Zymoetz Watershed Restoration Program

Aquatic Habitat Rehabilitation Works 1998/99

3-Km Side Channel (Site 9)
16-Km Side Channel (Site 54B)
Thomas Creek (Site 236B)
Simpson Creek (Site 253)

Prepared for
Ministry of Environment Lands and Parks

Annual Agreement Number: SBA 98 315
Standards Agreement #00124
Activity Number: 12332

Prepared by
Terrace Salmonid Enhancement Society

May 1999

Table of Contents

List of Tables

List of Figures

List of Photos

1.0 Introduction

Under the 1998/99 Forest Renewal BC Watershed Restoration Program in the Zymoetz watershed, aquatic habitat rehabilitation works in at four sites were scheduled to be carried out by the Terrace Salmonid Enhancement Society (TSES): 3-Km Side Channel (Type III), 16-Km Side Channel (Type III), Thomas Creek (Type IV), Simpson Creek (Type II).

The following report provides the required deliverables outlined in Section 5 of Schedule "A" of the Standards agreement between the Ministry of Environment Lands and Parks and TSES.

2.0 3-Km Side Channel (Site 9)

Phase I of Type III works involving side channel development were completed in December 1998. The first phase of this work included a test channel development, construction of a berm to withstand a 25-year flood event, reinforcement of the channel with large rocks and boulders plus the addition of LWD, rootwads and large boulders for habitat complexity. Phase II of this project is scheduled to begin in the spring or mid-summer of 1999 with the excavation of the lower 400m of channel and additional large boulder placement, spawning area creation, hydroseeding of banks and the berm. A summary report has been included with this works report package.

3.0 16-Km Side Channel (Site 54B)

Phase I of this Type III side channel development took place during March 1999. A 150-m test channel was excavated to determine if a constant flow of water could be accessed at the lowest level of the water table. The excess material was used to build a dike at the top end of the channel to prevent the entry of surface water. The banks were sloped back and the channel was blocked off to prevent the Zymoetz River water from backing into it until further work can be done in the 1999/00 fiscal year. A summary report has been included with this works report package.

4.0 Thomas Creek (Site 236B)

Type IV works involving the removal of a large log jam in Thomas Creek has been postponed to the 1999/00 fiscal year. Forest approval has been received for access to this site and TSES is currently searching for the required equipment to carry out the work.

5.0 Simpson Creek (Site 253)

Type II works involving the addition of one rock weir proposed for Simpson Creek was completed in August 1998. On October 6, 1999, a large flood severely damaged all works completed in Simpson Creek in 1997 and 1998 after water flow broke around the outside of the vees and completely ripped out the top vee and the third vee.

5.1 Summation and Design Plan of "As Built" Rock Vee

An as built design plan was not completed before the October 1999 flood.

The two new rock vees were constructed as proposed in the prescription downstream from the bridge across Simpson Creek on August 8, 1998 (Photo 3). The following steps were taken:

- A Hitachi EX60 excavator was used to dig openings in the substrate that were 60cm to 120cm diameter which the anchor rocks were set into. The depth of each anchor hole was about half the diameter of the rock that was placed into the excavation. All rocks used were taken from the base of the rock walls along the road above Simpson Creek and a few in Simpson Creek were moved into the vees;
- Once each anchor rock was secure, smaller rocks were fitted into the openings between the larger rocks;
- Spawning gravel between 2cm and 8cm in diameter was placed above each vee to a thickness varying from 30 to 60 cm;
- A 10m section of dike using rocks 30 to 90cm in diameter was constructed along the right bank, adjacent to the third and bottom vee.

5.2 Photographs

Photo 1. Looking upstream Simpson Creek before installation of vees began in 1997.

Photo 2. Downstream Simpson Creek after rock vee installation (10-26-97)

Photo 3. Excavation of lower rock vee (8-8-98).

Photo 4. Spawning chinook in Simpson Creek after rock vee completion (8-23-98).

Photo 5. Upstream Simpson Creek during the flood of October 1998 (10-6-98).

Photo 6. Damage caused by flood in Simpson Creek (10-9-98).

5.3 Georeferenced 1:20,000

A map referencing the location of Simpson Creek and the modified stream reach is found in below. Note the rehabilitated reach is highlighted.

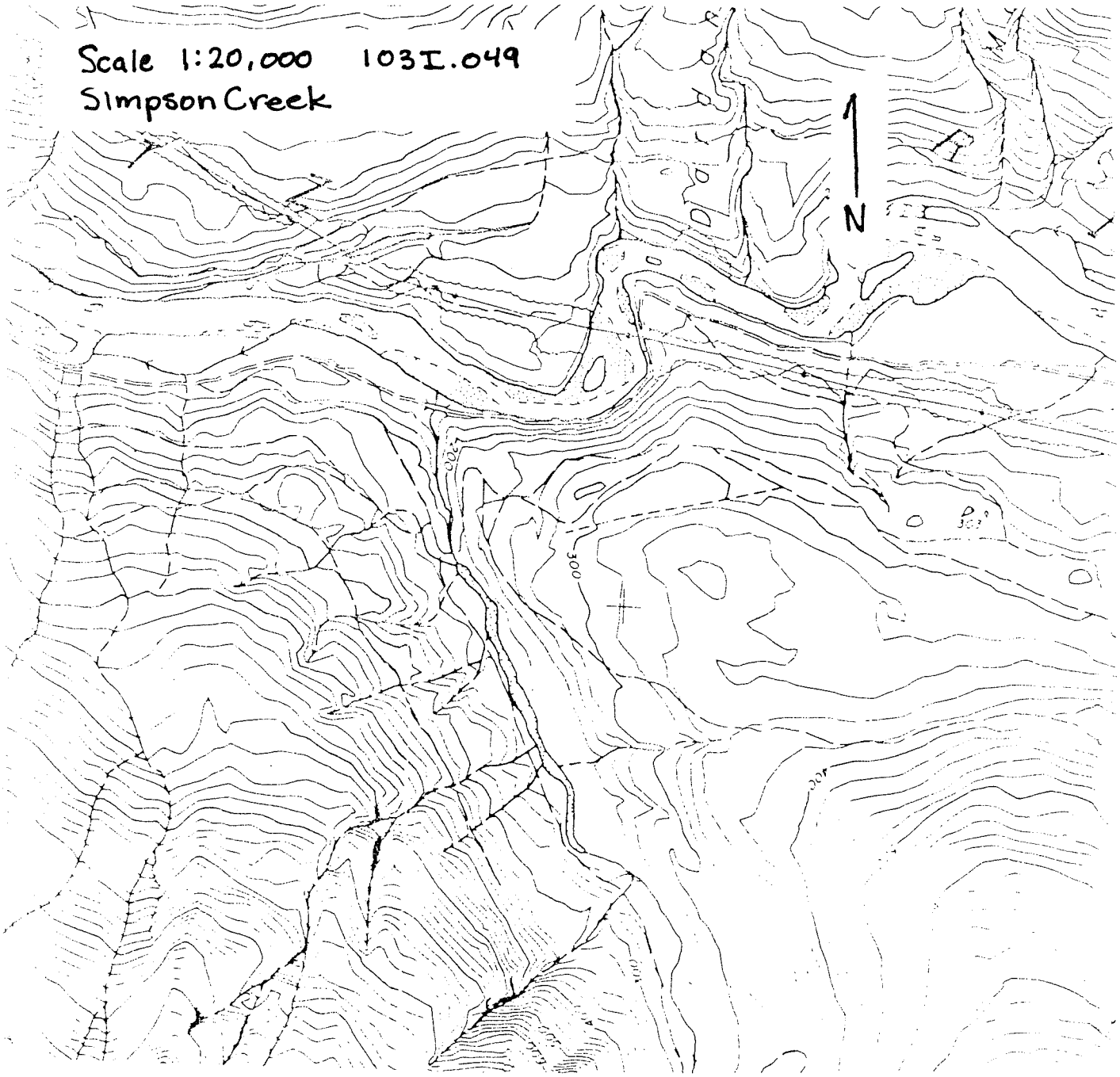


Figure 1. Location of restored reach in Simpson Creek.

5.4 Description of Modifications and Rationale

5.4.1 Original Design Plan

A sketch of the original proposed plan for the placement of a flat-shaped upstream rock vee can be found in Appendix I of this report. This plan was approved with two specific physical weir requirements:

1) Placement of this weir should be 4 to 6 channel widths downstream of the lower weir placed in 1997 (instead of the 3 channel widths proposed);
2) Rock used for the construction of the weir must be large enough to withstand the high water events of the Simpson Creek system.

5.4.2 Modifications and Rationale

Table 1. Modifications to the restoration plan and rationale.

Modification	Rationale
Addition of a forth vee constructed 10m below the bridge or immediately below the second vee.	A modified boulder cluster was constructed to reduce the water velocity and provide a step from the 3rd pool or lower pool to the 2nd pool for migrating salmonids
Addition of low level berm that flood waters can top	Constructed to protect the bottom or third vee, which is partly in the fan area of the creek.

5.5 Preliminary Monitoring Plan for 1999/00

A very heavy rainfall in the mid-Zymoetz watershed on October 6, 1998 caused an extreme flood in Simpson Creek and other streams close by. This resulted in the entire first and third rock cluster and 1/3 of the second vee to be washed out. Likely in part as a result of the reduced velocity of the flood flow at the third vee, and because of the construction of the berm the vee appears to be in tact, but buried under a huge amount of gravel that was moved downstream. One more effort is proposed to rehabilitate the Simpson Creek habitat downstream from the bridge. Adam Engineering Ltd. was contracted to carry out an engineered plan to mitigate the damage (WRP Site Survey and Design report). The reclamation works are scheduled to begin in early August of 1999. Highlights of the proposed plan include the:

- Use riprap armouring sized to be stable during an extreme flood event.
- Stream banks will be armoured and a low-level dike that floodwaters can pass over will prevent channel breakout.
- The upper or first vee which was the second vee will be reconstructed to create a pool and spawning area and what is now the second or lowest vee if not intact will be reconstructed or modified.
- Install instream boulders at the downstream end of the creek below the second vee to create scour pools and provide a stable creek bed.
- Periodic maintenance to monitor the condition of the substrate after flood events.
- A MELP and DFO preliminary review of the engineering plan are critical to determine if the new plan will have the ability to achieve the desired results. Further meetings will be held between the interested parties to try and find a solution.

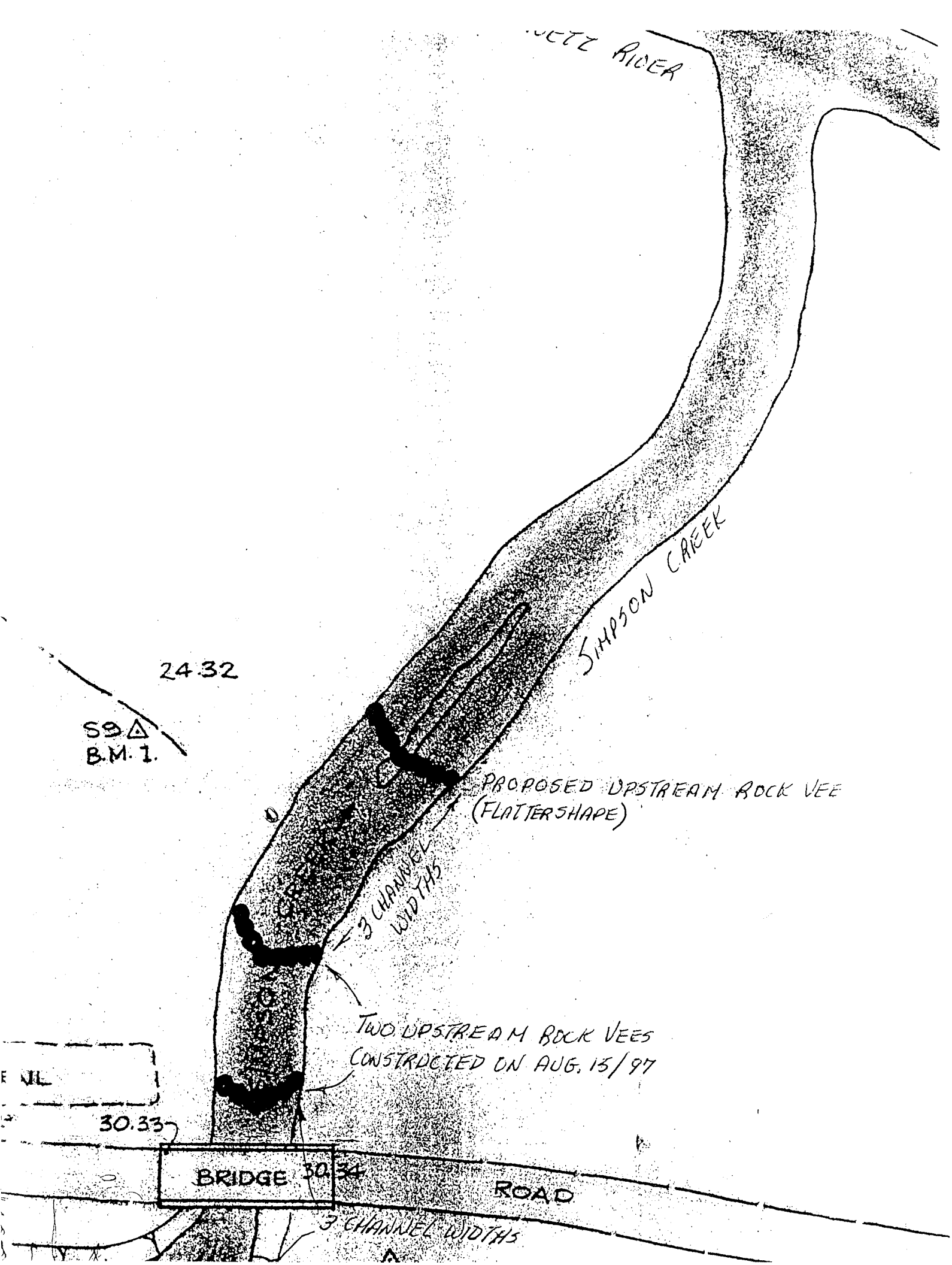
A monitoring plan will be put into place after the completion of this final rehabilitation work on the lower Simpson Creek fish habitat.

5.6 Cost Summary

The following is a cost summary for works completed at Simpson Creek:

Equipment	$2,000
Survey & Design	$4,213
Supplies	$32
Labour	$2,221
Total	$8,466

Appendix I: Original Simpson Creek Design Plan


RICER
SIMPSON CREEK
24.32
S9
B.M. 1.
PROPOSED UPSTREAM ROCK VEE
(FLATTER SHAPE)
3 CHANNEL WIDTHS
TWO UPSTREAM ROCK VEES
CONSTRUCTED ON AUG. 15/97
30.33
BRIDGE 30.34
ROAD
3 CHANNEL WIDTHS

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Terrace Salmonid Enhancement Society

May 13, 1999

Chris Broster
Senior Habitat Protection Officer
Ministry of Environment Lands and Parks
Kalum Forest District

Dear Chris:

Attached is one (1) copy of the final report for the Zymoetz Watershed Restoration Program Aquatic Habitat Restoration ***Works*** Standards Agreement #000124, Activity #12332 including attached summary reports for works not yet complete. Reporting has been provided for the following project areas as outlined in this Agreement:

- Rock vee construction at Simpson Creek (Site 253);
- Log jam modification at Thomas Creek (Site 236B)
- Off channel habitat complex at 3-Km Side Channel (Site 9).

In addition, Works have been undertaken at the following site:

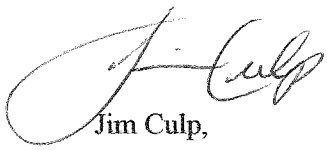
- Off channel habitat complex at 16-Km Side Channel (Site 54B).

Copies of this report have been distributed as follows:

- One (1) bound to Chris Broster, MELP Habitat Protection Officer;
- Three (3) bound, one (1) unbound and one (1) digital copy (summary reports) to Jeff Lough, WRP Regional Fisheries Specialist;
- One (1) bound to Mitch Drewes, DFO Habitat Protection Officer;
- One (1) bound retained by TSES.

If you have any questions or comments, do not hesitate to call.

Yours sincerely,



Jim Culp,
Project Manager,
TSES

KLS

Encl. (3)

CC: Jeff Lough
Mitch Drewes
TSES Board of Directors