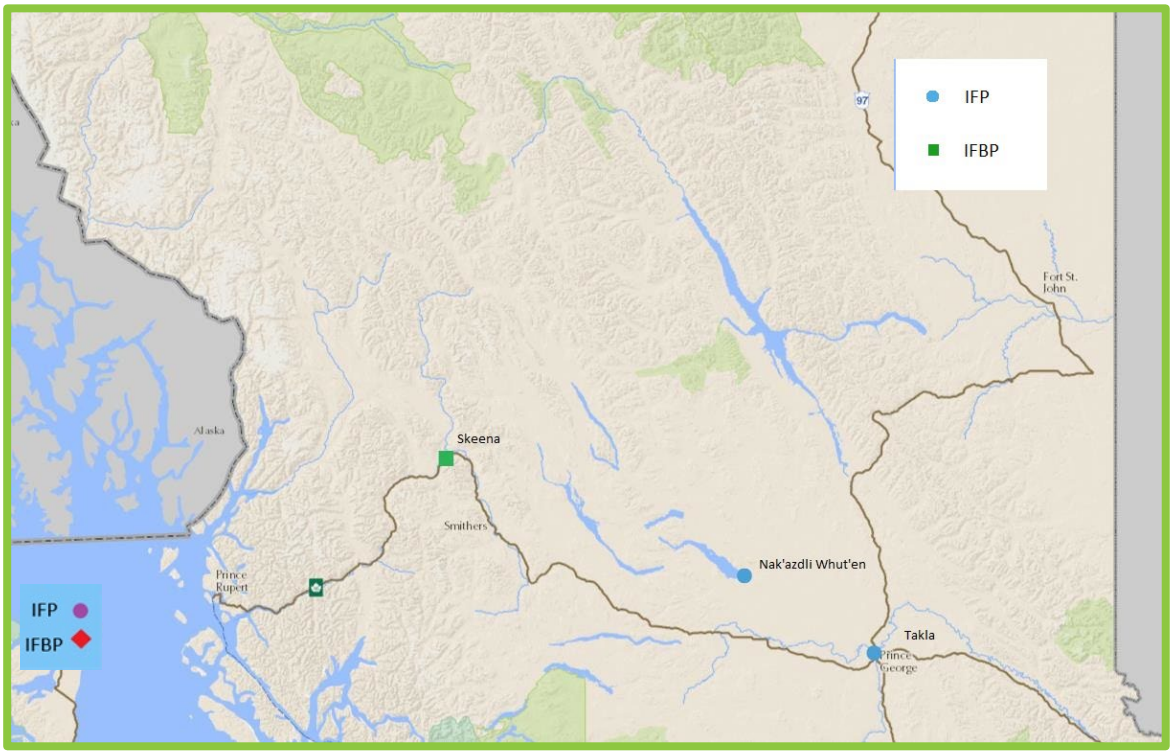
Project Outcomes

When implemented, the VR crane and truck configuration will:

- Improve the safety of harvest operations
- Increase harvest efficiency
- Improve the competitiveness of the operation

Skywest Environmental is a 100% Indigenous owned business that maintains a high operating standard and provides considerable mentorship and training options for current and new workers to contribute to building capacity and supporting a competitive local workforce. Increasing the efficacy of their operations will allow the company to continue to source more contracts, grow their business, and bring new opportunities to the region.

6. North Projects



6.1 Indigenous Forest Bioeconomy Program – North

6.1.1 Skeena Birch Water Joint Venture, Skeena, BC

For generations the First Nations and residents of the Skeena valley have worked together to identify and support socioeconomic activity in the region. This work continues to be done with the core values and environmental principles of the local communities being increasingly integrated to how we engage with the land base. Having recently been approached to discuss potential opportunities in an emerging health beverage market, the program partnered with the Skeena Watershed Conservation Coalition (SWCC). SWCC is based in Old Hazelton and has been working closely with the Indigenous and settler communities along the Skeena for many years. They conducted the initial engagement with the Gitxsan Wilps (House Groups) and local stakeholders to discuss the opportunity and pathways to establishing a Birch Water project in the area. Birch water, or Haawak, has the potential to provide a considerable bioeconomic opportunity for the area. There have been initial discussions with existing companies including a birch water company in the Lower Mainland, as well as a local brewery that suggest that next steps would be met positively. As a non-timber forest product that would allow for community-led collaboration without considerable environmental impact, participants were enthusiastic and are supportive of continuing to engage and guide the project forward as a collective. Initial scoping data was encouraging and suggest that advancing this initiative would be both economically feasible and socio-culturally impactful.

Community Context

The Hazeltons encompass primarily Gitxsan and Wet'suwet'en Traditional Territories but also have diverse and intergenerational Indigenous and settler communities. The local economy has struggled for decades with downturns

in forestry and would be significantly impacted by the development of an Indigenous led, collaboratively designed, and environmentally sustainable bioeconomic enterprise.

Project Outcomes

The development of a birch water industry in the area has the potential to bolster existing social and environmental programming, as well as independent forestry operations. There will be additional opportunities to support youth re-engaging on the land base and generated revenue would allow for further economic development.

A birch inventory study revealed that the Skeena Valley and specially the Kispiox and Bulkley Timber Supply Area provide sufficient area and density of birch stands for a multi-million-dollar industry to be developed.

6.2 Indigenous Forestry Program - North

6.2.1 Deadwood Innovations, Nak'azdli Whut'en, Fort St James, BC

Nak'azdli Whut'en has taken the next step in their partnership with Deadwood Innovations towards establishing a value-added manufacturing facility that uses mountain pine beetle and wildfire killed timber in Fort St. James. Having already completed a high-level feasibility study and product testing, the joint venture is moving forward with redeveloping a previous wood processing plant to house the proposed facility. Deadwood Innovations have developed process that takes this otherwise unmerchantable timber and produces an engineered wood product for which they have identified several potential high value uses while providing long term storage of embodied carbon. This facility, once established, will provide an important economic driver to the region while also supporting the forest sector in managing this type of residual fibre.

Community Context

Nak'azdli Whut'en is one of several Dakelh communities in the Omineca region that often work collaboratively to advance initiatives on behalf of their collective memberships. The long history of commerce prior to European contact and the establishment of Fort St. James as a major fur trading hub in the north meant that the lines of trade and communication between communities along the corridor were strong. The area continues to be heavily involved

in various natural resource industries and is well positioned to participate in new and innovative approaches that are rapidly evolving in these industries. The communities of Nak'azdli Whut'en and Fort St. James have been heavily impacted by fluctuations in the forest industry and have been proactive in identifying options for economic development. This process provides an opportunity for the local workforce to be reengaged in a business venture that utilizes extant skills and new technologies to produce a high value bioproduct.

Project Outcomes

The facility expects to be able to provide 35 full-time jobs during construction which will mean consistent, well-paid, work for local membership that often must leave the area to find equivalent opportunities. Deadwood Innovations and Nak'azdli Development Corporation have entered into a joint agreement outlining their shared vision for this project and specified the terms of the partnership. This facility has the potential to continue to grow as new processes and technologies become available and to pivot to meet the evolving needs of the forest sector and local communities.

The project will be moving into the demonstration phase over the 2021-22 fiscal year, thanks to significant federal support and the continued support of the IFBP.

6.2.2 Centralized Sort Yard Feasibility, Nak'azdli Whut'en, Fort St James, BC

The Nak'azdli Economic Development Corporation (NDC) moved forward with completing a feasibility assessment of a scanner-scaler sort facility incorporating whole-log trucking. The facility, proposed for Fort St. James, would have the ability to increase fibre utilization and get 'the right log to the right place'. The research focused on identifying how an operation of this scope and scale might be advanced, what approval and industrial requirements and adaptations might be required, and what impacts or challenges might be expected. The vision for this facility is an ambitious one, and the results of this stage of inquiry were that the considerable investment costs associated with the project in its current form would restrict NDCs ability to move forward. As such, discussions with other member nations of the Carrier-Sekani Tribal Council and external grant funders are on-going as the potential impacts of this project continue to be considered.

Community Context

See 6.2.1 for this information.

Project Outcomes

Implementation of a scanner/scaler sort yard in Fort St. James would have considerable impacts on the local industry and the surrounding communities. The number direct employment opportunities are forecast to be around 25, additional impacts have not been projected.

The potential impact of a scanner/scaler sort yard facility of this size is projected to be considerable, both for the communities involved and their identified partners as well as the forest industry at large. Being in the early stages of development leaves much to be decided but it is expected that many local workers from various fields will be able to reengage with the sector should these plans come to fruition.

6.2.3 Lumber Program for Housing Initiative, Takla, Takla Landing, BC

Takla is pursuing an ambitious and innovative net-zero housing project to provide much needed housing infrastructure in their community of Takla Landing. This project builds from learnings that came from a feasibility study for the production of Structurally Insulated Panels (SIPs) that Takla completed last year with support from the IFBP. While the study found that a certain market demand was needed before the venture would be sustainable, it did highlight the many favourable properties of SIPs in small-to-medium structure construction: the excellent energy efficiency, the modular-style construction, and ability to build quickly with them. As such Takla has utilized SIPs in their housing project. This year, the IFP supported a feasibility and equipment assessment of the small sawmill in Takla Landing so that it can pivot its current operations from conventional milling to the production of the interior finishing components that will be needed for the homes. Up to 40 structures over the next few years are planned to be built. This project will be able to add value to local fibre, provide hands-on-training for members, create new jobs, and sequester carbon in long-lived wood products.

Community Context

The Takla Lake First Nation is one of several Dakelh communities who act as stewards of their Traditional Territory of approximately 27,250 km^2 and are located roughly 320 km north of Prince George at Takla Landing. Having close ties with the other neighbouring Dakelh, Sekani and Babine Nations, the Takla Lake First Nation has long been involved in natural resource development, primarily in forestry, in a manner that supports sustainability and reflects the values of the communities in that region.

Project Outcomes

This project will provide training and employment opportunities. The next phase of their net-zero housing project will provide opportunities for additional wood products to be developed locally, by community members, for their own use and to meet their specific needs. Milling wood finishing components for the housing project is projected to create 4 new full-time positions for membership, with the possibility for additional job creation as the operation continues to grow. As training and capacity increases, the Nation may be able to move ahead with expanded plans and continue to produce SIP products that actually exceed 2030 structural and energy requirements, create new economic and employment opportunities in the region, and provide high-quality residential options for the region.

7. Province-wide Projects

7.1 Indigenous Forest Bioeconomy Program – Province-wide

7.1.1 D-Log Wood Press

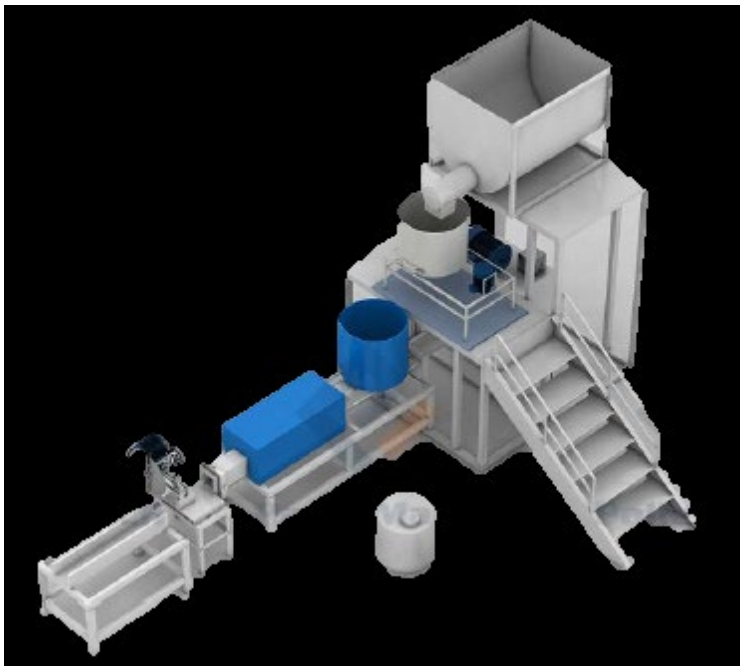
Fine wood fibre debris in BC is currently either not being utilized, or burned, sometimes in the form of bioenergy. However, if this fibre were able to be transformed into a long-lived wood product, there would be significant potential to increase the GHG mitigation impact of every tree harvested through carbon storage. Wood press machines present an opportunity to do just this in a highly scalable way – from a very small operation with an investment in the tens of thousands, to multi-million-dollar facilities. D-logs are an adaptation of a wood press machine and use a residual fibre and resin mixture in a mechanical press to form structural 'logs' that can quickly stack together to build small structures. This project phase centred on design and procurement of a prototype machine for testing, and an assessment of different types of feedstock and binding agents.

Community Context

Due to the scalable nature, the research and design project could have significant implications for many rural, remote, and Indigenous communities that experience challenges with housing and finding high-value applications for their residual fibre. The low investment requirement reduces the barrier and feedstock supply needed to realize this opportunity.

Project Outcomes

This project has the potential to create considerable opportunities for employment and value-added projects that work to meet the essential needs of rural, remote, and Indigenous communities. Having the ability to locally produce high quality building materials from low value residuals would have a considerable impact for many local and Indigenous communities that are struggling with providing safe housing options.



Building from the data provided in this initial assessment, researchers were able to define a workplan that projects validation testing to be performed over the coming fall and into Spring 2022. Moving this project forward will provide a valuable opportunity for training, increased fibre utilization, and revenue generation revenue while meeting considerable local needs.

7.1.2 Indigenous BioHubs

BioHubs are a concept being explored by the Province to decrease slash and harvest residuals that are left at the harvest site and take them to a centralised location that makes this fibre readily available to users of the fibre. A BioHub could operate as a yard or terminal would collect, grade, sort, merchandize and market logs and/or woody biomass residues from a central point to existing manufacturing facilities, including biomass processing, bioenergy and biorefinery facilities in BC. These sites may also incorporate satellite/reload yards to improve log hauling logistics, and whole tree trucking.

This study focused on:

- Identifying where in the province 'hot spots' with factors that could contribute to the greatest likelihood of success were located;
- Assessing various approaches to how such a BioHub could be laid out and operate in conjunction with nearby harvesting operations and fibre users; and,
- Evaluating the amount of value that would need to be added per m^3 of fibre handled in the BioHub to make the operation viable.

Project Outcomes

Operation of a BioHub would not only increase how much of each tree harvested is utilized to produce a product, but it would also increase the number of jobs created for every m^3 of fibre harvested. It is expected that this premise of doing 'more with less' will be compatible with the forest management visions of many First Nations across the province.

Burning harvest residues contributes to air pollution and releases carbon into the atmosphere. By capturing this fibre and using it in products or fuels that displace fossil fuel-based alternatives, net carbon releases could be decreased.

It is anticipated that creating increased access to a wide range of forest fibre types could lead to new small to medium forest manufacturing enterprises. Most of the volume of timber in B.C. is only available to Licensees as standing trees, limiting the options to these types of enterprises to access fibre. If successful in creating new manufacturing opportunities, it is also expected that the diversity of these operations could contribute to increased resiliency of the forest sector in small communities.

Next steps for the project should include consideration of what future forest policy decisions, such as carbon credits or pricing could do as either an incentive for finding alternative applications for the fibre, or disincentive for leaving it at the harvest site. Additionally, pilot trials of satellite re-load yards or similar can provide credible data for evaluating potential cost savings from streamlining operations at the harvest site. Ultimately, it will be important to engage with potential operators of a BioHub for future implementation of the model.

7.2 Indigenous Forestry Program – Province-wide

7.2.1 Western Hemlock Leather Tannins

As British Columbia continues to innovate within its forestry sector, identifying alternative uses for our forest resources that represent the highest possible value and work to meet our social, economic, and environmental goals is of great importance. Part of this work includes looking at by-products and residuals that are either waste or used in very low value applications. One such material is hemlock bark which, while readily available across the coast and

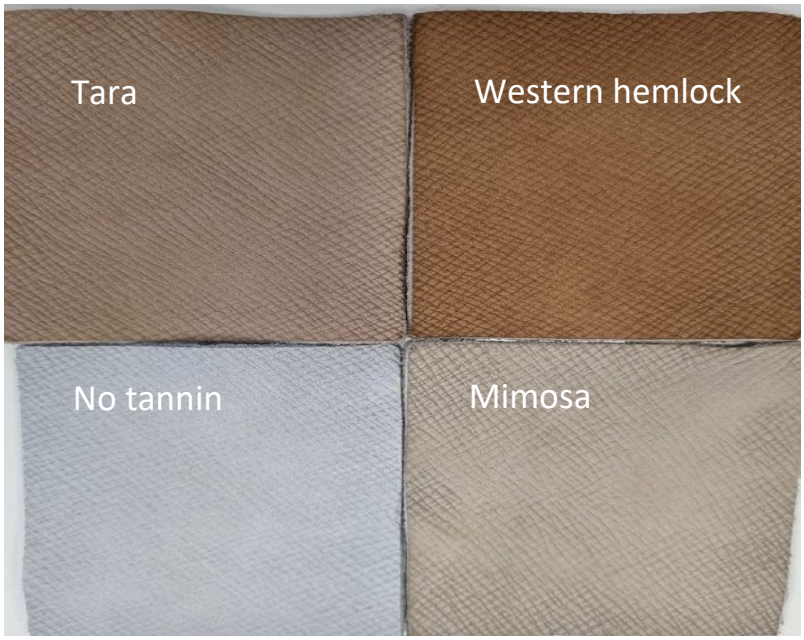
Kootenays at a low cost, has few contemporary uses beyond burning for heat and energy. Exploration of hemlock bark as a tanning material was the focus of this project that sought to test the functionality and provide information for future bioproduct development. This study, carried out in collaboration with the United Kingdom's University of North Hampton, performed a detailed analysis of the chemical composition, function, and properties of hemlock tannins. It was found that hemlock bark is excellent as a tanning agent for leather, comparable in efficacy to mimosa, the most widely used natural tanning agent globally. The main difference is that hemlock tannins give a distinctive red colour. These results provide valuable information that will be further developed through technical feasibility studies and market assessments.

Community Context

Hemlock bark has been used as a dye and tanning agent by First Nations in B.C. for millennia before European contact. As we collectively shift towards a circular economy and pursuing business and natural resource development in a more environmentally sustainable manner, reconsidering some of these processes and their potential applications with advanced technological capabilities may provide new opportunities. Previous work has shown that hemlock tannins can successfully be There are currently no specific First Nations attached to this project, however, several have been engaged and have expressed interest in developing projects or business ventures based on the outcome of this research.

Project Outcomes

The ability of communities with extant forestry operations to integrate value-added opportunities based on hemlock extractives would likely be very accessible and help to create or maintain more jobs. Using all parts of the natural resources that are harvested is reflective of the value of many Indigenous communities across the province. Identifying opportunities to pursue projects that can be delivered in ways that incorporate Indigenous knowledge and values is an asset to the industry at large.



Rayonier Forest Products operated a small hemlock bark tanning extraction facility in B.C. in the 1950s for a short period of time that had proved successful prior to the rise of chemical tanning processes. These new processes, while considerably less environmentally friendly, led to the plant being shut down. With the current level of interest, ease with which tannins may be extracted, and versatility of potential applications, it is expected that there may be various business development opportunities that grow from the outcomes of this project.