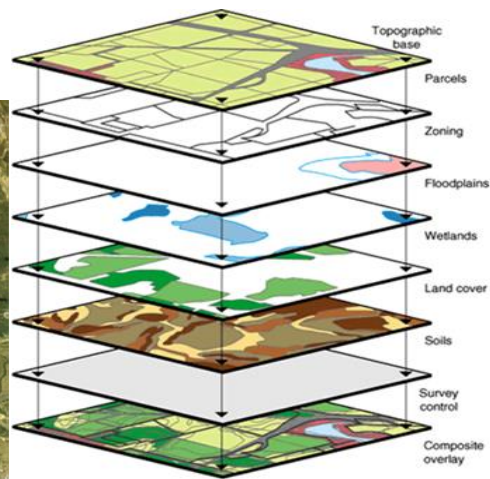


First Nations Forest Enhancement Society Service Delivery Model Pilot Project Report

Project WR0000266

October 2019

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British Columbia, Fuels Management Department**



**First Nations'
Emergency Services Society**
OF BRITISH COLUMBIA

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Abstract

The Forest Enhancement Society (FES) First Nations (FN) Service Delivery Model Pilot has proven to be cost effective and efficient. The project was developed and implemented with a \$50,000 FES budget allocation. Product outputs from the Service Delivery Model Pilot project have supported (approved) project submissions that exceed \$4,000,000 from a range of Federal, Provincial and Regional programs. This translates to over an 800% return on investment for developing the Service Delivery Model Pilot which product outputs continue to be used to support a range of Multiagency and Regional program project applications. Success of the pilot project and future implementation are dependent on critical model components which includes:

- Creation of a georeferenced integrated database that will support the business needs of a range of Federal, Provincial and Regional Programs.
- Refinement of the Wildland Urban Interface (WUI) utilizing Wildfire Prevention Management Zonation which is designed using proximity to values at risk and wildfire behaviour factors (fuels, topography and weather). This will enable better linkage of strategic, tactical and operational Fire Prevention planning initiatives, as well as integration of multiple resource management goals and objectives.
- Identification of management goals and (science based) measurable objectives for Wildfire Prevention Management Zones to provide guidance and consistency in development of prescriptions and implementation of operational treatments Province wide.
- Development of a Risk and Prioritization tool that incorporates criteria and indicators that will support prioritization of project initiatives across a range of programs and funding envelopes.
- Establish (or build on existing) multijurisdictional Regional and Local governance bodies with mandate to identify and confirm project prioritization and recommend target funding for Federal, Provincial and Regional Program initiatives.
- Development and integration of stand level and landscape tools/models to assess effectiveness of prescriptions and treatment unit design(s) spatially and temporally.

The Service Delivery Model results and recommendations will be provided to the CRI Management Committee, Core Community Wildfire Resiliency Planning (CWRP) Committee and FLNRORD Integrated Investment Specialists for consideration in the development, design and implementation of CWRP, Crown Land Wildfire Risk Reduction and Integrated Resource Management Planning in British Columbia.

Acknowledgements

The FN Service Delivery Model Pilot project initiative was supported by a significant number of FN Communities, organizations and individuals. FNESS would like to acknowledge the support of ?Aq'am, Aqisqnuq, Tobacco Plains, Shuswap, Fort Nelson FN, Northern Rockies Regional Municipality, N'Quatqua and BCWS and Rocky Mountain Trench Society representatives for making the FN Service Delivery Model Project a success.

Integrated spatial databases for the pilots were created with support from Nupqu Development Corporation, Geoterra Integrated Resource Systems and BA Blackwell and Associates. Randy Harris RPF (Wandering Ecotone) and Yvan Kathriner RPF (Nupqu) provided leadership in development of the risk and priority ranking tool utilized in the SE Pilot.

Wildfire Prevention Zonation for the SE FN Communities was designed by FNESS Fuels Management Specialists Robert Mitchell RPF and Larry Price RPF with review and support by BCWS Provincial and zone staff, as well as FN Community Lands and Resources staff.

Price Waterhouse Copper is also acknowledged for providing guidance and support on financial and milestone reporting requirements.

Problem Statement

First Nations Communities have not been effectively engaged in the full range of wildfire protection programs available to them throughout BC. There are 203 First Nations Bands in British Columbia and a significant number of these communities are situated in Wildland Urban Interface (WUI) areas that have a high to extreme risk from wildfires. Many First Nations communities lack the capacity to plan and develop projects that can be delivered through Forest Enhancement Society (FES) BC program and other Provincial, Federal and Regional program funding. Given First Nations involvement, participation and feedback to date regarding Forest Enhancement Program (FEP), there is a need to enhance communications and engagement to identify, plan and apply for project initiatives that are consistent with regional investment plans, FESBC mandate and project selection criteria, in collaboration with local governments and area-based tenure holders. Additionally, many Fire Prevention project initiatives developed and implemented through a variety of Municipal, Regional, Provincial and Federal Programs are disjointed and uncoordinated. This results in lost opportunity to leverage funding for a range of multiagency program initiatives, as well as, inability to implement effective operational treatments that are planned and designed to minimize risk of wildfires to BC Communities.

FN FES Service Delivery Model Opportunities

Working collaboratively with Federal, Regional, and Municipal multiagency teams and First Nations communities:

- Identify priorities for implementing First Nations FES project initiatives which are rationalized and harmonized with Regional Investment Plans.
- Promote the development of partnerships to leverage Municipal, Regional, First Nation, Provincial and Federal Government programs to safeguard communities with implementation of a range of programs (Forest Enhancement Society, FireSmart Canada, Strategic Wildfire Prevention Initiative, Community Resiliency Investment, Landscape Level Fire Management Planning, Indigenous and Indigenous Services Canada On-Reserve Fuel Treatment Program, Fire Safety Assessment and Kick Start Programs, Columbia Basin Trust, Rural Dividend Program, etc.) while meeting multiple resource management objectives.
- Providing better linkage of Strategic, Tactical and Operational Planning and integration of multiple resource management goals and objectives.
- Increased education and awareness of FES and other Federal, Provincial and Regional program opportunities within FN communities participating in the Pilot Projects.
- Support continuous improvement of FES and other programs that mitigate wildfire risk to communities.
- Reduce pressure on Forest Lands, Natural Resource Operations and Rural Development staff while increasing engagement, education, awareness and capacity building for implementing a range of Fire Prevention Program initiatives with First Nations throughout the Province.

Approved Project Scope

FNESS was approved by FES for the development and implementation of Service Delivery Model Pilot projects with First Nations in the following areas:

- South East BC (Akisqnuk, ?Aq'am, Tobacco Plains, Shuswap).
- North East NE (Fort Nelson First Nations and Northern Rockies Regional Municipality),
- Coast (N'Quatqua First Nation)

The original project proposal was for \$219,000 to develop and implement a Provincial model. FES Board approved \$50,000 to develop and implement pilots for proof of concept.

Measurable Pilot Outputs

1. Develop planning process that can be articulated to project proponents for identifying priority projects which support FES project opportunities, as well as priority projects that could be funded through other Provincial, Federal and Regional program initiatives such as, Community Resiliency Investment, SWPI, Department of Indigenous Services Canada (DISC), Columbia Basin Trust, BC Rural Dividend Program, etc.
FES project opportunities:
 - mitigating risk from wildfires to communities and critical infrastructure;
 - improving damaged or low value forests;
 - improving habitat for wildlife;
 - supporting the use of fibre from damaged and low value forests; and
 - treating forests to improve the management of greenhouse gases.
2. Support FN communities with the identification of FES and other related Federal, Provincial and Regional project opportunities within the pilot project areas and monitor effectiveness by tracking project approvals.
3. Document methods, procedures and approval tracking of pilot project submissions as a measurable indicator of service delivery model effectiveness.

Planning Process

- a. Presentation of planning process to FES Operations Management, Union of British Columbia Municipalities (UBCM) Strategic Wildfire Protection Initiative (SWPI) Representatives and Forest Lands and Natural Resource Operations and Rural Development (FLNRORD) Senior Program Management Representatives.
 - Service Delivery Model methods and procedures were presented to FES Operations Management Team in Kamloops on April 25th, 2017. Pilot areas and planning process was confirmed. N'Quatqua was identified as preferred option for the Coastal Pilot. Additionally, direction was provided relating to carbon sequestration projects and strategies that eliminated or reduced need to burn debris.
 - Service Delivery Model methods and procedures were presented to FLNRORD FES Director, Dan Peterson on May 25th, 2017. Confirmed pilot areas and current FN FES project application issues and linkages to other programs.
 - Meeting held with UBCM June 20th, 2017 to review pilot project and confirm linkages to SWPI. Confirmed Pilot project processes and outputs related to SWPI program objectives.
 - Meeting with BCWS Prevention Manager, Carol Loski to review pilot planning process and current FN FES project submission issues. Confirmed Pilot project processes and outputs related to SWPI program objectives.

- Meeting held on October 27th, 2017 with Provincial Lead for Ecosystem Restoration, Al Neal who supported methods and procedures for ecosystem desired future condition, prioritization and integration with areas identified for Wildfire Risk reduction.
 - Meeting on July 5th, 2017 with FLNRORD Director Strategic Planning Initiatives, Garth Wiggle. Reviewed model and confirmation to work with Regional Strategic Investment Specialist.
- b. Development of a spatially explicit integrated resource database (figure 1).
- For the South East pilot, a decision support model was developed which integrated spatially explicit database for the area administered by the Rocky Mountain Natural Resource District (RMNRD). Data base included information obtained from the RMNRD Landscape Fire Management Plan, Community Wildfire Protection Plans, Wildfire Prevention Management Zoning for FN Communities within RMNRD identifying management goals and measurable objectives by zone (figure 2), prioritized ecosystem restoration and wildlife habitat areas developed by Rocky Mountain Trench Ecosystem Restoration Program (Blue Print for Action 2013) as well as cadastral and other terrestrial and aquatic base data. This enabled identification of georeferenced areas that could support multiple resource management objectives requiring similar desired future conditions and areas of mutually exclusive management goals and objectives, such as, old growth management area and fuel mitigation management area (figure 3). Additionally, by integrating cadastral information that contains administrative boundaries, eligible funding from Federal, Provincial and Regional Programs was identified that could support priority projects.
 - Integrated spatially data databases were also created for the North East and Coastal Pilot Project areas to assist in identification of priority project initiatives. This included all relevant Fire Management planning and integrated resource management information such as ungulate winter range, old growth management areas, etc. that were available for the various pilot project areas. For the North East pilot project Caribou Habitat and associated Management Guidelines were not included due to disagreement in habitat mapping with Fort Nelson First Nations and Provincial Government data sources.

Integrated Spatial Database

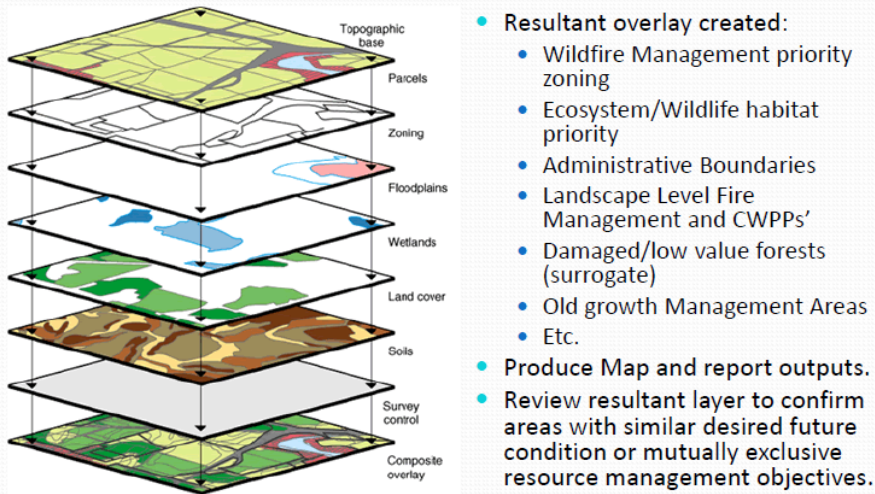


Figure 1. Creating Integrated Spatial Database



Figure 2. Wildfire Prevention Management Zones



Figure 3. Assessment of Multiple Objectives

- c. Prioritization of Ecosystem Restoration and Wildfire Management data layers areas used in the SE Pilot.
 - a. Significant work has been focused on Rocky Mountain Trench Ecosystem restoration over the past decades. A component of this work included prioritization of ecosystem restoration units. Five biologic criteria have been used to score each restoration unit.
 - i. Red and Blue Species: number of occurrence (animal, plant or invertebrate) in each restoration unit.
 - ii. Elk: measure of area in class 1 and 2 elk range condition as determined by the mapping layer provided with the Ungulate Winter Range Orders for Cranbrook and Invermere by restoration unit.
 - iii. Big Horn Sheep: Relative rating of the units for Bighorn Sheep.
 - iv. Biodiversity: Biodiversity was determined using the Shannon biodiversity index (Shannon and Weaver 1949) and using the site types found in each restoration as a surrogate for all species. Site types are the distinct land units (wet, riparian, rock outcrop, mesic, hydric, etc.) used to classify both Cranbrook and Invermere districts during Predictive Ecosystem mapping. The Shannon biodiversity index considers how many site series (and related species) are in a restoration unit as well as calculating how rare that site series is.

- v. Properly functioning condition: a measure of the health of the grasslands and how well they will respond to ecosystem restoration treatments. District range staff devised an expert layer indicating the relative importance of each range unit for wildlife and cattle forage, how well it should respond to treatments.
3. Development and Prioritization of Wildfire Prevention Management Zones for SE Pilot.
- a. Wildfire Prevention Management Zoning was completed for ?Aq'am, Akisqnuk, Tobacco Plains and Shuswap First Nations Bands as component input of the Rocky Mountain Natural Resources District Landscape Fire Management Plan. The overall goal of landscape fire planning and management (LFPM) was to create a more fire resilient landscape to mitigate fire impacts on priority values in an era of increasing fire hazards and risks. Wildfire Prevention Zoning and associated prioritization was completed as a result of collaborative planning with First Nations, Provincial and Regional Wildfire Service Representatives and FNESS representatives. This process was guided by the Fire Management Planning Process - Five Year Tactical Plan and Annual Operating Plan Guidance, Forests, Land and Natural Resource Operations 6/22/2014.
Fuel management zone design incorporated FireSmart zonation which expanded to the surrounding landscape. The design and number of Wildfire Prevention Management Zones were based on proximity to values at risk and wildfire behaviour factors fuels, topography and weather. Wildfire Prevention Zonation was also incorporated into the NE Pilot as a component of the Fort Nelson CWPP data input. No zonation, (other than high priority Wildfire threat class, as determined by PSTA) was incorporated in the N'Quatqa Coastal pilot.
 - b. Wildfire behaviour management goals and measurable objectives for zones were identified and incorporated into FN Community Wildfire Protection Plans in the SE and Fort Nelson FN to guide tactical and operational planning activities. It was also intended that zones and associated objectives be incorporated into strategic planning processes and associated social, environmental and economic analysis to support establishment of legal objectives for Wildfire Prevention Management.
 - c. Fuel Management and priority weighting model development. Relative ranking for fuel treatment was assigned for the entire SE Pilot planning area from the US Canada boarder to an area North of Radium. Likelihood and

Consequences were used to provide a relative risk rating. Refer to Figure 4 for examples of the ecosystem restoration and wildfire unit weightings. Likelihood and consequences were multiplied to determine the risk of wildfire to a community. Likelihood was determined by averaging the stand level values of the flammability scores of the forest surrounding a community as determined using the fuel type layer contained in the Provincial Strategic Threat Analysis (PSTA) data. The latest version (2017) of this map layer did not include private land. Individual stands in the threat analysis were rated qualitatively from very low to extreme flammability as follows:

- 1 - very low
- 2 - low
- 5 - medium
- 8 - high
- 10 - extreme

Consequence was scored qualitatively 1 to 5, by the experts assembled for the review, based on whether unit is down wind of community or housing, size of community, or if unit is adjacent to community or community defence line:

- 0 - > 5 km from any habitation
- 1 - >2 km from any habitation downwind and 1 km distance up wind
- 2 - 1 to 3 km away from habitation
- 3 - adjacent to or < 2 km upwind of any populations <100 people
- 4 - adjacent to or < 2 km upwind of populations > 100 people or downwind of <1000 people
- 5 - adjacent to or < 2 km upwind of populations > 1000 people

a. South East Pilot FN CWPP and Municipal CWPP integration:

Zoned areas in FN CWPP were priority weighted

- category 1 zone score =4.
- category 2 zone score = 2
- category 3 zone score = 0,

Community Wildfire Protection Plans (CWPP) for Fernie, Elkford, Cranbrook, Kimberley and Sparwood were utilized and ratings assigned based on identification of priorities for fuel treatment within the CWPP's. Additional input was also provided for Radium from Hot Springs staff on fuel unit weighting for units adjacent to Radium.

4. Review and Endorsement of Methodology South East Pilot

First approximation model weighting was reviewed by a group of experts. The initial review was held on August 2nd, 2017 when the concepts were presented to Forest Enhancement Society (Gord Pratt), RMD (Scott Hicks), Rocky Mountain Trench Natural Resources Society (Dan Murphy), wildlife habitat (Allana Oestreich), interface contractors (Geoff Byford) and Wildfire Management Services (Mike Morrow, Andre Chalabi) staff. The approach was endorsed. It should be noted that a project map displaying current conditions was reviewed and subsequently utilized by the Cranbrook Wildfire Base as a decision support tool for helping determine the location of landscape level fuel breaks for wildfire suppression.

A second review of project data and products occurred on October 18th, 2017 with RMD (Scott Hicks), Rocky Mountain Trench Natural Resources Society (Dan Murphy), wildlife habitat (Allana Oestreich) and BC Wildfire Service (Mike Morrow, Mike Black) staff. The approach, units and numeric rankings were discussed and confirmed. BCWS identified the need to include PSTA into the analysis to calculate Wildfire Likelihood.

Project and methodology were reviewed and endorsed by the Regional Investment Specialist SE (Julie Castonguay) on October 31st.

Further review by Wildfire Management Branch (Kelly Osbourne) occurred in March 2018, which provided favorable feedback.

SE FN review of methodology and product output occurred on the following dates:

- ?Aq'am February 8th, and April 11th, 2018,
- Tobacco Plains Feb 9th and April 13th, 2018
- Shuswap March 6th 2018
- Akisqnuk March 8th, 2018, and April 12th, 2018

Detailed methodology and complete listing of priority ranking for Ecosystem Restoration and Fire Prevention Treatments for the SE Pilot are available in the First Nations Forest Enhancement Society Service Delivery Model Pilot Project Report for the SE. (Harris, Kathriner 2018).

Examples of SE Pilot Area Weightings for Fuel Treatment and Ecosystem Restoration. Tables are supported by Map Product Outputs.

Table 2 Priority matrix for units showing Fuel Management priority ratings and scores, sorted by Interface Percent Score.

Interface Unit	Interface Percent Score	Total Interface Score	Fire Interface			CWP Unit	District Wildfire Management Plan Values			Frequency Nuisance Fires	First Nation Wildfire Plans			Prov. Crown Area (Y/N)
			PSTA ¹	Cons. ²	Total LC score ³		Commun. Prot. Line	1 st Fire Break	2 nd Fire break		Inside 1 st zone	Inside 2 nd zone	Inside 3 rd zone	
Maximum possible	100%	85	10	5	50	10	8	4	2	5	4	2	0	
Paqam	91%	79	10	5	50	10	8			5	4	2		N
Alkali/ Cranbrook Community Forest	76%	67	8	5	40	10	8	4		5			0	Y

Table 1 Prioritisation rating for Ecosystem Restoration Treatments for all Restoration Units in Rocky Mountain Trench

Restoration Unit	ER Score	ER Score	Red and Blue listed Spp.	Elk	Bighorn Sheep	Biodiversity-Shannon Score	Proper Functioning Condition	Provincial Crown (Y/N)
Possible Scores	%	130	25	10	15	30	50	
Tobacco Plains Village and Reserve	85%	110.2	11	9.5	13.5	26.2	50	N
Grasmere	85%	110.2	11	9.5	13.5	26.2	50	Y
Waldo South - Kikomun Highway	77%	100.4	11	9.5	7.5	27.4	45	Y

Figure 4.

5. **Review and Endorsement of Methodology North East Pilot**
 Fort Nelson First Nations (FNFN) and Northern Rockies Regional Municipality (NRRM) which share a common boundary, were introduced to the concept and opportunities of participating in the pilot on June 23rd, 2017.
 Review of the pilot project methodology occurred in November 30th, 2017. It was also acknowledged that FNFN and NRRM were partnered in a BC Rural Dividend FireSmart Home Ignition Zone (HIZ) Unmanned Aerial Vehicle project which would provide detailed aerial imagery and home ignition zone data to the integrated spatial database.
6. **Review and Endorsement of Methodology Coast Pilot**
 Initial meeting to introduce the Pilot Project concept was held at N'Quatqua on March 15th, 2018 with the following representatives.
 - Shane Wardrobe, FNESS
 - Larry Price RPF, FNESS
 - Shawn Patrick, N'Quatqua
 - Justin Penny, BCWS Pemberton Fire Zone

- Rob Dombowsky, BCWS Wildfire Officer, Pemberton Fire Zone
- Bruce Blackwell RPF, BA Blackwell and Associates

Support for the pilot project was acknowledged and agreement to proceed with development of the integrated spatial database was approved.

Additional review of pilot methodology with the following representatives occurred on October 12th, 2018.

- Shawn Patrick: N'Quatqua Lands & Resources.
- Rob Dombowski: BCWS Wildfire Officer, Pemberton Fire Zone, FLNRORD
- Frank DeGagne RPF: Land and Resource Specialist. Sea to Sky Natural Resources District, FLNRORD.
- Bruce Blackwell RPF; BA Blackwell and Associates.
- Jeff Fisher RPF; Sqomish Forestry.
- Larry Price RPF First Nations Emergency Services Society (FNESS).
- Peter Ronald (on phone); Union of BC Municipalities, Programs Officer, Community Resiliency Investment Program (CRI), Strategic Wildfire Prevention Initiative (SWPI).

Review of the integrated spatial database was used to identify preliminary project opportunities.

N'Quatqua was confirmed as having the highest fire risk and threat in the District and that it would proceed with project applications under the Community Resiliency Investment (CRI) Program for On-Reserve fuel treatment initiatives adjacent to residential, critical infrastructure and evacuation access linked to existing FES project on adjacent Provincial crown land. N'Quatqua would also apply to FES to obtain project funding to reduce wildfire threat from fuel accumulations on surrounding Provincial Crown Lands. Projects would complement and enhance past and current SWPI, Ecosystem Restoration and FES project initiatives adjacent to N'Quatqua reserve lands.

Given issues raised by SWPI and FES program staff relating to costs for prescription development and operational fuel treatments on the Coast it was agreed that opportunities existed to track detailed metrics on fuel treatment costs that could be used to support assessment of future fuel treatment initiatives.

Priority projects and associated budget was developed on November 7th 2018 and provided to the planning team for input and to N'Quatqua to support FES and CRI project applications with intake deadlines of November 30th and December 7th respectively.

Results

1. ?Aq'am

?Aq'am utilized the decision support model outputs to submit project applications to Community Resiliency Investment, Columbia Basin Trust (CBT) and Department of Indigenous Canada in 2018, 2019 and 2020. Projects focused on Wildfire Fuel Mitigation, Ecosystem Restoration, Home Ignition Zone Assessments and Training. It should be noted that in many of the areas approved for ecosystem restoration there was overlap with the areas prioritized for Wildfire Mitigation and achieved mutually beneficial objectives. ?Aq'am did not submit to FES as they wanted to focus all resources on the development and implementation of project initiatives that were on Reserve Lands. Total approximate value of approved projects is \$1,415,301. Breakdown of approved project initiatives are as follows (refer to appendix 1 for map of project areas):

- CBT: Ecosystem Restoration \$900,000, Fuel Mitigation \$248,000
- DISC: Fuel Mitigation \$167,301
- CRI: Fuel Mitigation \$100,000. (Note: \$150,000 project application submitted for 2020).

2. Akisqnuk

Akisqnuk utilized the decision support model outputs to submit project applications to FES, Community Resiliency Investment, Columbia Basin Trust (CBT) and Department of Indigenous Canada in 2018, 2019 and 2020. Projects focused on Wildfire Fuel Mitigation, Ecosystem Restoration, Wildlife Habitat Enhancement, Home Ignition Zone Assessments and Training. It should be noted that many of the areas of ecosystem restoration overlapped with the areas prioritized for Wildfire Mitigation and achieved mutually beneficial objectives. Total approximate value of approved projects was \$1,361,301. Breakdown of approved project initiatives are as follows (refer to appendix 1 for map of project areas):

- CBT: Fuel Mitigation \$254,000
- DISC: Fuel Mitigation \$167,301
- CRI: Fuel Mitigation \$100,000
- FES: \$510,000
- SWPI joint FES Project: \$330,000. Wildfire Zonation helped to support the only (joint) FES/SWPI approved project in B.C.

3. Shuswap

Shuswap utilized Service Delivery Model outputs to support project applications to FES, Community Resiliency Investment, Columbia Basin Trust (CBT) and Department of Indigenous Canada in 2018, 2019 and 2020. Projects focused on Wildfire Fuel Mitigation, Ecosystem Restoration, Wildlife Habitat Enhancement, Home Ignition Zone Assessments and Training. It should be noted that many of the areas of ecosystem restoration overlapped with the areas prioritized for Wildfire Mitigation and achieved mutually beneficial objectives. Total approximate value of approved projects was \$748,200. Breakdown of approved project initiatives are as follows (refer to appendix 1 for map of project areas):

- DISC: Fuel Mitigation \$57,690
- CRI: Fuel Mitigation and FireSmart \$100,000
- FES: \$590,510

4. Tobacco Plains

Tobacco Plains utilized Service Delivery Model outputs to identify project applications for CBT ecosystem restoration assessment planning, DISC on-reserve fuel treatments in Wildfire Prevention Management priority 1 zone and SWPI FireSmart HIZ training and assessments. Tobacco Plains chose not to apply to FES or CRI for fuel treatment or ecosystem restoration project funding due to concerns related to cumulative effects from forest cover removal related to timber harvesting operations, ecosystem restoration project initiatives, as well as impacts from high density motorized recreation use on lands adjacent to Lake Kookanusa reservoir. Due to these concerns Tobacco Plains has been seeking opportunities to access funding to assess cumulative effects and implement planning that provides analysis of spatial and temporal (treatment unit) designs across the landscape adjacent to reserve lands. This is needed to address issues of maintenance of connectivity and seral stage diversity prior to supporting any project initiatives that would alter habitat conditions on the surrounding landscape.

Total approximate value of approved projects initiatives are as follows (Note: \$150,000 CRI Project application submitted for 2020)

- DISC: Fuel Mitigation \$167,301

5. Fort Nelson First Nations and Northern Rockies Regional Municipality

Fort Nelson FN utilized the Service Delivery Model outputs to submit project applications to Community Resiliency Investment in 2019 and 2020 and Department of Indigenous Canada in 2018, 2019/20. Projects focused on Wildfire Fuel Mitigation, Home Ignition Zone Assessments and Training. FES Project opportunities were not pursued as FNFN wanted to focus on treating areas on reserve for fuel mitigation that were supported by 140 HIZ assessments completed on residential infrastructure that were funded by BC Rural Dividend Program. Additionally, there were inconsistencies with FN and Provincial Government critical Caribou habitat mapping and associated management guidelines on areas surrounding reserve lands that presented barriers for applying for ecosystem restoration or wildlife habitat restoration project opportunities. Total approximate value of approved projects was \$290,377. Break down of approved project initiatives are as follows (refer to appendix 3 for map of project areas):

- DISC: Fuel Mitigation \$190,377
- CRI: \$100,000 (Note: \$150,000 CRI project application submitted for 2020).

6. N'Quatqua

N'Quatqua First Nations utilized the decision support model outputs to submit project applications to FES and CRI Programs. Project proposals linked existing FES projects on adjacent Provincial crown land as well as focusing of proposed treatments adjacent to residential, critical infrastructure and evacuation access. Total value of approved projects was \$100,000. FES submission was not approved. It was noted by FES staff that the project had merit but was not ranked high enough when compared with other FES Provincial Fuel Mitigation project proposals given available budget (refer to appendix 1 for map of and description of priority projects). Breakdown of approved project initiatives are as follows.

- CRI: \$100,000. (Note \$149,920 CRI project application applied for under 2020 CRI Program).

Recommendations

The FES FN Service Delivery Model Pilot Project has proven to be cost effective and efficient. The project was developed and implemented with a \$50,000 FES budget allocation. Product outputs from the Service Delivery Model Pilot project have supported (approved) project submissions that exceed \$4,000,000 from a range of Federal, Provincial and Regional programs. This translates to over an 800% return on investment for developing the Service Delivery Model Pilot which product outputs continue to be used to support a range of Multiagency and Regional program project applications. Success of the pilot project and future implementation are dependent on critical model components which include.

1. Access to Spatial Data and Development of an Integrated Spatial Data Base:

Significant effort was required in the pilot projects to identify, assemble and integrate data from a range of sources that was used for analysis, mapping and report products. Recommend GeoBC (FLNRORD) streamline process to access spatial data and support integration of spatial data needed for FES, Federal, Provincial and Regional Wildfire Program decision support. This will require coordination with Provincial, Federal, Municipal and Local First Nations Governments and organizations, such as Integrated Cadastral Information Society (ISIS) to enable access to and integration of data. Data base must include but not be limited to data obtained from: Landscape Fire Management Plans, Community Wildfire Protection Plans, SWPI prescriptions and operational treatments, ecosystem restoration, wildlife habitat areas, terrain, cadastral and other terrestrial and aquatic data required for business needs. For the pilot project, integrated spatial data enabled identification of (geo-referenced) project areas which supported multiple resource management objectives with similar desired future conditions and areas of mutually exclusive management goals and objectives such as, old growth management and fuel mitigation management areas. Additionally, by integrating cadastral information, which contains administrative boundaries eligible funding from Federal, Provincial and Regional Programs was identified that supported priority projects.

2. Refine Wildland Urban Interface (WUI) through zonation:

WUI mapping has proven to be a useful product in providing coarse level resolution of population centers at risk to wildfire in British Columbia. However, refinement of the WUI utilizing Wildfire Prevention Management Zonation which design is based on proximity to values at risk and wildfire behaviour factors (fuels, topography and weather) allows for better linkage of strategic, tactical and operational planning. This concept builds on and is consistent with FireSmart Zonation 1a, 1, 2 and 3. Wildfire Prevention zonation extends farther out from FireSmart zone 3 through the community and onto the surrounding landscape. Identification of management goals and science based quantifiable objectives within zones (target ranges for surface fuel, crown bulk density, species conversion) will support consistency in prescriptions and operational treatments Province wide and allows for assessment and integration of multiple resource management goals and objectives. This concept is consistent with Forest and Range Practices Act (FRPA) and management of the visual landscape in BC. Establishment of Visual Quality Objectives (VQO's) provides quantifiable objectives (percent alteration targets, plan and perspective) for visual landscape units on the Provincial Forest Land base. Identification of target ranges for desired future condition enables identification of complimentary or conflicting resource management objectives (OGMA, Protected Areas, Recreation reserves, Ecosystem Restoration, etc.) required for integrated resource management planning and development of Regional Investment Plans. The integration of the Wildfire Prevention Zonation into FN CWPPs in the SE pilot has proven to be effective in providing linkage of strategic, tactical and operational planning. Additionally, the Regional District of Central Kootenay (RDCK) Wildfire Risk Reduction Committee has integrated Wildfire Prevention Zoning into pilot project initiatives within their administrative area and is investigating options (to develop science-based algorithms) which will generate variable width Wildfire Prevention Zoning.

3. Risk and Prioritization Tool Enhancement

All hazard risk and the need to mitigate risk varies spatially and temporally. For example, insect epidemics can increase wildfire risk to communities and necessitate the requirement for implementation fuel treatments to reduce risk. This can result in the need for inequitable distribution of fuel treatment funding between Regions throughout the Province spatially and temporally to treat fuels around communities most at risk. Although relative wildfire risk and ecosystem restoration prioritization occurred for the SE Pilot there was a need to improve on the ability to prioritize projects between the SE, NE and Coastal pilots. This can be partly attributed to differences in database resolution, inconsistencies and gaps in available data. For example, data for desired future conditions for ecosystem restoration are not available for all NDT 4 ecosystems throughout the Province. Provincial Strategic Threat Analysis and WUI Risk

Class mapping are the only tools that allow for coarse level risk classification across Regions. Although inconsistencies also exist in this data. For example, residential structure density data for many FN communities has not been input into WUI Risk Class mapping. This issue was identified in the First Nations Values Data Assembly Project (Price, Hammond 2017) and includes recommended action to address this issue. Additionally, there is a requirement for the risk and prioritization model to include indicators for assessing benefits and cost of projects with carbon sequestration. At the time of pilot project implementation uncertainty existed in confirmation of indicators and costing related to removing fibre (from fuel treatments) off site to facilities as hog fuel or bio-energy and eliminating the need for on-site burning.

4. Regional and Local Governance

Recommend establishment or building on existing Regional and local Governance to support access, leveraging and allocation of funds for development and implementation of priority projects from Provincial, Federal and Regional program funding streams. The pilot project confirmed the importance of having a multi-representational governance body to review and confirm priority projects. Regional Committees would confirm priorities and provide for the coordination of project initiatives that span multiple jurisdictions and scales over space and time. Development of a Risk and Prioritization model (recommendation 3) would provide Provincial and Regional governance bodies with a science-based tool to support identification and prioritization of projects.

5. Spatial and temporal planning.

Recommend Service Delivery Model incorporate methodology for assessing the effectiveness of treatment unit design spatially and temporally. The Service Delivery Model pilot project was able to display current spatial conditions against a lens of desired future conditions. This proved to be effective in supporting assessment of multiple project initiatives with differing management goals and objectives. Enhancement of the model is recommended by integrating stand level and landscape models that can assess effectiveness of prescriptions and treatment unit design spatially and temporally. This would enable for assessment of static and dynamic fuel breaks, fuel mitigation treatments, ecosystem restoration and habitat enhancement project design at the stand and landscape level. Furthermore, it would support identification and evaluation of harvest opportunities (linked to project initiatives) through space and time. Work currently being undertaken by the Regional District of Central Kootenay (RDCK) Wildfire Risk Reduction Pilot projects incorporates stand and landscape level models which will provide valuable information to guide direction on tools, methods and procedures to support spatial and temporal planning.

6. Community Wildfire Resiliency Planning (CWRP)

In partnership with the BC FireSmart Committee, the BC Wildfire Service is conducting a comprehensive review of the B.C. government's approach to community wildfire resiliency planning.

This review process represents a unique opportunity to learn from previous Community Wildfire Protection Plans (CWPPs) and current science on community wildfire resiliency and apply them to the development of the new Community Wildfire Resiliency Planning process.

Key goals of the Community Wildfire Resiliency Planning process include:

- increasing communities' capacity and understanding of wildfire risk
- fostering greater collaboration across administrative boundaries
- being more responsive to the needs of different types of communities throughout BC in terms of their size, their capacity and the threats they face.

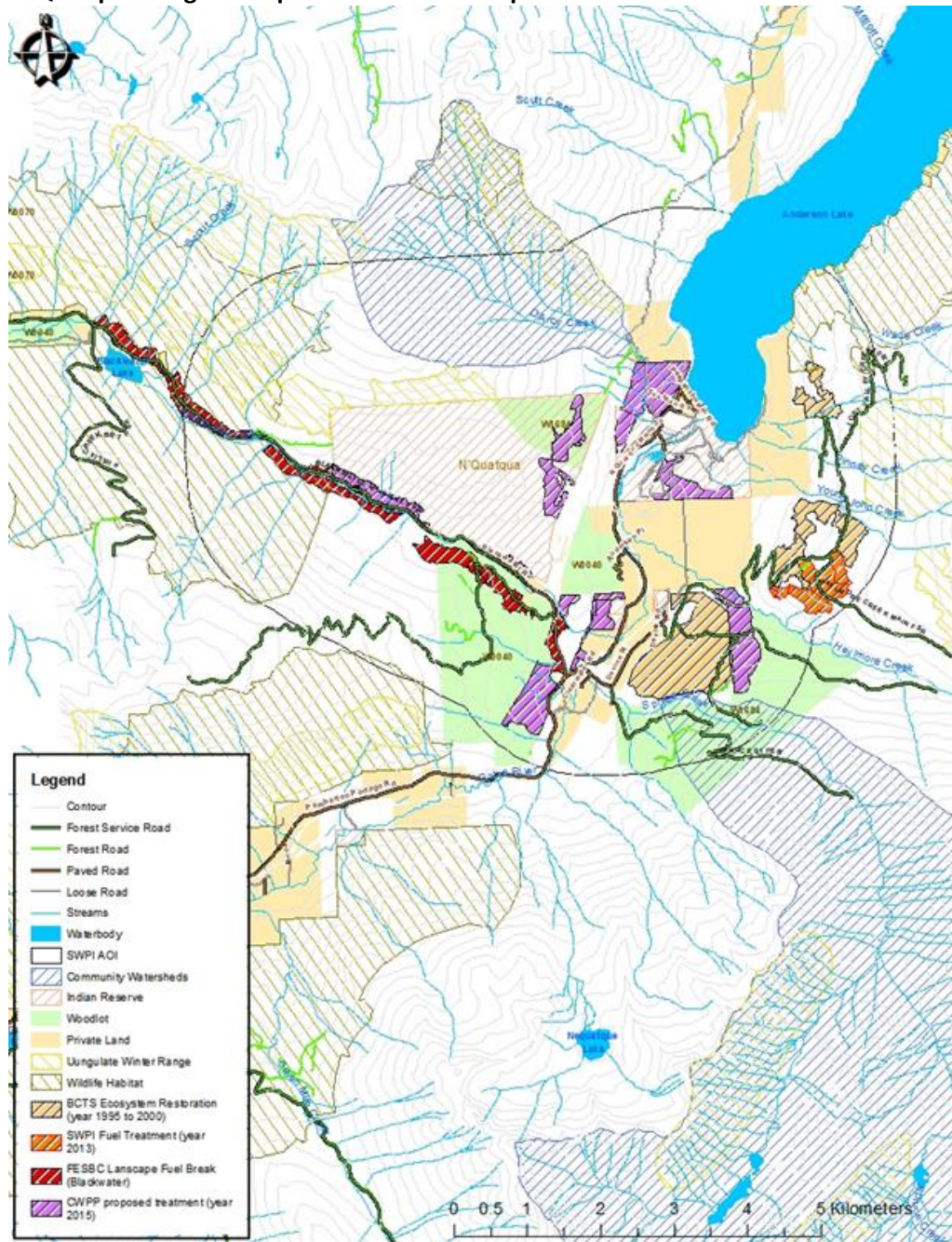
Although the Service Delivery Model Pilot does not address the scope of all FireSmart Disciplines included in Community Wildfire Resiliency Planning the pilot project results and recommendations will support CWRPs' with confirmation of:

- The importance of spatial data assembly, integration and tools to support greater collaboration across administrative boundaries.
- Identification of the benefits of refined WUI through Wildfire Prevention Management Zoning that would improve consistency in prescription development and improved linkage of Strategic, Tactical and Operational (multi-resource) planning.
- The importance of Regional and local governance to improve opportunities to prioritize projects, leverage, access and allocate funding from a range of Federal, Provincial and Regional Programs.
- The importance of Community Engagement to support education and awareness of Wildfire and all Hazard Risk and the range of Federal, Provincial and Regional programs that exist to mitigate risk to Communities.

Recommend FN Service Delivery Model results and recommendations be provided to the CRI Management Committee, Core CWRP Committee and FLNRORD Integrated Investment Specialists for consideration in the development, design and implementation of CWRP, Crown Land Wildfire Risk Reduction and Integrated Resource Management Planning in British Columbia.

Appendix 1: Pilot Project Mapping and Associated Information

N'Quatqua Integrated Spatial Data Base Output





N,Quatqua Wildfire Reduction Strategy

Project Description:

Eleven areas totaling 204 ha are proposed for fuel treatment prescriptions and wildfire risk reduction implementation (see Map 1). These areas were identified as priority hazardous fuel units in the latest N'Quatqua Community Wildfire Protection Plan (CWPP) Update (completed in August 2016 under the 2015 SWPI program). The areas proposed for fuel treatment prescription and operational implementation are located on Provincial Crown Land and on N'Quatqua reserve lands in the wildland urban interface. These areas were prioritized for fuel management treatment based on reduction in wildfire threat to the N'Quatqua community and public safety, critical infrastructure, timber resource values and adjacent values including Ungulate Winter Range (UWR) (rationale for individual treatment units are provided below in Table 1). This area represents one of the highest wildfire threat areas within the Sea to Sky District, given the local fire history and dry forest fire regime. As such, this area is one of the highest priority communities in the Sea to Sky District from a fire risk perspective.

Project Outcomes:

The N'Quatqua fuel treatment prescription and operational implementation project will complement and have synergies with the Sea to Sky District's fuelbreak work to extend the area under prescription and shovel-ready for treatment. Combined treatments will serve to significantly reduce the wildfire risk/threat in the D'Arcy/Devine and Blackwater corridors and enhance the ability of fire suppression crews to manage or suppress wildfire. This is particularly important in view of the vulnerability of these communities with regards to access and egress.

In addition to providing protection to the community from wildfires spreading into the WUI, the project will provide protection to adjacent values in the event a wildfire starts and spreads out from the community. These values include significant ungulate winter range (UWR) and timber values that could be disturbed or destroyed by wildfire.

Outline of Budget:

A. Jurisdiction

In order to cater to and facilitate application to the various funding sources available for wildfire risk reduction activities (i.e., Forest Enhancement Society of BC and Community Resiliency Investment program), the budget has been structured according to land ownership/jurisdiction. More specifically, the budget separates the cost and level of effort (person hours) associated with activities proposed on both Reserve land (100 ha) and Provincial Crown land (104 ha). The budget assumes a net down of 20 hectares (10 hectares per total area within each jurisdiction) to account for the presence of areas of lower hazard such as deciduous stands, right-of-way, or irrigated land.

B. Fuel Management Prescription and Operational Fuel Treatment

The budget has also been divided by phase or activity type, and the cost/level of effort are presented according to the proposed Fuel Management Prescription (FMP) development phase and the Operational Fuel Treatment (OFT) phase.

Proposed Approach and Rationale:

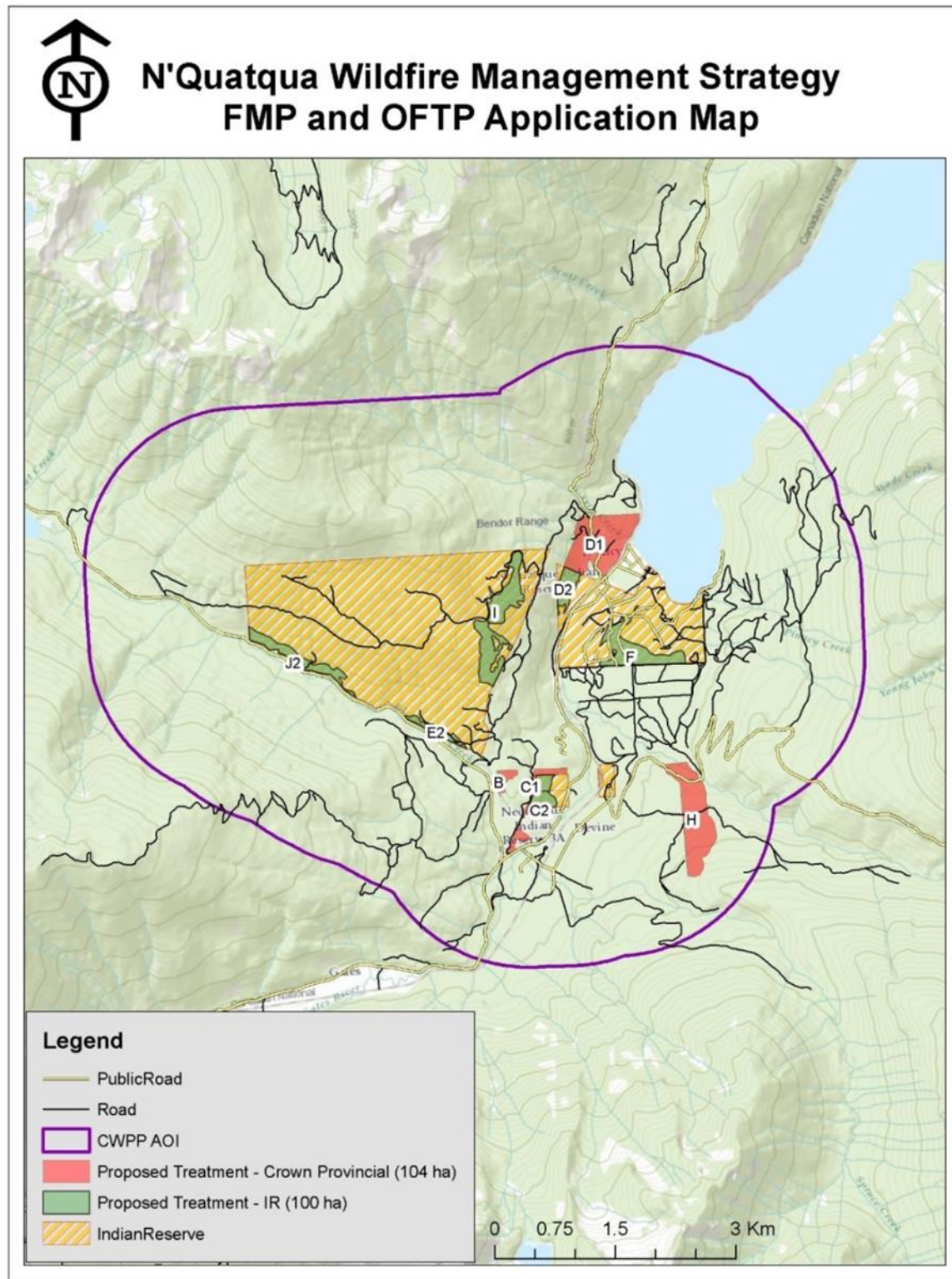
This multi-year project proposes a proactive wildfire risk reduction strategy for the N'Quatqua Band wildland urban interface, consisting of: 1) fuel management prescription development for strategically located priority units, and 2) fuel treatment implementation on both Crown Provincial and Federal lands. This strategy represents the most efficient approach to reduce the wildfire risk profile of communities within the area of interest.

We propose that the work can be conducted as follows:

Phase 1A: Fuel Management Prescription development for 204 ha on both Reserve and Provincial Crown land within the D'Arcy/Devine and Blackwater corridor (Sea to Sky Natural Resource District). The cost for this activity is \$72,639.00, exclusive of GST.

Phase 1B: Operational Fuel Treatment implementation on 94 ha of Provincial Crown land, as identified in the 2015 N'Quatqua CWPP Update. The cost for this activity is \$1,143,078.00, exclusive of GST.

Phase 2: Operational Fuel Treatment Implementation on remaining 90 ha of Reserve land, as identified in the 2015 N'Quatqua CWPP Update. The cost for this activity is \$1,092,978.00.



Approved Shuswap FESBC Project

Shuswap Band CWPP Dry Gulch Project (2019-202) PROJECT SITE LOCATION:

Dry Gulch Creek, ~2km north of the Shuswap Reserve, South of the Village of Radium Hot Springs and between highway 93/95 to the East and the Columbia wetlands to the West 82k060, 82k070 Lat/Long: (50.59625 N), (116.06255 W) UTM Zone 11: (566354, 6605376)

RATIONALE

The proposed forest treatment unit is located north of the Shuswap Band and bordering outside of the Band's CWPP 2000m AOI limitation. The FTU is represented by dense stands of Douglas fir Ingrowth and decadent stands of former Christmas Tree Permit holder Douglas fir. The wildfire threat to the surrounding communities is significant, (High to Extreme ratings). The goals of this forest fuel management project, through a combination of mechanical/manual forest falling, thinning, pruning and disposal is to reduce wildfire threat and improve upon low value forest stand.

PROJECT WR0000271 – DRY GULCH FOREST MANAGEMENT:

The proposed project area is located north of the Shuswap Reserve and adjacent to the Band's CWPP 2000m AOI limitation and has a "Moderate" treatment priority rating under the CWPP. The overall area has a gross area of ~215ha with an estimated net treatment area of ~120ha. The proposed Forest Treatment Unit is within the IDF (dm) BEC zone, with C7 fuel types and is represented by dense stands of Douglas fir Ingrowth intermixed with decadent stands of former Christmas Tree Permit holder Douglas fir. The FTU falls in the "Radium South" Logical burn unit (LBU). The wildfire threat to the surrounding communities is significant, (High to Extreme WUI ratings).

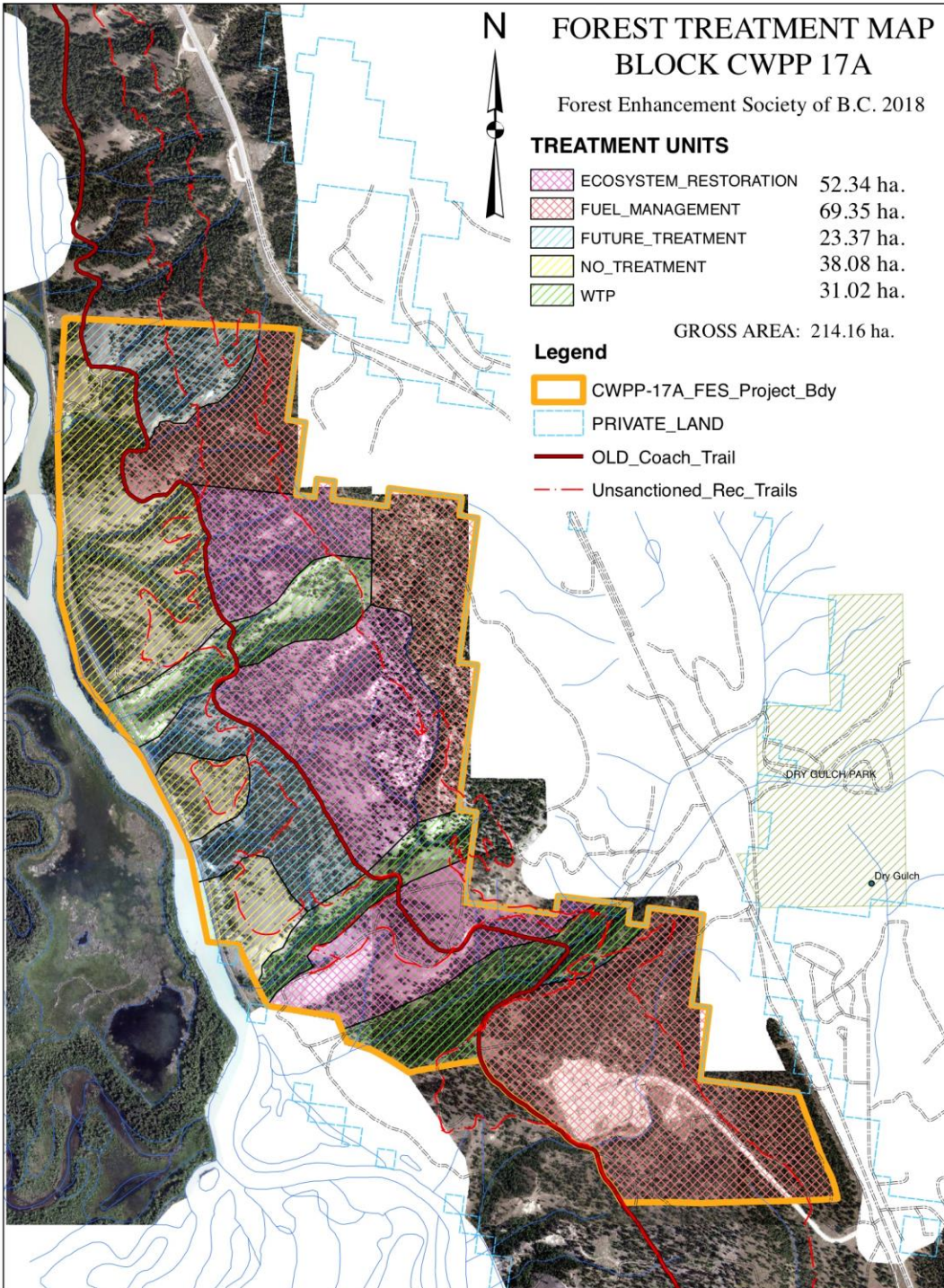
The proposed area has been mapped, re: 'Forest Enhancement Society First Nations Service Delivery Model Pilot Project' – Nupqu Development Corp. Yvan Kathriner

Desired Future Forest Condition-Open Range as well as 'FNESS FES Desired Future Condition, FMER by BAND V1' showing that the desired future condition for the application area is 'Open Forest' and that it is surrounded by a community protection line originally from the 2016 RMRD Fire Management Plan.

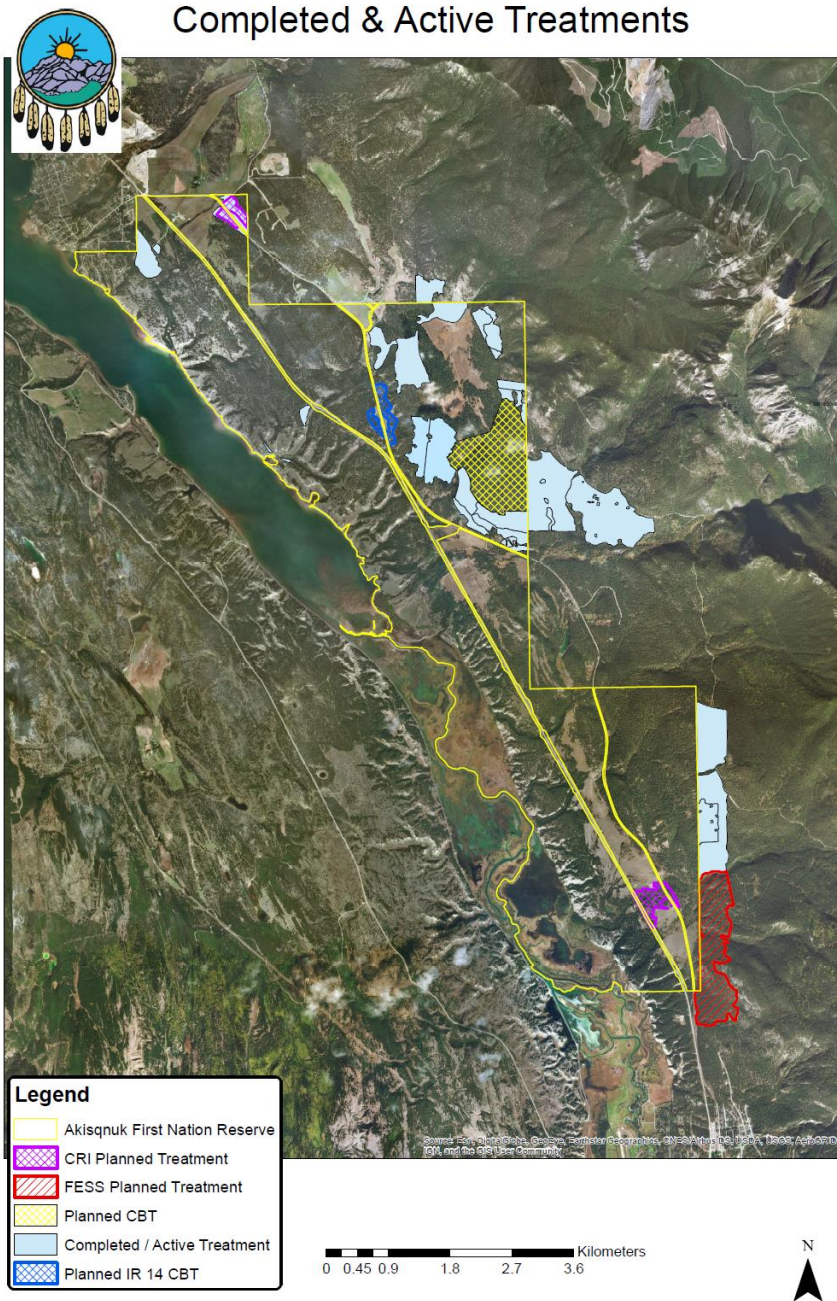
The main focus of this proposal is the FESBC goal to "Support strategic landscape-level fire management investments that lead to wildfire resilient ecosystems". The primary goal of this forest fuel management project; through a combination of mechanical/manual tree falling, thinning, pruning and disposal, is to reduce wildfire threat to the local communities. Wildfire threat reduction will be achieved by reducing crown continuity as well as reducing stand densities and fuel continuity of layers 2-4 through forest thinning of stand densities to recommended WUI stocking standards. Fuel breaks will be strategically located across the FTU utilizing and/or creating open spaces and increasing continuity of existing open areas.

Experienced professionals, field crews, and/or contractors in WUI treatments will be utilized in forest thinning, pruning, spacing and disposal activities. Landscape level fuel breaks have been discussed and identified in the Shuswap Band's updated CWPP as well as applied to varying degrees in past projects. FESBC focused secondary objectives are addressed in this unit including improving upon a low value forest stand. As is the case with much of the Douglas fir stands within the lower slopes of the Columbia valley, this FTU is composed of former Christmas tree production Douglas fir and therefore treatment

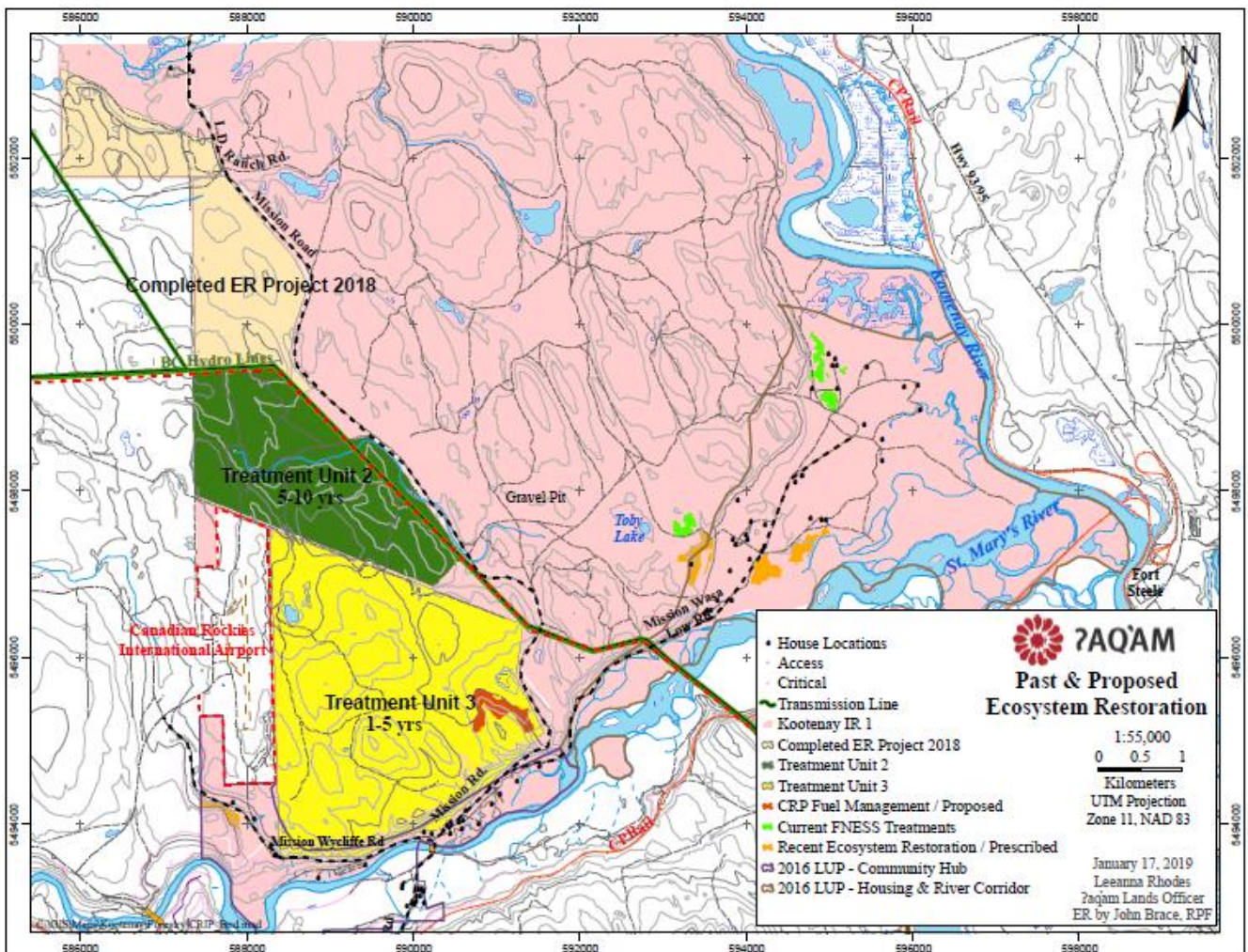
will lend support in reverting the forest to Crown land sawlog production with retention of merchantable timber, (>15cm dbh) and a reduction of the former Christmas tree layers. Improving habitat for wildlife is an equally weighted secondary objective achieved through the reduction of Fd Ingrowth and addressing the retrogression of grasslands and open forest to closed forest. Reverting closed forest to open range encourages the population growth of ground squirrels followed by the reintroduction of blue listed American Badger as has been observed on adjacent treatment units. The Shuswap Band is conducting Badger surveys on previous pre/post treatment units and compiling the results now with encouraging initial results. High recreational utilization by cyclists and hikers as well as the historical Old Coach Trail bisecting the area are additional values potentially enhanced.



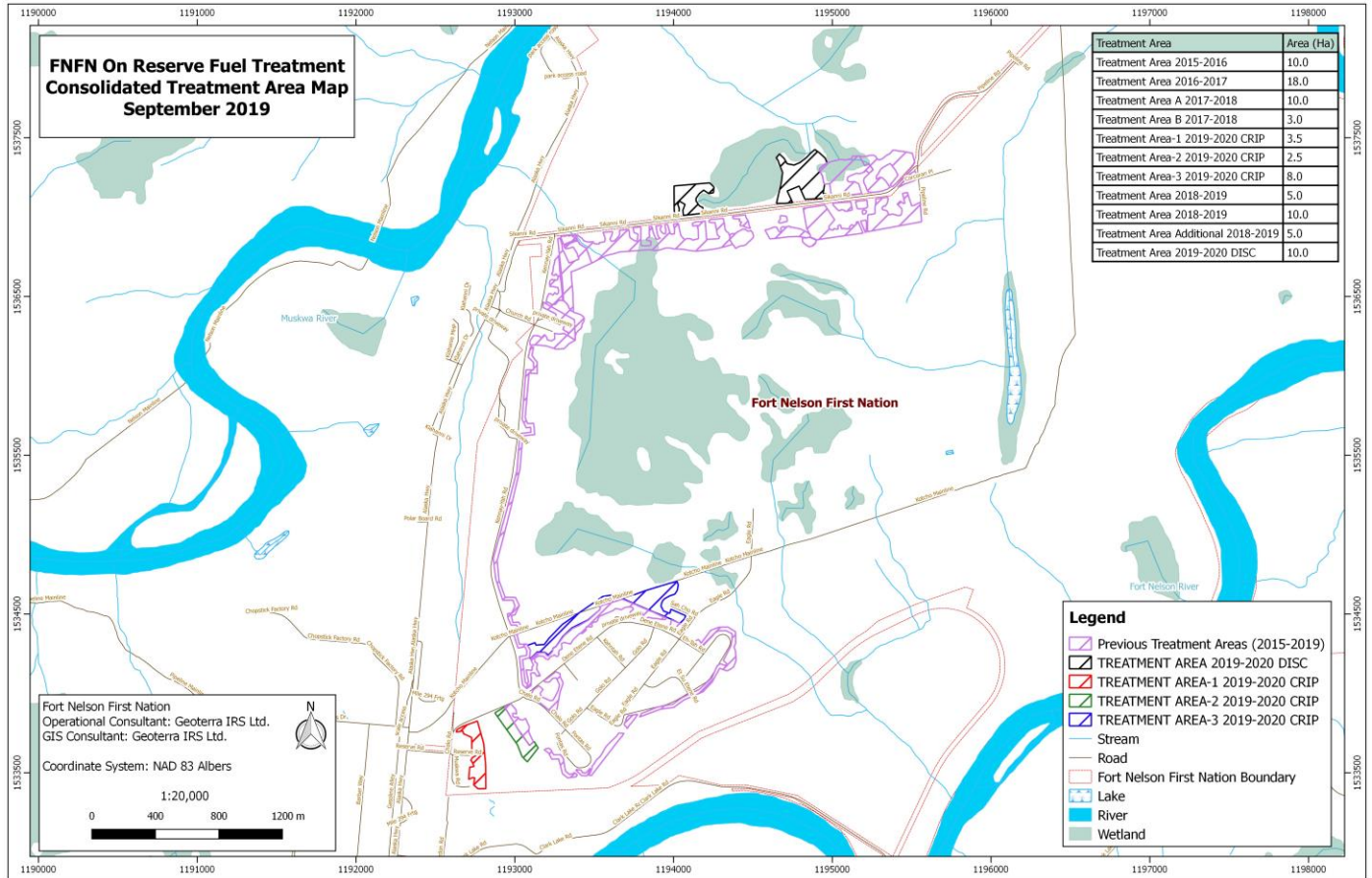
Akisqunuk Completed and Approved FES, CRI, DISC and CBT Projects



?Aq'am Approved Fuel Mitigation and Ecosystem Restoration Projects



Fort Nelson First Nations Approved Projects



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- 2013, Rocky Mountain Trench Ecosystem Restoration Program, Blueprint for Action 2013 Progress and Learnings 1997-2013, 48pp <http://trench-er.com/public/library>
- 2019, Community Wildfire Resiliency Planning (CWRP). BCWS Information Note. <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/funding-for-wildfire-prevention/crip>
- 2018, Harris, Kathriner; First Nations Forest Enhancement Society Service Delivery Model Pilot Project Report for the SE.
- The Fire Management Planning Process - Five Year Tactical Plan and Annual Operating Plan Guidance, Forests, Land and Natural Resource Operations 6/22/2014.