Steelhead Society of BC Bonaparte River Steelhead Habitat Enhancement Project Description, 2012

The proposed project is to install Steelhead habitat enhancement works at a site on the Bonaparte River, as summarized below.

1.0 Project Overview

The main activity in the proposed project is to construct a rock weir, pool and riffle complex on the Bonaparte River adjacent to the Tanamye Property (GPS location 50° 59.632 N, 121° 27.925 W). This site is located approximately 24 km upstream from Cache Creek and 12 km downstream from Loon Lake in a reach of the Bonaparte River with preferred steelhead habitat features. The proposed project offers the opportunity to build a pool/riffle/boulder-cluster complex in the Bonaparte River at a location with connectivity to key habitat features important to Steelhead such as suitable stream grade, beneficial groundwater attributes, stable up and downstream streambank habitat and existing off-channel habitat. The proposed site locations are shown on the attached project location map. A description of the proposed works including method and material requirements is summarized below.

2.0 Site Characteristics

The proposed site is located on a ranch isolated from high public traffic, set back from Loon Lake Road access. A natural rock outcrop confines the channel on its left bank, where no development is likely. A wide floodplain exists on its right bank including seasonally flooded wetland, riparian vegetation with proven groundwater up-welling nearby. Immediately downstream from the site several streambank restoration projects undertaken in the past have secured the right bank from erosion. In addition a very productive groundwater fed off-channel site previously constructed to enhance juvenile salmonid habitat is located approximately 100 m downstream (see map). The existing groundwater fed off-channel enhancement project has been very successful in providing high quality rearing habitat and was found in a 2010 utilization review using gee trapping to be occupied by large numbers of juvenile salmonids, particularly rainbow/steelhead. Water quality and temperature were also verified to be very suitable for juvenile rearing.

The proposed 2012 SSBC Bonaparte River Steelhead habitat enhancement site provides an opportunity to combine natural local features with some constructed ones to create year round improvement to key Steelhead habitat values such as low traffic, high quality groundwater intrusion and stream flows, residual pool and gradient features, healthy up and downstream riparian areas and connectivity to other nearby suitable steelhead habitats.

3.0 Description of Proposed Works

A cross channel rock weir and rock riffle complex will be installed which will create an upstream residual pool as a result of backwatering above the crest of the weir and a downstream riffle/boulder field suitable to Steelhead. The weir will be built using suitably graded 0.3-1.3 m diameter rock keyed and configured in a Newbury-type riffle design with a 3:1 face slope and 10:1 tail slope for structural stability, cresting with a net elevation increase at low flow of 0.3 m that will increase the grade of the Bonaparte River downstream over a 45 m length through a series of boulder clusters to offer adult and juvenile habitat preferred by Steelhead. The area of the downstream riffle and boulder complex will total approximately 650 m² (see photo 1 below). A 0.3 m drop to the centre of the weir combined with orienting each side of the weir offset 15 degrees from perpendicular-to-flow to form a chevron pointing upstream will assist in focusing weir overflow away from streambank areas toward channel centre and the boulder clusters located downstream. The design creates rapid flows over the head of the weir directed to cascade amongst the downstream boulder clusters to enable scour pool development, hydraulic variability and dissipate hydraulic energy. The design will also backwater the river upstream to create a residual pool approximately 50.3 m long. The upstream residual pool (at low flow) will be approximately 730m² in area (see photos 2 and 3 below). This pool area will also be complexed with boulder clusters as well as large wood debris secured to drilled ballast rock with cable and epoxy.

Materials estimates and project costs have been determined. Approximately 47 loads of rock will be required for the entire project, including 33 loads of mixed sized 0.3-1.3 m diameter rock to build the weir, as well as 9 loads of large boulders (0.8-1.3 m diameter) in the downstream boulder clusters and 5 loads of large (0.8-1.3m diameter) boulders for the upstream pool area. Large wood debris will be secured in the upstream pool area to add further complexity. In addition approximately 900 cuttings will be planted along the right streambank. Disturbed areas will also be grass seeded following construction.

4.0 Costs and Reporting

The project costs including the two largest unit costs for rock and excavator time have been firmed up. The all found project cost including all equipment, materials, labour supervision, and field expenses to complete the project as described above will be $40,288. An as-built summary including photos will be included with the project invoice upon project completion.

Photo 1 Looking downstream from proposed weir location to the 650m² area that will become a large boulder riffle

Photo 2 Looking upstream from the proposed weir location to the 730m² area that will become a complexed residual pool

Photo 3 Looking upstream from proposed weir location to illustrate expected relative increase in residual pool depth after weir installation (upper orange flag)

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