

Steelhead Society of BC

Presents:

Thompson River Watershed Restoration and Enhancement Project #4

Nicola River Bank Stabilization and Enhancement Project



Application for Funding

December 2013

1.0 BACKGROUND

The Thompson River has had poor returns of steelhead for the past 10 years. While many point to ocean survival as a leading cause for the demise of this famous run of steelhead, others blame the lack of water in the key spawning tributaries and degraded habitat conditions. The Steelhead Society of BC (SSBC) has little recourse related to improving ocean survival and water extraction/use, but can assist with habitat restoration and enhancement activities in the Thompson River watershed. Since 2011, the SSBC has been active in restoration and enhancement of fish habitat in the Thompson River watershed. We have successfully completed two significant stream restoration projects including Spius Creek Bank Stabilization Project (2011) and the Bonaparte River Riffle Habitat Project (2012). Recently, we have partnered with Fisheries and Oceans Canada (DFO) and the Pacific Salmon Foundation to fund a third restoration project scheduled for construction in early 2014.

It is important to note the SSBC has raised or partnered to collect all the funds for each of these projects. 100% of funds raised have been used to purchase materials and supplies and pay for labour and equipment necessary to complete these projects. We enlist industry professionals with decades of experience to undertake these projects, so we have a high degree of confidence they will remain functional for years to come.

2.0 INTRODUCTION

Through consultation with industry partners and DFO, the SSBC discovered this project opportunity on the Nicola River. At present there is a large multiple-faced cutbank on the outside of a bend of Reach 5 of the Nicola River, approximately 6.5 kilometers (km) upstream (northeast) of Merritt, BC and approximately 1.8 km downstream of Nicola Lake (southwest) (**Figure 1**). The latitude and longitude of site centre is 50° 9'20.29"N, 120°41'10.26"W respectively. This site is located on Nicola Ranch and has easy access from the Princeton-Kamloops Highway.

At present, the cutbank is actively eroding unknown quantities of sediment into the Nicola River. The result of this sediment load is significant infilling and smothering of benthic habitats and an overall loss of habitat productivity. Evidence of this can be seen when driving over the Nicola River when passing through Merritt on the Coquihalla Highway during spring freshet. The heavy sediment load is visually apparent.

Supporting rationale for the project and a description of the proposed restoration and enhancement work is provided in the sections below.

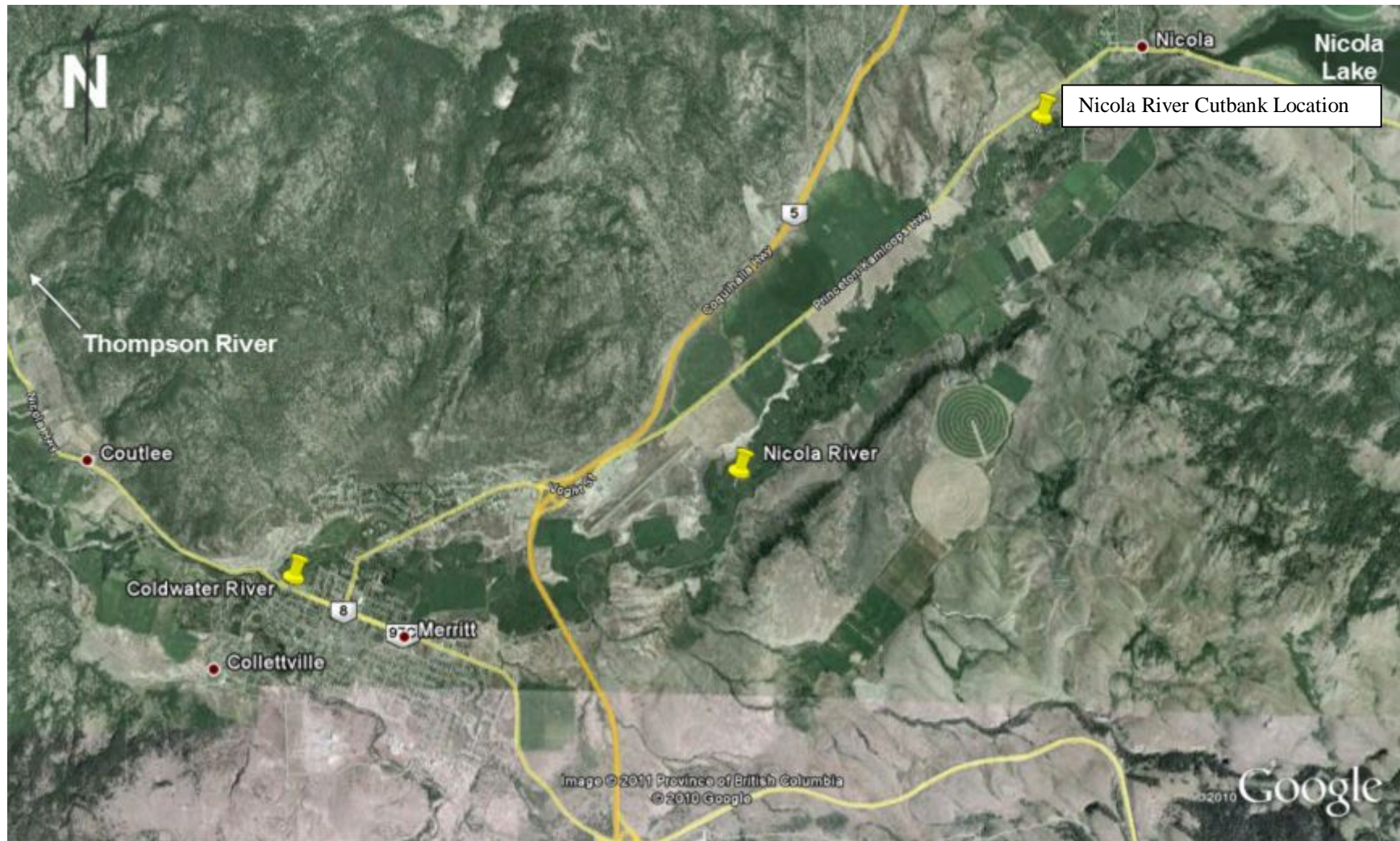


Figure 1 Proposed Fish Habitat Compensation Site Location on the Nicola River

3.0 SUPPORTING RATIONALE FOR THE RESTORATION PLAN

The Nicola River is the largest tributary to the Thompson River downstream of Kamloops Lake and is also a main spawning tributary for steelhead and chinook salmon. The Nicola River is relatively low gradient and predominantly flows through heavily utilized agricultural pastures and range land. The fish populations endemic to this river are struggling due to increasing land use pressures, degraded habitat and seasonal low water levels. According to DFO (1997), “bank instability and siltation due to forestry and agricultural activities” ranked second out of the three primary biophysical factors identified as limiting fish production in the Nicola River watershed. The Nicola River (not including tributaries) contributes 68.3% of the total biomass within the Nicola River watershed (DFO 1997). Nicola River is home to most of the fish species found within the Thompson River; however, chinook salmon, coho salmon and steelhead are the three species that are expected to benefit the most from the proposed bank stabilization and enhancement project.

DFO habitat enhancement staff in the Kamloops office recognize this site as a limiting factor to the overall productivity of the Nicola River between the site and Spius Creek confluence approximately 30 km downstream of the proposed Nicola River restoration site (Sean Bennett, DFO, Pers. Comm.).

This natural erosion zone is believed to be one of the largest in the Nicola River watershed. Substrates and gradient in the vicinity offer high potential for salmon and steelhead spawning and rearing provided water quality and sediment deposition remain within acceptable limits (Sean Bennett, DFO, Pers. Comm.). Current habitat values at the site are considered to be severely degraded from the on-going erosion of the channel bank and the poorly vegetated slope. Also, current habitat values downstream of the site are generally diminished as a result of the chronic/excessive sediment loading.

Visual assessment of river substrates in the vicinity of the cut bank on November 09, 2010 showed a high degree of sediment accumulation and substrate embeddedness downstream of the cut bank and clean substrate on the upstream side (**Photos 1 and 2**). Based on professional judgement, the extent of sediment observed covering the gravel and cobble substrates downstream of the cut bank was likely sufficient to cause benthic smothering and, as a result, limit macro-invertebrate production and diversity.

The intent of this restoration plan is to produce a net increase of the fish habitat productivity by improving water quality and restoring the channel substrate downstream of the cutbank site. The proposed bank stabilization/enhancement project is consistent

with similar restoration plans completed successfully within the Thompson and Shuswap watersheds in British Columbia.

The completion of proposed bank stabilization and restoration work on the Nicola River is expected to increase fish habitat productivity at and downstream of the site by:

- Improving feeding success of rearing fish;
- Reduced sediment loading between Nicola Lake and Spius Creek;
- Increasing benthic productivity over time as the accumulation of fine sediment is gradually washed away and not replenished;
- Reducing stress on fish during periods of high sediment load which can result in displacement from preferred habitats and from chronic gill abrasion;
- Improving fish habitat complexity adjacent to the bank stabilization areas through the addition of LWD and rock complexes; and
- Adding a source of food and nutrients and improving the long-term stability of the channel bank by planting vegetation within the bank stabilization matrix at the Nicola River site.

Details of the proposed compensation plan are presented below.



Photo 1 Sediment accumulation on and around river substrate material located approximately 100 m downstream of the erosion zone (November 09, 2010)



Photo 2 Clean substrate found upstream of the erosion zone (November 09, 2010)

4.0 DESCRIPTION OF THE PROPOSED PROJECT

The proposed restoration project will include the addition of instream complexing features such as tree stems and large boulders and will also allow the restoration of riparian vegetation along the river bank.

The restoration site currently consists of a 174 m long unstable cutbank, relatively featureless stream channel and poorly vegetated riparian area (on the cutbank side of the river) (**Photo 3**). The cut bank has been broken into three sites for the purposes of budgeting and construction. The bank restoration and stabilization prescription for this site includes the placement of long-stemmed woody debris, large rock, topsoil and willow stems woven together to create a highly resilient, yet natural looking stream bank. The natural elements of the restored stream bank will also provide functional fish habitat. **Photo 4** shows a similar bank stabilization approach successfully completed at a site on the Salmon River. The proposed restoration and enhancement works will include:

- A series of spurs created from recessed rock/large wood;
- The sand bank toe reinforced with large rock material;

- A brush layer placed horizontally above the rock toe and buried with a small amount of fill;
- Vertical willow post cuttings (*i.e.*, ~5 to 10 cm diameter willow posts) installed behind the rock toe to help stabilize the toe of the eroding slope;
- Willow live-stake plantings along near-shore areas to assist with long-term bank stabilization and contribute to fish habitat form and function. Plantings will be restricted to the lower bench near the water table; and
- Boulder clusters with secured large woody debris will be added to improve instream complexing.

The proposed prescription will allow the upper bank to continue to erode (due to forces of wind and rain) and slough in behind, and up to, the structures below. It is expected that the rate of erosion will decrease as a stable angle of repose develops over time. Wood materials installed on the right bank and instream will be secured using cable inserted into holes drilled in ballast rock and filled with epoxy. All instream works will be completed by an experienced operator under the supervision of the Project Contractor (Mike Wallis, R.P.Bio.) who is intimately familiar with stream bank restoration construction methods that proven successful within the Thompson River watershed. It is worth noting that Mike has completed over 300 bank stabilization projects in Interior BC similar to the one proposed. The site can be readily accessed during low flow periods with minimal intrusion within instream habitat. **Table 1** below shows the approximate restoration/enhancement areas associated with the Nicola River site. In total, 2,175 m² of Nicola River bank will be restored and enhanced; however, the influence of the bank stabilization project is expected to extend 30 km downstream to Spius Creek.

Table 1 Nicola River Bank Stabilization, Restoration and Instream Complexing

Habitat Restoration Evaluation	Estimate of the zone of significant influence under proposed restoration activity			Pre Treatment Value	Potential Value	Spp known/potential use
	site length (m)	effective width (m)	area (m ²)			
Instream habitat type						
In-channel	174	19	1,653	very low	very high	CO, CH, RB, ST
Stream bank	174	6	5,22	very low	very high	CO, CH, RB, ST
Total			2,175			

RB = Rainbow Trout; ST = Steelhead; CH = Chinook Salmon; CO = Coho Salmon

Source: Mike Wallis, R.P.Bio.



Photo 3 Proposed bank stabilization site on the Nicola River. Facing upstream.



Photo 4 Bank stabilization and channel enhancement site constructed on the Salmon River in 2009 using a similar approach proposed for the Nicola River site. Facing downstream.

5.0 SUMMARY

The SSBC has proposed a fourth stream restoration project in the Thompson River watershed. This project is planned for the Nicola River and involves stabilization of an existing cutbank which is actively eroding extensive volumes of sediment into the Nicola River each year. The impact of this sediment contribution extends approximately 30 km downstream, affecting fish habitat productivity and health. From a strictly quantitative perspective, the proposed compensation works are estimated to result in a total of approximately 2,175 m² of new and improved instream habitat. Qualitatively the project is expected to provide the following benefits:

- Creation of high value fish habitat which will provide benefit to steelhead and salmon on a year-round basis;
- “Turning off” this sediment source is expected to cause an increase in fish habitat productivity over an extensive area of the Nicola River (30 km in length);
- The local benefits of the project to Nicola River fish and fish habitat will be realized immediately following completion of the project; and
- The bank stabilization technique proposed for this project has been proven on hundreds of other sites throughout Interior BC and had a demonstrably high rate of success.

The proposed project will be undertaken subject to receiving *Water Act* Section 9 Approval from the Ministry of Forest, Land and Natural Resource Operations and DFO consent. Sean Bennett (DFO) has volunteered to undertake the permitting and approval component of the project.

Importantly, the SSBC will require funding of \$110,000 to complete the entire project as proposed. The SSBC will be applying for Partnership funding from DFO for 50% (\$55,000) and is in the process of raising the remaining 50% (\$55,000).

For any comments or questions regarding the proposed Nicola River Bank Stabilization and Enhancement Project please contact Trevor Welton (R.P.Bio.) at 604-866-8768.

Yours sincerely,

STEELHEAD SOCIETY OF BRITISH COLUMBIA



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