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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Water Committee

From: Lucas Pitts, Director, Policy, Planning and Analysis, Water Services

Date: March 28, 2022 Meeting Date: April 6, 2022

Subject: **GVWD Water Supply System 2021 Annual Update**

RECOMMENDATION
That the Water Committee receive for information the report dated March 28, 2022, titled "GVWD Water Supply System 2021 Annual Update".

EXECUTIVE SUMMARY
The *Greater Vancouver Water District - Water Supply System 2021 Annual Update* report summarizes key initiatives undertaken by Metro Vancouver in 2021, including water conservation, risk management, capital projects to accommodate regional growth, and responding to emergencies affecting the drinking water system. The 2021 update is the first edition of this annual report, which will be issued annually hereafter.

This report was prepared following guidance from the Ministry of Health (the Ministry) found in their draft Guidance for Water User Communication, which was shared with the Greater Vancouver Water District (GVWD) in October of 2021 for review and comment. The report meets the communication requirements stipulated in the *Drinking Water Protection Act* and *Regulation*.

PURPOSE
To provide the Water Committee with an overview of the *GVWD Water Supply System 2021 Annual Update*.

BACKGROUND
As a Water Supplier regulated under BC's *Drinking Water Protect Act* and *Drinking Water Protection Regulation*, the GVWD must communicate with water users on various topics defined in the legislation. To create a standardized document for meeting the legislated communication requirements, the Ministry of Health is developing the *Guidance for Water User Communications,* which is currently in draft format. Through the *GVWD Water Supply System 2021 Annual Update*, the GVWD seeks to build public awareness and involvement in the drinking water program, identified as one of the six components of the *Multi-Barrier Approach to Safe Drinking Water* by Health Canada.

The guidance document was provided to the GVWD for review and comment in October of 2021. To remain at the forefront of regulatory requirements and best practices and to stay aligned with the Ministry's initiatives, the GVWD has endeavoured to undertake the *GVWD Water Supply System 2021 Annual Update* report as recommended by the Ministry. Given that the guidance is still in draft, there may be changes to this report in the subsequent year's editions. This report is being brought forward at this time to align with the publication of *GVWD Water Supply System 2021 Annual Update* report, which the Ministry similarly requires.

GVWD Water Supply System 2021 Annual Update Report Summary

The *GVWD Water Supply System 2021 Annual Update* report summarizes initiatives undertaken by the GVWD in 2021. The report provides a general overview of the GVWD's drinking water system, including a description of the three sources, two treatment plants, and an overview of the regional transmission system to provide context to the work that GVWD undertook in 2021.

The key initiatives that are reported are summarized as follows:

- The analysis of over 38,000 water samples by the drinking water quality program. The results of which can be found in the 2021 Annual Water Quality Control Report;
- Mitigating risk for the drinking water system including long-term water supply infrastructure planning through the consideration of filtration pre-treatment, intake location and treatment designs for the Coquitlam Water Supply, and the Regional Water Supply System Lifeline Study: Seismic Vulnerability Assessment;
- Tracking, monitoring and analysis of drinking water demand. The highest peak day consumption in the summer of 2021 was 1.8 billion litres/day, which was recorded on Sunday, June 27, 2021;
- Undertaking the *We Love Water* campaign, promoted to increase awareness of the GVWD's drinking water system and the need for residential water conservation;
- Finalizing the Quality Management System for Drinking Water Operational Plan (QMSDW), which forms the foundation for specific prioritized actions to safeguard drinking water and to aid in the strategic decision-making, planning, and resource allocation, while focusing on continuous improvement;
- The continued system maintenance on the Little Mountain Reservoir was completed this year as well as the protective coating of equipment at the Capilano Energy Recovery Facility; and
- The spending for capital projects focused on growth, resilience, maintenance and opportunity upgrades.

Additionally, a summary of the Emergency Response and Contingency Plan is provided per Section 13 (4) of the *Drinking Water Protection Regulation*.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

This is an information report. No financial implications are presented.

CONCLUSION

By completing the *GVWD Water Supply System 2021 Annual Update* report, GVWD aligns with the Ministry of Health's direction and new initiatives. The report provides transparent and proactive communication with water users and promotes public involvement and awareness of the drinking water system, one of the six elements of Health Canada's *Multi-Barrier Approach to Safe Drinking Water*.

Attachment

GVWD Water Supply System 2021 Annual Update *(49557167)*

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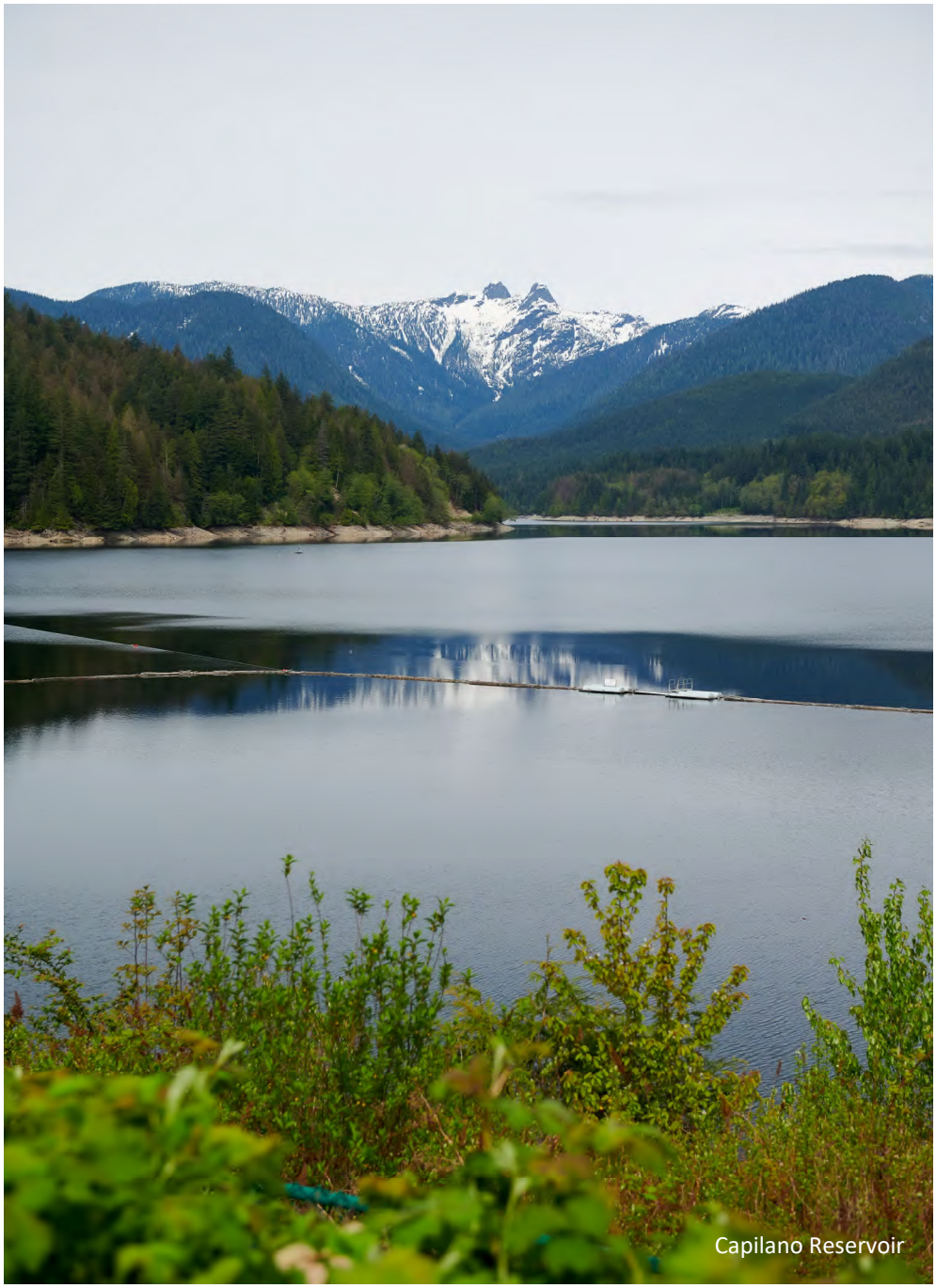
Capilano Reservoir

Great Vancouver Water District – Water Supply System 2021 Annual Update

March 2022

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EXECUTIVE SUMMARY

The *Greater Vancouver Water District Water Supply System 2021 Annual Update* report summarizes key initiatives undertaken by Metro Vancouver in 2021, including water conservation, risk management, capital projects to accommodate regional growth, and responding to emergencies affecting the drinking water system. The 2021 Update is the first edition of this annual report, which will be issued annually hereafter. This report was prepared following guidance from the Ministry of Health (the Ministry) found in their draft *Guidance for Water User Communication*.

Report Background

The purpose of the report is to meet the communication requirements stipulated in the provincial *Drinking Water Protection Act* and *Drinking Water Protection Regulation*. As a Water Supplier regulated under the *Drinking Water Protect Act* and *Drinking Water Protection Regulation*, Metro Vancouver, also known as the Greater Vancouver Water District, must communicate with water users on topics defined in the legislation.

The Ministry has developed the draft *Guidance for Water User Communications* to create a standardized approach to meeting the legislated communication requirements. The Ministry provided the draft guidance document to Metro Vancouver for review and comment in October 2021. To remain at the forefront of regulatory requirements and best practices and aligned with the Ministry's initiatives, Metro Vancouver has undertaken the *Greater Vancouver Water District - Water Supply System 2021 Annual Update* in a manner consistent with the recommendations in the Ministry's draft guidance. Given that the guidance is still in draft, there may be changes to the format of this report in the future year's versions.

By completing the *Greater Vancouver Water District - Water Supply System 2021 Annual Update* report, Metro Vancouver aligns with the Ministry's direction and new initiatives. This report provides transparent and proactive communication with water users and promotes public involvement and awareness of the drinking water system, which is one of the six elements of Health Canada's *Multi-Barrier Approach to Safe Drinking Water*.

Report Summary

Metro Vancouver sources the region's drinking water from three protected watersheds, Coquitlam, Seymour and Capilano. The water is then treated at one of two water treatment plants and distributed throughout the region via 520 km of transmission mains, pump stations and reservoirs. This water is tested throughout all of the processes to guarantee high-quality drinking water is being distributed to member jurisdictions. To ensure consistent and reliable high-quality water, Metro Vancouver maintains, upgrades and builds infrastructure to meet current and future needs. This includes seismic upgrades, reservoir cleaning, and building new infrastructure to meet the growth needs of the region. Community engagement is undertaken to increase awareness about the need for residential water conservation.

Key initiatives undertaken by Metro Vancouver in 2021, included the following:

- Water Quality Sampling Program, involving:
  - The analysis of over 38,000 water samples through the drinking water quality program. The results of which can be found in the 2021 Annual Water Quality Control; and
  - The adjustment of the finished water's pH to 8.3 and alkalinity to 20 mg/L as $CaCO_3$ to reduce the corrosiveness of the water and improve the stability of the water in the distribution system.
- Water System Risk Mitigation, involving:
  - Mitigating risk for the drinking water system including long-term water supply infrastructure planning through the consideration of filtration pre-treatment, intake location and treatment designs for the Coquitlam Water Supply, and the Regional Water Supply System Lifeline Study: Seismic Vulnerability Assessment.
- Water Conservation, involving:
  - Tracking, monitoring and analysis of drinking water demand. The highest peak day consumption in the summer of 2021 was 1.80 billion litres/day, which was recorded on Sunday, June 27, 2021; and
  - Undertaking the *We Love Water* campaign, promoted to increase awareness of Metro Vancouver's drinking water system and the need for residential water conservation.
- Financial Planning, involving:
  - Total water sales of $320 million with differential water rates intended to incentivize drinking water conservation efforts and reduce long-term pressure on the capital budget.
- Water System Management involving:
  - Finalizing the Quality Management System for Drinking Water Operational Plan (QMSDW), which forms the foundation for specific prioritized actions to safeguard drinking water and to aid in the strategic decision-making, planning, and resource allocation, while focusing on continuous improvement;
  - Annual maintenance projects including the isolation, draining, and cleaning of six in-system reservoirs to maintain water quality throughout the distribution system and the completion of 3,875 preventative maintenance work orders;
  - Finalizing the Port Mann Corridor Upgrades with the commissioning of the fourth leg, the Whalley Main, connecting the Whalley Reservoir to 148th Street; and
  - Commissioning the Jericho Reservoir, the 27th in-system reservoir that will be used to continue to supply water to the Township of Langley, and the City of Surrey.
- Emergency Response, involving:
  - Responding to two natural storm events that resulted in dam discharge flows that exceeded the minimum flood levels selected for the initiation of the Seymour Falls Dam Emergency Response Plan, however there were no hazardous conditions, no persons placed in danger and no impacts to the delivery of drinking water.
  - Continuing to respond to the changing COVID-19 situation and adjusting control measures following the Guidance of the Provincial Health Officer.

ACRONYMS

BC	British Columbia
BL	Billion Litres
CWTP	Coquitlam Water Treatment Plant
DBPs	Disinfection By-Products
DCC	Development Cost Charges
DWCP	Drinking Water Conservation Plan
ERCP	Emergency Response and Contingency Plan
GVWD	Greater Vancouver Water District
ML	Million Litres
MLD	Million Litres per Day
NBCC	National Building Code of Canada
QMSDW	Quality Management System for Drinking Water Operational Plan
SCFP	Seymour Capilano Filtration Plant
SFD	Seymour Falls Dam
UV	Ultraviolet

1.0 INTRODUCTION

1.1. Purpose

As a Water Supplier regulated under BC's *Drinking Water Protect Act* and *Drinking Water Protection Regulation,* Metro Vancouver is required to communicate with water users on various topics defined in the legislation. The *Greater Vancouver Water District Water Supply System 2021 Annual Update* is recommended by the Ministry of Health to meet the *Drinking Protection Act* and *Regulation*'s public communication requirements. This report was prepared following guidance from the Ministry of Health found in their draft *Guidance for Water User Communication*.

The purpose of the *Greater Vancouver Water District - Water Supply System 2021 Annual Update* is to proactively communicate with member jurisdictions and the public by providing an annual update on the water supply system. Through the *Greater Vancouver Water District - Water Supply System 2021 Annual Update*, Metro Vancouver seeks to build public awareness and involvement in the drinking water program, which has been identified as one of the components of the *Multi-Barrier Approach to Safe Drinking Water* by Health Canada.

1.2. Greater Vancouver Water District

Under the legal entity of the *Greater Vancouver Water District* (GVWD), Metro Vancouver provides drinking water to the region. The GVWD was created and constituted under the provincial statute, the *Greater Vancouver Water District Act*, to supply drinking water to the Metro Vancouver region. The GVWD is governed by an Administration Board (the Board) consisting of representatives from the member jurisdictions of the GVWD. The Board appoints a Commissioner (the GVWD Commissioner) who provides management and oversight of the activities of the GVWD.

GVWD and its member jurisdictions work together to provide clean, safe drinking water to the region. The GVWD membership consists of 18 municipalities, one Electoral Area, and one Treaty First Nation. The GVWD working together with its members, plans for and delivers regional-scale drinking water services to approximately 2.7 million people. The following are the member jurisdictions that are supplied water from the GVWD.

Table 1: GVWD Member Jurisdictions

Village of Anmore	Electoral Area A	City of North Vancouver	City of Richmond
Village of Belcarra	City of Langley	District of North Vancouver	City of Surrey
City of Burnaby	Township of Langley	City of Pitt Meadows	Tsawwassen First Nation
City of Coquitlam	City of Maple Ridge	City of Port Coquitlam	City of Vancouver
City of Delta	City of New Westminster	City of Port Moody	District of West Vancouver

The Metro Vancouver is responsible for:

- managing and protecting the water supply areas;
- treating the water at the source and throughout the Metro Vancouver network;
- transmission of drinking water to local water distribution networks;
- monitoring, testing, and reporting on Metro Vancouver water quality; and
- planning for Metro Vancouver water system's sustainability.

Once the water leaves Metro Vancouver's transmission system and enters into the local distribution mains, the water is the responsibility of the member jurisdiction.

2.0 DRINKING WATER SYSTEM OVERVIEW

Metro Vancouver's drinking water originates from rain and snowmelt stored in three protected reservoirs: Capilano, Seymour and Coquitlam. Three alpine lakes, Loch Lomond, Burwell Lake, and Palisade Lake, provide additional water storage. To control the storage in the reservoirs, Metro Vancouver operates and maintains the Cleveland, Seymour Falls, and alpine lake dams, while the Coquitlam Dam is owned and operated by BC Hydro. Water is collected, stored and distributed to local jurisdictions through a network of dams, treatment plants, water mains, pumping stations, and in-system storage reservoirs located throughout the region. The entire water system, including the water supply areas, encompasses a total land area of 2,860 square kilometres. Figure 1 provides an overview of the Metro Vancouver water supply system.

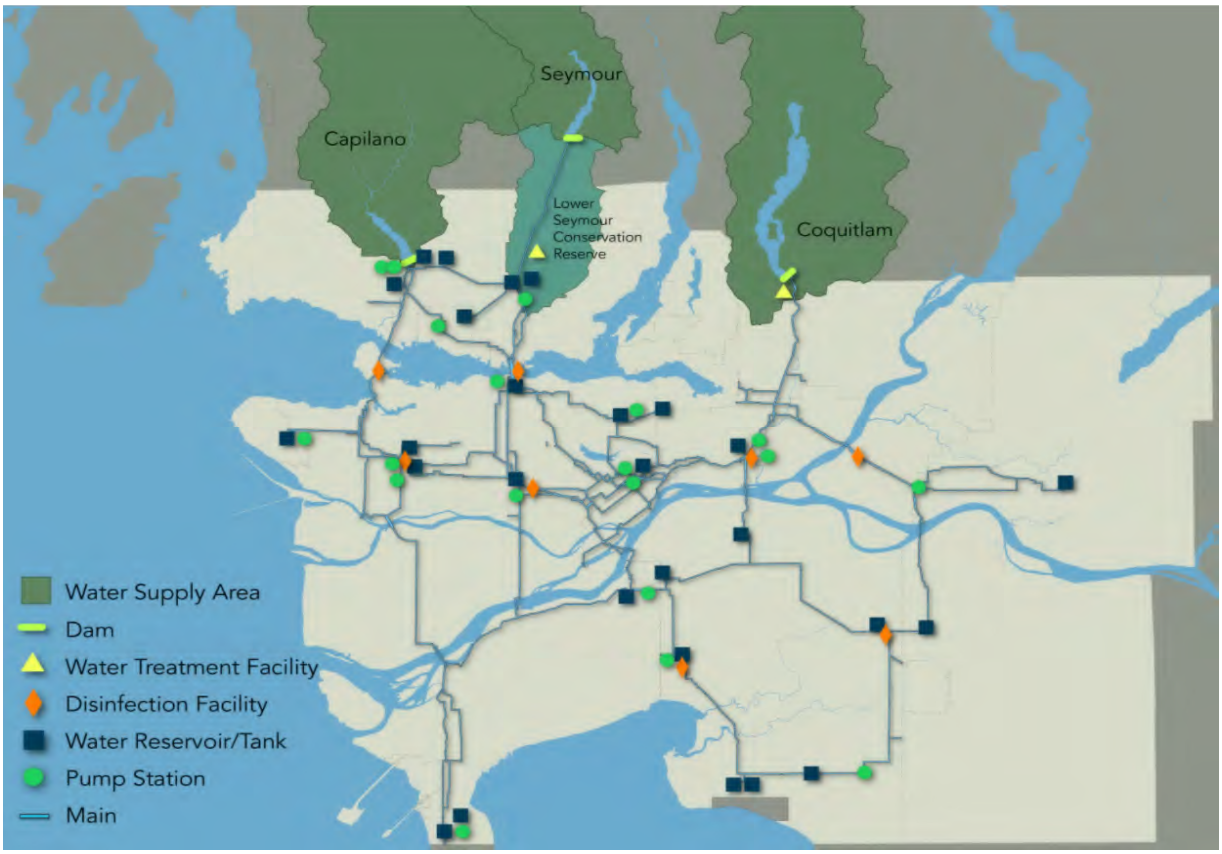

Figure 1: Metro Vancouver Drinking Water System Overview

2.1. Source Water

Metro Vancouver's water supply areas are approximately 60,000 hectares of protected lands north of the metropolitan area. The three water supply areas (drainages, catchments) are, in order from east to west, Coquitlam (20,461 hectares), Seymour (12,375 hectares), and Capilano (19,535 hectares). In addition, there are off-catchment lands of the Lower Seymour Conservation Reserve, which are a total of 5,600 hectares in area. Access to these lands is controlled and limited through the *Watershed Access Policy*. Protecting the water supply areas by restricting access is a fundamental component of the multiple barrier approach to safe drinking water, as outlined by Health Canada.

The Capilano Water Supply Area is 19,535 ha in area and the most western of Metro Vancouver's water supply areas. The Cleveland Dam is located on the Capilano River to store drinking water for the region; it is a concrete dam that was built in 1954. The Capilano Water Supply Area has one alpine lake, Palisade Lake, which provides an additional 10 BL of storage.

The Seymour Water Supply Area is 12,375 ha and is located north of the District of North Vancouver. The Seymour Falls Dam and the reservoir created behind it is the highest of three sources of supply for the water system. The Seymour Falls Dam was built in 1961 to replace a dam that was built in 1927. Also within the Seymour Water Supply Area are two alpine lakes, Burwell Lake and Loch

Lomond Lake. Burwell Lake provides 12,000 ML of storage, and Loch Lomond Lake provides 7,000 ML of storage. The dams for these lakes are opened during high-demand periods in the summer.

Metro Vancouver's most eastern water supply is Coquitlam Reservoir. Coquitlam Reservoir is owned by the Province and managed by BC Hydro for power generation. Metro Vancouver is licenced by the Province to use 451,000 ML per year from Coquitlam Reservoir. Additional water is purchased from BC Hydro annually. In 2021 Metro Vancouver purchased an additional nomination of 84,500 ML.

2.2. Water Treatment Facilities

As Metro Vancouver's source water is surface water, Metro Vancouver is required by the Ministry to treat the water to meet the *Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia.* Metro Vancouver's water is treated at two water treatment plants, either the Seymour Capilano Filtration Plant (SCFP) or the Coquitlam Water Treatment Plant (CWTP).

2.2.1. Seymour Capilano Filtration Plant

The Capilano and Seymour reservoir's water is treated at the Seymour Capilano Filtration Plant (SCFP). An underground tunnel transports water over 7 km from the Capilano Reservoir to SCFP so that water from both Seymour and Capilano can be treated at one facility.

The primary drinking water treatment processes at the Seymour Capilano Filtration Plant are filtration and ultraviolet (UV) disinfection. Filtration treats drinking water by removing particulates, organic matter, and micro-organisms. An added benefit of filtration is that less chlorine is required to maintain water quality in the transmission and distribution systems. Treatment after filtration includes UV disinfection, which works by inactivating micro-organisms in the source water. Following the UV, sodium hypochlorite (chlorination) is added for disinfection, and then the pH and alkalinity are adjusted using a combination of lime (calcium hydroxide) and carbon dioxide before the water enters the transmission system. Figure 2 describes the individual treatment processes. SCFP in 2021 treated a maximum day demand of 1,049 ML and an average of 670 ML per day; the plant is designed to treat up to 1,800 ML per day.

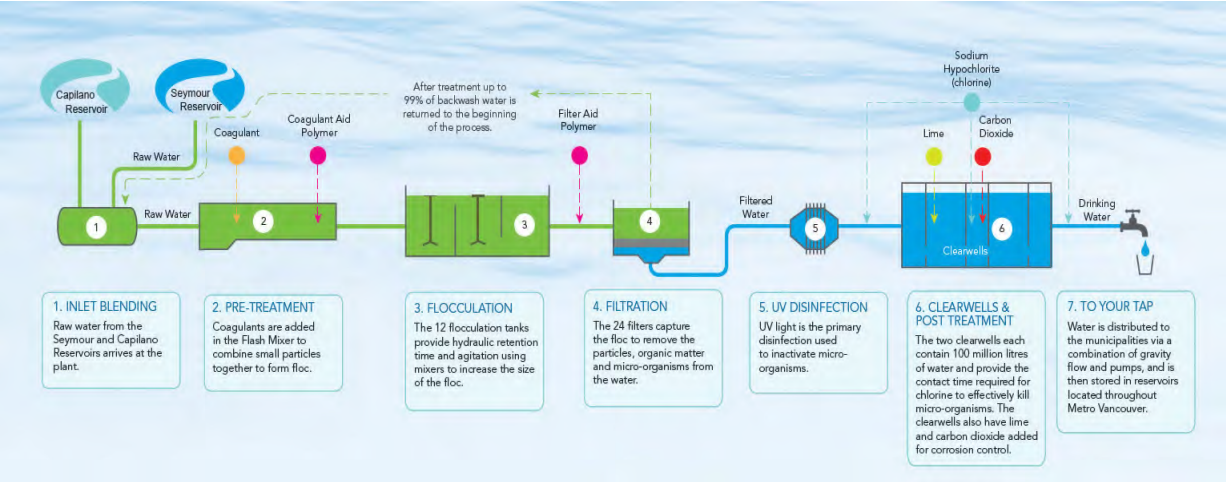

Figure 1: SCFP Treatment Processes

2.2.2. Coquitlam Water Treatment Plant

The Coquitlam Water Treatment Plant (CWTP) is located north of the City of Coquitlam and treats water from the Coquitlam Reservoir. In 2021 CWTP treated an average of 401 MLD and a maximum of 868 MLD; the plant is designed to treat a maximum of 1,200 MLD.

The Coquitlam Water Supply Area is of different geology than the Seymour and Capilano Water Supply Areas, and the water is typically less turbid even during heavy rain events, and as such, this system relies on different forms of treatment. At CWTP, ozone is used as a pre-treatment to help break down the organics and reduce the production of disinfection by-products (DBPs). The primary treatment is UV disinfection followed by sodium hypochlorite (chlorination) for disinfection. The pH and alkalinity are adjusted using a combination of soda ash (sodium carbonate) and carbon dioxide before it enters the transmission system. The following Figure 3 shows the process flow diagram for CWTP.

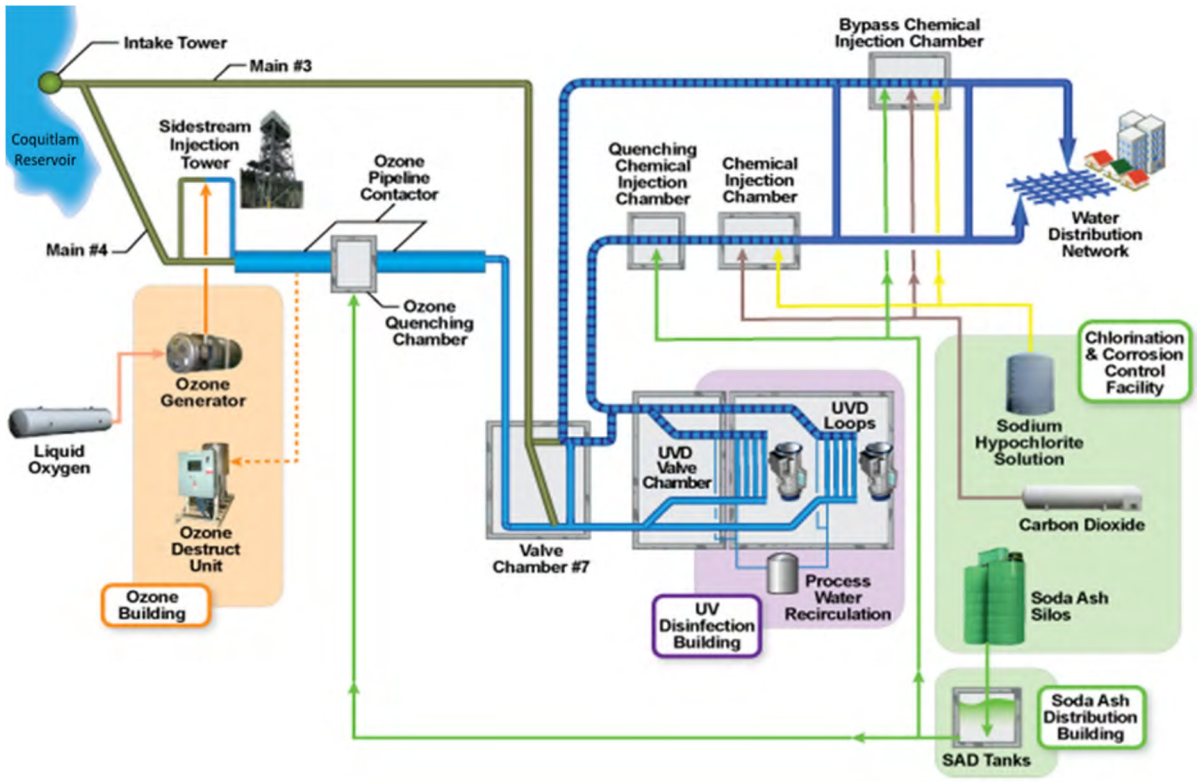

Figure 2: Coquitlam Water Treatment Plant Process Overview

2.3. Transmission System

Metro Vancouver supplies approximately one billion litres of drinking water each day (rising to over 1.5 billion litres in the summer) to member jurisdictions through a network of 19 pump stations, 27 in-system storage reservoirs, eight secondary disinfection facilities, and over 520 km of transmission water mains ranging from 350 mm to 3 m in diameter. Thousands of kilometres of additional municipal distribution mains deliver water to the consumer's tap.

Water transmission from the Capilano and Seymour sources across the Burrard Inlet is achieved via the First Narrows and Second Narrows marine crossings. The Coquitlam supply is conveyed south without crossing major waterways. From these points, the conveyance of water is predominantly in a north to south direction, with interconnecting east-west transmission mains and pump stations.

The geography of the region provides, in large part, for conveyance supported by gravity, for much of the region when demands are relatively low. However, when demand is higher during the summer months or if portions of the system are out of service for construction or maintenance work, pumping is required at many locations as gravity flow capacity alone is insufficient.

3.0 WATER QUALITY SAMPLING PROGRAM

Metro Vancouver conducts daily tests on the drinking water—analyzing around 38,000 water samples each year. Results are public and found in annual Water Quality Control reports on the Metro Vancouver Website. The *2021 Annual Water Quality Control* report will be available in April 2022. This Water Quality Control report provides a summary the water quality analysis results for source, treated and distributed water in 2021.

As part of Metro Vancouver's corrosion control program, the alkalinity and pH levels were adjusted on June 7, 2021 at both SCFP and CWTP. The treatment systems have been running reliably and steadily at a pH of 8.3, which is within Health Canada's Guidelines for Canadian Drinking Water Quality range of a pH of 7 to 10.5. To help improve the stability of the target pH level in the water transmission and distribution pipes, the alkalinity target was doubled to about 20 mg/L (expressed as calcium carbonate).

4.0 WATER SYSTEM RISK MITIGATION

Metro Vancouver follows the *Quality Management System for Drinking Water Operational Plan* (QMSDW), which was finalized in 2021. A formal internal audit is completed through this process, including risk assessment outcomes and implementation of critical control measures. Risk Assessment is a fundamental part of the QMSDW process. It forms the foundation for building a set of specific prioritized actions to safeguard drinking water and to aid in strategic decision-making, planning, and resource allocation. The analysis includes identifying, assessing, controlling, and mitigating the risks of the hazardous events that may occur in Metro Vancouver's drinking water system.

4.1. Water Supply Area Risks

Climate change is a significant source of risk for the Metro Vancouver water supply areas. With climate change, it is anticipated that significant precipitation events will occur more frequently, with higher intensity and less snow accumulation; this may result in landslides of higher frequency and magnitude in our water supply areas. Increased turbidity and other climate change risks have been considered in long-term water supply infrastructure planning by considering filtration pre-treatment, intake location and treatment designs. Metro Vancouver is fortunate to have three independent and well-protected water supply areas, which is an added measure of resiliency, particularly during the wet season when two of the three sources can currently meet regional water demand. Additional mitigation measures such as upgrading reservoir debris booms, monitoring wildfire risks and replacing stream-road crossings are underway.

4.2. Treatment System Risks

The current treatment for the Coquitlam system does not include filtration. Although the current water quality in Coquitlam Reservoir is very good, turbidity events do happen, and more frequent significant events are expected to occur in the future due to climate change.

Turbidity is just one water quality parameter among other parameters that would require filtration of the Coquitlam source water in the future. Filtration is beneficial for turbidity removal and removes a portion of naturally occurring organics. Organics reduction has several benefits, including reducing the amount of chlorination required to maintain adequate residual levels in the transmission and distribution systems. Reduced chlorination also reduces the levels of DBPs, which are health-regulated parameters under the federal Guidelines for Canadian Drinking Water Quality.

Metro Vancouver is in the process of planning for a new filtration plant for the Coquitlam source water. Filtration provides resiliency and risk mitigation against changing future regulations and emerging contaminants. The past decision to filter the Capilano and Seymour sources was predicated on similar considerations.

4.3. Transmission System Risks

In 2021 Metro Vancouver prepared the "Regional Water Supply System Lifeline Study: Seismic Vulnerability Assessment", which updates the previous Lifeline Study completed in 1993. The 2021 study investigated Metro Vancouver's water mains' seismic vulnerabilities and all other facilities, excluding dams. This report evaluated the water mains and facilities for earthquakes with a 1:2,475-year and 1: 10,000-year return period, respectively, per Metro Vancouver's Seismic Design Criteria and draft 2020 National Building Code of Canada (NBCC) requirements. This study recommends additional site-specific assessments and structural analysis for facilities to improve the predictions of seismic damage. The study also provides recommendations on other seismic resiliency measures.

4.4. Evolving Guidelines

In Canada, drinking water guidelines are developed by Health Canada's Water and Air Quality Bureau. BC's Ministry of Health is responsible for selecting and implementing the guidelines. As new guidelines are developed and implemented, Metro Vancouver proactively reviews the water supply system and ensures that the system is capable of meeting the latest guidelines or identifies if treatment system or other upgrades are required.

5.0 WATER USE AND CONSERVATION

5.1. Water Availability and Use Trends

The Metro Vancouver region experienced a higher than average snowpack in early 2021. Record high temperatures in the second half of June contributed to a faster than normal snowmelt, resulting in reservoir drawdown starting in early July. The source reservoirs were proactively managed to capture the incoming streamflow to ensure Seymour and Capilano Reservoirs reached their respective targeted full pool elevations before June 1, 2021, and July 1, 2021.

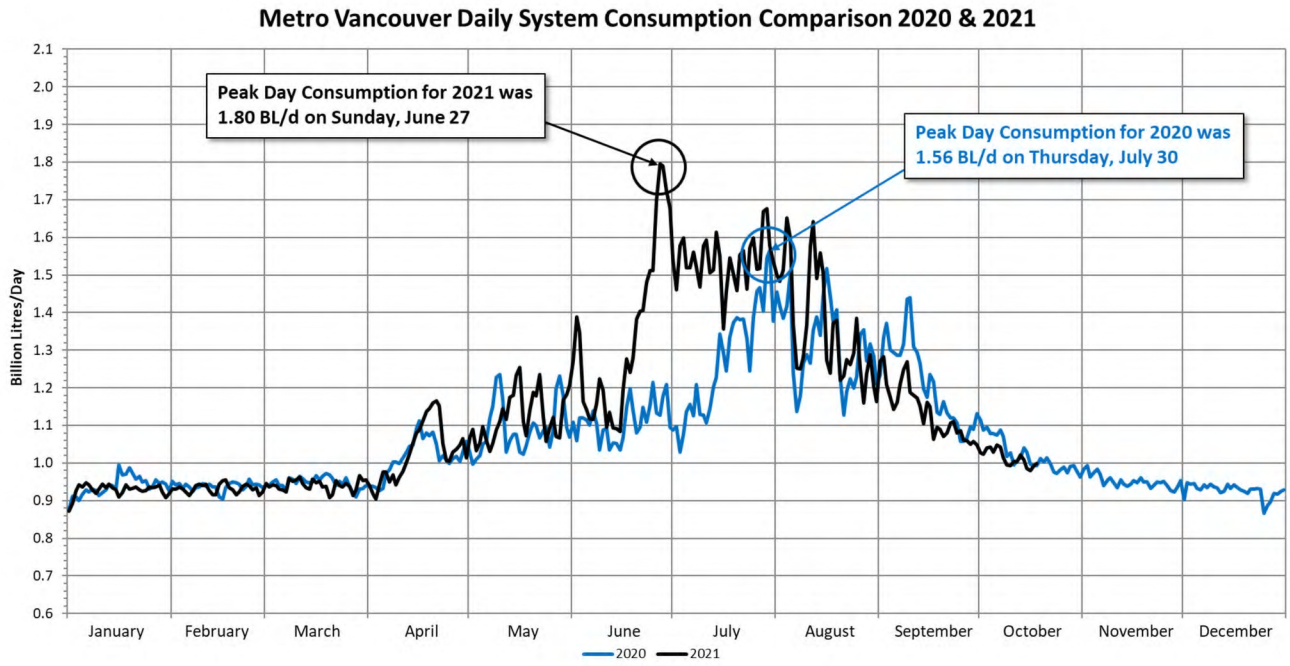

Figure 3: 2020 and 2021 Daily Water Consumption

As shown in Figure 4, the highest peak day consumption in summer 2021 of 1.80 billion litres/day was recorded on Sunday, June 27, 2021. An extreme heatwave affected the lower mainland from late June through mid-July and peaked on June 28 – 29, 2021. The above normal water use was sustained during this period. The 2021 peak day consumption was observed a few weeks earlier than recorded in previous years.

Between 1994 and 2021, Metro Vancouver's service population has grown by 940,000 people, at an annual growth rate of approximately 1.97%. Despite the population growth, average daily water demand has remained relatively constant over the past 28 years, as shown in Figure 5. Thus, per capita water use has been declining over the past 28 years, as shown in Figure 6, which is often attributed to more efficient plumbing fixtures, increasing public awareness about water conservation and increasingly stringent lawn watering. For similar reasons, most communities across Canada have seen comparable declines in per capita water use.

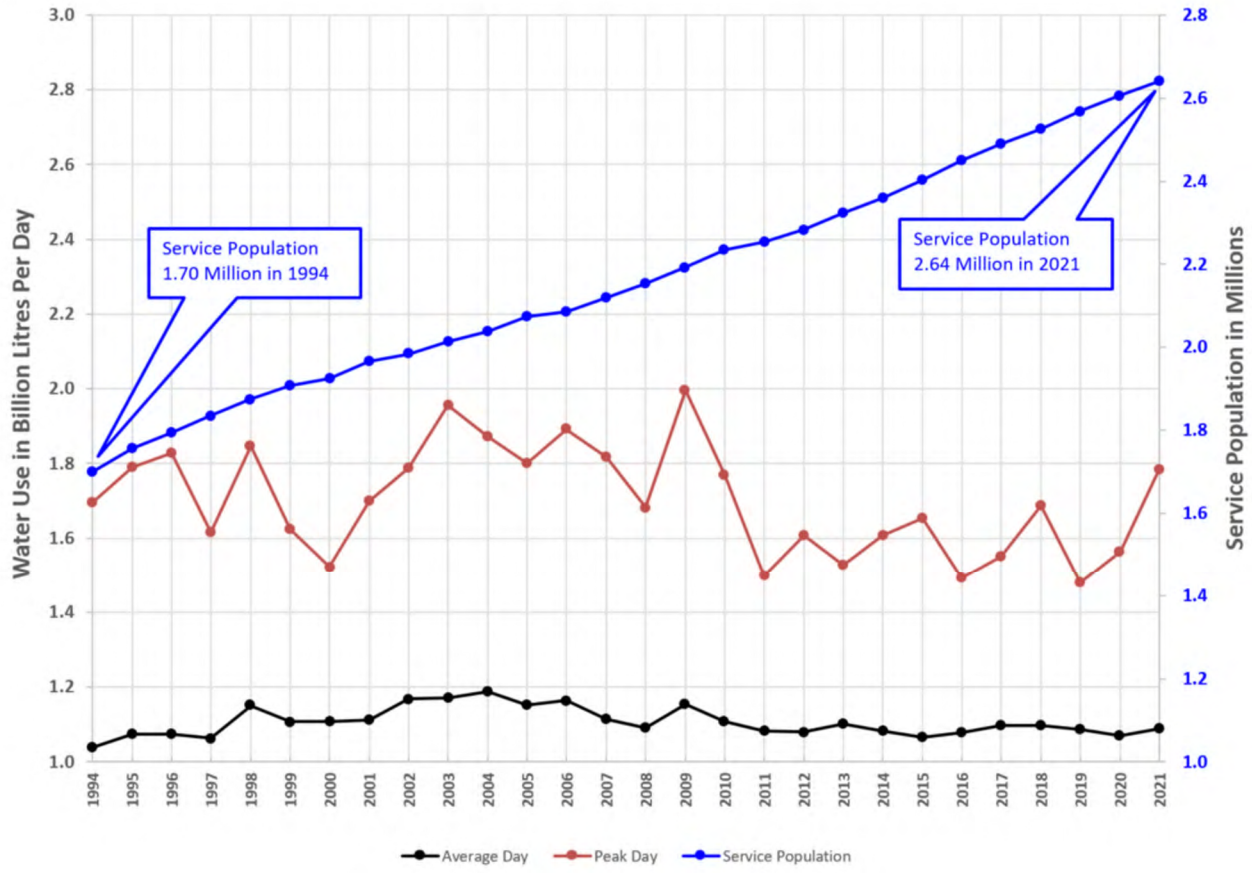

Figure 4: Regional Population and Water Use from 1994 to 2021

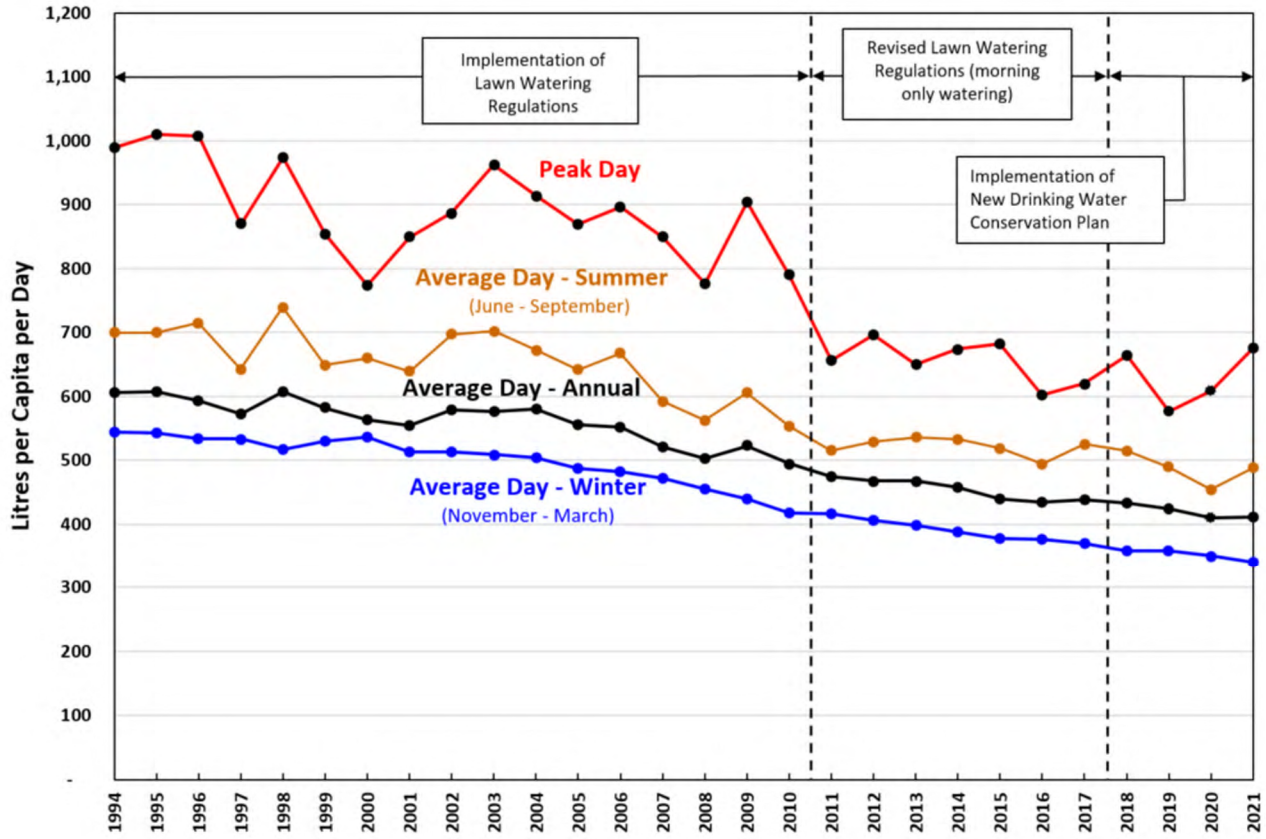

Figure 5: Regional Per Capita Water Use from 1994 to 2021

5.2. Water Conservation Measures

Metro Vancouver undertakes several communications initiatives annually to ensure water resources are used efficiently throughout the region. Key initiatives in 2021 included the communication of the region-wide watering regulations and the communications campaign – *We Love Water* – to increase awareness of Metro Vancouver's water system and the need for residential water conservation. The promotional strategy for both initiatives included a broad reach through television, radio, print, and outdoor advertising and targeted and weather-triggered digital tactics, in total, broadcast and digital promotions delivered over 36.6 million impressions with 35% more web visits than in 2020, including 9,479 visits to Metro Vancouver's Lawn Watering Regulation web page and over 599,000 social media views.

Despite the campaign's reach, water use was at a record high in 2021 during the ongoing hot and dry weather. In 2022 Metro Vancouver will update water conservation communications to reflect the changes to the Drinking Water Conservation Plan (DWCP).

Figure 6: Example of 2021 Lawn Water Regulations Public Communications

To help reduce seasonal demands, Metro Vancouver updated the DWCP, reducing the allowable residential and non-residential lawn watering days from two days per week to one day per week during Stage 1. Changes to Stage 2 include a ban on residential and non-residential lawn watering. Member jurisdictions will be responsible for their respective bylaw amendments for implementation in 2022.

The water supply system performed without significant stresses over the 2021 summer season. Water conservation will continue to be an important factor in determining future system needs. Sustained reductions in per capita water use over the coming years could potentially defer the significant capital investments required to meet the needs of a growing region.

6.0 FINANCIAL PLANNING

The 2021 total water sales revenues of approximately $320 million, with higher summer rates of $0.9546/m^3 for June through September and the lower rate of $0.7119/m^3 applying for the rest of the year (equating to an overall average water rate of $0.8110/m^3). The differential rates are intended to incentivize conservation efforts in the region and reduce long-term pressures on the capital budget.

7.0 WATER SYSTEM MANAGEMENT

7.1. Asset Management Program

Metro Vancouver's Asset Management Program ensures that assets are managed in a manner that minimizes asset failure risks and impacts to customers and optimizes the lifecycle value of assets to meet asset performance targets consistently, and enables evidence-based decision-making to provide quality services continuously. In 2019, the Board approved the *Asset Management for Water Services* policy. This policy establishes asset management principles and framework to balance asset performance, risk, and cost to deliver Metro Vancouver water services.

7.2. Operations and Maintenance Program

Through the Asset Management Program, the repairs and improvements required for the drinking water system are identified. These repairs and improvements are undertaken either as annual maintenance projects or one-time minor capital projects. Annual maintenance is an essential component of the long-range plan and addresses the need for replacement or refurbishment of existing infrastructure to ensure that it continues to perform as required to meet service objectives.

Metro Vancouver undertakes system maintenance daily to ensure the existing equipment and facilities are in a good state of repair and to know when additional maintenance or replacement is needed.

Multi-year maintenance projects that are underway, include the following:

Annual Reservoir Cleaning – Metro Vancouver's in-system water storage reservoirs are periodically isolated and drained for interior cleaning, inspection, and repair or upgrade construction. Cleaning is conducted either through draining and using high-pressure water spray or using divers to remove sediment from the interior. In 2021, six reservoirs were isolated, drained and cleaned, and one reservoir was cleaned by divers.

Water Meter Upgrade Program – There are over 200 water meters located at the points of connection to the member jurisdiction's systems. The Water Meter Upgrade Program started in 2018, it involves installing seven new water meters, and replacing 30 existing water meters. In 2021, two new water meters were installed, one water meter was replaced and the design for the installation or replacement was progressed on nine of the other water meters.

Capilano Energy Recovery Facility Corrosion Mitigation – The coating on some of the piping, valves, and other various equipment inside the Capilano Energy Recovery Facility's Machine Hall room was recently replaced to mitigate surface corrosion. This work involved cleaning and removing any existing corrosion, repassivation of stainless steel surfaces, and applying a corrosion prevention coating.

Valve Replacement Program – Metro Vancouver is continually reviewing the water transmission system to ensure valve chambers are in good working order through condition assessments and isolation tests. A number of air valves were assessed and replaced in 2021. A 2021 minor capital project was used to plan the refurbishment of a valve chamber south of the Second Narrows Crossing. The Capital Program is also used to replace valves identified during assessments such as the First Narrows Crossing valve replacement. A more formalized valve maintenance program is currently being developed to improve system operations and budgeting.

Condition Assessments – Condition assessments follow the Asset Management for Water Services Policy, and improve understanding of the system's health and resiliency and can lead to asset repair and replacement projects. In 2021 Metro Vancouver completed condition assessments of three

critical aerial crossings, two sections of a submerged crossing, isolation valve chambers for three aerial crossings, and 12 other chambers in the water system.

Mechanical, Instrumentation, and Electrical Maintenance – In 2021, the maintenance team performed 3,875 preventative maintenance work orders. Examples of maintenance work includes eight pump re-builds at various pump stations; and program troubleshooting for instrumentation at Newton Pump Station.

7.3. Capital Program

The Water Services capital budget for 2021 includes 118 active projects with an estimated investment value of $2.36 billion over 2021-2025. These projects ensure the overall water system is being upgraded to meet service levels as well as applicable changing or new regulations. Capital investments addressing population growth are the largest component of the budget, representing slightly more than 51% of spending in the next 5-years.

In 2021 many major projects reached significant milestones, including the following key projects:

Douglas Road Main No. 2 – This new water main will replace the existing Douglas Road Main No. 1 between North Burnaby and New Westminster built in the 1940s. Construction of the 15-kilometre-long, 1,500 mm diameter water main began in 2007, and several project phases have already been completed and are in service. The two remaining sections are the Vancouver Heights Section, for which construction was completed in early 2021 and commissioning in the fall of 2021, and the Still Creek Section, which commenced construction in the summer of 2021. The Still Creek Section is the final phase of the project. When complete, it will ensure the continued delivery of clean, safe drinking water to the cities of Burnaby and New Westminster.

Second Narrows Water Supply Tunnel – In October of 2021, the tunnel excavation was completed for the Second Narrows Water Supply Tunnel, an important infrastructure project that will improve the seismic resiliency of the region's drinking water system. Now that the 5.8 m diameter tunnel is complete, three large diameter steel water mains will be installed and connected to the existing water system with new valve chambers. This project is one of several new regional water supply tunnel projects that are being constructed to meet current seismic standards and increase supply capacity.

Fleetwood Reservoir and Water Main – Work is underway on a new reservoir and water main in Surrey that will help Metro Vancouver meet the demands of the growing communities south of the Fraser River for clean, safe drinking water. The water main will connect the new reservoir to the regional drinking water system. The reservoir will be located in Meagan Anne MacDougall Park, and construction, which is expected to last about two years, will start in early 2022. The reservoir will be able to hold 13.6 million litres of water.

First Narrows Crossing North Shaft Valve Chamber – The valve chamber for the north shaft of the First Narrows Crossing houses underground pipe connections and large valves that control water flow

from the Capilano Transmission Main on the north shore to a tunnel carrying water under Burrard Inlet. The Capilano Transmission Mains No. 4 and 5 isolation valves were replaced, and both mains returned to service in 2021.

Little Mountain Reservoir – The upgrades for the Little Mountain Reservoir, located in Queen Elizabeth Park, included roof repairs, concrete sealing, and joint replacement. The work involved close collaboration with the Vancouver Parks Board and was completed in summer 2021. This work ensures that water quality is maintained throughout the lifespan of the reservoir.

CWTP Ozone Control System – Water from the Coquitlam Reservoir is pre-treated with ozone before it enters the Coquitlam UV Disinfection Plant. The three ozone generator reactors and their power supply units were originally installed in 1999. The power supply units are currently being replaced and, upon completion, will increase the ozone production capacity of the ozone generator reactor.

In 2021 there were also projects that were finalized and commissioned, bringing new infrastructure into the water transmission system, including the following:

Whalley Main – The Whalley Main was the fourth and final leg of the Port Mann Corridor Upgrades project. This project reached substantial completion in 2021 with final connections made in the fall of 2021 and was put into service in December of 2021. The Port Mann Corridor Upgrades project connects Metro Vancouver's water supply to the communities south of the Fraser River. The Whalley Main consists of approximately 2,000 meters of 1,500 mm diameter water main on 148th Street between Whalley Reservoir and 95A Avenue in the City of Surrey. The new water main is required to meet growth south of the Fraser River and twins a portion of the existing Whalley-Clayton Main, which connects the Whalley Reservoir to the Whalley-Kennedy Main.

Jericho Reservoir Cell #1 - In 2021, the Jericho Reservoir Cell #1 was connected to the drinking water system and became Metro Vancouver's twenty-seventh in-system storage reservoir. The Jericho Reservoir is a key component of Metro Vancouver's supply to the Township of Langley, and the City of Surrey. Located in the Township of Langley, the reservoir is being constructed in two phases and will have a total combined storage volume of 39.1 ML. Phase 1 is comprised of two cells with a combined total storage volume of 20.6 ML, Cell #1 was completed and was put into service in 2021. The second cell is anticipated to be brought online in 2022. The second phase of the reservoir is being planned for 2040.

8.0 EMERGENCY RESPONSE SUMMARY

8.1. Emergency Response and Contingency Plan Summary

The Emergency Response and Contingency Plan (ERCP) covers all aspects of the Metro Vancouver Emergency Management structure. Together with the Corporate Emergency Management Plan, Emergency Management Standard, business continuity plans, and Emergency Response Plans, all activities related to emergencies that may affect water supply are addressed. This Plan is intended to meet all requirements of the *Drinking Water Protection Act* and *Regulatio*n for an *Emergency Response and Contingency Plan*. Similarly, this summary of the ERCP is intended to meet the *Drinking Water Protection Regulation* Section 13 (4), which requires water suppliers to make public a summary of the ERCP to the water users.

Water system operations and emergency management are shared responsibilities between Metro Vancouver and its member jurisdictions. The overall purpose of this Plan is to provide general guidance to Metro Vancouver in preparing for, responding to, and recovering from an emergency situation. Emergencies considered include, but may not be limited to, earthquakes, floods, wildland & interface fire, and severe weather. The Plan defines Water Services' roles and responsibilities during incidents, emergencies and disasters.

Ultimately, Metro Vancouver will endeavour to maintain the continuity of drinking water delivery to our member jurisdictions. In an emergency, Metro Vancouver's priorities are: (1) Deliver drinking water whenever possible to members for consumption and/or firefighting. (2) Protect the integrity of water in its system for public health, (sourced from Metro Vancouver's Water Services Emergency Management Plan V13).

In meeting these priorities, Metro Vancouver subscribes to the following Response Objectives, in order of priority they are as follows:

1. Ensure the safety and health of all responders and Metro Vancouver staff;
2. Save Lives;
3. Reduce Suffering;
4. Protect the Public;
5. Protect Critical Infrastructure;
6. Protect Property;
7. Protect the Environment; and
8. Reduce Social and Economic Losses.

8.2. Emergency Recovery

There were two natural storm events in 2021 that resulted in high flow releases from Seymour Falls Dam (SFD), on September 30 and November 15. Both events resulted in dam discharge flows that exceeded the minimum flood levels selected for the initiation of the Seymour Falls Dam Emergency Response Plan, and resulted in notification of external partners as listed in the plan. From staff

discussions with external partners, neither natural storm event resulted in hazardous conditions or persons placed in imminent danger. Similarly, there were no impacts on the delivery of drinking water to the member jurisdictions.

Additionally, Metro Vancouver continues to monitor the changing COVID-19 situation and periodically adjusts control measures following the guidance of the Provincial Health Officer to maintain the health and safety of staff. Access to drinking water facilities is being restricted to essential personnel only and all public tours are canceled until further notice. There have been some schedule impacts to the capital projects. However, there have been no negative impacts on the delivery of drinking water to the member jurisdictions.


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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Water Committee

From: Goran Oljaca, Director, Engineering and Construction, Water Services

Date: March 7, 2022 Meeting Date: April 6, 2022

Subject: **GVWD Capital Program Expenditure Update to December 31, 2021**

RECOMMENDATION

That the Water Committee receive for information the report dated March 7, 2022, titled "GVWD Capital Program Expenditure Update to December 31, 2021".

EXECUTIVE SUMMARY

The capital expenditure reporting process as approved by the Board provides for regular status reports on capital expenditures three times per year. This is the year-end report for 2021 which includes both the overall capital program for the water utility with a multi-year view of capital projects and the actual capital spending for the 2021 fiscal year in comparison to the annual budget. In 2021 the annual capital expenditures for GVWD were $214.9 million to date compared to an annual capital budget of $431.3 million. This shortfall is primarily due to project delays related to the timing of tenders, construction delays and issues relating to COVID-19.

Forecasted expenditures for the current water utility capital program remain within the approved budgets through to completion.

PURPOSE

To report on the status of the GVWD capital program and financial performance for the 2021 fiscal year ending December 31, 2021.

BACKGROUND

The capital expenditure reporting process as approved by the Board provides for regular status reports on capital expenditures with interim reports sent to the Water, Liquid Waste, Zero Waste, and Performance and Audit Committees, in July and October, with a final year-end report to the Committees and the Boards in April of each year. This report covers projects managed by both the Water Services and the Project Delivery Departments.

This is the third in a series of three reports for 2021 and looks at both the overall capital program for the water utility with a multi-year view of capital projects and the actual capital spending for the 2021 fiscal year to December 31, 2021 in comparison to the annual budget. This report covers projects managed by both the Water Services and the Project Delivery Departments.

2021 CAPITAL EXPENDITURES

GVWD Capital Program Funding

The capital spending for the water utility is funded through the GVWD operating budget by a combination of contribution to capital (pay-as-you-go funding) and debt service costs (principal and interest payments). As a result, the annual impact on the ratepayers is significantly less than the level of budgeted capital expenditures.

Overall Capital Program

The overall capital program for the water utility includes capital projects which require multiple years to complete. These projects are broken down into various phases such as project definition, pre-design, detailed design and construction. With the completion of each phase, more information is learned for the appropriate costing of subsequent phases.

It is expected that the capital spending on all GVWD capital projects completed in 2021 or ongoing at some point in 2021 will be under budget by approximately $39 million, or within 0.5% of total budget.

Table 1 in Attachment 1 provides a summary of GVWD capital expenditures for both ongoing and completed projects. Completed Projects include a summary of actual spending compared to the Board approved spending limits while the Ongoing Projects include a summary of projected spending to completion compared to Board approved spending limits. With the rare exception, projects tend to complete with actual spending below the approved limits predominantly due to savings on budgeted contingency amounts.

Attachment 2 provides the details behind the summary information including specific capital projects, summary financial information and notes where required. Attachment 3 provides additional project status information for some of the key projects included in Attachment 1 – Table 1.

2021 Capital Program Process

The Metro Vancouver financial planning process includes Board approval of both an annual Operating Budget (operations, contribution to capital and debt service) and an annual Capital Budget for the planned capital infrastructure projects. The annual Capital Budget comprises the projected spending for a list of capital projects either continuing or to be started within the calendar year.

In 2021, capital expenditures for GVWD are $214.9 million to December 31, 2021 compared to the total capital budget of $431.3 million.

The current underspend is due to several factors including delays in permitting and land acquisition, as well as COVID-19 impacts.

Forecasted expenditures for the current GVWD capital program remain within the approved budgets for 2021 and through to completion.

Table 2 in Attachment 1 provides a summary of the 2021 actual capital spending to December 31, 2021 compared to the Board approved capital budget.

Capital Program Impacts from COVID-19

During these unprecedented times of health and economic uncertainty, all departments have been monitoring the impacts of the pandemic on their operations. This includes capital program expenditures.

Overall, the impact to the water utility's capital program has largely been schedule related, with some notable impacts to project expenditures confirmed to date. Staff are monitoring impacts on their projects regularly. Some impacts to project schedules or expenditures are included under the respective project section of Attachment 3.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Capital expenditures are funded internally (pay-as-you-go) and through debt service costs (interest and principal payments). As capital expenditures are incurred, short-term financing is secured and converted twice per year to long-term debt through the Municipal Finance Authority.

CONCLUSION

This is the third in a series of three reports on capital expenditures for 2021. Overall, projected expenditures are expected to be under budget for capital projects ongoing or completed in 2021.

Forecasted expenditures for the current GVWD capital program are anticipated to remain within the approved budgets through to completion.

Attachments

1. Capital Expenditure Summary – Water Capital Projects *(47354536)*
2. Detailed Water Capital Expenditure Summary
3. GVWD Capital Project Status Information *(47359063)*

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Metro Vancouver

Capital Expenditure Summary
Water Capital Projects
As at December 31, 2021

Table 1 – Ongoing and Completed Project Summary

Water Services	Total Budget	Total Projected Expenditures At Completion	Total Budget Less Projected Expenditures
Ongoing	$ 7,360,071,000	$ 7,341,966,000	$ 18,105,000
Completed	60,050,000	39,208,000	20,842,000
Not Started	751,200,000	751,200,000	-
Cancelled	-	-	-
	$ 8,171,321,000	**$ 8,132,374,000**	**$ 38,947,000**

Table 2 – December 2021 Capital Spending Summary

Water Services	2021 Budget	Actual Expenditures to December 31, 2021	
Infrastructure Growth Capital	$ 167,550,000	$ 65,740,372	
Infrastructure Maintenance Capital	91,200,000	52,099,076	
Infrastructure Resilience Capital	155,600,000	93,729,326	
Infrastructure Upgrade Capital	14,900,000	3,340,447	
Opportunity Capital	2,000,000	-	
	$ 431,250,000	**$ 214,909,221**	**50%**

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Metro Vancouver
Water Capital Expenditures Summary As of
December 31, 2021

ATTACHMENT 2

Project Name	Project Location	Lifetime Total Project Budget	Lifetime Total Expenditures to Date	Lifetime Remaining Budget	Lifetime Total Projected Expenditures	Lifetime Total Budget Less Projected Expenditures	Lifetime Percent Complete	Status	Project on Schedule?	Note	Comments
Infrastructure Growth Capital											
Annacis Main No. 5 (Marine Crossing)	New West/Surrey	488,000,000	50,061,989	437,938,011	488,000,000	-	10%	Ongoing	N		Design delays
Annacis Main No. 5 (North)	New Westminster	51,500,000	854,555	50,645,445	51,500,000	-	2%	Ongoing	Y		
Annacis Main No. 5 (South)	Surrey	56,900,000	4,061,247	52,838,753	56,900,000	-	7%	Ongoing	Y		
Cape Horn Pump Station No. 3	Coquitlam	171,550,000	1,302,111	170,247,889	171,550,000	-	1%	Ongoing	Y		
Coquitlam Intake No. 2 & Tunnel	Coquitlam	1,181,230,000	8,105,533	1,173,124,467	1,181,230,000	-	1%	Ongoing	N		Project delayed due to value engineering optimized options.
Coquitlam Intake No. 2 (Water Treatment)	Coquitlam	1,486,000,000	887,669	1,485,112,331	1,486,000,000	-	1%	Ongoing	N		Project delayed due to value engineering optimized options.
Coquitlam Main No. 4 (Cape Horn)	Coquitlam	152,600,000	1,988,799	150,611,201	152,599,723	-	1%	Ongoing	Y		
Coquitlam Main No. 4 (Central Section)	Coquitlam	204,470,000	5,826,397	198,643,603	204,470,000	-	3%	Ongoing	Y		
Coquitlam Main No. 4 (South Section)	Coquitlam	408,250,000	6,302,346	401,947,654	408,250,000	-	2%	Ongoing	N		South Section Prebuilds delayed due to longer detailed design.
Fleetwood Reservoir	Surrey	43,367,000	6,809,477	36,557,523	43,367,000	-	16%	Ongoing	N		Project delayed due to property approval.
Grandview Reservoir Unit No. 2	Surrey	26,000,000	-	26,000,000	26,000,000	-		Not Started	Y		
Haney Main No. 4 (West Section)	Port Coquitlam	74,050,000	370,846	73,679,154	74,050,000	-	1%	Ongoing	Y		
Hellings Tank No. 2	Delta	29,411,000	5,643,855	23,767,145	29,411,000	-	19%	Ongoing	Y		
Jericho Reservoir No. 1	Langley Township	38,065,000	39,971,888	(1,906,888)	40,565,000	(2,500,000)	99%	Ongoing	Y	(c) (h)	
Kennedy Newton Main	Surrey	132,550,000	58,765,976	73,784,024	116,710,000	15,840,000	44%	Ongoing	N	(b)	Route selection delays.
Newton Pump Station No. 2	Surrey	50,800,000	5,311,398	45,488,602	50,800,000	-	10%	Ongoing	N		Property acquisition delays.
Newton Reservoir Connection	Surrey	27,050,000	-	27,050,000	27,050,000	-	0%	Not Started	Y		
Port Mann Main No. 2 (South)	Surrey	36,800,000	31,534,819	4,500,000	36,034,819	765,000	95%	Ongoing	Y		
South Surrey Main No. 2	Surrey	143,700,000	91,086	143,608,914	143,700,000	-	1%	Ongoing	Y		
South Surrey Main No. 2 Nickomekl Dam Prebuild	Surrey	2,000,000	-	2,000,000	2,000,000	-	0%	Not Started	Y		
Whalley Kennedy Main No. 2	Surrey	96,000,000	-	96,000,000	96,000,000	-	0%	Not Started	Y		
Whalley Main	Surrey	31,800,000	29,834,419	1,965,581	31,800,000	-	95%	Ongoing	Y		
		4,932,093,000	**257,724,410**	**4,674,368,590**	**4,954,787,542**	**(22,695,000)**					
Infrastructure Maintenance Capital											
Annacis Main No. 2 - Queensborough Crossover Improvement	New Westminster	1,200,000	-	1,200,000	1,200,000	-	0%	Not Started	Y	(e)	Likely not required. MOTI may not relocate Queensborough Main.
Annacis Main No. 3 BHP Potash Facility Pipe Protection	Surrey	600,000	-	600,000	600,000	-	0%	Not Started	Y	(e)	
Beach Yard Facility - Site Redevelopment	Dist of North Van	45,500,000	-	45,500,000	45,500,000	-	0%	Not Started	Y		
Boundary Road Main No. 2 & No. 3 Decommissioning	Burnaby	1,500,000	424,821	1,075,179	1,500,000	-	50%	Ongoing	Y		
Burnaby Mountain Main No. 2	Burnaby	10,200,000	-	10,200,000	10,200,000	-	0%	Not Started	Y		
Burnaby Mountain Pump Station No. 2	Burnaby	21,000,000	242,082	20,757,918	21,000,000	-	1%	Ongoing	N		Scope of work under review.
Cape Horn Reservoir Condition Assessment and Structural Repair	Coquitlam	1,550,000	-	1,550,000	1,550,000	-	0%	Not Started	Y		
Capilano Main No. 5 (South Shaft to Lost Lagoon)	Vancouver	260,000,000	12,374,911	247,625,089	260,000,000	-	5%	Ongoing	N		Delayed due to project approval timelines.
Capilano Main No. 7 Line Valve & Swing Connection	Dist of North Van	2,100,000	1,962,662	137,338	2,100,000	-	100%	Completed	Y		
Capilano Raw Water Pump Station Bypass PRV Upgrades	Dist of North Van	1,500,000	95,796	1,404,204	1,500,000	-	6%	Ongoing	Y		
Capilano Watershed Security Gatehouse	Dist of North Van	2,300,000	534,219	1,765,781	2,300,000	-	23%	Ongoing	Y		
Central Park Main No. 2 (10th Ave to Westburnco)	Burnaby	28,350,000	28,454	28,321,546	28,350,000	-	0%	Not Started	N		Delayed due to project scope review.
Central Park Main No. 2 (Patterson to 10th Ave)	Burnaby	91,900,000	32,275,586	59,624,414	91,900,000	-	35%	Ongoing	Y		
Central Park Reservoir Structural Improvements	Burnaby	1,900,000	-	1,900,000	1,900,000	-	0%	Not Started	Y		
Central Park WPS Starters Replacement	Burnaby	8,000,000	1,346,916	6,653,084	8,000,000	-	17%	Ongoing	N		Delayed due to re-zoning.
CLD & SFD Fasteners Replacement & Coating Repairs	Dist of North Van	2,100,000	1,720,354	379,646	2,100,000	-	82%	Ongoing	Y		
Cleveland Dam - Lower Outlet HBV Rehabilitation	Dist of North Van	4,900,000	2,210,055	2,689,945	4,900,000	-	75%	Ongoing	Y	(g)	
Cleveland Dam Drumgate Seal Replacement	Dist of North Van	1,250,000	269,208	980,792	1,250,000	-	22%	Ongoing	Y		
Coquitlam Pipeline Road Remediation	Coquitlam	2,000,000	1,855,820	144,180	1,856,960	143,000	100%	Completed	Y	(f)	
CWTP Ozone Sidestream Pipe Heat Trace and Insulation	Coquitlam	900,000	9,374	890,626	900,000	-	1%	Ongoing	Y		
CWTP Ozone Sidestream Pump VFD Replacement	Coquitlam	1,400,000	60,882	1,339,118	1,400,000	-	4%	Ongoing	Y		
CWTP pH, Alkalinity Upgrades	Coquitlam	1,700,000	1,684,847	15,153	1,700,000	-	99%	Ongoing	Y		
Dechlorination for Reservoir Overflow and Underdrain Discharges	Burnaby	2,700,000	245	2,699,755	2,700,000	-	0%	Not Started	Y		
Douglas Road Main No. 2 - Kincaid Section	Burnaby	12,300,000	9,705,838	2,594,162	12,300,000	-	80%	Ongoing	N		Alignment changes.
Douglas Road Main No. 2 (Vancouver Heights Section)	Burnaby	21,486,000	19,869,722	1,616,278	21,486,000	-	95%	Ongoing	N	(b)	Procurement delays.
Douglas Road Main No. 2 Still Creek	Burnaby	63,100,000	16,027,392	47,072,608	63,100,000	-	25%	Ongoing	N		Alignment changes.
Douglas Road Main Protection	Burnaby	1,500,000	14,101	1,485,899	1,500,000	-	1%	Ongoing	Y	(e)	
E2 Shaft Phase 3	Dist of North Van	16,500,000	15,535,852	964,148	16,500,000	-	95%	Ongoing	Y		
First Narrows Tunnel Isolation Chamber Improvements	Dist of North Van	7,000,000	4,341,548	2,658,452	5,000,000	2,000,000	95%	Ongoing	Y	(a)(b)	
Improvements to Capilano Mains No. 4 and 5	Dist of North Van	1,700,000	108,039	1,591,961	1,700,000	-	6%	Ongoing	Y		
Kersland Reservoir No. 1 Structural Improvements	Vancouver	6,250,000	1,025,137	5,224,863	6,250,000	-	16%	Ongoing	Y		
Little Mountain Reservoir Roof Upgrades	Vancouver	3,450,000	1,019,331	2,430,669	1,650,000	1,800,000	100%	Completed	Y	(g)	
Lulu Island - Delta Main - Scour Protection Phase 2	Richmond	3,550,000	-	3,550,000	3,550,000	-	0%	Not Started	Y	(e)	
Lulu Island - Delta Main No. 2 (Marine Crossing)	Richmond	370,000,000	-	370,000,000	370,000,000	-	0%	Not Started	Y		
Maple Ridge Main West Lining Repairs	Maple Ridge	3,500,000	190,470	3,309,530	3,500,000	-	7%	Ongoing	N		Project delayed as a result of delays on Seymour Main No. 2 Joints Improvement project.
Newton Rechlorination Station No. 2	Surrey	5,000,000	-	5,000,000	5,000,000	-	0%	Not Started	N		Project delayed to coordinate with Newton Pump Station Project.
Port Mann Main No. 1 (Fraser River Crossing Removal)	Coq/Surrey	18,500,000	255,000	18,245,000	500,000	18,000,000	100%	Completed	Y		This project is no longer required.

Metro Vancouver
Water Capital Expenditures Summary As of
December 31, 2021

ATTACHMENT 2

Project Name	Project Location	Lifetime Total Project Budget	Lifetime Total Expenditures to Date	Lifetime Remaining Budget	Lifetime Total Projected Expenditures	Lifetime Total Budget Less Projected Expenditures	Percent Complete	Status	Project on Schedule?	Note	Comments
Port Moody Main No. 1 Christmas Way Relocation	Coquitlam	2,350,000	-	2,350,000	2,350,000	-	0%	Not Started	Y	(e)	
Port Moody Main No. 3 Dewdney Trunk Rd Relocation	Coquitlam	2,700,000	4,523	2,695,477	2,700,000	-	85%	Ongoing	Y	(e)	
Port Moody Main No. 3 Scott Creek Section	Coquitlam	12,000,000	277,851	11,722,149	12,000,000	-	4%	Ongoing	Y		
Queensborough Main Royal Avenue Relocation	New Westminster	7,500,000	8,342	7,491,658	7,500,000	-	5%	Ongoing	Y		
Rechlorination Station SHS Storage Tank Replacement	Regional	1,200,000	204,025	995,975	1,200,000	-	17%	Ongoing	Y		
Rechlorination Station Upgrades	Regional	15,000,000	407,302	14,592,698	15,000,000	-	3%	Ongoing	Y		
Rehabilitation of AN2 on Queensborough Bridge	New West/Delta	2,500,000	829,859	1,670,141	2,500,000	-	33%	Ongoing	Y		
Relocation and Protection for MOTI Expansion Project Broadway	Vancouver	8,900,000	65,004	8,834,997	8,900,000	-	1%	Ongoing	Y	(e)	
Relocation and Protection for MOTI George Massey Crossing Replacement	Delta / Richmond	2,450,000	-	2,450,000	2,450,000	-	0%	Not Started	Y	(e)	
Relocation and Protection for Translink Expansion Project Surrey Langley SkyTrain	Surrey	6,600,000	-	6,600,000	6,600,000	-	0%	Not Started	Y	(e)	
Sapperton Main No. 2 North Road Relocation and Protection	Coquitlam	6,500,000	-	6,500,000	6,500,000	-	0%	Not Started	Y		
SCFP Centralized Compressed Air System	Dist of North Van	900,000	39,769	860,231	900,000	-	4%	Ongoing	Y		
SCFP Clearwell Membrane Replacement	Dist of North Van	17,400,000	-	17,400,000	17,400,000	-	0%	Not Started	Y		
SCFP Concrete Coatings	Dist of North Van	2,500,000	2,501,262	(1,262)	2,501,262	(1,000)	100%	Completed	Y		
SCFP OMC Building Expansion	Dist of North Van	2,650,000	123,403	2,526,597	2,650,000	-	5%	Ongoing	Y		
SCFP Polymer System Upgrade	Dist of North Van	3,450,000	503,748	2,946,252	3,450,000	-	15%	Ongoing	Y		
SCFP SCADA/ICS Controller Replacement	Dist of North Van	1,400,000	-	1,400,000	1,400,000	-	0%	Not Started	Y		
South Delta Main No. 1 - Ferry Road Check Valve Replacement	Delta	600,000	106,185	493,815	600,000	-	18%	Ongoing	Y		
South Surrey Main No. 1 Nickomekl Dam Relocation	Surrey	7,100,000	-	7,100,000	7,100,000	-	0%	Not Started	N	(e)	Project delayed by City of Surrey.
South Surrey Supply Main (Serpentine River) Bridge Support Modification	Surrey	400,000	79,469	320,531	400,000	-	20%	Ongoing	Y		
Sunnyside Reservoir Unit 1 Upgrades	Surrey	8,850,000	7,894,106	955,894	7,950,000	900,000	100%	Completed	Y	(b)	
Tilbury Main North Fraser Way Valve Addition	Burnaby	3,100,000	398,828	2,701,172	3,100,000	-	13%	Ongoing	Y		
Water Chamber Improvements and Repairs	Burnaby	2,000,000	36,226	1,963,774	2,000,000	-	2%	Ongoing	Y		
Westburnco Pump Station No. 2 VFD Replacements	New Westminster	2,550,000	254,118	2,295,882	2,550,000	-	10%	Ongoing	Y		
		1,148,986,000	**138,922,683**	**1,010,063,317**	**1,128,644,222**	**20,342,000**					
Infrastructure Resilience Capital											
Barnston/Maple Ridge Pump Station - Back-up Power	Pitt Meadows	9,000,000	240,156	8,759,844	9,000,000	-	3%	Ongoing	N		Delayed due to property selection.
Burnaby Mountain Tank No. 2	Burnaby	21,650,000	64,104	21,585,896	21,650,000	-	1%	Ongoing	Y		
Burnaby Mountain Tank No. 3	Burnaby	21,400,000	-	21,400,000	21,400,000	-	1%	Ongoing	Y		
Cambie Richmond Main No. 3 (Marine Crossing)	Richmond/Van	490,250,000	2,069,434	488,180,566	490,250,000	-	2%	Ongoing	Y		
Cape Horn Pump Station 2 - Back-Up Power	Coquitlam	8,000,000	131,722	7,868,278	8,000,000	-	2%	Ongoing	Y		
Capilano Mid-Lake Debris Boom	Dist of North Van	750,000	15,610	734,390	750,000	-	2%	Ongoing	Y		
Capilano Raw Water Pump Station - Back-up Power	Dist of North Van	33,000,000	11,830,734	21,169,266	33,000,000	-	36%	Ongoing	N		Site selection delays.
Capilano Reservoir Boat Wharf	Dist of North Van	850,000	69,235	780,765	850,000	-	8%	Ongoing	Y		
Clayton Langley Main No. 2	Surrey	16,900,000	-	16,900,000	16,900,000	-	0%	Not Started	Y		
Cleveland Dam Power Resiliency Improvements	Dist of North Van	1,700,000	30,530	1,669,470	1,700,000	-	2%	Ongoing	Y		
Cleveland Dam Seismic Stability Evaluation	Dist of North Van	800,000	-	800,000	800,000	-	0%	Not Started	Y		This project phase to start in 2022 after completion of the CLD Canyon Amplification/Concrete Dam Analysis project
Coquitlam Intake Tower Seismic Upgrade	Coquitlam	26,000,000	1,431,915	24,568,085	26,000,000	-	6%	Ongoing	Y		
Critical Control Sites - Back-Up Power	Regional	1,800,000	-	1,800,000	1,800,000	-	0%	Not Started	Y		
CWTP Ozone Back-up Power	Coquitlam	7,450,000	-	7,450,000	7,450,000	-	0%	Not Started	Y		
Emergency Power Strategy for Regional Water Facilities	Regional	400,000	158,699	241,301	400,000	-	40%	Ongoing	Y		
Grandview Pump Station Improvements	Surrey	2,600,000	387,271	2,212,729	2,600,000	-	15%	Ongoing	Y		
Haney Main No. 4 (Marine Crossing)	P.Coq/P.Meadows	390,250,000	235,112	390,014,888	390,250,000	-	1%	Ongoing	Y		
Mackay Creek Debris Flow Mitigation	Dist of North Van	9,700,000	9,115,257	584,743	9,700,000	-	98%	Ongoing	N		Delays due to challenging ground conditions.
Pebble Hill Pump Station Seismic Upgrade	Delta	1,800,000	-	1,800,000	1,800,000	-	0%	Not Started	N	(d)	Coordinating with City of Delta.
Pebble Hill Reservoir No. 3 Seismic Upgrade	Delta	9,500,000	361,525	9,138,475	9,500,000	-	4%	Ongoing	Y		
Pebble Hill Reservoir Seismic Upgrade	Delta	14,800,000	1,342,314	13,457,686	12,800,000	2,000,000	15%	Ongoing	N	(b)	Design delays due to geotechnical conditions.
Reservoir Isolation Valve Automation	Regional	6,450,000	1,192,875	5,257,125	6,450,000	-	18%	Ongoing	N		Delayed due to scope refinement.
Scour Protection Assessments and Construction General	Regional	4,000,000	-	4,000,000	4,000,000	-	0%	Not Started	Y		
Second Narrows Crossing (Tunnel)	Burnaby/DNV	468,550,000	279,843,998	188,706,002	468,550,000	-	60%	Ongoing	Y		
Seymour Falls Boat Wharf	Dist of North Van	800,000	65,345	734,655	800,000	-	11%	Ongoing	Y		
Seymour Lake Debris Boom	Dist of North Van	800,000	287,175	512,825	800,000	-	36%	Ongoing	Y		
Seymour Main No. 2 Joint Improvements	Dist of North Van	5,252,000	663,540	4,588,460	5,252,000	-	16%	Ongoing	N		Work delayed to coordinate with Broadway Skytrain relocation work.
Seymour Main No. 5 III (North)	Dist of North Van	236,900,000	5,019,663	231,880,337	236,900,000	-	2%	Ongoing	Y		
Seymour Reservoir Mid-Lake Debris Boom	Dist of North Van	2,300,000	1,230,676	1,069,324	2,300,000	-	54%	Ongoing	Y		
Sunnyside Reservoir	Surrey	19,300,000	7,556,887	11,743,113	19,300,000	-	50%	Ongoing	Y		
Vancouver Heights System Resiliency Improvements	Burnaby	1,500,000	6,661	1,493,339	1,500,000	-	0%	Not Started	Y		
Westburnco Pump Station - Back-up Power	New Westminster	23,500,000	1,238,752	22,261,248	23,500,000	-	5%	Ongoing	N		Design delay, scope modification.
		1,837,952,000	**324,589,191**	**1,513,362,809**	**1,835,952,000**	**2,000,000**					
Infrastructure Upgrade Capital											
CWTP Ozone Generation Upgrades for Units 2 & 3	Coquitlam	7,000,000	3,271,087	3,728,913	7,000,000	-	47%	Ongoing	N		Delay due to operational requirements.
Lower Seymour Conservation Reserve Learning Lodge Replacement	Dist of North Van	5,000,000	876,931	4,123,069	5,000,000	-	18%	Ongoing	Y		
Online Chlorine Monitoring Stations	Regional	4,150,000	-	4,150,000	4,150,000	-	0%	Not Started	Y		

Metro Vancouver
Water Capital Expenditures Summary As of
December 31, 2021

ATTACHMENT 2

Project Name	Project Location	Lifetime Total Project Budget	Lifetime Total Expenditures to Date	Lifetime Remaining Budget	Lifetime Total Projected Expenditures	Lifetime Total Budget Less Projected Expenditures	Percent Complete	Status	Project on Schedule?	Note	Comments
Sapperton Main No. 1 New Line Valve and Chamber	New Westminster	3,800,000	977,716	2,822,284	3,800,000	-	26%	Ongoing	N		Tie-ins delayed.
South Delta Main No. 1 - 28 Ave to 34B Ave	Delta	22,650,000	20,708,558	1,941,442	22,650,000	-	100%	Completed	N		Construction delays due to unforeseen environmental and geotechnical conditions.
South Delta Mains - 28 Ave Crossover	Delta	10,500,000	10,439,252	60,748	10,500,000	-	99%	Ongoing	N		Utility conflicts and additional scope of work.
Tilbury Junction Chamber Valves Replacement with Actuators	Richmond	5,600,000	4,542,070	1,057,930	5,600,000	-	81%	Ongoing	N		Tie-ins delayed due to railway permitting requirements.
Water Meter Upgrades	Regional	22,400,000	5,437,226	16,962,774	22,400,000	-	24%	Ongoing	N		Procurement delays.
Water Optimization - Flow Meters (Non-billing) Phase 1	Regional	16,500,000	-	16,500,000	16,500,000	-	0%	Not Started	Y		
Water Optimization - Flow Meters (Non-billing) Phase 2	Regional	19,500,000	-	19,500,000	19,500,000	-	0%	Not Started	Y		
Water Optimization - Instrumentation	Regional	11,400,000	-	11,400,000	11,400,000	-	0%	Not Started	Y		
Water Optimization Automation & Instrumentation	Regional	9,540,000	8,018,834	1,521,166	9,540,000	-	84%	Ongoing	N		Procurement delays.
		138,040,000	**54,271,675**	**83,768,325**	**138,040,000**	**-**					
Opportunity Capital											
Capilano Hydropower	Dist of North Van	114,250,000	218,368	114,031,632	114,250,000	-	1%	Ongoing	N		Project currently on hold.
		114,250,000	**218,368**	**114,031,632**	**114,250,000**	**-**					
Grand Total Water Capital		**8,171,321,000**	**775,726,327**	**7,395,594,673**	**8,132,374,000**	**38,947,000**					

Notes:

(a) Contingency not required.
(b) Construction costs lower than estimated.
(c) City of Surrey share - 33.72%, Township of Langley share - 66.28%.
(d) Cost sharing proposal with City of Delta
(e) Project start is dependent on a 3rd party. External agency yet to begin work.
(f) GVWD Cost Share City of Coquitlam, Fortis and BC Hydro
(g) Extent of construction scope less than originally anticipated.
(h) Design change/consutant

GVWD Capital Project Status Information

December 31, 2021

GREATER VANCOUVER WATER DISTRICT

Major GVWD capital projects are generally proceeding on schedule and within budget. The following capital program items and exceptions are highlighted:

Infrastructure Growth Program

- **Annacis Main No. 5 (Marine Crossing)** – A 2.3 km long, 4.5 metre diameter water supply tunnel is required under the Fraser River to meet growing water demand south of the Fraser and to provide increased system resiliency. Detailed design, and property acquisition are complete. The construction contract was awarded in late October 2021, and construction will commence in March 2022.

- **Annacis Main No. 5 (South)** – This project comprises approximately 3.0 km of 1.8 metre diameter steel pipe connecting the south shaft of the Annacis Water Supply Tunnel to the Kennedy Reservoir in the City of Surrey. Preliminary design has been completed and detailed design is in progress and expected to be complete in February 2022.

- **Cape Horn Pump Station No. 3** – Cape Horn Pump Station No. 3 with a back-up power system, will supplement the existing pump station to deliver Coquitlam source water to meet growing demand in the areas south of the Fraser River. Preliminary design of the new station started in Q1 2020 and is nearing completion. The RFP for detailed design and construction engineering services will be issued by end of Q1 2022

- **Coquitlam Intake No. 2** – A new intake, tunnel and treatment plant are proposed at the Coquitlam Reservoir to increase the regional supply from this source and meet growing future demand. A Value Engineering Optimization exercise, completed in early 2021, confirmed a preferred project option of a North Intake with Smaller Initial Filtration Treatment, which was endorsed by the Board. The Final Project Definition Report has been submitted for review. The project is now in the permitting and regulatory phase, which will focus on engagement with First Nations and stakeholders.

- **Coquitlam Main No. 4** – This 12 km long steel water main, consisting of the Central, South, South Tunnel and Cape Horn Sections, will increase the transmission capacity from the Coquitlam source to the Cape Horn Pump Station and Reservoir in the City of Coquitlam. This project is required to address capacity constraints in the existing Coquitlam transmission system and also provide additional transmission capacity for the Coquitlam Intake No. 2. Detailed design of the Central, South and Cape Horn Sections continues. Preliminary design of the South Tunnel Section is underway. Construction of the South Section Prebuild will commence in Q4 2022.

- **Fleetwood Reservoir** – Phase 1 of the Fleetwood Reservoir project includes a 13.6 ML reservoir, valve chamber, piping, access building and associated work located at Meagan Ann MacDougall Park in the City of Surrey. The City of Surrey has finalized the Property Lease Agreement and a Coordinated Works Agreement to include a portion of the city water main in the tender package and they are currently reviewing the building permit application. The construction tender has closed and will go

before the Board in March for award approval. Construction is expected to commence in Q2 2022.

- **Jericho Reservoir** – Phase 1 of the Jericho Reservoir project includes a 20.6 ML reservoir, chambers, piping and associated work located at 20400 73A Avenue in the Township of Langley. Construction is substantially complete with minor deficiencies remaining. The reservoir is currently in service.

- **Kennedy Newton Main** – This project comprises approximately 9.0 km of 1.8 metre diameter steel water main between the Kennedy Reservoir and the Newton Reservoir in the City of Surrey and is divided into 3 phases. Construction of Phase 1, between 72nd Avenue and 84th Avenue, is complete. Construction of Phase 2, between 72nd Avenue and Newton Reservoir commenced in September 2020 and is nearing completion. Design of the remaining Phase 3, from 84th Avenue to Kennedy Reservoir, is complete with the construction tender to be released in Q1 2022.

- **Newton Pump Station No. 2** – This project, located at 6287 128th Street in the City of Surrey, consists of replacing the existing Newton Pump Station and includes full back-up power redundancy, connections to existing and future infrastructure, and installation of new outlets to the existing Newton Reservoir. The detailed design is in progress with completion expected in Q1 2022. Construction of the new reservoir outlets is anticipated to start in fall 2022 with the main pump station construction planned in spring 2023.

- **Port Mann Main No. 2 (South)** – This 2.8 km long, 1.5 metre diameter steel water main will twin the existing Port Mann Main No. 1 between the south shaft of the Port Mann Water Supply Tunnel and the Whalley Main in the City of Surrey. The project is required to meet growing water demand south of the Fraser River. The water main installation and commissioning are now complete and the new main is now in service.

- **Whalley Main** – This 2.0 km long, 1.5 metre diameter steel main will twin the existing Whalley Clayton Main between the Whalley Reservoir and the Whalley Kennedy Link Main in the City of Surrey. The water main installation and commissioning are now complete and the new main is now in service.

Infrastructure Maintenance Program

- **Douglas Road Main No. 2 – Still Creek Section** - This project comprises approximately 2.5 km of 1.5 metre diameter steel pipe with trenchless crossings of Highway 1, Still Creek and the BNSF rail line. The water main alignment has been finalized in consultation with the City of Burnaby. The Project is planned to be constructed in three phases, with the North Open Cut Section and the Trenchless Crossing Section currently under construction. Design of the South Open Cut Section is underway.

- **Douglas Road Main No. 2 – Vancouver Heights Section** - This project comprises approximately 2.0 km of 1.5 metre diameter steel pipe connecting the Vancouver Heights Reservoir to the Douglas Road Main No. 2 at Beta Avenue and Albert Street in the City of Burnaby. The installation construction contract is complete. Final tie-ins and commissioning are planned for fall 2022.

- **Central Park Main No. 2 – Patterson to 10th Ave** - This project comprises approximately 7.0 km of 1.2 metre diameter steel pipe connecting the Central Park Pump Station in Burnaby to the existing Central Park Main in New Westminster at 10th Avenue. The water main is divided into three phases with the 500 m long Maywood Pre-build completed in December 2020. Construction of Phase 1 of the project commenced in October 2020 with completion anticipated in mid-2022. Design of Phase 2 is underway and is expected to be complete in summer 2022.

- **Capilano Main No. 5 (Stanley Park Section)** – This 1.4 km long steel water main, in a tunnel, will replace the aged existing Capilano Main No. 4 through Stanley Park to meet growing water demand and provide increased system resiliency. Detailed design is nearing completion. Work to secure permits and land agreements is on-going. The procurement phase for construction is scheduled to commence in April or May 2022, with construction anticipated to start in 2023.

Infrastructure Resilience Program

- **Mackay Creek Debris Flow Mitigation** – Construction commenced in spring 2019 and was completed in March 2020. Site restoration was completed in late 2021.

- **Second Narrows Water Supply Tunnel** – This project comprises a 1.1 km long, 6.5 metre diameter water supply tunnel under Burrard Inlet, between North Vancouver and Burnaby, to increase the reliability of supply in the event of a major earthquake and provide additional long-term supply capacity. Construction commenced in early 2019. Construction of the north and south shafts is complete. The Tunnel Boring Machine began tunnel excavation in the fall of 2020 and the tunnel was completed in fall 2021. Construction of the south valve chamber and installation of the steel water mains inside the tunnel commenced in late 2021. Overall construction is scheduled to be complete by late 2023, followed by site restoration and final tie-ins and commissioning in 2024 and 2025.

- **Capilano Raw Water Pump Station – Back-up Power** – This project consists of installing diesel generators to provide 8 MW of back-up power to the pump station. A portion of the equipment has already been delivered and the design for the construction tender is nearing completion. Construction is anticipated to start in early fall 2022 with overall project completion in 2024.

- **Coquitlam Intake Tower Seismic Upgrade** – The Coquitlam Intake Tower is located in the southeast corner of the Coquitlam Reservoir. Constructed in 1913, the tower provides the GVWD its primary intake of water from Coquitlam Reservoir. The Tower is a 27 metre-high and 5.5 metre diameter unreinforced concrete structure, founded on bedrock. Detailed design of the seismic upgrade is 75% complete. Completion of detailed design is expected in Q2 of 2022. Due to coordination with BC Hydro work and water supply operations, construction will be completed over two winter periods 2024 to 2026.

- **Pebble Hill Reservoir No. 1, 2 and 3 Seismic Upgrade** – Pebble Hill Reservoir in south Delta is comprised of three units. Construction is scheduled to be completed in stages, taking only one unit out of service at any time. Construction of Unit 1 is ongoing and will finish in the summer of 2022. Unit 2 will commence in the fall of 2022 and finish in the summer of 2023. A separate tender will be issued for Unit 3 which is not expected to start until 2025.

- **Westburnco Pump Station – Back-up Power** – This project consists of installing diesel generators to provide 5 MW's of back-up power to the pump station. Preliminary design was completed in 2019 and detailed design is underway.

- **Cambie-Richmond Water Supply Tunnel** – This project comprises an approximately 1 km long 4.5 m diameter tunnel under the Fraser River between the City of Vancouver and the City of Richmond to increase the reliability of supply in the event of a major earthquake and provide additional long-term supply capacity. Conceptual design commenced in 2019 and is almost complete. Preliminary design is scheduled to commence later this year.

Infrastructure Upgrade Program

- **Coquitlam Ozone Upgrade** – This project consists of upgrades to the ozone generators at the Coquitlam Water Treatment Plant. The generators for units 1, 2 and 3 have been replaced and units 1 and 2 are in service. Testing and commissioning of unit 3 is scheduled for Q1 2022. Completion of the upgrades to the ozone control system will follow.

47359063

To: Water Committee

From: Jesse Montgomery, Division Manager, Environment, Water Services

Date: March 1, 2022 Meeting Date: April 6, 2022

Subject: **2021 Contribution Agreement Annual Reports - Seymour Salmonid Society and Coquitlam River Watershed Roundtable**

RECOMMENDATION

That the Water Committee receive for information the report dated March 1, 2022, titled "2021 Contribution Agreement Annual Reports - Seymour Salmonid Society and Coquitlam River Watershed Roundtable".

EXECUTIVE SUMMARY

The Seymour Salmonid Society (SSS) operates the Seymour River Hatchery on Greater Vancouver Water District (GVWD) land and conducts comprehensive area stewardship activities. The GVWD and SSS have been partners since 1989. The GVWD has a current three-year (2021 – 2023) Contribution Agreement with the SSS for $125,000 annually. The SSS released over 500,000 juvenile salmonids into local waterways in 2021.

The Coquitlam River Watershed Roundtable (CRWR) has a mission "To preserve and enhance the health of the Coquitlam River Watershed through collaboration, education and advisory action". The GVWD has a three-year (2020 – 2022) Contribution Agreement to the CRWR for $34,000 annually. The CRWR took action on stormwater management engagement in 2021 and constructed a demonstration rain garden in Port Coquitlam.

The SSS and CRWR have met the requirements of the respective GVWD Contribution Agreements in 2021. The two attached annual reports provide an overview of the programs in 2021.

PURPOSE

To provide the Committee and Board with the SSS's and CRWR's 2021 annual reports in accordance with the contribution agreements between the GVWD and these two non-profit societies contributing to regional environmental stewardship.

BACKGROUND

In 2014, the first three-year Contribution Agreement from the GVWD to SSS was drafted to formalize a historic funding arrangement. At its October 2, 2020 meeting, the GVWD Board adopted the following resolution to renew the agreement for a third consecutive three-year term:

> *That the GVWD Board approve the renewal of the Contribution Agreement between the Greater Vancouver Water District and the Seymour Salmonid Society for a three-year term, and annual contribution amount of $125,000, commencing on January 1, 2021 and ending on December 31, 2023.*

A three-year Contribution Agreement, the first between the GVWD to CRWR, was approved in 2020 to provide funding via the Watershed Watch Salmon Society (acting as Financial Trustee). At its November 1, 2019 meeting, the GVWD Board adopted the following resolution:

> *That the GVWD Board approve the Contribution Agreement between the Greater Vancouver Water District and the Watershed Watch Salmon Society for a three-year term and annual contribution of $34,000 commencing on January 1, 2020 and ending on December 31, 2022.*

A requirement of the contribution agreement with each society is to submit an annual report on its activities to the GVWD by January of the following year. This report provides the annual update of the societies as identified in the 2022 Water Committee Work Plan. Operations for both societies in 2021, particularly as it pertains to public engagement and education initiatives, continued to be impacted by public health restrictions due to the COVID 19 Pandemic.

SEYMOUR SALMONID SOCIETY HISTORY

The Seymour River Hatchery is located on GVWD land near the base of the Seymour Falls Dam. The hatchery commenced operations in 1977 in response to declining fish stocks in the Seymour River and Burrard Inlet. The hatchery was managed by the BC Institute of Technology (BCIT) for the first decade of operation. The SSS was formed in 1987 to oversee hatchery operations, volunteer activities and educational programming. Initially, solely funded by Fisheries and Oceans Canada (DFO), the GVWD began contributing to the core funding for the SSS in 1996. The relationship between the GVWD, DFO and the SSS has been highly collaborative since the hatchery facility was established.

Seymour Salmonid Society Contribution Agreement Funding

The SSS utilized core funding from the GVWD and DFO to administer regular hatchery operations in 2021. They also leveraged an additional $405,659 primarily from the BC Salmon Restoration and Innovation Fund, and the Habitat Conservation Trust fund to continue rock breaking activities at the 2014 Seymour River Canyon rockslide site. These funders along with a number of other community stewardship supporters further contributed to equipment upgrades for hatchery infrastructure, educational initiatives, and other operational objectives.

COQUITLAM RIVER WATERSHED ROUNDTABLE HISTORY

The CRWR was formed in 2011 with roots back to a Coquitlam River Watershed Strategy from 2007 developed by a number of local stakeholders. The group completed a *Lower Coquitlam Watershed Plan* in 2014 and identified action plans and implementation strategies which have been ongoing since 2016. Priorities of the CRWR pertain to advocacy and actions contributing to improvements in development practices, stormwater and invasive species management.

Coquitlam River Watershed Roundtable Contribution Agreement Funding

The CRWR primarily utilized the GVWD funding to support the full-time Roundtable Coordinator position and public outreach activities. Ongoing partnership funding was received from the Kwikwetlem First Nation, City of Coquitlam and the City of Port Coquitlam, and additional short term funding was received from Fisheries and Oceans Canada and several stewardship-minded business organizations.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

The GVWD is a primary contributor to the SSS and CRWR, providing $125,000 annually through 2023, and $34,000 annually through 2022 respectively, within the Watersheds & Environment Program budget. Renewal requests for subsequent contribution agreements are expected to be received from both organizations and will be brought forward to the Board for consideration.

CONCLUSION

Under the terms of the contribution agreement with the GVWD, the SSS and CRWR are required to submit annual reports on their activities for the prior year. Despite ongoing challenges with the COVID 19 Pandemic and associated gathering restrictions, particularly in community engagement and public education, both organizations fulfilled the obligations of their respective contribution agreements.

Attachments

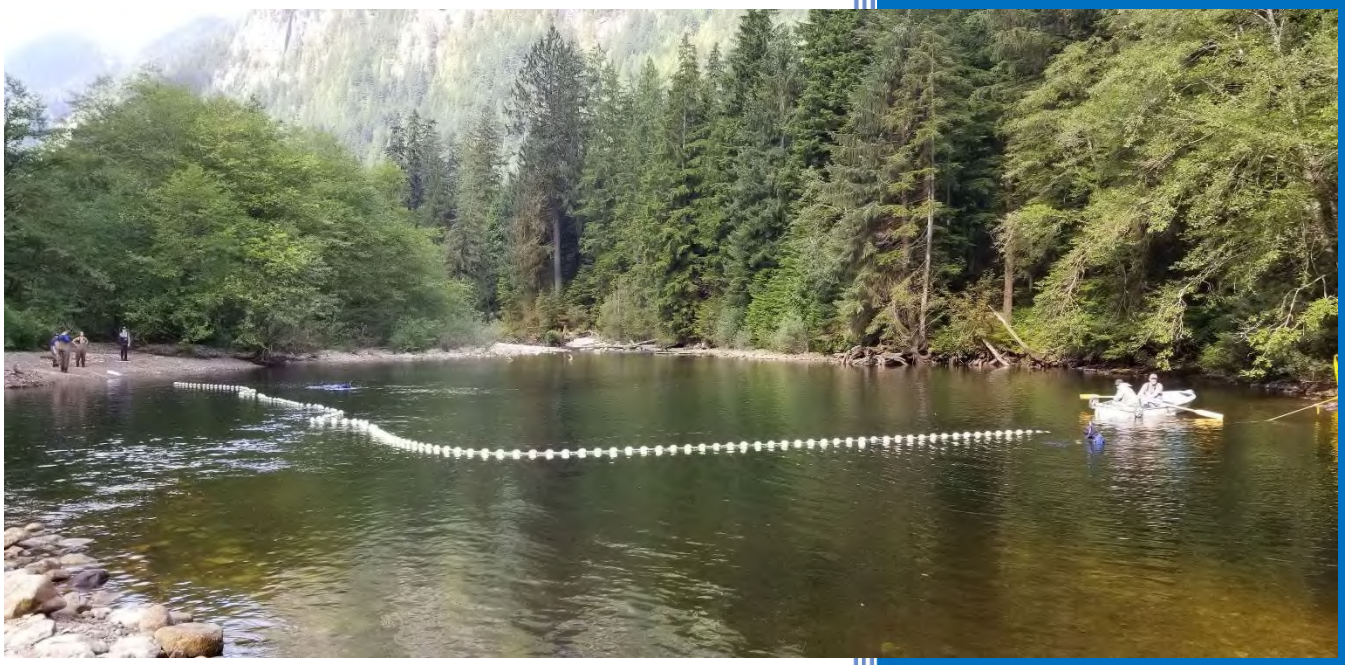
1. Seymour Salmonid Society's 2021 Annual Report for Greater Vancouver Water District *(50160639)*
2. Coquitlam River Watershed Roundtable's 2021 Annual Report for Greater Vancouver Water District *(50271806)*

49021769

ATTACHMENT 1

2021

Seymour Salmonid Society's Annual Report For Greater Vancouver Water District



Seymour Salmonid Society

PO Box 52221, North Vancouver, V7J 3V5

12/20/2021

SEYMOUR
SALMONID
SOCIETY

Mission Statement

To enhance Seymour River salmon and educate the public about the importance of the river as a resource for drinking water, wildlife and the forest.

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Executive Summary

Acknowledgements

The Seymour Salmonid Society (SSS) would like to recognize the significant annual contribution of $125,000 for the period to December 31, 2023 by the Greater Vancouver Water District (GVWD) to support enhancement and education efforts at the Seymour Hatchery. The money that GVWD contributes to the hatchery operations allows the SSS to leverage monies from other sources, including Fisheries and Oceans Canada (DFO) and other external funding sources. These contribute to a significant proportion of our annual operating budget.

We would also like to thank significant financial contributions from BC Salmon Restoration and Innovation Fund (BCSRIF), the Habitat Conservation Trust Foundation (HCTF) and the Pacific Salmon Foundation (PSF) in 2021. These funds were generously provided for the rockslide mitigation project, enhancement activities, hatchery operations and equipment improvements. We are also grateful for the ongoing support by the DNV Firefighters Charitable Society, Neptune Terminals, CN Rail and BC Gaming for our community education programs and for the many community donations provided by local individuals and stakeholders during 2021.

We would also like to thank GVWD, DFO and the District of North Vancouver for their ongoing support with staff hours or in-kind contributions for hatchery operations. We would also like to acknowledge the BC Ministry of Forests, Lands, and Natural Resource Operations and Rural Development (FLNRORD) for their ongoing support of our steelhead program.

We are most grateful for the contribution by our over 900 registered volunteers, who are an integral part of the operation of the hatchery and SSS. This includes Sarah Leslie and Katelynn Hansell from BCIT who worked on our radio telemetry monitoring program in the lower river as part of their second year Fish, Wildlife and Recreation Diploma Program. Without the significant community involvement, our staff would not be able to accomplish a fraction of what is completed at the hatchery or the work we do in the watershed.

COVID-19

The pandemic's ongoing restrictions effected our normal community outreach activities, but with the relaxing of some restrictions we were able to welcome our volunteers during 2021 at the hatchery and within the watershed. The pandemic resulted in cancellation of our annual community events, including Blueridge Days Festival, the chum fry release at Maplewood Farm, O.W.L Community Event, Family Fishing Day, Hatchery Open House and the Coho Festival. The steps we took included self monitoring prior to arrival at the hatchery, physical distancing while at the hatchery or assisting in activities in the watershed, regular hand hygiene and use of personal protective equipment including masks within confined areas.

Habitat Conservation and Enhancement

The SSS and its partners have continued to work hard to mitigate the effects of the rockslide in 2021 and have confirmed that adult salmon and steelhead are continuing to successfully migrate through the Seymour Canyon to spawn within the river upstream, albeit only at certain flow conditions. We completed work at Junior Creek Enhancement Area with significant support from GVWD and DFO and will continue to monitor the inlet channel to ensure it maintains flows into the habitat ponds throughout the winter and spring 2022. Despite the natural challenge of the rockslide over the past six years, and thanks to GVWD's continued support, fish populations on the Seymour River have a realistic long-term future within the watershed.

Broodstock Collection and Production

We released 10,000 fed fry above the Seymour Falls Dam in May, along with 51 coho adults in November. A total of 372,238 chum fry comprising approximately 43,673 Seymour origin and 328,565 Alouette origin were released in the lower river in May. Smolt releases were successful for both our coho and summer/winter run steelhead, with 55,807 coho smolts released from the hatchery into Hurry Creek, and 32,644 steelhead smolts transported to West Vancouver laboratory and released directly into the ocean.

This year saw our broodstock anglers out regularly during the summer and fall periods for steelhead, coho, pink and chum salmon. This was in addition to the five hatchery pool seine events to collect adult broodstock. We spawned 74 pairs of coho, 7 pairs of chum and 112 pairs of pink salmon from the Seymour River. We have also collected 444,110 Alouette River chum eggs for our broodstock program. We continue to search for summer and winter run steelhead adults in preparation for spawning in spring 2022. We are also continuing the egg incubation activities to ensure sufficient fry and smolt production for the coming year ahead.

Environmental Monitoring

Radio telemetry studies commenced to monitor progress of the rockslide remediation project and passage of returning adults to the spawning grounds above the rockslide. A total of 20 adult coho had gastric radio tags installed and released downstream of the rockslide. The tagged fish were monitored using two primary identification approaches, these being four fixed receiver telemetry stations and mobile telemetry tracking both upstream and downstream of the rockslide. We did not register any tagged fish upstream of the rockslide during the monitoring period, but regularly tracked fish downstream of the rockslide. It is interesting that no tagged fish were encountered upstream of the rockslide in 2021, especially given the number of salmonids captured during broodstocking upstream of the rockslide.

Hatchery staff also undertook mark and recapture activity during broodstock collection, along with carcass recovery surveys in October. A total of 161 fish that were captured during our hatchery pool seine events and had their left operculum punched before being released back to the hatchery pool. This mark and recapture process is then used during carcass recovery activity to estimate the total number of adult coho returning to the river in 2021. To date we have identified 35 coho carcasses during surveys, with seven having had the left operculum punch. Thus, the estimated coho returns during 2021 is 805 ± 460 fish.

Community Outreach and Education

Due to the restrictions associated with COVID-19, the SSS cancelled annual community events, including Blueridge Days Festival, the chum fry release at Maplewood Farm, O.W.L Community Event, Family Fishing Day, Hatchery Open House and the Coho Festival However, with the loosening of COVID restrictions we were able to welcome a greater number of our community volunteers to the hatchery for activities such as fin clipping, rive seine events and the fertiliser release program. In addition, the District of North Vancouver Firefighters were able to hold their annual Fishing Derby during September, albeit in a socially reduced capacity. The only community event we were able to hold in 2021 was to celebrate International Rivers Day, where we organised an estuary clean-up and replanting at the river mouth at the end of September. With help from GVWD staff and volunteers from the SSS, a significant amount of invasive plant species was removed and replaced with native shrubs and tree species. A large amount of trash was also removed from the estuary area.

The Spring and Fall in-person education program under our Gently Down the Seymour (GDS) program had to be cancelled again due to COVID restrictions. However, we were able to operate our online education program called Zoom in on the Seymour (ZIS) to 55 classes in the Spring and 31 during the Fall. This resulted in 1,765 elementary school children enjoying the ZIS program. We are hopeful that 2022 will provide the opportunity to run our GDS program again for Grade 2-6 students.

Hatchery Infrastructure Upgrades and Maintenance

We were able to install our new feed-storage container at the hatchery, thereby providing a food storage system that is not only secure to environmental conditions, but also to wildlife. We were also able to continue our ongoing equipment maintenance and replacement program. These facility upgrades also provided safe, warm and visually appealing facilities for our hatchery staff, volunteers and visitors coming to the hatchery in 2021, while also reducing the health and safety risks to the hatchery staff.

Human Resources

The following provides an overview of the hatchery facility staffing and governance for the Seymour Salmonid Society.

Board of Directors

President	Shaun Hollingsworth
Treasurer	Darren Radons
Secretary	Graeme Budge
Directors	Stephen Vincent
	Nick Martinovic
	Dee-Dee Soychuke
	Brian Halabourda
	Naomi Yamamoto
	Kyla Jeffrey
	Glen Parker
	Mark Whorrall
	Sean Ramsden
	Derek James

Hatchery Staff

Marc Guimond: Executive Director & Hatchery Manager

Marc grew up in Toronto and attended the University of Guelph, earning a degree in Biological Sciences in 1995. In 1997 he moved to Vancouver and volunteered at the Vancouver Aquarium teaching students about marine invertebrates. The following year, Marc joined the SSS and has been overseeing all aspects of salmonid production and monitoring for over 20 years.

Reece Fowler: Environmental Coordinator

Reece was born and raised on the banks of the Whanganui River in New Zealand. He attended Massey University in Palmerston North (NZ), gaining a Bachelor of Science (BSc) in 1995, before completing a Doctorate in Freshwater Ecology in 2000. After university, Reece went on to work in the environmental consultancy sector for over 16 years, before volunteering at the hatchery in 2017 and joining the SSS in May 2018.

Sasha Gale: Program Coordinator

Sasha grew up on the BC Coast. She obtained a diploma in Environmental Studies from Langara College in 2009 and continued her studies at BCIT in 2010 in the Fish, Wildlife and Recreational Management program. After receiving her diploma, she went on to complete a Bachelor of Science in Ecological Restoration in 2015. She worked on the Estuary Projects on the North Shore and as an Environmental Consultant for the City of Richmond prior to being hired at the Seymour Hatchery in January 2016.

Megan Samson: Seasonal Fisheries & Monitoring Technician

Megan was born in Vancouver and raised in White Rock before pursuing her interest in science at BCIT. She completed her diploma in Fish, Wildlife and Recreational Management in 2021 and worked for Freshwater Fisheries Society of BC at the Nechako White Sturgeon Conservation Centre in Vanderhoof (BC) following her diploma, before joining the SSS in August to assist with hatchery operations and radio telemetry monitoring.

Significant Weather Events

The Seymour River had multiple significant flow events in Fall 2021 that resulted in sustained high flows through the Seymour Canyon and rockslide area. The significant peak flows as measured from the Grantham Street Bridge flow gauge were on September 30th (352m^3s), October 17th (276m^3s), November 15th (502m^3s), November 28th (277m^3s) and December 1st (263m^3s). The November 15th flow event coincided with the weather system that resulted in significant flooding in the Sumas Prairie in the Fraser Valley. Figure 1 shows a before and during photo of the rockslide during the highest flow event on November 15th, while Figure 2 shows the rockslide as it currently exists.

FIGURE 1 SEYMOUR ROCKSLIDE BEFORE (LEFT) AND DURING (RIGHT) THE 502 M^3/S FLOW EVENT

The series of high flow events during fall 2021 resulted in mobilization of additional material within the rockslide areas, with early indications suggesting that it has benefitted fish passage through the Seymour canyon and rockslide area. We will continue to monitor the rockslide and canyon throughout winter and spring 2022 to better understand whether fish passage is possible during all flow conditions.

FIGURE 2 SEYMOUR ROCKSLIDE ON DECEMBER 14, DURING AVERAGE FLOWS

Habitat Conservation and Enhancement

Hatchery staff supported by DFO and GVWD undertook a series of habitat activities within the watershed during 2021. The following provides an overview of activities undertaken based on habitat area:

Seymour Rockslide Remediation Project

The objective of the 2021 work was to continue rock breaking activities to create and improve a wetted channel through the rockslide area during all flow conditions. Rock breaking activities began on August 3rd, with the primary aim of establishing a primary channel on river-right to enable fish passage during low-medium river flows, along with a secondary channel on river-left for passage during higher river flows. In-river works comprised:

- Rock drilling and small level rock breaking activities within the house rock rubble pile to break down the large boulders into smaller boulders
- Wedge and feather method of cracking boulders during high to extreme fire danger ratings in summer 2021
- Pneumatic rock breaking of smaller boulders into basketball sized rocks
- Using expanding grout to crack and break up larger boulders
- Using air bags and manual manipulation to push larger boulders within the rockslide to establish the primary and secondary primary channel
- Manual manipulation, side casting and using scaling bars to move smaller boulders within rubble pile
- Lowering of the former house rock rubble pile along a longitudinal distance of 20 - 30m through the rockslide

Note that Nxburst was not required during rock breaking and moving activities in 2021. In addition, mitigation activities were not required at The Well site this year as the activities during 2020 were completed and confirmed that fish passage was possible though this area of the river. All equipment for the rock moving activities was sourced via the professional engineers commissioned on the project, with in-river rock moving activities completed on September 3rd (Figure 3).

Following the 2021 rock moving activities and monitoring surveys (i.e., visual observations and radio telemetry monitoring of returning adults), we confirm that passage for adult coho salmon and summer run steelhead was possible through the rockslide at certain river flows. Although we are yet to confirm the actual number of fish that moved through the canyon in 2021 (i.e., as carcass recovery counts continue into January 2022), we successfully seine netted 351 coho from the hatchery pool, broodstock angled nine summer run steelhead and over 40 coho above the rockslide this year. We also visually observed good numbers of spawning coho salmon in the tributaries and habitat enhancement sites during our ongoing carcass recovery works. We are continuing our carcass recovery operations with the aim of improving our estimate of fish successfully migrating into the upper river to spawn naturally.

Our observations this year suggest that the number of adult coho and summer run steelhead moving through the rockslide was higher this year than in 2020 and likely due to improved fish passage through the canyon area. As part of this, the high flow events during the September to November period provided benefit by moving rock debris and improving the fish passage through the Seymour canyon area.

FIGURE 3 SEYMOUR ROCKSLIDE FOLLLOWING COMPLETION OF MITIGATION WORKS

In addition, we were able to broodstock coho, pink and chum salmon in the lower river due to significant effort provided by our volunteer broodstock anglers during the August to November period. We successfully broodstock angled 399 pink salmon and 27 chum salmon in the lower river, along with 95 coho salmon for use in our broodstock program (refer Table 1). In addition, we observed a reasonable number of chum and pink salmon spawning in the lower river, along with coho salmon within tributary streams in the upper watershed as well as the lower river.

Once water levels recede in spring 2022, geotechnical engineers will again survey the canyon area to understand the movement of debris over the 2021/22 winter period. SSS staff are also aiming to undertake drift-dive activities during the winter period to better understand the underwater conditions throughout the Seymour canyon area, and to identify locations where summer and winter run steelhead may be holding in the upper river. Following this, a work plan will be established for any instream activities that may be required during the summer 2022.

Fish Above Seymour Falls Dam Project

Coho salmon once migrated up the Seymour River to habitat that is now isolated upstream of Seymour Falls Dam. In 2019 the SSS, DFO and GVWD successfully collaborated on an agreement to enable transport of adult salmon above the dam, so they can once again spawn and rear in the upper watershed. The aim of the project is to focus transport on the early run coho, since it is this portion of the adult returns that would have likely migrated above the Seymour Falls during the higher freshet flows. Of note, the former Seymour Falls is now part of the existing Seymour Dam.

The agreement allows the release of up to 400 adults above the dam each year. This figure is based on the Bradford's bio-standard of 85 smolts/female and a target of producing 17,000 wild smolts from natural habitat above dam each year. Annual wild spawned fry releases will be augmented by up to 40,000 hatchery fed fry above the dam. This will continue until it is possible to release more than 200 adults above the dam each year. After which the plan would be to reduce hatchery fed fry releases accordingly.

Ultimately, we would like to reach a point where 400 adults are transported above the dam annually, thereby negating the need to augment with any hatchery fed fry.

Transporting adult coho above the dam would partially mitigate the historic impact of dam construction and re-establish wild salmonid stocks in a pristine area that is more resilient to future stressors such as climate change given the lower water temperatures in the upper watershed. The number of adult coho being transported above the dam annually is determined by the number of adult fish returning to the river, along with the number of fish we can collect as part of our broodstock program.

On November 19th and December 3rd, with the assistance of GVWD staff, the SSS transported 51 adult early run coho salmon to the Seymour River above the dam. These fish were captured during river seining events at the hatchery pool a short distance downstream of the dam and were retained at the hatchery until sufficient fish were secured for our broodstock program. The fish were released at the 21km mark in the upper watershed at a location known locally as Rustad Branch. Each fish was transferred via catch net from the hatchery truck tank and released directly to the river.

River Fertilization Project

The Program was originally initiated by the province to mitigate for the possible impacts of the Seymour Falls Dam on the downstream habitat of summer-run juvenile steelhead, and to make up for poor ocean conditions for salmon resulting in reduced adult returns. The prevailing thought is that the over-wintering period for juvenile steelhead is a population bottleneck in the Seymour River. Thus, making the fry bigger and (presumably) healthier during the Summer/Fall months because of greater food availability, would improve over-winter survival of the juvenile steelhead population, resulting in a greater number of smolts that would then out-migrate to the ocean in the Spring (with the assumption that sending more fish to the ocean would result in more fish coming back).

The fertilization program, led by GVWD and SSS hatchery staff, continued in 2021. Hatchery staff and volunteers support the program by filling the burlap bags with fertiliser and placing them in three locations in the river each spring. Fertiliser bags were deployed on July 6th by hatchery staff and volunteers. Loading rates were the same as previous eight years (i.e., 1,350kg of fertiliser total: 27 bags at Dam Outflow, 54 bags at Hatchery Pool, and 54 bags at Spur 4). The pellet fertiliser used was supplied by Ostara (Ostara.com) and the product is called Crystal Greene, with a pellet size of SGN 300. Concurrent with this fertiliser installation, GVWD performed bi-weekly water quality sampling during the summer growth period (June to October) at locations upstream and downstream of the fertiliser release sites as described in the monitoring section of this report.

Junior Creek Enhancement Project

The Junior Creek enhancement area comprises a man-made channel that flows between Paton Creek and the juvenile rearing ponds in the enhancement area. The bank along a small section of this man-made inlet channel has degraded over time and required additional work to ensure it maintains sufficient flow to the Junior Creek ponds. The primary focus of work in 2021 included improvements to the inlet channel banks using DFO habitat specialists and a mechanical excavator to re-establish the channel banks and introducing additional large woody debris. Figure 4 show Junior Creek following habitat works in summer 2021.

FIGURE 4 JUNIOR CREEK FOLLOWING COMPLETION OF HABITAT WORKS DURING SUMMER 2021

SSS Staff undertook regular visual inspections of the Junior Creek works during the Fall to ensure than the habitat works were operating as designed. Following the significant high flow events from the storms in September to November, it was identified that significant accumulation of fine material had re-occurred in the channel. In addition, part of the stream bank had eroded away again and caused water to flow away from the Junior Creek ponds and into the forest and Paton Creek. Visual observations of the lower section of Junior Creek during the carcass recovery program suggested insufficient water depth to provide effective spawning habitat for the returning salmon downstream of the Junior Creek ponds.

As such, temporary sand-bagging works were undertaken by SSS staff on December 9 to ensure more water flowed into the Junior Creek habitat area (Figure 5, Figure 6). The sand used to fill the bags was shovelled from outside the flowing channel to avoid disruption to wetted gravels. A

follow-up visual inspection on December 10th showed that more water was flowing into the Junior Creek habitat area and water depth was more appropriate for the spawning salmon. Visual inspections will continue at Junior Creek during our carcass recovery program to ensure that sufficient water flow and depth is maintained for the spawning gravels. More permanent works will be required in Spring/Summer 2022 to the Junior Creek intake channel to ensure future effective water flow to the enhancement area.

FIGURE 5 JUNIOR CREEK SAND-BAGGING ON DECEMBER 9, 2021

FIGURE 6 TEMPORARY REPAIRS AT JUNIOR CREEK ON DECEMBER 9, 2021

Mid-Valley Enhancement Project

The Mid-Valley enhancement area is man-made and was established over 20 years ago to provide significant salmonid juvenile rearing and adult spawning habitat. This enhancement area supplements for aquatic habitat lost in the upper watershed via historical human activities. This area also benefits the watershed by providing valuable habitat for other aquatic species such as amphibians, birds, insects and invertebrates. However, over the past eight years the inlet channel has become clogged with finer sediment, in part because of a beaver dam at the outlet to the habitat area.

The aim of the habitat works at Mid-Valley during 2021 was to bring the enhancement area back into effective use for both juvenile salmonids and returning adult spawners. Works comprised the removal of a beaver dam in Fall 2020, which was blocking access for salmonids to the enhancement area, along with channel cleaning works in the inlet channel and deposition of additional spawning gravel material. Monthly site visits were undertaken by SSS staff between April and December 2021 to confirm the beaver mitigation works were successful. Site visits confirmed they had not returned and that the entrance channel remained free of obstructions. In addition, without the beaver dam impoundment the water flows through the inlet channel and habitat area also improved and allowed mobilisation of some finer sediments within the inlet channel.

Additional channel clearing works were planned for summer 2021; however, due to fire risk restrictions, along with the songbird nesting season work window, we were unable to undertake the channel cleaning works during 2021. We will be reviewing the Mid-Valley habitat area in conjunction with Murray Manson of DFO to identify whether these works can go ahead during summer 2022, especially given the positive impact the beaver dam removal has had on the level of fine sediment within the inlet channel.

Nevertheless, the Mid-Valley habitat area remains free of fish passage issues and visual inspections confirmed that salmon fry are again using the habitat area for juvenile rearing purposes. Carcass recovery surveys during Fall 2021 also confirmed that returning adult salmonids were regularly using the habitat area for spawning purposes.

Broodstock Collection and Production

The following provides an overview of the broodstock collection and production activities undertaken in the Seymour watershed during 2021. Table 1 provides a summary of the fish collected from these broodstock activities for the Seymour Hatchery fish production program.

TABLE 1 BROODSTOCK COLLECTION FOR THE SEYMOUR RIVER HATCHERY IN 2021

Species	Seine Netting	Broodstock Fishing	Pairs Spawned, or Eggs Collected
Coho salmon (early and late run)	351	95	74
Steelhead (2022 summer run brood year)	-	10	-
Steelhead (2021 winter run brood year)	-	8	3
Chum salmon (Seymour River)	-	27	7
Pink salmon (Seymour River)	-	350	112 pairs (164,652 eggs)
Chum salmon (Alouette River)	-	-	191 pairs (444,110 eggs)
Pink salmon (Tenderfoot Creek)1	-	-	-

Notes: ***1*** *– eyed eggs were not available for broodstock from tenderfoot hatchery during this season.*

Hatchery Pool Seines

During the late summer period coho salmon began congregating in the Hatchery Pool. The SSS undertook five seine events between September and November and captured 351 adult coho, with 51 of these transported and released above the dam, while 161 of these captured fish had their left operculum punched and released back to the river for the carcass recovery program (i.e., to provide an estimate of the total coho return for 2021). The remaining 139 captured adults were used at the hatchery for use in our broodstock program. No steelhead were captured during the seine events (Figure 7, Figure 8). Table 1 summarises the broodstock collected for the Seymour River Hatchery in 2021.

FIGURE 7 HATCHERY POOL SEINE EVENT DURING OCTOBER 2021

FIGURE 8 SORTING COHO DURING HATCHERY POOL SEINE EVENT

Broodstock Angling

Our broodstock anglers were out regularly during the June to December period for summer run steelhead, coho, pink and chum salmon fishing, along with the January to May period for winter run steelhead. The aim of the broodstock program was to capture as many returning adult fish in the river and begin to capture the winter and summer run steelhead (Figure 9). To date we collected 95 coho, 27 chum and 10 summer run steelhead via our broodstock angling program (Table 1).

FIGURE 9 SECURING AN ADULT COHO INTO A BROODSTOCK BAG FOR TRANSPORT TO THE HATCHERY

Egg Transplants

Further to our ongoing broodstock collection within the Seymour River, each Fall hatchery staff visit the Alouette River with DFO to collect additional eggs to continue rebuilding the chum salmon population in the Seymour River. We also generally visit the Tenderfoot Hatchery during odd numbered years to collect eyed pink salmon eggs to continue rebuilding the pink salmon population in the Seymour River.

During Fall 2021 we collected an additional 191 pairs of chum (~458,000 eggs) from the Alouette River for this purpose (Table 1). We have estimated 2,400 eggs per adult Alouette female in 2021. However, eyed pink eggs were not available for broodstock from Tenderfoot Hatchery during this season due to insufficient returning pink salmon to enable collection.

Hatchery Broodstock Production

The SSS are contracted by DFO to produce three salmonid species: coho and chum annually, and pink salmon every odd numbered year. The SSS also has an agreement with the BC Ministry of Forests, Lands, and Natural Resource Operations and Rural Development (FLNRORD) to produce summer and winter run steelhead smolts. The SSS's goal is to enhance and maintain salmonid populations within the Seymour River to historical levels.

The 2020 brood were incubated at the hatchery over winter 2020 and released as fry in selected habitats throughout the LSCR and above the Seymour Reservoir in Spring 2021. Whereas the current 2021 brood year eggs will be incubated at the hatchery over winter 2021 and be released as fry in the mid-reaches of the river and side channel habitat during spring 2022. All fry releases augment the numbers of adult coho that spawn in the watershed during each Fall to maintain fry numbers to historical wild production levels. Table 2 illustrates the fry and smolts that were released in 2021.

Generally, we release 40,000 fry above the Seymour Falls dam, but we only released 10,000 this Spring as we used the balance to release in the river downstream of the dam (i.e., to account for lower likely wild spawned fish due to rockslide impacts.

TABLE 2 SMOLT AND FRY RELEASES FROM THE SEYMOUR HATCHERY IN 2021

Species	Brood year	Number
Coho salmon fry	2020	40,754
Coho salmon smolts[1]	2019	55,807
Summer Steelhead smolts	2020	13,787
Winter Steelhead smolts	2020	18,857
Chum Salmon fry (Seymour River)	2020	43,673
Chum Salmon fry (Alouette River)	2020	328,565
Pink Salmon fry (Tenderfoot Creek)	2020	-

***Note**: **1** – 7,500 of these smolts were scheduled for release into temporary DFO net pens in Port Moody, but was cancelled due to COVID-19.*

Environmental Monitoring

Radio Telemetry Monitoring

As part of the rockslide mitigation project, radio telemetry studies continued to monitor adult coho salmon migration through the Seymour canyon area. In partnership with BCIT the SSS completed the monitoring program to determine when and if fish can migrate through the canyon where the rockslide occurred. A total of 20 adult coho salmon had gastric radio tags installed on the riverbank before being released downstream of the rockslide and the Well areas. No steelhead were tagged in 2021 due to insufficient numbers of returning fish being captured to enable tagging. The fish were released downstream of the Rockslide within one hour of radio tag insertion (Figure 10).

FIGURE 10 RELEASING A RADIO TAG COHO SALMON IN THE LOWER RIVER

The tagged fish were monitored using two primary identification approaches, these being four fixed receiver telemetry stations and mobile telemetry tracking. The fixed receivers are set up along the river, one at Spur 4 (above the rockslide), one at Twin Bridges (above the rockslide), the third at Pool 91 (below the rockslide) and the fourth at the fish fence (below the rockslide 1km from the river mouth). These fixed receivers record if any of the radio tagged fish pass by them. Mobile tracking was undertaken at least once per week from September until December 2020. We would like to thank Sarah Leslie and Jacklynn Hansell from BCIT's second year Fish, Wildlife and Recreation Diploma Program for their invaluable radio tracking efforts during this period. The tagged adults were detected at one of the fixed stations downstream of the rockslide. We did not register any tagged fish upstream of the rockslide during the monitoring period, either through fixed stations or mobile telemetry.

Many of tagged fish were still being registered at the Pool 91 fixed station, given the high flow events and regular watershed closures due to rainfall it has been difficult to undertake comprehensive mobile tracking downstream of the rockslide. Some of the tagged fish may have been flushed downstream and out of the river during the significant flow events in the Fall, while

others may still be in the lower river but too far away from the fixed stations to be identified regularly. It is interesting that no tagged fish were encountered upstream of the rockslide in 2021, especially given the >350 coho captured during seine events or broodstocking upstream of the rockslide. SSS staff are seeking further guidance from radio tagging specialists and DFO staff managing the Big Bar rockslide, to better understand passage of tagged fish upstream, of rockslides.

Coho Escapement, Mark and Recapture

As a compliment to the radio telemetry monitoring project, hatchery staff re-established carcass recovery operations in October 2021 after a seven-year hiatus due to the rockslide and will continue through until January 2022. During seines upstream of the canyon and below the dam, adult coho are given a visualized mark (usually an operculum hole punch) and released to remix with the population. Once spawners begin to spawn in the tributaries and enhancement sites, staff, students and volunteers periodically walk these waterways to find carcasses to examine whether they are marked or not. Data such as date, location, sex, origin (W or H), punch observed or not, and percent spawn of females is recorded and the carcass is cut in half to avoid recounting. The data from marking and carcass recovery are used to formulate a population estimate.

Carcass recovery surveys were undertaken twice per week between October and December to maximise the number of fish identified. This data enables us to formulate an estimate of coho numbers that migrated through the rockslide during the Fall of 2021. A total of 161 fish that were marked and released during our hatchery pool seine events. To date we have identified 35 coho carcasses during surveys, seven of which had the LOP. The estimate to date of coho returns during 2021 is 805 ± 460 fish.

Drift Dive Surveys

Two drift surveys were undertaken in 2021 primarily to identify the current fish passage status of the rockslide area and fish presence. Surveys were undertaken on January 26th and July 15th between the Wedding Pool (100m above Twin Bridges) down through the Rockslide to The Well. One steelhead was observed at the Wedding Pool in January, while the July survey identified approximately 40 coho at the base of the rockslide.

Water Quality Monitoring

GVWD continues to lead the water quality sampling during the summer growth period downstream of the dam. These samples are collected as part of the fertiliser release project on the river as presented in the Habitat Conservation and Enhancement section of this report. Background water quality samples were collected on June 4th prior to fertiliser installation, while eight post-installation sampling sessions were scheduled every second Friday thereafter (i.e., June 18; July 2/16/30; August 13/27; September 10/24). Samples were processed at ALS Labs.

The Seymour Hatchery, as part of hatchery operations, monitors water temperatures from several sources including reservoir, groundwater seepage, chilled and boiler water, and dissolved oxygen regularly. Water from the Seymour Reservoir feeds into an aeration tower on the hatchery site and maintenance and flow levels are regularly monitored.

Community Education Programs

Gently Down the Seymour (GDS)

A field trip to the Seymour Hatchery expands student learning of the salmon life cycle to include experience and observation of salmon habitat and the surrounding watershed ecosystem. Students, teachers and parents have an opportunity to connect with their local ecosystem and gain a greater understanding of how urban development impacts natural resources. We hope visitors become greater stewards for salmon, ensuring there will be salmon in our region for generations to come.

The Gently Down the Seymour (GDS) program has a lasting impact on participants as shown by the considerable volume of thank you letters received from the students, along with teachers regularly commenting on how students recall details and experiences from the field trip many years later. Unfortunately, due to the ongoing restrictions associated with the COVID-19 pandemic, the SSS had to cancel our in-person GDS education program for 2021. We hope to re-start our education program in 2022 once permitted by Provincial Health Orders.

Zoom in on the Seymour (ZIS)

Given the cancellation of the GDS program due to COVID, in it's place the SSS initiated an online education program called Zoom in on the Seymour (ZIS), which was operated during 2021. The ZIS aims to temporarily replace GDS and teachers choose one of the following programs:

1. Salmonids of the Seymour River – students will learn about the life cycle of salmonids and the role of Seymour Hatchery (i.e., salmon life stages, anatomy, predator-prey relations, journey challenges, salmon-human interactions, species); or

2. Healthy Streams, Healthy Salmon - students will be introduced to Aquatic Ecology and learn about ecosystems interactions and stream health indicators (i.e., habitat requirements, food chain interactions and aquatic macroinvertebrates).

The ZIS classes meet via Zoom and were scheduled during the Spring and Fall periods. Each ZIS class is approximately one hour in length and includes a presentation, interactive games and videos. Registration for ZIS went live in February and bookings were secured quickly for the program. The ZIS program was successfully undertaken with 55 classes (1,120 students) during the Spring and a further 31 classes (645 students) during the Fall period, which totalled 1,765 elementary school children enjoying the ZIS program.

Community Outreach

Unfortunately, due to the ongoing restrictions associated with COVID-19 we had to cancel our community outreach activities in 2021. In addition, the community events organised by others were also cancelled. In addition, while the District of North Vancouver Firefighters, a major financial supporter of our education programs, were able to hold their annual Fishing Derby on September 25, in a socially reduced capacity, we were unable to attend the weigh in event at the end of the day.

The hatchery was open for access to the public and volunteers throughout 2021, subject to appropriate health and safety protocols to ensure everyone was kept safe. The four steps we took included self monitoring prior to arrival at the hatchery, physical distancing while at the hatchery or assisting in activities in the watershed, regular hand hygiene and use of personal protective equipment and mask wearing in enclosed spaces. Further information relating to COVID-19 is provided earlier in this report.

Thus, although 2021 has been a difficult year for community outreach, we were able to provide access to over 550 people at our hatchery and education centre via the Coho Trail (Figure 11).

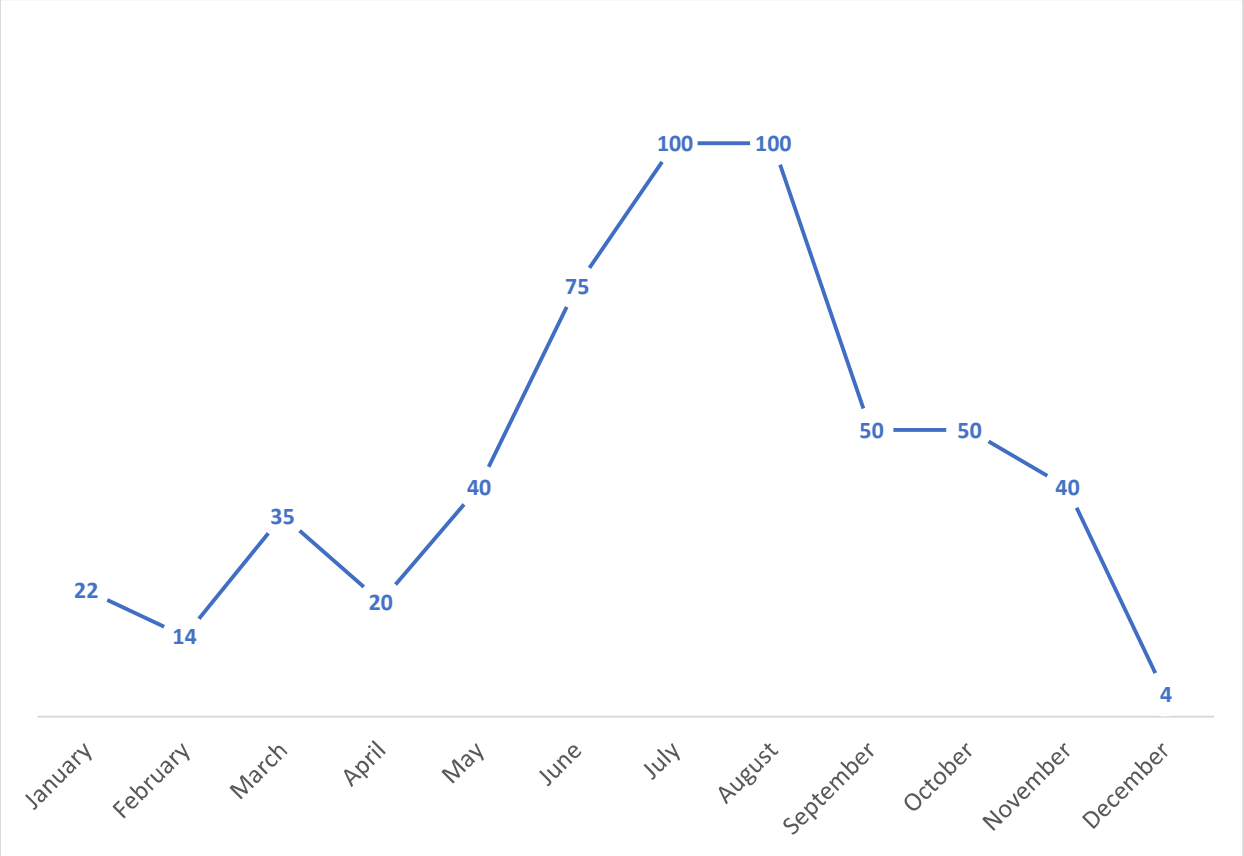

FIGURE 11 NUMBER OF VISITORS TO THE SEYMOUR RIVER FISH HATCHERY IN 2021

World Rivers Day Event

The only community event we were able to hold in 2021 was to celebrate World Rivers Day, where we organised an estuary clean-up and replanting at the river mouth on September 26th. With help from GVWD staff and volunteers from the SSS, we were able to undertake considerable replanting and cleanup work at the Seymour Estuary (Figure 12). The following species were planted at the estuary:

- Salmonberry (*Rubus spectabilis*)
- Red flowering currant (*Ribes sanguineum*)
- Pacific ninebark (*Physocarpus capitatus*)
- Nootka Rose (*Rosa nutkana*)
- Salal (*Gaultheria shallon*)

A significant amount of invasive plant species were removed and replaced with native shrubs and tree species, while many bags of trash were also removed from the site. We would also like to acknowledge the District of North Vancouver for collecting and disposing of the invasive plants and trash from the day.

FIGURE 12 REPLANTING AND INVASIVE PLANT REMOVAL AT THE ESTUARY ON WORLD RIVERS DAY

Social Media

The SSS continues to operate our website (www.seymoursalmon.com), with the assistance of Rudy Kehler (The Simplify Company). The SSS also continues to communicate though social media via our Instagram and Facebook internet platforms. The SSS Facebook page has gone from 747 followers in 2018 to over 1,000 followers in 2021, while our Instagram site has increased from 256 followers in 2018 to over 925 followers in 2021. These social media platforms are two effective ways for members of the community to see what we are doing on a weekly basis.

Volunteering

Volunteers are an integral aspect of the operation of the hatchery and SSS. Without the high level of public involvement, the staff would not be able to accomplish a fraction of what is completed at the Hatchery or SSS events. The SSS currently has over 900 volunteers registered to assist with the ongoing activities at the hatchery or within the watershed.

Our hatchery and conservation activities were supported by over 1,900 volunteer working hours during 2021 (Figure 13). Student participation remained at zero given cancellation of the in-person GDS activities. We are most grateful for the volunteer assistance we receive each year and would not be able to undertake all the work we do in the watershed without their help.

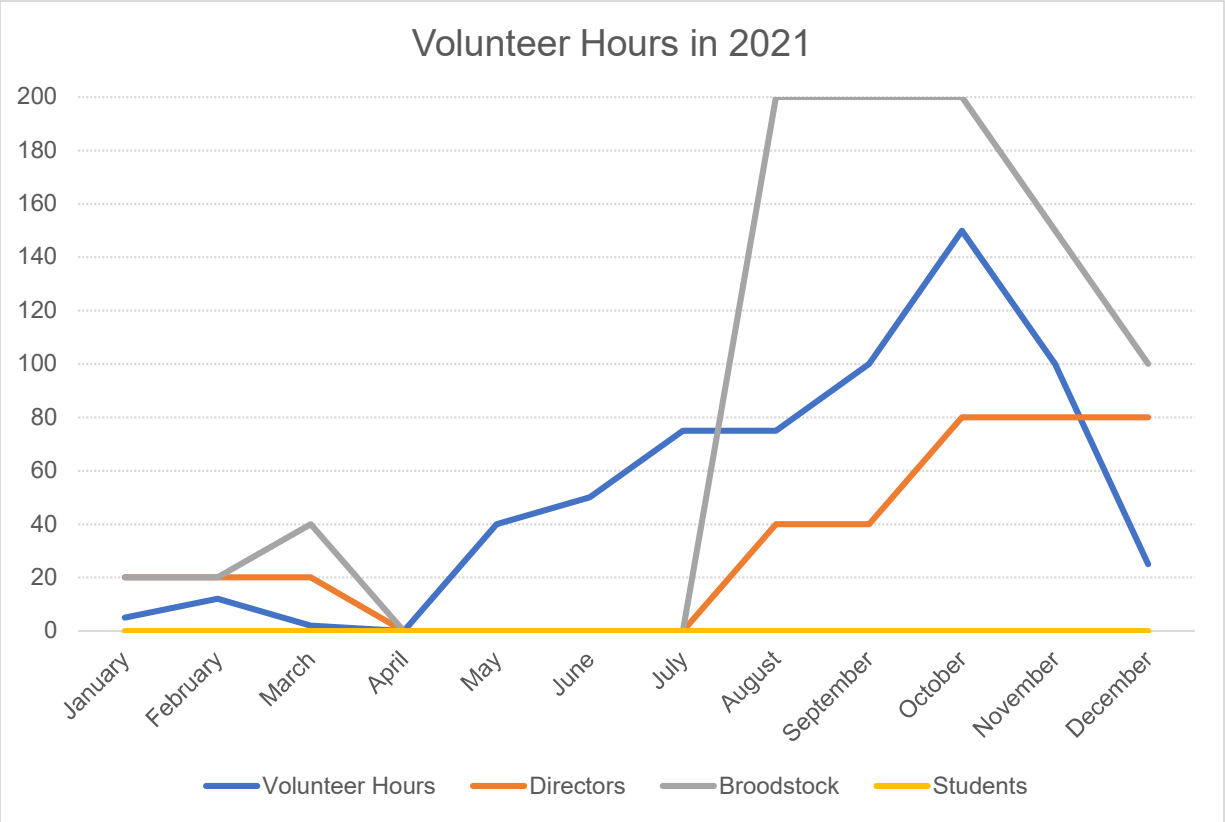

FIGURE 13 VOLUNTEER WORKING HOURS DURING 2021

Hatchery Infrastructure Upgrades and Maintenance

We continued our ongoing facility infrastructure and maintenance upgrades during 2021, including out fitting and installation of a standalone secure feed storage shed, along with planning and preparation for renovations to the hatchery workshop. The new feed shed was delivered and installed on November 11 and is now storing our fish food for use at the hatchery (Figure 14; Figure 15; Figure 16).

Plans were also in place to renovate the existing hatchery workshop, undertake repairs to the perimeter fence and repairs to the structural poles in the outdoor steelhead rearing ponds 1 – 6 and coho ponds A and B. However, due to the significant rainfall we received in the lower mainland during Fall 2021contractors were either not able to access the hatchery due to LSCR access restrictions, or because our contractors live in the Fraser Valley and could not travel due to highway flooding closures. In addition, we have found it difficult to source the piping for the rearing pond structural pole repairs due to COVID-19 supply chain delays in the lower mainland during 2021. Our plan is to undertake these renovation works and repairs as soon as environmental conditions and construction material availability allow.

Other upgrades or replacements included equipment such as waders and wet weather gear for hatchery staff, along with waders for volunteer use at the hatchery or our works sites within the watershed.

FIGURE 14 INSTALLATION OF FITTED-OUT FEED STORAGE CONTAINER

FIGURE 15 NEW FISH FEED-CONTAINER INSTALLED AT THE HATCHERY ON NOVEMBER 11, 2021

FIGURE 16 THE NEW FEED-STORAGE CONTAINER WITH FIRST LOAD OF FISH FOOD

Financials

The following sections provide an overview of the funding proposals, revenue and expenditure for the SSS during 2021. Please note that the SSS's fiscal year runs between April 1, 2021 to March 31, 2022.

Significant 2021 Funding Approvals

Multiple funding proposals were prepared by hatchery staff and submitted for consideration of funding for the hatchery and education centre, along with our conservation activities within the watershed. Successful funding agreements outside of our annual contribution agreements from DFO and GVWD are summarised in the following sections.

BC Salmon Restoration and Innovation Fund (BCSRIF) - Habitat

The final contract was agreed on July 9, 2020 for funding from the BCSRIF totalling $135,011 for the 2021/22 fiscal year. These funds are allocated for the Rockslide Mitigation project, radio telemetry monitoring, along with other habitat restoration and enhancement activities within the watershed. The SSS completed habitat restoration and enhancement works for 2021 by November, while radio telemetry monitoring work will continue into January 2022. We are grateful to BCSRIF for this significant funding agreement, without which mitigation and monitoring works would not have been possible for the rockslide.

BCSRIF – Hatchery Infrastructure

The final contract was agreed on July 28, 2021 for funding from the BCSRIF totalling $28,490 for the 2021/22 fiscal year. These funds are allocated for purchase, fit-out and installation of the new feed-storage container, repairs to the perimeter fence and outdoor rearing pond roof structures, along with a backup mobile generator. The feed-storage container was delivered and installed to the hatchery in November. The mobile generator was purchased and delivered to the hatchery. Unfortunately, given the significant rainfall events restricting contactor access to the hatchery, the feed-container is awaiting connection to the mains-power and have vegetation planted around the container to provide a visual buffer. We are grateful to BCSRIF for this significant funding agreement, without which our hatchery infrastructure repair and improvements would not have been possible.

Habitat Conservation Trust Foundation (HCTF)

An emergency proposal was submitted to the HCTF during March 2021 to request $80,000 to support the mitigation works at the rockslide. Additional works were required in 2021 as there were no high flow events during the winter to mobilise the rubble pile associated with the house rock that was created in December 2020. HCTF approved the emergency funding on April 1st, so we had the funds required for the additional rockslide mitigation works. We are grateful to HCTF for this significant funding, without which the mitigation works as the rockslide would not have been possible.

Pacific Salmon Foundation (PSF)

The proposals were approved on April 30, 2021 for funding totalling $16,250 for use on the production and installation of new information signage at the hatchery. The new hatchery signage will replace the existing 20+ year old signs and is no longer fit-for-purpose or providing up to date information. The new signage will provide education and community outreach information for students, volunteers and visitors to the hatchery. The signage design and production are currently progressing, with the aim to install the new signage during spring 2022. We are most grateful to PSF for this significant funding, without which the information signage replacement would not have been possible.

DNV Fire Fighters Charitable Society

The DNV Firefighters Charitable Society again continue to generously contribute towards our education program, as part of their annual Firefighters Fishing Derby, which was held on September 24, 2021. Funding from the firefighters has been an annual funding contribution and this year the contribution was $30,052. The SSS have allocated these funds to help operate the GDS and ZIS program and we are most appreciative for this funding support, without which the GDS education program would not be possible.

Neptune Terminals

Neptune Terminals generously contributed $10,000 towards our community education programs. Funding from the Neptune Terminals is based on a three-year funding contribution for education, without which the GDS education program would not be possible.

CN Rail

We were successful in our application to CN Rail as part of their CN Stronger Communities Fund, who generously contributed $10,000 towards our community education programs during May 2021. Funding from CN Rail is to go towards upgrades to the hatchery educational signage, without which we would not be able to provide suitable learning facilities at the hatchery for local visitors and students.

British Columbia Community Gaming Grants

We were successful in our application to BC Gaming as part of their Community Gaming Grant Fund, who generously contributed $7,500 towards our GDS education program for 2022. Funding from BC Gaming will go towards the GDS education program, or our online ZIS program. Without this funding we would not be able to run our education program at the hatchery for elementary school students.

Lower Seymour Conservation Reserve (LSCR)

We are very grateful for LSCR on behalf of the GVWD for approximately $10,000 worth of in-kind lumber that will be used during the hatchery signage upgrade. Without this generous in-kind contribution, we would not be able to construct the sign kiosks at the hatchery.

Great Canadian Landscaping Company (GLC)

We are very grateful for GLC and their associates for significant in-kind construction materials that will be used during the hatchery entrance and landscaping upgrades. Without these in-kind contributions we would not be able to upgrade our entrance and landscaping strategy at the hatchery.

Seymour Salmonid Society 2021 Revenue

Table 3 provides a summary of the SSS revenue for 2021.

TABLE 3 SEYMOUR SALMONID SOCIETY OPERATIONS REVENUE 2021

Funding Partner	Allocations	Funding Amount
GVWD	Hatchery Operations	$125,000
Fisheries & Oceans Canada	Hatchery Operations	$100,000
Additional Revenue'	Education/Projects	$405,659
	Total Revenue	**$630,659**

Additional 2021 Revenue Summary* (from 'Additional Revenue' in Table 3)

The funds provided by GVWD enabled SSS staff to accrue supplementary monies for specific projects and programs. Table 4 provides a summary of these amounts and allocations.

TABLE 4 SEYMOUR SALMONID SOCIETY ADDITIONAL REVENUE 2021

Source	Project	Amount
BC Salmon Restoration & Innovation Fund (BCSRIF)[1]	Habitat Restoration Project	$229,969
Habitat Conservation Trust Foundation (HCTF)	Rockslide	40,000
BCSRIF[1]	Infrastructure Renewal Project	$18,760
Pacific Salmon Foundation (PSF)	Capital Improvements	$20,000
PSF	Signage	16,250
DNV Fire Fighters Charitable Society	Education Programs	$30,052
Neptune Terminals	Education Programs	$10,000
CN Rail	Education Programs	$10,000
BC Gaming	Education Programs	$7,500
Canada Summer Jobs Fund	Seasonal staff wages	$7,229
Public Events/Donations/Memberships	General Society business	$7,539
Richard Tak/Kate Keogh Donation	Education Programs	$5,000
HCTF	Funding MSc Student	$2,500
ZIS Registrations	Education Programs	$860
	Total Revenue	**$405,659**

***Note**: **1** - this is the revenue received in 2021 as of December 13, 2021; however, the total funds allocated by BCSRIF for the Habitat Restoration Project and the Hatchery Infrastructure Renewal Project for the fiscal year to March 31, 2022, is $135,011 and $28,490, respectively. The remaining BCSRIF funds for both projects will be expended by March 31, 2022.*

Seymour Salmonid Society 2021 Expenditures

Table 5 provides a summary of the SSS expenditure for 2020.

TABLE 5 SEYMOUR RIVER HATCHERY OPERATIONAL EXPENDITURE 2021

Expenditure Type	Expenditure
Wages (including monitoring technician wages)	$220,111
Overhead (includes insurance, WCB, health benefits)	$39,671
Fish Food	$8,935
Vehicle Maintenance / Fuel	$4,455
Fish Culture Equipment	$431
Operations / Maintenance	$955
Mileage	$655
Safety and Training	$90
Communications (Mobile Phone / Internet)	$1,448
Additional Expenditure	$292,398
Total Expenditure	**$569,151**

Additional 2021 Expenditure Summary (from 'Additional Expenditure' in Table 5)

Table 6 provides a summary of the additional expenditure incurred by the SSS that is secured via external funding applications.

TABLE 6 SEYMOUR SALMONID SOCIETY ADDITIONAL EXPENDITURE 2021

Expenditure Type	Expenditure
BCSRIF Habitat Restoration Project	$221,115
BCSRIF Hatchery Infrastructure Renewal Project	$17,582
Environmental Education[1]	$13,496
Landscaping Upgrade Concept Drawings and deposit	$15,795
GDS Video production	$14,513
Mid-Valley Beaver Management	$5,454
Junior Creek Habitat Project Excavator Machine time	$4,443
Total Additional Expenditure	**$292,398**

***Note**: **1** - expenditure was significantly lower in 2021 as the GDS program was cancelled due to COVID-19 and replaced with the online Zoom in on the Seymour (ZIS) education program.*

Looking Forward

The year ahead is expected to be as busy as the last, with the most significant major projects we will be focusing on are as follows:

- **The Rockslide Mitigation** – drift dives during winter 2021/22 and above-water review in Spring 2022 following freshet to identify what works may be required next year to maintain and improve fish passage during all flow conditions
- **Juvenile Salmon and Steelhead Smolt Releases** - juvenile steelhead and coho will continue rearing in the ponds over the winter and released during June 2022
- **Juvenile Salmon Fry Releases** – release of coho fry upstream of the dam, along with off channel habitat between the dam and the rockslide during Spring 2022. The chum and pink salmon fry will also be released to the lower river during Spring 2022
- **Adult Radio Telemetry Tracking** – for returning adult salmon to monitor movement through the rockslide
- **Adult Carcass Recovery** - within the river and tributaries to better understand the number of coho migrating through the rockslide to spawn naturally
- **Restoration Activities** – for existing and new aquatic habitat for both juvenile rearing and adult spawning activities as part of our BCSRIF project
- **GDS Education Program** – subject to COVID-19 restrictions; we would like to re-start our GDS program to provide potentially a spring 2022 program at least
- **Community Events and Enhancement Program** – subject to COVID-19 restrictions; we would welcome the ability to host and/or attend community events in 2022
- **Ongoing Hatchery Infrastructure Renewal** – to secure the hatchery and education facility for the next generation of community volunteers, elementary school children and fisheries

2021 Annual Report

Addressing Climate Change Through Engagement

coquitlamriverwatershed.ca | info@coquitlamriverwatershed.ca

Coquitlam River Watershed Roundtable

Published by:
Coquitlam River Watershed Roundtable

January 15th, 2022

Our Mission

To preserve and enhance the health of the Coquitlam River Watershed through collaboration, education and advisory action.

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Executive Summary

Acknowledgements

We wish to thank our funders for their generous financial support in 2021. Our deepest gratitude to our partners for their contributions of time and staff resources.

Core Committee

The Roundtable lost one of its founding members Norm Fletcher when he passed in November 2021. He will be dearly missed. Cllr. Nancy McCurrach, Scott Walmsley and Cllr. Laura Dupont joined the Core Committee from the City of Port Coquitlam. Due to staff shortages from the COVID-19 pandemic, the Provincial seat remained empty in 2021.

Active committees for 2021 included the standing committees for Resilience and Capacity Building and Communications; Project Committees included Roundtable Meeting Planning, Water Use and Stormwater Management task groups.

Operations

The Roundtable continues to follow its COVID-19 response plan and adheres to Provincial mandates for gathering restrictions.

Projects and Public Outreach

The COVID-19 pandemic has created staffing shortages for industries world-wide. The Roundtable is pleased to report that it has been able to continue implementation of its *Lower Coquitlam River Watershed Plan*, albeit with some delays due to partner staff availability.

The Development Committee continues to work on its strategy to encourage low-impact development (LID) in the watershed. The committee is producing a paper on the effects of urban development and LID techniques. UBC's Centre for Law and the Environment is currently assisting with an analysis of associated regulations. The paper expected to be released in the summer of 2022.

The Stormwater Committee is currently engaged in two strategies: a watershed-wide adaptive monitoring program for stormwater and public outreach to single family homeowners. The group facilitated presentations by all governments with jurisdiction in the watershed to speak to their stormwater management and monitoring programs. The committee installed a demonstration rain garden in Lions Park, Port Coquitlam to educate the community and encourage implementation of rain gardens on private property.

The Roundtable commissioned a report by the University of Victoria's Environmental Law Centre titled *Reducing Water Extraction and Increasing Environmental Flows in the Coquitlam River*, which was reviewed by the Core Committee in January 2021. A Water Use Committee is currently liaising with governments in the watershed to discuss how to best implement recommendations provided in the report.

Facilitated by our Engagement team, the Roundtable developed a three-fold strategy to address littering and dumping during Earth Week, which included education to newcomers to the watershed,

empowering individuals that are homeless to participate in an incentivized clean-up and engaging students to create litter art.

The Earth Week program engaged with 84 individuals and removed approximately one cubic yard of waste from the watershed. On Rivers Day, our Engagement team partnered with the three other local organizations to conduct an in-stream *and* streamside clean-up and successfully removed approximately 4 cubic yards of waste from the watershed.

Thanks to the Canada Summer Jobs program the Roundtable hired videographer Ethan Moore to produce a *Hidden Gems* video series that aimed to encourage community members to visit some of the lesser-known areas thereby emoting concern and promoting stewardship. Videos in the series were viewed a total of 4362 times during the year.

The Roundtable hosted two Community Roundtable Meetings/Webinars during the year. The webinars, *Building Resilience: Weathering the Stormwater* and *Fire Prevention in Urban Watersheds* were viewed by 113 and 131 people (recorded and live) respectively. During each event, participants were asked to prioritize which *Watershed Plan* strategies should be implemented in the coming months. The pre-show video for the webinar, *Stormwater Management in the Coquitlam River Watershed*, featured inspirational examples of stormwater management in the community. It was also viewed by 99 people outside of the webinar.

Meetings and Presentations

The Core Committee convened six times during the year. The Resilience and Capacity Building Committee met five times and the Communications Committee assembled quarterly. The Community Roundtable Meeting/Webinar planning group met fourteen times, while the Development Project and Water Use committees convened once each, and Stormwater Management committee assembled fourteen times. Finally, the Financial Trustee Task Force met once to reconcile annual expenditures for year-end reporting.

One delegation presentation was given to the City of Coquitlam Council as a core funder and three presentations were made to community groups: SUCCESS Immigration Services (as part of our Waste Ban campaign), BCIT's Fish, Wildlife and Recreation program students and Code-Blue BC.

Social Media and Website

The Roundtable website was updated to feature the organization's growing video library. Website analytics show the average number of monthly website users to be 629 individuals, with a total of 7553 annual users. Facebook likes have increased from 814 at the start of the year to 861 at the end, Twitter followers have grown from 829 to 882 and Instagram from 432 to 591. YouTube video views have increased from 982 in 2020 to 2734 in 2021.

Communications

An annual Backgrounder was published in Spring and bi-annual Implementation Updates were distributed in Spring and late Summer. E-news is published on a quarterly basis. These publications had an open rate of between 33%-45%. Efforts made late in the year to increase subscribers by boosting posts promoting the newsletter appear to be effective and should be continued moving forward.

In-kind Contributions

In-kind contributions were valued at $19,566 including 707 hours of time and $700 of venue and skilled trades donations.

Financials

The Roundtable received $128,781 and carried over $35,434 from 2020 for a total of $164,215 available funds for the year. Cash expenditures totaled $99,422. When combined with in-kind contributions of $19,566, the organization's operating costs totaled $118,988. GVWD Funds were largely attributed to operational costs, the greatest of which was to maintain the Roundtable Coordinator.

Year in Review

Much like the previous year, 2021 was one for the books with continued challenges presented by the COVID-19 pandemic and extreme examples of climate change. We are once again proud to say that the Roundtable was able to adapt and took the challenges as an opportunity to increase community engagement on strategies that aim to reduce the effects of climate change. The increase in outreach is exhibited by the metrics for our virtual platforms, which have all shown excellent growth: average monthly website use is up 15% compared to 2020, social media growth 210% from the previous year and YouTube by 158%.

In-kind contributions were comparable and due to funding uncertainties fiscal expenditures were conservative. In December, Kwikwetlem First Nation committed to doubling its annual contribution for the next five years; the City of Coquitlam also agreed to renew its funding agreement for five years and the City of Port Coquitlam for one year.

Moving Forward

In 2022 funding agreements with the City of Port Coquitlam and Metro Vancouver's Greater Vancouver Water District will be up for renewal. The Roundtable will seek renewed funding agreements with those partners and continue to pursue alternate sources to ensure a balanced budget. With a clear direction provided by community Roundtable members, the CRWR will continue to advance its Lower Coquitlam River Watershed Plan as capacity allows.

The Roundtable would like to express its deepest gratitude to all partners, volunteers and contributors for their ongoing support through these challenging times. We look forward to continued partnerships for years to come.

Acknowledgements

We wish to thank the following organizations for their generous financial support in 2021:

Our deepest gratitude to the following partners for their contributions of time, staff resources and venue and refreshment supplies:

- City of Coquitlam
- City of Port Coquitlam
- Watershed Watch Salmon Society
- Jack Cewe Construction Ltd.

Core Committee Sectors and Representatives

The Core Committee comprises a team of 19 sector representatives from 12 diverse sectors, all of whom contribute their time in-kind to attend Core Committee and Community Roundtable meetings, sit on standing and project committees and attend outreach events. Without their dedication and collaborative efforts, the Roundtable would not be what it is today. Each member sits on the Core Committee for 18-24 month terms, although many continue on for years beyond their tenure. We wish to thank our Core Committee members for their generous contributions of time in 2021.

Federal Government

Scott Ducharme
Fisheries and Oceans Canada

Regional Government

Dave Dunkley
Greater Vancouver Water District

Local Government

Cllr. Steve Kim
City of Coquitlam

Local Government

Caresse Selk
City of Coquitlam

Local Government

Cllr. Nancy McCurrach
City of Port Coquitlam

Local Government

Scott Walmsley
City of Port Coquitlam

First Nations Government

Cllr. George Chaffee
Kwikwetlem First Nation

First Nations Government

Craig Orr
Kwikwetlem First Nation

Utilities

Cam Hiebert
BC Hydro

Real Estate Development

Geoff Nagle
Morguard

Sophie Mullen
Lehigh Hanson Materials Ltd.

Kirsten Wilson
Jack Cewe

Marvin Rosenau
BC Institute of Technology

Eve Gauthier
Tri-City Green Council

Norm Fletcher
Port Coquitlam & District Hunting and Fishing Club

Tony Matahlija
North Fraser Salmon Assistance Project

Sherry Carroll
ArtsConnect

Susan Devlin
Vancity

Note: *For 2021 the Provincial Government seat remained vacant and is not represented here*

Roundtable Representatives

The following representatives are not members of the Core Committee but provide vital services to the Roundtable. The Financial Trustee and Engagement Coordinator contribute a large portion of their time in-kind to attend meetings and participate in sub-committees.

Financial Trustee

Shayla Walker
Watershed Watch Salmon Society

Engagement Coordinator

Melissa Chaun
Coquitlam River Watershed Roundtable

Roundtable Coordinator

Sharee Dubowits
Coquitlam River Watershed Roundtable

Late in the year, the Core Committee lost one of its founding members, Norm Fletcher, when he passed away in November. The Roundtable remembers Norm for his incredible contributions to the watershed and community; he will be dearly missed. City of Port Coquitlam designate Cllr. Nancy McCurrach and staff representative Scott Walmsley joined as new members, and Cllr. Laura Dupont, also from the city of Port Coquitlam was welcomed back late in the year. Due to staff shortages during the COVID-19 pandemic, the Roundtable was unable to secure a Provincial Government representative and the seat remained vacant throughout 2021.

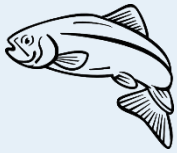
Subcommittees

Resilience and Capacity Building Committee

Cllr. Steve Kim, Cllr. Nancy McCurrach, Caresse Selk, Shayla Walker, Kirsten Wilson

Communications Committee

Shayla Walker, Melissa Chaun, Shannon Wagner, Scott Walmsley

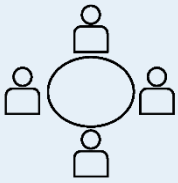


Habitat Committee

Tony Matahlija, Scott Ducharme

Development Project Committee

Melissa Chaun, Geoff Nagle, Lilian Kan



Roundtable Meeting Planning Committees

Eve Gauthier, Susan Devlin, Cllr. Nancy McCurrach, Sophie Mullen, Mitch Mivehchi

Stormwater Management Committee

Scott Walmsley, Eve Gauthier, Glen Joe

Water Use Committee

Cllr. Nancy McCurrach, Jim Allard, Margaret Birch

Financial Trustee Task Force

Shayla Walker, Jace Harrison

Operations

COVID-19 Response

The Roundtable continues to follow its COVID-19 response plan and adheres to Provincial mandates for gathering restrictions. Core Committee, subcommittee and Community Roundtable meetings continue to be held virtually when possible. Any events or projects that require in-person activities are held outdoors, observe physical distancing and personal protective equipment such as masks and gloves when appropriate. While Watershed Plan projects continue to be prioritized by the Community Roundtable, activities are modified to observe COVID-19 safety protocols.

Projects and Public Outreach

The COVID-19 pandemic has created staffing shortages for industries world-wide. The Roundtable is pleased to report that is has been able to maintain implementation of its *Lower Coquitlam River Watershed Plan* strategies, however progress on some projects has slowed due to staffing availability of some of our partner organizations.

Development

Development is the top-rated pressure on the Coquitlam River Watershed and affects the highest number of components in the area. Our subcommittee was originally formed to address a *Development Incentives* strategy that proposed an incentives program for developers who choose to implement low-impact development (LID) techniques. Subcommittee members from the Urban Development Institute noted a lack of awareness of the effects of urban development, LID techniques that could help to alleviate these pressures and relevant bylaws and policies. The subcommittee adjusted the strategy to focus on education and engagement of developers, planners and end-users.

Low-Impact Development Engagement Project

With the assistance of a volunteer technical writer and various post-secondary institutions, the Roundtable is producing a report that will identify evidence-based impacts of urban development in the watershed. This paper will discuss low-impact development (LID) strategies that can help to alleviate this pressure and describe the associated maintenance practices. It will also identify the relevant Provincial building codes and local policies and bylaws that may either assist or inhibit the implementation of these features and provide recommendations to reduce barriers.

The information related to development impacts and LID techniques has been drafted and is in review by committee members from the Development sector. UBC's Centre for Law and the Environment has agreed to perform a review of local policies and bylaws that either facilitate or inhibit the implementation of LID approaches. The paper is expected to be published in summer 2022.

Once the report has been finalized, the findings will be presented to the development community at a virtual workshop.

Stormwater Management

Stormwater is another high-rated pressure in the watershed that is associated with the introduction of foreign or excess material into hydrologic systems due to surface water loading and runoff from the

built environment. Stressors to the watershed ecosystem may include toxins (from vehicles, pavement, roofs, etc.), fertilizers and refuse (plastics, etc.). These stressors can result in degraded water quality, altered hydrological dynamics, increased nutrient loading, and consequently, compromised human, aquatic/riparian species and habitat health.

Watershed-wide Adaptive Monitoring Program

A subcommittee is currently facilitating regular presentations by the cities of Coquitlam and Port Coquitlam and Kwikwetlem First Nation regarding their progress in developing an adaptive monitoring program for stormwater management. Once each government has completed their relevant integrated stormwater management plan and adaptive monitoring program, the goal is to coordinate monitoring schedules, techniques and adaptations to facilitate a watershed-wide monitoring program with consistent information-sharing sessions. These local governments met for the first time in March regarding stormwater management practices and have committed to regular updates.

Outreach to Single-Family Homeowners

This strategy aims to develop outreach materials to help single-family homeowners improve stormwater practices in the lower Coquitlam River watershed. Key actions include:

- Encouraging best practices in rainwater management, water quality and riparian areas
- Providing outreach awareness of stormwater problems caused by everyday actions
- Reducing stormwater impacts on the river system, riparian areas, salmon, cultural and spiritual values, human health and safety, and resources industries.

To accomplish this, the subcommittee began installation of a demonstration rain garden in Lions Park, Port Coquitlam. The project encouraged the participation of community members and provides how-to signage for installing a rain garden, including a link to an instructional video and a mural depicting how rain gardens work to filter stormwater. It also features two rain barrels that capture stormwater from disconnected downspouts on the adjacent building, which will be used to water the garden during the dry season. The project was generously supported by Vancity, the City of Port Coquitlam and Jack Cewe Construction Ltd. The city of Port Coquitlam will be using this as a pilot project to gauge feasibility for this type of green infrastructure elsewhere in the municipality.

The rain garden filters water from approximately 150 m^2 of impermeable surface. The installation events engaged and educated 28 community members about the purpose and procedures for creating a rain garden.

Water-Use

The Roundtable commissioned a report by the University of Victoria's Environmental Law Centre titled *Reducing Water Extraction and Increasing Environmental Flows in the Coquitlam River*. The paper was released in November 2020 and reviewed by the Core Committee in January 2021, after which a subcommittee was formed to address the recommendations in the report. The recommendations included suggestions for reducing water use, regulating impermeable surfaces, determining environmental flow needs and creating a Water Sustainability Plan for the Lower Coquitlam River Watershed. The subcommittee met to discuss implementation of these recommendations and is currently liaising with local governments in the watershed to determine their plans for incorporating the advice provided in the report.

Anti-Littering and Dumping Engagement

During Earth Week the Roundtable launched its renewed anti-littering and dumping campaign. Typical litter clean-ups engage community members that are already aware of and active in solutions for the problem. This campaign took a three-fold approach to littering:

1. Educated newcomers to the watershed by hosting a webinar for SUCCESS Immigration Services. During this event we gathered information on cultural perceptions of the littering problem, shared information about the impacts of litter, where the local litter "hot spots" are and how we can reduce our waste production.
2. Empowered people who are homeless or facing homelessness from Hope for Freedom, Raincity Housing and ACCESS Youth Outreach Services to get involved in an incentivized clean-up program, supported by the Downtown PoCo BIA.

3. Engaged local students to use the litter collected from the clean-up program to create a litter art piece that spoke to the ongoing waste problem in the watershed.


During Earth week we engaged with 84 community members through the webinar, clean-ups and litter-art construction. Approximately one cubic yard of litter was removed from the shoreline.

The campaign was resumed on Rivers Day when the Roundtable teamed up with The Web of Life, Chandos Construction, the Beaver Canoe Club and community volunteers to conduct an in-stream AND streamside clean-up.



An incredible 30 participants endured a very soggy day to remove approximately four cubic yards of waste from the river and its riparian area. The waste collected was primarily from abandoned homeless camps and spurred discussions of adding the pressure of homelessness to the *Lower Coquitlam River Watershed Plan*. A portion of the litter collected was used by artists Dolores Altin and Elvira Monteverde to create a public litter art piece that will be displayed in Gates Park for 2022.

Mainstream Cultural Norms Outreach

Mainstream cultural norms pressure is associated with a disconnection from or lack of understanding of the value of local ecosystem services provided to people by local natural resources. Stressors associated with mainstream cultural norms include increased apathy, decreased stewardship, lack of environmental awareness and knowledge, lack of respect for nature and decreased sense of value. Outreach programs were identified as the most effective strategy to alleviate this pressure.

Hidden Gems Video Series

Thanks to the Government of Canada's Canada Summer Jobs program, the Roundtable was able to hire a videographer to produce regular communications content for release on social media and to Telus Community Television's *Community Content* channel. Videographer Ethan Moore's main project was to create a video series, titled *Hidden Gems of the Coquitlam River Watershed*, depicting some of the lesser-known spots to visit in the area. The goal of the project was to encourage people to visit, engage with and be stewards of the watershed.

The series has had excellent reach on our social media platforms:

Table 1. 2021 Views of the Hidden Gems video series

Video	YouTube Views	Facebook Views	Total Views
Hoy Creek	61	20	81
Westwood Wetlands	33	261	294
Fjords	33	65	98
Colony Farms	30	15	45
Upper Coquitlam River Park	66	4950	5016
The Oxbow Side Channels	258	36	294
Ridge Park	29	58	87
The Upper Watershed	305	352	657
Hidden Gems Sneak Peek	11	33	44
			6616

Community Roundtable Webinars

The Roundtable aims to host one to two Community Roundtable meetings each year, which are typically in-person events. Due to COVID-19 restrictions, meetings have been modified to a webinar format until further notice. The benefit of the online format is a huge reduction in cost, which allowed the Roundtable to host two webinars within their annual budget.

Building Resilience: Weathering the Stormwater

The Spring event tied into work by the stormwater subcommittee that year. Guest speakers Mitch Mivehchi (BMP Engineering) and Joanna Ashworth (SFU, North Shore Rain Garden Project) discussed what rain and stormwater are and how participants could help alleviate stormwater's negative effects on the watershed. The event was well-attended by local representatives and community members, and the Roundtable received valuable feedback on how to prioritize *Watershed Plan* strategies in the coming months. Survey results (n=19) indicated that participants prioritized outreach on tree management, engagement with developers on implementing low-impact development techniques and outreach to single-family homeowners about stormwater, which was to take shape as a demonstration rain garden. A recording of the webinar was posted on our YouTube channel and Facebook page for subsequent viewing/input.

Table 2. 2021 Spring Community Roundtable Webinar Attendance and Views

Pre-registrations	Attended Live	YouTube Views	Facebook Views
88	60	29	28
Total Views	**117**		

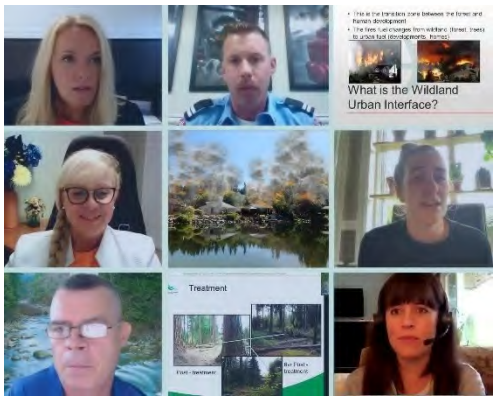
The full event report is available on our website.

Stormwater Management in the Coquitlam River Watershed

For the Spring Community Roundtable Webinar event pre-show, the Roundtable put together a short video titled *Stormwater Management in the Coquitlam River Watershed* featuring community members and organizations that are working to reduce the effects of stormwater in an effort to inspire viewers to

do the same. The video was later released as a public outreach piece to further address mainstream cultural norms. The video is available on our YouTube, website and social media pages. In 2021 the video had 74 views on YouTube and 36 on Facebook for a total of 110 views throughout the year.

Fire Prevention in Urban Forests



Coming off a historic fire season, the Roundtable hosted a Community Roundtable webinar in the late Summer / early Fall to provide education about how to manage urban forests and community properties to help reduce the risk of wildfire in the watershed. Guest speakers Richard Boase (District of North Vancouver) and Cptn. Chad Evans (Port Coquitlam Fire Department) spoke to urban forest management techniques that mimic the natural structure of a forest, defined the urban-wildland interface and provided examples of how to reduce combustible material around the home. Presentations were engaging, event operations ran smoothly and valuable feedback was received to prioritize *Watershed Plan* activities. Attendance was slightly lower than previous events, however the recorded versions were well-viewed. Prioritization survey results (n=12) indicated a preference to focus on tree management, a natural space strategy for developers, low-impact development techniques and invasive species management. A recording of the webinar was posted on our YouTube channel and Facebook page for subsequent viewing/input.

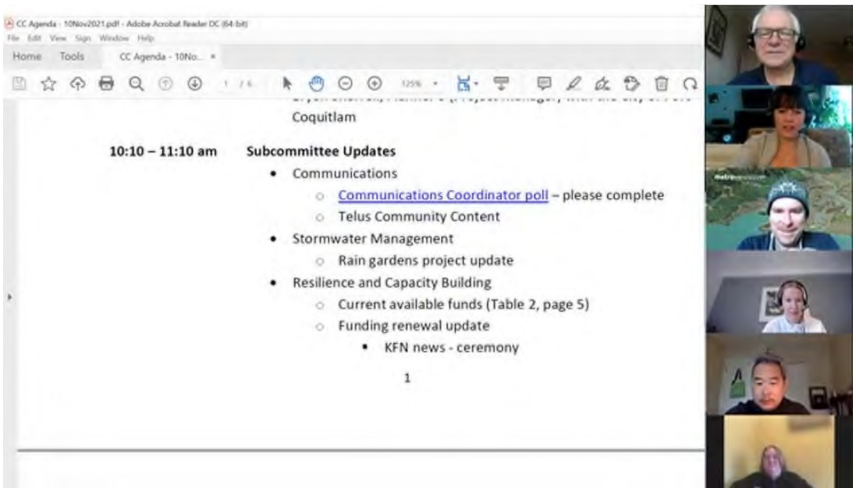
Pre-registrations	Attended Live	YouTube Views	Facebook Views
28	39	28	71
Total Views	**138**		

The full event report is available on our website.

Meetings and Presentations

As a collaborative governance organization, meetings and presentations are a key component of the success of the Roundtable. Due to COVID-19, all meetings and presentations were held virtually via Zoom. Most members are growing more comfortable with this technology however, the virtual format does at times limit engagement within meetings since body language is poorly transmitted remotely. Fortunately, Zoom provides a phone-in option for those without access to computers, and the Roundtable continues to use online surveys as an effective method of gathering feedback. All members contributed their time in-kind.

Core Committee and Subcommittee Meetings



The Core Committee met for five two to three-hour meetings in the months of January, March, June, September and November and one additional one and a half hour meeting in June. These meetings discussed prioritizing Watershed Plan implementation strategies, funding agreement renewals, budgeting issues, project updates, outreach campaigns and issues of watershed health.

Subcommittee Meetings

Subcommittees include standing committees for resilience and capacity building, communications and habitat and ad hoc project committees for community roundtable meeting planning, development, stormwater management, water use and financial matters. Littering and dumping pressures were addressed with our Engagement Coordinator.

The Resilience and Capacity Building committee met five times to discuss funding agreement renewals and strategies for increasing Roundtable capacity, business plans, prioritizing strategies and budget drafts. The Communications committee met on a quarterly basis to discuss communications strategies and publications, social media and the Roundtable website. The Habitat committee typically convenes when issues arise concerning fish or wildlife habitat. We are happy to report that there were no incidents that required the committee to meet. The Community Roundtable Meeting Planning committee met fourteen times during the course of the year to plan the Spring and Summer/Fall events, shoot videos for pre-shows and execute the events. The committee is responsible for organizing guest speakers, venues, activities, refreshments, facilitators, communications (including photography, videography, promotions and social media), speeches and agendas. The Development project committee met once to discuss edits to the first part of the LID paper and is awaiting further progress by UBC's Centre for Law and the Environment department, who is assisting with writing the assessment of codes, regulations, policies and bylaws.

The Stormwater committee met eleven times during the year to work on two strategies: a watershed-wide adaptive management program and outreach to single family homeowners, which took shape as a demonstration rain garden in Lions Park, Port Coquitlam. The team was responsible for conducting research on adaptive monitoring programs in the Province, liaising with all governments in the watershed, facilitating a collaborative meeting with those parties and planning, designing and installing the rain garden.

The Water Use committee met once to review recommendations provided in a water flows report written by the University of Victoria Environmental Law Centre for the Roundtable and liaised with municipal governments via email to discuss implementation of these counsels. Finally, a Financial Trustee task force met twice to reconciliate annual finances for reporting purposes.

Presentations

To help build capacity and engage in community outreach, the Roundtable gives delegation presentations to potential and existing funders and other organizations/groups. Due to COVID, these presentations were given virtually.

Two delegation presentations were given to core funders (the cities of Coquitlam and Port Coquitlam) to provide an update on the Roundtable's activity for the year. Three community presentations were made to SUCCESS Immigration Services, BCIT's Fish, Wildlife and Recreation Program and CodeBlue BC Community Volunteers. The first presentation was part of an outreach program about littering and dumping, the second was a general presentation to post-secondary students about the Roundtable and the third was to promote volunteer opportunities in the watershed.

Social Media and Website

The Coquitlam River Watershed Roundtable maintains a website at www.coquitlamriverwatershed.ca to provide details about watershed history, the Roundtable and Core Committee, event and media promotions and contacts. Over the year, the site was modified to feature the Roundtable's growing library of videos, including virtual watershed tours and our Hidden Gems series

Website analytics show the average number of monthly website users to be 629 individuals, with a total of 7553 annual users. There is a typical decline in website use during the warmer summer months.

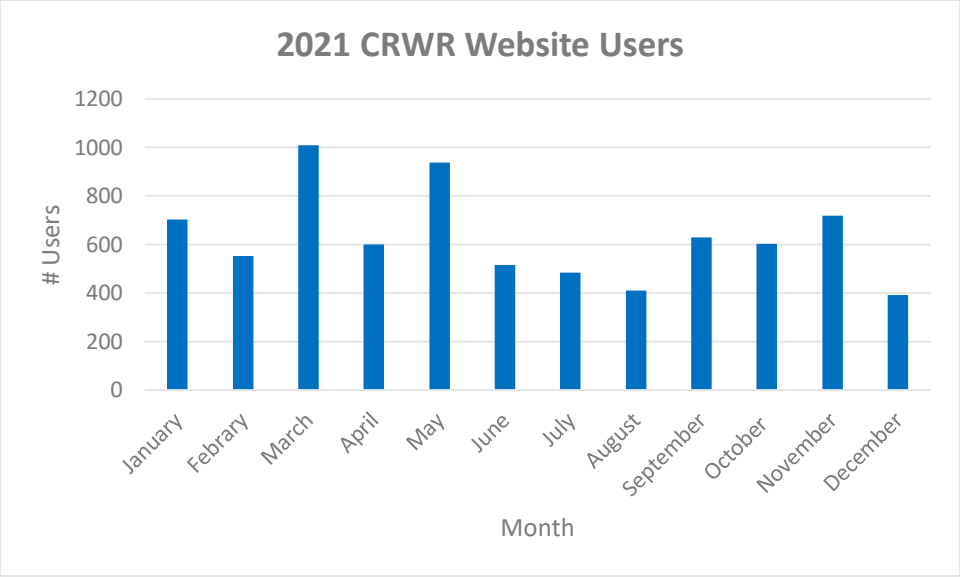


Figure 1. 2021 CRWR Website Users

The Roundtable also reaches community members via social media outlets Facebook, Twitter, Instagram and YouTube. Each is used to promote project and event information with the main goal to direct users to the Roundtable website. Facebook followers have increased from 814 at the start of the year to 861 at the end. Twitter followers have grown from 829 to 882 throughout the year and Instagram from 432 to 591, which made Instagram the platform with the largest growth in 2021.

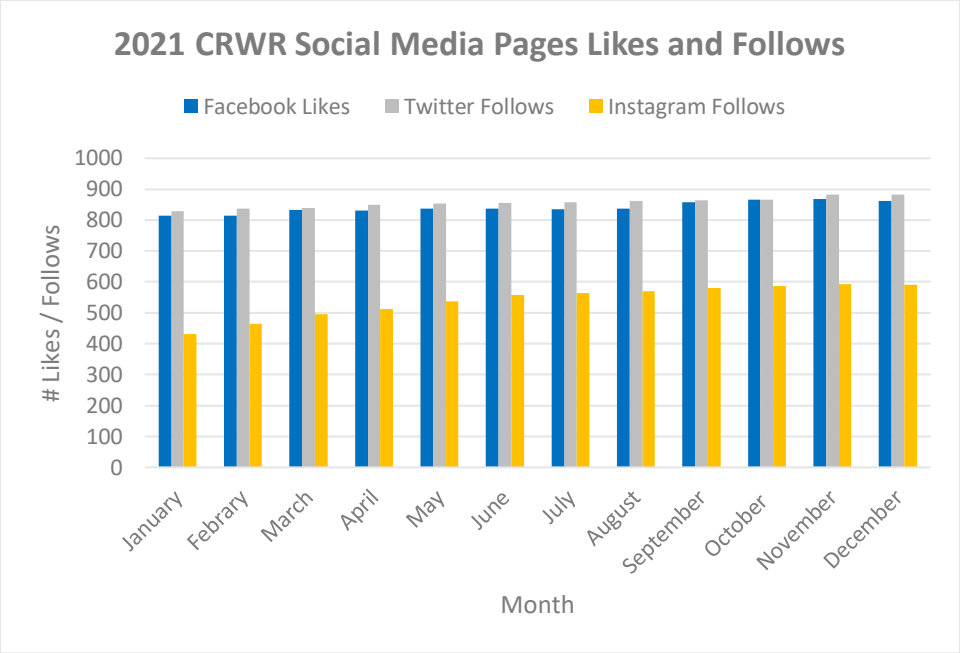


Figure 2. 2021 CRWR Social Media Pages Likes and Follows

Since COVID began the Roundtable has put a larger effort into producing virtual communications and the group's YouTube page has received steady viewership. Videos received an average of 228 views per month.

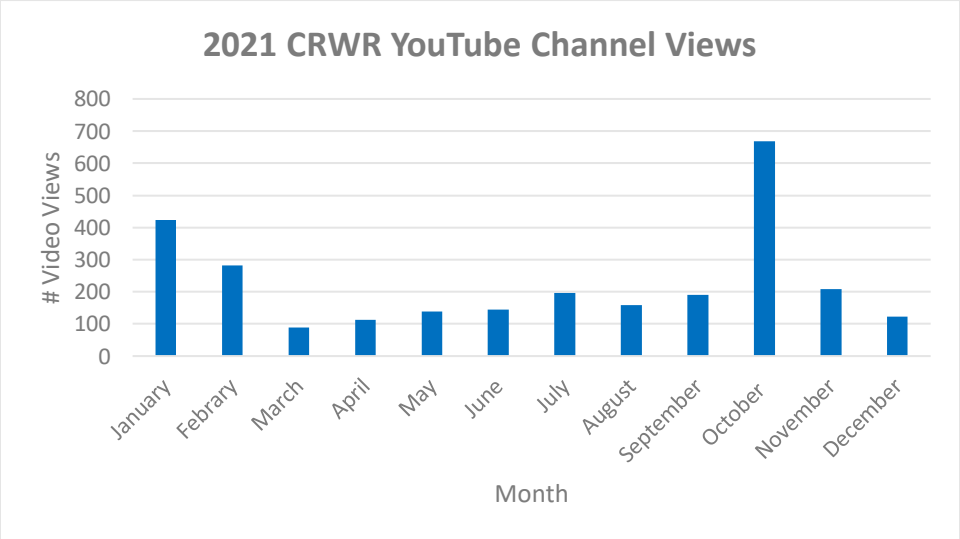


Figure 3. 2021 CRWR YouTube Views

2021 videos were viewed a total of 2734 times compared to 2020, which saw a total of 982 views.

Communications

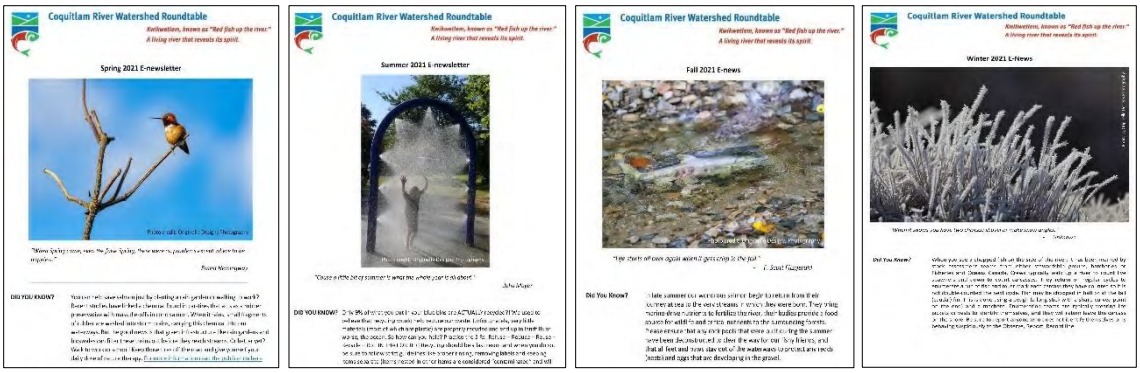
Regular publications are sent to a list of subscribers throughout the year and promoted on social media. These communications are intended to keep the community apprised of the Roundtable's activities and provide an avenue for open dialogue and feedback.

Backgrounder and Implementation Updates

Backgrounders are released annually each Spring and provide information about the Roundtable's history, funders, mission, vision, values, the current composition of the Core Committee and the watershed. The 2021 issue was sent to 275 subscribers and opened by 34% of recipients.

Lower Coquitlam River Watershed Plan Implementation Updates are released bi-annually in the Spring and Summer of each year. Our Spring update was sent to 271 subscribers and was opened by 34% of recipients and, our Summer update was sent to 264 subscribers and was opened by 45% of recipients.

E-news



E-news is sent out on a quarterly basis in Spring, Summer, Fall and Winter to provide an update on the Roundtable's activities and promote events and campaigns. Open rates for 2021 e-news editions ranged from 33% to 44%.

Table 3. 2021 CRWR E-news Subscribers and Open Rate

E-news Edition	# Subscribers	% Opened
Spring	272	33%
Summer	270	40%
Fall	263	37%
Winter	271	44%

In-kind Contributions

The Roundtable's success relies heavily on the generous contributions of time, staff resources and venue, event and refreshment supplies. In-kind contributions were valued at an incredible **$19,566** including **707 hours** of time.

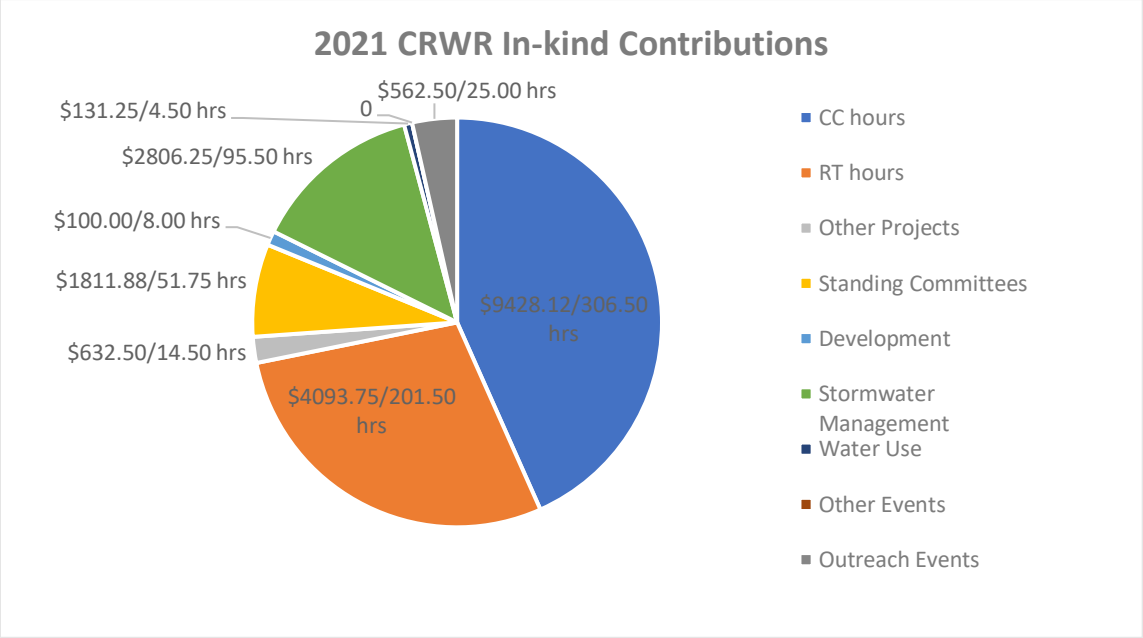


Figure 4. 2021 In-kind Contributions to the CRWR

Financials

Revenues

The Coquitlam River Watershed Roundtable currently operates on one of the smallest budgets of any Roundtable organization in British Columbia. Our Resilience and Capacity Building committee is currently working with funders to renew current funding agreements and seeking new partners so we can continue to advance our Lower Coquitlam River Watershed Plan with increased capacity.

In 2021, the Roundtable received $128,781 and carried over $35,434 from 2020 for a total of **$164,215** available funds for the year.

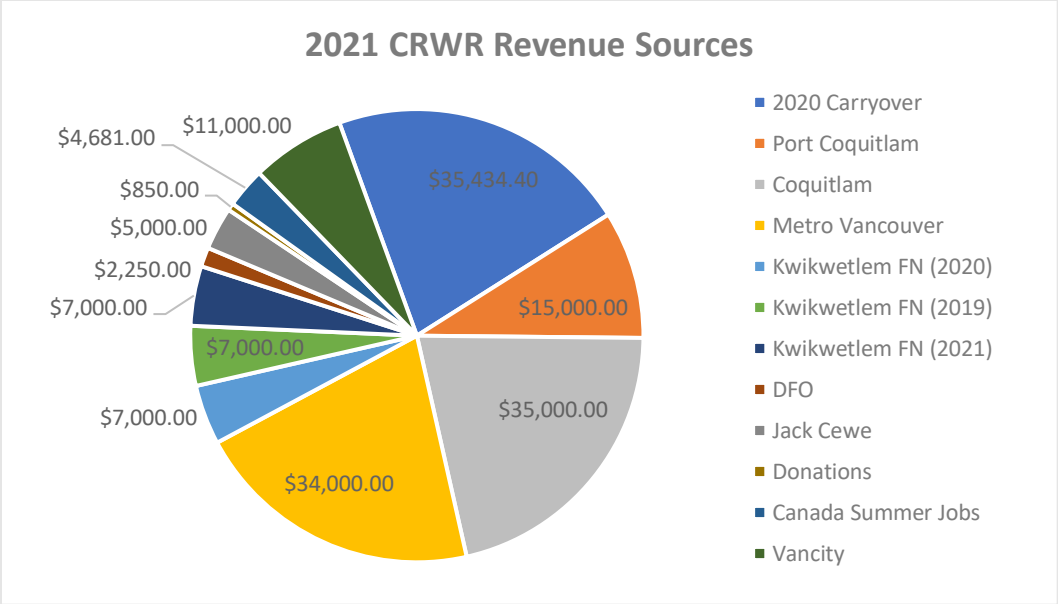


Figure 5. 2021 CRWR Revenue Sources

Expenditures

Core Committee and Roundtable meetings, public outreach, communications and Watershed Plan implementation projects are all organized by the Roundtable Coordinator, whose salary currently comprises the majority of Roundtable expenses, followed by administration fees, advertising and Roundtable meetings.

In 2021, the Roundtable's cash expenditures totaled **$99,422** (this does not include GST). When combined with in-kind contributions of $19,566, the organization's operating costs totaled **$118,988**.

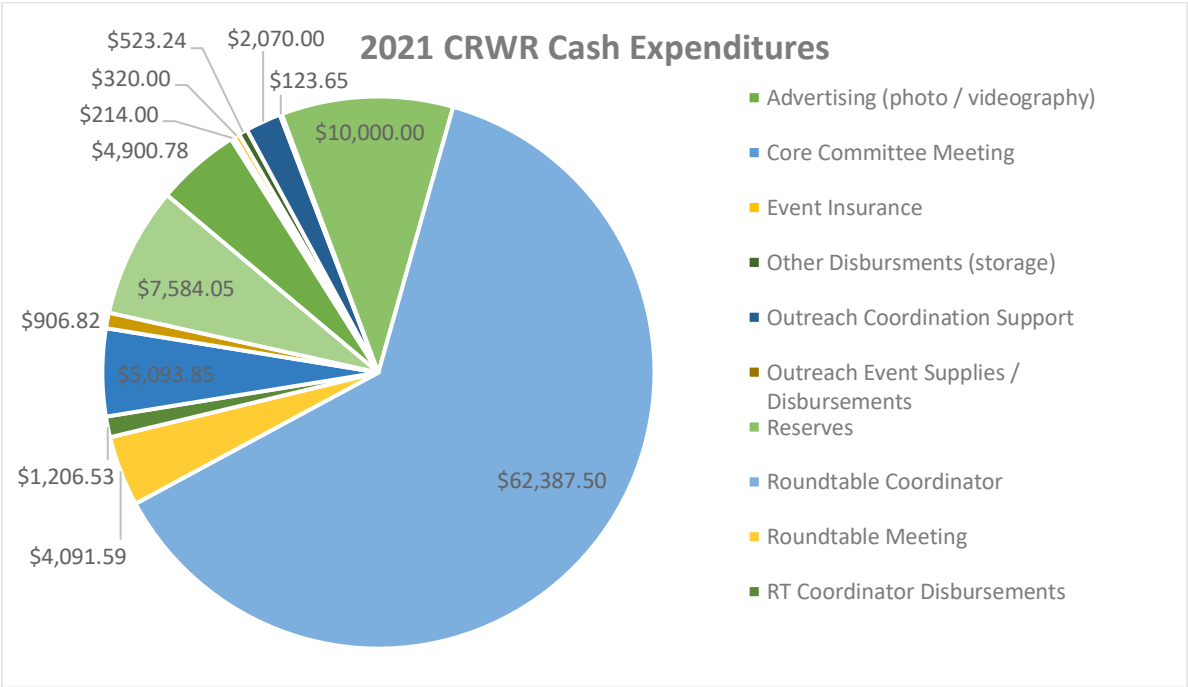


Figure 6. 2021 CRWR Cash Expenditures

Some projects required applications for additional funding and are not represented in the following figure, which shows expenditures specific to GVWD funding.

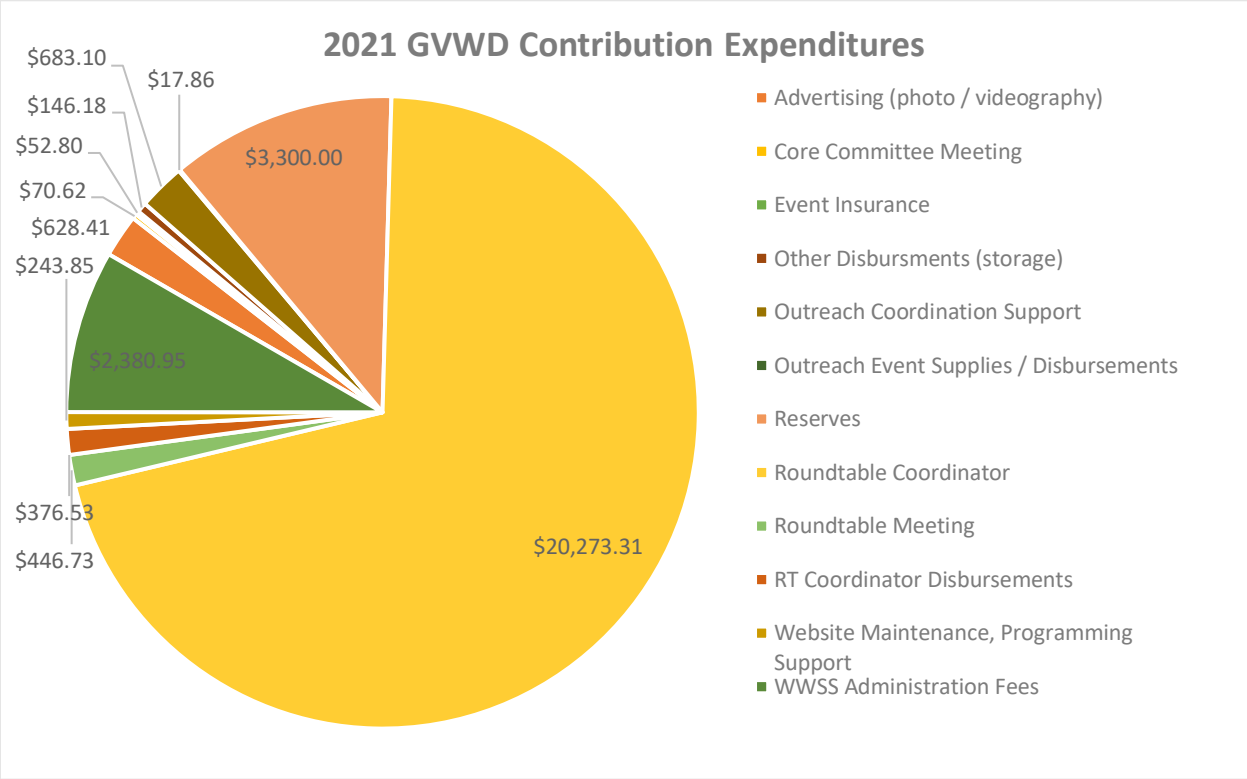


Figure 7. 2021 Greater Vancouver Water District Contribution Expenditures

Year in Review

The year 2021 was another for the books. Still amid the COVID-19 pandemic, facing challenges of staffing shortages and financial uncertainty, the watershed community also encountered drastic examples of climate change including droughts, “heat domes”, extreme fires and floods. The Roundtable took the opportunity to increase its engagement with the community and partners to facilitate responsible management of the watershed with the intent to reduce the effects of climate change:

- Community Roundtable meetings were prioritized to be held twice in the year
- A videographer was hired to increase media output
- Community engagement events focused on hands-on activities, when possible, to further encourage members to implement changes in their daily lives

The efficacy of our outreach is demonstrated by our virtual platform metrics. Website use has shown over 11% growth in monthly users with an average monthly usage of 629 users compared to 566 in 2020. The Roundtable’s social media presence was boosted with a commitment to post regularly on all three platforms (Facebook, Twitter and Instagram). Based on the growth of likes and follows for each platform, the Roundtable was able to engage 259 more people on social media compared to an increase of only 86 people in 2020, which is 201% growth. With the concentrated efforts on media communications, YouTube has demonstrated another excellent year of growth at 178% compared to the previous year.

Regularly scheduled communications (implementation reports, backgrounders and e-news) had an average open rate of 38.5%. This exceeds the average peer open rate of 37.7% as identified by Mailchimp. While the open rate of these publications is satisfactory, efforts could be made to increase the number of subscribers, which fluctuated and eventually decreased by a total of 1 subscriber over the year. Efforts made late in the year to boost one post each month encouraging viewers to sign up for the newsletter appear to correlate with a growth in subscribers; this strategy should be carried forward into subsequent years.

In-kind contributions were comparable to 2020 values, with a slight increased value of approximately $1000. Given that in-person events remain limited due to COVID-19 restrictions, these values are well within the expected range.

The Roundtable spent $99,422 of the $128,781.00 contributed in 2021. An amount of $35,434 was carried over from 2020, which is similar to the carryover from the previous year due to late municipal funding contributions in 2019. With the uncertainty of continued funding/agreement renewals due to COVID, fiscal expenditures were conservative, leaving a healthy carryover of $64,793 from 2021 into 2022. In mid-December, The Roundtable received confirmation from Kwikwetlem First Nation that its annual contribution would double for the next five years. The City of Coquitlam also confirmed that its current funding agreement would be renewed for five years, and the City of Port Coquitlam has confirmed funding for 2022.

Moving Forward

In the coming year, funding agreements with the cities of Port Coquitlam and Metro Vancouver's Greater Vancouver Water District will be up for renewal. The Roundtable intends to seek renewed agreements for the years 2023-2026 with both partners. Alternate partner funders will also be pursued to ensure a balanced budget in the years to come.

With a clear direction provided by community Roundtable members, the CRWR will continue to advance its Lower Coquitlam River Watershed Plan as capacity allows. Strategies to address the pressures of development, vandalism/illegal activity, stormwater and invasive species have been prioritized for the start of 2022.

The Roundtable would like to express its deepest gratitude to all partners, volunteers and contributors for their ongoing support through this challenging time. We look forward to continued partnerships for years to come.

To: Water Committee

From: Lucas Pitts, Director, Policy, Planning and Analysis, Water Services

Date: March 11, 2022 Meeting Date: April 6, 2022

Subject: **Drinking Water Conservation Program Update**

RECOMMENDATION

That the Water Committee receive for information the report dated March 11, 2022, titled "Drinking Water Conservation Program Update".

EXECUTIVE SUMMARY

The summer of 2021 was exceptionally warm and dry, with higher than usual drinking water consumption experienced throughout the Region. In response to those conditions, and the ongoing efforts to address household affordability, several new initiatives were developed for the summer 2022 season. The most significant of those changes was an update to the Drinking Water Conservation Plan which reduces the allowable watering days for lawns (both residential and commercial) from two days per week to one day per week. According to the Comprehensive Regional Water Supply Study a per capita consumption of drinking water of less than 202 litres per capita per day (LPCD) would need to be achieved by 2036 to avoid a supply shortage of between 5-55 billion litres. Currently the Region uses about 231 LPCD, so a reduction of an additional 10-15% is still required to meet the 2036 predicted values. This report details those changes and other upcoming improvements to the water conservation program currently in development for the summer of 2023.

PURPOSE

To summarize the changes to the Region's water conservation program for summer 2022 and new initiatives currently under development.

BACKGROUND

As identified in the *Water Supply Outlook 2120* study, mounting stresses on Metro Vancouver's water supply are occurring because of growing populations, urbanization and climate change. Of those threats, climate change poses the biggest uncertainty to the overall water supply. Precipitation forecasts indicate drier summers that could extend later into the year. Hotter days and longer dry spells over the summer months, combined with a reduction in the snowpack, could strain the existing water supply during times of the year when temperatures are high and water is in greatest demand. Potentially many different solutions exist to manage and meet these challenges.

Metro Vancouver will address these vulnerabilities over time through planned increases in supply and storage capacity, including constructing a second intake in the Coquitlam Reservoir that can access increased storage volumes to deeper depths. However, investing in capital infrastructure is expensive and can have impacts on the overall household affordability in the region. Metro Vancouver may be able to delay some of these large capital projects if we implement best practices to more sustainably manage residential, industrial, commercial and agricultural use of drinking water.

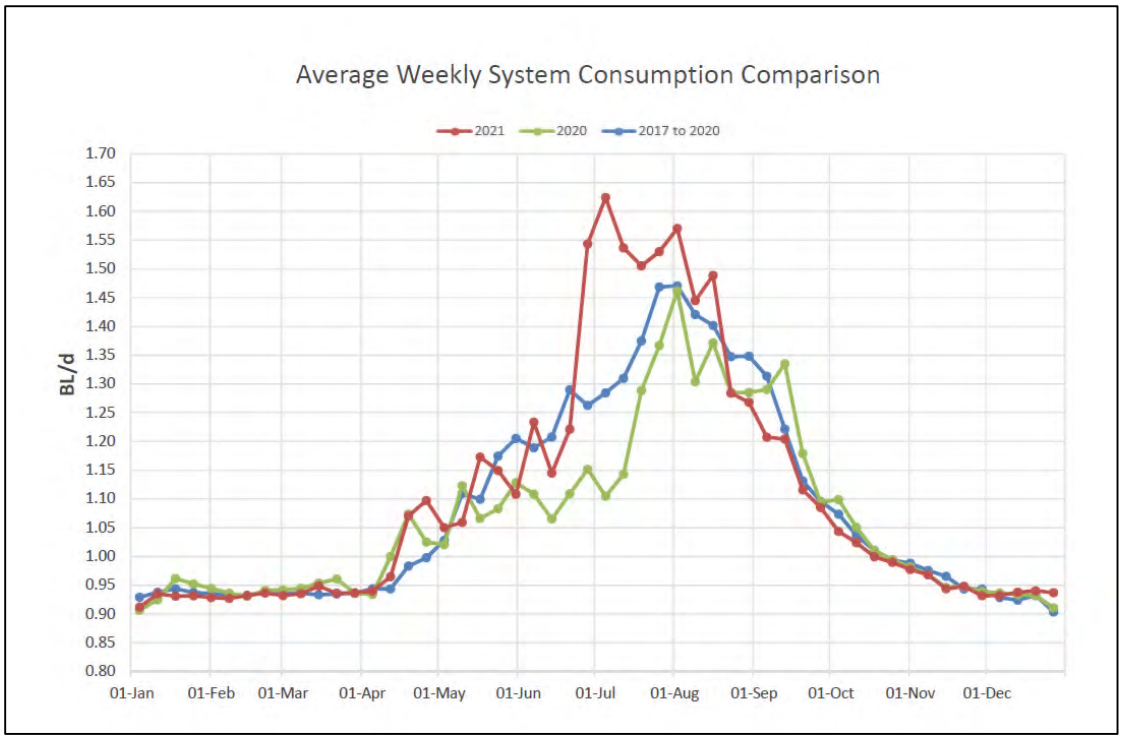
As part of the long-term planning for maintaining and expanding the overall drinking water supply, in 2016, the Comprehensive Regional Water Supply Study (CRWSS) was completed. That study modeled the potential water demand in 20 year increments to better plan for the Region's long-term infrastructure needs. That study identified the mid-2030s as the time when the Region would require an incremental addition to the drinking water supply (Coquitlam Intake #2). If that infrastructure is to be deferred, then the actual regional drinking water consumption in 2036 would need to be lower than the modeled values from the CRWSS. A summary of the projected drinking water use in 2036 is presented in Figure 1.

Figure 1 – Comprehensive Regional Water Supply Study 2036 Predicted Demand Factors

Item	**2016**	**2036 (Predicted range)**
Population (millions)	2.5	3.1 - 3.4
Total Annual Water Demand (BL)	394	405 - 443
Residential Per Capita Demand (L/Capita/Day)	268	202 - 212
Annual Water Supply Gap (BL)	0	5 - 55
Demand and Supply Uncertainties: Demographic growth, the density of growth, conservation effectiveness, water supply variability, water quality, climate change		

The summer of 2021 was particularly challenging to regional water conservation efforts. There were 40 days where the Greater Vancouver Water District (GVWD) delivered over 1.5 BL of water, and a peak day demand of 1.8 billion litres was experienced in June, as shown in red in Figure 2 (next page). Demands such as these are a rare occurrence in the Region as shown by the blue line in Figure 2, which shows the average weekly consumption for 2017 to 2020.

Figure 2 – Summer 2021 Drinking Water Consumption



While June, July and some of August experienced high drinking water consumption, September and October were unseasonably cold and wet and thus the overall per capita consumption did not increase.

Figure 3 – Residential Per Capita Consumption Trends

Year	Winter (Nov - March)		Summer (June - Sept)		Annual Average	
	Regional	Residential	Regional	Residential	Regional	Residential
	LPCD	LPCD	LPCD	LPCD	LPCD	LPCD
2010	418	243	606	323	495	273
2011	417	243	555	300	475	262
2012	407	241	515	314	468	271
2013	398	217	529	292	468	246
2014	388	206	536	283	458	234
2015	378	209	533	286	440	242
2016	377	204	519	268	435	232
2017	370	201	495	285	439	231
2018	359	232	526	332	433	272
2019	358	223	515	304	424	254
2020	350	201	489	284	411	235
2021	344	199	488	280	403	231
Avg	**380**	**218**	**526**	**296**	**446**	**249**

The focus of water conservation efforts continues to be on summer discretionary use through the Drinking Water Conservation Plan (DWCP). The summer months are when supply and system operations can be challenged because drinking water demand typically increases 30-45% over winter drinking water demand.

NEW IN 2021

For the summer of 2022, Metro Vancouver has implemented the following two new initiatives to further reduce summer discretionary water use.

DWCP Update

In November 2021, the Metro Vancouver board approved the updates to the DWCP that limits lawn watering in Stage 1 for both commercial and residential properties to one morning per week (down from two). During Stage 2, residential and commercial lawn watering is banned. The updated DWCP has been adopted into member jurisdiction bylaws for summer 2022. It is anticipated that these changes will save between 1-20% of summer water use, depending on engagement and enforcement.

DWCP Summer Support Program

This summer, Metro Vancouver will have a team of water conservation engagement specialists that will move throughout the Region addressing non-compliant water use through either direct engagement or reporting addresses directly to member jurisdictions. Member jurisdictions have the option to sign up for participation in this program and are able to guide what the program looks like in their community. The program is financed through the Policy, Planning and Analysis operational budget.

Anticipated Initiatives for 2023

Metro Vancouver is in the process of developing the following two new indexes to monitor and communicate the status of drinking water availability and drinking water use in the region.

Drinking Water Stress Index

The Drinking Water Stress Index (DWSI) is in development for rollout in the summer of 2023. Similar to the Province's Fire Danger Rating or Drought Response Levels, the DWSI will allow the GVWD to convey urgency around our drinking water resources without having to trigger stage 2 or stage 3 restrictions. The DWSI is in early development but will consider current consumption patterns, source storage, weather conditions, drought conditions and predictive modeling. The idea is to use the DWSI to draw attention to drinking water system conditions and supply during the critical summer months. The intent is to make sure the DWSI is widely shared throughout the Region and prominently displayed on our website. This project is funded through the Policy, Planning and Analysis operational budget.

Drinking Water Consumption Index

The Drinking Water Consumption Index (DWCI) is in development for rollout in the summer of 2023. The DWCI will consider current summer consumption patterns and compare them with historical trends. For example, in 2021, when the consumption was higher than usual, the DWCI would have been rated as high or extreme. Similar to the DWSI, the intent is to share the DWCI throughout the Region and prominently display it on the Metro Vancouver website. This project is funded through

the Sustainability Innovation Fund and is part of a larger suite of data analytic and predictive tools the GVWD is developing.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
This is an information report. No financial implications are presented.

CONCLUSION
Water conservation continues to be a priority item for the region. The summer of 2022 will see updates to the DWCP as well as the implementation of the DWCP Summer Support Program. New initiatives are being planned for upcoming peak (summer) seasons as well. Staff will continue to work closely with member jurisdictions to develop region-wide approaches to water conservation. Sustained reductions in per capita water use are going to be key to consider any deferral of large capital projects and the impacts of those projects on household affordability.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Water Committee

From: Lucas Pitts, Director, Policy, Planning and Analysis, Water Services

Date: March 28, 2022 Meeting Date: April 6, 2022

Subject: **Water Supply Update for Summer 2022**

RECOMMENDATION
That the Water Committee receive for information the report dated March 28, 2022, titled "Water Supply Update for Summer 2022".

EXECUTIVE SUMMARY
This report provides a summary of the current state of source water supply, past trends in water use, and an update on the current plans for operating the source reservoirs and water system during the summer and fall of 2022.

The existing snowpack, precipitation in the form of rainfall, and expected full source lake storage will be sufficient to ensure an adequate water supply for the 2022 summer season. The peak day and average summer day water usage saw an increase in 2021, primarily because of the record-breaking heat dome of 2021. Winter water use continues to decrease while average day water use is starting to stabilize, indicating the importance of conservation initiatives and continued support to these initiatives from our member jurisdictions. System improvements have increased the capacity of the transmission system to meet peak summer demands.

PURPOSE
To provide the Committee with the annual update on the current water supply and water consumption projections in advance of the approaching summer peak demand period.

BACKGROUND
As per the Committee's 2022 Work Plan, and those of previous years, water supply and water consumption status reports are brought forward each spring. These reports are developed based on the current state of source water supply and trends in water use and reflect current plans for operating the source reservoirs and water system during the summer and fall.

CURRENT SOURCE WATER SUPPLY SITUATION
Snowpack
Snowpack measurements are routinely conducted at sample sites across the Capilano, Seymour and Coquitlam Water Supply Areas. The March 1, 2022 survey results indicate that the depth and water equivalent of the snowpack is 98% and 107% respectively of the historical average for this survey period. April 1 snow survey results are not available for this report print date although there has been modest snowpack accumulation through upper elevations during March. The March 1 survey results and recent snowfall indicates an average spring runoff from snowmelt.

While snowpack is important, it should be noted that the region's water supply is not solely dependent on snowpack. Rainfall further contributes to the water levels in the three primary source reservoirs that serve Metro Vancouver.

Stored Water - Source Reservoirs

a) Capilano Reservoir: currently being managed under the spring operating protocol, with the reservoir currently at 66% of full summer storage capacity. The GVWD expects the Cleveland Dam Drum Gate to be raised by late April and anticipates that the reservoir will be at full capacity by late spring.

b) Seymour Reservoir: currently being managed under the spring operating protocol, with the reservoir currently at 99% of full summer storage capacity. The reservoir is expected to be at full capacity by late spring.

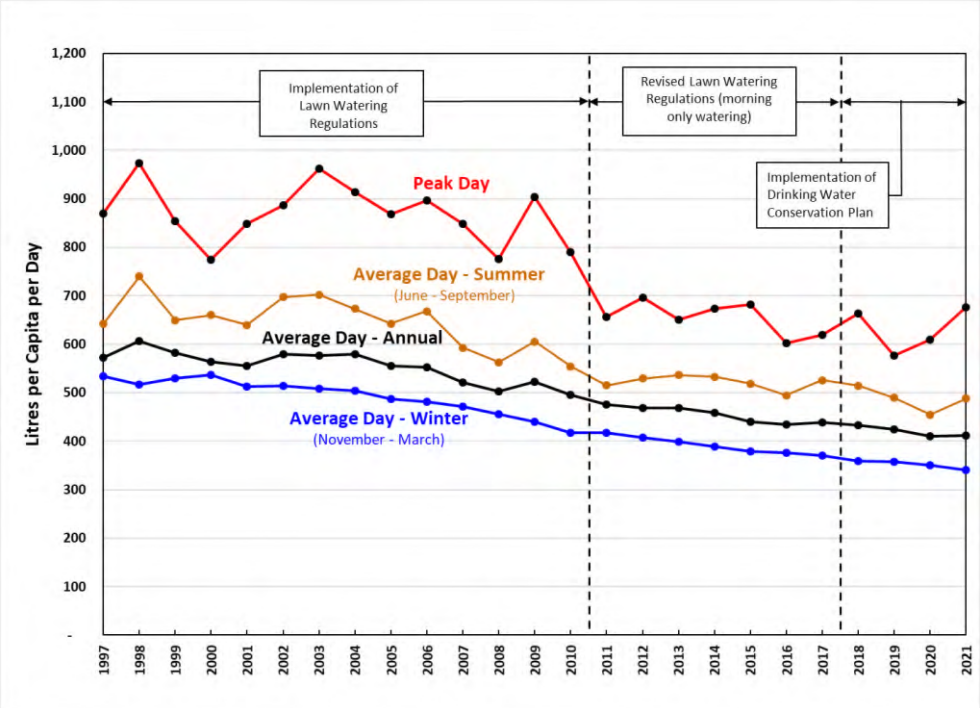
c) Coquitlam Reservoir: controlled by BC Hydro within a condition established by an agreement with the GVWD. It is expected that BC Hydro will have Coquitlam Reservoir sufficiently full to provide for adequate regional summer water supply. BC Hydro is upgrading their tunnel gates in the fall, and there will be no impact on the summer water supply.

d) Alpine Lakes: GVWD's three alpine lake sources, Palisade, Burwell, and Loch Lomond, which are used as reserves for Capilano and Seymour reservoirs during the summer period, are all expected to be at full capacity by late spring.

Trends in Water Consumption/Use

This section discusses trends in water consumption/use, as well as some of the factors affecting water use. Figure 1 shows water use in the region in litres per capita per day for the last 25 years (1996 to 2021).

Figure 1: Per Capita Water Use in the Region



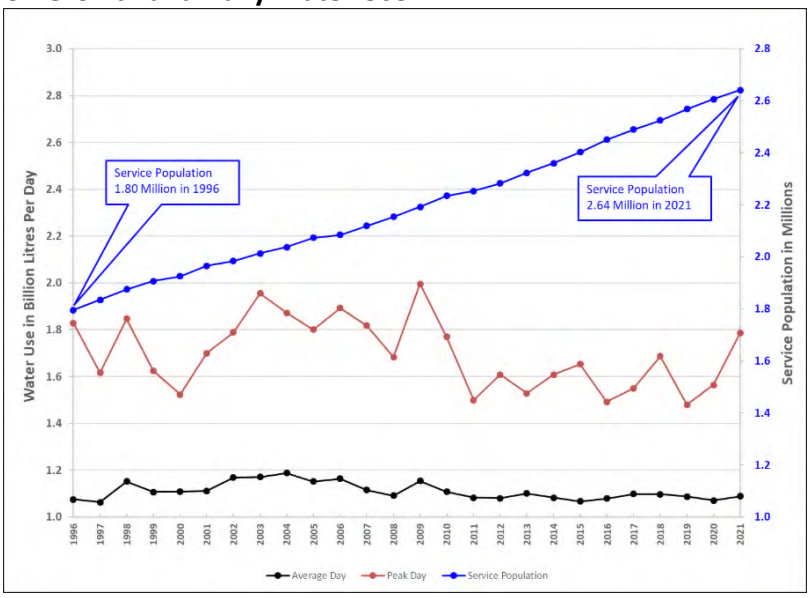
Historically, peak day per capita use (red line in Figure 1) occurs on a hot and dry summer day when many people in the region are watering their lawns. In 2021, the record-breaking heat dome resulted in a peak day per capita use higher than the previous five year's peak day per capita use. To curb this increase in peak day per capita water use, the updated *Drinking Water Conservation Plan* (DWCP), which was approved by the Greater Vancouver Water District (GVWD) Board in November 2021, includes the annual implementation of Stage 1 restrictions on May 1 that limit lawn watering for residential and non-residential properties to one morning a week. During Stage 2, residential and non-residential lawn watering is banned. The updated DWCP has been adopted into member jurisdiction bylaws in preparation for summer 2022.

The black line in Figure 1 shows the yearly average day per capita water use. This represents the overall regional water use on a per capita basis, which has been gradually trending downwards. The summer of 2021 was challenging to the regional water supply as there were 40 days where the GVWD delivered over 1.5 BL of water. This resulted in a spike in the average summer day per capita use (brown line). However, the overall annual average day per capita demand remained stable, primarily because of lower water usage during an unseasonably cold and wet fall. Metro Vancouver is updating the *Region-Wide Guide for Enforcement of the DWCP*, and will continue to work with member jurisdictions to enhance the water conservation education programs and enforcement efforts of the updated DWCP.

The blue line in Figure 1 shows winter per capita water use steadily declining since 1996, due to water efficiency and conservation policies. During the winter months of November to March, outdoor water use is generally low with little fluctuation due to weather conditions, making winter water use on a per capita basis a good measure for comparing baseline water use from year to year.

Figure 2 below shows the serviced population and total water use in billions of litres per day. Although total water use has stabilized in recent years, it is expected to increase as the effect of population growth on water demand begins to exceed per capita water use reductions due to water efficiency.

Figure 2: Population Growth and Daily Water Use



SYSTEM OPERATIONS OUTLOOK FOR SUMMER 2022

Water usage patterns will be monitored and adjustments made to withdrawals from each of the three main sources and within the transmission system to meet the regional water demand through the summer and fall. Additional withdrawals from Coquitlam Reservoir have been secured from BC Hydro for 2022. The three alpine lakes will also be utilized within their refillable storage limits, as required.

Hot and dry summer weather conditions drive demands and may create challenges for the transmission system to meet service levels in parts of the region, most notably in the southern and eastern parts that are both geographically furthest from the sources and are experiencing the fastest population growth rates. System upgrades such as the Port Mann Water Supply Tunnel, Clayton Reservoir, Jericho Reservoir Cell # 1, South Delta Main No. 1 Replacement (Phases 3 and 4), Port Mann Main No. 2 (South), Port Mann Main No. 2 (North), and Whalley Main have all contributed to additional transmission system capacity to meet summer peak demands in both the eastern and southern jurisdictions and will continue to benefit the regional transmission system during the summer.

If summer water storage supplies become stressed, Metro Vancouver will introduce additional water restrictions as per the DWCP.

ALTERNATIVES

This is an information report; no alternatives are presented.

FINANCIAL IMPLICATIONS

During the hotter and drier months, the demand for water increases significantly compared to the winter months, putting additional stress on the water supply system. Metro Vancouver's seasonal pricing structure, where annual rate increases are applied to the peak rate only, reflects the cost of building larger infrastructure and higher operating costs such as increased pumping to meet peak summer demands.

CONCLUSION

Based on the April 1, 2022 snowpack survey and anticipated spring precipitation, expected source storage will be sufficient to ensure adequate water supply for the 2022 summer season.

Although the region's population continues to grow, overall water demand has remained relatively steady, generally offset by conservation measures. It is, however, anticipated that overall water use will increase gradually as the effect of population growth on water demands begins to exceed the per capita water use reductions. Outdoor watering regulations, along with our regional partners' implementation of the *Region-wide Guide for Enforcement of the DWCP*, are expected to help manage water demands during the upcoming peak season.

System improvements have increased the capacity of the transmission system to meet peak summer demands.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Water Committee

From: Lucas Pitts, Director, Policy, Planning and Analysis, Water Services
Farshad Mortazavi, Senior Project Engineer, Water Services

Date: March 22, 2022 Meeting Date: April 6, 2022

Subject: **GVWD Flow Meter Upgrade Program – Progress Report**

RECOMMENDATION

That the Water Committee receive for information the report dated March 22, 2022 titled "GVWD Flow Meter Upgrade Program – Progress Report".

EXECUTIVE SUMMARY

Metro Vancouver (MV) owns and operates over 200 large diameter flow meters, located either at boundaries of Greater Vancouver Water District (GVWD) member jurisdictions or at some individual connections, to measure the amount of drinking water utilized by each member in the region. The region annually consumes around 390 billion liters of water per year, which translates to around $320 million in revenue. Metro Vancouver continues to improve the collection and processing of data by the continued improvements made through the Water Meter Upgrade Program (WMUP). This program allows Metro Vancouver to continually improve data collection, processing, and quality control, resulting in improved billing accuracy for our members. Accurate water consumption data also allows the region to focus on targeted water conservation initiatives.

PURPOSE

That the Water Committee receive for information the nature and progress of the Metro Vancouver Flow Water Meter Upgrade Program and associated improvement projects.

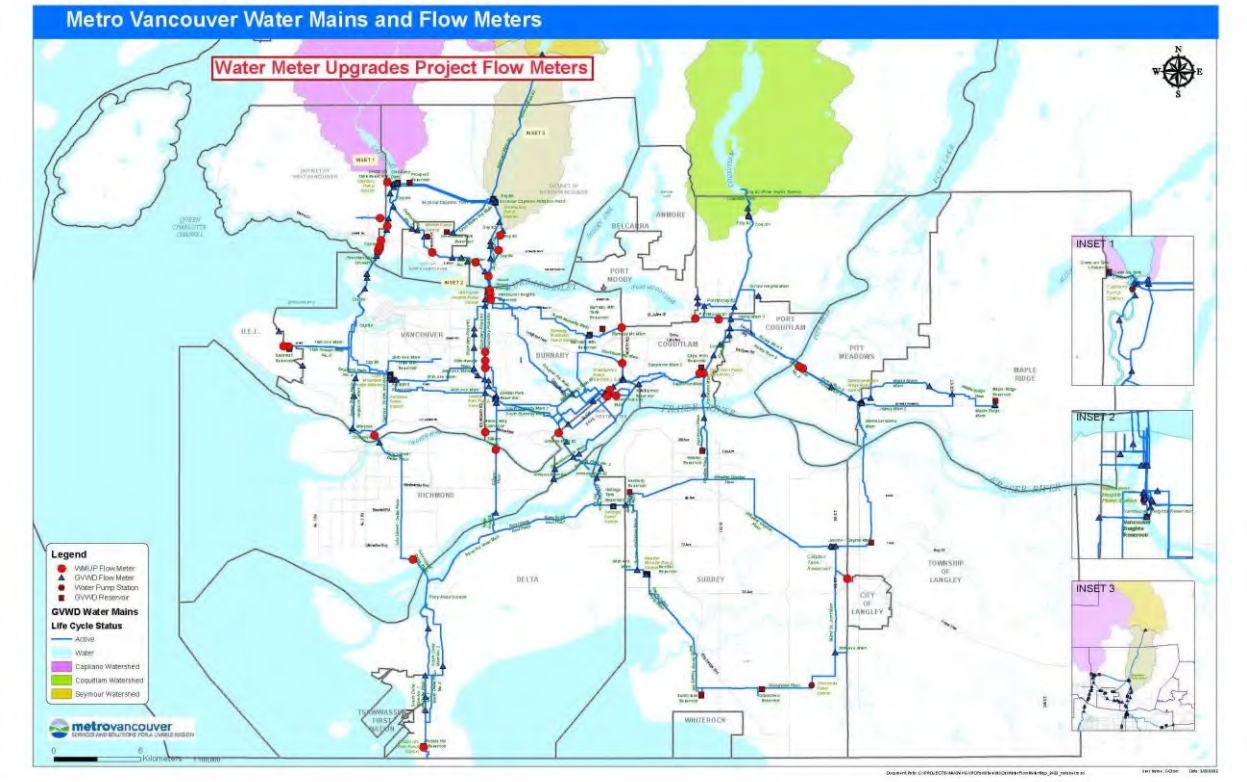
BACKGROUND

Drinking water consumed by the GVWD's member jurisdictions (customers) is measured via regional water flow meters located in key locations throughout the region. The regional water utility is continually upgrading its metering network in order to accurately measure the amount of water flowing throughout the water system and to replace meters as they reach the end of their service life. Meters are connected to the Supervisory Control and Data Acquisition (SCADA) system, which can process the flow data on a near real-time basis and allows data to be shared with customers.

The data received from the water flow meters undergoes a quality control process and is then used to prepare the Monthly Water Consumption Report and to issue water billing invoices. Annual metered water consumption is in the range of 390 billion litres. This translates into revenue of around $320 million per year.

Over 200 large diameter water flow meters are utilized for operational, billing, and planning purposes. Meters are generally located at the boundaries between customers and on some individual connections. Figure 1 below highlights locations of projects in WMUP.

Figure 1: Water Meter Upgrade Project Flow Meters



WMUP

The primary benefit of the WMUP is the continuous improvement of the accuracy of the overall network of existing GVWD billing water meters. WMUP also encourages the installation of water meters on new and existing connections, which aligns with Section 3.2.3 of the current Drinking Water Management Plan.

WMUP includes 37 flow meter projects (7 new and 30 replacements), which were selected from a ranking analysis study, and are being implemented through three separate contracts, designated as 'Sets':

- Set 1 (WMUP1) includes 14 meters
- Set 2 (WMUP2) includes 10 meters
- Set 3 (WMUP3) includes 13 meters

Figure 2: Project Schedule

Set	2018	2019	2020	2021	2022	2023	2024	2025	2026	LRP Budget
WMUP1										$7.6M
WMUP2										$7.8M
WMUP3										$7.0M
							Total			$22.4M

ALTERNATIVES
This is an information report. No alternatives are provided.

FINANCIAL IMPLICATIONS
Out of 37 water meter upgrade projects, 8 have been completed, 16 are in the design stage, and 13 have not yet started. As of January 2022, $5.3 million has been spent. WMUP is currently under budget and behind schedule because there are project delays related to the timing of tenders, construction delays, and issues related to access to infrastructure and resources required for isolation of water mains.

CONCLUSION
WMUP is designed to improve the data collection, processing, and quality control of water consumption data. With the better data, Metro Vancouver is better able to realize continuous improvement for the water meter billing process and share more accurate flow information with our customers.

48986298

To: Water Committee

From: Cheryl Nelms, General Manager, Project Delivery

Date: March 23, 2022 Meeting Date: April 6, 2022

Subject: **Project Delivery Capital Portfolio Update**

RECOMMENDATION

That the Water Committee receive for information the report dated March 23, 2022 titled "Project Delivery Capital Portfolio Update".

EXECUTIVE SUMMARY

Metro Vancouver is providing an update on the Water portfolio of major capital projects being delivered by the Project Delivery Department. This update contains project specific information and a portfolio dashboard that provides information on the various programs and projects being delivered by the Department. The next updates will be in July and October 2022.

PURPOSE

This report provides an update on the progress of major capital projects being delivered by the Project Delivery Department.

BACKGROUND

Metro Vancouver is implementing best practices related to governance and oversight on the highest value, risk, and consequence capital projects. A key deliverable is to provide regular, standardized updates on the portfolio of major capital projects being delivered by the Project Delivery Department. Metro Vancouver has developed a standardized dashboard report, which includes the following information for each major capital project:

- Primary location
- Project schedule over the next 10 years
- Project update
- Current status
- Anticipated date for next review by the relevant Metro Vancouver Board

To improve communication and transparency on these major capital projects, Metro Vancouver plans to provide three updates in 2022 – April, July and October.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

This is an information report. No financial implications are presented.

CONCLUSION

This report provides a progress update on the portfolio of capital projects being delivered by the Project Delivery Department. The next updates will be in July and October 2022.

Attachment

Project Delivery Capital Portfolio Dashboard – Water Projects – April 2022 *(49922081)*

ATTACHMENT

Metro Vancouver Capital Projects Gantt Chart - Project Delivery

April 2022

Definition | Preliminary Design | Detailed Design | Construction

Grandparent Name	Project Name	Municipality	Years	Comments	Status	Next Expected Board Review Date
			2022-2026 Capital Plan 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031			
Water						
Annacis Water Supply Tunnel						
	Annacis Water Supply Tunnel	New West/Surrey		Construction contract awarded in October 2021, with construction to start in March 2022		Oct 2022
Cambie Richmond Water Supply Tunnel						
	Cambie Richmond Water Supply Tunnel	Richmond/Van		Conceptual design essentially complete. Preliminary design to commence in mid 2022.		Sep 2022
Coquitlam Water Supply						
	Coquitlam Intake No. 2 & Tunnel	Coquitlam		In Permitting and Regulatory phase. Engagement with First Nations and Stakeholders underway. Project construction is deferred to 2038 completion and is contingent on ongoing water conservation efforts.		Jan 2023
	Coquitlam Intake No. 2 (Water Treatment)	Coquitlam		In Permitting and Regulatory phase. Engagement with First Nations and Stakeholders underway. Project construction is deferred to 2038 completion and is contingent on ongoing water conservation efforts.		Jan 2023
	Coquitlam Main No. 4 (Cape Horn)	Coquitlam		Detailed design has started with a refinement of the alignment through Riverview Lands		Sep 2023
	Coquitlam Main No. 4 (Central Section) - WTP to Gravel Pit	Coquitlam		Detailed design at approximately 60%		Sep 2023
	Coquitlam Main No. 4 (Central Section) - Gravel Pit to Robson	Coquitlam		Detailed design at approximately 60%		Sep 2024
	Coquitlam Main No. 4 (South Section) - Prebuild	Coquitlam		Detailed design at 100% with construction RFP anticipated in Q2 2022		May 2022
	Coquitlam Main No. 4 (South Section) - Tunnel	Coquitlam		Preliminary design has commenced		Jan 2023
Haney Water Supply Tunnel						
	Haney Water Supply Tunnel	P.Coq/P.Meadows		Conceptual design/definition to commence in early 2022		May 2022
Lulu-Delta Water Supply Tunnel						
	Lulu-Delta Water Supply Tunnel	Richmond		Early planning in progress. Conceptual design/definition to commence in 2023.		Jun 2023
Second Narrows Crossing						
	Second Narrows Water Supply Tunnel	Burnaby/DNV		Construction in progress, approx. 75% complete. On track to complete and in-service in 2025		Oct 2022
	Second Narrows Crossing 1 & 2 (Burrard Inlet Crossing Removal)	Burnaby		Planning/design to commence in late 2022, pending requirement from Port of Vancouver.		No reports anticipated
Stanley Park Water Supply Tunnel						
	Stanley Park Water Supply Tunnel	Vancouver		Construction procurement in 2022, with construction start mid 2023. Delays for approval on land and right of way with Park Board.		Apr 2022