

Seven Mile Project Water Use Plan

Monitoring Programs Annual Report: 2009

- **SEVMON-1 Seven Mile Tailrace Fish Stranding**
- **SEVMON-2 Seven Mile Sub-adult Bull Trout Entrainment Monitoring**

For Water Licences 113791, 113922, and Conditional Water Licence 111911

24 June 2009

BC Hydro Seven Mile Project Water Use Plan Monitoring Programs Annual Report: 2009

1 Introduction

This document is a summary of the status and the results of the Seven Mile Project Water Use Plan (WUP) monitoring programs to 31 May 2009, as per the Seven Mile Project Order under the *Water Act*, dated 18 December 2006. There are two monitoring programs including:

- a) SEVMON-1 Seven Mile Tailrace Fish Stranding
- b) SEVMON-2 Seven Mile Sub-adult Bull Trout Entrainment Monitoring

2 Background

The Water Use Planning process for BC Hydro's Seven Mile Dam and Generating Station was initiated in the late 1980's as part of the licensing process associated with the addition of a fourth generating unit. The process was revisited between December 2000 and January 2002 by the reviewing agencies to ensure that operations associated with the entire facility were considered. The conditions proposed in the WUP for the operation of the project reflect the February 2003 recommendations of the WUP Consultative Committee.

In February 2003, the Seven Mile Project WUP was submitted to the Comptroller of Water Rights (Comptroller). The draft WUP was sent out to regulatory agencies, First Nations and interested stakeholders for review. In December 2006, the CWR approved the final WUP and issued an Order to BC Hydro to implement the conditions proposed in the Seven Mile Project WUP and prepare the monitoring programs Terms of Reference (TOR).

As outlined in the WUP, a formal review of the WUP is recommended in ten years. A review could be triggered sooner if one of the following events occurs:

1. Imminent significant changes to upstream facilities or operations. It is anticipated that this includes, but is not limited to, physical changes to Boundary Dam and FERC relicensing of that facility;
2. Imminent, significant changes to downstream facilities. It is anticipated that this includes, but is not limited to, an expansion of the Waneta facilities; or
3. Emergent water use issues. It is expected that this may include, but not be limited to, the establishment of a strong link between bull trout entrainment and dam operations at the end of the five year monitoring program or new information making a strong link between white sturgeon and dam operations.

The following table outlines the dates that Seven Mile TOR have been submitted to, and approved by the CWR:

Name of Monitoring Program or Physical Works	Order Clause Fulfilled	Submission Date	Approval Date
SEVMON-1 Seven Mile Tailrace Fish Stranding	Clause 6 (i)	12 March 2007	20 March 2007
SEVMON-2 Seven Mile Sub-adult Bull Trout Entrainment Monitoring	Clause 6 (ii)	12 March 2007	20 March 2007

3 Status

The following table outlines the status and schedule for the Seven Mile Project WUP monitoring programs and physical works.

Table 3-1: Status of Seven Mile Project WUP Monitoring Programs Implementation

Monitoring Programs	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	WLR YR1	WLR YR2	WLR YR3	WLR YR4	WLR YR5	WLR YR6	WLR YR7	WLR YR8	WLR YR9	WLR YR10 Final Review
Seven Mile Tailrace Fish Stranding	✓	✓								
Seven Mile Sub-adult Bull Trout Entrainment Monitoring	✓	✓	u/w							
Legend: <ul style="list-style-type: none"> ■ = Program to be undertaken/initiated in identified year u/w = Project is underway ✓ = Program completed for the year x = Program started, but encountered operational or hydrological delays 										

4 Seven Mile Project WUP Monitoring Programs

This section outlines the status of the Seven Mile Project WUP monitoring programs as per the Order under the *Water Act*, dated 18 December 2006.

4.1 Seven Mile Tailrace Fish Stranding Monitoring

4.1.1 Overview

The primary objective of the fish stranding monitoring study is to reduce uncertainty related to the extent of fish stranding in the Seven Mile Dam tailrace. The scope of the assessments include the two bars where stranding was identified as a concern, and the bar that has been re-contoured during previous construction activities.

The Consultative Committee for the Seven Mile Dam and Generating Station Water Use Plan raised concerns of fish stranding in the Seven Mile Dam tailrace during flow fluctuations. Snorkel assessments of habitat in the Seven Mile tailrace and historic

observations suggested potential risk of fish stranding associated with low water levels (zero dam discharge and low Waneta Reservoir levels).

Monitoring Indicators a): number of fish stranded and the fish species/lifestages stranded

This monitoring program involved a two person crew conducting one pre-freshet and one post-freshet fish stranding assessment downstream of Seven Mile dam. Monitoring crews conducted visual inspections of potential fish stranding habitat and, using electrofishers or other means, captured and identified fish stranded in isolated pools. The assessment of potential mitigation options was undertaken as an office-based exercise.

4.1.2 Status

This monitoring program was initiated in March 19, 2007 and was carried out over 1-2 years when operating conditions allowed collection of fish stranding data. The pre-freshet stranding assessment was completed on February 24, 2008 and the post-freshet assessment was completed September 16, 2007. The final program report was completed in October 2008 and the study is now complete. The final report will be reviewed with the appropriate regulatory agencies in 2009.

4.1.3 Interpretation of Data

Surveys yielded a low risk of stranding. The pre-freshet survey produced one fish and the post-freshet survey yielded five fish. Stranding rates per site were therefore calculated at 0.3 and 1.6 respectively. Native salmonids were not recorded and stranded fish were comprised of small mouth bass (4) and black crappie (2) – both introduced species. No fish were found stranded on the recontoured bar.

Based on Seven Mile Dam discharge and Waneta Reservoir elevation data, the maximum number of flow conditions with the potential to strand fish at bars 1, 2, and 3 in 2007 was 70 events compared to 32 in 2005 and 16 in 2006. Based on these stranding rates, the maximum net loss in 2007 due to stranding could be as high as 112 fish and would most likely affect introduced, exotic species.

As stranding rates is not expected to have a population level effect on either native salmonids or introduced centrarchids, further recontouring of the bars is not considered necessary at this time.

4.2 Seven Mile Sub-adult Bull Trout Entrainment Monitoring

4.2.1 Overview

The primary objective of the entrainment monitoring study is to reduce uncertainty related to the use of the reservoir by Salmo River sub-adult bull trout, and the potential for entrainment through the facility. A secondary objective is to obtain additional information on sub-adult bull trout abundance, life history and habitat use in the Salmo River system. The latter information will help to assess the impact of entrainment on the Salmo River bull trout populations associated with the Seven Mile Reservoir, and identify other factors affecting population recovery.

The Consultative Committee for the Seven Mile Dam and Generating Station Water Use Plan expressed some concern that large drawdowns of the reservoir for maintenance purposes and spill events might increase the risk of sub-adult bull trout entrainment through the dam and result in their loss to the Salmo River bull trout population.

The key management questions are:

- 1) Whether Salmo River sub-adult bull trout are entrained through the dam.
- 2) Whether dam operations (primarily deep drawdowns during the winter) affect the rate of entrainment.
- 3) Whether entrainment has a population level effect on the bull trout population in the Salmo River watershed.

This monitoring program involves capturing sub-adult bull trout and implanting fish with radio tags so that fish movements can be tracked throughout the year. Tracking will occur using both mobile and stationary receivers. Data will be collected on habitat use, temperature and reservoir operations so that relationships between fish movement and environmental factors can be considered in data interpretation.

4.2.2 Status

This monitoring program was initiated in June 2007 and will be carried out over approximately 3 years. The first year resulted in successful tagging and tracking of 14 sub-adult bull trout. In the fall of 2008 an additional 9 fish were tagged. Fish movement has been successfully monitored over the first and second winter and continues on those tags that remain active. The second interim report was prepared in June 2009 and the final tagging session of the study will occur in October. The final report will be prepared June 2010. The report for the first two years will be reviewed with the appropriate regulatory agencies in 2009.

4.2.3 Interpretation of Data

The preliminary results of the monitoring program show that some sub-adult bull trout from the Salmo River do utilize the Seven Mile Reservoir (n=3,). All radio tagged sub-adult bull trout were observed moving between the Salmo River and the tailrace of Boundary Dam in the upper zone of Seven Mile Reservoir. Bull trout remained in the reservoir during the summer, which is inconsistent with the sub-hypothesis that warm water temperatures limit use of the reservoir to fall, winter, and spring months. There have been no detections of radio tagged bull trout in the tailrace downstream of the Seven Mile Project which suggests no entrainment of tagged fish to date.

5 Seven Mile Project WUP Monitoring Programs Costs

The following table summarizes the Seven Mile Project WUP monitoring programs costs approved by the Comptroller on 20 March 2007 and the actual costs to 31 May 2009.

Table 5-1: Seven Mile Project WUP Monitoring Programs Costs

Monitoring Programs	Activity	Costs approved by CWR	Total Forecast (Life to Date Actuals and Forecast)	Variance Total to Approved	Explanation	Corrective Action
SEVEN MILE WATERSHED						
SEVMON#1 SEVEN MILE TAILRACE FISH STRANDING		\$ 19,972	\$ 15,485	\$ 4,487		
	Direct Management	\$ 7,288	\$ 6,341	\$ 947	Study Complete	
	Implementation	\$ 12,684	\$ 9,144	\$ 3,540	Study Complete	
SEVMON#2 SEVEN MILE SUBADULT BULL TROUT ENTRAINMENT MONITORING		\$ 387,043	\$ 381,694	\$ 5,349		
	Direct Management	\$ 33,385	\$ 28,075	\$ 5,310	Last year of Study	
	Implementation	\$ 353,658	\$ 353,619	\$ 39	Last year of Study	