Revelstoke Landscape Scale Fuel Break Treatment Project
PROJECT OVERVIEW

Submitted to: Forest Enhancement Society of BC

Submitted by: Mountain Labyrinths Inc. in partnership with
B.A. Blackwell and Associates Ltd.
Archie McConnachie, Retired BC Forest Service Columbia Base Manager

Date: November 29, 2018

Background

The City of Revelstoke[1] has been actively engaged in community wildfire protection (CWP) for over a decade:

2009 – Initial Community Wildfire Protection Plan (CWPP) followed by creation of broad-based CWP Committee

2012 – Enhanced wildfire risk assessment and updated CWPP completed, followed by assessment of City owned properties and critical infrastructure with fuel management where needed as well as encouraging FireSmart actions on private property.

2015 – Community fuel break/defensible area design and updated CWPP[2] with priorities for landscape scale fuel breaks, improved wildfire protection within Mt. Revelstoke National Park and continued FireSmart actions by private land owners.

2016 to date - Wildfire Management Plan prepared by Parks Canada for Mt. Revelstoke National Park and fuel reduction treatments implemented to create a defensible space along the roadways and boundary lines on the lower slopes, and landscape scale fuel breaks upslope, continuing Parks Canada's decades-long program of community and landscape scale wildfire risk reduction. City confirmed cell towers are wildfire resistant to ensure communications continuity and hosted events to encourage FireSmart actions on private property.

The City has received funding through the Strategic Wildfire Protection Initiative and the Columbia Basin Trust for CWP activities.

Since 2008, staff from the following agencies has been active partners on the CWP Committee and in planning and implementing CWPP activities:

- BC Wildfire Service (BCWS) Columbia Base;
- Revelstoke office of Forests, Lands and Natural Resource Operations and Rural Development (FLRNORD);

[1] The population of the City of Revelstoke and area is approximately 8,000.

[2] Pearce. C., et. al. 2015.Updated Revelstoke & Area Community Wildfire Protection Plan. (Uploaded in the project application as WR0000571- 4)

- Parks Canada office for Mt. Revelstoke and Glacier National Parks; and
- Columbia Shuswap Regional District.

For example, BCWS staff created and maintain FireSmart fuel management demonstration areas in the community and BCWS and Parks Canada staff have supported City Fire Rescue Services and contract staff in community FireSmart education events.

During the community fuel break/defensible area project a controversy developed about the feasibility of shaded break fuel management treatments in local forest ecosystems. A research compilation[3] verified the concerns of local foresters that the ladder fuel removal and crown separation needed to eliminate crown fires would prompt rapid western red cedar and western hemlock natural regeneration, with as much as 1 metre annual growth, which would necessitate frequent and costly maintenance. This makes these treatments infeasible except for small areas to protect high values or on very dry sites. These findings increased the priority to establish landscape fuel breaks as well as the community scale defensible areas to reduce wildfire risks to the community.

Until recently it was understood that the provincial government would be responsible for landscape fuel break planning, with implementation by licensees and the provincial government. The provincial government recently indicated that they are not able to undertake this work at this time and invited a community lead initiative. Consequently this has now become one of the highest priorities for CWPP implementation.

Project Purpose

This project has three primary purposes:

1. The primary purpose of this project is to **reduce wildfire risks for the community of Revelstoke and the many regional and provincial assets** in this area by designing and treating landscape fuel breaks on provincial Crown lands within 10 kilometres of the City of Revelstoke municipal boundary (see map on last page), which includes Greeley Creek, the main consumptive watershed. The regional and provincial assets include:
    - BC Hydro Revelstoke dam – a major provincial electricity generator;
    - BC Hydro transmission line from Revelstoke dam to the Lower Mainland;
    - Trans –Canada Highway;
    - Canadian Pacific Railway;
    - Mt. Revelstoke National Park;
    - mountain caribou habitat; and
    - Revelstoke Mountain Resort.

[3] Martin. T. 2015. A Review of Understory Response to Changes in Overstory Conditions and Community Scale Fuel Break Design in Wet Interior Cedar Hemlock Forests in British Columbia. (Uploaded in the project application as WR0000571- 5)

2. This project will also facilitate rapid implementation of fuel breaks through the **creation of shared knowledge, best practices and practical experience** in landscape fuel break design and implementation in local forests amongst provincial land managers, licensees and First Nations. This will be accomplished by bring together local representatives from the Stewardship and Wildfire Services sections of FLNRORD; forest licensees; Mt. Revelstoke National Parks Fire Management section; City of Revelstoke; and First Nations through the Project Steering Committee and at key stages in the project. Ideally at the end of this project local licensees and agencies will have the capacity to implement landscape fuel breaks through the partnerships that have been established.
3. An additional purpose is to **rapidly share learnings** from this project to contribute to the much-needed implementation of landscape scale fuel breaks across BC.

The Project Team and Steering Committee

The Project Team worked together to successfully complete the 2009 enhanced wildfire risk assessment and the 2015 community wildfire fuel break/defensible space and CWPP update for the City of Revelstoke . Team members include:

- **Cindy Pearce, RPF, of Mountain Labyrinths Inc.** – Cindy will be the Project Lead as she was in the earlier projects. Cindy has over 35 years of experience leading and participating in multi-party teams in natural resource management projects including land use planning, endangered species recovery, timber supply review and training/extension. She has decades long working relationships with staff at the local FLNRORD District office, BCWS, local forest and recreation use licensees, First Nations claiming traditional territory in the area and recreation user groups through past land use planning and other projects. She has been working for the City of Revelstoke on CWP activities since 2011. She will be responsible for overall project management and administration and lead the community review and extension aspects of the project.
- **Bruce Blackwell, RPF, RPBio, and GIS staff with B.A. Blackwell and Associates Ltd.,** - This firm is a recognized provincial leader in wildfire risk assessment, behavior analysis, community protection planning and landscape fuel break planning and implementation. Bruce will lead these aspects of the project and the firm staff will provide GIS support. The firm has four active projects with FESBC where they have worked with Price Waterhouse as a funding recipient. Staff who are experienced with FESBC and Price Waterhouse administration systems will provide advice and support to Mountain Labyrinths Inc.
- **Archie McConnachie, retired BC Forest Service Columbia Base Manager –** Archie brings over 40 years of local wildfire behavior, risk reduction planning and prescribed fire expertise to the team.

The Project Team has secured support from the following government agencies, forest licensees, City of Revelstoke and National Parks local wildfire expertise for this project (see letters of support uploaded in the Partnership section of the application). Some of these individuals will be members of the Project Steering Committee:

- Ministry of Forests, Lands, Natural Resource Operations and Rural Development
  - Julie Castonguay, Integrated Investment Specialist, Kootenay-Boundary Region
  - Kurt Huettmeyer, Resource Manager, Revelstoke Office
  - Quintin Balfour, BC Wildfire Service, Columbia Base Manager

- Mike Morrow, BC Wildfire Service, Fuel Management Specialist, Southeast Fire Centre

- Earl Hunt, Woodlands Supervisor, Revelstoke Field Team and Miles Howard, Planning Forester, BC Timber Sales, Okanagan-Columbia
- Ashley Ladyman, Woodlands Manager, Stella Jones Inc.
- Angus Woodman, Manager, Downie Timber Ltd. and Kerry Rouck, Corporate Forestry Manager, The Gorman Group
- Dwayne Voykin, Fire Chief, City of Revelstoke
- Spencer Verdiel, Fire Management Officer, Mt. Revelstoke and Glacier National Parks

These organizations have committed to provide in-kind support to the project.

The project is also supported by the Habitat Section of FLNRORD at the Revelstoke Office.

First Nations claiming traditional territory within the project area will be invited to participate in the project. One of the first steps in the project will be to prepare a First Nations engagement plan for FLRNORD approval. The project budget includes funding for one representative from each of the three First Nations claiming traditional territory in the area to participate on the Steering Committee and for workshop attendance, including travel. The Project Lead has strong working relationships with these First Nations which will facilitate their engagement.

Recreation licensees and user groups with interests in the project area will be engaged during the community outreach.

Project Approach

The three distinct milestone phases of this project are described below.

Project tasks will be undertaken consistent with the relevant FLNRORD standards.[4]

All project work proposed will be conducted on crown land and will be incremental to tenure obligations.

One principle of the project is to use best available information – for example, existing fire behavior modelling[5] and a regional first approximation fuel break design[6] - with additional analysis or research only when necessary.

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[4] FLNRORD Fires and Fuel Management - https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/fire-fuel-management/fuel-management

FLNRORD Preparing a Burn Plan - https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/prescribed-burning/planning-a-burn. Accessed Nov. 27, 2018.

[5] Parisien, A.M., et. al. 2012. Considerations for modeling burn probability across landscapes with steep environmental gradients: an example from the Columbia Mountains, Canada. Published in Natural Hazards. (Uploaded in the project application as WR0000571- 6)

[6] Prepared in 2018 by B.A. Blackwell and Associates Ltd. for the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Kootenay-Boundary Region.

To minimize project treatment costs, all efforts will be made to locate fuel breaks to include natural features (e.g. rock, deciduous, old-growth) and man-made elements (e.g. transmission lines, highways, forest roads, ski runs).

A. **Landscape design milestone** – 6 months estimated (October to March to avoid fire season)

1. Team planning.
2. Prepare First Nations engagement plan for FLRNORD approval.
3. Establish Steering Committee to finalize workplan and budget.
4. Gather information -area wildfire history, regional burn analyses studies, regional fuel break design, local climate change and disturbance projections, landscape values maps.
5. Review regional first approximation wildfire fuel break location and treatments with local wildfire experts and revise as recommended.
6. Workshop with forest licensees, wildfire experts, ecosystem specialist, City Fire Rescue Services, First Nations and interested user groups to introduce landscape fuel break concept; review climate change ecosystem and wildfire impact projections[7]; review landscape scale values; recommend revisions to the draft fuel break design; and explore fibre utilization options.
7. Revise draft break design.
8. Community outreach on draft design through open house, presentations to key community and user groups and media.
9. Final draft break design.
10. Steering Committee to approve final break design; agree to one pilot firebreak for operational planning and implementation milestones; refine workplans and budgets for these milestones; and contribute to the summary of learnings.
11. Team hosts webinar to share learnings.

B. Operational plans milestone – One field season

Note: Assume treatment is a combination of logging with broadcast burn in the timber harvesting land base (THLB) and prescribed burn above the THLB – total of approximately 500 ha. Funding is included for the Team and First Nations participation and for estimated licensee time that is additional to normal harvest planning requirements – approximately 10 hours.

1. Team prepares the cutblock sequence plan with licensee and local wildfire experts. Licensee and FLNRODRD agree to plan.
2. Licensee prepares site plan for initial cutblock, including wildfire risk reduction objectives, with input from wildfire experts and team support for meetings and additional information as needed.
3. Licensee prepares burn plan for cutblock with input from BCWS and team if needed.
4. BCWS prepares burn plan for upslope break with input from the team and Parks Canada wildfire specialists.
5. Team completes fire behavior modelling to evaluate the effectiveness of the planned break. Fuel break design and plans are revised if needed.

[7] Utzig, G. 2016. Climate Disruption and Ecosystems of the Northwest Columbia. (Uploaded in the project application as WR0000571-7)

6. Team and licensee explore fibre utilization options and may apply for FESBC funds to support additional utilization.
7. Steering Committee meeting to refine Milestone 3 workplan and budget and compile learnings from Milestone 2.
8. Team hosts webinar to share learnings.

C. Implementation milestone – 1-2 years allowing for weather and timber market conditions

1. Licensee harvests cutblock. The project supports enhanced fibre utilization if feasible.
2. Licensee completes broadcast burn on cutblock and BCWS completes the prescribed burn. BCWS and Parks Canada crews assist if available.
3. Steering Committee meeting to debrief on implementation, review/revise designs for remaining breaks, plan next steps and compile learnings.
4. Team hosts webinar on learnings.

The Priority for Landscape Scale Fuel Breaks to Protect Revelstoke

In the provincial wildfire risk assessment[8], which is heavily weighted to wildfire *probability*, Revelstoke and area is predominately classed as moderate risk, with some higher risk areas. However, In addition to the usual rural community values of developed areas and infrastructure, including the community watershed, there is significant *consequence* potential from wildfires to provincial, national and regional assets including:

- BC Hydro Revelstoke dam – a major provincial electricity generator;
- BC Hydro transmission line from Revelstoke dam to the Lower Mainland;
- Trans –Canada Highway;
- Canadian Pacific Railway;
- Mt. Revelstoke National Park;
- mountain caribou habitat; and
- Revelstoke Mountain Resort.

These assets significantly elevate the wildfire risk in this area. Columbia River – Revelstoke MLA Doug Clovechok[9] has provided a letter of support for this project based on the elevated risks.

There are a number of additional reasons to consider this a priority project:

1. **Historic and recent wildland-urban wildfires** – Although the area is known as the 'Interior Rainforest' catastrophic fires have occurred historically, and wildfires that could not be suppressed have happened in the last 15 years within sight of the community.

   From the 1890s to the 1930s the area experienced several wildfires that burned 10s of kilometres in an afternoon from the east and the south of the City, into the forests adjacent to

[8] https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/fire-fuel-management/wui-risk-class-maps. Accessed Nov. 20, 2018.

[9] Uploaded in the project application as WR0000571 - 8

the community. In 2003 and 2006 the community watched wildfires on the slopes to the east and west of the City that could not be suppressed because of safety risks for ground crews. These fires continued to burn for weeks. Only quiet wind conditions kept these fires from burning into the community, as fires have historically.

2. **Long distance spotting due to local cedar forests –** Western red cedar is a leading species in many of the local forest/fuel types. This species burns hot and fast, with extensive spotting, making landscape scale fuel breaks, at a distance from the developed areas as well as the regional and provincial assets, an essential wildfire risk reduction tool in the Revelstoke area.

3. **Landscape fuel breaks as defensible spaces are essential because traditional fuel management treatments are too expensive to justify** - During past CWP projects, local foresters expressed concerns about the high costs of fuel management treatments that would achieve adequate wildfire risk reduction (e.g. removal of dead/down materials and ladder fuels along with conifer crown spacing to 2+ metres) in the local, highly productive cedar/hemlock/fir forests because:

    - dead, down and ladder fuels are usually extensive in these forests;
    - most areas must be hand treated due to terrain conditions; and
    - very rapid conifer (cedar and hemlock) re-establishment and growth rates (up to 1 metre per year) resulting in frequent and high cost retreatments to maintain wildfire resilience (see footnote 3).

4. **Local concentration of wildfire behavior and fuel break planning expertise -** In addition to Bruce Blackwell and Archie McConnachie on the Project Team, this project brings together a unique combination of local wildfire expertise that is not readily available to other communities to contribute to the growing practices of landscape fuel breaks as a wildfire risk reduction tool in BC:

    - BCWS Columbia Wildfire Base management staff who will contribute local knowledge of recent fire behaviour during extreme wildfire seasons and experience with prescribed burns conducted in partnership with Revelstoke Community Forest Corporation, as well as three 20-person unit crews and several initial attack crews who will assist with the prescribed burn treatment, if they are available; and
    - Fire management staff from Mt. Revelstoke and Glacier National Parks will bring their decade-long experience designing and creating fuel breaks in nearby National Parks using prescribed fire, wildfire and fuel management in local fuel types. Parks Canada wildfire crews may also be available to assist with the prescribed burns.

5. **Project designed intentionally to rapidly share learnings -** There is very limited experience in BC with designing and creating landscape scale fuel breaks. This project is intentionally designed to rapidly share learnings about these practices in two ways:

    - By working with all of the local licensees and BCTS – all of which have operations in other regions of the province – learning about wildfire fuel breaks will be rapidly extended to all local forestry practitioners, and through these individuals to their colleagues and into other areas.
    - Project tasks include compiling learnings at the end of each project milestone and sharing these through webinars to expedite information extension more broadly. The

team is prepared to host on-site field trips as well if there is interest (Note: this has not been included in the submitted budget). Cindy Pearce and Bruce Blackwell are both very experienced trainers and facilitators.

Project Costing

Project costing is provided in the table at the end of this section.

The team is confident in the cost estimates for the landscape design milestone. Costing for the operational plan and implementation milestones for the selected fuel break are based on assumed treatments of logging with broadcast burning within the THLB and prescribed burning above the THLB, on a total area of 500 hectares. Estimates for these milestones are based on the team's experience and conversations with:

- Spencer Verdiel, Fire Manager, Mt. Revelstoke and Glacier National Forests, Parks Canada;
- Nora Hannon, Balfour-Harrop Fire Chief and Regional District of Central Kootenay Wildfire Mitigation Coordinator;
- Erik Leslie, RPF, Forest Manager, Harrop-Proctor Community Forest;
- Kevin Bollefer, Operations Forester, Revelstoke Community Forest; and
- Heather Beresford, Environmental Stewardship Manager, Whistler.

The estimates for the operational plan and treatment milestones will be revised at the end of the preceding milestones, with clear separation of tenure obligations, for discussion with and approval by FES BC/PWC before going forward.

Once the landscape break is selected for the implementation milestone of the project, there will be discussion with the relevant licensee to ensure continuing with Mountain Labyrinths Inc. as the recipient for this funding is the most efficient approach.

The Team will seek funding for community outreach in Milestone 1 from CBT, potentially reducing the FES BC funding required by $5,000.

Budget estimate notes:

1. **First Nations engagement budget:** Approximately 20% of the funding requested for Milestone 1 and 25% of the funding requested for Milestone 2 is for First Nations engagement. This estimate assumes the 3 nations claiming traditional territory in the area will engage in this project. The funding estimate include travel time and costs for one representative from the Secwepemc First Nations to the east; the Okanagan Nation Alliance in Westbank and the Ktunaxa Nation in Cranbrook.

2. **Treatment costs**

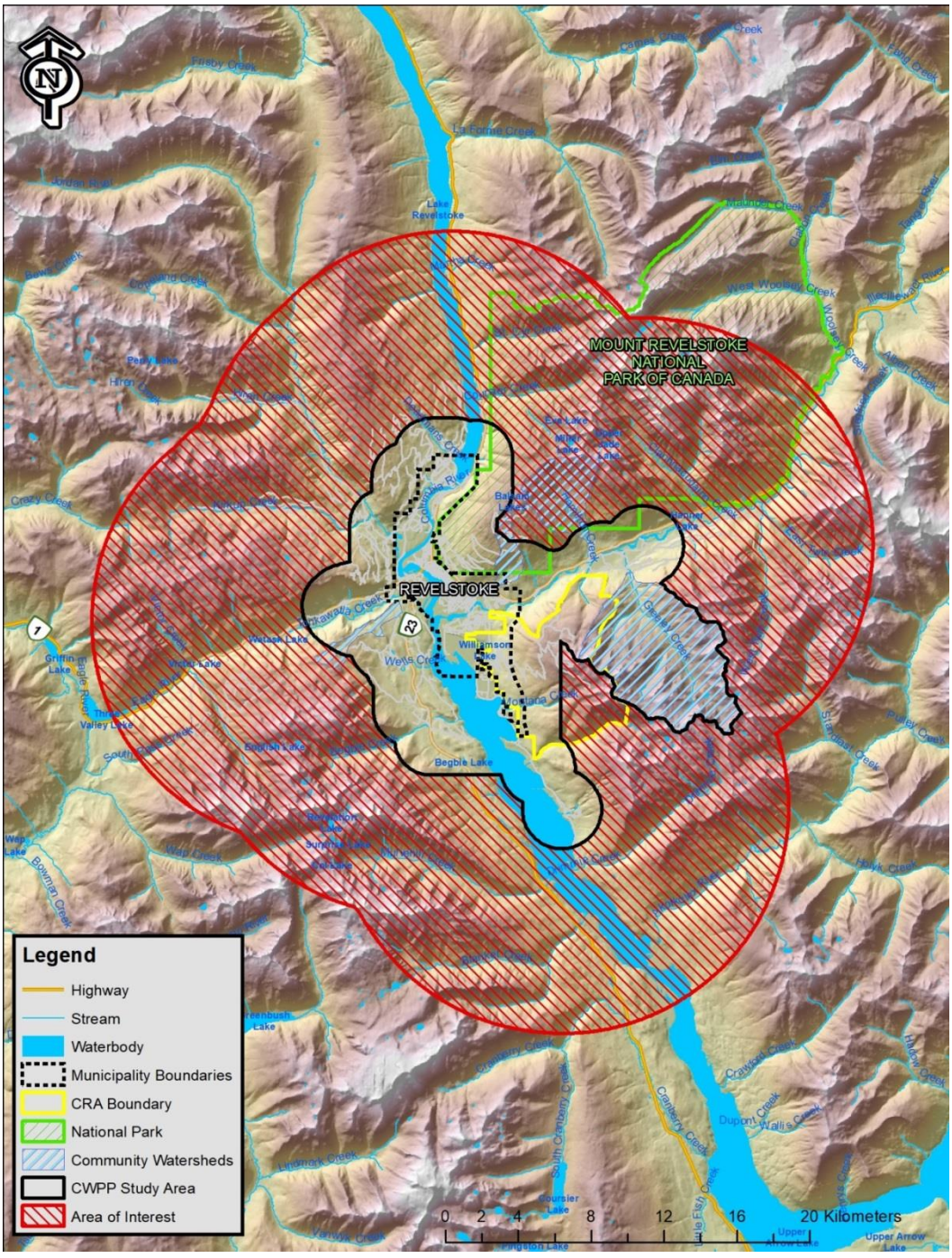
    - To minimize project treatment costs, all efforts will be made to locate fuel breaks to include natural features (e.g. rock, deciduous, old-growth) and man-made elements (e.g. transmission lines, highways, forest roads, ski runs).

- BC Wildfire Service and Parks Canada managers are interested in having their wildfire crews assist with the cutblock broadcast burn and the prescribed burn in Milestone 3 for training purposes. However, these crews may not be available when conditions are suitable for burning so estimates for contracted services are included.
- Milestone 3 Implementation contracted materials/labour is for prescribed fire treatment that is not a licensee obligation, estimated at $2,500/ha. for 500 ha. This estimate will be refined at the end of Milestone 1 - when the landscape scale design is completed and the pilot fuel break is selected, and at the end of Milestone 2 – when the operational plans are completed for the pilot fuel break, for review and approval of FES BC/PWC.

Component	Milestone 1 Landscape design 2019-20	Milestone 2 Operational plans 2020-21	Milestone 3 Implementation 2021-22	PROJECT TOTAL
Materials	$0	$0	$0	$0
Recipient fees	$14,500	$7,000	$7,000	$28,500
Contracted materials/labour	$31,000	$17,500	$1,320,000	$1,368,500
Equipment charges	$0	$0	Included in contracted amount	$0
Project supervision/QA	Included in recipient fees	Included in recipient fees	Included in contracted amount	$0
Administration (10%)	$4,550	$2,450	$132,700	$139,700
Funds requested from FESBC	**50,050**	**$26,950**	**$1,459,700**	**$1,536,700**
In-kind fees/materials	$16,500	$15,000	$5,700	$37,200
TOTALS	**$66,550**	**$41,950**	**$1,465,400**	**$1,573,900**

Revelstoke Landscape Scale Fuel Break Design Project Area

Note:

Only provincial Crown lands are included in this project. Mt. Revelstoke National Park is not included.

The 10 km radius was defined to include ignition points for wildfires that have burned into the community historically, the main community watershed and adequate area to protect the key provincial and national resources.