

Campbell River Water Use Plan Monitoring Program and Physical Works

Annual Report: 2018

Implementation Period: October 2017 to September 2018

- **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-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, 2018

BC Hydro Campbell River Project Water Use Plan Monitoring Programs and Physical Works Annual Report: 2018

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, 2018, 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	Dec 22, 2017	Jan 26, 2018
JHTMON-8 Quinsam and Salmon Rivers Smolt and Spawner Abundance Assessment	Schedule F.5.a	Sep 26, 2013	Jan 30, 2014	Dec 22, 2017	Jan 26, 2018
JHTMON-9 Upper and Lower Campbell Lake Reservoir Amphibian Assessment	Schedule C.4.a, Schedule D.3.a	May 04, 2018	May 18, 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	Schedule E.3.c				
JHTMON-14 Lower Campbell River Load Factoring Fisheries Assessment	Schedule E.3.d				
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	Jul 06, 2018	Jul 18, 2018
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

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, 2018.

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			✓	✓	✓F							
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

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 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 anticipated 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 and field work began in 2015. Work will continue annually for 10 years until 2023.

Attached is the Year 3 (2016/2017) report dated May 25, 2018.

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.

This monitoring program was initiated in June 2014 and will be carried out over 10 years. Attached are the Year 3 (2016) report dated November 2, 2017 and the Year 4 (2017) report dated July 23, 2018.

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

The intent of this study was 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. This project is complete.

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-4 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.

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 first component has been completed with a final report submitted with the 2017 Annual Report. Planning is underway to initiate the second component with field work expected to begin in 2019.

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 three-component monitoring program was initiated in April 2015 and will be carried out over nine years. This study is intended to assess rivers within the Campbell River hydroelectric system, which initially included Salmon River. As BC Hydro has decommissioned the Salmon River Diversion, a revised TOR was submitted to the CWR and approved in January 2018. Study components related to the Salmon River were removed from the JHTMON-6 TOR.

Components 1 and 2 are ongoing. A study plan for Component 3 is under development and work will begin in 2019.

The draft report for Component 1 Years 2 to 3, and the draft report for Component 2 Year 3 are currently under review and will be submitted along with the 2019 Annual Report.

5.7 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. This study is intended to assess rivers within the Campbell River hydroelectric system, which initially included Salmon River. As BC Hydro has decommissioned the Salmon River Diversion, a revised TOR was submitted to the CWR and approved in January 2018. Study components related to the Salmon River were removed from the JHTMON-8 TOR.

Attached are the Year 3 (2016) report dated November 9, 2017 and the Year 4 (2017) report dated July 3, 2018.

5.8 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 Terms of Reference were approved by the CWR in May 2018. This study is scheduled to commence in late 2018 and continue for 2 to 3 years.

5.9 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.

The Year 1 (2014) 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 Year 5 (2018). 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. The results of the model validation work in 2018 will determine whether this project extends beyond Year 5.

Year 5 results will be reported along with the 2019 Annual Report.

5.10 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.

To inform our understanding of impacts to shoreline and erosion processes, LiDAR data was collected in October 2017, wind and wave data continues to be collected, and a geotechnical field survey was conducted in September 2018. Development of the field survey report is underway.

5.11 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, on December 13, 2017, BC Hydro was granted relief from further implementation of JHTWORKS-5.

5.12 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.

The John Hart Generating Station upgrade project includes a system in the new facility designed to automatically bypass flows during tripping events. Commissioning work of the new powerhouse began in 2018 and is currently ongoing. Once the new flow bypass system is operational, the risk to downstream habitat from tripping events should be reduced and BC hydro will re-assess the scope of this project.

5.13 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 new John Hart Generating Station is fully commissioned and load factoring operations for the new facility are proposed.

5.14 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 are the Year 2 (2015) report dated October 31, 2017 and the Year 3 (2016) report dated October 22, 2018.

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, LiDAR data, and wind and wave data is now being collected, and a geotechnical field survey was conducted in September 2018, 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

The focus of this work is to improve recreational access and to remove safety hazards in the Upper Campbell Lake and Buttle Lake Reservoir and Campbell Lake Reservoir.

The feasibility of nine sites was completed and summarized in the Recommendations Report dated October 11, 2017. On October 31, 2017, the CWR approved to progress to detailed design and implementation of seven sites.

As designs progressed, design changes were made to the Dogwood Beach site. The proposed dredge at Dogwood Beach was eliminated, as it was determined that the cost of the dredge exceeded the public benefit value (approved by CWR on July 18, 2018).

Further submissions will be made to the CWR related to Buttle Lake day use area and boat launch by November 30, 2018.

Below is summary of the status of the works.

Project	Scope	Status
Loveland Bay Dock	Repaired reservoir end of the existing dock and installed a new dock extension to the end of the existing dock.	Complete In-service date: May 14, 2018
Dogwood Beach Dredge	BC Hydro, RSTBC, and First Nations agreed that the work would not benefit park users and that this money would be better allocated to the Karst Creek Boat Launch Project.	NA – Funds Reallocated to Karst Creek Boat Launch
Miller Creek Dock	Removed the existing jetty and dock and replace with engineered jetty, aluminum gangway and new dock.	Complete In-service date: May 18, 2018
Campbell Recreation Site	Rock barriers installed in 7 locations along the bank between campsites and the beach. Rock stairs installed at 8 locations along the bank providing safe public access to the beach.	Complete In-service date: March 8, 2018

Project	Scope	Status
Buttle Lake Boat Launch	Boat ramp upgrades for safety	Late 2018
Buttle Lake Campground Day Use Area	Trail upgrades to be determined	Scheduled for Spring 2019
Karst Creek Boat Launch	Boat launch upgrades to be determined	Scheduled for 2019/2020

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.

The project is being delivered in three phases with Phases 1 and 2 covered under the current TOR. The methods and the budget for Phase 3 will be submitted to the CWR for approval at the end of Year 6 (2022).

The identification and prioritization of selected revegetation sites around Upper Campbell Reservoir (Phase 1) is now complete. Phase 2, starting in October 2018, includes trial treatments (i.e. active planting) at selected high priority sites and will continue throughout the next two years until spring 2020.

Attached is the Year 1 (2017) report dated January 12, 2018.

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 Recreation Sites and Trails BC (FLNRORD) had already upgraded the portage trail along the 6 km portion of the Sayward Canoe Route along the Salmon River Diversion, the TOR (approved by the CWR on May 15, 2016) only included signage and safety advisories.

As a result of the decommissioning of the Salmon River Diversion Dam, the safety signs were modified and installed in September 2017 to accurately reflect the type of hazard that exists along this part of the route.

This project is complete.

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

Due to BC Hydro's decommissioning of the Salmon River Diversion facility, BC Hydro was granted relief from this project on December 13, 2017.

6.6 JHTWORKS-6 Salmon River Diversion Fish Screen Upgrade

Due to BC Hydro's decommissioning of the Salmon River Diversion facility, BC Hydro was granted relief from this project on December 13, 2017.

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, 2018.

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	\$6,820	\$12,116	\$18,937	\$2,257		
JHTM01A Digital Elevation Mod	\$164,335	\$66,474	\$50,414	\$116,888	\$47,447		
JHTM01A Digital Elevation Mod - OR DM	\$22,630	\$22,558	\$3,524	\$26,082	(\$3,452)		
JHTM01A Digital Elevation Mod - OR Imp	\$141,705	\$43,916	\$46,890	\$90,806	\$50,899		
JHTM02A Public Use Perception - OR	\$1,345,982	\$433,402	\$497,862	\$931,264	\$414,718		
JHTM02A Public Use Perception - OR DM	\$117,321	\$38,730	\$26,712	\$65,442	\$51,879		
JHTM02A Public Use Perception - OR Imp	\$1,228,661	\$394,673	\$471,150	\$865,822	\$362,839		
JHTM02A Public Use Perception - ONR			\$190,122	\$190,122	(\$190,122)	Remaining OR TOR approved budget will be shifted to ONR TOR approved budget as of January 2019 to reflect the new license requirement	
JHTM02A Public Use Perception - ONR DM			\$7,108	\$7,108	(\$7,108)		
JHTM02A Public Use Perception - ONR Imp			\$183,014	\$183,014	(\$183,014)		
JHTM03A Fish Spawn Success As	\$1,657,581	\$1,091,584	\$527,694	\$1,619,278	\$38,303		
JHTM03A Fish Spawn Success As - OR DM	\$149,098	\$62,300	\$46,049	\$108,349	\$40,749		
JHTM03A Fish Spawn Success As - OR Imp	\$1,508,483	\$1,029,284	\$481,645	\$1,510,929	(\$2,446)		
JHTM04A Littoral Productivity - OR	\$632,771	\$530,539	\$4,095	\$534,634	\$98,137	Project Complete	
JHTM04A Littoral Productivity - OR DM	\$104,696	\$36,325	\$4,094	\$40,420	\$64,276		
JHTM04A Littoral Productivity - OR Imp	\$528,075	\$494,214	\$0	\$494,214	\$33,861		
JHTM05A Littoral vs Pelagic - OR	\$985,111	\$492,198	\$390,839	\$883,036	\$102,075	Budget to be reassessed following decision on work proposal	
JHTM05A Littoral vs Pelagic - OR DM	\$116,246	\$33,160	\$17,739	\$50,899	\$65,347		
JHTM05A Littoral vs Pelagic - OR Imp	\$868,865	\$459,037	\$373,100	\$832,137	\$36,728		
JHTM05A Littoral vs Pelagic - ONR			\$27,175	\$27,175	(\$27,175)	Remaining OR TOR approved budget will be shifted to ONR TOR approved budget as of January 2019 to reflect the new license requirement	
JHTM05A Littoral vs Pelagic - ONR DM			\$1,275	\$1,275	(\$1,275)		
JHTM05A Littoral vs Pelagic - ONR Imp			\$25,900	\$25,900	(\$25,900)		
JHTM06A Fish Production Asses - OR	\$839,068	\$436,692	\$187,645	\$624,336	\$214,732	Budget to be reassessed following decision on work proposal	
JHTM06A Fish Production Asses - OR DM	\$110,518	\$43,702	\$4,396	\$48,098	\$62,420		
JHTM06A Fish Production Asses - OR Imp	\$728,550	\$392,990	\$183,248	\$576,238	\$152,312		
JHTM06A Fish Production Asses - ONR			\$138,882	\$138,882	(\$138,882)	Remaining OR TOR approved budget will be shifted to ONR TOR approved budget as of January 2019 to reflect the new license requirement	
JHTM06A Fish Production Asses - ONR DM			\$13,852	\$13,852	(\$13,852)		
JHTM06A Fish Production Asses - ONR Imp			\$125,030	\$125,030	(\$125,030)		
JHTM08A Quinsam & Salmon	\$2,246,345	\$961,763	\$729,694	\$1,691,457	\$554,888	Salmon River study area removed from project.	
JHTM08A Quinsam & Salmon - OR DM	\$137,667	\$48,934	\$50,224	\$99,158	\$38,509		
JHTM08A Quinsam & Salmon - OR Imp	\$2,108,678	\$912,829	\$679,470	\$1,592,300	\$516,378		
JHTM09A Lake Res Amphibian As	\$301,430	\$51,691	\$243,974	\$295,665	\$5,765		
JHTM09A Lake Res Amphibian As - OR DM	\$55,656	\$33,908	\$15,983	\$49,891	\$5,765		
JHTM09A Lake Res Amphibian As - OR Imp	\$245,774	\$17,783	\$227,991	\$245,774	\$0		
JHTM10A Shoreline Veg Model	\$268,799	\$206,679	\$61,556	\$268,235	\$564		
JHTM10A Shoreline Veg Model - OR DM	\$65,412	\$54,459	\$10,546	\$65,006	\$406		
JHTM10A Shoreline Veg Model - OR Imp	\$203,387	\$152,220	\$51,010	\$203,230	\$157		
JHTM11A Erosion Assessment	\$344,874	\$135,051	\$176,945	\$311,996	\$32,878		
JHTM11A Erosion Assessment - OR DM	\$76,403	\$72,516	\$12,397	\$84,912	(\$8,509)		
JHTM11A Erosion Assessment - OR Imp	\$268,471	\$62,536	\$164,548	\$227,084	\$41,387		
JHTM12A Salmon Div Erosion				\$0	\$0	Study merged with JHTWORKS-05	
JHTM12A Salmon Div Erosion - OR DM							
JHTM12A Salmon Div Erosion - OR Imp							
JHTM13A Ramp / Trip Physical - OR		\$7,090	\$4,374	\$11,464	(\$11,464)	Study may no longer be necessary due to new JHT powerhouse.	
JHTM13A Ramp / Trip Physical - OR DM		\$7,090	\$4,374	\$11,464	(\$11,464)		
JHTM13A Ramp / Trip Physical - OR Imp							
JHTM13A Ramp / Trip Physical - ONR			\$19,772	\$19,772	(\$19,772)	Remaining OR TOR approved budget will be shifted to ONR TOR approved budget as of January 2019 to reflect the new license requirement.	Study decision deferred until new plant is fully operational.
JHTM13A Ramp / Trip Physical - ONR DM			\$19,772	\$19,772	(\$19,772)		
JHTM13A Ramp / Trip Physical - ONR Imp							
JHTM14A Factoring Fisheries - OR		\$8,979	\$9,769	\$18,748	(\$18,748)	Project not yet implemented	TOR submission once new plant is fully operational.
JHTM14A Factoring Fisheries - OR DM		\$8,979	\$9,769	\$18,748	(\$18,748)		
JHTM14A Factoring Fisheries - OR Imp							
JHTM14A Factoring Fisheries - ONR			\$21,549	\$21,549	(\$21,549)	Project not yet implemented. Remaining OR TOR approved budget will be shifted to ONR TOR approved budget as of January 2019 to reflect the new license requirement.	TOR submission once new plant is fully operational.
JHTM14A Factoring Fisheries - ONR DM			\$21,549	\$21,549	(\$21,549)		
JHTM14A Factoring Fisheries - ONR Imp							
JHTM15A Elk Canyon Smolt - OR	\$2,180,378	\$1,218,800	\$76,545	\$1,295,345	\$885,033		
JHTM15A Elk Canyon Smolt - OR DM	\$141,441	\$70,031	\$7,096	\$77,127	\$64,314		
JHTM15A Elk Canyon Smolt - OR Imp	\$2,038,937	\$1,148,769	\$69,449	\$1,218,218	\$820,719		
JHTM15A Elk Canyon Smolt - ONR			\$690,914	\$690,914	(\$690,914)	Remaining OR TOR approved budget will be shifted to ONR TOR approved budget as of January 2019 to reflect the new license requirement	
JHTM15A Elk Canyon Smolt - ONR DM			\$43,227	\$43,227	(\$43,227)		
JHTM15A Elk Canyon Smolt - ONR Imp			\$647,687	\$647,687	(\$647,687)		
JHTW01A Up Campbell Erosion		\$18,364		\$18,364	(\$18,364)		
JHTW01A Up Campbell Erosion - OR DM		\$18,364		\$18,364	(\$18,364)		
JHTW01A Up Campbell Erosion - OR Imp							
JHTW02A Rec Facility Upgrad	\$2,500,359	\$985,658	\$1,164,829	\$2,150,486	\$349,873		
JHTW02A Rec Facility Upgrad - OR DM	\$461,115	\$391,015	\$75,842	\$466,857	(\$5,742)		
JHTW02A Rec Facility Upgrad - OR Imp	\$2,039,244	\$594,643	\$1,088,987	\$1,683,630	\$355,614		
JHTW03A Up Campbell Re-Vege	\$774,380	\$238,409	\$716,799	\$955,207	(\$180,827)	Submit TOR in 2022 or 2023	TOR to be submitted after completion of Phase 2. Work to be completed under future TOR addendum at the end of Year 7
JHTW03A Up Campbell Re-Vege - OR DM	\$92,833	\$87,471	\$52,309	\$139,780	(\$46,947)		
JHTW03A Up Campbell Re-Vege - OR Imp	\$681,547	\$150,938	\$664,490	\$815,428	(\$133,881)		
JHTW04A Sayward Canoe Route	\$45,788	\$21,362		\$21,362	\$24,426		
JHTW04A Sayward Canoe Route - OR DM	\$20,488	\$11,702		\$11,702	\$8,786		
JHTW04A Sayward Canoe Route - OR Imp	\$25,300	\$9,660		\$9,660	\$15,640		
JHTW05A Salmon Erosion Cont	\$54,462	\$17,106		\$17,106	\$37,357		
JHTW05A Salmon Erosion Cont - OR DM	\$54,462	\$17,106		\$17,106	\$37,357		
JHTW05A Salmon Erosion Cont - OR Imp							
JHTW06A Salmon Screen Upgrd	\$842,742	\$480,598		\$480,598	\$362,144		
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.