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Nitinat River WRP: Tsuk-si-tay Groundwater Side Channel and Upslope Management

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The Tsuk-si-tay side channel portion of the Nitinat River Watershed Restoration Project was initiated in 1998. Caycuse River and Campus Creek are the two main tributaries of the lower Nitinat River, emptying into Nitinat Lake, located on the south west coast of Vancouver Island (Figure 1). During the spring of 1998, an initial field reconnaissance and an overview assessment (FHAP) of Caycuse River and Campus Creek were conducted. The assessment indicated the highest priority for stream restoration would be through creating off-channel habitat in the Caycuse River watershed (Taylor, 1998). During the summer of 1998, the Department of Fisheries and Oceans, Habitat Restoration Department was involved in selecting a site for development of the side channel. The location was a relic channel, located along the toe of the slope at the edge of the flood plain. Features such as bedrock outcrops near the top of the channel would provide excellent flood protection. The side channel would parallel the lower Caycuse River, where it empties into Nitinat Lake.

In September 1998, test pits were installed for monitoring substrate materials and low water levels. The findings of the test pits were excellent, with good substrate and sufficient ground water. DFO then conducted Level 2 design surveys and produced a Level 2 report (Taylor, 1999a).

In an effort to reduce project costs for the coming construction season (1999), preparatory work was completed in the 1998-99 fiscal year. This included blasting of approximately 1200 m^3 of coarse rock for channel complexing, the building of cement slabs for the creation of cut banks in the channel, and the construction of an access road.

Upslope Management

There were three additional reports completed for the Nitinat watershed in the spring of 1998. The Road/ Access Management Plan (Ostapowich, 1998) recommended road deactivation for the Caycuse River in areas of high risk for failure. To date, 3.8 km of roads have been deactivated in the Caycuse watershed (Rick MacDonald, pers. comm.). An additional report – The Hydrology and Sediment Source Survey (Chapman, 1998) for the Nitinat watershed – also played a role in directing the road deactivation activities to the Caycuse Watershed.

Based on findings of the riparian overview conducted for the Nitinat watershed during the spring (Masai and Fear, 1998) and on additional funding sources from Timberwest WRP program, a riparian assessment and prescription recommendations were completed

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This Quarter
Summer 2000

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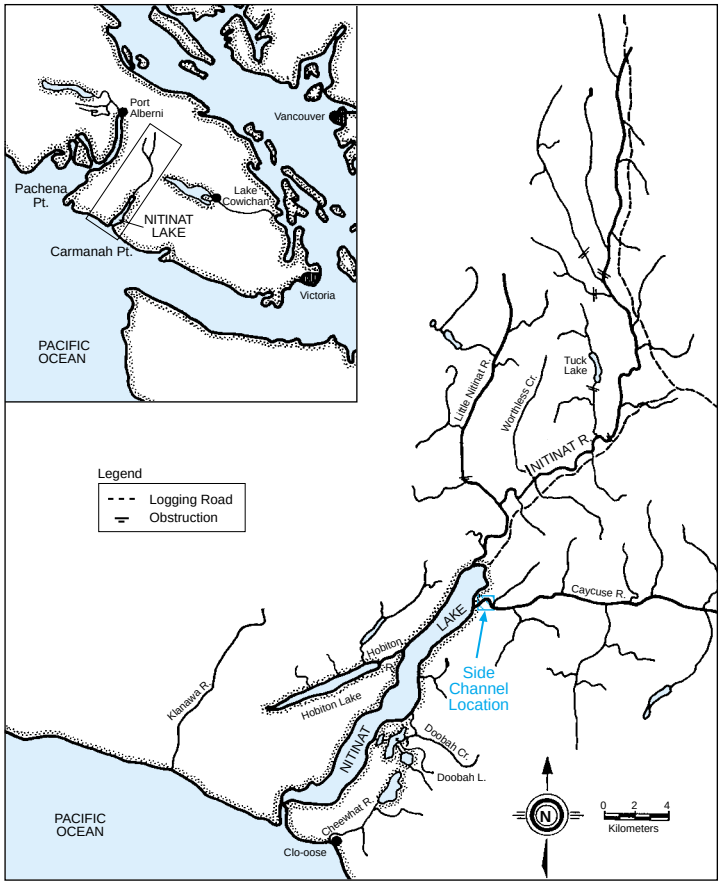

Figure 1. Nitinat Lake Watershed, located on the southwest coast of Vancouver Island (see inset).

for the Caycuse watershed (Mueller, 1999). A portion of the Caycuse watershed falls within Timberwest TFL 46, thus allowing Forest Renewal BC funding to be spent on this project: this is a good example of partnerships working well.

Channel Construction

The channel survey indicated that a portion of the proposed side channel would fall on M&B (now Weyco) private land (with the remainder on M&B crown land TFL). As Forest Renewal BC funding cannot be spent on private lands, it was necessary to look for other funding sources. In addition, it appeared that the estimated cost for the side channel would be higher than the anticipated Forest Renewal BC (WRP) allotment for the Nitinat Watershed. The additional funding sources included M&B private funds, HRSEP, RAMS (FsRBC), and DFO in kind through design help, technical advice and supervision. These alternate funding sources satisfied MB's concerns of FRBC funding on private lands, and allowed for the entire proposed channel length to be constructed.

Funding breakdown was as follows:

Forest Renewal BC	$128,045.00
HRSEP	$ 60,000.00
MB private	$ 20,000.00
FsRBC (RAMS)	$ 8,000.00
Total	$216,045.00

Construction of the channel commenced July 12, 1999 and was completed by September 13, 1999. Two excavators (CAT330 and CAT320), two off-road rock trucks for end hauling, and a D-6 Cat bulldozer were used during the project. The machines worked in tandem to move the large volumes of materials. The brush was removed first, followed by the removal of topsoil (to dump sites), removal of the first pass of gravel to ground water table, removal of the second pass of gravel to grade (all gravel used on berm), and finally, complexing with rock and wood (Figure 2).

Excavation of the channel was completed in 6

Figure 2. Typical channel view, upper end, showing rock and wood complexing.

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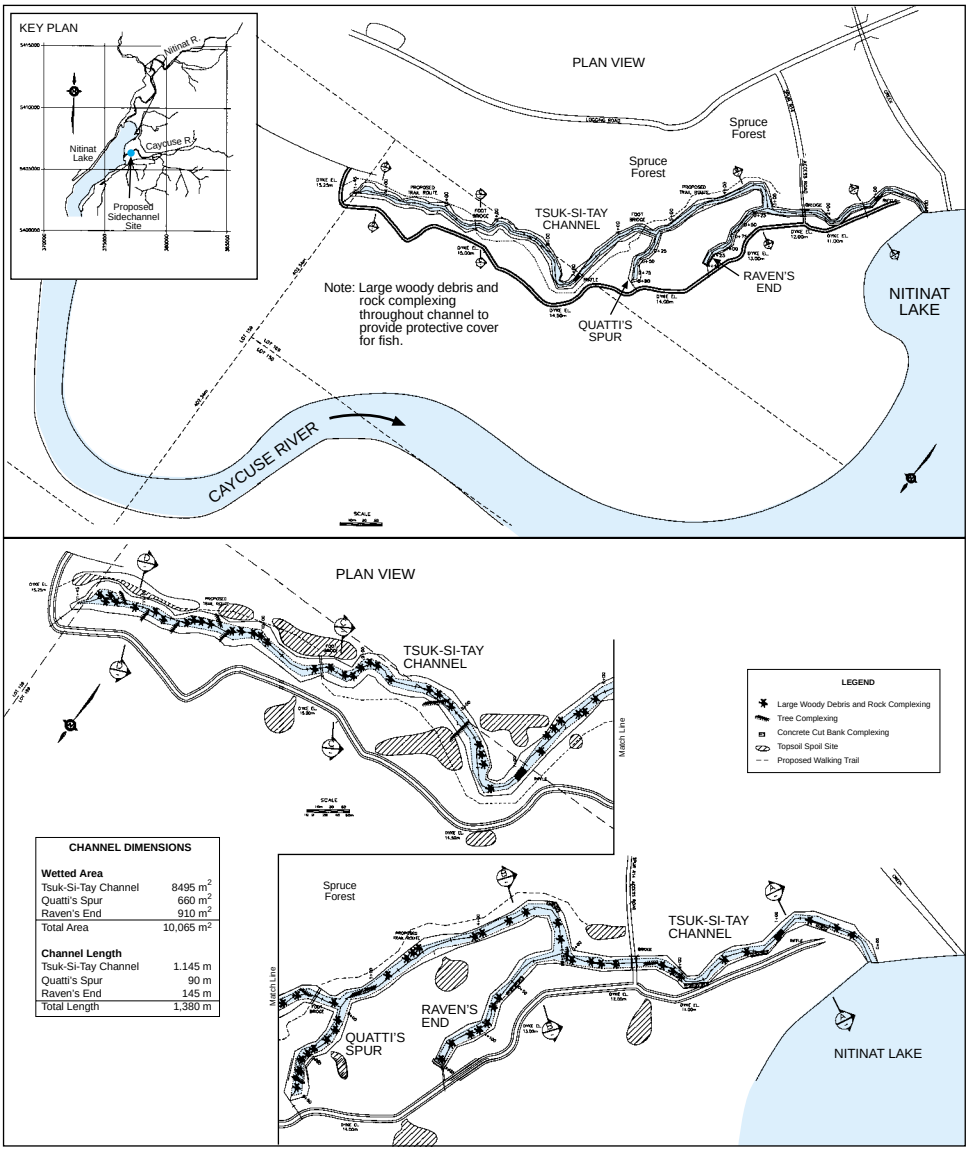

Figure 3. Caycuse River Tsuk-si-tay groundwater channel, plan view and detailed view - as built.

weeks. The mainstem of the channel is 1,145 m in length, the upper spur is 90 m, and the lower spur is 145 m, for a total length of 1,380 m (Figure 3). Average channel width is approximately 7 m, giving the channel a surface area of 10,065 m^2. Depths in the channel range from 0.3 m to 1.2 m in the pools (Figure 4).

Adding complexity took between three and four weeks to complete. There have been approximately 500 LWD stumps and 1200 m^3 of rock added to the channel. The rock was placed along the toe of the channel to help avoid bank cutting from spawning chum and to provide rearing habitat for coho fry (Figure 5).

Cement slabs were installed at five sites in the channel to provide cut bank habitat. Two rock riffle structures were built in the main side channel to maintain water levels.

A nature trail was also constructed along the length of the side channel. Two natural log bridges were installed across the channel for viewing. The side channel and its fishery are to become part of the Ditidaht school program.

The channel banks and any disturbed areas were seeded to prevent erosion. During the week of October 25, approximately 3000 seedling trees were planted along the channel banks. Willow planting (wattles) was planned for some steeper banks during spring, 2000.

Employment Generated

This project helped generate 50 person-days of work for six Ditidaht First Nation people. This work was primarily labour intensive, and included clearing, cabling, and planting; there were also two flag persons needed when machinery was moved to and from the site. The engineer/ on-site construction supervisor worked 56 days and the biologist/project co-ordinator worked a total of 74 days. This included pre-construction mobilization and organizing, construction, and as-built write up. In total, there were 180 person-days generated by this WRP project.

Seaton Taylor, River-Run Bio Ltd., was the project co-ordinator and biologist for the Nitinat Watershed. Mr. Taylor has been working with the hatchery for several years. He is very familiar with the area, and has an excellent working relationship with the Ditidaht First Nation.

Partners

The following partners undertook the Nitinat WRP

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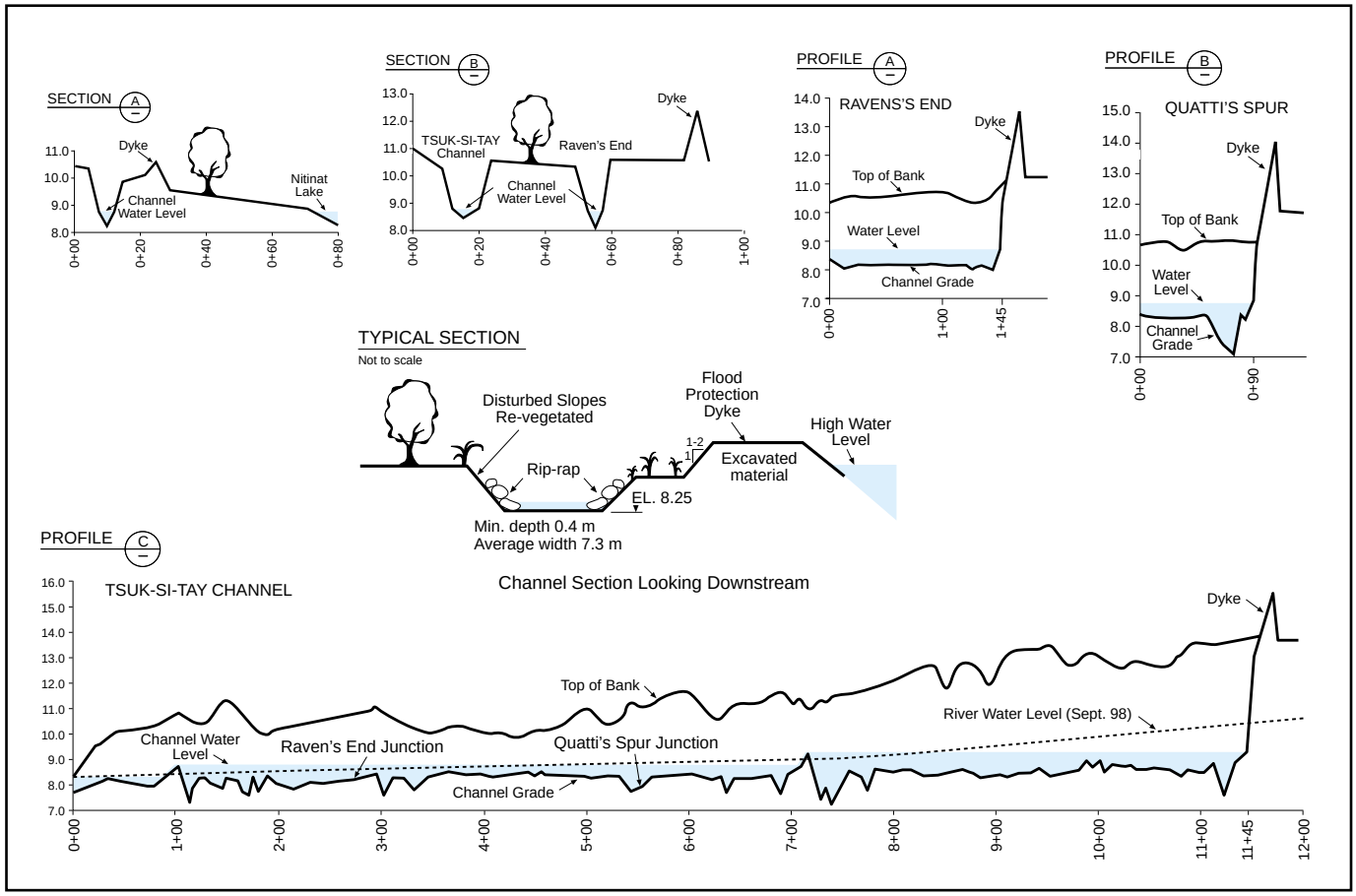

Figure 4. Examples of some of the Caycuse River Tsuk-si-tay Groundwater Channel Sections and Profiles - As Built.

project:

- Weyerhaeuser (formerly MacMillan Bloedel)
- Ditidaht First Nations
- Resource Investment Corporation (RIC), Weyco
- DFO - Habitat Restoration group
- Nitinat Hatchery
- MELP
- Timberwest
- MoF

Production Estimates

Predicted coho smolt production, calculated using criteria from previous side channel projects, is about 10,065 smolts or approximately 1 coho smolt per square meter (Mel Sheng, pers. comm.). Based on an average 10% ocean survival rate for smolts to returning adults (Koning and Keeley, 1997), we should see approximately 1000 coho adults return to the channel. However, a recent trough in ocean survivals may reduce this number significantly (i.e. 2% survival rate equates to 200 returning adults).

The channel should produce chum salmon, with approximately 300 chum fry/m^2 of useable spawning beds, the area of which will not be known until chum begin to spawn in the channel. The current estimate of 500 square metres of spawning habitat would produce 150,000 fry. With a 1% survival rate from fry to adult, approximately 1,500 adult chum would return to the channel.

Monitoring

In March 2000, a crew from the Nitinat Hatchery conducted a field survey to quantify the production of the side channel. Based on the Peterson mark-recapture method, the population estimate was approximately 16,254 coho juveniles (Lightly, 2000). The calculated density is 1.6 juveniles/m^2. The density of coho juveniles in Tsuk-si-tay channel was high, supporting the hypothesis that groundwater channels with good complexing can support greater than 1 smolt/m^2.

With construction so recent, the fish from this study

Figure 5. Rock is placed along the toe of the channel to prevent spawning chum from digging into the banks.

must have moved in from Nitinat Lake during fall, winter and spring. To further evaluate this groundwater channel's performance, it is anticipated that spawning and incubation success will also be observed in the future.

Cutthroat trout, sticklebacks and sculpins were also caught during the sample survey.

Side Channel Opening Ceremony

The Tsuk-si-tay side channel construction was a very important project for the Ditidaht people. Not only were people from the band employed, they were also happy to see restoration works performed to help bring back historical fish numbers in their traditional areas. The Ditidaht First Nations selected the name for the side channel, and its two spurs. In fact, Tsuk-si-tay means "the river behind." This refers to a former channel in that vicinity, one that was historically significant to the First Nations; now the river (side channel) has been brought back to them.

As part of their involvement with the project, the Ditidaht hosted a channel-opening ceremony, along with a potluck for all the parties involved in bringing about the completion of the side channel. The side channel was officially named and blessed (Figure 6) in a ceremony that included the returning of fish bones back into the channel to signify the circle of life. The Ditidaht First Nation spokesman, Joe Thorne, only had one thing to say: "THANK YOU." ▲

Acknowledgements

The following individuals assisted in making this side channel project a reality: Seaton Taylor, Mel Sheng, Russ Doucet, Graham Hill, Rob Brouwer, Joe Thorne, Deb Epps, Rick MacDonald, Steve Lorimer, Bud Iverson, Dave Marquis, Gray Switzer, and Wayne French.

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Figure 6. Ditidaht First Nations hosted a channel-opening ceremony during which the channel was officially named and blessed.

Feature

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Technical Tips

Channel Rehabilitation: Constructing Debris Groins as a Bank Stabilization Option

Rheal Finnegan

Debris groins, which can be used to stabilize eroding streambanks and create desirable fish habitat, were discussed as a viable technique in the "Technical Tip" section of a previous Streamline publication (Vol. 4 No. 2). This additional information on construction design steps is provided to supplement the original Tech Tip.

Debris groins are currently being considered for a reach of the Horsefly River which lacks riparian vegetation as it flows adjacent to an open field (Figure 1). The heavy machinery required to construct the groins will access the site from the open field. Since the proposed groins can be installed with the required machinery operating adjacent to the river, it is anticipated that construction activity necessary for debris groins will not affect the water quality in the mainstem during construction.

Figure 1. A section of the Horsefly River where debris groins are a bank stabilization option.

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