Environment and Climate Change Canada

Canada Nature Fund: Community-Nominated Priority Places for Species at Risk

Kootenay Connect: Slocan River Valley – Riparian Restoration Plans

Year 5 (2023–2024)

Kootenay Connect is a project facilitated by the Kootenay Conservation Program

Columbia Basin trust

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Slocan River Valley – Riparian Restoration Plans

PREPARED FOR:

Columbia Basin Trust

and

Kootenay Conservation Program
Project: Kootenay Connect Priority Places

AUTHORS:

Ryan Durand, MSc., R.P.Bio.
EcoLogic Consultants

Tyson Ehlers, B.Sc., R.P.Bio.
Masse Environmental

Gregoire Lamoureux
Slocan River Streamkeepers Society

SUBMITTED BY:

Slocan Lake Stewardship Society
Box 87, New Denver BC V0G 1S0

The Slocan Lake Stewardship Society respectfully acknowledges that these assessments, projects and planning initiatives are in the traditional, ancestral, and unceded territories of the Sinixt, Syilx Okanagan, Ktunaxa and Secwépemc. We recognize the relationship between land and people and continue to work towards Indigenous people's continued presence on the lands being acknowledged and respected.

March 2024

Table of Contents

1.0 Project Overview

We are proposing to restore and enhance two crown land sites on the Slocan River: Perry Bridge (north and south) and Oxbow Island (Figure 1-1). Both sites are situated on active low and mid-bench floodplains including roughly 2.5km of shoreline and 13.8 ha of land. We are also working with a landowner to restore several hectares of riparian area on private land along a Slocan River side channel just south of Lemon Creek (Figure 1-2). The private land restoration will be done in conjunction with in-stream fish habitat restoration work.

Protecting and enhancing existing black cottonwood ecosystems and restoring degraded areas in the Slocan Valley is one of the most important conservation actions that can be undertaken to benefit the greatest number of species over time.

The goals of this project are to:

- restore these sites to a healthy, diverse riparian cottonwood ecosystem
- establish young cottonwood trees that are currently lacking in the area
- create and enhance wildlife habitat, particularly for species-at-risk and fish
- re-establish riparian communities to stabilize the riverbank and reduce erosion.

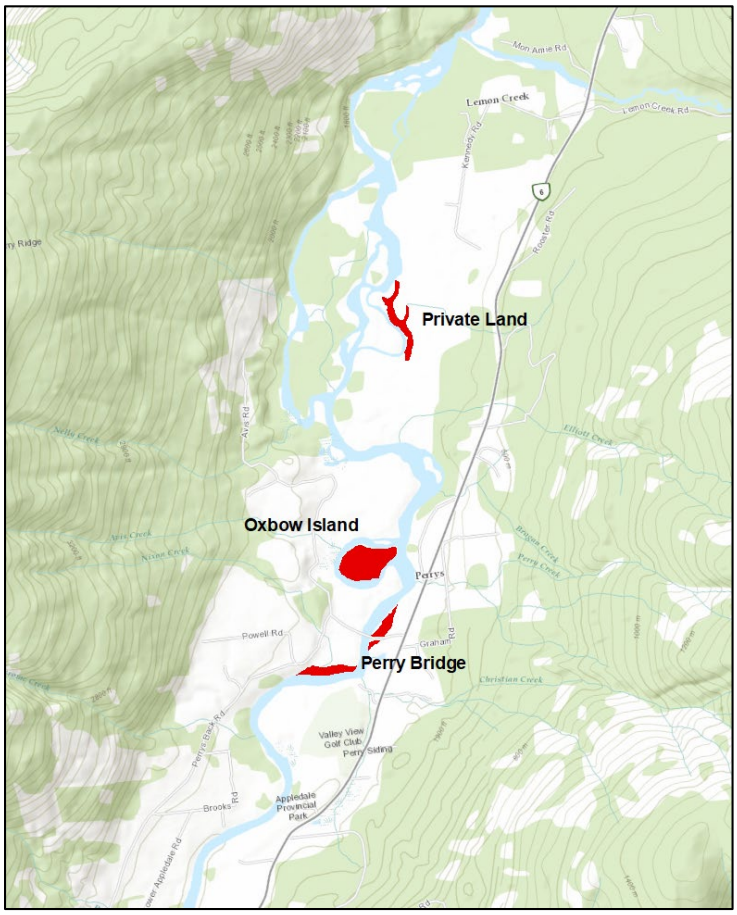

Figure 1-2. Restoration Site Locations.

Mature black cottonwood forests arise on middle bench floodplains which experience short spring flood events that do not occur every year. The Fm01 Black Cottonwood (*Populus trichocarpa*)/ Snowberry (*Symphoricarpos albus*) – Roses (*Rosa* spp.) middle bench floodplain ecosystem is a Red-listed (endangered or threatened) ecological community found in the Slocan Valley (BC CDC 2023). Throughout its range, this ecological community has been highly disturbed and degraded by human activities and is further threatened by climate change (BC CDC 2019). Historically, the Slocan River Watershed was host to vast areas of cottonwood floodplain that have diminished due to the combined influences of human settlement, channelization, livestock disturbance, agriculture developments, invasive species, and hydrological alterations and fragmentation associated with bridges, culverts, and roads.

Black cottonwood floodplains perform critical ecological functions in healthy watersheds. They are the interface between aquatic and terrestrial ecosystems and integral to watershed hydrology (Figure 1-2). Mature cottonwood forests adjacent to rivers are biodiversity hotspots that provide the greatest diversity of habitat for the most species in the valley. Black cottonwood is the largest broadleaf tree native to BC, and very old trees in riparian settings are extremely valuable. They are host to a myriad of species, many of which are exclusively associated with old cottonwood. These include minute invertebrates, slime moulds and pin lichens, to larger insects, fungi and macrolichens. They provide nesting habitat for eagles and osprey and numerous cavity nesters such as owls and woodpeckers. Many large mammals including bears, cougar, and ungulates depend on mature cottonwood floodplain forests for food and shelter at some point in the year. Large trees also provide shade and nutrient input to the adjacent river, benefiting fish and other aquatic species. They eventually break or fall from wind or beavers and these logs become habitat for a whole other suite of both terrestrial and aquatic organisms. A large number of species at risk are associated with black cottonwood floodplain forests, including Western Screech Owl (*Megascops kennicottii*) and the Coeur d'Alene Oregonian (*Cryptomastix mullani*) snail. In the Slocan Valley we have found some rare and undescribed species of pin lichens (i.e., *Sclerophora amabilis* and a *Chaenothecopsis* sp.), the latter of which is currently known from a single site in the valley.

Black cottonwood is also an excellent species for riparian restoration and streambank stabilization, being very fast growing and able to root from cuttings. Anecdotal observations suggest that there is a lack of recruitment of younger trees in the remaining black cottonwood floodplains (Plate 1-1 and 1-2). This may be due in large part to the rapid spread of reed canary grass (*Phalaris arundinacea*) in the past century, which prohibits the establishment of young cottonwood seedlings, as well as the impacts of livestock and beavers. A riparian restoration program is proposed to facilitate cottonwood recruitment along with other suitable riparian species to help maintain and restore these important ecosystems.

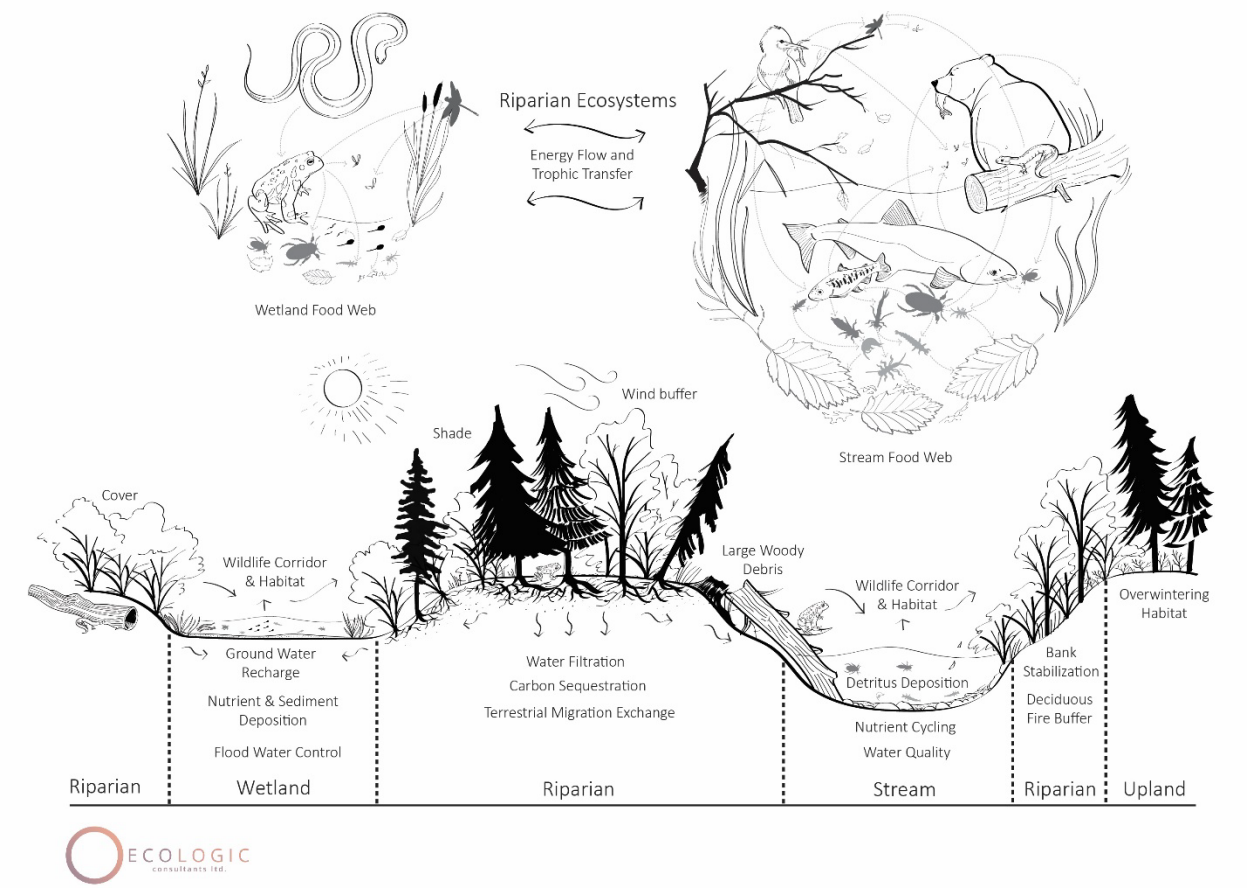

Figure 1-2. Interconnectivity and ecological function of a riparian floodplain system.

Plate 1-1. Example of a reed canarygrass dominated cottonwood stand on the Slocan River with low diversity and little tree regeneration.

Plate 1-2. Example of a pristine cottonwood stand on lower Little Slocan Lake with high diversity and no invasive reed canarygrass.

2.0 Perry Bridge and Oxbow Island Sites

Perry Bridge and Oxbow Island are location between Winlaw and Lemon Creek (Figure 2-1). This portion of the Slocan River is the southern limit of the high quality (best) habitat for rainbow trout in the Slocan River. A fish habitat restoration project was implemented by Slocan River Streamkeepers at Brian Cross and Penny Clarke property across the river to the north of Oxbow Island. The enhancement of these sites will improve fish habitat in the river by ensuring that the cottonwood stands persist and large woody debris continues to enter the riverine system and riparian vegetation provides shade and food. In addition, a healthy riparian community will help reduce riverbank erosion.

There are several species-at-risk that have been observed in the area, including include western painted turtles, Lewis's woodpecker, great blue heron, tundra swans, bank swallows, and Western screech owl. Bald eagles, red tail hawks and other birds of prey are often seen in the area.

A variety of proven techniques will be used for the restoration. Based on almost two decades of experience restoring riparian areas along the Slocan River, Gregoire Lamoureux (Slocan River Streamkeepers) has a robust system of using both tall, rooted plants and large diameter dormant cuttings in reed canarygrass areas. All plants are grown locally in the Slocan Valley and have been used extensively for restoration projects. As the restoration sites all have similar conditions (thick invasive reed canarygrass, beaver and/or cattle use, eroding soils, and a lack of diversity and cottonwood recruitment), similar techniques will be used on all sites.

Native species for planting will include:

- Black cottonwood
- Paper birch (*Betula papyrifera*)
- Red osier dogwood (*Cornus sericea*)
- Willows (*Salix* sp.)
- Mountain alder (*Alnus incana*)
- Hawthorn (*Crataegus* sp.)
- Western red cedar (*Thuja plicata*)
- Englemann spruce (*Picea engelmannii*)

A total of 1,000 rooted trees and 1,000 large diameter dormant cuttings are planned for the two sites, with an approximate breakdown as follows:

- Perry Bridge - 650 rooted trees and 650 dormant cuttings
- Oxbow Island - 350 rooted trees and 350 dormant cuttings

In addition, live stakes (willows, cottonwood and red osier dogwood) will be cut on site where possible (and when not detrimental to local populations) and directly planted. It is expected that several hundred additional live stakes will be planted in each site.

Rooted trees will require hand digging for each plant, and the installation of plastic tree protectors where needed to reduce browse by cows, ungulates and beavers. The large diameter dormant cuttings will be installed with a fence post pounder or manually pounded in. The small live stakes will be pressed in by

hand, or a hole made with a length of rebar or auger based on local soil conditions. The exact location of each planting, use of tree protectors, and depth of the cutting or live stake will be determined at the time of planting due to variable soil conditions and elevation from the water table.

These techniques have been proven to be effective in the Slocan Valley, where the presence of the thick reed canarygrass is challenging. By using large trees, in conjunction with targeted live stakes and tree protectors, we expect that a large percent of the vegetation will survive. Over time, the increase in shrub and canopy cover will create shade, thereby reducing reed canarygrass cover and creating opportunities for other species to become established.

2.1 Perry Bridge

The Perry Bridge site includes three areas to the north and south of Perry Bridge, about 7 km north of Winlaw (Figure 2.1-1). The three areas include a total of 4.6 ha along 1.2 km of shoreline. These sites focus on areas of the Slocan River that have considerable bank erosion and limited tree and shrub populations along the river edge (Plates 2.1-1 to 2.1-4). As with the other sites, invasive reed canarygrass is the dominant cover, often with few other herbaceous species. Small clusters of willow, hawthorn and cottonwood occur away from the river, and little cottonwood regeneration is occurring.

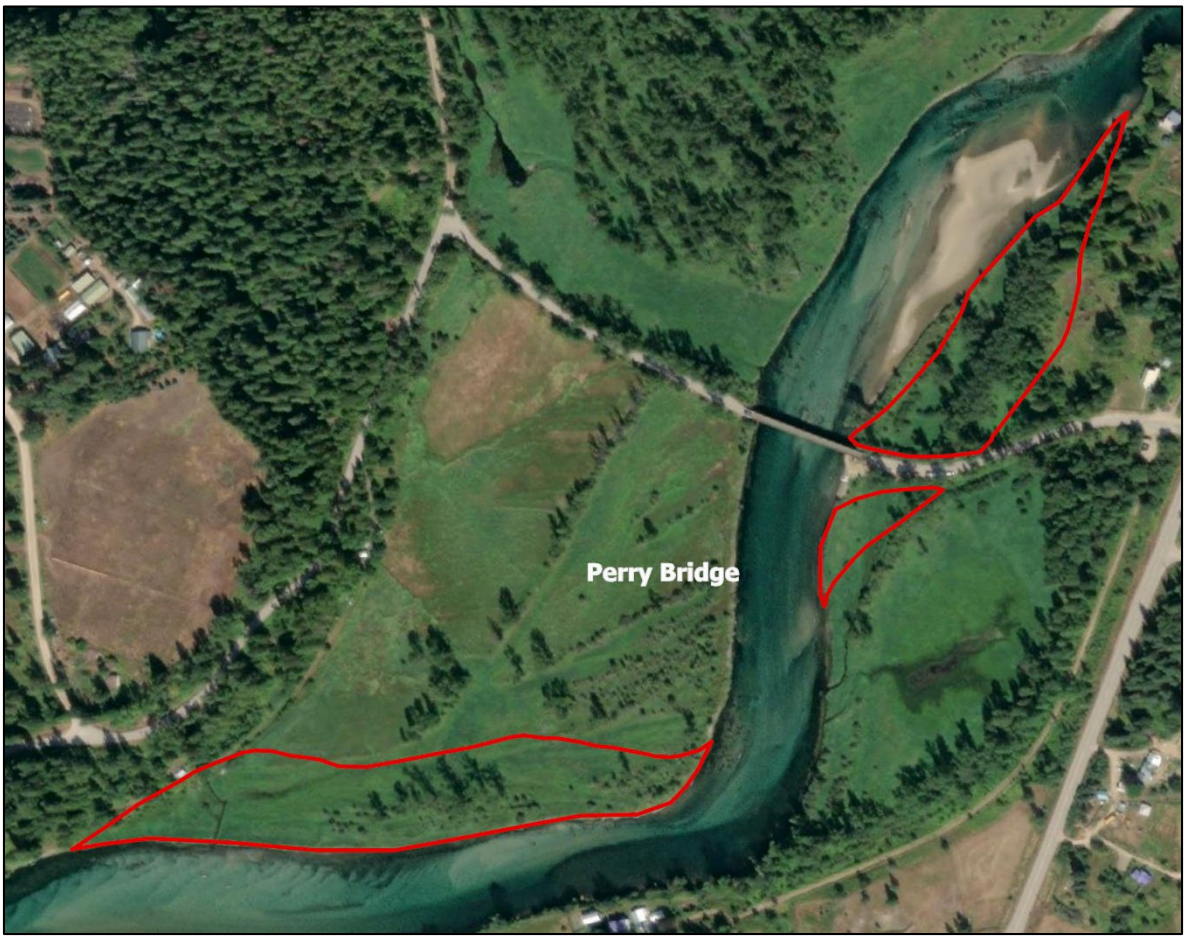

Figure 2.1-1. Perry Bridge.

Plate 2.1-1. Reed canarygrass dominated areas along the edge of the river that is targeted for riparian planting.

Plate 2.1-2. Severe bank erosion along the Slocan River.

Plate 2.1-3. Example of the bank erosion exceeding 3m in height.

Plate 2.1-4. Riparian area south of Perry Bridge.

2.2 Site 2- Oxbow Island

Oxbow Island is bordered by the Slocan River in all direction (Figure 2.2-1). It is in the centre of what is known locally as the oxbow which is 0.5 km north of Perry Ridge at Perry Siding (7 km north of Winlaw). The island is 9.1 ha in size and includes mid-bench cottonwood floodplain across most of the island, while the 1.3 km shoreline is generally a low-bench floodplain community.

The Island has a mature cottonwood forest in the centre with mostly reed canarygrass understory (Plate 2.2-1). A few shrubs such as hawthorn, hazelnut (*Corylus cornuta*), mountain alder and Oregon grape (*Berberis aquifolium*) occur around the perimeter of the island with a thick layer of reed canarygrass (Plate 2.2-2). The mature cottonwood trees are slowly dying back and falling on the ground. There are no small or young cottonwood trees and few middle age cottonwood to replace the older trees when they die. The reed canarygrass appears to be preventing new cottonwood trees from getting established; a pattern that we find on many sites along the Slocan River.

Figure 2.2-1. Oxbow Island.

Plate 2.2-1. Interior stands of cottonwood on Oxbow Island showing thick grass and a lack of regeneration and expected floodplain diversity.

Plate 2.2-2. River edge on Oxbow Island dominated by invasive reed canarygrass.

3.0 Private Land Restoration Site

The private land restoration site is located on a side channel of Slocan River and part of the wildlife corridor that connects across the Slocan River to the Lemon Creek Wildlife Corridor. To the north west of this corridor is the Valhalla Range and Provincial Park and to the east going upstream on Lemon Creek is Kokanee Glacier and Provincial Park. Directly west of the site in the Slocan River is the Walter Clough Bird Sanctuary owned and managed by the Nature Trust of BC. This section of the river including the reach from Lemon Creek and Perry's bridge, "has been identified as having the highest quality and the most diverse aquatic habitat found on the river. It is meandering over approximately 6 km's with intact islands, gravel bars, functional side channels and spawning gravel. It is also an area of cold-water refuge due to input from Lemon Creek. It is unbound by roads and is moderately impacted". (Slocan Valley Watershed Gap Analysis Report, February 2020). The property has underground water flowing from the Lemon Creek aquifer with a high-water table that will increase the success of a riparian restoration project. As the property still contains a working farm, the SLSS restoration project will be limited to the riparian areas (including a small stream that drains into the Slocan River) that were previously cleared and no longer farmed (Figure 3-1, Plate 3-1 and 3-2).

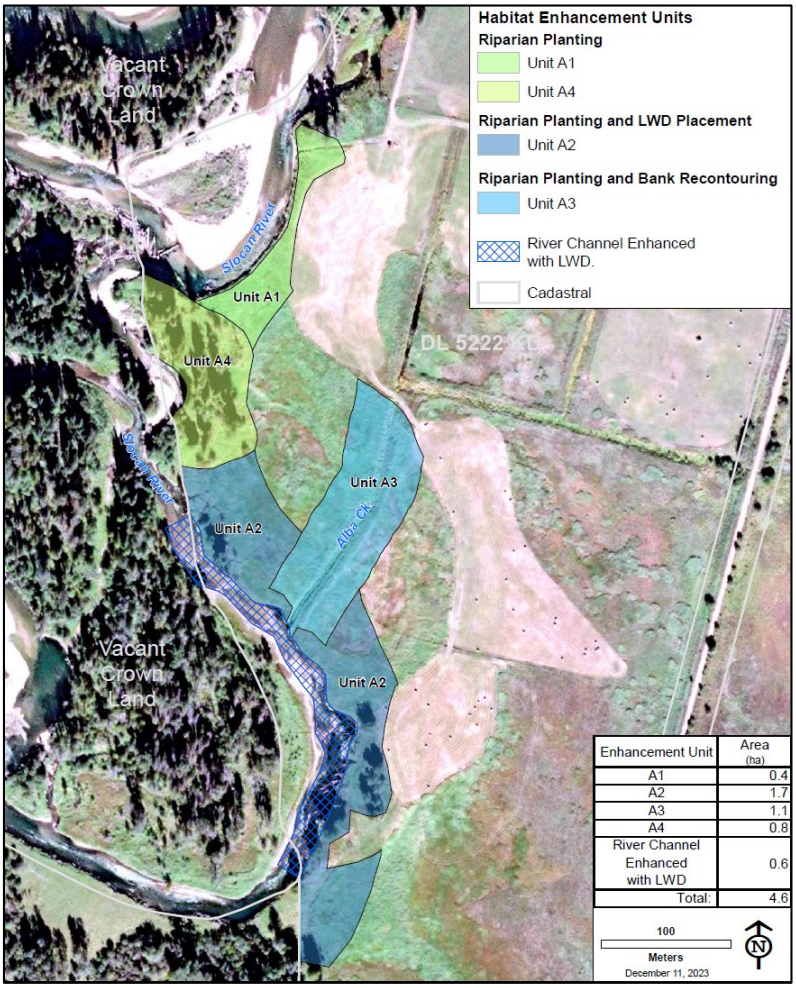

Figure 3-1. Preliminary restoration plan for the private land project.

Plate 3-1. The existing side channel and reed canarygrass dominated riparian area that will be restored.

Plate 3-2. The small stream that flows into the Slocan River that will be restored.

The restoration project will include the placement of large woody debris, potentially re-contouring the channelized stream, and extensive planting of native vegetation over a four-hectare area. As the majority of the site contains thick reed canarygrass, large, rooted stock will be utilized when possible. Live stakes and container stock will also be planted in areas with lower grass cover.

The preliminary species list for restoration includes a range of native species that are found in the area. For this project, as it is on private land, conifers will not be planted as the landowners are attempting to reduce forest fire potential on their land. Selected species include:

- Black cottonwood (*Populus trichocarpa*)
- Paper birch (*Betula papyrifera*)
- Red osier dogwood (*Cornus sericea*)
- Willows (*Salix* sp.)
- Mountain alder (*Alnus incana*)
- Hawthorn (*Crataegus* sp.)
- Snowberry (*Symphoricarpos albus*)
- Roses (*Rosa* spp.)
- Douglas maple (*Acer glabrum*)
- Oregon grape (*Berberis aquifolium*)
- Beaked hazelnut (*Corylus cornuta*)
- Hawthorn (*Crataegus* sp.)

4.0 Preliminary Monitoring and Maintenance Plan

A monitoring plan will be developed for each of the restoration sites before planting occurs. The plan will detail how monitoring sites will be established in a manner that allows for the objectives of the project to be assessed over time.

After the 2023 planting is completed, a maintenance plan will be developed for each restoration site. The plan will address issues such as tree protector maintenance, watering (if needed), and brushing (or other methods to reduce reed canarygrass where needed).

5.0 Permits and Next Steps

For the crown land sites we have confirmed with the province that no permits are required for the riparian planting. As we are not proposing to use machines or disturb soil, an archeological assessment is not expected to be required, however we will follow the typical chance find procedures during planting in conjunction with our First Nation partners.

For Oxbow Island and the downstream portion of Perry Bridge, we will require access through private property to bring plants to the sites. We have existing relationships with both landowners, and if for some reason access cannot be obtained, the sites are accessible via boat.

For the private land project, permits will be required for the larger non-Kootenay Connect projects being undertaken in the same time period as it involves in-stream work and soil disturbance for the benefit of the riparian zones. A *Water Sustainability Act* approval will be required for those conservation projects on private land. It is expected that the project will involve engineering and archeology. For the SLSS portion of the project, permits should not be required, however it is likely that the larger project permitting process will include the riparian plantings.