Campbell River Water Use Plan

Monitoring Program and Physical Works

Annual Report: 2017

Implementation Period: October 2016 to September 2017

- **JHTMON-1 Upper and Lower Campbell Lake Reservoir Digital Elevation Model**
- **JHTMON-2 Upper and Lower Campbell and John Hart Reservoirs Public Use and Perception Survey**
- **JHTMON-3 Upper and Lower Campbell Lake Fish Spawning Success Assessment**
- **JHTMON-4 Upper and Lower Campbell Lake Reservoirs Littoral Productivity Assessment**
- **JHTMON-5 Campbell Reservoirs Littoral vs. Pelagic Fish Production Assessment**
- **JHTMON-6 Campbell Watershed Riverine Fish Production Assessment**
- **JHTMON-7 Campbell River Watershed Riverine Fish Rearing**
- **JHTMON-8 Quinsam and Salmon Rivers Smolt and Spawner Abundance Assessment**
- **JHTMON-9 Upper and Lower Campbell Lake Reservoir Amphibian Assessment**
- **JHTMON-10 Upper and Lower Campbell Lake Reservoirs Shoreline Vegetation Model Validation**
- **JHTMON-11 Upper Campbell Lake Reservoir Erosion Assessment**
- **JHTMON-12 Salmon River Diversion Erosion Monitoring**
- **JHTMON-13 Lower Campbell River Ramping and Tripping Physical Model and Assmt**
- **JHTMON-14 Lower Campbell River Load Factoring Fisheries Assessment**
- **JHTMON-15 Elk Canyon Smolt and Spawner Abundance Assessment**
- **JHTWORKS-1 Upper Campbell Lake Erosion Control**
- **JHTWORKS-2 Upper and Lower Campbell Lake Recreation Facility Redevelopment**
- **JHTWORKS-3 Upper Campbell Drawdown Zone Revegetation program**
- **JHTWORKS-4 Sayward Canoe Route (Portage and Signage)**
- **JHTWORKS-5 Salmon River Diversion, Fry Creek Erosion Control**
- **JHTWORKS-6 Salmon River Diversion Fish Screen Upgrade**

For Water Licences 126726, 126725, 126722, 126724, 126713, 126721, 126751, 126727, 126757, 126764, 126759, 126765, 126761 and Conditional Water Licence 23265

October 31, 2017

BC Hydro Campbell River Project Water Use Plan Monitoring Programs and Physical Works Annual Report: 2017

1 Introduction

This document represents a summary of the status and the results of the Campbell River Water Use Plan (WUP) monitoring programs and physical works to September 30, 2017, as per the Campbell River Order under the *Water Act*, dated November 21, 2012. There are thirteen monitoring programs and six physical works.

2 Status

The following table outlines the dates that Terms of Reference (TOR) for the Campbell River WUP monitoring programs and physical works were submitted to and approved by the Comptroller of Water Rights (CWR).

Table: 2-1: Dates of Campbell River WUP TOR Submissions and Approvals by the Comptroller of Water Rights

Monitoring Program & Physical Works TOR	Order Clause	Original ToR Submission		Most Recent ToR Resubmission	
		Date Submitted	Date Approved	Date Submitted	Date Approved
JHTMON-1 Upper and Lower Campbell Lake Reservoir Digital Elevation Model	Schedule C.1.c	Dec 21, 2016	Feb 10, 2017		
JHTMON-2 Upper and Lower Campbell and John Hart Reservoirs Public Use and Perception Survey	Schedule C.2.b, Schedule D.1.c, Schedule E.2	Sep 26, 2013	Oct 08, 2013		
JHTMON-3 Upper and Lower Campbell Lake Reservoirs Fish Spawning Success Assessment	Schedule C.3.a, Schedule D.2.a	Jul 04, 2013	Jul 11, 2013	Jan 27, 2016	Apr 21, 2016
JHTMON-4 Upper and Lower Campbell Lake Reservoirs Littoral Productivity Assessment	Schedule C.3.b, Schedule E.1.a	Jul 04, 2013	Jul 11, 2013	Jan 27, 2016	May 19, 2016
JHTMON-5 Campbell Reservoirs Littoral vs. Pelagic Fish Production Assessment	Schedule C.3.c, Schedule D.2.b, Schedule E.1.b, Schedule F.5.b	Sep 26, 2013	Nov 12, 2013		
JHTMON-6 Campbell Watershed Riverine Fish Production Assessment	Schedule E.3.a. and 3.b	Sep 26, 2013	Jan 30, 2014		
JHTMON-8 Quinsam and Salmon Rivers Smolt and Spawner Abundance Assessment	Schedule F.5.a	Sep 26, 2013	Jan 30, 2014		
JHTMON-9 Upper and Lower Campbell Lake Reservoir Amphibian Assessment		Mar 31, 2018			
JHTMON-10 Upper and Lower Campbell Lake Reservoirs Shoreline Vegetation Model Validation	Schedule C.4.b, Schedule D.3.b	Sep 26, 2013	Jan 14, 2014	Jun 28, 2016	Jul 26, 2016
JHTMON-11 Upper Campbell Lake Reservoir Erosion Assessment	Schedule C.1.a and 2.a	Jul 04, 2013	Jul 11, 2013	Jul 12, 2017	Aug 18, 2017
JHTMON-13 Lower Campbell River Ramping and Tripping Physical Model and Assmt					
JHTMON-14 Lower Campbell River Load Factoring Fisheries Assessment	Schedule E.3.d	To be submitted Jan 31, 2020			
JHTMON-15 Elk Canyon Smolt and Spawner Abundance Assessment	Schedule E.3.e	Sep 26, 2013	Jan 20, 2014	Jan 27, 2016	May 19, 2016
JHTWORKS-1 Upper Campbell Lake Erosion Control					
JHTWORKS-2 Upper and Lower Campbell Lake Recreation Facility Redevelopment	Schedule C.1b, 1d Schedule D.1a, 1b	Jan 26, 2016	Mar 15, 2016	Oct 11, 2017	Pending
JHTWORKS-3 Upper Campbell Drawdown Zone Revegetation Program	Schedule C.1.c	Jun 28, 2016	Jul 26, 2016		
JHTWORKS-4 Sayward Canoe Route (Portage and Signage)	Schedule C.4.a	Jan 26, 2016	Mar 15, 2016		
JHTWORKS-5 Salmon River Diversion, Fry Creek Erosion Control	Schedule F.4.b & c	2016-01-20 Early ID Phase funding	Mar 15, 2016		
JHTWORKS-6 Salmon River Diversion Fish Screen Upgrade	Schedule F.4.d	Jan 28, 2014	Apr 10, 2014	Aug 27, 2015	Oct 13, 2015

* JHTMON-13 is negated by the John Hart Upgrade Project

3 Schedule

The following table outlines the current schedule for the monitoring programs and physical works being delivered for the Campbell River WUP.

Table 3-1: Monitoring Programs and Physical Works Schedule as of September 30, 2017.

Monitoring Program	2013 WLR YR1	2014 WLR YR2	2015 WLR YR3	2016 WLR YR4	2017 WLR YR5	2018 WLR YR6	2019 WLR YR7	2020 WLR YR8	2021 WLR YR9	2022 WLR YR10	2023 WLR YR11	2024 WLR YR12
JHTMON-1 Upper and Lower Campbell Lake Reservoir Digital Elevation Model					✓	■	■					
JHTMON-2 Upper and Lower Campbell and John Hart Reservoirs Public Use and Perception Survey		✓	✓	✓	✓	■	■	■	■	■	■	
JHTMON-3 Upper and Lower Campbell Lake Reservoirs Fish Spawning Success Assessment		✓	✓	✓	✓	■	■	■	■	■	■	
JHTMON-4 Upper and Lower Campbell Lake Reservoirs Littoral Productivity Assessment			✓	✓	✓							
JHTMON-5 Campbell Reservoirs Littoral vs. Pelagic Fish Production Assessment		✓	✓	✓	✓	■	■	■	■	■	■	
JHTMON-6 Campbell Watershed Riverine Fish Production Assessment			✓	✓	✓	■	■	■	■	■	■	
JHTMON-7 Campbell River Watershed Riverine Fish Rearing (not ordered)												
JHTMON-8 Quinsam and Salmon Rivers Smolt and Spawner Abundance Assessment		✓	✓	✓	✓	■	■	■	■	■	■	
JHTMON-9 Upper and Lower Campbell Lake Reservoir Amphibian Assessment						■	■	■				
JHTMON-10 Upper and Lower Campbell Lake Reservoirs Shoreline Vegetation Model Validation		✓	✓	✓	✓	■	■	■	■	■	■	
JHTMON-11 Upper Campbell Lake Reservoir Erosion Assessment				✓	✓	■	■	■	■	■	■	
JHTMON-12 Salmon River Diversion Erosion Monitoring (merged with WORKS-5)												
JHTMON-13 Lower Campbell River Ramping and Tripping Physical Model and Assmt [2]												
JHTMON-14 Lower Campbell River Load Factoring Fisheries Assessment								■	■	■	■	■
JHTMON-15 Elk Canyon Smolt and Spawner Abundance Assessment		✓	✓	✓	✓	■	■	■	■	■	■	
Physical Works												
JHTWORKS-1 Upper Campbell Lake Erosion Control [1]												
JHTWORKS-2 Upper and Lower Campbell Lake Recreation Facility Redevelopment				✓	✓	■	■	■	■	■	■	■
JHTWORKS-3 Upper Campbell Drawdown Zone Revegetation Program				✓	✓	■	■	■	■	■	■	■
JHTWORKS-4 Sayward Canoe Route (Portage and Signage)				✓	✓**F**							
JHTWORKS-5 Salmon River Diversion, Fry Creek Erosion Control [2]												
JHTWORKS-6 Salmon River Diversion Fish Screen Upgrade [2]	✓	✓	✓									

Footnote [1] Terms of Reference pending results of JHTMON-11. Implementation date and duration of program not set.
[2] Request for relief pending submission. No further work planned.

Legend: ■ = Program to be undertaken/initiated in identified year
✓ = Program completed for the year
✓**F** = All field work for this project is complete. No further field work is planned.

4 Monitoring Programs and Physical Works Terms of Reference

The Monitoring Programs and Physical Works being implemented under the Campbell River WUP are described in Terms of Reference. These Terms of Reference and the reports for work completed to date can be found here:

http://www.bchydro.com/about/sustainability/conservation/water_use_planning/vancouver_island/campbell_river.html

5 Status of Monitoring Programs

5.1 JHTMON-1 Upper and Lower Campbell Lake Reservoir Digital Elevation Model

On February 10, 2017 we received approval for the Terms of Reference for this project.

The intent of this project is to review boating hazards related to operating levels on the Upper Campbell Lake Reservoir/Buttle Lake Reservoir, and Campbell Lake Reservoir. On both reservoirs, spatial data will be collected and boating hazard zones will be mapped for different reservoir levels. The scope includes the collation of both existing and new aerial photography, bathymetry, mapping analysis and digital elevation models.

The spatial information collected by this project will also support spatial data needs associated with other projects including JHTWORKS-2 (recreation facility redevelopment), JHTWORKS-3 (revegetation program), as well as JHTMON-3, 4, and 5 (fish spawning and productivity studies).

All deliverables are anticipated to be completed in early 2019.

5.2 JHTMON-2 Upper and Lower Campbell and John Hart Reservoirs Public Use and Perception Survey

The intent of this project is to develop and implement a systematic approach to evaluate public use and perception of the operation and flow management in the Campbell River hydroelectric system, as well as of any works constructed as part of the WUP. The information gathered from this study is expected to provide a better understanding of the relationship between system operations and the overall recreation benefit expected from implementing WUP operations. The information will be used to inform future decisions that would necessitate trade-offs between recreation and other values such as fish and power benefits.

The monitoring program was initiated in 2014 with the design and development of the in-person, recreational use survey. Field work began in 2015 and will be carried out until 2023. The results to date suggest that the majority of recreationists are satisfied with their recreation experience on both the reservoir and river systems.

Attached is the Year 2 (2015/2016) report dated January 27, 2017.

5.3 JHTMON-3 Upper and Lower Campbell Lake Reservoirs Fish Spawning Success

The intent of this project is to assess the impact of the WUP operating regime on effective spawning habitat for cutthroat trout and rainbow trout in the Upper Campbell Reservoir and Campbell Lake Reservoir. The methodology, as described in the revised TOR, approved by the CWR April 21, 2016, is to use a combination of standardized snorkel surveys of spawning fish in tributaries as well as gill-netting/trap netting techniques to measure abundance of the species of interest in the reservoirs.

Methods used in this study will continue to be reviewed with regulatory agencies and the Monitoring Committee and this study will be adaptively managed to ensure that it will meet the intent while remaining cost effective. Hypothesis testing will commence in future years with each management question being answered as the data become available.

This monitoring program was initiated in June 2014 and will be carried out over 10 years. Attached is the Year 2 (2015) report dated April 29, 2016. The Year 3 report (2016) will be included in next year's annual report.

5.4 JHTMON-4 Upper and Lower Campbell Lake Reservoirs Littoral Productivity Assessment

The intent of this study is to assess the extent to which the management of reservoir levels affect littoral productivity. The results of this study will be used with the results of JHTMON-5 to determine how littoral productivity influences fish production.

In a letter dated May 19, 2016, the CWR approved a revision to the TOR for JHTMON-4 increasing the scope of data collection but reducing the duration for data collection. These changes resulted in a much more robust data set and therefore more likely success in answering the Management Questions. We are expecting to be able to model littoral productivity over a full range of reservoir fluctuations thus reducing the need to collect data over multiple years.

Periphyton, benthic invertebrate, and fish sampling was completed in Lower Campbell Reservoir in Year 1 (2015), with sampling continuing for Upper Campbell Reservoir in Year 2 (2016). Attached is the report for Year 2 (2016) dated October 23, 2017.

5.5 JHTMON-5 Campbell Reservoirs Littoral vs. Pelagic Fish Production Assessment

The intent of this study is to assess the extent to which fish production is driven by littoral or pelagic production and how this relates to BC Hydro operations. The results of this study will be used with the results of JHTMON-3 to determine how littoral or pelagic productivity influences fish production.

This monitoring program was initiated in July 2014 and will be carried out over a 10-year period. The TOR suggests that there were to be some years where no work was planned; however, for project management efficiencies we have decided to more evenly distribute the work over the full 10-year period.

There are two components to this study: the first component uses stable isotope analysis to assess the source of food for fish (littoral or pelagic) as it relates to

reservoir operation, and the second component assesses pelagic bacteria as an indicator of biological production related to water residence time in the reservoir. The information gathered from this study will be used to assess linkages between benthic and pelagic production and the effect of BC Hydro operations on fish production.

Attached is the report for Year 3 (2016) dated October 23, 2017.

5.6 JHTMON-6 Campbell Watershed Riverine Fish Production Assessment

The intent of this study is to address uncertainty around the relationship between habitat and flow in rivers within the Campbell River hydroelectric system and to determine the range of flows migrating fish need to successfully navigate barriers within the rivers. The study also examines the effectiveness of flow versus habitat modelling techniques.

This monitoring program was initiated in April 2015 and will be carried out over nine years. To gain project management efficiencies, the project has been separated into three components:

Component 1: Flow Habitat Relationships;

Component 2: Fish Passage Prescriptions; and

Component 3: Flow Habitat Analysis.

Attached are the Component 1 Year 1 (2015) report dated January 5, 2017 and also the Component 2 Year 2 (2016) report dated October 23, 2017. Component 3 will be implemented at a future date once the John Hart Generating Station upgrade project is complete.

There are parts of this study pertaining to the Salmon River Diversion that we have reviewed with respect to the recent decommissioning of the Salmon Diversion facility. Affected parts of the study will need to be removed. A revised TOR will be submitted to the CWR by December 2017.

5.7 JHTMON-7 Campbell River Watershed Riverine Fish Rearing

This project was not ordered.

The intent of this study was to understand the consequences for fish growth and biomass from small variations in river flow related to operations. Prior to finalizing the WUP and approval of the Order from the CWR, agencies and BC Hydro agreed that this study did not provide a clear linkage to addressing operational uncertainties identified under the WUP. As a result, the requirement to study riverine fish rearing was not included in the Order.

5.8 JHTMON-8 Quinsam and Salmon Rivers Smolt and Spawner Abundance Assessment

The intent of this study is to identify the primary factors that limit fish abundance in the Campbell River system and how these factors are influenced by BC Hydro operations, as well as to evaluate the effectiveness of WUP-based operations on fish abundance.

This monitoring program was initiated in March 2014 and will be carried out over 10 years. Attached is the Year 2 (2015) report dated October 12, 2016.

There are parts of this study pertaining to the Salmon River Diversion that are under review with respect to the recent decommissioning of the Salmon Diversion facility. Affected parts of the study will need to be removed. A revised TOR will be submitted to the CWR by December 2017.

5.9 JHTMON-9 Upper and Lower Campbell Lake Reservoir Amphibian Assessment

The intent of this study is to assess the response of amphibians to the operation of the Campbell River system largely through gaining a better understanding of the linkage between reservoir elevation and flow regime to amphibian habitat quantity and quality.

The initial Terms of Reference submission is scheduled for March 17, 2018.

5.10 JHTMON-10 Upper and Lower Campbell Lake Reservoirs Shoreline Vegetation Model Validation

The intent of this study is to determine if the shoreline vegetation model used during the development of the WUP to quantify operational impacts of reservoir operations could accurately predict how the plant communities respond to reservoir operational change over time.

This monitoring program was initiated in July 2014 and will continue for 10 years.

The Year 1 results demonstrated that for the Upper Campbell Reservoir, the shoreline vegetation model did not correlate well with field observations. It has been determined that fieldwork originally planned for Year 10 would be better done mid-way through the project in 2018 (i.e., Year 5). This will allow calibration of the model and confirmation of its ability to predict vegetation community change on the Upper Campbell Reservoir before the end of the study period. If at Year 5, the model is proven to be accurate or if the model requires refinement, then as per the TOR, the data collection/processing in future years may be altered to help improve or expand the shoreline vegetation model. Currently, water level data collection and reporting is forecast to continue through Year 10.

Attached is the Year 1 (2014/2015) report dated November 27, 2015.

5.11 JHTMON-11 Upper Campbell Lake Reservoir Erosion Assessment

The original approved TOR assumed that enough information was known to conclude that private properties (i.e., Cedar Creek, Strathcona Park and Strathcona Park Lodge subdivisions) were being affected by shoreline impacts related to reservoir operations. However, upon further review, it has been determined that a better understanding of shoreline impact and erosion processes relative to private property boundaries is necessary to determine the best approach to address issues associated with shoreline impacts.

The original TOR included collecting data on wind and wave action adjacent to private properties which was initiated in 2016. A wind and wave monitoring buoy was deployed in Upper Campbell Lake on August 31, 2016 and is collecting hourly data.

On August 18, 2017, we received approval from the CWR for revisions to the TOR to more effectively focus this study on assessing the risk of shoreline impacts to private properties. The revisions include the collection of LiDAR data,

as well as a geotechnical survey, and the continuation of the wind and wave data collection. This will more accurately define the potential for shoreline impact relative to BC Hydro property and private property boundaries. LiDAR has already been collected in October 2017.

5.12 JHTMON-12 Salmon River Diversion Erosion Monitoring

The intent of JHTMON-12 was to develop a correlation between Salmon River Diversion flows and the rate of erosion and identified locations. However, for project management efficiency the Consultative Committee agreed to not pursue JHTMON-12 and instead merge the scope of this study with JHTWORKS-5 Salmon River Diversion, Fry Creek Erosion Control.

Due to the decommissioning of the Salmon River Diversion facility during the summer of 2017, BC Hydro will be seeking relief from further implementation of JHTWORKS-5.

5.13 JHTMON-13 Lower Campbell River Ramping and Tripping Physical Model and Assessment

This study was intended to correlate the quantity and quality of spawning and rearing habitat with John Hart Generating Station ramp rates and tripping events.

Due to the John Hart Generating Station upgrade project and the application of a flow bypass system in the new facility designed to automatically bypass flows during tripping events, the need for this project requires review. However, BC Hydro would like to defer any decision to seek relief from this project until we know more about the effectiveness of the bypass operation once the new facility is commissioned. The new John Hart powerhouse will move to toward commissioning over the next two years. Updates on this project will continue to be provided as feedback is received about the effectiveness of the new flow bypass.

5.14 JHTMON-14 Lower Campbell River Load Factoring Fisheries Assessment

The intent of this project is to develop a correlation between load factoring (ramping according to peak power demand) at John Hart Generating Station and spawning/rearing behaviour and success. This two-year project will start after the John Hart Generating Station replacement project is completed and load factoring operations for the new facility are proposed.

5.15 JHTMON-15 Elk Canyon Smolt and Spawner Abundance Assessment

The intent of this study is to track the success or failure of the flow prescription in Elk Canyon to meet the intended WUP objectives around optimizing the flow versus habitat relationship in the canyon.

This monitoring program was initiated in September 2014 and will be carried out over 10 years.

Attached is the Year 1 2014/2015 report dated November 3, 2015. The Year 2 2016 report will be included in next year's annual report.

6 Status of Physical Works

6.1 JHTWORKS-1 Upper Campbell Lake Erosion Control

This physical works project was intended to develop an engineered solution using “soft techniques” (e.g., vegetation and natural materials) to mitigate shoreline erosion adjacent to private properties at Cedar Creek, Strathcona Park and Strathcona Park Lodge subdivisions. As stated above under JHTMON-11, wind and wave data is now being collected, and LiDAR will be collected, as well as property/geotechnical surveys will be completed in order to support a decision on the need for an erosion control physical works strategy.

If a decision is made to proceed with a physical works strategy, a TOR will be prepared and submitted to the CWR.

6.2 JHTWORKS-2 Upper and Lower Campbell Lake Recreation Facility Redevelopment

This physical works project is intended to determine the feasibility of upgrading boat ramps and beaches in Provincial Park sites and forest recreation sites in the Upper Campbell Lake and Buttle Lake Reservoir and Campbell Lake Reservoir, to define and prioritize upgrades as ordered by the CWR and to assess boating related recreation hazards. The focus of the work is to improve recreational access and address public safety risk across the normal operational range of both reservoirs.

The TOR for the identification/feasibility and early definition phases of this project was approved by the CWR on March 15, 2016. The TOR was developed with input on site selection and scope from local BC Parks and FLNRO staff.

A TOR addendum was sent to the CWR on October 11, 2017. The addendum outlines the seven sites that were selected for upgrades, as well as the type of upgrade (e.g., dock extension, ramp improvement, etc.) as based on discussions with BC Parks and FLNRO staff. The addendum also includes the feasibility studies that were conducted by engineering firms for each site. The most recent TOR submission highlights that the upgrades will be completed by the end of 2019. Implementation of the works will commence immediately after receipt of approval from the CWR.

6.3 JHTWORKS-3 Upper Campbell Drawdown Zone Revegetation Program

The intent of this project is to identify, prioritize, and revegetate highly visible reservoir perimeter sites within the drawdown zone in the Upper Campbell Reservoir.

Our approach to this project was discussed with the Monitoring Committee on April 20, 2016. The project will be delivered in three phases with Phases 1 and 2 included covered under the TOR (approved on July 26, 2016) while the methods and the budget for Phase 3 will be submitted to the CWR for approval at the end of Year 6.

The first phase of the project is underway with the identification and prioritization of selected revegetation sites around Upper Campbell Reservoir. Site selection and the type of revegetation treatment plan (e.g., allow for natural regeneration, or active planting, etc.) was completed by a contract team through site visits,

literature review, and a workshop on June 20, 2017 with local agencies, First Nations, outdoor recreation specialists, and revegetation experts. Phase 2 will include trial treatments at selected high priority sites throughout the next three years and the development of a Re-vegetation Treatment Plan to be implemented in Phase 3. We will update the CWR on our progress in next year's annual report.

6.4 JHTWORKS-4 Sayward Canoe Route (Portage and Signage)

The original intent of this project was to improve access and signage along portage routes on the Salmon River Diversion to reduce public safety risks. Since the Consultative Committee process wrapped up in March 2003, Recreation Sites and Trails BC (FLNRO) has upgraded the portage trail along the Salmon River Diversion portion of the Sayward Canoe Route. As a result, improving access along the portage routes is no longer required and the TOR of this project focuses on the enhancement of signage and safety advisories associated with approximately 6 km of the Sayward Canoe Route along the Salmon River Diversion.

The TOR for this project was approved by the CWR on May 15, 2016. The signs were developed and installed by a local contractor. However, with the decommissioning of the Salmon River Diversion Dam, BC Hydro no longer affects the flow of water throughout this stretch of the Sayward Canoe Route. As a result of the decommissioning, the safety signs were modified and re-installed in September 2017, to accurately reflect the type of hazard that exists along this part of the route. The modification also includes the removal of BC Hydro's logo from the signs and any references to upstream BC Hydro facility operations.

6.5 JHTWORKS-5 Salmon River Diversion, Fry Creek Erosion Control

Due to BC Hydro's decommissioning of the Salmon River Diversion facility in summer 2017, BC Hydro will be seeking relief from this project.

6.6 JHTWORKS-6 Salmon River Diversion Fish Screen Upgrade

Due to BC Hydro's decommissioning of the Salmon River Diversion facility in summer 2017, BC Hydro will be seeking relief from this project.

7 Monitoring Programs and Physical Works Costs

The following table summarizes the Campbell River WUP monitoring programs and physical works costs approved by the Comptroller and the Actual Costs to September 30, 2017.

Table 7-1: Campbell River WUP Monitoring Programs and Physical Works Costs

Monitoring Programs & Physical Works	Costs approved by CWR	Life to Date Actuals (LTD)	Estimated to Complete (Forecast)	Total Forecast (LTD and Forecast)	Variance Total to Approved	Explanation	Corrective Action
Campbell River WUP Annual Report	$21,194	$5,294	$14,690	$19,984	$1,210		
JHTM01A Digital Elevation Mod	$164,335	$36,231	$128,103	$164,334	$1		
JHTM01A Digital Elevation Mod - OR DM	$22,630	$16,354	$6,276	$22,630	$0		
JHTM01A Digital Elevation Mod - OR Imp	$141,705	$19,878	$121,827	$141,705	$0		
JHTM02A Public Use Perception	$1,345,982	$310,083	$861,997	$1,172,080	$173,902	Efficiencies found during implementation	
JHTM02A Public Use Perception - OR DM	$117,321	$32,566	$42,661	$75,227	$42,094		
JHTM02A Public Use Perception - OR Imp	$1,228,661	$277,517	$819,337	$1,096,853	$131,808		
JHTM03A Fish Spawn Success As	$1,657,581	$707,470	$873,216	$1,580,686	$76,895	Efficiencies found during implementation	
JHTM03A Fish Spawn Success As - OR DM	$149,098	$52,230	$61,558	$113,789	$35,309		
JHTM03A Fish Spawn Success As - OR Imp	$1,508,483	$655,240	$811,658	$1,466,897	$41,586		
JHTM04A Littoral Productivity	$632,771	$530,214	$17,788	$548,002	$84,769	Efficiencies found during implementation	
JHTM04A Littoral Productivity - OR DM	$104,696	$36,000	$17,788	$53,788	$50,908		
JHTM04A Littoral Productivity - OR Imp	$528,075	$494,214	$0	$494,214	$33,861		
JHTM05A Littoral vs Pelagic	$985,111	$490,921	$426,322	$917,244	$67,867	Efficiencies found during implementation	
JHTM05A Littoral vs Pelagic - OR DM	$116,246	$31,884	$25,451	$57,335	$58,911		
JHTM05A Littoral vs Pelagic - OR Imp	$868,865	$459,037	$400,871	$859,908	$8,957		
JHTM06A Fish Production Asses	$839,068	$319,776	$409,332	$729,107	$109,961	Efficiencies found during implementation	
JHTM06A Fish Production Asses - OR DM	$110,518	$36,278	$27,408	$63,687	$46,831		
JHTM06A Fish Production Asses - OR Imp	$728,550	$283,497	$381,923	$665,421	$63,129		
JHTM07A Fish Rearing Behavior			$0	$0	($0)	Project not ordered	
JHTM07A Fish Rearing Behavior - OR DM			$0	$0	($0)		
JHTM07A Fish Rearing Behavior - OR Imp			$0	$0	($0)		
JHTM08A Quinsam & Salmon	$2,246,345	$815,132	$1,253,887	$2,069,019	$177,326	Efficiencies found during implementation	
JHTM08A Quinsam & Salmon - OR DM	$137,667	$43,586	$60,510	$104,096	$33,571		
JHTM08A Quinsam & Salmon - OR Imp	$2,108,678	$771,546	$1,193,377	$1,964,923	$143,755		
JHTM09A Lake Res Amphibian As		$15,914		$15,914	($15,914)	No Terms of Reference (TOR)	Terms of Reference to be sumbmitted by March 31, 2018.
JHTM09A Lake Res Amphibian As - OR DM		$15,409		$15,409	($15,409)		
JHTM09A Lake Res Amphibian As - OR Imp		$505		$505	($505)		
JHTM10A Shoreline Veg Model	$268,799	$178,280	$90,519	$268,799	($0)		
JHTM10A Shoreline Veg Model - OR DM	$65,412	$49,307	$16,105	$65,412	($0)		
JHTM10A Shoreline Veg Model - OR Imp	$203,387	$128,973	$74,414	$203,387	$0		
JHTM11A Erosion Assessment	$344,874	$84,987	$244,534	$329,521	$15,353		
JHTM11A Erosion Assessment - OR DM	$76,403	$55,165	$19,534	$74,699	$1,704		
JHTM11A Erosion Assessment - OR Imp	$268,471	$29,822	$225,000	$254,822	$13,649		
JHTM12A Salmon Div Erosion			$0	$0	($0)	Study merged with JHTWORKS-05	
JHTM12A Salmon Div Erosion - OR DM			$0	$0	($0)		
JHTM12A Salmon Div Erosion - OR Imp			$0	$0	($0)		
JHTM13A Ramp / Trip Physical		$6,881	$0	$6,881	($6,881)	Study may no longer be necessary because of new JHT powerhouse.	Study decision deferred until new plant is operational.
JHTM13A Ramp / Trip Physical - OR DM		$6,881	$0	$6,881	($6,881)		
JHTM13A Ramp / Trip Physical - OR Imp			$0	$0	($0)		
JHTM14A Factoring Fisheries		$8,623		$8,623	($8,623)	No TOR, project not yet implemented	TOR submission once new plant is operational
JHTM14A Factoring Fisheries - OR DM		$8,623		$8,623	($8,623)		
JHTM14A Factoring Fisheries - OR Imp							
JHTM15A Elk Canyon Smolt	$2,180,378	$1,051,061	$1,032,799	$2,083,860	$96,518	Efficiencies found during implementation	
JHTM15A Elk Canyon Smolt - OR DM	$141,441	$63,456	$62,850	$126,306	$15,135		
JHTM15A Elk Canyon Smolt - OR Imp	$2,038,937	$987,605	$969,949	$1,957,554	$81,383		
JHTW01A Up Campbell Erosion		$18,364	$0	$18,364	($18,364)	No TOR, future phases not yet forecast	TOR submission after JHTMON-11 is complete.
JHTW01A Up Campbell Erosion - OR DM		$18,364	$0	$18,364	($18,364)		
JHTW01A Up Campbell Erosion - OR Imp			$0	$0	($0)		
JHTW02A Rec Facility Upgrad	$514,729	$389,729	$125,000	$514,729	($0)	Approved CWR costs are for Phases 1 and 2 only (of 3 total phases).	TOR addendum for Phase 3 (Construction) submitted on Oct 11, 2107. Approval still pending.
JHTW02A Rec Facility Upgrad - OR DM	$134,632	$230,377	$31,089	$261,466	($126,834)		
JHTW02A Rec Facility Upgrad - OR Imp	$380,097	$159,352	$93,911	$253,263	$126,834		
JHTW03A Up Campbell Re-Vege	$774,380	$135,032	$553,118	$688,150	$86,230		
JHTW03A Up Campbell Re-Vege - OR DM	$92,833	$69,178	$23,655	$92,833	($0)		
JHTW03A Up Campbell Re-Vege - OR Imp	$681,547	$65,854	$529,463	$595,317	$86,230		
JHTW04A Sayward Canoe Route	$45,788	$19,561	$2,152	$21,713	$24,075		
JHTW04A Sayward Canoe Route - OR DM	$20,488	$11,507	$2,152	$13,659	$6,829		
JHTW04A Sayward Canoe Route - OR Imp	$25,300	$8,054	$0	$8,054	$17,246		
JHTW05A Salmon Erosion Cont	$54,462	$17,106	$0	$17,106	$37,356	Requesting relief, final reporting outstanding	Seek relief from the CWR to dismiss this project due to the decommissioning of the Salmon River Diversion Dam
JHTW05A Salmon Erosion Cont - OR DM	$54,462	$17,106	$0	$17,106	$37,356		
JHTW05A Salmon Erosion Cont - OR Imp							
JHTW06A Salmon Screen Upgrd	$842,742	$480,598		$480,598	$362,144	Requesting relief, final reporting outstanding	Seek relief from the CWR to dismiss this project due to the decommissioning of the Salmon River Diversion Dam
JHTW06A Salmon Screen Upgrd - OR DM	$46,881	$41,526		$41,526	$5,355		
JHTW06A Salmon Screen Upgrd - OR Imp	$795,861	$439,071		$439,071	$356,790		

OR - Ordered Remissible
ONR - Ordered Non-Remissible

*** Red values in parentheses denote overage.**