Fostering a Shared Stewardship of the Bert Brink Wildlife Management Area

Graphic Renderings of a Restored Fraser Floodplain Habitat

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Completed August 2023

Acknowledgments

I acknowledge my position as an uninvited guest on the unceded territory of the Stó:lō, Sḵwxwú7mesh (Squamish), Səlílwətaʔ/Selilwitulh (Tsleil-Waututh) and xʷməθkʷəyəm (Musqueam). I am grateful for the opportunity to live, work and learn on this territory and strive to continue learning the histories and current work of Indigenous presence and care taking. I would like to thank Semá:th (Sumas) First Nation for their feedback on the restoration project for Bert Brink Wildlife Management Area (Bert Brink WMA), and recognize that the project falls within the unceded territory of the Semá:th, Leq'á:mel, Áthelets (Aichelitz), Máthxwi (Matsqui), Shxwhá:y, Sq'ewqéyl (Skowkale), Squiala, Ch'iyaqtel (Tzeachten), and Yeqwyeqwí:ws (Yakweakwioose). I would also like to recognize the limited engagement with these communities due to time and project scope constraints, and that the intent for this project is to further engage with Stó:lō communities going forward.

Big thank you to Roberta Webster and Keeley Nixon from Rivershed Society of BC for their help to facilitate this project and for their support and encouragement along the way.

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Disclaimer

Contents

Executive Summary

The Fraser River stands as the largest river on the west coast of Canada and its extensive Watershed drains more than one-quarter of the province's land area (Scott et al.). The river and floodplain provide a rich ecosystem that supports many species including salmon, trout, beavers, birds of prey, waterfowl, and bears. However, the ecosystem is facing several challenges, including the impacts of land clearing, diking, watercourse draining, forest harvesting, mining, agriculture, and development, which continue to occur along the extent of the Fraser River (Rosenau and Angelo). Approximately 85% of floodplain habitat is no longer accessible to salmon along the Fraser River due to diking and other infrastructure (Finn et al.). Loss of floodplain habitat is particularly impactful for Chinook and coho salmon that rely on this habitat for juvenile rearing (Finn et al.).

The Bert Brink Wildlife Management Area (Bert Brink WMA) is one of few remaining undiked floodplain habitats on the Lower Fraser River. Bert Brink WMA was first designated as a Game Reserve in 1925 to protect a nesting colony of great blue heron, recognizing the ecological significance of the site (News Release: New Wildlife Management Areas). Although the great blue heron colony no longer nests in the Bert Brink WMA, suitable nesting habitat still exists today, and the site continues to be an ecologically significant area for many other species (Clark).

In 2009 an 8-hectare former agriculture field consisting primarily of invasive reed canary grass, was added to the Bert Brink WMA. The addition of this area to the Bert Brink WMA offers an opportunity to enhance floodplain habitat on the Fraser River by expanding the existing floodplain forest, increasing biodiversity, and reintroducing species at risk.

Project Intent

Visualizations are an important communication tool to share complex information in a simple and efficient way. Graphics can help entice interest, help people understand and process information more quickly, and aid in the retention of information. Through the use of visualizations this project aims to:

1. Communicate the importance of floodplain habitat on the Lower Fraser River.

2. Support Rivershed's goal of connecting a movement to protect 30% and to restore 2.4% of the Fraser Watershed.

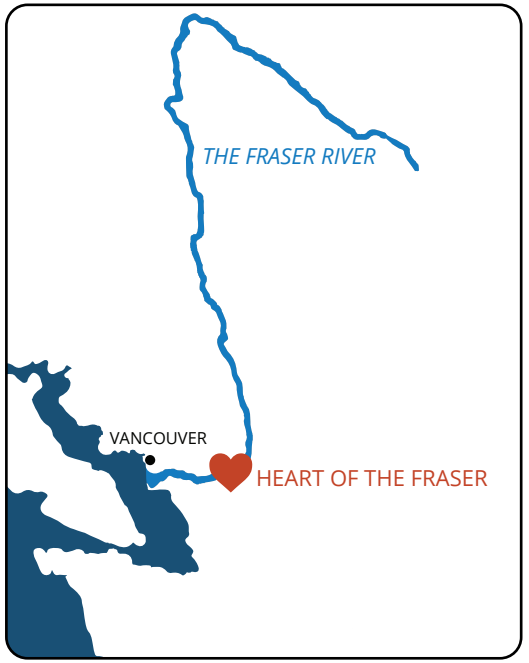
3. Communicate the restoration plans for the Bert Brink WMA.

4. Foster a community of support for the restoration of Bert Brink WMA.

The Heart of the Fraser

The Fraser Gravel Reach Habitat

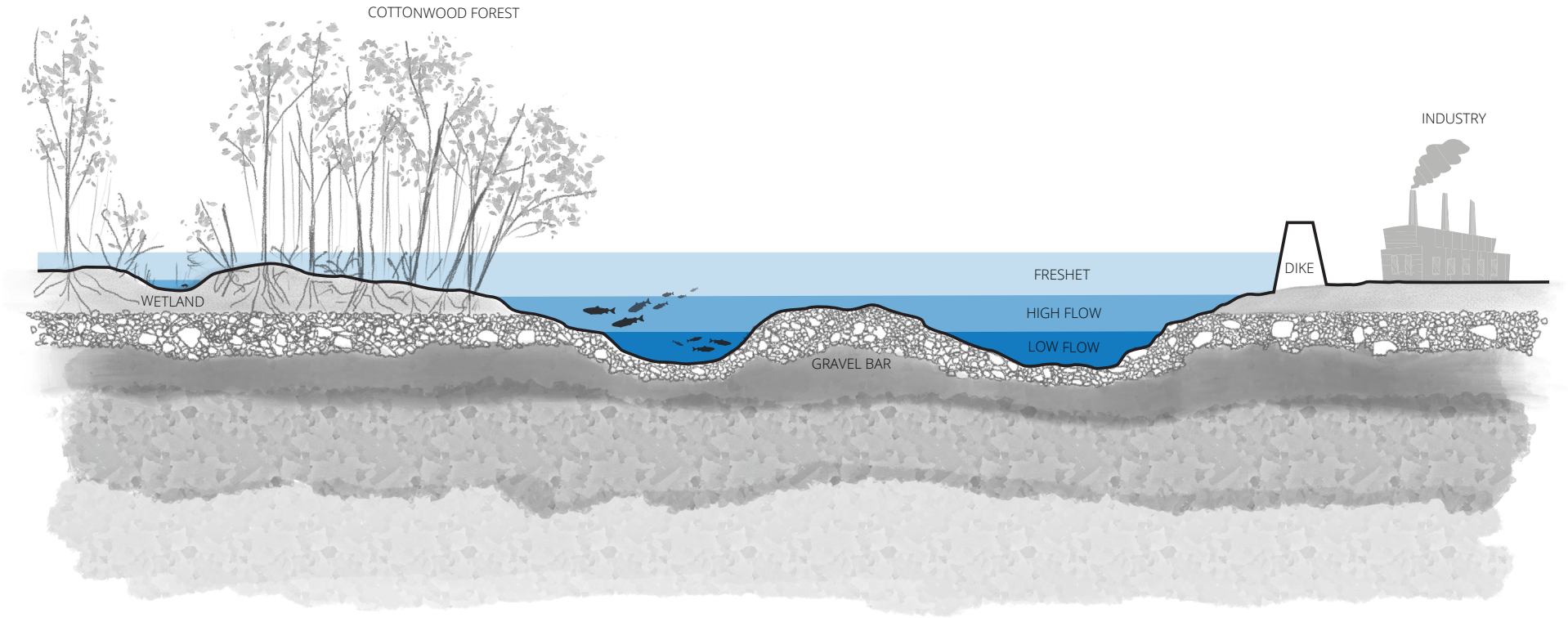
Known as the Heart of the Fraser for its unique habitat, the Fraser gravel reach plays a crucial role in supporting a diverse range of species and ecological processes (Rosenau and Angelo). Spanning approximately 50 kilometers from Mission to Hope, this stretch of river is characterized by its dynamic and shifting gravel bars that are constantly changing due to the river's flow and sediment transport. The shifting gravel bars contribute to the formation of side channels, sloughs, and wetland areas, providing valuable habitat for numerous fish, birds, amphibians, and mammals. The interconnectedness of these habitats allows for the movement of wildlife and the exchange of nutrients and energy throughout the ecosystem.



Fish in the Heart of the Fraser

The Fraser gravel reach supports more than 30 species of fish including salmon, trout and whitefish, and has one of the highest concentrations of sturgeon in Canada (Rosenau and Angelo). These fish rely on the abundant food resources found in the river, including insects, small invertebrates, and other fish species. The complex network of channels, pools, and riffles within the gravel reach creates diverse habitats that support the various life stages of these fish.

In particular, the Fraser gravel reach is known for its role in supporting salmon. Hundreds of millions of salmon migrate through the Heart of the Fraser on their way out to the ocean each year (Rosenau and Angelo). The gravel bars provide essential spawning grounds for several species of salmon, including pink and chum (Local Ecology). The gravel provides an ideal substrate for salmon eggs to incubate and develop, providing an adequate flow of oxygen (Greig et al.). Wetlands and side channels within the Fraser River floodplain provide habitat for rearing salmon and trout.



Restoration Project

In the Heart of the Fraser, significant modifications have been made to floodplain habitat due to resource extraction, agriculture and development. In particular, the construction of dikes has disconnected important floodplain habitat from the Fraser, having detrimental effects on the ecosystem. The remaining ecological value of the Fraser floodplain habitat is at risk, so protecting and enhancing what is left is vital to sustain the ecological diversity and function. The preservation of this unique habitat is not only essential for the survival of numerous species but also for the cultural and economic well-being of local communities that depend on the Fraser River for sustenance and recreation.

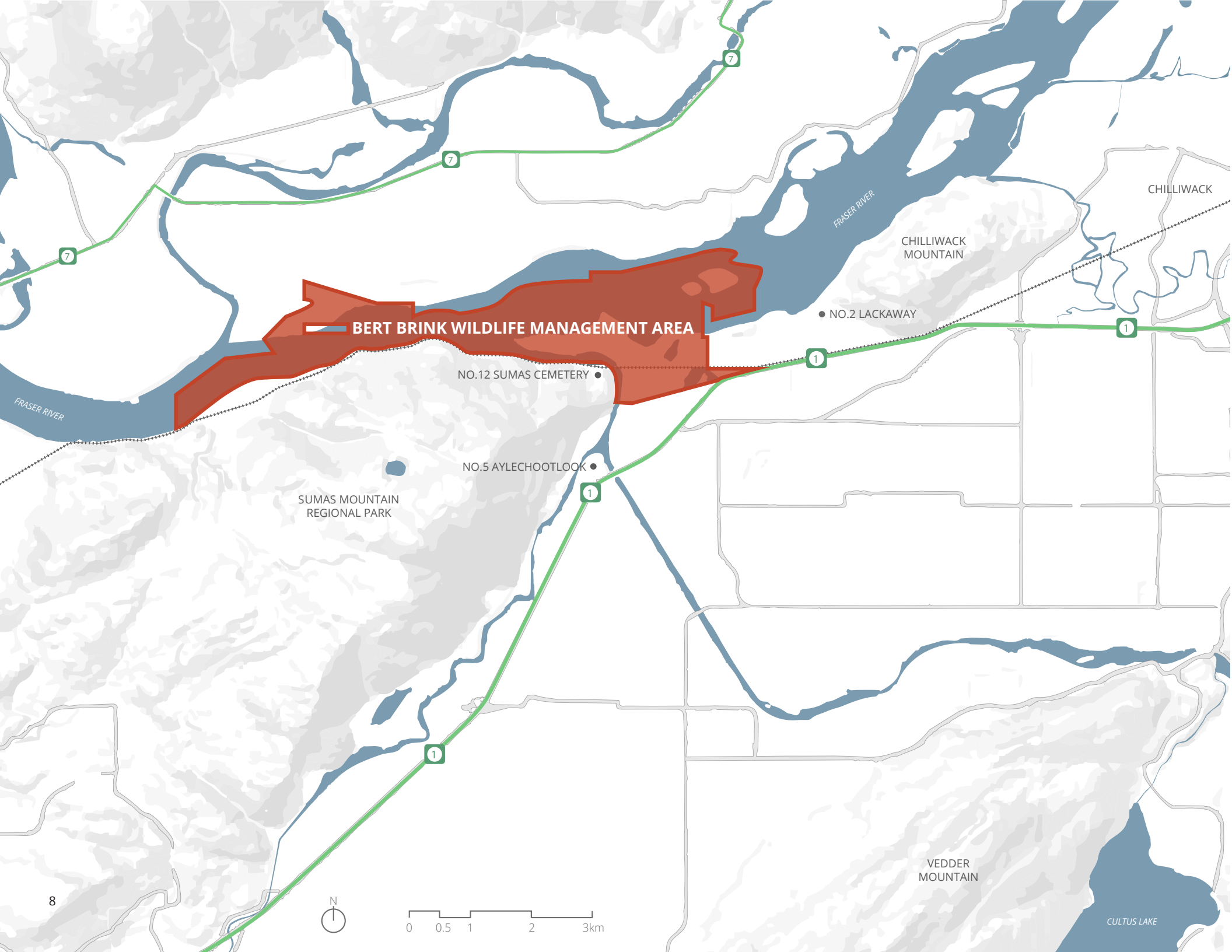
Bert Brink Wildlife Management Area (Bert Brink WMA) provides an opportunity to restore floodplain forest habitat.

Project Goals

1. Expand the floodplain forest in the Bert Brink Wildlife Management Area and restore its structure and function to that of undisturbed forests in the Lower Fraser River floodplain.

2. Ensure long-term restoration success through monitoring and adaptive management.

3. Foster community support and engagement for the restoration and shared stewardship of the Bert Brink Wildlife Management Area.


BERT BRINK WILDLIFE MANAGEMENT AREA
FRASER RIVER
FRASER RIVER
CHILLIWACK
CHILLIWACK MOUNTAIN
NO.2 LACKAWAY
NO.12 SUMAS CEMETERY
NO.5 AYLECHOOTLOOK
SUMAS MOUNTAIN REGIONAL PARK
VEDDER MOUNTAIN
CULTUS LAKE
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Bert Brink Wildlife Management Area

Overview

The Bert Brink Wildlife Management Area is one of few remaining undiked floodplain habitats along the Fraser, providing habitat for a variety red and blue listed species that are at risk of extinction or of special concern. Species include great blue heron, white surgeon, Pacific salmon, steelhead trout, peregrine falcon, bald eagle, marbled murrelet, and foraging wigeon (Province of British Columbia).

Historical Context

Since time immemorial Stó:lō First Nations, also known as “the river people”, lived and managed the land along their territory of the Stó:lō, which is the Halq’eméylem name for the Fraser River. Stó:lō First Nations are a group of indigenous communities including Semá:th (Sumas), Leq’á:mel, Áthelets (Aichelitz), Máthxwi (Matsqui), Shxwhá:y, Sq’ewqéyl (Skowkale), Squiala, Ch’iyaqtel (Tzeachten), and Yeqwyeqwí:ws (Yakweakwioose), who have and continue to use the area in and around what is now commonly referred to as the Bert Brink Wildlife Management Area to fish, hunt and harvest.

Living along the dynamic Stó:lō provided a rich diet for the Stó:lō peoples. The fluctuating water levels and shifting

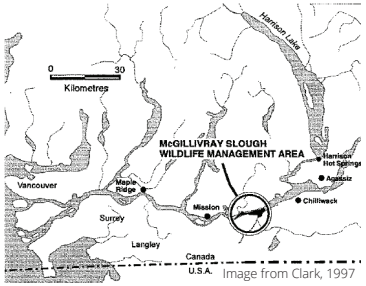


Image from Clark, 1997

1925

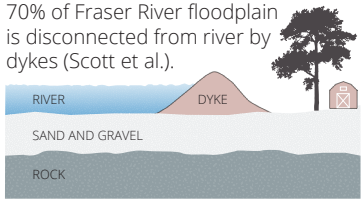
McGillivray Creek Game Reserve established to protect a nesting great blue heron colony (Clark).

1945

Notation of Interest made to make McGillivray Game Reserve a military reserve. The motion was rescinded in 1996 due to interest in making this ecological significant area a wildlife management area (Clark).

Mid 1900s

70% of Fraser River floodplain is disconnected from river by dykes (Scott et al.).

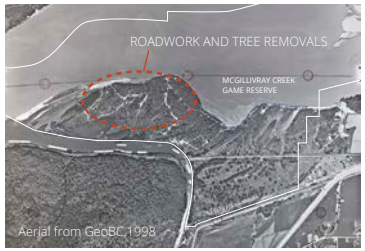


1967

Public recreation use added as a compatible use under provincial Crown Land Reserve (Clark).

1963-1978

Tree removal and construction of roads and trails occurred within the McGillivray Creek Game Reserve (Wheatley et al.).



Aerial from GeoBC 1998

1977

The heron colony abandoned the Reserve (Clark).

gravel bars created habitat for a wide diversity of species including salmon. Salmon were a primary food source for the Stó:lō First Nations and continue to be an important part of their culture. Pre-settler contact, approximately 4-12 million salmon were consumed by the Stó:lō people annually (Carlson).

While the fluctuating river provided valuable habitat, it meant a nomadic life style for the Stó:lō peoples and early settlers. When industry and agriculture developed in the Lower Mainland, dikes were added in an attempt to control the river. By the mid-1900s 70% of floodplain habitat was disconnected from the river by dikes (Scott et al.). Poor fisheries management along with development along the Fraser has led to significant declines in the salmon population.

With significant growth and development along the Fraser, the area which is known today as Bert Brink WMA, was designated as the McGillivray Creek Game Reserve to protect a nesting great blue heron colony (Clark). This designation prohibited development and hunting within the reserve, and is one of few remaining undiked areas along the Fraser today.

In 2009, the site was renamed the Bert Brink Wildlife Management Area, after Bert Brink, a well recognized conservationist and UBC agricultural scientist who received the Order of Canada and Order of British Columbia among other awards for his work in conservation (News Release: New Wildlife Management Areas).

1985-2003

Agricultural tenures were granted for haying and grazing on the southern portion of the Reserve (Clark).

2006

Probyn Log constructed compensation channels and a pump station adjacent to the Reserve to offset impacts of their operations (Wheatley et al.)

2009

Site was renamed the Bert Brink Wildlife Management Area and established under the Wildlife Act. An additional 8 hectares were added to the WMA from land acquisition by The Nature Trust of BC, forming a total of 915 hectares of habitat (Rivers).

1985

The Nature Trust of BC purchased 16.8 ha of land south of the railway which was added to the Reserve (Clark).

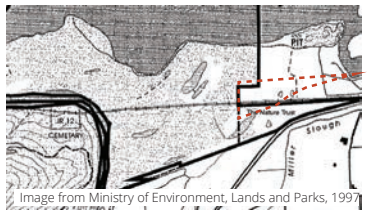


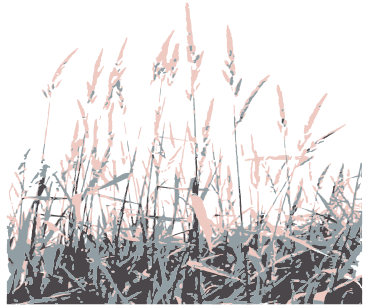
Image from Ministry of Environment, Lands and Parks, 1997

1996

The BC Wildlife Act was established (Wildlife Act).

2008-2010

Monitoring of compensation channels indicated minimal success due to encroachment of reed canary grass into new plantings (Wheatley et al.).



Since the Bert Brink WMA was protected in 1925, additional properties have been added to the WMA. Two former agriculture fields were added to the Bert Brink WMA in 1985 and 2009 (Wheatley et al.). The addition of these two former agriculture properties provides an opportunity to enhance existing habitat for rearing juvenile salmon along with many other riparian species (Lower Fraser River Salmon).

While legally Wildlife Management Areas allow for many indigenous cultural practices today, it is important to recognize that protected areas are a colonial invention that historically prevented most human access including the indigenous cultural practices that occurred on the site for time immemorial. Further consultation with Stó:lō First Nations is needed to understand the historical impact of the Game Reserve/Wildlife Management Area.

This report includes a limited history of the Stó:lō (Fraser River) and the uses by the Stó:lō people. To learn more about indigenous history, law and land management consult:

Relaw - West Coast Environmental Law
https://www.wcel.org/program/relaw

2021

On April 15, a fire occurred on the south side of the railway tracks. A total of 19-hectares of reed canary grass habitat was burned (Vadeboncoeur).

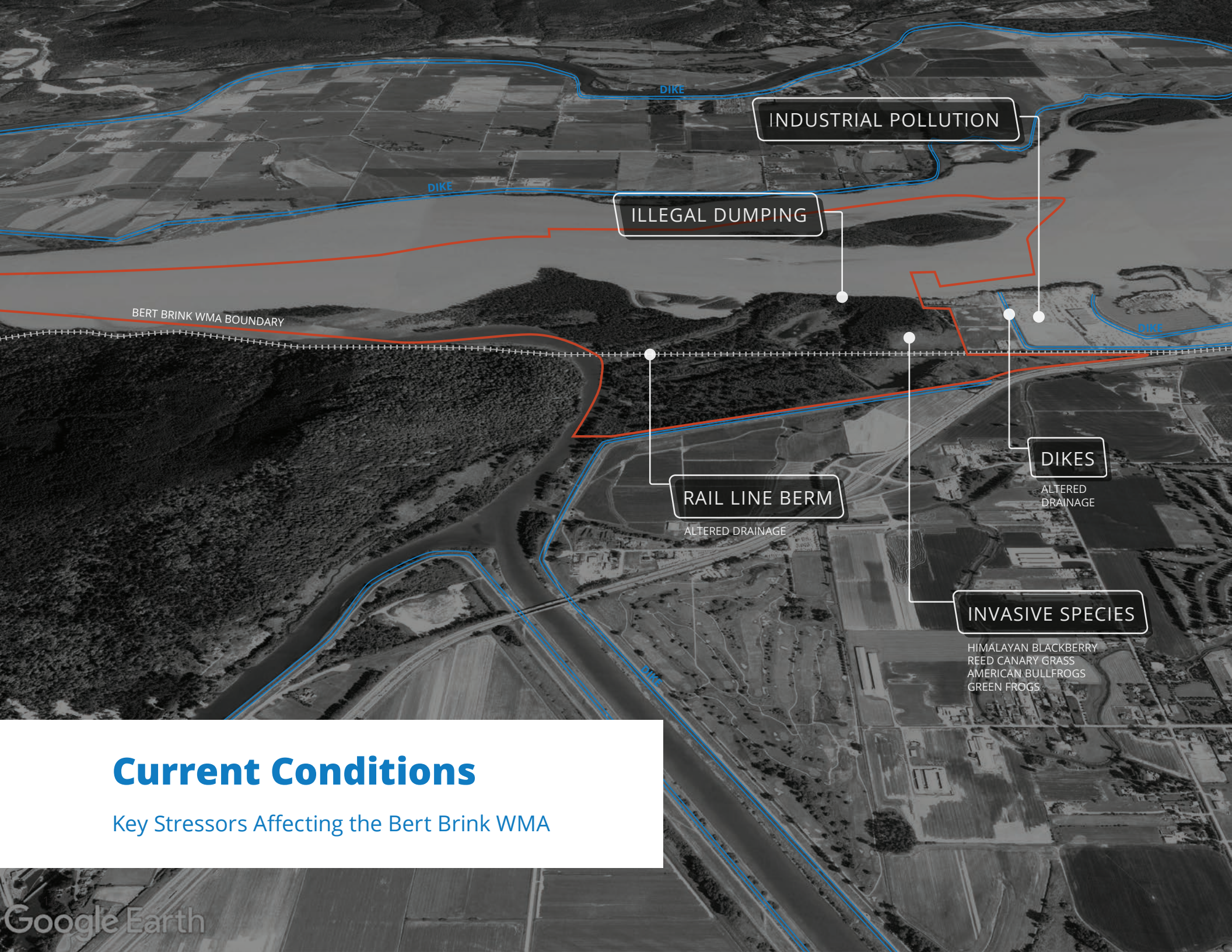
2021

Reports of drywall dumping in the WMA made the local news on April 28, with calls to restrict road access. Illegal dumping continues to be an ongoing maintenance issue in the WMA.

2022

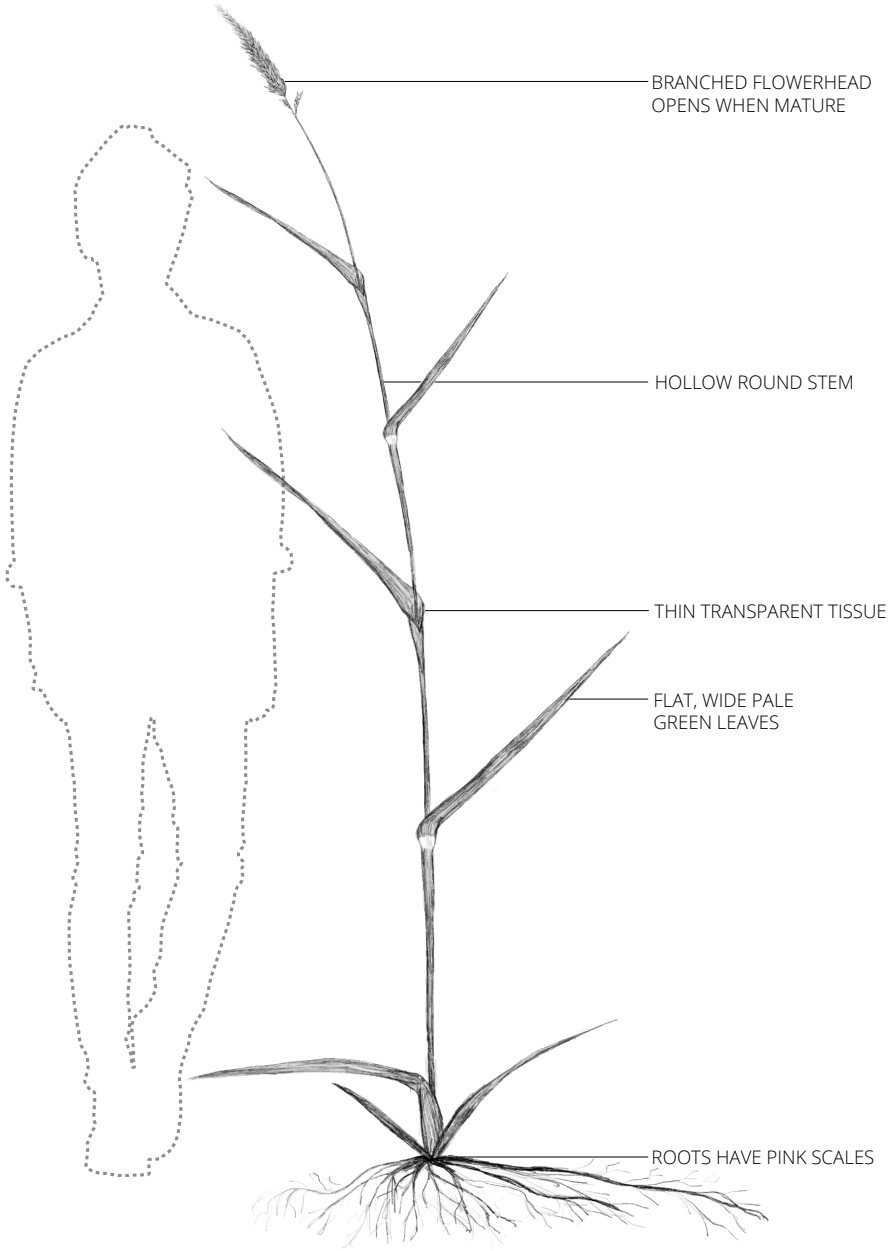
The BC Wildlife Act was amended to incorporate indigenous knowledge into decision making, and allow indigenous nations to invite guests from other nations for the purpose of hunting or sheltering (Re: Wildlife Act - Indigenous Amendments, 2022).

Today



Current Conditions

Key Stressors Affecting the Bert Brink WMA



Reed Canary Grass

Description

Reed canary grass (*Phalaris arundinacea*) is a fast-growing grass species known for its tall stature and widespread distribution (Best Management Practices for Reed Canarygrass). Reed canary grass has been utilized for forage production, erosion control, and biomass energy production. It typically grows in wetlands, marshes, and along stream banks, but can also thrive in drier habitats. With its deep root system and rapid growth rate, reed canary grass is considered highly invasive in Fraser River floodplains.

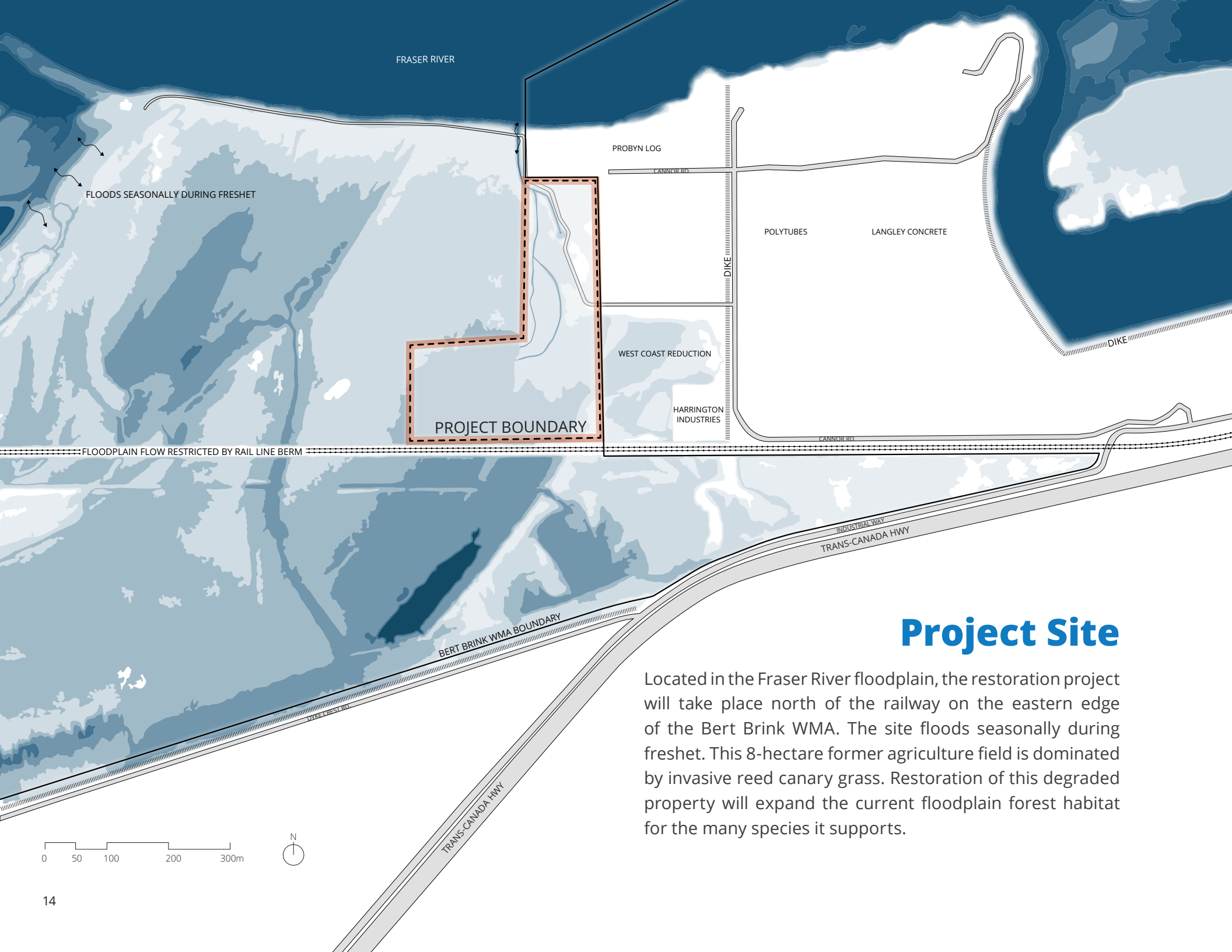
Impacts

Reed canary grass impacts ecosystems by:

1. Forming dense, 1-2m tall stands, that out compete native vegetation and alter ecosystems (Best Management Practices for Reed Canarygrass).

2. Creating a thick thatch layer of tightly woven living and dead stems over the soil that changes water level and flow of wetlands (Best Management Practices for Reed Canarygrass; Wheatley et al.).

Read more at rivershed.com/blog/reed-canary-grass/



Project Site

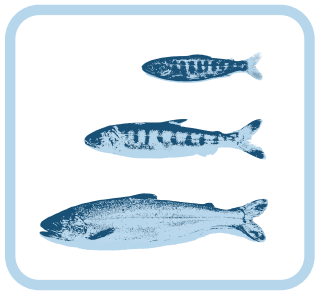
Located in the Fraser River floodplain, the restoration project will take place north of the railway on the eastern edge of the Bert Brink WMA. The site floods seasonally during freshet. This 8-hectare former agriculture field is dominated by invasive reed canary grass. Restoration of this degraded property will expand the current floodplain forest habitat for the many species it supports.

Restoration Plan

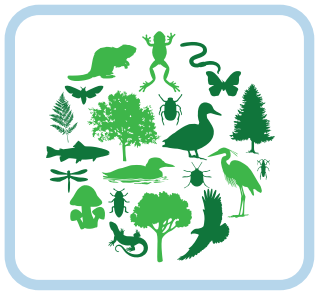
Shading is one of the most effective ways to reduce reed canary grass presence and reestablish native plant communities. Reed canary grass is intolerant of shade, so establishing a tree canopy will reduce reed canary grass growth, and allow native species to compete (Best Management Practices for Reed Canarygrass*)*. Shading, along with mowing and tilling are the primary methods proposed to restore the project site (Balke).

Unlike other reed canary grass control projects, this restoration plan does not attempt to eradicate reed canary grass due to its scale and abundance on the site. Instead the proposed plan uses a series of planting patches that will establish overtime and gradually shade out the reed canary grass. This method attempts to minimize the impact on existing wildlife that may use the reed canary grass field, and reduces the costs of planting on a large site (Wheatley et al.).

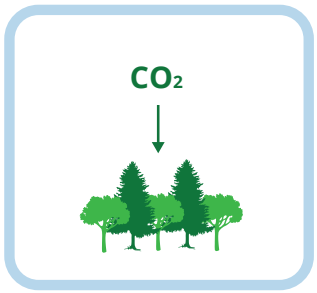
Project Benefits



INCREASED SALMON GROWTH RATES



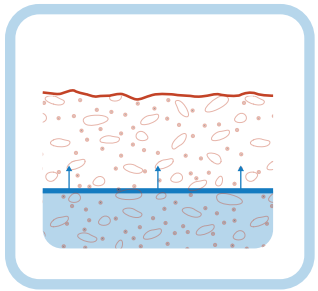
INCREASED BIODIVERSITY



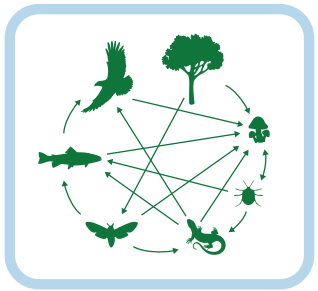
INCREASED CARBON STORAGE

MICROCLIMATE COOLING

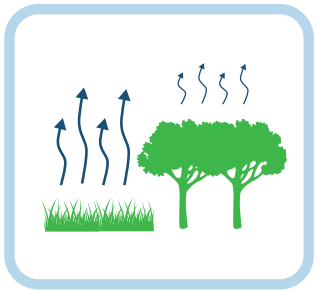
MORE WILDLIFE HABITAT



HIGHER WATERTABLE



INCREASED FOOD-WEB COMPLEXITY



DECREASED EVAPORATION

REDUCED FLOOD DAMAGE

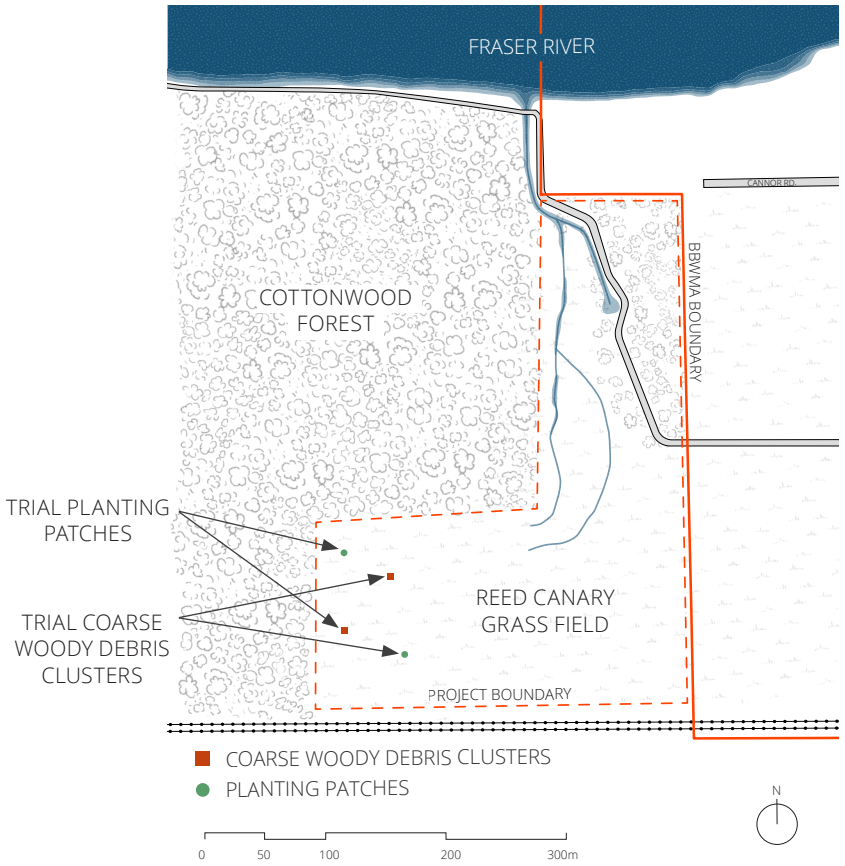
(Antieau; Bills; Jeffres et al.; Tolbert et al.; Vivian-Smith)

Year 1

Reed Canary Grass Suppression

In year 1 following freshet, likely in July or August, the site will be mowed, targeting the reed canary grass at its most vulnerable time (Balke). A second mowing treatment will be applied again in September, followed by tilling to remove the reed canary grass thatch, disturb the seed bank, expose rhizomes and create varied topography. Finally, seeding of a dense cover crop across the site will help stabilize disturbed soils and compete with the reed canary grass. Invasive Himalayan blackberry on the western and northern perimeter of the site will be manually and chemically controlled to prevent encroachment into the disturbed soils.

A few trial planting patches and coarse woody debris clusters will be used to test treatment methods and allow for amendments to the approach prior to planting the rest of the site in year 2.

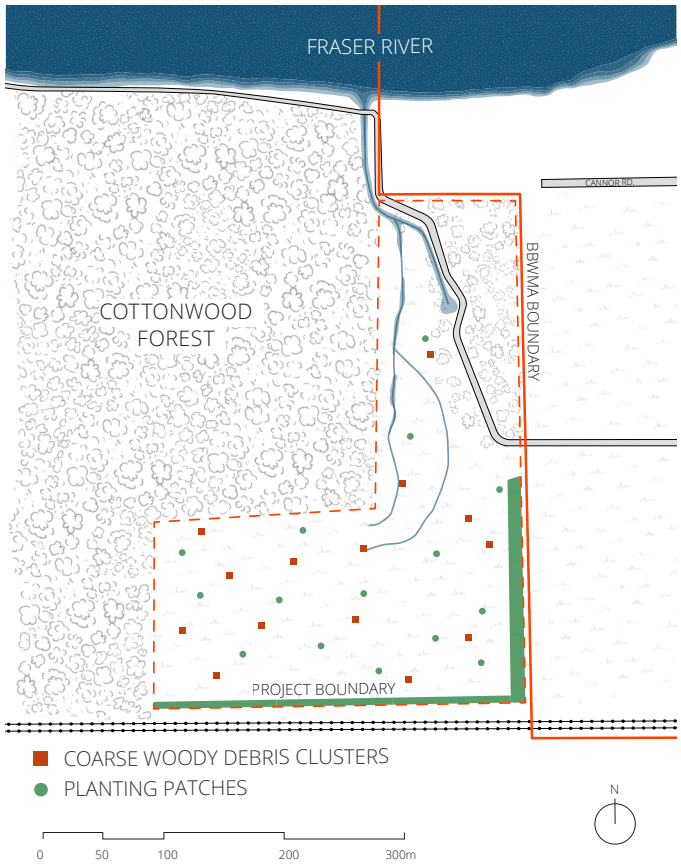


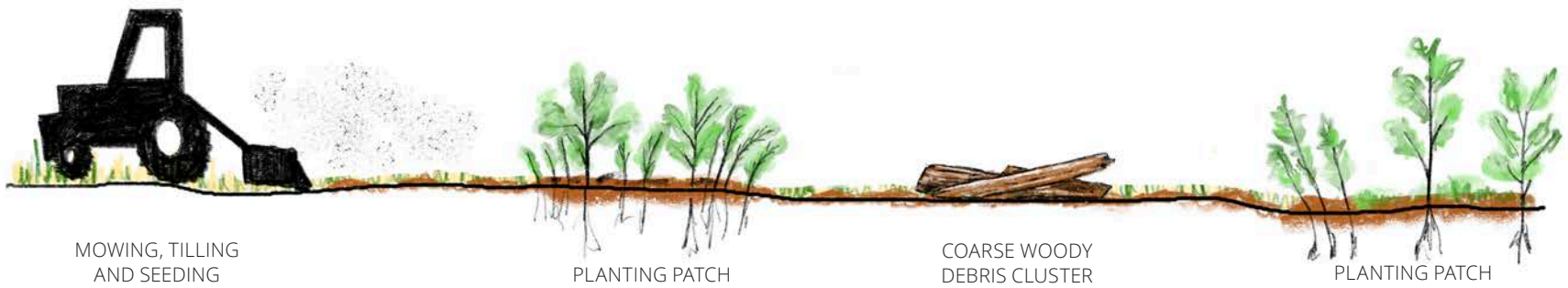
REED CANARY GRASS (RCG) MOWING, TILLING AND SEEDING COVER CROP

Year 2

Planting and Coarse Woody Debris

Following year 2 freshet, the cover crop will be tilled into the soil and a native seed mix will be spread over the site (Balke). Fourteen course woody debris clusters will be placed throughout the site by August. Planting and staking of native restoration plants will occur along a 10 metre wide buffer on the eastern and southern perimeters, and in 15 circular plots of 25m^2. Fencing will be constructed around planted areas to prevent grazing by deer and beavers during establishment. Continued monitoring of the planting patches will need to occur to measure and ensure success.



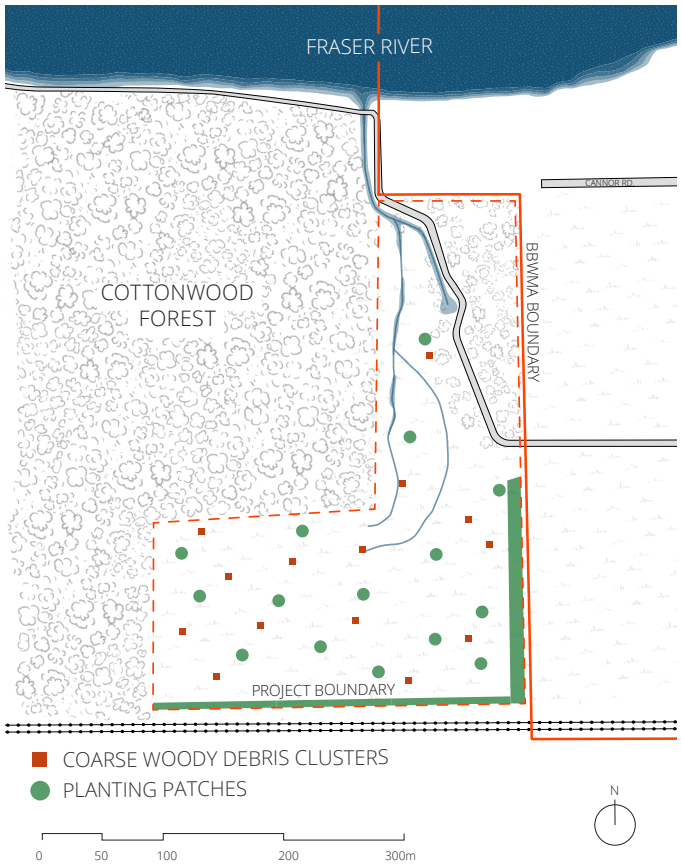


Year 3-10

Planting Patches Establish

While planting patches establish, reed canary grass will need to be regularly removed and suppressed around the planted areas, to reduce competition for new plantings (Wheatley et al.). As the plants grow, they will help to shade out reed canary grass and allow for further growth and establishment. Coarse woody debris will shade out reed canary grass in its vicinity and begin to decay, adding nutrients to the soil.

Once plants have established, there may be opportunities to introduce species at risk, or culturally significant plants. Additional resources may enable creation of additional planting patches.



PLANTING PATCHES GROW AND SHADE OUT REED CANARY GRASS

COARSE WOODY DEBRIS SHADES OUT REED CANARY GRASS

Year 10-50

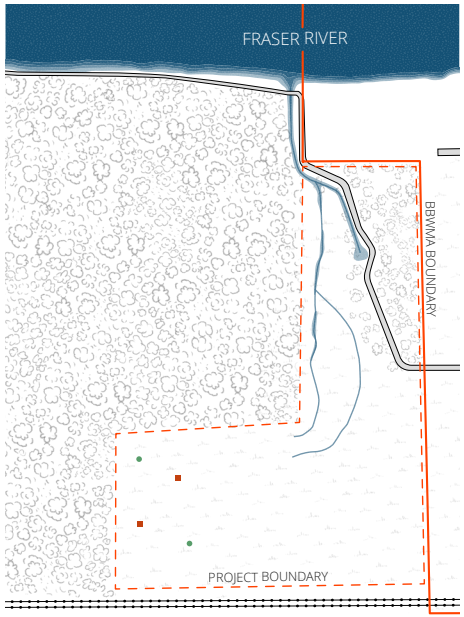
Planting Patches Expand

Once the planting patches establish, they will shade out the reed canary grass, allowing for the planting clusters to spread and new seeds to germinate (Wheatley et al.). Coarse woody debris will create micro-habitats for new seedlings and help to shade out reed canary grass. Coarse woody debris will decay providing nutrients to the soil and further improving the growing conditions for native plants. Eventually planting patches will grow together and little reed canary grass will remain.

PLANTING PATCHES EXPAND

SAPLINGS GROW FROM COARSE WOODY DEBRIS

Year 1



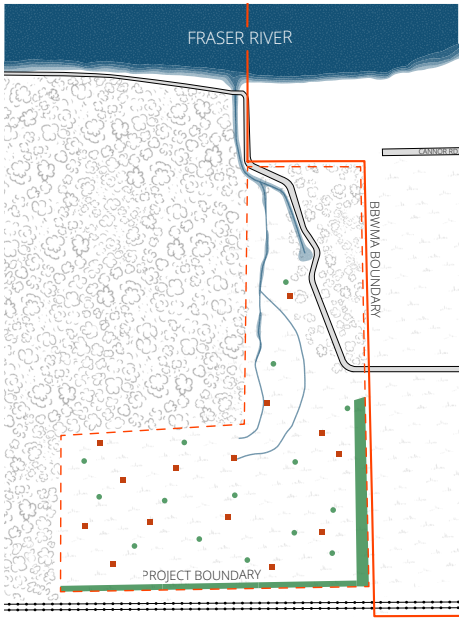
COARSE WOODY DEBRIS CLUSTERS

PLANTING PATCHES

0 50 100 200 300m

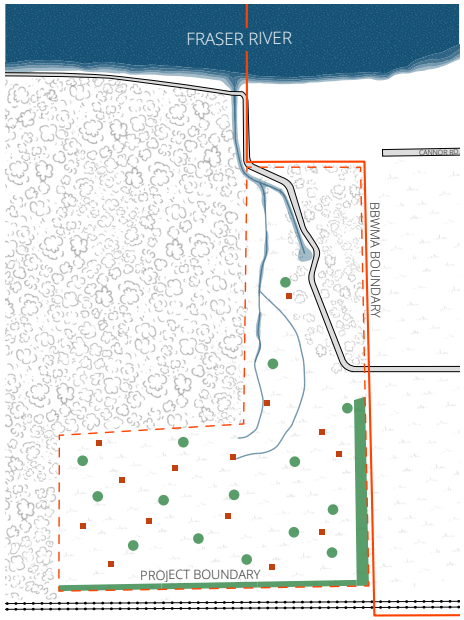
REED CANARY GRASS SUPPRESSION

Year 2



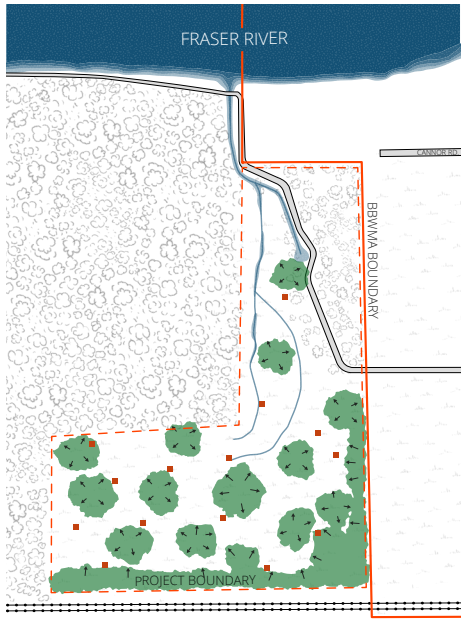
PLANTING AND COARSE WOODY DEBRIS

Year 3-10



PLANTING PATCHES ESTABLISH

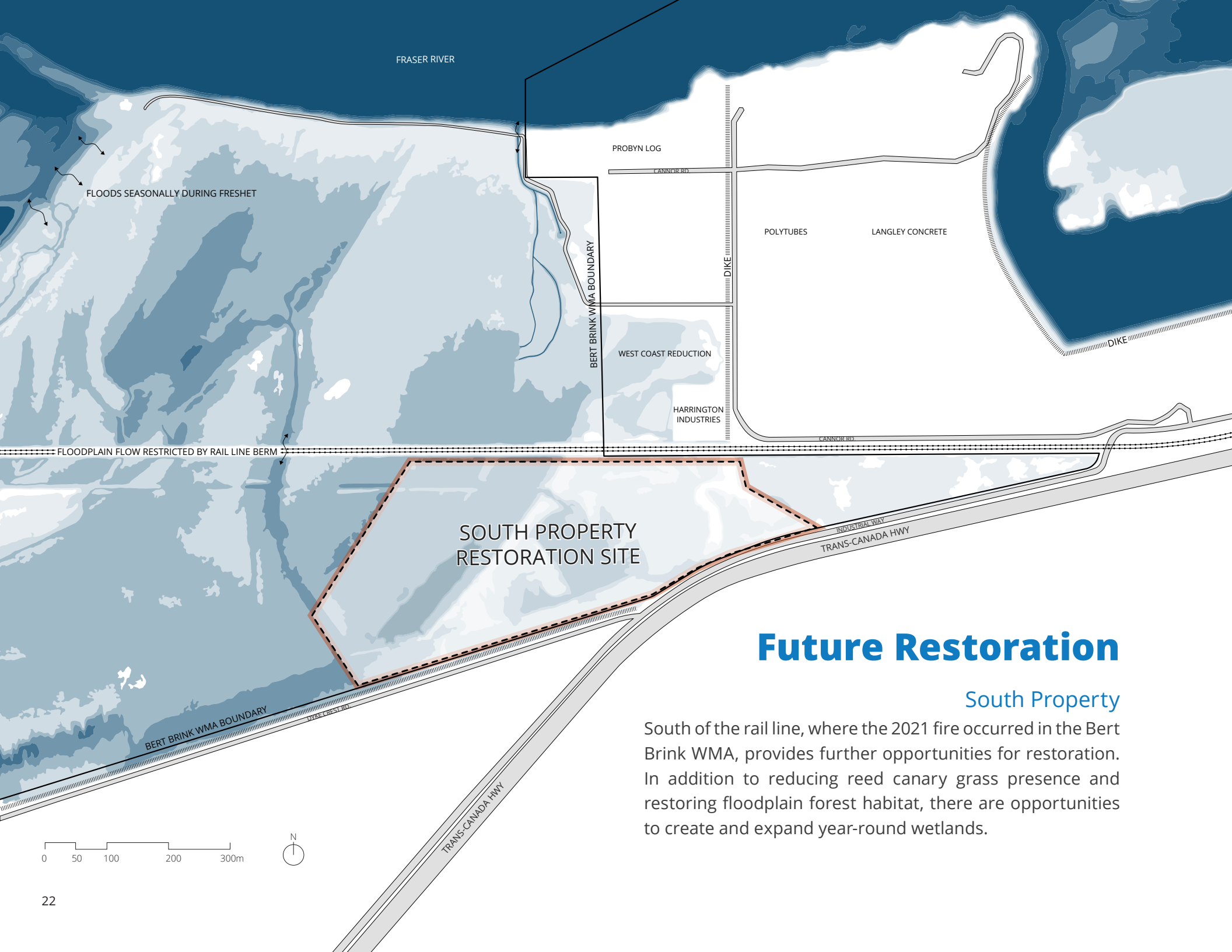
Year 10-50



PLANTING PATCHES EXPAND

Desired Future State

Visualizing a Restored Bert Brink WMA



Future Restoration

South Property

South of the rail line, where the 2021 fire occurred in the Bert Brink WMA, provides further opportunities for restoration. In addition to reducing reed canary grass presence and restoring floodplain forest habitat, there are opportunities to create and expand year-round wetlands.

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