

Puntledge River Habitat Restoration

Jack Hames Side-Channel Improvements 2003 – 2004

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Prepared by:

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Executive Summary

Location:	6 km from the mouth of the Puntledge River, the Jack Hames Channel is on the Right Bank of the Puntledge River in the City of Courtenay's Bear James Park. Access to the site is off Rod and Gun Road and Robert Lang Drive.		
Watershed Code:	92055320094-4200		
Map References:	92 F-11		
UTM Co-ordinates:	Zone 10.	5505699mN, 353748mE	(NAD83)
Construction Drawings:	31-47-06		
Cost Summary:	Total 2003/04 costs		\$21,805
	BC Hydro		\$14,087
	In Kind (DFO, Volunteers)		\$ 7,718

The Jack Hames Side-channel (formerly called the Rod and Gun Side-channel) was constructed in 1984 by Fisheries and Oceans to provide spawning habitat for pink, chum and coho salmon and trout. Although primarily designed for spawning, it has become an increasingly significant off-channel rearing and overwintering habitat for coho and trout juveniles. Activities in the Jack Hames side-channel in 2003 include the addition of over 100 pieces of LWD, the construction of 8 rock riffles and placement of 141 m³ of spawning gravel in proximity with new and existing riffle features. While most riffles were added features to the channel, three were used to replace existing concrete weirs that were removed and used to build cut-bank features. Over 130 hours of volunteer labour from the local community helped to make this project a success.

These measures will increase productivity and survival of overwintering juvenile salmonids by improving channel complexity, rearing habitat and stable LWD cover structures; increase spawning habitat for pink salmon; and, to improve access for adult and juvenile salmonids. The Jack Hames Side-channel Improvement Project addresses the interruption of gravel and wood recruitment and the reduction in spawning and rearing habitat below the diversion dam, as outlined in the BCRP Strategic Plan Volume 2, Chapter 3 (Puntledge River), by improving stable off-channel spawning, summer rearing and overwintering habitat and ensuring its integrity over the long term.

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1 Introduction

1.1 Background

The Jack Hames Side-channel (formerly called the Rod and Gun Side-channel) was constructed in 1984 by Fisheries and Oceans to provide spawning habitat for pink, chum and coho salmon and trout. Although primarily designed for spawning, it has become an increasingly significant off-channel rearing and overwintering habitat for coho and trout juveniles. Since its construction, improved techniques in off-channel habitat enhancement have been developed to optimize fish production. Natural stream features such as undercut banks, large woody debris (LWD), rock riffles and boulders are now more commonly incorporated into fish habitat restoration projects to maximize juvenile rearing. Not only was this channel lacking complexity, it contained several concrete weirs that created access barriers for juvenile fish, and trapped sediments which has deteriorated spawning habitat quality.

1.2 Need Statement

Spawning habitat in the Puntledge mainstem below Comox Lake is presently limited to the lower-most reach (reach 1), and small pockets in the upper section of reach 3. The spawning grounds in reach 1 were cited as being impacted from accentuated fall-winter freshets following the expansion of the hydro facilities in 1955, and the lack of gravel inputs leading to declines in the fall-run chinook stock (Marshall, 1971).

Gravel sources and gravel recruitment to the lower Puntledge River reflect geologic processes that took place in south-western British Columbia since the last (Fraser) glaciation, 15,000 years ago. Events during and after the retreat of the glaciers resulted in deposition of gravel mainly around the present 150 m (500 ft) contour. The information suggests that a large proportion of gravel deposits (post-glacial deltaic gravel and sand sediments) in the Puntledge River became unavailable for transport by the construction of the diversion dam at elevation 130 m (430 ft) asl downstream of Comox Lake. Historically, the lake would have settled much of these gravel deposits, therefore gravel recruitment downstream of the lake would have been limited. Supply Creek, the main tributary between the two dams probably once provided moderate contributions as evidenced by the formation of gravel bars at the confluence of this tributary with the Puntledge mainstem (Bengeyfield and McLaren, 1994). Since 1912 gravel contributions from sources above the diversion dam have been eliminated by the dam and are now restricted to the deltaic and fluvial terrace sediments downstream. The falls reach likely never supported much spawning but was mainly a transport reach and gravel recruitment from this reach is limited to the scouring of the thin alluvial deposits along the banks (Bengeyfield and McLaren, 1994).

Not only has hydro-electric development in the watershed interrupted gravel recruitment to the lower river from dam construction, but the regulation of flow downstream of the dam has resulted in frequent rapid fluctuations in discharge and occasional excessive flow events which have scoured existing gravel. The reduction in good quality spawning gravel in the lower reaches is further complicated by the repeated utilization of the same spawning habitat by different species, mainly pink and chum salmon (MacKinnon *et al.*, 1979).

The proposed project addresses the interruption of gravel and wood recruitment and the reduction in spawning and rearing habitat below the diversion dam, as outlined in the BCRP Strategic Plan

Volume 2, Chapter 3 (Puntledge River), by improving stable off-channel spawning, summer rearing and overwintering habitat and ensuring its integrity over the long term.

1.3 Objectives

The objectives of the Jack Hames Side-channel Improvement Project are to increase productivity and survival of overwintering juvenile salmonids by improving channel complexity, rearing habitat and stable LWD cover structures; increase spawning habitat for pink salmon; and, to improve access for adult and juvenile salmonids.

2 Study Area

The Jack Hames side-channel is located on the south side of the Puntledge River in the City of Courtenay's Bear James Park, approximately 1.1 km downstream of the Puntledge Hatchery (Figure 1). The side-channel is fed by a screened box intake from the Puntledge River mainstem and consists of meandering low gradient (0.4%) glide and pool habitat created from concrete weirs. The channel is approximately 395 m in length with ~ 1900 m² of spawning and rearing habitat. Access to the channel is from an existing road at the upstream end (with permission from the Calvary Community Church) and a trail network paralleling the channel.

3 Methods

3.1 Site Isolation and Fry Salvage

A stop net was installed at the outlet of the side-channel to prevent juveniles from re-entering the channel during construction. Fry salvaging took place over a 3-day period using baited minnow traps, pole seines and volunteers from the Morrison Creek Streamkeepers. Flow into the side-channel was reduced slowly during this period by adding stop logs at the intake control box to facilitate the fry salvage operation. Salvaged fry were counted, identified to species and released into the Puntledge River mainstem. A filter fence was placed across an existing stoplog weir structure, 40 m upstream from the channel outlet, to trap silt that may have reached the lower channel during construction.

3.2 Gravel, boulder and LWD placement

Spawning gravel, boulders and stumps were delivered to the site in dump trucks and stockpiled until needed. A Bobcat was used to move materials (boulders and spawning gravel) to the channel while an EX 70 working within the channel distributed the materials. Where machine access was limited, boulders and gravel were moved by hand. LWD for channel complexing was salvaged from windfall adjacent the channel and rootwads and were placed in the upper channel with an EX 70 and EX 150 excavator.

4 Results

Between August 26 and November 30, 2003, the following construction and monitoring activities were completed in the Jack Hames side-channel:

- Placement of ~47 pieces of LWD to construct 8 habitat features designed to provide cover for fish and increase stream complexity. LWD complexes are associated with either new or existing riffle features.
- Placement of ~60 pieces of LWD (rootwads) in the upper rearing pond (0 + 90 m) to provide cover for fish (Photo 3 & 4).
- Placement of 141 m³ of spawning gravel at critical locations in proximity with new and existing riffle features.
- Construction of 8 rock riffles using 113 m³ of rock (300-500 mm dia). While most riffles were added features to the channel, three were used to replace existing concrete weirs that were removed intact and used to build cut-bank features (Photos 1, 2 & 6). An estimated 14 m³ of rocks were used to build each riffle.
- Bioengineering technique using prescribed riparian plants to revegetate an estimated 60 m² of ground disturbed during construction.
- Exposed construction sites including tote roads were deactivated and grass-seeded to minimize erosion and accelerate revegetation.
- Installation of a chum salmon exclusion fence at the channel outlet to prevent the repeated utilization of spawning gravels and exposure of incubating pink eggs by chums (Photo 5).
- Installation of a sign adjacent the channel in Bear James Park to raise public awareness about the importance of the fish habitat structures and channel improvements, and the overall value of this channel in the ecologic health of the Puntledge River watershed.
- Visual surveys of pink salmon spawning activity in the channel and chum salmon access above the exclusion fence.

5 Discussion

Following completion of the project, flows were established in the side-channel to attract pink salmon from the Puntledge River mainstem. Over 1000 pink salmon spawned in Jack Hames channel between mid-September and the end of October. Although this number is similar to past escapements, spawning and incubation success is expected to be much higher due to the improved habitat quality. The average coho smolt density for many constructed side-channels in B.C. and the Pacific Northwest is 0.67 smolts/m² (Koning and Keeley, 1997). Using this biostandard, the expected coho smolt production from the Jack Hames Channel is approximately 1273 smolts.

6 Recommendations

Monitoring of this side-channel will be completed annually (in-kind by DFO and volunteers) and will consist of visual counts of adult pink salmon in the fall, installation and removal of the chum exclusion fence, and monitoring flows during the spawning and egg incubation period.

7 Acknowledgements

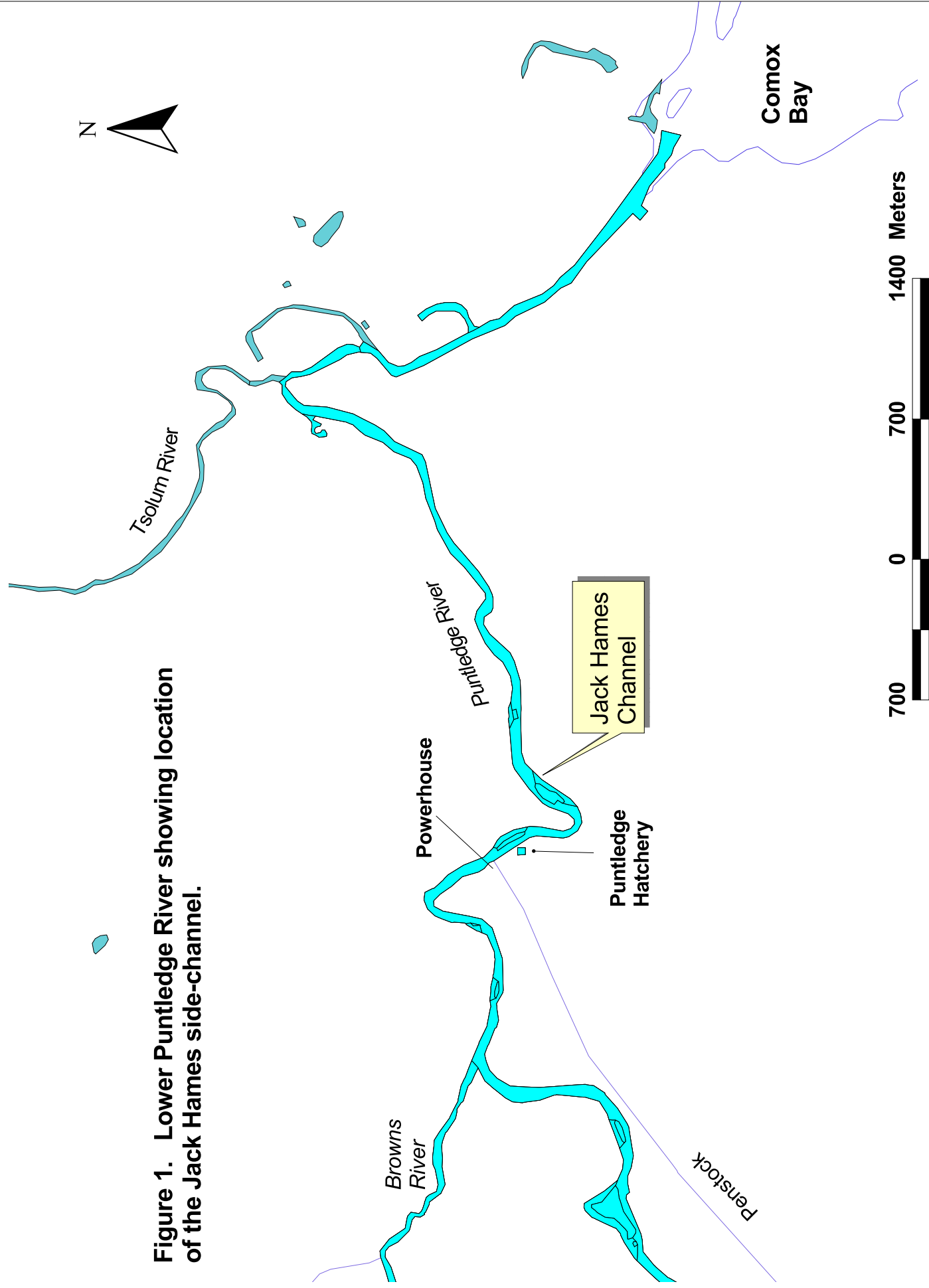
This project was made possible through the financial support of BC Hydro Bridge Coastal Fish and Wildlife Restoration Program and the technical and supervisory support of Fisheries and Oceans Canada Pacific Region Habitat and Enhancement Branch (Nanaimo). The project could

not have succeeded without the generous time volunteered by the following members of the Morrison Creek Steamkeepers: Stephani Nathan, Bob Foster, Julie Foster, Maryanne Foster, Jamie Bainbridge, Denise Bainbridge, Dave Radford, David Rossi, Nicole Taylor, George Sherwood, and Nita Palmer.

8 References

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Figure 1. Lower Puntledge River showing location of the Jack Hames side-channel.



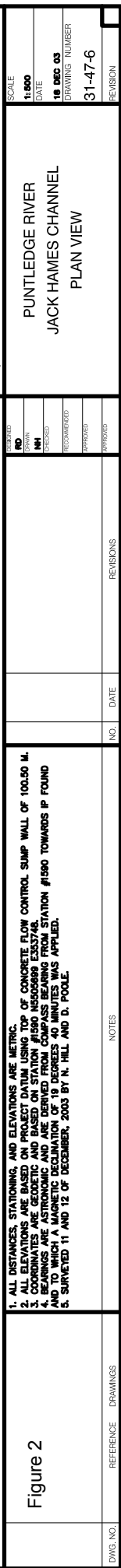




Photo 1. Pre-construction view of Jack Hames Channel, looking upstream from 0+290 m at one of three concrete weirs identified for removal (August 2003).

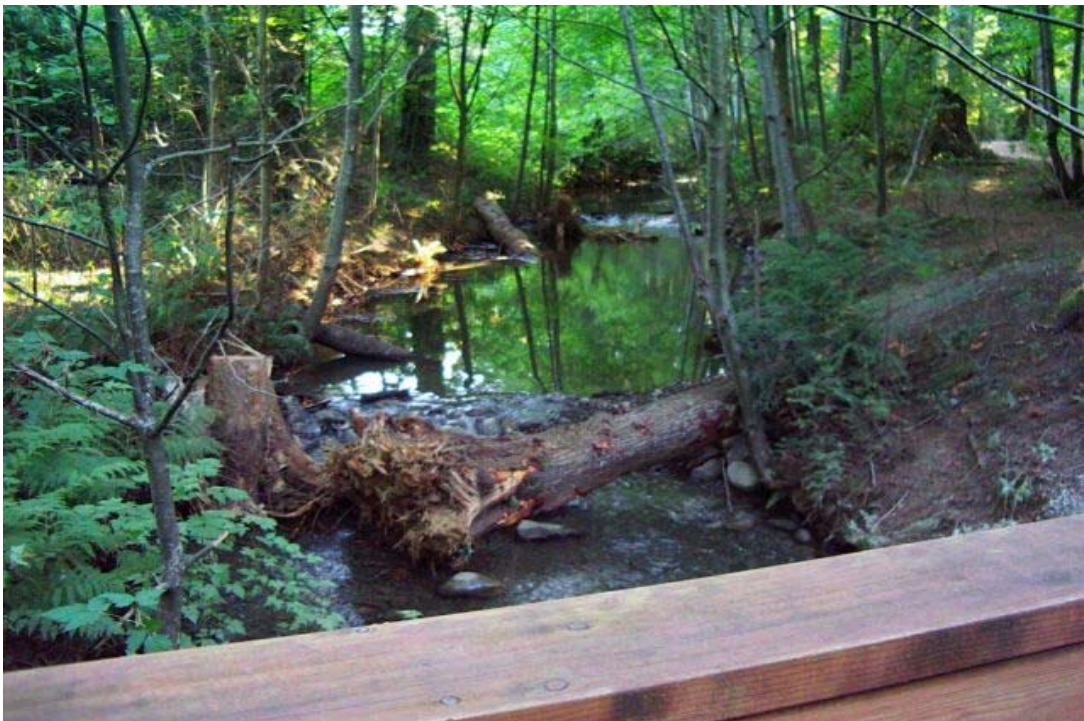


Photo 2. Post-construction view of Jack Hames Channel from 0+290 m at a riffle sequence and LWD replacing the concrete weir (September 2003).



Photo 3. Pre-construction, downstream view of Jack Hames Channel at 0+65 m showing lack of protective cover for rearing juvenile fish (Aug 2003).



Photo 4. Post construction, downstream view of Jack Hames Channel at 0+65 m showing LWD added (Sep 2003).



Photo 5. Chum salmon exclusion ramp installed in October 2003 at the lower end of the channel (0+317 m) which operates between October and December.



Photo 6. Concrete weir removed and used as an undercut feature on left of photo (September 2003).

Financial Statement

Income & Expenses

	Income	Expensed	
Income			
BCRP	\$ 14,092.00		
In-kind	\$ 7,718.34		
Total Income			
Expenses		BCRP	(In-kind)
Project Personnel			
Project supervision and reporting	\$ 2,296.88	\$ 2,296.88	
Technicians	\$ 2,500	\$ 2,500	
Labour	\$ 1,280	0	\$ 1,280
Professional (engineer, eng-tech, biologist, etc.)	\$ 4,900	0	\$ 4,900
Equipment & Expenses			
Equipment (excavator - Ex70, tandem, mobil)	\$ 5,742.60	\$ 5,742.60	
Materials (gravel, boulders incl trucking, exclusion ramp)	\$ 1,734.31	\$ 1,734.31	
Equipment rental	\$ 661.20	\$ 661.20	
Travel expenses	\$ 551.60	\$ 51.60	\$ 500
Signage	\$ 1,055	\$ 1,055	
Misc. field expenses	\$ 45.25	\$ 45.25	
Overhead			
Administration (5% of total)	\$ 1,038.34	0	\$ 1,038.34
GST	\$ 978.37	\$ 978.37	
Subtotal (not incl. GST)	\$ 21,805.18	\$ 14,086.84	\$ 7,718.34
Total Expensed		\$ 14,092	
Balance		\$ 5.16	

*Unspent BCRP financial contribution to be returned to: BC Hydro, BCRP
6911 Southpoint Drive (E16)
Burnaby, BC. V3N 4X8
ATTENTION: JANICE DOANE



Appendix B. Confirmation of BCRP Recognition: sample of poster display at Puntledge Hatchery showing summary of activities in the Puntledge River from 2002 - 2004.

From the Comox Valley Record, August 22, 2003

Bear James Park Upgrades Coming...

If you go out in the woods today you're in for a big surprise! At least in Bear James Park anyway...

Fisheries and Oceans Canada and BC Hydro Bridge Coastal Fish and Wildlife Restoration Program have teamed up to provide upgrades to the spawning channel located, in part, in the City of Courtenay's Bear James Park at the former Fish and Game Club site on Rod and Gun Rd.

Channel improvements will also be undertaken at the Powerline spawning channel located in the Hydro Right of Way up-

stream of Puntledge Hatchery.

The channel upgrades and habitat complexing will benefit returning pink salmon and juvenile salmonids.

Activities will commence on Tuesday August 26 and will be completed within a week. The public is asked to stay clear of designated work areas at both sites during this time for safety reasons.

For more information, please contact Fisheries and Oceans Puntledge Hatchery at 703-0909.

Restoring the Puntledge

By Larry Peterson
Puntledge River Restoration Committee

After decades of closure, the Puntledge River was open to sport-fishing for the third year in a row. The fishery closed at the end of last month, but during the season, which started October 1, there were 12 to 30 cars at Condorsory Bridge every day.

One day in October, four motorhomes, each carrying two Italian fishers, found their way to the Puntledge. One day last month, four Japanese visitors roamed its banks.

The abundance of fish and the generous but reasonable opportunities to retain coho, chum and chinook were strokes of good fortune and good management.

So how has all this come about?

Many factors and many people have played roles. First, about six years ago, the Courtenay Fish and Game Club, the local chapter of the Steelhead Society and other concerned citizens staged a large rally to insist on a predator control program for seals in the lower river. These seals were taking up semi-permanent residency in the inter-tidal zone and intercepting adult spawners on their way up-river. More importantly, the seals were feasting on young, downstream migrants on their way out to sea. Over half of all Puntledge River smolt production was being intercepted and consumed.

Secondly, the Puntledge River Restoration Committee reformed and began lobbying politicians, provincial and federal fisheries and BC Hydro to initiate and carry out a revitalization program which would see stepped-up fish production so there would be enough bodies out there to prejudice the odds towards survival instead of against it.

The second half of the equation was habitat improvement so that fish had abundant areas to spawn and rear and suitable water flows to guarantee efficiency of spawning and rearing.

Over the past five years, the Puntledge River Hatchery staff have been pumping out coho, chinook, pinks and chums to the point that salmon production has almost returned to historical levels.

BC Hydro has paid for and worked with the Department of Fisheries and Oceans (DFO) for side-channel construction and gravel placement at such places as Bull Island, (a semi-natural, \$200,000 project just upstream of Stotan Falls), the power-line area and the Courtenay Fish and Game side-channel.

Altogether, about \$227,000 has



Checking out restoration work at Bull Island is, from left, Brian Munroe, assistant manager of the Puntledge River Hatchery, Janice Doane, project manager with BC Hydro's Bridge Coastal Fish and Wildlife Restoration Program, and Larry Peterson, of the Puntledge River Restoration Committee.

been spent on restoration.

BC Hydro has guaranteed flows which are favorable for fish and provincial fisheries has both a cut-throat trout and a steelhead program in their early stages. There is a spirit of cooperation which is showing obvious positive results.

There is also another part to the effort. Ocean survival in the past four years has been excellent with the subsiding of El Nino and the rich upwellings of nutrients in the North Pacific.

The impact on salmon species has been pronounced and positive. Whether conditions are also starting to favor steelhead and cutthroat is still unknown, and all we can do is continue to plan and work and hope. We also need to get an estuary complexing study, still in the planning stages, under way.

We are not there yet. Much work and good fortune are still needed, but the Puntledge is on its way to once again becoming a world-class river.

Meanwhile, funding applications for monitoring Bull Island and further restoration on other parts of the Puntledge have been submitted to BC Hydro's Bridge Coastal Program.

The largest project being considered is restoration of spawning habitat for summer-run chinook downstream of the Comox Lake dam.