ATNARKO SPAWNING CHANNEL

INTAKE FLOW PROJECT

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Abstract

The Atnarko Spawning Channel was constructed in 1986 to provide a spawning habitat that was not effected by seasonal flooding. The objective was to increase good habitat available for Pink Salmon spawners. The vision for the channel has changed somewhat over the years, part of its current use is to function as secure rearing habitat for hatchery chinook and coho.

The stream bed has changed in the vicinity of the water intake resulting in a reduction of intake flow to approximately one half of the design volume.

Given the apparent reduction in all Atnarko / Bella Coola salmon stocks a decision was made to restore historic flow volume to the channel intake. DFO staff proposed a rock deflection groyne and an intake channel rebuild to solve the problem.

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Introduction

- The Atnarko Spawning Channel was built in 1986 to provide a "buffer" against the effects of high water events on Pink, Chinook and Coho salmon in the Atnarko River. A log jam slightly downstream of the Spawning Channel intake ensured adequate intake flow. A high water event removed the log jam, lowering the intake level and intake volume.
- Subsequent high water events have eroded the left bank of the Atnarko River which has moved the thalweg away from the intake channel entrance thus reducing intake flow volume.
- The Channel is designed for an operating flow of 50-70cfs. As the intake structure began to fail, flows have dropped to less than 20 cfs for most of the year. Fish production has declined to less than 20% of capacity as a result.

Objectives

- The project objective was restoration of the designed operating flow to the channel by reducing the tendency of the left bank to erode and by redirecting water from the Atnarko River into the spawning channel intake. Snootli Hatchery staff expects that restoration of design flow will result in an immediate potential for a sustainable increase in fry and smolt production (Historic maximums; 2,660,000 Pink, 4,101,084 Coho, 590,948 Chinook. 2006 production; 27,000 pink, 0 Coho, 0 Chinook).

- Restoration of adequate flow also required placement of rock armor along the edge of the intake channel.

- Increasing production of northerly migrating chinook stocks will contribute to Canadian and Alaskan PST chinook indices. Increasing the number of coho will provide additional harvest over the short term and over time allow the Atnarko River coho population to rebuild to historical levels of abundance by providing additional spawners.

Methods

The solution posed by DFO engineering to increase intake flow was to place a rock deflection groyne in the Atnarko River opposite the intake channel.
To accommodate increased intake volume the debris and gravel bar blocking the intake channel was removed.
The prescription requested rip rap bank armor to guard against intake channel bank erosion. Approximately 500 m^3 of rip rap were required to construct the deflection groyne and intake channel bank armor. An opportunity to blast the rock occurred in Feb. 08, even though final agency approvals were not yet in place it was decided to proceed with blasting. Two other rip rap generation projects were in progress and the economy of scale that this opportunity presented resulted in a considerable saving. The rip rap was taken from the Nooklikonnik Quarry in Hagensborg which was the closest registered quarry to the project site, a distance of 46 km.
Following Agency approval, site work began on April 17 2008. An excavator loaded rip rap at the quarry, two rock trucks (the only ones locally available) transported the rock to the project site. At the project site an excavator constructed an access ramp on to the river bed and using gravel from the excavated intake channel the bridge approach was constructed across the bar. (The left bank directional groyne site did not have road access.) Simultaneously a tandem axel crane truck transported required Acrow Panel bridge components to the project site. Following completion of the bridge approach the crane truck began to assemble the bridge. The excavator continued to excavate the intake channel and place the bank armor. An 80 ft. bridge was assembled and placed on rollers and after adding counter-weight the structure was launched across the Atnarko River to the opposite bank. The counter-weight and the extra 20 ft. were removed and set to the side, available when required to retrieve the structure. The structure was then placed on its footings and decking was installed.
As the excavator placed the rock armor on the intake channel bank, any suitable rock for the deflection groin was set to the side. This rock was now trucked across the bridge and the excavator began placing the groyne structure. Large rock was used for this (plus / minus 1 m^3). It was anticipated that as flood waters passed over the groyne, the downstream side would erode. To keep the structure from rolling into the void, large slabs were placed on the downstream side of the groyne
Following completion of the deflection groyne, the excavator continued to armor the intake channel and the bridge crew proceeded to dismantle the bridge.
As the excavator worked on the channel armor, vegetation that was suitable for replanting was incorporated into any disturbed soils adjacent to the armor. Doing this reestablished some riparian cover and helped prevent extensive sediment transport. It was Parks staff wish that no non native plants were used for sediment control.
The project was completed with-in the established budget. The Ministry of Forests and Range chose to not charge for bridge rental (the agreed cost for the bridge rental was a small amount of crane truck time to arrange bridge parts in their yard and they were given the used decking). The project began with blasting the rip rap, this phase was coupled with two other local projects, thus mob. and demob. costs were shared. These two items allowed the project to come in considerably under budget.
Close to the end of construction Parks staff asked if we could construct an information kiosk at the site, permission for this item was granted from P.S.C. A kiosk was constructed to Parks standard and erected on site.

The table below is a summary of the tasks associated with the project;

Concept and design	Structure design complete	Oct. 2007
Concept approval	Met with MOE and Parks to introduce the project.	Oct. 2007
Rip Rap	Blasting of required rip rap was done in conjunction with 2 other rip rap projects.	Feb. 2008
Agency site visit	DFO Engineering and Habitat Specialist, MOE Biologist, Hatchery Staff and Parks Staff meet on site to review project and initiate the approval process.	Feb. 2008
Agency approval	MOE, DFO and Parks issue approval	Apr. 2008
Project construction	• Bridge constructed • Intake channel cleared and armored • Deflection groyne constructed • Bridge and access ramp removed	Apr. – May 2008
Information Kiosk	Construction and placement	June 2008
Report and monitoring	The next low water in the Atnarko River will allow a project assessment.	

Figure 1. Air photo of Atnarko River and Atnarko Spawning Channel

Figure 2. Intake channel befor construction

Figure 3. Bridge construction across the Atnarko River, excavator is beginning intake channel reconstruction and rock armor placement.

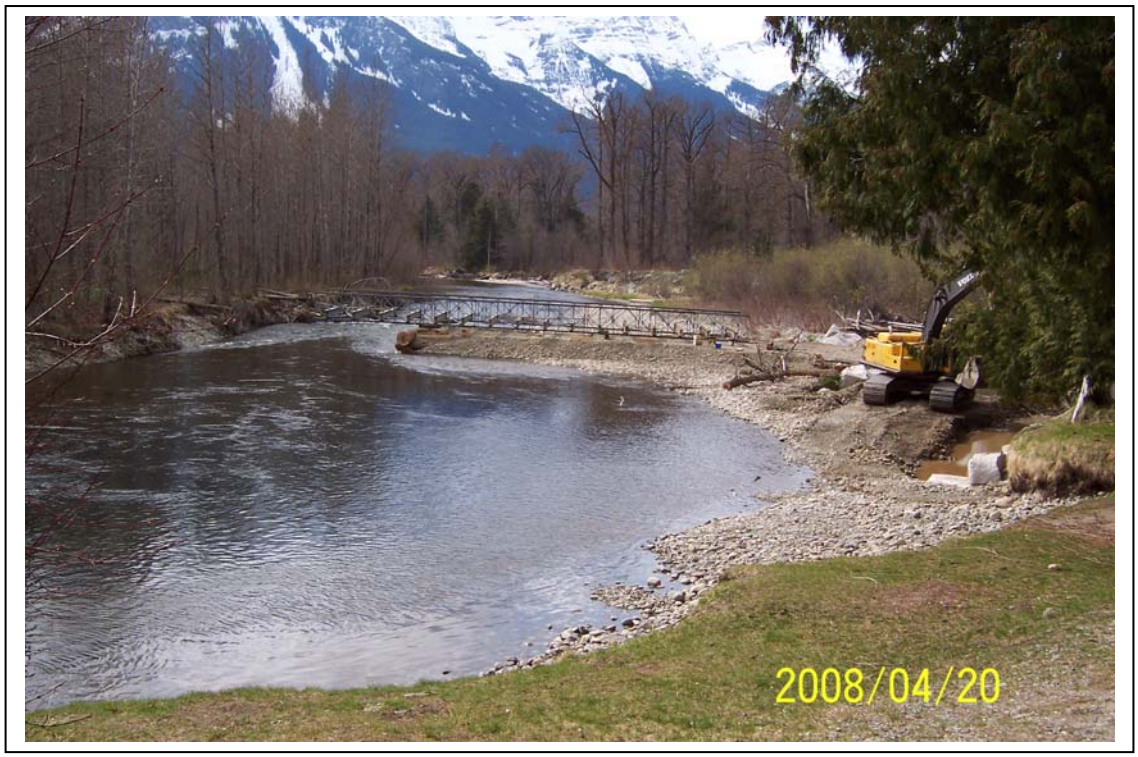

Figure 4. Excavator placing rock deflection groyne againt river bank opposite the intake channel.

Figure 5. Intake channel with bank armor.

Figure 6. Intake channel entrance after bridge removal, photo taken as the access ramp was being removed. The deflection groyne is visible at the left and bank armor is visible at the right of the photo.

Results

As construction on the deflection groyne progressed the water level in the intake channel increased. The objective was to increase intake flow and with construction of the groyne, and enlargement and armoring of the intake channel, intake flow increased to a level beyond spawning channel requirements.

The real measure of success will come when winter low flow occurs and repositioning of gravel deposition is evident and if required flow volume is available to the intake structure.

At the time of this report spring melt water has receded and it is evident that the deflection groyne has been covered with gravel and a small bar has formed directly downstream. This is encouraging as the trend has been for the river to erode the left bank thus moving the thalweg away from the channel intake.