SHUSWAP WATERSHED COUNCIL

Water Quality Program &
Recreation Safety Education Program

in the Shuswap watershed for 2016 to 2020

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PREFACE

The Shuswap watershed in British Columbia is a special place: it's been the home of the Secwepemc People for thousands of years; it's the source of drinking water for many thousands of residents; it's the centre-piece of the tourism economy and attracts visitors world-wide; it supports a diversity of fish and wildlife, including the famed Adams River Sockeye salmon; and it facilitates a highly desirable lifestyle for many residents.

The Shuswap was the focus of a public planning process in 2007 to ensure a sustainable watershed. In 2008 the *Strategic Plan for Shuswap and Mara Lakes* was completed and implemented through a pilot project from 2011-2014. The Plan set out goals and several strategies for clean water, sustainable shoreline development, and safe recreation. Implementation was done through government agencies, private partners and stewardship groups, and was overseen by a steering committee. More information can be found in *Shuswap Lake Integrated Planning Process: Final Report* (Fraser Basin Council, 2014).

The Shuswap Lake Integrated Planning Process (SLIPP) pilot project completed in March 2014. In advance of its completion, the steering committee held a strategic planning session and decided to develop a program for the succeeding years that primarily focuses on water quality – the component of SLIPP that achieved the greatest benefits.

The SLIPP steering committee modified their membership to better reflect their new strategic direction and changed their name to Shuswap Watershed Council (SWC). The SWC developed this proposal – contained in the following pages – for a water quality program and recreation safety education program in the Shuswap. The programs are based upon the template provided by SLIPP (i.e., its goal and strategies for clean water); input collected through public engagement and several delegations to local governments and first nations; scientific research and recommendations for new strategies; and the objectives, capacities, and limitations of complementary programs and partners' contributions, thereby indicating the opportunity for the Shuswap Watershed Council to fulfill unique and much needed roles in coordination, communication, and facilitation.

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EXECUTIVE SUMMARY

The Shuswap Watershed Council (SWC) was established in early 2014 with a vision of *Enhanced water quality that supports human and ecosystem health and the local economy in the Shuswap watershed*. It is a collaborative partnership of representatives from local governments, first nations, stewardship groups, and provincial agencies.

The SWC committed time and resources in 2014 to develop a program that would help make their vision become a reality. The process to do this involved a number of steps:

- Writing a program Terms of Reference document that outlines the objectives and proposed strategies
- Conducting three phases of public engagement to inform the public and orders of government, seek feedback, gauge support and interest, and make modifications to the program
- Consulting and collaborating with scientists and experts, who provided critical advice and recommendations to the program proposal.

The SWC developed content for two separate programs that will be delivered throughout the Shuswap watershed from 2016 - 2020. The SWC will also provide communications, program management and administration.

Water Quality Program

The water quality program has two initiatives: a water monitoring initiative and a water protection initiative.

The water monitoring initiative coordinates and builds upon the existing monitoring programs led by government organizations. This ensures the whole Shuswap watershed is monitored efficiently. Without the coordinating efforts of a body like the SWC, monitors don't regularly collaborate, share resources or data. Where there are significant gaps in water quality monitoring within the watershed, the SWC will provide support for new monitoring components. The water monitoring initiative will also facilitate 'exploratory' monitoring to determine the presence and/or concentration of compounds such as pharmaceuticals and endocrine-disruptors; these compounds are known to be deleterious to human and ecosystem health but there currently is no information about their presence in the Shuswap. Furthermore, the water monitoring initiative will improve access to water quality data and investigate historical data.

The water protection initiative will reduce nutrient pollution in the rivers and lakes of the Shuswap watershed. With the oversight of an advisory committee, and the academic leadership of research partners, the SWC will investigate the source and transportation pathways of excess phosphorus from land to surface water, and it will

support remediation and phosphorus mitigation to improve water quality. The SWC will also support nutrient management education opportunities in the Shuswap.

The activities and accomplishments of the water quality program will be summarized in an annual water quality report.

Recreation Safety Education Program

The recreation safety education program will develop and deliver education campaigns for issues, events and activities pertaining to safe water-based recreation. Campaigns will focus on issues unique to the Shuswap and for which there is currently minimal awareness. The SWC will work with other organizations to deliver campaigns through different media to ensure a maximum reach, thereby helping to ensure the Shuswap is a safe place for everybody to recreate on the water.

Program Management, Communications and Administration

Program management, fund development, administration, facilitation, and committee support is provided to the Shuswap Watershed Council. The SWC will also do communications work to ensure the public is informed about their activities and to ensure public access to resources about water quality and safe water-based recreation.

Financial Requirements

The five-year budget for each component is as follows ($):

Water Quality Program, Water Monitoring Initiative	340,450
Water Quality Program, Water Protection Initiative	328,500
Recreation Safety Education Program	32,500
Communications Plan	115,000
Program Management and Administration	145,000
TOTAL	961,450

This budget accounts for labour and hard costs (i.e., travel and contracts); it does not account for in-kind or cash contributions from partners. Annual budgets vary year-to-year because of changing scopes for the different activities. The first year will be the most costly; this is partly because of extra activities associated with launching the new programs.

About the Author

This document has been prepared for the Shuswap Watershed Council by the Fraser Basin Council (FBC), a non-government organization in British Columbia focused on advancing sustainability through facilitation and education. To that end, the FBC has served as the program manager for the Shuswap Watershed Council since its inception in January 2014, as well as for the predecessor organization, the Shuswap Lake Integrated Planning Process (SLIPP) Steering Committee since January 2013. The FBC's tasks for developing the program were set out in the *2014 Developmental Year Plan*.

In some instances where the Shuswap Watershed Council is cited in this proposal, it has been the FBC acting on their behalf.

INTRODUCTION

The Shuswap Watershed Council is a partnership of local governments, first nations, stewardship groups, and provincial government agencies. It is based on a model of collaboration: working together for a common good and common goal. Collaboration takes shape when there is a place for dialogue, ideas and knowledge are exchanged, and resources are shared.

The Vision of the Shuswap Watershed Council (SWC) is *Enhanced water quality that supports human and ecosystem health and the local economy in the Shuswap watershed*.

Program Terms of Reference

The SWC committed time and resources in 2014 and 2015 to develop a new program that would begin in 2016. The SWC initially set out the program Terms of Reference[1], intended to be a starting point from which to build a more detailed program and to be used in public engagement. The Terms of Reference outline the objectives and strategies:

1. COLLABORATE with all water quality monitoring partners and regulatory agencies to maintain and enhance the quality of water in the Shuswap watershed for the following reasons:

- To ensure that standards for safe drinking water are met or exceeded
- To support the economic and recreational benefits of good water quality including tourism, boating, fishing, swimming and sustainable development
- To avoid duplication of effort, save time and money, and work with partners through a fair and equitable resourcing of the program

Strategies:

- Identify sources and causes of pollution and degradation
- Explore and develop action plans designed to remedy pollution; OR
- Undertake actions directly through the program (subject to funding)
- Encourage new or modified management approaches that improve water quality
- Oppose further diversions of water from the Shuswap watershed
- Support in principle the development of community sewer and water systems in rural areas of the Columbia Shuswap Regional District where there is significant benefit to doing so

Goals/metrics associated with this objective:

- Water quality is within existing guidelines (or establish our own through this process)
- Number, type and extent of algae blooms

[1] The Terms of Reference are available in full at www.shuswapwater.ca.

- Number of water quality issues caused by humans or human activity, vs. natural causes
- Number of boil water notices or water quality advisories issued
- Number of beach closures
- Number of new or modified management approaches due to water quality information

2. COORDINATE and report on water quality information in the Shuswap watershed

Strategies:

- Coordinate all collection and analysis of water quality monitoring data in the Shuswap
- Utilize science and objective data to support decision making
- Provide broad and open access to these data

Goals/metrics associated with this objective:

- Number of partners involved in data gathering and collection
- Partners' evaluations of the program's data collection, coordination and reporting
- Proportion of total budget contributed
- Leveraging of in-kind time and expenses

3. COMMUNICATE with, inform and engage residents, visitors and the public and private sectors about water quality and the activities of the program

Strategies:

- Provide the public with educational communications about the quality of the water in the Shuswap watershed
- Engage residents and all relevant interests to participate in water quality enhancement

Goals/metrics associated with this objective:

- Number of residents and relevant interest groups in the public and private sectors engaged
- Number of students or classes engaged
- Evaluation of program communications by residents and all relevant interest groups
- Participation at meetings
- Number of website hits or downloads of information
- Engagement levels on social media sites

4. From time to time, the Shuswap Watershed Council will consider projects that EDUCATE recreational users about safety on the water

Strategies:

- Distribute information promoting safety in or on the water
- Meet with agencies/businesses/organizations with a safety mandate to determine effective ways that the program can promote safety and minimize duplication

Goals/metrics associated with this objective:

- Number of safety partners engaged

- Number of interactions/meetings with residents, visitors and public and private sector groups
- Number of safety related incidents on the water

The Terms of Reference summarize the Shuswap Watershed Council's earliest proposal for water quality[2] and recreation safety education programs in the Shuswap. From this, the programs have been refined, developed, and modified through a process of public engagement and scientific research and recommendations.

Public Engagement

The Shuswap Watershed Council facilitated a three-part public engagement campaign to educate and inform the public and orders of government about the proposed program, seek feedback and make modifications to the proposal, and gauge the level of support for it.

Phase I

The first phase of public engagement was done via an online survey and a workshop focus group. The public was invited to read the Terms of Reference, and respond to questions via online survey about the proposed objectives and strategies of the program. Results indicated the following[3]:

- 76% of survey respondents are in favour of a program to focus on water quality and safe water-based recreation
- 64% of survey respondents believe that the objectives and strategies as outlined in the Terms of Reference will achieve the SWC's Vision
- The majority of survey respondents indicated support/agreement of the objectives (74%, 80% and 75% respectively for the first three objectives); support for the fourth objective was divided[4].

The workshop focus group engaged 60 people from stewardship groups and resource/technical staff from first nations and government agencies. Focus group results indicated the following:

- Support for using science and citizen science in decision making
- Support for continued education and engagement.

Phase II

The second phase of public engagement was done through a series of open house community meetings. Seven open house meetings were held in different

[2] At the time of developing the Terms of Reference, the proposed program was referred to as the "Shuswap Watershed Water Quality Program"
[3] Results are summarized from 226 survey responses
[4] Please see Disclaimer on next page

communities[5] throughout the Shuswap for the purposes of having face-to-face dialogue, presenting the program outline, answering questions and receiving feedback. Five meetings included a touch-pad polling exercise, whose results indicate the following:

- When asked to describe water quality in the Shuswap watershed, 85% of respondents said it is 'very good' or 'good'; 3% said it is 'poor' or 'very poor'; 12% said they 'don't know or don't have an opinion'
- When asked to describe a water quality trend in the Shuswap watershed, 6% of respondents said it is 'getting better'; 37% said it is 'staying the same'; 43% said it is 'getting worse'; 14% said they 'don't know or don't have an opinion'
- When asked to rank the importance of monitoring water quality, 89% of respondents said 'very important' or 'important'; 10% said 'minimally important' or 'not important at all'; 1% said they 'don't know or don't have an opinion'
- When asked to rank the importance of minimizing and eliminating known sources of water quality pollution in the Shuswap, 88% of respondents said 'very important' or 'important'; 9% said 'minimally important' or 'not important at all'; 3% said they 'don't know or don't have an opinion'
- When asked to rank the importance of educating the public about water quality in the Shuswap, 82% of respondents said 'very important' or 'important'; 16% said 'minimally important' or 'not important at all'; 2% said they 'don't know or don't have an opinion'
- When asked to indicate their support for the Shuswap Watershed Council's proposed programs based on information presented at the meeting, 59% replied 'yes'; 13% replied 'no'; 28% replied 'undecided'.

Feedback received through this phase of public engagement indicated the following[6]:

- Emphasis on the importance of good water quality and support for a program to monitor, report on, and protect it
- To a lesser degree, concern that the program will duplicate other efforts, and/or that it is introducing additional bureaucracy
- Divided support for a recreation education program
- Difficulty supporting the programs without knowing the associated costs and governance/representation of the SWC
- Specific ideas for implementation (not listed here).

Disclaimer

The Shuswap Watershed Council recognizes the challenge of meaningful public engagement. It acknowledges that while the <u>proportion</u> of different inputs is likely not representative (e.g., 59% express support for the SWC; 13% express non-support for the SWC; 28% are undecided, as indicated above) it does represent different <u>kinds</u> of input. Despite low participation from the public during

[5] Meetings were held in Chase, Falkland, Sicamous, Salmon Arm, Scotch Creek, Enderby, and Sorrento
[6] Results are summarized from 19 comment forms submitted in writing or online

engagement activities, the SWC is confident that a broad and representative range of ideas and concerns were brought forth.

Phase III

The third phase of public engagement consisted of presentations and delegations to local governments and first nations. Two regional district boards, three first nations, and five city/village councils received delegations. Requests to appear as a delegation were sent to all local governments and first nations in the Shuswap watershed, as well as to the Shuswap Nation Tribal Council and the Okanagan Nation Alliance.

Scientific Research and Expert Recommendations

The Shuswap Watershed Council engaged scientific expertise in the development of some aspects of the program. Part of the strategic direction for the SWC was guided by a report commissioned by the Shuswap Lake Integrated Planning Process (SLIPP): *Water Quality Report: Sources of Nutrients 2014* (Tri-Star Environmental Consulting, 2014). One of the key recommendations in this report is as follows:

> *Management activities should likely focus initially on reducing [nutrient] loadings from agricultural activities in the Salmon, Eagle and Shuswap Rivers watersheds* (p. iii).

As a follow up to this recommendation, in 2014 the SWC engaged a professional agrologist to prepare a report that 1) summarizes the current state of knowledge about phosphorus management in watersheds to reduce phosphorus loading to surface water, and 2) proposes nutrient management strategies specific to and suitable for the Shuswap watershed. The report, *Agricultural Nutrient Management in the Shuswap Watershed for Maintaining and Improving Water Quality: Literature Review and Nutrient Management Strategies* (McDougall, 2014) was critical to developing the SWC's water protection initiative.

The SWC worked collaboratively with a team of professionals with regulatory requirements for water quality monitoring to develop the Water Monitoring Initiative. This team of individuals collectively has over 100 years of water quality experience in the Shuswap.

Limitations of this Proposal

This proposal was developed independently from, and concurrently to, an assessment of governance and funding models for the Shuswap Watershed Council. Therefore, this proposal was developed without such knowledge.

PROGRAM OUTLINE

The Shuswap Watershed Council's programs are based upon their objectives, input received through public engagement campaigns, scientific research and recommendations; and the objectives, capacities, and limitations of complementary programs[7] and partner contributions. Consideration of the latter ensures that the SWC's programs do not duplicate existing programs and capitalizes on opportunities to fulfill a unique niche as a coordinator and facilitator. The programs are outlined below:

SHUSWAP WATERSHED COUNCIL	
PROGRAMS	
Water Quality Program • Water Monitoring Initiative • Water Protection Initiative	Recreation Safety Education Program

Two Programs: an overview

The Shuswap Watershed Council has two programs: a water quality program and a recreation safety education program. The water quality program is the primary focus for the SWC.

The water quality program has two initiatives:

1. The water monitoring initiative coordinates the activities of monitors to ensure that monitoring takes place at priority locations across the watershed. This coordination will help to achieve an efficient watershed-wide monitoring program and cut duplication.
2. A water protection initiative focuses on identifying reducing nutrient-pollution in rivers and lakes.

The recreation safety education program consists of periodic campaigns to address water-based safety issues unique to the Shuswap. These campaigns will increase public awareness about little-known events or activities that are a threat to human safety or well-being.

Implementation Area

The program covers the entire Shuswap watershed (see Figure 1). This includes tributary watersheds, such as the Shuswap, Eagle, Salmon, and Adams Rivers. The downstream boundary of the Shuswap watershed is at Chase or Sahhaltkum where Little Shuswap Lake flows into the South Thompson River.[8]

[7] For example, the *Shuswap River Watershed Sustainability Plan*

[8] The SWC acknowledges that while the implementation area is limited to the watershed boundary, there are downstream effects to the Thompson and Fraser Rivers.

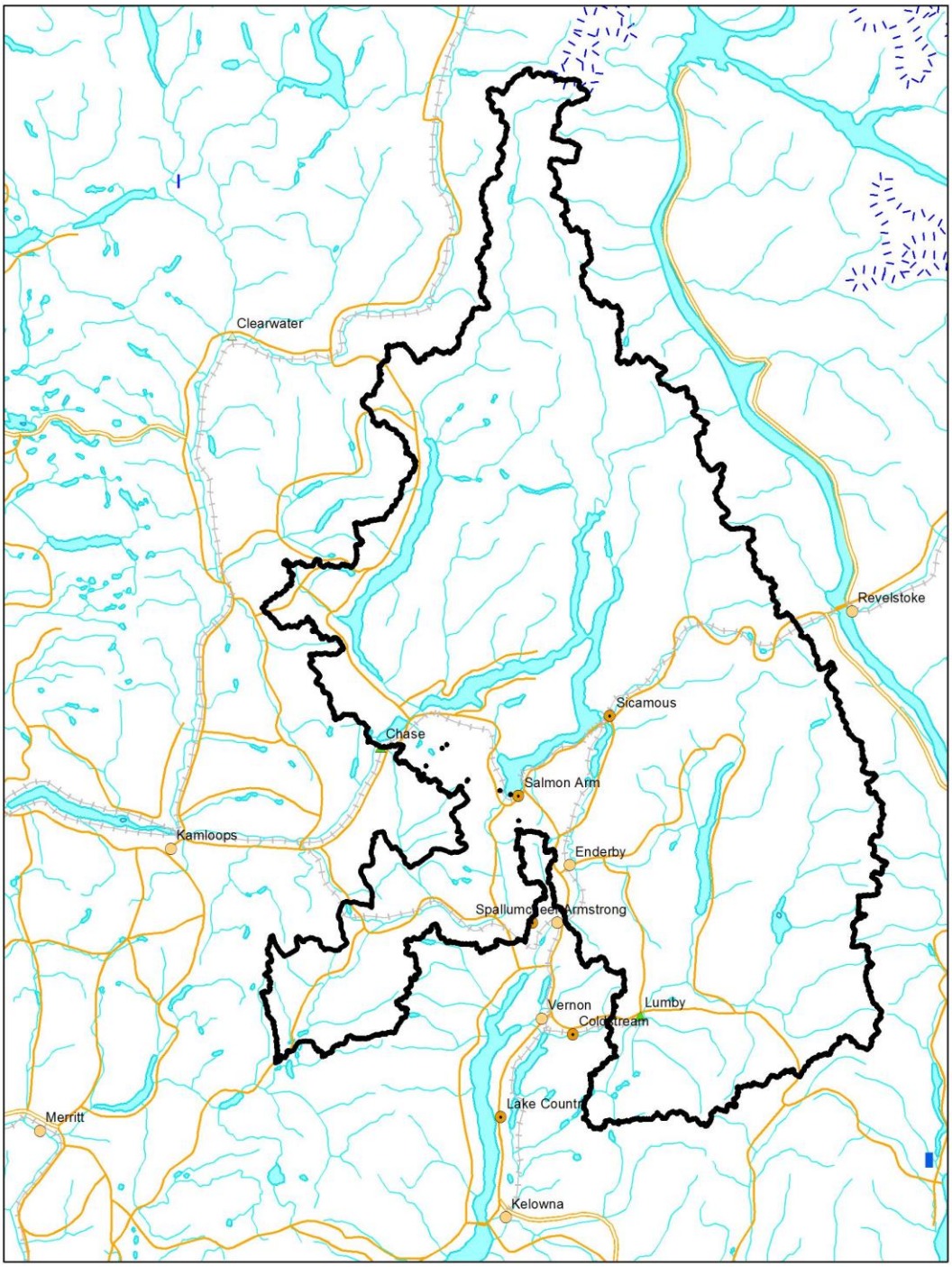

Figure 1. The Shuswap Watershed Council's programs cover the entire Shuswap watershed, as defined above. It's acknowledged that the watershed is within Secwepemc and Syilx traditional territories.

Funding and Governance

The SWC's programs were developed independently from, and concurrently to, an assessment of governance, funding, and delivery models for the Shuswap Watershed Council (led by the Columbia Shuswap Regional District). Therefore, this document does not contain such content.

THE PROGRAMS: A CLOSER LOOK

Details of the two proposed programs, the communications plan, and program management and administration are explained below. The budget is presented in the next section.

Water Quality Program

The water quality program is the primary focus for the Shuswap Watershed Council. The impetus for this program is derived from the success achieved by the Shuswap Lake Integrated Planning Process (SLIPP) water quality monitoring initiatives and public support for a water quality program going forward.

Water Monitoring Initiative

This initiative coordinates the existing water quality monitoring activities being done by agencies and organizations in the Shuswap watershed. Different monitoring programs are already underway – each for their own purpose and to meet different requirements, and varying in scope and location. The SWC coordinates monitoring in priority locations around the Shuswap watershed efficiently, and cuts duplication. The SWC will also coordinate analysis and reporting out of water quality data.

The water monitoring initiative will:

- Enable watershed-wide monitoring coordination with all partners
- Facilitate dialogue and planning
- Continue to build a baseline of water quality information
- Track nutrient loads in the lakes, and identify trends where possible
- Reveal new water quality problems that may require further investigation
- Implement further investigation as needed, where resources allow
- Use several monitoring stations.

Through coordinated work planning with water monitoring partners, the SWC has realized monitoring 'gaps' in some locations of the watershed. Facilitating additional monitoring, further to what is done by agencies and local governments, is based on professional recommendations, research appeal, and public interest.

The activities of the water monitoring initiative are listed below:

A. Annual work planning

The SWC will facilitate annual work planning with all monitoring partners (the "water monitoring technical team").

The tasks for the SWC are:

- Coordinate and facilitate annual work planning meetings (minimum one face-to-face meeting per year)
- Communicate with members of the water monitoring technical team during implementation, as needed.

The tasks for the water monitoring technical team in annual work planning are:

- Review water quality data from across the watershed for potential emerging threats or trends
- Discuss and prioritize water quality monitoring activities
- Assess the extent and frequency of monitoring, and:
    - Propose eliminating monitoring activities, where they are redundant
    - Propose new monitoring activities, if necessary, to address new issues
- Collaborate to implement the monitoring program as efficiently as possible
    - Include community/volunteer groups or students where appropriate
- Work with the SWC on the annual water quality report
- Work with the SWC on other water quality education and communications tasks.

B. Implement the 5-year monitoring plan

Table 1 outlines a suite of water monitoring activities. For each of the activities, the table states the type water monitoring, the purpose, and the sites. It also states the funder and the annual cost of the monitoring to the funder[9]. Where the SWC has perceived there to be a significant gap in water quality monitoring, it will facilitate additional monitoring so that the entire Shuswap watershed is monitored. Please see Appendix I for a description of monitoring activities by the Shuswap Watershed Council and its partners.

The tasks for the SWC in this activity are:

- Maintain/steward the monitoring plan and make changes/updates as necessary
- Oversee the implementation of new monitoring programs
- Coordinate volunteer monitors, where applicable
- Coordinate contract monitors, where applicable.

The SWC will not oversee or manage implementation of monitoring programs that are led by regulatory agencies.

The SWC recognizes the need to approach the monitoring plan with some flexibility in order to address arising issues, and agency and partner capacity and resources.

[9] It should be noted that where the SWC is identified as the funder, the costs would not necessarily come from the annual operating budget. The SWC will seek external funds to implement monitoring programs – see Appendix IV for a list of funding opportunities.

Table 1. Summary of water quality monitoring activities (subject to change, per Activity A, above)

			Annual cost ($)*									
Monitoring Type	**Purpose**	**Site(s)**	**2016**		**2017**		**2018**		**2019**		**2020**	
			SWC $	**Other $**	**SWC $**	**Other $**	**SWC $**	**Other $**	**SWC $**	**Other $**	**SWC $**	**Other $**
Deep Stations (Shuswap, Mara, Mabel and Sugar Lakes)	Environmental	10 sites	0	15300	0	15300	0	15300	0	47415	0	15300
Tributary	Environmental	2 sites: Salmon and Shuswap Rivers	0	5800	0	5800	0	5800	0	5800	0	5800
Tributary	Environmental	5 sites: Salmon River	27000		27000		27000		*pending*		*pending*	
Tributary	Environmental	3 sites: Salmon River watershed	0		0		20700		20700		20700	
Tributary	Environmental	3 sites: Eagle, Seymour, and Adams Rivers	0		0		0		25950		0	
Tributary	Environmental	10 sites: Newsome and White Creeks	*pending*	*pending*	0		0		0		0	
Tributary	Environmental	Canoe Creek	0	30000	0	30000	0	30000	0	30000	0	30000
Tributary	Environmental	5 sites: Lower Shuswap River	7300		7300		7300		29500		7300	
Tributary	Environmental	4 sites: Mid and Upper Shuswap River							3700			
Groundwater	Environmental	3 sites	no cost to SWC									
Drinking water systems	Public Health	unknown	no cost to SWC									
Beaches	Public Health	unknown	no cost to SWC									
Impact assessment	Permit requirement	Various (lakes, rivers, groundwater)	no cost to SWC									
TOTALS			**34300**	**51100**	**34300**	**51100**	**55000**	**51100**	**79850**	**83215**	**28000**	**51100**

** Estimated cash contributions only (i.e., not inclusive of in-kind labour and expenses)*

C. Annual reporting

The SWC will prepare annual water quality reports to summarize the work of the water monitoring initiative, suitable for public consumption, and widely available[10]. Please see the Communications Plan for details.

D. Create open access to water quality monitoring data

The SWC will improve access to water quality data. This may have utility for research, reporting or public interest. Working with the BC Ministry of Environment (the steward of the Environmental Management System database – the "EMS"), the SWC will investigate options for developing a public platform for accessing Shuswap water quality monitoring data housed within the EMS, and implement a cost-effective mutually beneficial system. Ideally, this platform will be web-based and provide access to near-real time and historic data.

Concurrently, the SWC will work to ensure that all monitoring partners are participating in the database thereby ensuring a single maximally comprehensive water quality database for the Shuswap.

Tasks for this activity are anticipated to be the following:

- Assess current situation of EMS – what types of data are in it, who is contributing data to it
- Conduct gap analysis for EMS – what is missing from it, what are the opportunities to make it more comprehensive
- Coordinate new water monitoring partners to join the EMS, as per results of gap analysis
- Investigate web-based database platforms to understand the scope and breadth of options
- Work with the EMS database manager to implement a mutually beneficial platform.

E. Investigate historical water quality data

The SWC will investigate sources of historical water quality data for the Shuswap watershed and determine if there are trends in historical and present day data. Depending on the results of this investigation, the SWC may do one or more of the following tasks:

- Catalogue historical data
- Incorporate historical data into the EMS database
- Compare historical data to modern data to reveal trends (this may only be done if this data are scientifically comparable).

[10] This item goes hand-in-hand with Activity D in the Communications Plan

F. Exploratory monitoring of potential emerging threats to water quality

The Shuswap Watershed Council will facilitate an 'exploratory' monitoring program to determine what emerging threats to water quality exist in the Shuswap watershed. This program will focus on contaminants that are a potential threat to human and ecosystem health. Examples of these include pharmaceuticals, hormones, personal care products, endocrine disruptors, and pesticides; there are hundreds of such compounds found in greywater and storm water (Northwest Hydraulic Consultants Ltd., 2010). The presence or concentrations of these compounds are not known for the Shuswap[11].

Tasks for this activity will be:

- Establish a research partnership that meets the following criteria:
    - Relevant academic qualifications and experience (e.g., environmental chemistry and ecotoxicology)
    - Laboratory capacity
    - Local facilities and human resources
- Design sampling and analysis methodology
    - Determine what compounds to test for
    - Determine sampling location(s), timing and frequency
- Develop/seek funding (to leverage contributions from SWC)
- Implement monitoring program to determine presence and concentration of compounds in waste water effluent (anticipated to be a one-year program beginning in 2017)
- Receive and analyse results
- Facilitate SWC meeting with special guest(s) to present and interpret results (anticipated 2018).

The SWC will seek to establish a research partnership with Thompson Rivers University (TRU) in Kamloops. TRU has the resources and capacity to engage in this work. The perceived benefits are:

- Established relationship between SWC and TRU
- Use of local intellectual talent and facilities
- Opportunity to leverage research grants
- Opportunities for student engagement and capacity-building
- Good value

[11] The author was unable to identify any studies of this nature for the Shuswap; to our best knowledge and efforts this kind of monitoring has not been done

Water Protection Initiative

The water protection initiative focuses on better understanding and reducing nutrient pollution in the rivers and lakes of the Shuswap watershed. Specifically, it reduces how much phosphorus moves from land to the major rivers[12] and lakes. The impetus for this initiative is derived from water quality monitoring, research, and recommendations facilitated through the Shuswap Lake Integrated Planning Process (Tri-Star Environmental Consulting, 2014) that indicated that excess nutrients – especially phosphorus – is one of the greatest known threats to water quality in the Shuswap.

The water protection initiative also supports reductions in nutrient pollution to the watershed from other sources. This is done primarily through information and referral to relevant authorities.

The activities of the water protection initiative are listed below:

A. Establish and facilitate an advisory committee

The Shuswap Watershed Council will establish an advisory committee with representation from the agriculture industry, academia, government (local, first nations, and provincial), and stewardship groups. Striking this committee in the early stages of implementation will help ensure the success of the water protection initiative. The role of the committee will be to oversee the initiative, as it is proposed in Activities B – F below.

The SWC will facilitate periodic meetings of the advisory committee to discuss and review implementation and results of the water protection initiative (estimated to be once or twice per year).

B. Identify sources of phosphorus

The primary activity for the SWC in the water protection initiative will be to determine the source(s) and transportation pathways of phosphorus into the Shuswap, Salmon, and Eagle Rivers[13] so that precise mitigation measures may be applied.

Tasks for this activity will be:

- Establish a research partnership that meets the following criteria:
    - Relevant academic qualifications and experience (e.g., geochemistry, soil and fluvial hydrology)
    - Field and laboratory capacity

[12] The focus for this initiative is on the Shuswap, Salmon and Eagle Rivers

[13] As recommended in *Agricultural Nutrient Management in the Shuswap Watershed for Maintaining and Improving Water Quality: Literature Review and Nutrient Management Strategies (McDougall, 2014)*

    - Local facilities and human resources
- Develop/seek funding (to leverage contributions from the SWC)
- Implement a research project to determine the sources and transportation pathways of phosphorus from land to surface water (anticipated to be three years, lasting from 2016-2018)
- Receive results
- Facilitate SWC meeting with special guest(s) to present and interpret results of the research program and provide recommendations for nutrient remediation (for implementation as early as 2019).

The SWC will seek to establish a research partnership with the University of British Columbia – Okanagan campus (UBC-O) in Kelowna. UBC-O has the resources and capacity to engage in this work. The perceived benefits are:

- Impartiality and credibility of an academic institution
- Established relationship between SWC and UBC-O
- Use of local intellectual talent and facilities
- Opportunity to leverage research grants
- Opportunities for student engagement and capacity-building
- Good value

This is an especially important activity for the water protection initiative. Without understanding where and how phosphorus is moving from land to surface water, it will be difficult to implement the appropriate management techniques with confidence that they will be effective.

C. Support remediation and phosphorus mitigation projects to improve water quality

The SWC will participate in remediation projects in two phases:

Phase 1: in the first three years of the water quality program, concurrent with Activity B listed above, the SWC will support remediation projects to improve water quality and achieve a suite of environmental benefits, build relationships with communities in the Shuswap, and increase the profile of the SWC. The SWC will seek out opportunities for remediation projects that meet the following conditions:

- Collaborative – involving multiple partners, including a technical lead
- Low-cost and/or with substantial cost-sharing
- Short-term measurable outcomes

The role for the SWC in these projects will be to provide funding support (matching funds will be sought), administration, and communications/community engagement. The SWC will not be the technical lead for these projects; that will be the responsibility of a partner organization or agency. For example, the SWC may form a partnership with Splatsin Indian Band, the Salmon River Watershed Roundtable, the Lower Shuswap Stewardship Society, and/or local fish and game

clubs; these groups are experienced in remediation and restoration, and have local and traditional knowledge.

These projects will achieve broad environmental and social benefits. Remediation projects – such as stream bank stabilization and riparian planting – are known to improve water quality, reduce loss of land through erosion, improve aquatic and riparian habitat, and achieve other benefits, sometimes for minimal cost. These projects will not necessarily reduce nutrient pollution, which is the objective of phase 2 below.

Phase 2: the SWC will implement phosphorus mitigation efforts, commencing as early as 2019. These projects will be different from those listed above in Phase 1 in that their objective is specifically to improve (i.e., reduce) nutrient pollution in the Shuswap. It's anticipated that these efforts will draw on the best management practices outlined in *McDougall, 2014*[14] to reduce the transport of phosphorus to surface water, and may include other measures per the results of Activity B.

D. Support nutrient management education

The SWC will support nutrient management education for the agriculture industry and all residents in the Shuswap. The tasks for this activity will be guided by the advisory committee (see Activity A, above). Tasks may include:

- Providing financial support to bring guest presenters to local industry events (i.e. seminars, workshops, annual general meetings)
- Providing financial support to send local agriculture producers to educational events outside of the region
- Providing financial and administrative support to host field tours
- Prepare and distribute nutrient management education (general audience)
- Prepare and distribute information about the activities and results of the water protection initiative (targeted audiences via industry publications)
- Participating in industry conferences (e.g. BC Dairy conference, BC Cattlemen's Association conference and AGM).

E. Promote nutrient management and pollution reduction from other sources

Where possible, the SWC supports reductions in nutrient pollution to the watershed from sources such as pleasure crafts and houseboats, septic systems, and wastewater treatment plants. This is done through information and referral to authorities such as industry, local governments, utilities, and others.

[14] *Agricultural Nutrient Management in the Shuswap Watershed for Maintaining and Improving Water Quality: Literature Review and Nutrient Management Strategies. Chapter 6.*

F. Annual reporting

The SWC will prepare annual water quality reports to summarize the work of the Water Protection Initiative, suitable for public consumption, and widely available[15]. Please see the Communications Plan for details.

[15] This item goes hand-in-hand with Activity D in the Communications Plan

Recreation Safety Education Program

This program delivers education campaigns for issues, events and activities pertaining to safe water-based recreation. Campaigns will focus on issues unique to the Shuswap and for which there is currently minimal awareness. This program leverages the financial and human resources of the Shuswap Watershed Council to advocate for safety, and help to ensure the Shuswap can be a safe place for everybody.

The activities of the recreation safety education program are listed below:

A. Develop and deliver education campaigns

The SWC will develop educational campaigns with input from tourism operators, safety authorities, and the public. Campaigns will be delivered through various media such as news stories, social media, radio spots, and/or signage. Campaigns will be delivered on a perceived as-needed basis.

Tasks for this activity will be:

- Engage tourism organizations and safety authorities to understand education opportunities for the SWC
- Review public input received through Phase I and Phase II of public engagement
- Develop and deliver campaigns.

The first two years of program implementation will require more time and resources to develop campaigns. In subsequent years, the campaigns will be re-delivered annually, with adjustments made as necessary.

In preparation for implementing this program, the SWC conducted an analysis of current safety campaigns and programs for water-based recreation in the Shuswap. That information will help guide the implementation of the education program, such that new campaigns can meet present needs. Please see Appendix II for details.

Communications Plan

The communications plan supports the Shuswap Watershed Council public engagement and outreach. It is aimed at building public awareness of the SWC's activities from 2015 – 2020.

Communications Priorities

These are the SWC's communications priorities:

- Report to the public on the SWC's activities
- Report to the public on key decisions and outcomes
- Maintain an online presence that houses key resources and timely updates
- Educate the public about water quality and safe recreation.

Activities

A. Develop Shuswap Watershed Council brand

Upon approval of the proposal, the SWC will create a brand for itself. This will help it become recognizable and ensure consistent use of the organization and program names. Suggested items for brand consideration include:

- Logo
- Program names[16]
- Tagline(s)
- Communications templates.

B. Create communications collateral

The SWC will develop materials to support their activities and build public understanding of the SWC and its programs. Materials will include but not be limited to:

- Website[17]
- Social media platform(s)
- Electronic and print versions of a brochure or overview of the SWC and its programs
- Introductory presentation for use online or in presentations.

[16] Suggestions for program names were received through Public Engagement Phase I; if it so chooses, the SWC may find a suitable candidate listed there

[17] In 2014 the SWC maintains an interim website at www.shuswapwater.ca. Upon approval of the proposal, the SWC will further develop the website so that it's branded appropriately and suitable for housing reference materials.

C. Publicize the SWC's activities

This builds public understanding and awareness of the work of the SWC. This is done by preparing media releases, distributing periodic e-newsletters, and maintaining and up-to-date website and social media platforms.

D. Publish water quality program annual report

The SWC will write and publish an annual water quality report on the most current monitoring data available from across the watershed[18]. The report will also highlight the activities and summarize the research results of the water protection initiative. The report will be posted online, distributed electronically, and a limited number of print copies made available.

For the water monitoring initiative, the annual report will include but not be limited to:

- An overview of water quality for the Shuswap watershed, and for regions within the watershed
- Highlight areas of concern, naming locations (e.g. beach closures; Canadian Drinking Water Guideline exceedances; occurrence of algae blooms, etc.)
- Highlight trends, where apparent – improving or declining
- Publicize the results of historical data recovery and analysis, if feasible[19]
- Map(s) or chart(s), as appropriate.

For the water protection initiative, the annual report will include but not be limited to:

- Summarize the SWC's research and remediation activities
- Summarize research results
- Explain the benefits of remediation.

The report will be written in a way such that it is suitable for public consumption[20].

Key Messages

The key messages are intended to reflect and be consistent with the SWC's programs. These key messages form the foundation of communications. They will be updated as the programs are implemented and activities evolve. Please see Appendix III for detailed key messages.

[18] This item goes hand-in-hand with Activity C in the water monitoring initiative and Activity F in the water protection initiative

[19] Refer to Activity E in the water monitoring initiative

[20] The agencies, BC Ministry of Environment especially, are responsible for producing technical documents according to their internal needs and purposes.

Program Management and Administration

Administration, facilitation and program management is provided to the Shuswap Watershed Council by a third-party non-government organization, the Fraser Basin Council (FBC). Where the SWC is cited in this document, it may be the FBC acting on their behalf.

The SWC will prepare brief quarterly reports and an annual report and financial summary for each year of implementation. These reports will summarize and highlight the key activities, accomplishments, and present the revenue and expenses. The reports will be made publicly available on the website.

Activities

A. Program management and facilitation

Activities may include but are not limited to:

- Providing support to the Shuswap Watershed Council by coordinating meeting logistics and facilitation
- Liaising with the SWC or representatives of the SWC
- Working with the Chair and Vice Chair in their respective roles
- Coordinating and overseeing implementation of the proposal ("*Activities*" listed throughout this document)
- Reporting activities and accomplishments
- Contract management.

B. Administration and fund development

Activities may include but are not limited to:

- Financial management
- Fund development
- Annual budgeting processes
- Financial reporting (quarterly and annual reports)

ANNUAL PROGRAM DELIVERY CYCLE AND INTERIM REVIEW

The Shuswap Watershed Council's programs will commence on January 1st 2016 for a five-year period[21]. A core review will be conducted at the end of year three (by December 31st, 2018); subject to the results of that review, the program will continue for an additional two years.

Annual Program Delivery Cycle

Table 2 illustrates the program activities in the timing and sequence that they will be conducted.

Interim Review

The Shuswap Watershed Council will review program performance and achievements after three years of implementation. The continuation of the program for the fourth and fifth years (2019 and 2020, respectively[22]) would be contingent on the results of the review.

The review will begin on October 1st 2018 (coinciding with the first day of the fourth quarter). The SWC will establish a review committee prior to October 1 and set out committee terms of reference. The committee will perform the review and bring a recommendation regarding the continuation or termination of the SWC's programs back to the entire SWC.

The process for performing the core review will be set out by the committee and is not part of this proposal. However, it's anticipated that the committee will draw upon the following resources in its review (including but not limited to):

- SWC Annual Report and Financial Summary 2016 (available March 2017)
- SWC Annual Report and Financial Summary 2017 (available March 2018)
- Interim reports for 2018 up to September 30th 2018
- Goals and metrics, as laid out in the program Terms of Reference, for crosschecking.

The recommendation and final decision to continue or terminate the Shuswap Watershed Council's programs will be finalized by December 31st, 2018.

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[21] The implementation period was originally intended to be 2015 – 2020; the dates in this document have not been changed to reflect a modified implementation schedule

[22] See point (21) above; the dates for implementation will be shifted accordingly

Table 2. Annual Program Delivery Cycle

	2016	2017	2018	2019	2020
Water Quality Program					
Water Monitoring Initiative					
A. Annual work planning*	September - October	September - October	September - October	September - October	
B. Implement the 5-year monitoring program	March - November	March - November	March - November	March - November	March - November
C. Annual reporting**		March - April	March - April	March - April	March - April
D. Create access to data	✓	✓			
E. Investigate historical data		✓			
F. Exploratory monitoring	✓	✓	✓		
Water Protection Initiative					
A. Establish and facilitate working group	✓	✓	✓	✓	✓
B. Identify sources of phosphorus	✓	✓	✓		
C. Remediation and P-mitigation	✓	✓	✓	✓	✓
D. Nutrient management education	✓	✓	✓	✓	✓
E. Promote other information	✓	✓	✓	✓	✓
F. Annual reporting**		March - April	March - April	March - April	March - April
Recreation Safety Education Program					
A. Develop and deliver campaigns	March - August	March - August	March - August	March - August	March - August
Communications Plan					
A. Develop SWC brand	January - June				
B. Create communications collateral	✓				
C. Publicize SWC's activities	✓	✓	✓	✓	✓
D. Publish water quality annual report		May	May	May	May
Program Management and Administration					
Management and facilitation	✓	✓	✓	✓	✓
Administration and fund development	✓	✓	✓	✓	✓

* *Annual work planning will take place in September-October prior to the next year's implementation.*
*** A fifth annual report and summary could be produced in 2021 if resources are available (not included in this table)*

SUMMARY OF RESOURCE REQUIREMENTS

Financial Requirements and Budget

Table 3 provides cost estimates for each of the activities in the water quality and recreation safety education programs, as well as the communications plan and program management and administration.

Appendix IV lists external funding opportunities that may be available to the Shuswap Watershed Council for program implementation.

Explanation of budget

Some of the activities listed in this document are solely the responsibility of the Shuswap Watershed Council, and therefore the associated costs will be borne by the SWC. Other activities in the proposal will be delivered collaboratively with other organizations, and matching funds will be sought. Therefore, an explanation of the budget is necessary to discern where costs will be shared, and what will be the SWC's portion of shared costs for some activities.

Under the Water Quality Program, Water Monitoring Initiative, all costs identified in Table 3 will be borne by the SWC. There are several cash and in-kind contributions to *Activity B: Implement the 5-year monitoring plan*; these are explained more fully in Table 1. The SWC, in partnership with an academic institution, will seek external funding for *Activity F: Exploratory monitoring* but for the purpose of the budget in Table 3, an estimate of the all-inclusive cost is provided (i.e. assuming external funds cannot be secured). A contingency fund of $20,000 will be established in the first year of the program. The purpose of this fund is to pay for any immediate unforeseen costs associated with the water monitoring initiative (a possibility due to the variability of natural events and water monitoring results). If the contingency fund is not used, it will be rolled into subsequent years' budgets.

Under the Water Quality Program, Water Protection Initiative, the SWC will bear the costs for *Activity A: Establish and facilitate advisory committee*, *Activity D: Nutrient management education*, *Activity E: Promote other information*, and *Activity F: Annual reporting*. The SWC, in partnership with an academic institution and agricultural organizations, will seek external funding for *Activity B: Identify sources of phosphorus*. The budget estimate provided for this activity in Table 3 is based on preliminary discussions with potential partners and securing 2:1 matching funds (SWC to external funds). Ideally the SWC will strive for and secure a greater ratio, however it's likely that 2:1 can be secured and as a conservative estimate this is what the budget is based on. For *Activity C: Support remediation and P-mitigation*

projects, the SWC will partner with relevant stewardship, first nation, industry, and academic organizations to seek matching funds. Phase 1 of Activity C is somewhat flexible: if more funds are secured, more work can be done; the budget for Phase 1 is presented as a minimum.

Table 3. Summary of Financial Resource Requirements

	SWC Expenses ($)					
Activities	**2016**	**2017**	**2018**	**2019**	**2020**	**5-year budget**
Water Quality Program						
Water Monitoring Initiative						
A. Annual work planning	6000	6000	6000	6000	6000	30000
B. Implement the 5-year monitoring plan*	34300	34300	55000	79850	28000	231450
C. Annual reporting**						0
D. Create access to data	10000	2000	2000	2000	2000	18000
E. Investigate historical data	0	6000	0	0	0	6000
F. Exploratory monitoring	7500	20000	7500	0	0	35000
Contingency	20000					20000
Sub-total	77800	68300	70500	87850	36000	340450
Water Protection Initiative						
A. Establish and facilitate working group	5500	4500	4500	4500	4500	23500
B. Identify sources of phosphorus	50000	45000	45000	0	0	140000
C. Remediation						
phase 1	10000	10000	10000	0	0	30000
phase 2	0	0	0	50000	50000	100000
D. Nutrient management education	6000	6000	6000	6000	6000	30000
E. Promote other information	1000	1000	1000	1000	1000	5000
F. Annual reporting*						0
Sub-total	72500	66500	66500	61500	61500	328500
Recreation Safety Education Program						
A. Develop and deliver campaigns	9500	9500	4500	4500	4500	32500
Communications Plan						
A. Develop SWC brand	5000	0	0	0	0	5000
B. Create communications collateral	10000	0	0	0	0	10000
C. Publicize SWC's activities	8000	8000	8000	8000	8000	40000
D. Publish water quality annual report	0	15000	15000	15000	15000	60000
Sub-total	23000	23000	23000	23000	23000	115000
Program Management and Administration						
Management and facilitation	13000	13000	13000	13000	13000	65000
Administration and fund development	16000	16000	16000	16000	16000	80000
Sub-total	29000	29000	29000	29000	29000	145000
Totals	**211800**	**196300**	**193500**	**205850**	**154000**	**961450**

** For a detailed budget on Activity B under the Water Monitoring Initiative, see Table 1*
*** These indicate place-holders; the budget for annual water quality reporting is included under the Communications Plan, Activity D*

Phase 2 is contingent on the results of Activity B; at the time of writing, the budget for Phase 2 is an estimate of SWC funds, to be matched, to do two years of nutrient remediation.

For the Recreation Safety Education Program, the SWC will seek external funding but for the purpose of the budget in Table 3, an estimate of the all-inclusive cost is provided (i.e. assuming external funds cannot be secured).

For the Communications Plan and Program Management and Administration, all costs listed in Table 3 will be borne by the SWC. In recent years, it has become very difficult for organizations to secure external funds to cover these kinds of operating costs.

Human and Organizational Resource Requirements

The organizational requirements for program management include:

- Ability to enter into and carry out legal contracts
- Demonstrated capacity and resources for program management
- Financial services
- Local support staff

Additional beneficial organizational assets include:

- Existing relationships with academia, agriculture industry, community and stewardship groups, regulatory monitors, and all orders of government
- Demonstrated past performance of similar work experience

Required skills and experience for staff support include:

- Educational background in natural resource management, environmental science, or related fields
- Facilitation and committee support
- Fund development
- External communications (various media)
- Internal communications: branding, website development
- Partnership development and community relations
- Public engagement and education
- Administrative and financial management
- Research, data management, synthesis, and interpretation
- Computer software, internet, online, and cloud-based platforms

The programs, as they are written, requires 0.8 staff FTE[23] to implement program delivery and management (excluding consultants, academics, or seasonal staff).

[23] FTE = Full Time Equivalent. This is based on a 7.5 hour work day, 5 days a week. Therefore one FTE is equivalent to 260 days/year (not accounting for annual leave).

RECOMMENDATIONS AND CONSIDERATIONS FOR PROGRAM IMPLEMENTATION

This section of the proposal outlines some critical immediate steps for the Shuswap Watershed Council to take in implementing the approved proposal.

Assumptions made by the author

The author has written this document with the following assumptions:

- The programs may be implemented in full or in part, at the Shuswap Watershed Council's discretion; they are not an all-or-nothing programs
- The governance structure of the program was not known at the time of writing
- The delivery model or program manager was not known at the time of writing. No assumption was made that the author would be a delivery agent or program manager.

Recommendations and considerations for program implementation

The following actions will be completed as soon as the proposal is approved, and governance and program management are in place:

- Establish a scope of work for the program manager
- Prepare a detailed annual work plan
- Modify the budget, as necessary, to be reflective of the annual work plan.

The following items are suggested for the Shuswap Watershed Council's consideration and action:

- Identify cost leveraging goals: determine how much and what proportion of funding should come from the SWC for a particular activity, thereby indicating how much matching funds to seek; this may be particularly worthwhile for the water protection initiative, for which there are currently no in-kind contributions committed
- Surplus SWC funds: in the event of surplus funds from 2015, the Shuswap Watershed Council will need to decide where to allocate those funds

APPENDIX I

Types and purposes of water quality monitoring

There are many reasons why water quality is monitored:

- To observe and record water quality, repeatedly over a period of time at the same locations, to ensure a healthy ecosystem. It identifies change, trends, existing and/or emerging water quality problems (thereby enabling management action to be taken if necessary).
- To identify the source(s) of pollution
- To understand the cause of water quality events (such as algae blooms or high turbidity)
- To protect public health and manage risk by ensuring water is safe for drinking and recreation
- To ensure compliance with pollution regulations or permit requirements
- To gather information so that pollution prevention or remediation programs can be designed
- To measure how goals or targets for water quality are being met
- To understand how specific activities affect water quality

Responsibilities for water quality monitoring rest with different agencies and orders of governments. Permitted dischargers, watershed groups, universities, and environmental groups also do monitoring.

Descriptions and rationale for the types of water quality monitoring identified in this document (the Water Monitoring Initiative) is provided below.

Deep Stations

This type of monitoring is done in open water at deep points in a lake. It determines biological productivity and health of a lake system. Many of the deep station sites included in the proposal are long-term stations and continued monitoring at these sites reveals trends. The BC Ministry of Environment does more intensive monitoring at these sites in years following a dominant salmon return (once every four years, i.e. 2015, 2019, etc.) to better understand the effect that salmon returns have on water quality.

Tributary

This type of monitoring is done on tributaries (rivers and creeks flowing into a lake) to (a) understand the health of the river system as an independent unit, and (b) understand the water quality that it contributes to the Shuswap watershed. Several tributaries are identified as being part of the SWC monitoring plan. Some of the

tributaries have past or present monitoring programs led and paid for by an agency. Others are proposed to have new monitoring programs led and paid for by the SWC. Descriptions of four proposed tributary monitoring programs are below:

Salmon River

The Salmon River has been monitored periodically by other agencies and organizations, most notably by the Salmon River Watershed Roundtable and Agriculture and Agri-Food Canada in the early 2000s. Environment Canada also has one long-term, ongoing monitoring station. The Salmon River is a significant tributary to the Shuswap Lake system and is one of the largest sources of nutrient pollution (i.e., excess phosphorus) to the lakes (Tri-Star Environmental Consulting, 2014). The Salmon River has been the site of hundreds of restoration projects, and is the natal stream for important Chinook, Coho, and Sockeye stocks. For these reasons, the SWC proposes to establish a monitoring program at five sites on the river for a minimum of three years beginning in 2016 to understand the current state of water quality in the river and determine the approximate locations of excess phosphorus inputs in that river. Following the results and analysis of data from the Salmon River, the SWC proposes to monitor water quality on some of the small tributaries to the Salmon River in 2018 or 2019[24] (e.g., Spa Creek, Silver Creek, Bolean Creek – to be determined at a later date by the water monitoring technical team).

Eagle, Seymour, and Adams Rivers

These three rivers comprise a significant volume of water to the Shuswap Lake system, and there is not currently an ongoing water quality monitoring program for them. The Adams River in particular is the natal stream for the largest Sockeye salmon fishery in the world. All three rivers are relatively undeveloped, and establishing current baseline water quality for these rivers will have utility for the future. The SWC proposes to monitor water quality in these three rivers once every four years, following the dominant salmon returns (i.e., 2015, 2019, etc.).

Newsome and White Creeks

These small tributaries have been the site of a short-term water quality monitoring program since 2013. The SWC will tentatively continue supporting this monitoring (cost-shared with the Province) in 2016. depending on the results and conclusions from monitoring in 2013-2015.

Shuswap River

This river contributes the largest volume of water to the Shuswap Lake system; it has also been identified as the largest source of nutrient pollution (i.e., excess phosphorus) to the lakes (Tri-Star Environmental Consulting, 2014). The Shuswap River was recently the site of a three-year monitoring program, led by the Regional

[24] The cost estimates in the budget are based on the Salmon River watershed monitoring beginning in 2018; the start date will be contingent on the results of the main stem water monitoring, it's possible that it could be delayed until 2019.

District of North Okanagan and various stewardship organizations; this program came to an end in 2013. The SWC proposes to re-establish a monitoring program using the same sites in the lower reaches of the river (five sites) and establish new sites in the middle and upper reaches of the river (four sites). The lower reaches of the Shuswap River will be more intensively monitored in years following a dominant salmon return (i.e., 2015, 2019, etc.). In non-dominant years (i.e., 2016, 2017, 2018), sites on the lower, mid, and upper reaches will be monitored 3 times per year[25].

Groundwater

The Province of BC has at least three observation wells established within the Shuswap watershed for continuous monitoring of water quantity and periodic monitoring of water quality. The SWC does not have any direct involvement with this type of monitoring. The extent and cost of this monitoring is not known to the SWC.

Drinking water systems

There are numerous water purveyors within the Shuswap watershed. Purveyors are required to monitor drinking water quality to ensure its safety for human consumption. The SWC does not have any direct involvement with this type of monitoring. The extent and cost of this monitoring is not known to the SWC.

Beaches

Water quality is monitored at public beaches by the appropriate authorities (e.g., the provincial or local government) to ensure its safety for recreation. The SWC does not have any direct involvement with this type of monitoring. The extent and cost of this monitoring in the Shuswap is not known to the SWC.

Impact assessment

All permitted discharges (e.g., waste water treatment plants; industry discharges; etc.) are required to do "receiving environment monitoring" to ensure they are in compliance with their permit. The SWC does not have any direct involvement with this type of monitoring. The extent and cost of this monitoring in the Shuswap is not known to the SWC.

[25] The variable monitoring frequencies on the Shuswap River is reflected in the budget: in 2015 and 2019, the lower Shuswap is budgeted separately from the mid and upper Shuswap sites; in 2016-2018 all sites on the river are budgeted for as a single unit.

APPENDIX II

Current situation analysis of safety campaigns for water-based recreation in the Shuswap

A review of nearly 30 groups, organizations, government agencies and businesses shows that there are many water-related recreation safety programs in the Shuswap (see Table 4, below). However there is no universal safety program for boating and water safety in the Shuswap. Most safety resources and programs are specific to the activity they pertain to, whether it's paddling, diving, or motorized boating. For the latter, there are plenty of resources including safety information, training, and in some instances free life jackets (depending on location).

Recreationists can seek out safety information from a number of locations. Safety information is available online as part of obtaining a Pleasure Craft Operator License (required). Various other programs such as first aid, rescue, and swimming lessons offer safety information online; these usually stem from Transport Canada's Office of Boating Safety or Canadian Red Cross. The Royal Canadian Marine Search and Rescue group delivers boating safety programs that provide free personal flotation devices (PFDs), information and demonstrations; this program is primarily delivered in coastal BC locations but does deliver programming in the Shuswap.

There have been some coordinated lake patrols in the past for the purposes of ensuring compliance and promoting education, but no on-going program or efforts of this kind.

Table 4: Water safety programs available in the Shuswap

Organization / Group	**Water Recreation Safety Program, Materials or Information - Description**	**Scope**	**Link**
Adams Lake Indian Band	Education; life jacket program	Local	www.adamslakeband.org
BC Hydro	Online information and coordinated patrols with RCMP at Hydro recreation sites	Local	www.bchydro.com/community/recreation_areas/recreation_area_closures.html
BC Parks	Seasonal education program and materials in some parks; emphasis on safe boating	Provincial	www.env.gov.bc.ca/bcparks
Canadian Red Cross	Online information, materials available, training and swimming lessons, research	National	www.redcross.ca/what-we-do/swimming-and-water-safety/drowning-research

Organization / Group	Water Recreation Safety Program, Materials or Information - Description	Scope	Link
Canadian Safe Boating Council	Information and events	National	www.csbc.ca/index.php/en/about-us/activities
City of Salmon Arm	Online information, support of RCMP lake patrols	Local	www.salmonarm.ca/index.aspx?nid=198
Columbia Shuswap Regional District	Online advisory, past funding for coordinated lake patrols	Local	www.csrd.bc.ca/services/emergency-management-program/shuswap-emergency-program/sep-advisories/public-awareness
Compliance and Enforcement - Natural Resource Officers	Lake patrols	Provincial	www.for.gov.bc.ca/hen/
Copper Island Diving/kayaking	Water safety information and safe diving courses	Local	www.copperislanddiving.com/
Destination BC - Visitor Information Centre (Salmon Arm)	Print materials (i.e. *Safe Boating Guide*)	Local	www.destinationbc.ca/Programs/Visitor-Centre-Network.aspx#.VEGpxXl0zIU
District of Sicamous	Provide free life jackets at public beach access	Local	www.sicamous.ca/content/home
Freshwater Fisheries Society of BC	*Learn to Fish* program has components of safe boating and safety near water	Local	www.gofishbc.com/how-to-fish/fishing-programs/learn-to-fish.aspx
Girl Guides of Canada	Water related programs include swimming lessons and boating safety	National	www.girlguides.ca/GGC/Home/GGC/Default.aspx?hkey=f6cbd051-db58-4e5d-9cc8-a732f8b05586
Ocean Pacific Water Sports Inc.	Water safety information and safe diving courses	One-off	www.opwatersports.com
RCMP Reservist Patrol	Extra lake patrols	Local	www.salmonarm.ca/index.aspx?nid=198
Regional District North Okanagan	Lake and river patrols by the Conservation Officer service by contract	Local	www.rdno.ca/index.php/services/community-services

Organization / Group	Water Recreation Safety Program, Materials or Information - Description	Scope	Link
Royal Canadian Marine Search and Rescue	Provides search and rescue; delivers safety programs for boaters, families (e.g. *Kids Don't Float* program)	Local	www.ccga-pacific.org/boating-safety/index.php
Royal Canadian Mounted Police	Lake patrols, enforcement of Canada's *Shipping Act*	Local	www.salmonarm.ca/index.aspx?nid=198
Salmon Arm Citizens Patrol (City of Salmon Arm)	Volunteer group that patrols beaches for illegal or dangerous behaviour	Local	www.salmonarm.ca/index.aspx?nid=199
Salmon Arm Secondary School	No general program, only on a one-off basis	One-off	www.sass.sd83.bc.ca/
Scouts Canada	Water related programs include swimming lessons and boating safety	National	www.scouts.ca/ca/search/node/boating%20safety
Shuswap Association for Rowing & Paddling	Provides safety training specific to rowing	One-off	www.shuswaprowingandpaddling.com/
Shuswap Lake Integrated Planning Process (SLIPP)	Online information, survey/research, past coordination of compliance and enforcement patrols	Local	www.slippbc.ca/recreation1
Shuswap Search and Rescue	Search and rescue services	Local	www.shuswapvsar.org/contact.aspx
Shuswap Tourism	General information around boat safety, including boating in high water	Local	www.shuswaptourism.ca
Sicamous - Parkview Elementary School	Swimming lessons	Local	www.par.sd83.bc.ca/
Transport Canada	Online materials, videos, information and licences/tickets	National	www.tc.gc.ca/eng/marinesafety/debs-obs-menu-1362.htm

APPENDIX III

Shuswap Watershed Council key messages

The key messages are intended to reflect and be consistent with the SWC Terms of Reference. These key messages form the foundation of communications. They will need to be updated as the programs are implemented and activities evolve.

Shuswap Watershed Council

The Shuswap Watershed Council (SWC) is a collaborative partnership aimed at enhancing water quality and safe recreation activities that support human and ecosystem health and the local economy in the Shuswap watershed.

The Shuswap Watershed Council was created following completion of a three-year pilot project of the Shuswap Lake Integrated Planning Process (SLIPP) in early 2014. There was unanimous support within regional districts and municipalities for a successor program to SLIPP, one with a more focused mandate on water quality. The SWC has created terms of reference relating to water quality and recreational safety.

The SWC has no regulatory or enforcement mandate. It is a collaborative body that works on coordinating data collection and reporting, research, education, advice and voluntary actions to improve water quality, and advocating for safe recreation in the Shuswap.

The SWC has representation from regional districts, municipalities, first nations, the Province of BC, and multi-interest watershed groups.

The SWC delivers two programs: a water quality program and a recreation safety education program.

Water Quality Program

The Shuswap Watershed Council's water quality program is a collaborative program for 2016 – 2020 to maintain and enhance the quality of water in the Shuswap watershed. There are two initiatives:

Water Monitoring Initiative

The water monitoring initiative coordinates water quality monitoring in priority locations around the Shuswap watershed.

Monitoring complements, not duplicates, the current work of regulatory authorities that are responsible for overseeing drinking water quality, water quality at swimming beaches, and receiving environment monitoring (i.e. effects of permitted polluters).

The water monitoring initiative also coordinates the collection and reporting out of water quality data.

Water Protection Initiative

The water protection initiative is a collaborative effort to support the economic and environmental benefits of good water quality.

This initiative focuses on reducing the amount of phosphorus that flows from agricultural land into surface water. Water quality monitoring in 2011 – 2013 showed that there were high concentrations of phosphorus in some locations of the Shuswap watershed. An excess of nutrients – phosphorus especially – can lead to an overgrowth of algae, reduce water clarity, create odours and impair the value of water for drinking and recreation. A 2014 study on the sources of nutrients show that the Shuswap, Salmon, and Eagle Rivers contribute a vast majority of nutrients to the lakes, and that run-off and erosion from agricultural land is the largest source of nutrients in those tributary watersheds.

Following expert recommendations, the SWC is focusing its efforts by working collaboratively with the agricultural sector to reduce nutrient loadings, with an emphasis on phosphorus management in the Shuswap, Salmon, and Eagle Rivers watersheds. A wider adoption of best management practices in this sector will have the greatest positive impact on water quality and is therefore a good investment.

Also following professional advice, the SWC is facilitating a research project to determine with more precision the sources of phosphorus loading in the Shuswap River. Once this is understood, it will enable the implementation of mitigation measures where they are most needed.

The water protection initiative also supports reductions in nutrients to the watershed from other sources. This is done primarily through information and referral to relevant authorities and sources of support such as:

- Initiatives undertaken by the pleasure craft/houseboat industry to eliminate greywater discharge
- Septic system maintenance/replacement by residents
- Sewer system installations in priority rural locations
- Waste water treatment improvements.

Recreation Safety Education Program

The Shuswap Watershed Council's recreation safety education program delivers educational campaigns to ensure the Shuswap is a safe place for everybody. Educational campaigns focus on issues, events and activities in water-based recreation that are unique to the Shuswap and for which there is minimal awareness.

APPENDIX IV

External funding opportunities for the Shuswap Watershed Council

Several sources of external funds may be available to the Shuswap Watershed Council for program implementation. They are listed below in alphabetical order (not a complete list, other sources likely exist):

Table 5: Potential external funding sources for the Shuswap Watershed Council

Organization/ Agency	**Program Name**	**Eligible Applicants**	**Eligible Work**
BC Ministry of Community, Sport and Cultural Development	Community Gaming Grants - Environment	Non-profit community organizations	Programs that support BC's environment or protect wildlife. Programs must have been established for a minimum of one year.
Bullitt Foundation	Ecosystem Services Program	Non-profit organizations in the Pacific Northwest (includes BC)	Programs that restore and protect nature to sustain healthy and resilient urban communities. Priorities include collaborative governance and ecological restoration.
Canada-BC Agri-Innovation Program	Canada-BC Agri-Innovation Program	Regional districts and local governments	Research and pilot projects that support innovate products, technologies and practices in agriculture
CN Rail	CN Stronger Communities Fund	Not-for-profit organizations, registered charity, or municipality	Projects that promote health and safety for youth; projects that protect the environment by reducing waste and pollution
Department of Fisheries and Oceans	Recreational Fisheries Conservation Partnerships Program	Any	Activities that enhance and the sustainability and ongoing productivity of Canada's recreational fisheries
Environment Canada	Habitat Stewardship Program (HSP) for Species at Risk	Any	Activities that protect or conserve habitats for designated species at risk

Organization/ Agency	Program Name	Eligible Applicants	Eligible Work
Environment Canada	Habitat Stewardship Program (HSP) Prevention Stream	Any	Activities that prevent priority species from becoming a conservation concern. Research not eligible.
Environment Canada	EcoAction Community Funding Program	Non-profit community organizations	Projects that divert and reduce substances that negatively affect water quality
Habitat Conservation Trust Foundation	Habitat Conservation Trust Foundation	Any	Activities that benefit freshwater wild fish and habitat
Investment Agriculture Foundation of British Columbia	Agriculture Environment Initiative		Projects that enable continued improvement in environmentally responsible farming practices
Real Estate Foundation of BC	Real Estate Foundation of BC - Freshwater Sustainability	Not-for-profit organizations	Projects that support clean and adequate supply of fresh water; includes monitoring, governance, and stewardship
Real Estate Foundation of BC	BC Water Sustainability Endowment Fund		*Currently suspended, check in 2015*
Royal Bank of Canada	RBC Blue Water Project - Community Action Grant	Registered Charity	Initiatives that protect and preserve water in areas with population $\geq$ 10000
TD Friends of the Environment Foundation	TD Friends of the Environment	Not-for-profit organizations	Activities that protect/preserve the environment; engage youth in environment activities
Vancouver Foundation	Vancouver Foundation - Environment Grant	Registered Charity	Strategies that strive for long-term sustainability, protection and resilience of water quality and flow
World Wildlife Fund and Loblaw Companies Ltd.	Loblaw Water Fund	Registered Charity	Projects that aim to conserve, protect or restore freshwater habitats

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