

**METRO VANCOUVER REGIONAL DISTRICT
WATER COMMITTEE
REGULAR MEETING**

Thursday, March 5, 2020

9:00 am

28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia

A G E N D A¹

1. ADOPTION OF THE AGENDA

1.1 March 5, 2020 Regular Meeting Agenda

That the Water Committee adopt the agenda for its regular meeting scheduled for March 5, 2020 as circulated.

2. ADOPTION OF THE MINUTES

2.1 February 13, 2020 Regular Meeting Minutes

That the Water Committee adopt the minutes of its regular meeting held February 13, 2020 as circulated.

3. DELEGATIONS

4. INVITED PRESENTATIONS

5. REPORTS FROM COMMITTEE OR STAFF

5.1 2019 Seymour Salmonid Society's Annual Report for Greater Vancouver Water District

Designated Speaker: Jesse Montgomery, Division Manager, Environmental Management, Water Services

That the Water Committee receive for information the report dated February 26, 2020, titled "2019 Seymour Salmonid Society's Annual Report for Greater Vancouver Water District".

5.2 Award of Phase C - Construction Engineering Services for the Annacis Water Supply Tunnel

Designated Speakers: Roy Moulder, Director, Purchasing and Risk Management, Financial Services and Murray Gant, Division Manager, Major Projects, Water Services

¹ Note: Recommendation is shown under each item, where applicable.

That the GVWD Board:

- a) approve the award of Phase C, Construction Engineering Services in the amount up to \$17,881,271 (exclusive of taxes) to the Phase A and B project consultant, Hatch Corporation, for the Annacis Water Supply Tunnel (Request for Proposal No. 15-127); and
- b) authorize the Commissioner and the Corporate Officer to execute the required documentation.

5.3 Manager's Report

Designated Speaker: Marilyn Towill, General Manager, Water Services

That the Water Committee receive for information the report dated February 27, 2020, titled "Manager's Report".

6. INFORMATION ITEMS

7. OTHER BUSINESS

8. BUSINESS ARISING FROM DELEGATIONS

9. RESOLUTION TO CLOSE MEETING

That the Water Committee close its regular meeting scheduled for March 5, 2020 pursuant to the *Community Charter* provisions, Section 90 (1) (e), (k) and 90 (2) (b) as follows:

- "90 (1) A part of the meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:
- (e) the acquisition, disposition or expropriation of land or improvements, if the board or committee considers that disclosure could reasonably be expected to harm the interests of the regional district;
 - (k) negotiations and related discussions respecting the proposed provision of a regional district service that are at their preliminary stages and that, in the view of the board or committee, could reasonably be expected to harm the interests of the regional district if they were held in public; and
- 90 (2) A part of a meeting must be closed to the public if the subject matter being considered relates to one or more of the following:
- (b) the consideration of information received and held in confidence relating to negotiations between the regional district and a provincial government or the federal government or both and a third party."

10. ADJOURNMENT/CONCLUSION

That the Water Committee adjourn/conclude its regular meeting of March 5, 2020.

Membership:

Brodie, Malcolm (C) – Richmond
Elford, Doug (VC) – Surrey
Asmundson, Brent – Coquitlam
Baird, Ken - Tsawwassen First Nation
Belenkie, Neil - Belcarra

Bell, Don - North Vancouver City
Bligh, Rebecca – Vancouver
Dingwall, Bill - Pitt Meadows
Froese, Jack - Langley Township
Guichon, Alicia – Delta

Keithley, Joe – Burnaby
McEwen, John – Anmore
Svendsen, Ryan - Maple Ridge

**METRO VANCOUVER REGIONAL DISTRICT
WATER COMMITTEE**

Minutes of the Regular Meeting of the Metro Vancouver Regional District (MVRD) Water Committee held at 1:00 p.m. on Thursday, February 13, 2020 in the 28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia.

MEMBERS PRESENT:

Chair, Mayor Malcolm Brodie, Richmond
Vice Chair, Councillor Doug Elford, Surrey
Councillor Brent Asmundson, Coquitlam
Chief Ken Baird, Tsawwassen
Councillor Don Bell, North Vancouver City
Councillor Rebecca Bligh, Vancouver (arrived at 1:02 p.m.)
Mayor Jack Froese, Langley Township
Councillor Alicia Guichon, Delta
Councillor Joe Keithley, Burnaby
Mayor John McEwen, Anmore
Councillor Ryan Svendsen, Maple Ridge

MEMBERS ABSENT:

Mayor Neil Belenkie, Belcarra
Mayor Bill Dingwall, Pitt Meadows

STAFF PRESENT:

Marilyn Towill, General Manager, Water Services
Jerry W. Dobrovolny, Chief Administrative Officer
Genevieve Lanz, Legislative Services Coordinator, Board and Information Services

1. ADOPTION OF THE AGENDA

1.1 February 13, 2020, Regular Meeting Agenda

It was MOVED and SECONDED

That the Water Committee adopt the agenda for its regular meeting scheduled for February 13, 2020 as circulated.

CARRIED

2. ADOPTION OF THE MINUTES

2.1 November 14, 2019 Regular Meeting Minutes

It was MOVED and SECONDED

That the Water Committee adopt the minutes of its regular meeting held November 14, 2019 as circulated.

CARRIED

3. DELEGATIONS

No items presented.

4. INVITED PRESENTATIONS

No items presented.

5. REPORTS FROM COMMITTEE OR STAFF

5.1 2020 Water Committee Priorities and Work Plan

Report dated January 27, 2020 from Marilyn Towill, General Manager, Water Services, presenting the 2020 Water Committee Work Plan and priorities.

1:02 p.m. Councillor Bligh arrived at the meeting.

It was MOVED and SECONDED

That the Water Committee:

- a) endorse the work plan as presented in the report dated January 27, 2020 titled "2020 Water Committee Priorities and Work Plan"; and
- b) receive for information the Water Committee 2020 Terms of Reference as attached to the report dated January 27, 2020 titled "2020 Water Committee Priorities and Work Plan".

CARRIED

5.2 Water Use by Sector in Metro Vancouver: 1985 - 2017

Report dated January 14, 2020 from Inder Singh, Director, Policy, Planning and Analysis, Water Services, providing members with information on regional water-use trends and statistics by sector.

Members commented on regional water use statistics and the benefit of comparing consumption with other jurisdictions of similar size.

Request of Staff

Staff was requested to incorporate a comparison of regional water consumption by sector to other comparably-sized jurisdictions across Canada in future reports.

It was MOVED and SECONDED

That the Water Committee receive for information the report dated January 14, 2020, titled "Water Use by Sector in Metro Vancouver: 1985 – 2017".

CARRIED

5.3 Manager's Report

Report dated January 14, 2020 from Marilyn Towill, General Manager, Water Services, informing members of the 2020 Standing Committee events and Water Metering Evaluation Tool training session.

It was MOVED and SECONDED

That the Water Committee receive for information the report dated January 14, 2020, titled "Manager's Report".

CARRIED

6. INFORMATION ITEMS

No items presented.

7. OTHER BUSINESS

No items presented.

8. BUSINESS ARISING FROM DELEGATIONS

No items presented.

9. RESOLUTION TO CLOSE MEETING

It was MOVED and SECONDED

That the Water Committee close its regular meeting scheduled for February 13, 2020 pursuant to the *Community Charter* provisions, Section 90 (1) (e), (i) and (k) as follows:

"90 (1) A part of the meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:

- (e) the acquisition, disposition or expropriation of land or improvements, if the board or committee considers that disclosure could reasonably be expected to harm the interests of the regional district;
- (i) the receipt of advice that is subject to solicitor-client privilege, including communications necessary for that purpose; and
- (k) negotiations and related discussions respecting the proposed provision of a regional district service that are at their preliminary stages and that, in the view of the board or committee, could reasonably be expected to harm the interests of the regional district if they were held in public; a request under the *Freedom of Information and Protection of Privacy Act*, if the board is designated as head of the local public body for the purposes of that Act in relation to the matter."

CARRIED

10. ADJOURNMENT/CONCLUSION

It was MOVED and SECONDED

That the Water Committee adjourn its regular meeting of February 13, 2020.

CARRIED

(Time: 1:14 p.m.)

Genevieve Lanz,
Legislative Services Coordinator

Malcolm Brodie, Chair

To: Water Committee

From: Jesse Montgomery, Division Manager, Environmental Management, Water Services

Date: February 26, 2020 Meeting Date: March 5, 2020

Subject: **2019 Seymour Salmonid Society's Annual Report for Greater Vancouver Water District**

RECOMMENDATION

That the Water Committee receive for information the report dated February 26, 2020, titled "2019 Seymour Salmonid Society's Annual Report for Greater Vancouver Water District".

EXECUTIVE SUMMARY

The Seymour Salmonid Society (the Society) is a non-profit organization that operates the Seymour River Hatchery on Greater Vancouver Water District (GVWD) lands at the base of the Seymour Falls Dam. GVWD and the Society have been partners since 1989 constructing fisheries enhancement projects, raising public awareness on water and fisheries issues and creating stewardship opportunities in the Seymour Valley. Over the years the partnership has influenced tens of thousands of people through special events, K-12 programs and passive visitors. The Society has raised and released millions of fry and smolts into the Seymour River and has worked tirelessly with GVWD on promoting stewardship of the Seymour River system. The GVWD has a current three-year (2018 - 2020) Contribution Agreement with the Society for \$125,000 annually. The funding provides for core hatchery and education program operating expenses.

The *2019 Seymour Salmonid Society's Annual Report for Greater Vancouver Water District* (attachment) provides an overview of a successful program in 2019.

PURPOSE

To provide the Committee and Board with the Seymour Salmonid Society's 2019 Annual Report in accordance with the Contribution Agreement between GVWD and the Society.

BACKGROUND

In 2014, the first three-year Contribution Agreement was drafted to formalize funding provision by the GVWD to the Society. At its May 18, 2017 meeting, the GVWD Board adopted the following resolution to renew the agreement for a subsequent 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, 2018 and ending on December 31, 2020.

As part of the Contribution Agreement, the Society is required to submit an annual report on its activities to GVWD on or before January 31 of the following year. This report provides the Society's annual update as identified in the 2020 Water Committee Work Plan.

SOCIETY HISTORY

The Seymour River Hatchery is situated on GVWD lands at 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 British Columbia Institute of Technology for the first decade of operation. The Society was formed in 1987 to oversee hatchery operations, volunteer activities and educational programming.

The Society has been an effective advocate for environmental education and stewardship on the North Shore. Their mission statement is "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." Hatchery initiatives and education programs support goals and strategies in the Board Strategic Plan, Drinking Water Management Plan and Joint Water Use Plan as they pertain to the Seymour Watershed.

The relationship between GVWD and the Society has been highly collaborative since the hatchery facility was established. Along with Fisheries and Oceans Canada (DFO), GVWD began contributing to the Society's core funding in 1996.

Contribution Agreement

The Contribution Agreement specifies five key the Society goals, supported by GVWD. They are:

- 1) Provide a sustainable hatchery program in the production of fry and smolts to be released into the Seymour River system;
- 2) Deliver educational school programs to classes that are effectively linked to current school curriculum and to GVWD's Drinking Water Management Plan and Joint Water Use Plan;
- 3) Monitor and collect data on adult fish returns and out-migrating smolts;
- 4) Create stewardship links with local NGOs and school districts; and,
- 5) Funds are to be used to hire society staff, administer the hatchery program, purchase equipment and supplies, and leverage additional donations and support from other sources.

Annual Reporting Highlights

The 2019 Annual Report is provided as an attachment and is summarized as follows:

- 1) Hatchery Program - The Society is contracted by DFO and BC Ministry of Forests, Lands, and Natural Resource Operations and Rural Development to raise coho, chum, and pink (even years only) salmon, as well as steelhead trout. For the 2019 operational period the Society released 241,235 coho, 280,016 chum and 36,047 steelhead into the Seymour River system. River seines (netting) and a floating fish fence resulted in the capture of 1,116 adult fish, of which some were taken to the hatchery as broodstock and the remainder were released in habitat upstream of the rockslide and Seymour Falls Dam for natural spawning.

- 2) Education Program - The Society delivered 65 programs to 1,974 students through primary and intermediate classes from 5 different school districts. Both the spring and fall programs allow students to experience salmon habitat, life cycles and the surrounding watershed. This allows students to better connect with the local ecosystems in their communities and become champions of water resource conservation.
- 3) Monitoring and Enhancement Projects - In 2019, the Society continued to monitor fish returns on the Seymour system in partnership with Instream Fisheries Research, Squamish Nation, and Tsleil-Waututh Nation. The monitoring program has determined that fish are successfully able to migrate past the rockslide that occurred in December, 2014 in the Seymour River Canyon. The Society will continue to assess the progress at the rockslide mitigation works and monitor both upstream and downstream fish passage through the site.
- 4) Stewardship and Public Outreach - The Society hosted three well-attended community events in 2019; Family Fishing Day, Fall Open House and Seymour River Estuary Clean-up. In addition, 3,600 people visited the hatchery directly to view and learn about its operations. Volunteers participated in 2,670 hours of work and the Society reached new audiences through social media with Facebook at 898 followers and Instagram at 500 followers.
- 5) Funding - The Society utilized their core funding from GVWD and DFO to administer the hatchery program and was able to leverage an additional \$144,173 in revenue. This funding was used towards the education program, enhancement projects and infrastructure replacements, with the largest portion going towards the Seymour River Rockslide Mitigation Project.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

GVWD is one of the primary contributors to the Society, providing \$125,000 annually through 2020, within the Watershed & Environmental Management Program budget. A further three-year Contribution Agreement will be coming forward for consideration later in 2020.

CONCLUSION

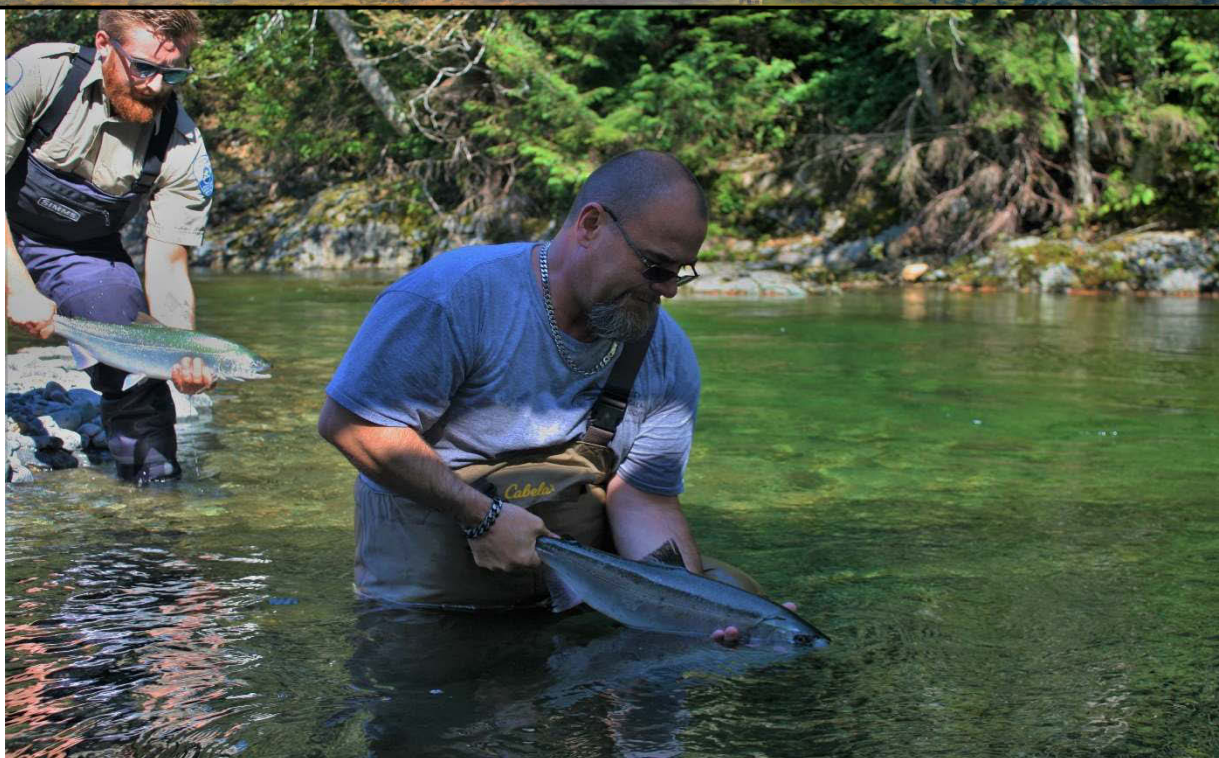
Under the terms of the Contribution Agreement with GVWD, the Society is required to submit an annual report on its activities to Metro Vancouver. The Society achieved the goals set out in the Contribution Agreement and operated successfully in 2019. The 2019 Seymour Salmonid Society's Annual Report to the GVWD meets the requirements of the Contribution Agreement.

Attachment

2019 Seymour Salmonid Society's Annual Report for Greater Vancouver Water District

2019

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



Seymour Salmonid Society

PO Box 52221, North Vancouver, V7L 1J2

12/17/2019

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 contribution of the Greater Vancouver Water District (GVWD) for supporting enhancement and education efforts at the Seymour Hatchery. We would like to thank the GVWD Board for approving the renewal of the Contribution Agreement between the GVWD and the SSS for a three-year term, which includes an annual contribution of \$125,000 for the period January 1, 2018 to December 31, 2020. The money that the GVWD contributes to the hatchery operations allows the SSS to leverage monies from other sources, including the Department of Fisheries and Oceans Canada (DFO). These contribute to a significant proportion of our annual operating budget.

We would also like to thank significant financial contributions from the District of North Vancouver Firefighters, Neptune Terminals and Loblaws for their ongoing support of our Gently Down the Seymour (GDS) education program. Significant funds were also provided for operations equipment improvements and the Rockslide Mitigation Project from the Pacific Salmon Foundation (PSF), Recreational Fisheries Conservation Partnership Program, Freshwater Fisheries Society of BC, along with local community donations.

We are also most grateful for the contribution by our over 850 registered volunteers, who 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 the work we do in the watershed without their help. In addition, we would like to thank Shayna Trousdell, Georgia Dixon and Brad Neary from BCIT's second year Fish, Wildlife and Recreational Management diploma program for their significant volunteering efforts as part of the radio telemetry work in the lower river during the Fall period.

Staffing Changes

The hatchery has also undergone some staffing changes in 2019, with Brian Smith (Watershed Enhancement Manager and Executive Director) moving on to work for DFO. In addition, we saw the return of Sasha Gale (Volunteer Coordinator) following maternity leave and the full-time appointment of Reece Fowler (Environmental Coordinator) who was covering for Sasha while on maternity leave. We also welcome the interim appointment of Marc Guimond as Hatchery Manager/Executive Director. The SSS would especially like to extend gratitude to Brian for his significant contribution to the society over the past 25 years and wish him well in his new role.

Education

This year saw the SSS continuing our Spring and Fall education program under our Gently Down the Seymour (GDS) program. A total of 1,974 students from 65 classes attended in 2019, separated into 1,558 students from 51 classes during the Spring period and 416 students from 14 classes during the Fall period. Maintaining the number of classes provides ongoing opportunities for students in Metro Vancouver to connect with the flora and fauna of the Seymour River Watershed.

Watershed Health

There are several obstacles in conserving sustainable salmon and steelhead populations within the Seymour River watershed, the most significant of which is the rockslide that occurred in December 2014 and blocked passage of migrating fish to the middle spawning reaches of the river. The SSS and its partners have continued to work hard to mitigate the effects of the rockslide in 2019 and have confirmed that out-migrating fry and smolts are able to move downstream past the slide. In addition, we also confirmed the first adult salmon and steelhead successfully migrating through the rockslide to spawn within the river upstream, with the numbers at least comparable to those we moved via the trap and truck program. We are now awaiting the higher flows during the 2019 freshet to move material from the summer rock breaking activities in the hope that passage may be further improved for the 2020 returning adult salmonids. Despite this natural challenge and thanks to Metro Vancouver's continued support from both operating funds and staff resources, fish populations on the Seymour River have a realistic long-term future within the watershed.

Community Outreach

The SSS has welcomed over 3,600 people through its doors via the Old Growth Trail, provision of informative tours, Metro Vancouver school groups, and events such as Family Fishing Day and our annual Open House. The SSS was also actively involved in many public events and stewardship meetings, including Blueridge Community Day, Maplewood Farm Chum Release, Family Fishing Day, Seymour Hatchery Open House, District of North Vancouver Firefighters Charity Fishing Derby, Rivers Day Estuary Clean-up, Coho Festival. We also provided presentations to organisations such as the Squamish Nation Council and the Seymour Roundtable, among other more informal presentations.

Stewardship Initiatives and Activities

This year saw a continuation of our conservation activities within the watershed. Instream activities associated with the rockslide mitigation project were ongoing during the summer and initiatives resulting from this including the fish fence, radio telemetry monitoring and lower river seines continued to successfully mitigate for the restrictions associated with the rockslide. We also continued our river fertilization program, along with our ongoing broodstock fish production program for coho, pink, chum and steelhead. In addition, for the first time in over 90 years returning adult coho salmon were able to reach the river habitat upstream of the Seymour Falls Dam, via our trap and truck program. Seymour hatchery and Metro Vancouver staff successfully translocated 64 early run adult coho salmon above the Seymour Falls Dam to spawn naturally within the upper watershed.

We also implemented ongoing infrastructure improvements at the hatchery, including new predator netting over the outdoor ponds, installation of a new back-up power generator, purchase of a new groundwater pump and installing a winch unit to the aeration tower to enable efficient cleaning of the bio-rings in the tower.

Board of Directors

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

Society Staff



Brian Smith: Watershed Enhancement Manager/Executive Director

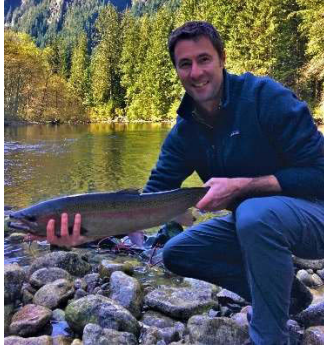
Brian graduated from the Fish and Wildlife program at the Sault College of Applied Arts and Technology in Sault Ste. Marie, Ontario in 1989. Brian moved to British Columbia in 1990 and worked in the fish farming industry for two years before starting work with the SSS. Brian has worked for the SSS for 25 years and has been the manager of the Hatchery for over 10 years.

After 26 years of service within the watershed, Brian ended his tenure with the Society in November 2019 and has taken the role as Community Advisor with DFO.



Marc Guimond: Hatchery Manager/Executive Director

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: Volunteer 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.

Summary of Seymour River Health

General

The Seymour River currently has a range of restrictions that impact the natural processes within the watershed, including a water supply dam in the upper reaches, a natural rockslide in the lower reaches, along with urbanisation in the lower reaches and estuary. The impoundments impede access to the most valuable salmonid spawning habitat in the upper and middle reaches of the river. In addition, the lower reaches flow through the urbanized area of North Vancouver, which contribute to the loss of riparian habitat, increased hard surface runoff, bank modifications and instream habitat changes within the watershed. However, despite these impacts the Seymour watershed is in good health and provides significant habitat for aquatic and terrestrial flora and fauna so close to a large metropolitan area.

As part of the Seymour rockslide mitigation project, funding was secured from the Pacific Salmon Foundation (PSF) and Fisheries and Oceans Canada (DFO) to install a temporary fish fence and fish trap, which continued to operate in 2019. The fish fence intercepts adult migration less than 1 kilometre (km) upstream of the river mouth (Figure 1). Prior to installation, many fish were injuring themselves as they attempted to pass the rockslide within Seymour River canyon. Once the temporary fence and fish trap were installed it allowed the returning fish to be trapped and captured in the fence's live trap, while also enabling in-river seining and a trap and truck program. In addition, significant broodstock fishing activities were undertaken in 2019 just downstream of the rockslide at Pool 88 and 91, along with further downstream. Combined, these efforts have enabled translocation of over 254 returning coho and 136 pink salmon adults to over 14km of available spawning habitat upstream of the rockslide, while also providing broodstock for the hatchery.

In addition, through our trap and truck program for the first time in over 90 years returning adult coho salmon were able to reach the river habitat upstream of the Seymour Falls Dam. Seymour hatchery and Metro Vancouver staff successfully translocated 64 early run adult coho salmon above the Seymour Falls Dam on September 6, 2019. The plan is to continue these adult releases above the dam in 2020 and beyond to promote natural spawning in the upper watershed.

The Seymour River watershed health can be measured by the successful return of salmonids such as coho, chum and steelhead that entered the river in 2019. The tanker truck translocation efforts via in-river seining, tangle netting and broodstock programs successfully moved 254 coho and 136 pink salmon from the lower river to above the rock slide to spawn naturally, along with an additional 275 coho, nine steelhead (eight via broodstock fishing) and 26 chum to the hatchery for broodstock in 2019. Studies have estimated the coho salmon run is approximately 3,500 annually in the river.

It is the ongoing efforts by the SSS, volunteers from the local community, staff from Metro Vancouver and DFO, along with the Squamish and Tsleil-Waututh First Nations, that are instrumental in maintaining viable salmonid populations in the Seymour River.



FIGURE 1 REINSTALLING THE FISH FENCE BLADDER IN SPRING 2019

Seymour River Rockslide Mitigation Project

Consistent with 2018, an opening ceremony marked the start of the fourth year of operations adjacent to the rockslide on Fisherman's trail on July 10, 2019. The opening ceremony was attended by SSS Directors and staff, DFO, Metro Vancouver staff, Provincial Government, the Tseil-Waututh and Squamish First Nations, along with the public and other interested stakeholders (Figure 2). Presentations were made by the SSS (Shaun Hollingsworth and Brian Smith), the Federal Fisheries Minister (Jonathan Wilkinson), MLA for North Vancouver (Jane Thornthwaite), the Squamish Nation (Chris Lewis), Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) (Colin Schwindt), and Outdoor Recreational Council of BC (Mark Angelo).

The objective of the 2019 work was to continue rock breaking activities to create a continuous channel around the "house" boulder and through the rockslide area, with the aim of reducing the in-river gradient and fill the large interstitial spaces.

Contractors began site mobilization work on July 2, 2019 and were able to work through the Summer period until August 16, 2019, when works ended for the season. During that period, approximately 308 metres (m) of rock was drilled and approximately 137 cubic metres (m³) of rock was blasted on seven separate blast days within 204 drilled holes.



FIGURE 2 MINISTER WILKINSON AND CHRIIS LEWIS (SQUAMISH NATION) AT OPENING CEREMONY

Consolidation of the debris pile through the main Seymour River channel was achieved by blasting the larger boulders. This consolidation has continued to reduce the height of the upstream section of the debris pile and reduced the rockslide lip within the channel. The significant benefit of the 2018 and 2019 instream works is that we had our first confirmation of returning adult salmon passing through the rockslide without human assistance. To date, a total of three radio tagged fish have successfully negotiated the rockslide area. We have also confirmed passage from non-radio tagged fish through the rockslide, via a marking program during river seining events. All coho that were moved via the truck and transport activities were marked with an operculum clip, so any non-clipped fish found upstream of the rockslide passed through the rockslide without human assistance.

The 2019 Fall has seen lower river flows that in previous years, so although some material will have been mobilised during the Fall rains, it won't be until Spring 2020 before we'll be able to quantify the volume moved. Nonetheless, relatively uniform channel grade has formed in the lower (downstream) section of the debris pile (Figure 3), which has allowed some adult migrating salmon to move through the rockslide to spawn naturally within the upper river. A summary of the radio telemetry monitoring program is provided later in this report.



FIGURE 3 OVERVIEW IMAGE OF THE ROCKSLIDE ON DECEMBER 1, 2019

Once the water levels recede in Spring 2020, geotechnical engineers will again use drones and laser surveys to assess the movement of debris over the 2019 winter months. Following this, a work plan will be established for any instream activities that may be required during the Summer 2020.

Fish Above Seymour Falls Dam Project

Coho salmon and steelhead once migrated up the Seymour River to habitat that is now isolated behind the Seymour Falls Dam (SFD). The SSS and DFO have been working with Metro Vancouver to enable the release of adult salmon above the dam, so that they can once again spawn and rear naturally in the upper watershed. Planting adult coho in their ancestral habitat 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. The number of adult coho proposed for transport is based on the carrying capacity of the watershed above the dam and would spawn naturally and their offspring could eventually replace the fry that are currently being stocked above the dam. Salmon are a positive influence on overall watershed health and will benefit aquatic and terrestrial ecosystems in the upper Seymour watershed.



FIGURE 4 THE FIRST COHO RELEASED ABOVE THE SEYMOUR FALLS DAM IN 90 YEARS

This year for the first time in over 90 years we successfully translocated returning adult coho salmon to the available river habitat upstream of the Seymour Falls Dam. On September 6, 2019 the SSS translocated a total of 64 adult coho salmon to the Seymour River in the upper watershed. These fish were captured during a river seining event in the lower river adjacent to Maplewood Farm and transported via tanker trailer to the upper watershed. The translocation took approximately 1.5 hours to move the fish between capture and release locations, before being lowered via bucket and hand released to the river (Figure 4).

Radio Telemetry Tracking Project

As part of the rockslide mitigation project, radio telemetry studies commenced to monitor juvenile and adult coho salmon and steelhead migration through the slide area (Figure 5). Juvenile monitoring was undertaken in 2017 and 2018 during the period of outmigration for juvenile salmon. The results revealed that tagged juvenile coho salmon were able to migrate downstream through the rockslide following releases in 2017 (between April 28 to June 1) and during 2018 (April 28 to May 25). The telemetry work completed for juvenile salmon confirms that smolts successfully navigate past the rockslide and out-migrate to the lower Seymour River. We observed a high downstream passage rate (84%) among radio tagged juvenile fish and highlight that the environmental conditions during the smolt outmigration period appeared to permit safe and timely passage of the rockslide.



FIGURE 5 RADIO TELEMETRY TRACKING AT POOL 88

In contrast, upstream migration of tagged adult coho salmon was not occurring through the slide area between the adult return periods from 2015 to 2018. However, in August 2019, hatchery staff captured (via broodstock fishing in the hatchery pool) the first known coho to have naturally passed the rockslide (Figure 5). In addition, visual observations from Bear Island Bridge during the same period confirmed the presence of two summer run steelhead in the river. As such, monitoring fish adult passage through the rockslide during 2019 was considered especially important to determine if more fish are successfully passing through the slide area, and under what conditions.

Radio tags were installed within adult returning coho and pink salmon between August and October 2019 and radio telemetry tracking was undertaken between September and December 2019 to confirm the movement of tagged adults within the river.- A total of 36 coho and eight pink salmon were successfully tagged and released as part of the 2019 study. Mobile tracking along the Seymour River was undertaken weekly until the end of the 2019 coho run. To date, three radio tagged fish have successfully made their way through the rockslide to their spawning grounds.

Carcass Recovery Project

As a compliment to the radio telemetry tagging project, hatchery staff undertook carcass recovery operations between October and December, to identify the ratio of spawning fish that had been trapped and trucked as part of our river seining or moved through the rockslide on their own accord. The difference in fish is confirmed by the presence or absence of an operculum punch in each fish. The early results of this program suggest that the number of fish moving through the rockslide on their own accord is at least comparable to the number that were moved upstream as part of the trap and truck program. Further analysis of these data is required following completion of the recovery program in January 2020, to provide a final estimate of fish that have made their own way through the rockslide.

Gently Down the Seymour Education Program

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.

Spring Education

The GDS program allowed 1,558 visitors from 51 classes across five school districts to visit the Seymour River Hatchery and Education Centre during Spring 2019 (April 1 and June 14, 2019). All participants had raised salmon in a classroom aquarium, with the Salmonids in the Classroom program. GDS is an effective extension to salmon studies by supporting the science and math curriculum of visiting classrooms (Figure 6; Figure 7; Figure 8; Figure 9).

Fall Education

GDS offered field trips between October 2 and November 1, 2019 to 14 elementary school classes. Students totaling 416 visitors, along with 115 parents and teachers visited the hatchery from 14 classes in the Vancouver area. The teaching activities outlined for GDS in October 2019 were consistent with that provided in the Spring; however, some new activities unique to the Fall period were incorporated into regular station delivery. Additional activities including viewing salmon spawning (pink and chum), along with utilization of adult returning salmonids as part of school learning. Furthermore, weather conditions were again favourable for the field trips in Fall 2019, with no trip cancellations experienced due to area access restrictions within the watershed.

Program Schedule

Programs were offered in the Spring, between April 1 and June 14, while the Fall program was offered between October 2 and November 1 (Table 1; Table 2). The GDS program was delivered to 65 classes from schools across Metro Vancouver. The Seymour River Hatchery hosted 1,974 student visitors, accompanied by over 300 teachers and parents, during the Spring and Fall education programs.



FIGURE 6 STREAM HABITAT SURVEYS DURING GDS EDUCATION DAYS



FIGURE 7 STUDENTS COLLECTING STREAM BENTHIC INVERTEBRATES



FIGURE 8 STUDENTS VIEWING BENTHIC INVERTEBRATES USING MICROSCOPES



FIGURE 9 STUDENT PARTICIPANTS FEEDING JUVENILE COHO DURING THE GDS PROGRAM

TABLE 1 NUMBER OF CLASSES BY SCHOOL DISTRICT

	April	May	June	October	November	Total
Vancouver	7	5	5	5	-	22
New Westminster	1	1	-	-	-	2
Burnaby	6	5	1	2	-	14
North Vancouver	1	5	3	5	1	15
West Vancouver	3	2	-	-	-	5
Independent	2	3	1	1	-	7
Total Classes	20	21	10	13	1	65

TABLE 2 NUMBER OF VISITORS BY SCHOOL DISTRICT

	April	May	June	October	November	Total
Vancouver	240	138	138	160	-	676
New Westminster	30	28	-	-	-	58
Burnaby	178	141	26	64	-	409
North Vancouver	34	137	120	145	28	464
West Vancouver	74	73	-	-	-	147
Independent	81	93	27	19	-	220
Total Participants	637	610	311	388	28	1,974

Teacher Feedback

Teachers were emailed a link to a feedback form at the conclusion of their field trip day. Feedback was submitted by 26 teachers and showcased strong support for the GDS program delivery. Table 3 present a summary of teacher feedback received during 2019.

Community Outreach

The Seymour River Hatchery has welcomed over 3,600 people through its doors via the Old Growth Trail, provision of informative tours, Metro Vancouver school groups, and events such as Family Fishing Day and our Open House in 2019 (Figure 10). The SSS was also actively involved in many public events and stewardship meetings.

TABLE 3 SUMMARY OF TEACHER FEEDBACK RECEIVED FROM 2019

Topic	Feedback
Overall	A total of 25 responding teachers agree the GDS program met expectations. All teachers agree this program supports their Salmonids in the Classroom experience.
Program Design	A total of 26 teachers agree the GDS program has grade appropriate content and activities, and 26/26 agree it supports current school curriculum.
Field Trip Delivery	All teachers recorded the students were engaged and learning at field trip stations, with all teachers agreeing to the educators being informative and working well with students.
Supporting Materials	A total of 20 teachers surveyed used the Teacher Resource provided by the GDS program for the field trip.
Application of Learning	25 teachers strongly agree students will apply the GDS program experience to classroom studies. 24 teachers strongly agree students will apply the GDS program experience outside the classroom. 20 teachers agree they will use the techniques from the GDS field trip to assess their stream during the salmon fry release.
Community Reach	All teachers agree they will share the GDS program experience with the school and parent community. Having many parents attend the field trip encourages that conversation.

The SSS actively participated in a range of community events in 2019. Events were generally attended by at least two Board of Directors, along with a hatchery staff member. We also utilized the generous support from our volunteers during the Family Fishing Day and Open House events. Most events comprised setting up a SSS information booth, which would include a fish tank with coho/steelhead fry, education and interpretive materials, along with art materials to engage children and their parents. Events that the SSS attended in 2019 include:

- Blueridge Community Day – Interpretive booth
- Maplewood Farm Chum Release - Organizers
- Family Fishing Day – Co-hosts and Interpretive booth
- Seymour Hatchery Open House – hosted
- District of North Vancouver Firefighters Charity Fishing Derby - Interpretive booth
- Rivers Day Estuary Clean-up - hosted
- Coho Festival – Interpretive booth
- Squamish Nation Council – Presentation
- Seymour Roundtable – Presentation

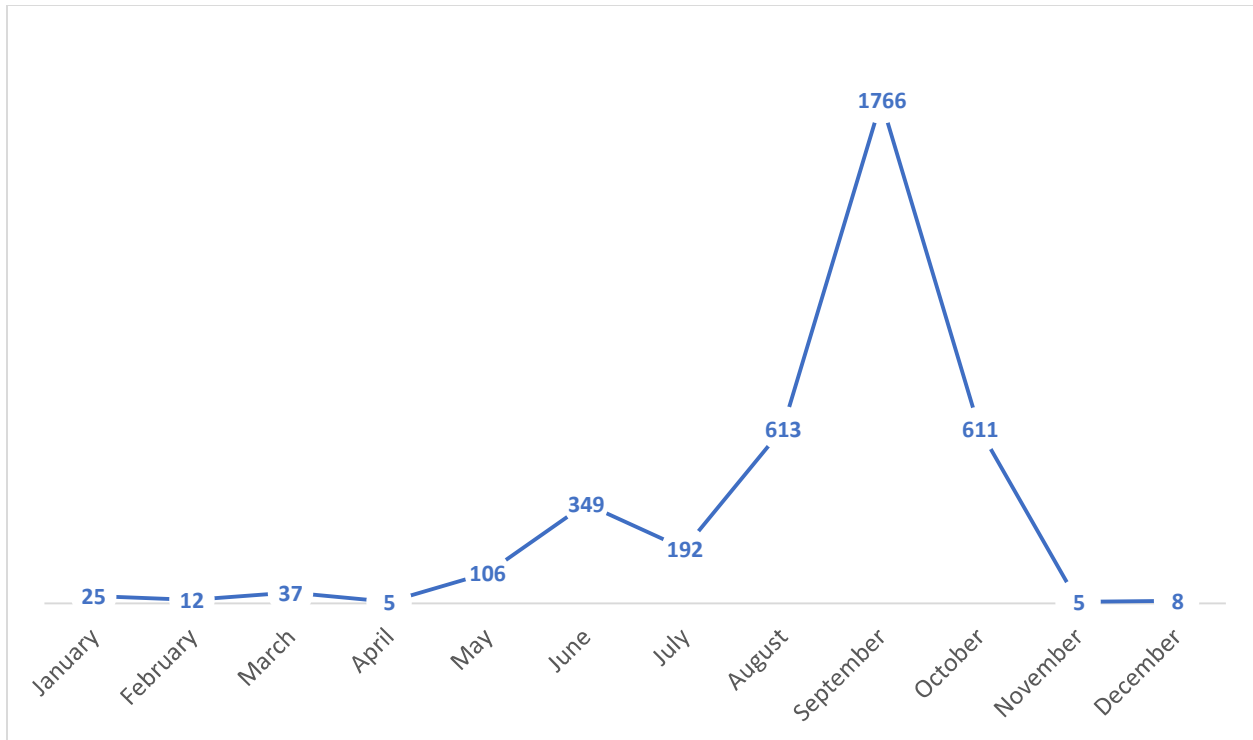


FIGURE 10 NUMBER OF VISITORS TO THE SEYMOUR RIVER FISH HATCHERY IN 2018

Family Fishing Day

Family Fishing Day is an annual event that the SSS co-hosts with Metro Vancouver. It was held on Fathers-day (June 16th) and over Family Fishing weekend, which is a free annual Province wide event to promote freshwater fishing. Many different community groups set up booths in two areas of LSCR. Shuttles provide attendees an opportunity to travel up into the watershed with Metro Vancouver watershed tour staff to gain a better understanding of the watershed itself. The tour also enabled the public to visit the hatchery and have a tour of the facility (Figure 11; Figure 12).

In addition, children and their parents were able to have the opportunity to fish in Rice Lake with rods provided by the SSS. A rainbow trout release was also provided at Rice Lake, which allowed the public to release 500 rainbow trout into the lake as part of the day's activities.

The day was attended by members of the public, with the sunny and warm weather during 2019 again significantly contributing to the success of the day. Exhibitor stands were located either at Rice Lake itself, or at the entrance to the LSCR trail system at the Rice Lake security gate.



FIGURE 11 MEMBERS OF THE PUBLIC ENJOYING THE OPPORTUNITY TO FISH AT RICE LAKE



FIGURE 12 VIEW OF EXHIBITOR BOOTHS AT RICE LAKE

Exhibitors kindly attending the Family Fishing Day at Rice Lake included:

- Seymour Salmonid Society:
 - Concession stand & Information Booth
 - Kids hats/art table and face painter
 - Fishing gear & Fly Tying Tables
 - GDS Information Booth
- DFO Stewardship
- Fortis BC
- Coho Society
- District of North Vancouver Water Conservation
- Freshwater Fisheries Society of BC
- Metro Vancouver:
 - Watershed Education
 - Fire Suppression
 - Parking Attendants
 - Staff to assist with day tasks
- North Shore Black Bear Society
- Wildcoast Ecological Society
- Wild Bird Trust
- UTS bouncy castle

We were also very grateful for the attendance of the White Spot Food Truck to serve visitors at the event entrance, along with the band 'Backspin Bluegrass' for entertainment, along with Panago Pizza's for kindly providing lunch for the volunteers at the event.

Seymour Hatchery Open House

The hatchery hosted its annual Open House event on Sunday August 11, 2019. The event was well attended by visitor to the LSCR and hatchery, with positive feedback from attendees to the day (Figure 13). In addition, a range of public figures, including Bowinn Ma (MLA for North Vancouver-Lonsdale) and Jane Thornthwaite (MLA for North Vancouver-Seymour), among others, attended the event and helped us celebrate the hatchery open house day.

The day was also frequented by hatchery tours for guests as well as the Old Country Pierogi Food Truck, games and art for kids, a fin clipping demonstration, among other activities. We are also very grateful to the Metro Vancouver Watershed Tour staff for managing/marshalling the public as part of the bus access to the hatchery, while also undertaking watershed tours prior to arrival at the hatchery.

Rivers Day – Estuary Clean-up

To celebrate International Rivers Day the SSS hosted an estuary clean-up and replanting at the river mouth (Figure 14). With help from Dave Harper from the River's Institute at British Columbia Institute of Technology (BCIT), some BCIT students, volunteers from the SSS, the Deep Cove Scouts Troup and Beaver Canoe Club provided a considerable volume of replanting and cleanup work, despite the torrential rainfall. We were also honoured by a visit from the now Minister of Environment and Climate Change (formerly Minister of Fisheries, Oceans and Canadian Coast Guard) Jonathan Wilkinson.



FIGURE 13 VISITORS ENJOYING THE GDS EDUCATION ROOM DISPLAYS AND ACTIVITIES



FIGURE 14 REPLANTING ACTIVITIES AT THE SEYMOUR ESTUARY ON RIVERS DAY

The replanting activities were, in part, to augment the effect of a small brush fire adjacent to the railway bridge during the Summer of 2019. The following species were planted at the estuary during the day and were sourced locally from Dykhof Nurseries & Florists in North Vancouver:

- Shore Pine
- Snowberry
- Oregon Grape
- Salmonberry
- Red Flowering Currant
- Pacific Ninebark

A significant volume of invasive plant species was removed and replaced with native shrubs and tree species, while many bags of trash were also removed from the site. We'd like to acknowledge the District of North Vancouver for collecting and disposing of the invasive plants and trash from the day. The SSS plans to make this an annual event in 2020.

Seymour Roundtable

The SSS initiates biannual meetings with stakeholders across the North Shore, topics include discussion on stewardship initiatives, potential enhancement projects and coordinated dialogue amongst government agencies and local stewardship groups. The current focus of the group is the ongoing funding for mitigation works within the Seymour Canyon rockslide.

Social Media

The SSS completed the rebuild of the website (www.seymoursalmon.com), with the assistance of Rudy Kehler (The Simplify Company). The SSS also continues to reach out through social media via our Facebook and Instagram internet platforms. The SSS Facebook page has gone from 747 followers in 2018 to 898 followers in 2019. In addition, Instagram has increased from 256 followers in 2018 to over 500 followers in 2019. 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 850 volunteers registered to assist with the ongoing activities at the hatchery or within the watershed and was supported by over 2,670 volunteer working hours during 2019 (Figure 15). 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.

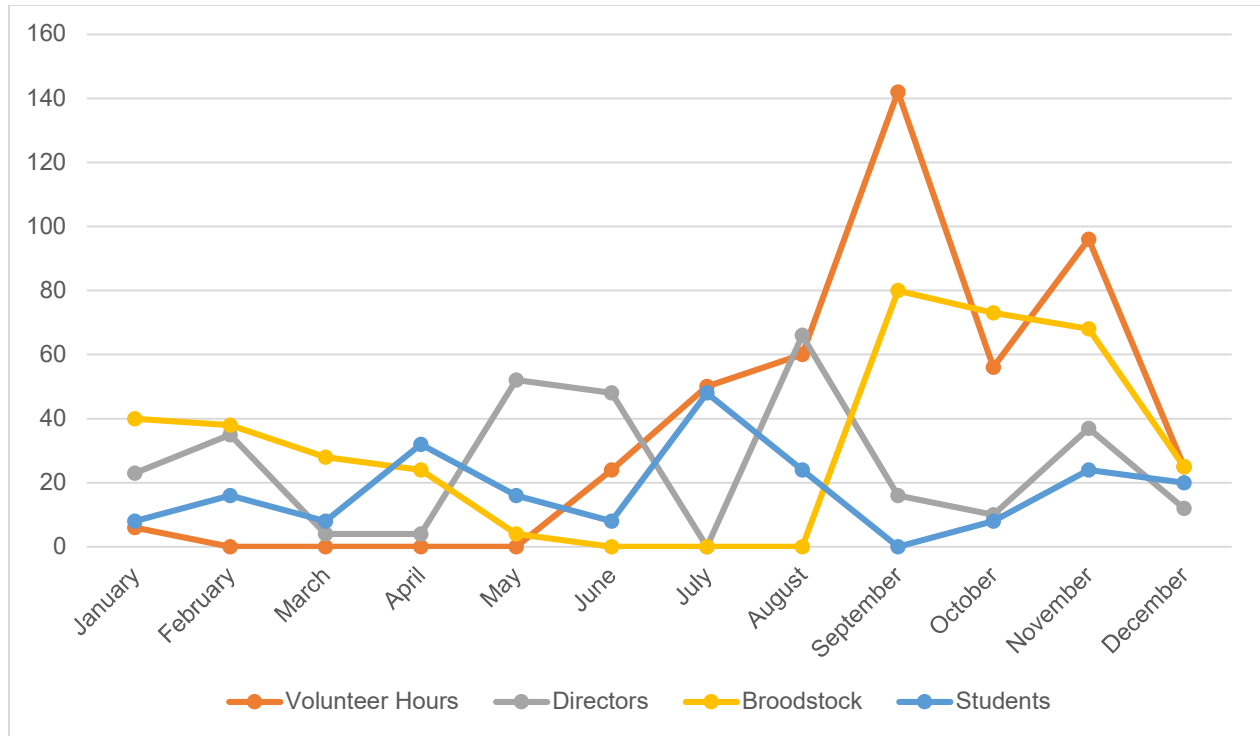


FIGURE 15 VOLUNTEER WORKING HOURS DURING 2018 WITH THE SEYMOUR SALMONID SOCIETY

Stewardship Initiatives and Activities

Floating Fish Fence

The floating fish fence has been an effective method for low stress fish capture. It has allowed SSS staff to trap fish in the lower river and move them above the slide or to the hatchery. The fish fence is located adjacent to Maplewood Farm in the lower river. The fish fence was serviced in February 2019 and reinstallation activities occurred at the same time to replace the old air-filled bladder with a new one. The fish fence began operation again on February 20, 2019 (Figure 16).

The fish fence remained operational in the river until higher flows in mid-October 2019 that resulted in damage to the bladder sleeve. Numbers of returning fish were comparable with last year. A total of 44 adult salmon captured during the river seine events or as a result of the fish fence were used in the radio tagging program and released to the river upstream of the fish fence.



FIGURE 16 FISH FENCE DURING SPRING 2019

Radio Telemetry Monitoring

In partnership with Instream Fisheries Research the SSS continues to undertake a monitoring program to determine when and if fish can migrate through the canyon where the rockslide occurred. In Summer/Fall 2019, a total of 36 adult coho and eight adult pink salmon had gastric radio tags installed on the riverbank before being released upstream of the fish fence. No steelhead were tagged in 2019 due to insufficient numbers of returning fish being captured to enable tagging. The fish were released upstream of the fish fence within one hour of radio tag insertion.

There are four fixed receivers set up along the river, one at Spur 4 (above the slide), one at Twin Bridges (above the slide), the third at Pool 91 (below the slide) and the fourth at the fish fence (1km from the river's mouth). These fixed receivers record if any of the radio tagged fish pass by them.

Mobile tracking was undertaken generally once per week from August until December 2019. We would like to thank Shayna Trousdell, Georgia Dixon and Brad Neary from BCIT's second year Fish, Wildlife and Recreational Management diploma program for their significant radio tracking efforts. All the tagged adults were detected at one of the fixed stations downstream of the rockslide, while three tagged fish were detected at the Twin Bridge or Spur 4 fixed stations upstream of the rockslide. To date, two of these tagged fish were regularly detected within the hatchery pool approximately 1km onstream of the Seymour Falls Dam, while the third fish was regularly detected at Twin Bridges or immediately upstream of the rockslide lip.

Lower River Seines

Due to low flows in late summer fish were congregating in a pool below the fish fence and adjacent to Maplewood Farm. The SSS undertook seven successful seine events between August 22 and November 6, 2019, to trap and truck the fish above to rockslide. The river seining activities ended on November 6 due to low numbers of fish encountered and the higher than expected river flows (Figure 17; Figure 18). Damage to the fish fence during higher flows in late October also meant the fish fence ceased operations and enabled the fish to move through the lower reaches of the river and hold in Pool 88 and Pool 91 just downstream of the rockslide.

As part of the river seining activities, a total of 254 coho and 136 pink salmon were moved upstream of the rockslide to spawn naturally within the river, while an additional 275 coho, 425 pinks, 26 chum and nine steelhead were taken to the hatchery as broodstock. Tangle netting activities were not required within the river this year given the success of the river seine events.

The number of adult salmonids moved would have been significantly lower without the in-kind support of Metro Vancouver. They provided the use of a bobcat vehicle that helped move fish from the seine net to waiting truck tanks, along with one to three staff members when resources allowed (Figure 18)

Broodstock Fishing

Our registered broodstock anglers were out regularly during the May to December period for summer run steelhead fishing, along with the January to April period for winter run steelhead fishing. In addition, our broodstockers were fishing during the August to December period for the returning coho salmon. The aim of the broodstock fishing was to capture as many returning fish in the river and begin to capture the winter and summer run steelhead.

Carcass Recovery

Carcass recovery requires hatchery staff to walk side channel streams where coho typically spawn to record the number of fish that are either actively spawning or have spawned in the system already. Fish that have been trapped and trucked as part of our river seining or broodstock programs have had their operculum punched with a small circular hole to distinguish them from those fish that have moved through the rockslide on their own accord.



FIGURE 17 VOLUNTEERS HELPING TO PERFORM THE RIVER SEINING ACTIVITIES

This collection provides us with a ratio of coho gaining passage of the slide on their own compared to the trapped and trucked. During the carcass recovery, each fish counted is cut in two and deposited in the forest to distinguish them week to week. This survey was undertaken twice per week between October and December to maximise the number of fish identified. This will enable us to formulate an accurate estimate of coho numbers that migrated through the rockslide during the Fall of 2019.

River Fertilization

The fertilization program continues to be led by Metro Vancouver Staff. Hatchery staff and volunteers support the program by filling the fertilizer bags and placing them in three locations in the river each Spring.

Infrastructure

We undertook multiple facility upgrades during 2019, the first being replacement of the predator netting over the six steelhead ponds and the two coho ponds. The second was the installation of a new back-up power generator to bring the back-power supply up to current requirements. The third upgrade included purchase of a new groundwater pump to act as a backup for the current pump on the water system. The fourth upgrade included installing a winch unit to the aeration tower to enable efficient cleaning of the bio-rings in the tower. The remaining upgrades included purchase of new oxygen stones and regulation units and dissolved oxygen meters, along with a new egg picker to separate live from unviable incubating eggs.



FIGURE 18 CAPTURING ADULT SALMONIDS DURING RIVER SEINING

Fish Production

The SSS is 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 toward and maintain salmonid populations to historical levels.

The 2020 fry releases will be scaled back due to moving over 254 coho adults to the mid-reaches and the movement of comparable numbers of adult coho that made their own way through the rockslide in 2019. Given the adult returns and number of fish spawning naturally in the river, we will lower our fry releases to pre-rockslide production levels. The 2019 brood will then be released as fry in selected habitats throughout the LSCR and above the Seymour Reservoir in Spring 2020. Every year the SSS engages families with children with an event at Maplewood Farm where up to 25,000 chum fry are released into Maplewood Creek. Table 4 illustrates the fry and smolts that were released in 2019.

TABLE 4 SMOLTS AND FRY RELEASES FROM THE SEYMOUR HATCHERY IN 2019

Species	Broodyear	Number
coho salmon fry	2018	191,298
coho salmon smolts	2017	49,937
Summer Steelhead smolts	2018	23,245
Winter Steelhead smolts	2018	12,802
Chum Salmon fry (Seymour River)	2018	31,649
Chum Salmon fry (Alouette River)	2018	248,367

Financials

Seymour Salmonid Society 2019 Revenue

Table 5 provides a summary of the SSS revenue for 2019.

TABLE 5 SEYMOUR SALMONID SOCIETY REVENUE 2019

Funding Partner	Allocations	Funding Amount
Metro Vancouver	Hatchery Operations	\$125,000
Fisheries & Oceans Canada	Hatchery Operations	\$110,000
Additional Revenues	Education/Projects	\$144,173
Total Revenue		\$379,173

Additional 2019 Revenue Summary* (from row 3 in Table 5)

The funds provided by Metro Vancouver enabled SSS staff to accrue supplementary monies for specific projects and programs. Table 6 provides a summary of these amounts and allocations.

TABLE 6 SEYMOUR SALMONID SOCIETY REVENUE 2019

Source	Project	Amount
Public Events/donations/memberships	General Society business	\$8,523
Pacific Salmon Foundation	Capital Improvements	\$23,420
Pacific Salmon Foundation	Rockslide Mitigation Project	\$40,000
Neptune Terminals	Education Programs	\$10,000
Education registration fees	Education Programs	\$8,319
Victor Foundation	Education Programs	\$2,000
Loblaws Donation	Education Programs	\$1,929
North Shore Fire Fighters	Education Programs	\$20,000
Recreational Fisheries Conservation Partnership Program	Rockslide Mitigation Project	\$9,982
Fresh Water Fisheries Society BC	Rockslide Mitigation Project	\$20,000
Total Revenue		\$144,173

Seymour Salmonid Society 2019 Expenditures

Table 7 provides a summary of the SSS expenditure for 2019.

TABLE 7 SEYMOUR RIVER HATCHERY OPERATIONAL EXPENDITURE 2019

Expenditure Type	Expenditure
Overhead	\$39,547
Fish Food	\$9,007
Fish Culture Equipment	\$3,048
Communications (Mobile Phone / Internet)	\$2,236
Vehicle Maintenance / Fuel	\$4,506
Mileage	\$887
Wages	\$192,976
Operations / Maintenance	\$4,127
Total Expenditure	\$256,334

Additional 2019 Expenditure Summary

Table 8 provides a summary of the additional expenditure incurred by the SSS that is secured via external funding applications.

TABLE 8 SEYMOUR SALMONID SOCIETY ADDITIONAL EXPENDITURE 2019

Expenditure Type	Expenditure
Environmental Education	\$47,122
Rockslide Mitigation	\$160,541
Facility Upgrade / Equipment	\$31,304
Total Additional Expenditure	\$238,967

A Year in Review

Much has been accomplished in 2019, the Rockslide Mitigation Project continued successfully during the Summer; the SSS continued to operate the expanded GDS education program; we updated capital operations equipment; the trap and truck program moved fish to the river above the rockslide and above Seymour Falls dam, both via seining and broodstock angling (Figure 19); more events than ever were hosted and participated in; fundraising was successfully completed.

The most significant was confirmation that some returning coho and steelhead adults are successfully making their way through the rockslide, without human intervention (Figure 20). To date we are estimating that the number of coho that have made their own way through the rockslide are at least comparable to the number transported via our trap and transport. Thus, although at the time of writing this report the final counts and data have yet to be completed, we are optimistic for future returns given that the rockslide is now passable to some returning adults, and/or during certain river flows.

In addition to confirming some fish passage through the rockslide, Seymour hatchery and Metro Vancouver staff successfully translocated 64 early run adult coho salmon above the Seymour Falls Dam to spawn naturally within the upper watershed. This is the first time in over 90 years returning adult coho salmon were able to reach the river habitat upstream of the Seymour Falls Dam.



FIGURE 19 RADIO TELEMETRY TRACKING WITHIN THE ROCKSLIDE

Year four of the rockslide mitigation project was completed on budget and on time with works ending August 16, 2019. Crews worked during the summer period and culminated in seven rock breaking blasts in total. The 2019 cost of the rockslide mitigation project was \$160,541. We are now awaiting the increased flows in Spring of 2020 to move the broken rock, before planning for required works in 2020.



FIGURE 20 FISH PASSAGE IS POSSIBLE THROUGH THE ROCKSLIDE

The GDS education program was a huge success giving opportunity for 1,974 students and over 300 teachers/parents from 65 elementary school classes to visit the hatchery and watershed in 2019. Spots filled up within 15 minutes of registration opening.

The hatchery facility upgrades will also provide safe, warm and visually appealing facilities for visitors coming to the hatchery in 2020, while also reducing the health and safety risks to the hatchery staff.

The SSS hosted three main events in 2019, Family Fishing Day, Seymour Hatchery Open House and a Rivers Day estuary clean-up. All three were a success and enjoyed by all. We also participated by setting up booths at several different community events.

This year we spawned 18 Seymour River female chum, along with an additional 14 females from the Alouette River. The number of chum eggs collected from the Alouette was lower than usual given the poor adult returns into the Alouette this year. Coho spawning has begun, with a maximum of 85 pairs to be spawned by the end of January 2020. Our spawning quota for 2019 is less than usual given the higher numbers of fish successfully moving into the upper river to spawn naturally. So far, no steelhead have been spawned but we are targeting at least eight pairs of summer steelhead and five pairs of winter steelhead.

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 Fish Fence** – repairs and re-installation
- **The Rockslide Mitigation** – works comparable to the 2019 rock breaking season
- **GDS Education Program** - continuing the program to provide both Spring and Fall periods
- **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
- **Community Events and Enhancement Program** – we will host three annual events (Family fishing day, Open house, Rivers Day cleanup), along with the enhancement program will run as usual

The juvenile steelhead and coho will continue rearing in the ponds over the winter and released during June 2020. The steelhead smolts will be released into Burrard Inlet at DFO's Centre for Aquaculture and Environmental Research in West Vancouver, while the coho smolts will be released from the hatchery. Some coho smolts will also be held for approximately three weeks in DFO net pens, before being released to provide a recreational fishery within the Port Moody area during June 2020. In addition, coho fry will be released upstream of the dam, along with off channel habitat between the dam and the rockslide during Spring 2020. The chum and pink salmon fry will also be released to the lower river during Spring 2020.

Dates have been set for our three annual events in 2020 and planning is underway. Our goal for next year is to increase the number of guests that attend. It is important to the SSS to raise awareness about the importance of a healthy ecosystem and the role that salmon play in the watershed.

The Gently Down the Seymour education program will begin registration at the end of January 2020 for the Spring education program. Funding is in place for the Spring and Fall 2020 programs and we're anticipating the running of at least 70 fieldtrip days over the Spring and Fall periods.

Engineers from Northwest Hydraulics consultants and BGC Consultants will assess the rockslide area after Spring 2020 freshet, when water levels drop. Once they have determined the amount of movement that occurred over the high-flow winter months a plan of action will be established for 2020. The 2020 in-river work is anticipated to run during summer 2020, water flow dependent. Funding is already in place to accommodate a work schedule comparable to that undertaken during 2019.

To: Water Committee

From: Roy Moulder, Director, Purchasing and Risk Management, Financial Services
Murray Gant, Division Manager, Major Projects, Water Services

Date: February 26, 2020 Meeting Date: March 5, 2020

Subject: **Award of Phase C - Construction Engineering Services for the Annacis Water Supply Tunnel**

RECOMMENDATION

That the GVWD Board:

- a) approve the award of Phase C, Construction Engineering Services in the amount up to \$17,881,271 (exclusive of taxes) to the Phase A and B project consultant, Hatch Corporation, for the Annacis Water Supply Tunnel (Request for Proposal No. 15-127); and
 - b) authorize the Commissioner and the Corporate Officer to execute the required documentation.
-

EXECUTIVE SUMMARY

In 2015, GVWD issued Request for Proposal (RFP) No. 15-127: Consulting Engineering Services for Preliminary Design, Detailed Design and Construction Engineering Services for the Annacis Water Supply Tunnel. A contract for Phase A, Preliminary Design, was subsequently awarded to Hatch Corporation (Hatch). In 2017, the GVWD Board approved the award of Phase B, Detailed Design, to Hatch. With the project nearing the completion of Phase B, Hatch provided an updated fee estimate for Phase C, Construction Engineering. The total amount for Phase C increased compared to the original proposal, primarily due to contractually allowed hourly rate increases for inflation since 2015, as well as an increase in the construction schedule, and an allowance for quality assurance testing. Based on the evaluation, it is recommended that the GVWD Board award Phase C Construction Engineering Services to Hatch Corporation, in the amount up to \$17,881,271 (exclusive of taxes), and authorize the Commissioner and the Corporate Officer to execute required documentation.

PURPOSE

The purpose of this report is to request authorization by the GVWD Board to award Phase C, Construction Engineering Services to the Phase A and B project consultant, Hatch Corporation, for the Annacis Water Supply Tunnel in the amount of up to \$17,881,271 (exclusive of taxes).

BACKGROUND

Pursuant to the *GVWD Officers and Delegation Bylaw No. 247, 2014 (Bylaw)* and the *Procurement and Real Property Contracting Authority Policy (Policy)*, procurement contracts which exceed a value of \$5 million require the approval of the GVWD Board of Directors. Further, the Policy states that contracting authority for multi-phase contracts is determined based on the anticipated total value of the services to be provided over all phases.

The original contract for Phase A, Preliminary Design engineering services, was awarded to Hatch in 2015. Upon the successful completion of preliminary design, at its meeting on June 30, 2017, the GVWD Board approved the award of Phase B, Detailed Design engineering services, to Hatch. Staff now require GVWD Board approval to proceed with Phase C, Construction Engineering Services.

This report is being brought forward to the Water Committee to consider a recommendation to the GVWD Board to authorize award of Phase C - Construction Engineering Services, to the Phase A and B project consultant, Hatch Corporation, in order to continue with engineering services through construction of the Annacis Water Supply Tunnel.

PROJECT DESCRIPTION

The Annacis Water Supply Tunnel project will provide increased capacity to meet future demand south of the Fraser River, long term scour protection, and improved resiliency to withstand a major earthquake. The location of the project is shown on Attachment 1. The project comprises an approximately 2.3-kilometer-long tunnel and two deep vertical shafts, one in the City of New Westminster and one in the City of Surrey. The project will include:

- constructing temporary access shafts;
- excavating a deep tunnel below the river using a Tunnel Boring Machine (TBM);
- installing a large diameter steel water main inside the tunnel and shafts;
- constructing underground valve chambers near the top of each shaft; and
- connecting the water supply tunnel to new water mains on each side of the river.

A Request for Qualification (RFQ) No. 15-049 for the preliminary design, detailed design, and construction engineering of the Annacis Water Supply Tunnel was publicly advertised on Metro Vancouver's and BC Bid websites on March 4, 2015. A Request for Proposal (RFP) No. 15-127 was subsequently issued on August 6, 2015 to the two proponents shortlisted during the RFQ process. The RFP closed on September 18, 2015, and both proponents submitted proposals. Hatch was identified as offering the highest-ranked proposal. Following negotiations, Hatch was awarded Phase A, Preliminary Design, for \$5,386,942. At the time of award of Phase A, the anticipated value of the contract for all three phases of work was \$30,600,994 (exclusive of taxes).

On May 11, 2017, following the completion of Phase A, Hatch provided an estimated cost for Phase B, Detailed Design, totaling \$11,108,137 (exclusive of taxes). The GVWD Board subsequently approved the award for Phase B at its meeting on June 30, 2017. Phase B is now substantially complete.

On February 5, 2020, following discussions and negotiations with staff, Hatch submitted a revised estimated cost for Phase C, Construction Engineering Services, totaling \$17,881,271 (exclusive of taxes). The amount is higher than the original proposed amount of \$14,861,997 (exclusive of taxes) primarily due to contractually allowed staff hourly rate increases for inflation since 2015, an increase in the construction schedule, and an allowance for quality assurance testing which was not included in the original RFP. The increase in the cost for Phase C was reviewed by Water Services and Purchasing staff and is deemed reasonable.

ALTERNATIVES

1. That the GVWD Board:
 - a) approve the award of Phase C, Construction Engineering Services, in the amount up to \$17,881,271 (exclusive of taxes) to the Phase A and B project consultant, Hatch Corporation, for the Annacis Water Supply Tunnel (Request for Proposal No. 15-127); and
 - b) authorize the Commissioner and the Corporate Officer to execute the required documentation.
2. That the GVWD Board terminate the contract with Hatch Corporation resulting from RFP No. 15-127: Consulting Engineering Services for Preliminary Design, Detailed Design and Construction Engineering Services for the Annacis Water Supply Tunnel and direct staff to report back to the GVWD Board with options for an alternate course of action.

FINANCIAL IMPLICATIONS

If the GVWD Board approves Alternative 1, Construction Engineering Services, in the amount up to \$17,881,271 (exclusive of taxes), will be added to the contract with Hatch Corporation. This amount is within the total construction budget allotted for the project.

The GVWD Board has the choice not to proceed with Alternative 1, but staff will need further direction in relation to the project. Alternative 2 will likely result in a delay to the project schedule which could add additional costs to the overall project.

CONCLUSION

Request for Proposal No. 15-127 was issued for Preliminary Design, Detailed Design and Construction Engineering services for the Annacis Water Supply Tunnel. The contract for Phase A, Preliminary Design, was awarded on December 11, 2015 to Hatch Corporation. Hatch's contract was subsequently amended to include Phase B, Detailed Design engineering services. As Phase B nears completion, staff have identified that the total anticipated value of the contract for Phase C, Construction Engineering Services, will exceed the original estimated cost of \$14,861,997 (exclusive of taxes). This is primarily the result of hourly rate increases due to inflation which are allowed in the contract, an increase in the construction schedule, and an allowance for quality assurance testing during construction which is required but was not included in the original RFP.

Based on the evaluation of the revised scope and costs, it is recommended that the GVWD Board authorize the award of Phase C - Construction Engineering Services to Hatch Corporation in the amount up to \$17,881,271 (exclusive of taxes), and authorize the Commissioner and Corporate Officer to execute the required documentation. There is sufficient funding within the overall project budget to support the contract increase.

Attachment

Annacis Water Supply Tunnel - Location Plan

ANNACIS WATER SUPPLY TUNNEL
OVERVIEW
N.T.S

CONCEPTUAL - FOR DISCUSSION ONLY



To: Water Committee

From: Marilyn Towill, General Manager, Water Services

Date: February 27, 2020

Meeting Date: March 5, 2020

Subject: **Manager's Report**

RECOMMENDATION

That the Water Committee receive for information the report dated February 27, 2020 titled "Manager's Report".

1. Second Narrows Water Supply Tunnel Project

The Second Narrows Water Supply Tunnel project involves the construction of a 6.5 m diameter, 1100 m long tunnel approximately 30 m below the bottom of Burrard Inlet, using a unique type of tunnel boring machine (TBM) with a pressurized face. The project also includes the construction of two deep vertical shafts, one in North Vancouver and one in Burnaby, the installation of three large diameter water mains inside the shafts and tunnel, and the construction of two valve chambers which will facilitate the connections into the existing GVWD system.

Construction commenced in early 2019, starting with the north shaft, which is the entry shaft for the TBM. Construction of the 70 m deep north shaft was completed in December 2019 using slurry wall technology to provide temporary ground support prior to constructing a permanent reinforced concrete lining for long-term support of the shaft. Preparation of the shaft is currently underway, along with the assembly of the TBM which was manufactured in Germany and delivered to the site by barge in early February. Once the preparatory work is complete, the TBM will be lowered down the shaft and prepared for launch. Tunneling is scheduled to commence in May of this year and will take 9 to 12 months to complete. Other work currently underway includes installation of TBM support facilities, setting up temporary power supply for the TBM, and excavation of the 110 m deep shaft in Burnaby. The project is scheduled to be completed in 2024.

2. Attendance at 2020 Standing Committee Events

Participation by Water Committee members at external events provides important learning and networking opportunities. The following events fall under the purview of the Water Committee and were included in the 2020 Leadership and Engagement budget. For the following events, up to two spots are available for Committee members:

- AWWA – Sustainable Water Management
Place and Date: Minneapolis, Minnesota, March 29 – April 1, 2020
Number of Attendees: 2

- AWWA Annual Conference (ACE 2020)
Place and Date: Orlando, Florida, June 14 – 17, 2020
Number of Attendees: 2

Please notify the Committee Chair or Committee Manager as soon as possible, but not later than **March 6, 2020** if you are interested in attending either of the above noted events. As the funds for these events are budgeted in general government, the Finance and Intergovernment Committee will consider approval of the events, but final approval on attendance rests with the Board Chair.

3. Water Committee Work Plan

Attachment 2 is the updated 2020 Work Plan indicating the status of the committee's key priorities together with the quarter that each is expected to be considered by the Committee.

Attachments

1. Second Narrows Water Supply Tunnel – Project Photos
2. 2020 Work Plan

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Tunnel Boring Machine at the factory in Germany



Tunnel Boring Machine: cutter head delivery at North Vancouver Project Site



Water Committee 2020 Work Plan

Priorities

1st Quarter	Status
Water Use-by-Sector Report	Completed
Annual Energy Management Program Update	In Progress
First Nation Engagement Updates	Pending
Seymour Salmonid Society 2019 Annual Report	In Progress
GVWD Development Cost Charge Update	In Progress
Long Term Financial Plan	Pending
Contract Approvals – Contracts > \$5 Million (as applicable)	Pending
Water Policies (as applicable)	Pending
2nd Quarter	
GVWD Water Quality Annual Report	Pending
Water Supply Update for Summer 2020	Pending
Status of GVWD Capital Expenditures	Pending
Lawn Water Regulations Communication & Regional Water Conservation Campaign	Pending
2020 Water Wagon Schedule	Pending
Water Services Watershed Wildfire Preparedness Update	Pending
Annual Dam Safety Program Update	Pending
Contract Approvals – Contracts > \$5 Million (as applicable)	Pending
Water Policies (as applicable)	Pending
3rd Quarter	
Status of GVWD Capital Expenditures	Pending
Contribution Agreement Renewal – Seymour Salmonid Society	Pending
Drinking Water Management Plan Update	In Progress
Contract Approvals – Contracts > \$5 Million (as applicable)	Pending
Water Policies (as applicable)	Pending
4th Quarter	
Coquitlam Intake No. 2 Project Definition Report & Engagement Results	Pending
Reservoir Limnology Program Report	Pending
Watershed Fisheries Initiatives Annual Update	Pending
Environmental Management System Update	Pending
Status of GVWD Capital Expenditures	Pending
Capilano Hydropower Project Business Case Assessment	In Progress
Annual Budget and 5-year Financial Plan – Water Services	Pending
Summer 2020 Water Supply Performance	Pending
Water Wagon Program 2020 Results	Pending
Regional Water Conservation Campaign and Water Regulations Communications 2020	Pending
Update on Capilano Main No. 5 – Stanley Park Water Supply Tunnel	Pending
Annual Energy Management Program Update	Pending
Contract Approvals – Contracts > \$5 Million (as applicable)	Pending
Water Policies (as applicable)	Pending