

April 30, 2024

Connie Chapman P.Ag.
Director and Comptroller of Water Rights
Ministry of Water, Land and Resource Stewardship
PO Box 9340 Stn Prov Govt
Victoria, BC V8W 9M1

Dear Ms. Chapman:

**Re: Duncan Dam Project Water Use Plan
Monitoring Programs and Physical Works Annual Report 2024**

Your letters approving the Duncan Dam Water Use Plan monitoring programs and physical works Terms of Reference state that BC Hydro is required to submit an annual report as well as individual monitoring program reports in April of each year.

Please find enclosed the 2024 Duncan Dam Water Use Plan Monitoring Programs and Physical Works Annual Report for the implementation period April 2023 to March 2024. As per our submission dated April 30, 2023, the 2024 annual report for Duncan Dam is provided via letter.

DDMMON-17 Duncan Reservoir Kokanee Stock Assessment

The objective of this program was to improve understanding of the effects of reservoir operation on Kokanee populations to lead to a better understanding of the implications of entrainment on Kokanee populations. This information will be used to assist in future decisions regarding the operation of Duncan Reservoir.

This monitoring program was carried out for three years from 2016 to 2018. The final report (Year 3) is still under final review and will be submitted with the 2025 Annual Report letter.

DDMWORKS-3 Plan to Address Nutrient Retention Caused by Duncan Dam Operations

The objective of this project is to contribute to and assess the nutrient retention in the Duncan Reservoir and downstream associated with Duncan Dam operations. Payments are made annually to the amount of 17.5% of the previous year's fertilization cost as per the letter of agreement between BC Hydro and the Fish and Wildlife Compensation Program (FWCP).

In 2020, an assessment of the effectiveness of the DDMWORKS-3 contributions was initiated. This work includes two components:

- The review and evaluation of Duncan Dam nutrient retention and DDMWORKS-3 contribution to determine if the level of contribution reflects the level of impacts from Duncan Dam operations.
- Fieldwork to validate the calculation of operational component of nutrient retention.
 - Field work was completed in 2021 and found that while total phosphorus (TP) was within the range of the original dataset from the 1990s, total dissolved phosphorus (TDP) was significantly lower. In 2022, additional sampling was completed to further investigate if the low TDP levels occurred because the 2021 sampling program failed to capture nutrient peaks during freshet.
 - A second full field season was scheduled for 2023/2024, to address remaining concerns from 2021 regarding the unseasonably dry weather and comparability with the original dataset from the 1990's.

The 2021 and 2022 fieldwork reports are attached. The fieldwork report from 2023/2024 is in draft and will be submitted with the 2025 Annual Report. The effectiveness report was completed on behalf of the Fish & Wildlife Compensation Program, and is posted on the provincial Ecocat website, at the following link.
[COL F22 W 4119 DCA 1705946575582_02FBF805BC.pdf \(gov.bc.ca\)](https://www.ecocat.gov.bc.ca/col/f22/w/4119/dca/1705946575582_02FBF805BC.pdf)

The following individual project reports can be found on our Extranet site:
<https://extranet.bchydro.com/sites/wlre/CWR/Forms/AllItems.aspx>

- **DDMWORKS-3 Plan to Address Nutrient Retention Caused by Duncan Dam Operations:** Updated Analysis of Dam Operational Impacts (2021) (Year 1, dated November, 2022)
- **DDMWORKS-3 Plan to Address Nutrient Retention Caused by Duncan Dam Operations:** Results of 2022 Sampling Program to Reduce Uncertainty of Phosphorus Retention in Duncan Lake Reservoir (Year 2, dated August 2023)
- **DDMWORKS-4 Plan to Address Nutrient Retention Caused by Duncan Dam Operations:** Action Plan to Minimize Stranding of Kokanee Spawning in Lower Duncan River Side Channel (Year 1, dated June 12, 2017)

The updated financial information is in Table 1 below.

Monitoring Programs	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
Duncan Dam WUP Annual Report	\$25,300	\$18,900	\$4,364	\$23,264	\$2,036		
DDMM01A Ramping Rate	\$247,883	\$129,234		\$129,234	\$118,649	Project complete	
DDMM01A Ramping Rate - ONR DM	\$34,639	\$20,909		\$20,909	\$13,730		
DDMM01A Ramping Rate - ONR Imp	\$213,244	\$108,324		\$108,324	\$104,920		
DDMM02A Low Duncan HabitatUse	\$566,815	\$503,570		\$503,570	\$63,245	Project complete	
DDMM02A Low Duncan HabitatUse - ONR DM	\$84,707	\$42,098		\$42,098	\$42,609		
DDMM02A Low Duncan HabitatUse - ONR Imp	\$482,108	\$461,472		\$461,472	\$20,636		
DDMM03A Low Duncan Hydraulic	\$751,718	\$745,598	\$3,621	\$749,219	\$2,499	Project complete, completion report outstanding	
DDMM03A Low Duncan Hydraulic - ONR DM	\$118,096	\$115,515	\$3,621	\$119,136	(\$1,040)		
DDMM03A Low Duncan Hydraulic - ONR Imp	\$633,622	\$630,083		\$630,083	\$3,539		
DDMM04A Low Duncan Kokanee Sp	\$1,462,700	\$881,488	\$3,621	\$885,109	\$577,591	Project complete, completion report outstanding	
DDMM04A Low Duncan Kokanee Sp - ONR DM	\$148,850	\$80,463	\$3,621	\$84,084	\$64,766		
DDMM04A Low Duncan Kokanee Sp - ONR Imp	\$1,313,850	\$801,025		\$801,025	\$512,825		
DDMM05A Up Duncan Bull Study	\$436,738	\$370,775		\$370,775	\$65,963	Project complete	
DDMM05A Up Duncan Bull Study - ONR DM	\$88,738	\$59,211		\$59,211	\$29,527		
DDMM05A Up Duncan Bull Study - ONR Imp	\$348,000	\$311,564		\$311,564	\$36,436		
DDMM06A Low Duncan Bull Pass	\$280,970	\$99,246		\$99,246	\$181,724	Project complete	
DDMM06A Low Duncan Bull Pass - ONR DM	\$78,970	\$33,316		\$33,316	\$45,654		
DDMM06A Low Duncan Bull Pass - ONR Imp	\$202,000	\$65,930		\$65,930	\$136,070		
DDMM07A Low Duncan Water Qual	\$154,827	\$106,813		\$106,813	\$48,014	Project complete	
DDMM07A Low Duncan Water Qual - ONR DM	\$43,003	\$22,776		\$22,776	\$20,227		
DDMM07A Low Duncan Water Qual - ONR Imp	\$111,824	\$84,037		\$84,037	\$27,787		
DDMM08A Low Duncan Riparian	\$1,457,738	\$1,263,360	\$3,621	\$1,266,981	\$190,757	Project complete, completion report outstanding	
DDMM08A Low Duncan Riparian - ONR DM	\$192,758	\$151,825	\$3,621	\$155,446	\$37,312		
DDMM08A Low Duncan Riparian - ONR Imp	\$1,264,980	\$1,111,535		\$1,111,535	\$153,445		
DDMM09A LDR Mosquito Mon	\$730,574	\$574,049	\$3,621	\$577,670	\$152,904	Project complete, completion report outstanding	
DDMM09A LDR Mosquito Mon - ONR DM	\$122,310	\$117,478	\$3,621	\$121,099	\$1,211		
DDMM09A LDR Mosquito Mon - ONR Imp	\$608,264	\$456,571		\$456,571	\$151,693		
DDMM10A Res Seasonal Habitat	\$791,362	\$680,885	\$3,621	\$684,486	\$106,876	Project complete, completion report outstanding	
DDMM10A Res Seasonal Habitat - ONR DM	\$117,205	\$83,058	\$3,621	\$86,679	\$30,526		
DDMM10A Res Seasonal Habitat - ONR Imp	\$674,157	\$597,807		\$597,807	\$76,350		
DDMM11A Duncan Burbot	\$829,768	\$656,978	\$3,621	\$660,599	\$169,169	Project complete, completion report outstanding	
DDMM11A Duncan Burbot - ONR DM	\$173,632	\$68,838	\$3,621	\$72,459	\$101,173		
DDMM11A Duncan Burbot - ONR Imp	\$656,136	\$588,140		\$588,140	\$67,996		
DDMM12A Duncan Arch Assess	\$68,632	\$71,633		\$71,633	(\$3,001)	Project complete, completion report outstanding	
DDMM12A Duncan Arch Assess - ONR DM	\$21,870	\$27,104		\$27,104	(\$5,234)		
DDMM12A Duncan Arch Assess - ONR Imp	\$46,762	\$44,529		\$44,529	\$2,233		
DDMM13A Duncan Arch Monitor	\$306,185	\$248,018	\$3,621	\$251,639	\$54,546	Project complete, completion report outstanding	
DDMM13A Duncan Arch Monitor - ONR DM	\$79,579	\$69,112	\$3,621	\$72,733	\$6,846		
DDMM13A Duncan Arch Monitor - ONR Imp	\$226,606	\$178,906		\$178,906	\$47,700		
DDMM14A DuncanResRiparianWLD	\$578,836	\$427,126	\$3,621	\$430,747	\$151,710	Project complete, completion report outstanding	
DDMM14A DuncanResRiparianWLD - ONR DM	\$119,625	\$123,453	\$3,621	\$127,074	(\$3,828)		
DDMM14A DuncanResRiparianWLD - ONR Imp	\$459,211	\$303,673		\$303,673	\$155,538		
DDMM15A LDR StrandingProtocol	\$257,049	\$223,327	\$3,621	\$226,948	\$33,722	Project complete, completion report outstanding	
DDMM15A LDR StrandingProtocol - ONR DM	\$71,421	\$67,660	\$3,621	\$71,281	\$3,761		
DDMM15A LDR StrandingProtocol - ONR Imp	\$185,628	\$155,668		\$155,668	\$29,960		
DDMM16A LDR Stranding Assess	\$1,166,464	\$1,166,462		\$1,166,462	\$2	Project complete, completion report outstanding	
DDMM16A LDR Stranding Assess - ONR DM	\$100,166	\$82,684		\$82,684	\$17,482		
DDMM16A LDR Stranding Assess - ONR Imp	\$1,066,298	\$1,083,778		\$1,083,778	(\$17,480)		
DDMM17A Duncan Res KoK Mon	\$248,583	\$190,036	\$15,621	\$205,657	\$58,547	Project complete, final report outstanding	
DDMM17A Duncan Res KoK Mon - ONR DM	\$49,281	\$31,033	\$3,621	\$34,654	\$18,248		
DDMM17A Duncan Res KoK Mon - ONR Imp	\$199,302	\$159,003	\$12,000	\$171,003	\$40,299		
DDMW01A Argenta Slough Eros	\$735,777	\$243,829	\$3,621	\$247,450	\$488,327		
DDMW01A Argenta Slough Eros - ONR DM	\$69,080	\$81,022	\$3,621	\$84,643	(\$15,563)		
DDMW01A Argenta Slough Eros - ONR Imp	\$666,697	\$162,808		\$162,808	\$503,889		
DDMW02A Glacier Creek Boat	\$197,339	\$127,422		\$127,422	\$69,917	Project complete	
DDMW02A Glacier Creek Boat - ONR DM	\$71,139	\$40,845		\$40,845	\$30,294		
DDMW02A Glacier Creek Boat - ONR Imp	\$126,200	\$86,576		\$86,576	\$39,624		
DDMW03A Plan Nutrient Reten	\$3,153,043	\$2,881,966	\$270,405	\$3,152,371	\$672		
DDMW03A Plan Nutrient Reten - ONR DM	\$72,700	\$67,516	\$8,328	\$75,844	(\$3,144)		
DDMW03A Plan Nutrient Reten - ONR Imp	\$3,080,343	\$2,814,450	\$262,076	\$3,076,527	\$3,817		
DDMW04A Action Plan Kokanee	\$241,650	\$93,792	\$3,621	\$97,413	\$144,237	Project complete, completion report outstanding	
DDMW04A Action Plan Kokanee - ONR DM	\$90,342	\$39,855	\$3,621	\$43,476	\$46,866		
DDMW04A Action Plan Kokanee - ONR Imp	\$151,308	\$53,938		\$53,938	\$97,370		

OR - Ordered Remissible
ONR - Ordered Non-Remissible

Should you have any questions please do not hesitate to contact me.

Regards,

A handwritten signature in black ink, appearing to read "Donald Reid".

Donald Reid, P.Geo., R.P.Bio.
Manager, Water Program
Phone: 604-528-1426 / Cellular: 604-813-8507
Email: Donald.Reid@bchydro.com

Encl.

C:

Manjit Kerr-Upal, Ministry of Environment
Dan Sneepe, Fisheries and Oceans Canada