

Five Year Business Plan 2019-2024



Shawnigan Basin Society

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Preamble

The Shawnigan Basin Society (SBS), a non-profit organization, arose from the Shawnigan Roundtable. The SBS, under the leadership of Bruce Fraser and incorporated in 2012, was formed to engage the public, industrial landowners, land developers, and First Nations in a collaborative effort to restore the watershed to a fully functional condition and to increase the community's resilience in response to climate change. The Society's work began with a public discussion on the "state of the basin" including informal meetings and local field trips. It proceeded to collect a base of scientific information about the character and condition of the watershed: its streams, wetlands, forests, lakes, and foreshore along with accurate maps and models of the basin geography and human footprint. The SBS worked to promote a holistic approach toward environmental solutions, community engagement, and local stewardship.

The year 2019 has become a turning point for the Shawnigan Basin Society. Dr Bruce Fraser has resigned as the President and as a member of the Board of Directors. We have had to let go our Executive Director, Ms Kelly Musselwhite, because of budgetary issues. A number of new people have joined the Board of Directors. We have been engaged in some reflection to address the question of 'Quo vadis?' or where are we heading to? Our current five-year plan arose out of this 'Quo vadis' exercise.

Also, we have been faced with a financial crisis with zero budgeting from the CVRD for the Shawnigan Basin Society function. To address the short-term aspect of the Society's financial health we have introduced a \$20 membership fee and have expanded our membership to more than 70 people. A number of donors who wish to remain anonymous have given us \$15,650 plus \$2,000 worth of computer equipment. Mosaic has agreed to fund our activities with a \$10,000 donation over the first five years of our agreement (Appendix 1). We, however, need base funding from the CVRD if we are to survive as a non-profit Society and serve the community. As can be seen on page 4 - 7, the Shawnigan Basin Society has accomplished a great deal. The studies facilitated by the Society, documents collected in the Shawnigan Basin Society Office and the knowledge present within the Board of Directors provide an important resource for the CVRD.

Executive Summary

Our mission is working to protect and secure the long-term health and safety of the Shawnigan Lake Community Watershed specifically and the South Cowichan region generally, particularly the drinking water these watersheds provide. Over the next five years we will:

- i) Continue to work on development of a Watershed Master Plan based on ecological, physiographic and socioeconomic information that is assembled and catalogued from a variety of governments, research programs, and private sector sources;
- ii) Systematically engage and integrate the local watershed management efforts with private sector land owners, the CVRD, agencies of senior governments, and similar civic watershed initiatives arising elsewhere;
- iii) Monitor the water and sediment quality of Shawnigan Lake and creeks feeding and draining the Lake. We will also collect information about the aquifers and other bodies of water within the South Cowichan region and make this available to the public and other interested parties;
- iv) Continue to provision a watershed planning office in Shawnigan Village, that can be shared with other public and private sector partners, where the Society and the others can keep records, display maps and models, meet with interested parties, hold public planning sessions, conduct monthly community outreach seminars and provide access to Basin Authority and Society members and staff;
- v) Engage and cooperate with other groups interested in the Cowichan valley, including the Invasive Species Council of BC, Koksilah Watershed Group, The Mill Bay and District Conservation Group, The Cowichan Watershed Board, the Malahat Nation, and Mosaic;
- vi) Continue to participate in the Community Technical Advisory Group (CTAG) Drinking Water and Watershed (DWWP) Strategy Initiative and the South Sector Liquid Waste Management Planning Committee of the CVRD as well as participating in the CTAG – South Sector Liquid Waste Management Plan (SSLWMP) process ;
- vii) Continue working with the Volunteer and Think Shawnigan initiatives
- viii) Continue to engage with Area Planning Commissions and the Soil Bylaw Officer

- ix) Obtain funding by preparation of grant requests to foundations and government infrastructure and environmental improvement programs for projects intended to improve the ecological status and function of the South Cowichan Watersheds. We believe we will be more successful in this effort in the future since three of the Board members have considerable experience in applying for and receiving grants.
- x) Work with partners to obtain funding to place critical habitats in public trust.

The Shawnigan Basin Society has accomplished a great deal since its founding in 2012 – see pages 5-8. We hope to accomplish even more in the next five years.

Past Accomplishments of the Shawnigan Basin Society

The Shawnigan basin Society has had considerable success since its establishment in 2012. A summary of the main accomplishments is presented below.

- 1) In collaboration with the Shawnigan Basin Society Ms Maria Del Mar Martínez De Saavedra Álvarez carried out a study of vegetative changes in the Shawnigan Lake watershed over a period of 30 years. This study mapped the vegetation changes between 1984 and 2014 in southern Vancouver Island using various methods, including the Normalized Differential Vegetation Index (NDVI) derived from satellite data. Very detailed analyses in the Shawnigan Lake Watershed during those 31 years provide information on vegetation cover, urban sprawl, and remaining ecological corridors. This study formed her Master's dissertation at Royal Roads University. For further information please see: <https://www.shawniganbasinsociety.org/vegetation-changes.html>
- 2) Established the Ecological Design Panel comprised of Barry Gates, Ecoforester; Andy McKinnon, Ecologist; Lorna Medd, Public Health Officer (retired); David P. Polster, Plant Ecologist and Land Remediation Specialist; Craig Sutherland, Water Resource Engineer; Charlie Western, MOF Forester. The Panel is comprised of a group of senior technical experts in land use, water resource management, forestry, ecology, ecosystem restoration, and public health. Their function is to provide objective advice on basin management to the Basin Society, land developers, the Shawnigan Advisory Planning Commission, and the planning staff of the Regional District. This Panel has been instrumental in, amongst other things, in foreshore restoration planning.
- 3) The Shawnigan Basin Society commissioned an Eco-based Conservation Plan for the Shawnigan Lake Watershed by Herb Hammond of Silva Ecosystem Consulting Ltd. Members of the Ecological Design Panel worked with Lakeshore owners and local landowners to implement recommendations of the Hammond Report. The Hammond Report can be found at: <https://www.shawniganbasinsociety.org/ebcp.html>. This study is the most intensive watershed evaluation on Vancouver Island, if not in British Columbia.
- 4) The Shawnigan Basin Society commissioned Jenny Berg, an environmental scientist, to carry out a Shawnigan Lake Foreshore Inventory. This was done in collaboration with Grant Price of Shawnigan Lake. The objective of this project was to assess the ecological integrity of the riparian zone of Shawnigan Lake and the condition of the immediate foreshore. Over 500 pictures were stitched together and coded to document the current state of the Shawnigan Lake foreshore. The information is presented by sub-basin and highlights five categories of impact. The Sub-Basins include: McGee Creek Sub-Basin, Village Sub-Basin, East Sub-basin, and West Sub-Basin. See: http://www.shawniganbasinsociety.org/uploads/2/4/3/7/24371226/pdf_east_basin_dec2.pdf
- 5) During September of 2016 the SBS sponsored a public workshop on foreshore restoration. This workshop was led by David Polster, a member of the Ecological Design Panel. The workshop was attended by 25 people. The workshop was followed by a hands-on foreshore restoration at the West Shawnigan Provincial park where 16 people learned how to put the theory of building wattle walls and making live stakes created from willow branches, a native

species, to mitigate foreshore erosion by absorbing and disbursing wave energy caused by motorized recreational activity. Altogether the Shawnigan Basin Society has been involved in four foreshore restoration projects, supported in part by a \$5,000 Aviva Community Funding grant. Information on these activities can be found at:

<https://www.shawniganbasinsociety.org/get-involved.html>

An example of such a foreshore restoration project is given in the Figure1 below.



Figure 1. A stone wall (left) was replaced initially by a wattle wall and bulrushes (middle) and after a few years a more natural shoreline is in place (right).

- 6) In response to a request by the Shawnigan Basin Society, TimberWest sponsored the mapping of Shawnigan Lake by Ekistics. Two series of mappings were carried out: Shawnigan Community Mapping and Shawnigan Basin Bio-Physical Mapping. These maps can be found in the Basin Society Office as well as online at:
<https://www.shawniganbasinsociety.org/community.html>
- 7) TimberWest also collaborated with the Shawnigan Basin Society in providing tours of the watershed for the general public.
- 8) Dr Linda Gregory prepared an informative paper that summarizes both historical and present land and water use literature pertaining to the Shawnigan Lake watershed while focusing on their hydrological implications. The paper closely examines water quality, lake limnology, water chemistry, and sediments. This paper can be found at:
https://www.shawniganbasinsociety.org/uploads/2/4/3/7/24371226/dr._linda_gregory_sl_report.pdf
- 9) The Natural Sciences & Engineering Research Council of Canada's RES'EAU Water Network of Excellence was testing sites to determine the efficacy of a hollow fiber nanofiltration (HFNF) approach to remove total organic carbon from water. The SBS invited this Network of Excellence to carry out tests at Shawnigan Lake. The testing was carried out at Mason's Beach. Unfortunately, the hollow fibres used were found to be defective. The report can be found at:
http://www.reseauwaternet.ca/files/RES_EAU_2016_Year_in_Review.pdf
- 10) The Shawnigan Basin Society carried out several surveys of *Mryiophyllum spicatum* (Eurasian watermilfoil) around the lake. Vetted & collated a vast body of pertinent information which available to the public online at
<https://www.shawniganbasinsociety.org/milfoil1.html>

The figure below shows the distribution of Eurasian watermilfoil around Shawnigan lake in 2015.

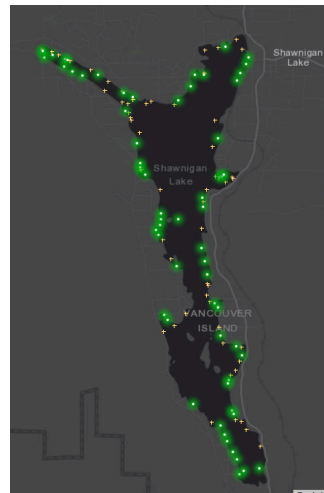


Figure 2. Distribution of Eurasian watermilfoil around Shawnigan Lake on September 21, 2015.

- 11) Members of the Shawnigan Basin Society have been investigating new approaches to eliminating invasive species. We have been monitoring three properties around the Lake where owners have installed oxygen nanobubbler in an attempt to control Eurasian watermilfoil. Specifically, we have been monitoring water temperature, water oxygen saturation percentage and dissolved oxygen content in milligrams oxygen per litre water. Monitoring was done weekly through June to mid-September. We also have been photographing milfoil to determine whether the oxygen nanobubble systems are affecting watermilfoil growth. The systems in place this summer only had a modest effect on water oxygen concentration in the water near the vicinity of the nanobubbler systems and had no observable effect on milfoil growth.
- 12) The Shawnigan Basin Society facilitated Koksilah Watershed Study by providing \$10,000 in funding to the Koksilah Cowichan Station Residents Association.
- 13) Director Bill Savage has taken members of the community on his boat around Shawnigan Lake to show them how human activity alters the lake ecosystem.
- 14) Under the leadership of Dr Bruce Fraser, the Shawnigan Basin Society successfully changed the zoning in the waters of lake end roads from W2 to W4, thus preventing development in the waters out 30' (~9m) from the road end.
- 15) The Shawnigan Basin Society has been collaborating with the Shawnigan Bioremediation Society in finding natural approaches to provide long-term solutions to problems in local watersheds.

- 16) The Shawnigan Basin Society office also acted as the command station in community protests against the contaminated soil dumpsite located on Lot #23 off Stebbins Road.
- 17) The former President, Dr Bruce Fraser and colleagues published the second edition of the book entitled “Saving Water: Stewardship of the Shawnigan Community Watershed. Adapting to Change in the Critical decades 2020 to 2030”.

Strategic Direction 2019-2024

Introduction

The Shawnigan Basin Society, a non-profit organization, arose from the Shawnigan Roundtable. The Shawnigan Basin Society, under the leadership of Bruce Fraser and incorporated in 2012, was formed to engage the public, industrial landowners, land developers, and First Nations in a collaborative effort to restore the watershed to a fully functional condition and to increase the community's resilience in response to climate change. The Society's work began with a public discussion on the "state of the basin" including informal meetings and local field trips. It proceeded to collect a base of scientific information about the character and condition of the watershed: its streams, wetlands, forests, lakes, and foreshore along with accurate maps and models of the basin geography and human footprint. The Shawnigan Basin Society works to promote a holistic approach toward environmental solutions, community engagement, and local stewardship.

Although the initial focus of the SBS was the immediate Shawnigan Lake Watershed, its ultimate aim is the protection of the South Cowichan Watershed. With the expansion in the Board of Directors there is also now an interest in educating the public about the South Cowichan Watershed with an emphasis on acting as a resource for the public on the vulnerabilities of the aquifers and other bodies of water in the region, particularly in the context of climate change.

We will also work closely with academic institutions, the Koksilah Watershed Group, The Cowichan Water Board, the Cowichan Stewardship Roundtable, the Mill Bay and District Conservation Society, Invasive Species Council of BC, and in particular the Malahat Nation as well as other interested parties such as Mosaic on watershed issues we hold in common. Appendix 1 contains a letter of support from Mosaic while Appendix 2 contains a letter of support from the Malahat Nation.

We have also been working with the CVRD's Drinking Water and Watershed Strategic Initiative, the South Sector Liquid Waste Management Planning Committee, the Volunteer and Think Shawnigan initiatives as well as with the Area Planning Commissions and the Soil Bylaw Officer

Current Board of Directors

David Munday, President; Bernhard H.J. Juurlink, Vice President; Shirley Astleford, Treasurer, Paul Doherty, Secretary; Shelagh Bell-Irving, Director; Susanne Darby, Director; Carolyn Dowell, Director; Clifford Evans, Director; Rod Garbutt, Director; Linda Gregory, Director; Terry Lineham, Director; Kelly Loch, Director; William Savage, Director; Edward Wiebe, Director

The current Directors have expertise in: agrology and contaminated sites remediation, bioremediation, business, engineering, medical sciences, biology with specialization in water and environment, forestry and parks. The specific expertise and areas of interest of individual Directors can be found in the 'Who We Are' section of the Shawnigan Basin Society website: <https://www.shawniganbasinsociety.org/shawnigan-basin-society.html>

General Objectives

Our general objectives are governed by the idea that one of the most powerful ways to cope with the upcoming changes in our climate is to restore ecological balance.

- 1) To ensure the water and sediment quality of Shawnigan Lake and the input and output streams remains within established guidelines and objectives by developing and implementing water and sediment water quality monitoring programs that align and complement other water quality strategies by the CVRD, Province and academic institutions.
- 2) To prevent or limit silt and nutrient loading into Shawnigan Lake and the input and output streams.
- 3) To restore foreshore function using bioremediation techniques and practices.
- 4) To increase the area of forest and wetlands under public trust.
- 5) To restore the hydrological integrity of the upland forests.
- 6) To monitor sites designated by MoE as contaminated in order to protect the public's drinking water
- 7) To implement invasive species controls e.g. *Myriophyllum spicatum* (Eurasian watermilfoil) and *Cytisus scoparius* (Scotch broom).
- 8) To develop a more resilient and rationale use of our aquifers.
- 9) To increase public involvement in decisions about land and water use of the lake and streams.
- 10) To assist the residents of the South Cowichan region in addressing local environmental issues.

Specific Objectives

- 1) To monitor the watershed involving the CVRD and the Shawnigan Lake School
 - a) To assess any changes in the Upper Shawnigan Creek, McGee Creek, West Arm inflow Creek, Shawnigan Lake and Lower Shawnigan Creek water and sediment chemistry and compare the information to established guidelines and objectives.
 - b) To identify activities that affect the ecology of the watershed including the measurement of silt/sediment inflow to the lake
 - c) To document the lake and riparian biota with particular emphasis on invasive species (e.g., Eurasian watermilfoil and Scotch broom).
 - d) To document vegetative changes along the foreshore.
- 2) To increase the area of ecologically critical forest and wetlands under public ownership.
- 3) To restore the integrity of the Shawnigan Watershed, including all inputs and outputs within South Cowichan and including the mapping or documentation of
 - a) the Foreshore
 - b) the Forests
 - c) the Farmlands
- 4) To act as a public resource for information on the state of the aquifers in the South Cowichan Area.
- 5) Through Board member participation in programs at O.U.R Ecovillage, the SBS is able to encourage and support community awareness and engagement with some of the environmentally resilient practices being carried out on Mount Baldy to the benefit of our community ecology.

O.U.R. Ecovillage, located on Baldy Mountain, is a 25-acre working farm and educational demonstration site that specializes in natural building, organic & permaculture food production, and sustainable living.
- 6) To collect and collate individual water test reports and interpret changes over time of such tests.
- 7) To organize Public Education via talks and tours of
 - a) the Lake
 - b) the Riparian habitat
 - c) the Forests
- 11) To assist the residents of the South Cowichan region in addressing local environmental issues

Addressing the Specific Objectives

1) To Monitor the Watershed involving CVRD and Shawnigan Lake School

- a) To assess changes in the lake water and sediment chemistry of Shawnigan lake, South Shawnigan Creek and other lake inflows and outflows.**

The Shawnigan Basin Society in cooperation with Shawnigan Research Group (SRG) is proposing a water quality and sediment quality sampling program to monitor the health of the Shawnigan Lake ecosystem. Five members of the Shawnigan Research Group are also Directors of the Shawnigan Basin Society. This program will continue the monitoring conducted by SRG in 2018 (Munday, pers. comm.). The 2018 program was designed to complement the attainment monitoring program conducted by the BC Ministry of Environment (MOE) designed to determine whether the water quality of Shawnigan Lake and associated streams is meeting pre-established water quality objectives. The 2018 monitoring program included harmonized field programs conducted by Ministry of Environment (MOE), Cowichan Valley Regional district (CVRD) and SRG. Unfortunately, the reporting process has been difficult due to lack of data sharing between the groups involved. For 2020, SBS/SRG propose to conduct water quality and sediment quality sampling for the Shawnigan Lake Watershed in cooperation with CVRD under an attainment water quality program currently under development by the CVRD.

The Basin Society is fortunate that three of its Board Directors have expertise in environmental issues. Paul Doherty is an agrologist registered with the BC Institute of Agrologists. Paul is environmental consultant with experience in contaminated sites investigation and remediation. David Munday is a Registered Professional Biologist and Senior Environmental Specialist who has specializes in aquatic biology, environmental impact assessment and permitting for aquatic and terrestrial developments. Dr Linda Gregory has worked for the BC Ministry of Environment and has written many reports on water quality and watersheds for both the Federal and BC Ministries of Environment. In addition, Dr Gregory has written a number of reports on species at risk for the Committee on the Status of Endangered Wildlife in Canada. Also, Dr Ralph Turner of the Shawnigan Research Group will be involved in the water and sediment testing. He has over thirty years of experience in biogeochemistry of terrestrial and aquatic systems. As can also be seen from the SBS website, a number of Board Directors have been involved in forestry, parks and bioremediation.

Two reports (Kopat *et al.* 2019a; Kopat *et al.* 2019b) summarize previous water quality attainment monitoring conducted from 2006 to 2014. Associated Environmental (AE) on behalf of BC Ministry of Environment (BCMOE) conducted a one-year water sampling program in South Shawnigan Creek and associated tributaries (Associated Environmental 2017). The AE program had two significant objectives:

1. To assess the water quality in South Shawnigan Creek relative to surface water quality guidelines and,

2. To determine whether contaminants from the Cobble Hill Holdings (CHH) contaminated soils landfill are impacting downstream water quality.

Sediment quality was assessed at the same sample sites in the upper watershed on one occasion in October/November 2016 by MOE personnel (Hawryluk, 2017).

The water quality and sediment quality program described in this proposal follows many of the recommendations put forward by Associated Environmental (2017). The Shawnigan Research Group (SRG) in collaboration with the Shawnigan Basin Society is proposing this study. The proposed study is focused on maintaining the ecological health of the Shawnigan Lake watershed and is specifically focused on the issue of contaminants entering the Shawnigan Lake due to activities in the watershed. The 2019 sampling program anticipates that we will conduct sampling at stations in the lake and in the South Shawnigan Creek watershed. It is anticipated that CVRD will sample at inflow and outflow stations, as well as at intakes for drinking water facilities.

The study is designed to be cost effective with sufficient sample stations to establish current conditions and detect change over time in the Shawnigan Lake watershed.

Details of the proposed study can be found in Appendix 3.

b) To assess silt/sediment input to the Shawnigan Lake and the inflowing streams

Many of the land-altering activities such as forestry, mining and dumping fill on the lands around the lake and beside the creeks feeding the lake results in high suspended sediment in the waters entering the lake. This suspended material can be a source of nutrient rich silts and clays. Much of the input is with precipitations, notably rain and thus we plan to collect samples at site S-8 at the mouth of south Shawnigan Creek (see Appendix 3) and within the lake at the creek input for turbidity, total suspended sediment, total nitrogen and total phosphorus and take Secchi disk readings in the lake water. The samples will be collected as indicated in Appendix 3. Turbidity and Secchi Disk readings will be weekly and total nitrogen and total phosphorus twice, during the rains in October and November. Turbidity will be measured with the YSI ProDSS multiparameter probe, Secchi disk by hand with a Secchi disk and the samples for suspended sediment, total nitrogen and total phosphorus will be collected and submitted to ALS analytical laboratories. All of the samples will be collected by volunteers. The cost – once the YSI ProDSS is available – will be for the suspended sediments and total nitrogen and phosphorus analyses. There will be two samples in the creek and two samples at two depths in the lake for each of the two sample times giving a total of 8 samples. The unit cost is \$27 for the three parameters.

In addition, we will engage landowner involved and provide some guidance on how to minimize sediment input into the waterways.

c) To monitor invasive species

The focus will be on *Cytisus scoparius* (Scotch broom) and *Myriophyllum spicatum* (Eurasian watermilfoil). Scotch broom was introduced into the Pacific Northwest when

Captain Water Colquhoun Grant planted it on his farm in the Sooke Basin somewhere around 1850. Eurasian watermilfoil was introduced into the Okanagan in the 1970s and from there spread throughout BC.

Scotch broom removal parties will be organized when it is in full bloom. Small plants will be uprooted while larger ones will be cut at ground level. This is the recommended procedure as most of the energy will be above ground, there will be minimal release of seeds, and the roots of the larger cut plants will die in the summer sun. The removal parties will be organized by SBS and the Ecological Design Panel members. There is no cost.

Eurasian watermilfoil can be removed manually when water temperatures are 10° C or lower. A number of lake front owners have purchased oxygen nano-bubbler machines and are attempting to remove milfoil using this approach. The Shawnigan Basin Society is monitoring these activities. Monitoring includes measuring water temperature, dissolved oxygen and recording effects, if any, on plants. If the oxygen nano-bubbler approach appears to kill milfoil, the Shawnigan Basin Society will organize a formal study, with permission under the Waters Act, that will include delineating what oxygen tension kills milfoil, whether other plants are affected and also whether plankton, invertebrates and vertebrates are affected. If this study is found to be necessary, the cost will be about \$2000.00

d) To document vegetative changes along the foreshore

We will work with landowners and under the direction of the Ecological Design Panel members to increase vegetation around homes to enhance the retention of water in the vegetation and soils.

This would be done by volunteers and there would be no cost.

2) To increase the amount of forest and wetlands under public ownership.

We will cooperate with other interested parties such as the Cowichan Land Trust to fund-raise to purchase critical portions of our watersheds and place such lands into a conservation land trust.

3) To restore the integrity of the watershed

- a) We will engage with landowners to encourage them to:
 - i) restore their foreshore areas in keeping with the principles of the Green Shores initiative https://stewardshipcentrebc.ca/Green_shores/about/. Additional workshops on foreshore restoration will be organized by our Ecological Design panel members. SBS members will then work with interested lakefront owners.
 - ii) use ecoforestry practices. We will work with Mosaic to promote forestry practices in the watershed that will allow for less clear-cutting, more deadfall in place to promote water retention by the forest floor and more snags in place to provide habitat for wildlife to enhance biodiversity.
 - iii) use ecological approaches to farming. We will work together with the Shawnigan Cobble Hill Farmers Institute to promote more eco-friendly farming practices.

- iv) Also see **1b. Silt/Sediment Inflow to the Lake**
- b) Promote relationships with the Malahat Nation to enhance the watershed
- c) Monitor the biota within and around the Lake. We will depend upon both upon SBS members and community volunteers to report on changes within the watershed.

This specific objective will be largely due to co-operation with other groups and have no specific SBS cost.

4) To engage the community in public education

- a) The Office is open three days per week allowing access to the physical maps and access to other watershed information and materials, including water conservation approaches. The Office is intended to be staffed by a part-time administrator as well as volunteers.
- b) There is a Board meeting open to the public on every first Tuesday of the month as well as community outreach seminars at 7:00 p.m. on the third Tuesday of each month.
- c) We will re-establish watershed public tours in collaboration with Mosaic.
- d) We also publish a monthly information newsletter that is sent to all members of the SBS and contribute articles of interest to local media.
- e) The Ecological Design Panel currently comprised of Barry Gates, Andy McKinnon, David Polster and Craig Sutherland is willing to engage in public education activities.

Much of this work will be organized by the part time administrator and is included in the office expenses.

Budgets

Our budgets have three distinct components: 1) A budget request to the CVRD to maintain the running of the Shawnigan Basin Society Office; 2) A separate budget request to the CVRD to carry out testing of the water and sediment of Shawnigan Lake as well as the major input and output creeks of the Lake. This includes a one-time expense for the purchase of a YSI ProDSS multi parameter meter with 60 m cable. 3) Budget components to address other Shawnigan Basin Society initiatives. These monies will come through various granting agencies. It should be noted that three of the Board Directors have considerable experience in applying for and receiving grant funds. To date, through membership fees and private donors we have raised \$15,650 plus we have received \$2,000 in computer and printer equipment. We have a commitment of \$10,000 through our MOU with Mosaic. Clearly, there is a Community interest in the survival of the Shawnigan Basin Society.

Budget – 1. Annual administrative and office costs

Item	Details	Cost
Office rental costs	The office is critical for the Shawnigan Basin Society function. It acts as a Resource Centre for Community and where the Society's donated computer and printer is housed. It is also used for storage of Reports, Maps and the 3-dimensional model of the Shawnigan watershed. It will also be used for storage of scientific equipment used for water and sediment testing. Note the Shawnigan Basin Society will collaborate with other interested watershed groups in the use of the acquired equipment.	\$12,600
Administrative Assistant	<p>Part-time (12 hr/week) salary plus fringe benefits</p> <p>A critical function of this administrative assistant is the maintenance of membership records, maintenance of the website, preparation of the monthly newsletter, etc. We wish to develop this administrative position into three days a week.</p> <p>The person will assist in the preparation of applications for grants where part of the salary of this administrative position will come from grants.</p>	\$15,023
Telus internet		\$600
Hydro		\$600
Computer and printing supplies	Computer and printer have been donated	
Hostgator Website and Domain Name		\$250
Cowichan Land Trust Membership		\$100
Bank fees		\$30
Office supplies		\$600
Director's Insurance		\$610
Volunteer Canada Membership		\$125

Community mailouts	2 times per year	\$1000
Professional Accountant		\$500
Volunteer Administration	Office staffing & report generation not performed by office admin \$18 x 12 x 56	
Volunteer Executive Director	Board Members performing ED duties (20 hours/wk). Meeting partners, committee representation, grant applications etc.	
	TOTAL Annual Office-Related Expenses	\$32,038

Budget – 2. Annual costs for specific objectives

1) Monitoring the Watershed involving CVRD and Shawnigan Lake School		
a) Shawnigan Lake, South Shawnigan Creek and Shawnigan Inflows and Outflows Water and Sediment Chemistry		
Item in Specific Objective	Details	Cost (\$)
One-time equipment	YSI ProDSS multi parameter meter with 60 m cable	15,462.72
	Calibration solutions	1,045.00
Water samples for water quality analyses (SBS samples collected by volunteers)	Lake samples - 4 sites, 2 per site, 2 times per year & \$500 per sample (Lab)	8,000
	Stream samples - 9 sites, 1/site, 2 times per year & \$500 per sample (Lab)	9,000
	Annual pH probe replacement and general consumables	600
	Boat and safety equipment provided by Mr. Munday	No cost
	Sampling equipment provided by Dr. Turner	No cost
Sediment samples for sediment quality analyses (SBS samples collected by volunteers)	Lake samples - 4 sites, 2/site, 1 time per year & \$300 per sample (Lab)	2,400
	Stream samples - 6 sites, 1/site, 1 time per year & \$300 per sample (Lab)	1,800
	Boat and safety equipment provided by Mr. Munday	No cost

	Sampling equipment provided by Dr. Turner	No cost
	TOTAL Annual 2019 Stream and lake sampling	21,800
	TOTAL first year cost with one-time equipment purchase	38,307.72

1 b) Silt/Sediment Inflow to the Lake		
Item in Specific Objective	Details	Cost (\$)
Water samples for water quality analyses	Requires use of YSI ProDSS multi parameter probe (see one-time equipment) and Sechi Disk	no on-going cost
(Collected by volunteers)	Lake samples - 1 site, 1 per site, 2 times in OC/Nov, \$27 per sample (lab)	54
	Stream samples - 2 sites, 1 per site, 2 times in Oct/Nov, \$27 per sample (lab)	108
	TOTAL annual silt/sediment input sampling	162

1 c) Monitoring invasive species		
Item in Specific Objective	Details	Cost (\$)
Scotch broom	Ecological Design panel members and volunteers	No cost
Eurasian watermilfoil	Volunteers and if necessary, a study on nano-bubble procedure	
Biological controls for Milfoil	Volunteers and if necessary, a study on nano-bubble procedure	
Ivy & Daphne		
ISCC - CDD Signage installation & reporting		
	TOTAL 1 c)	

* not included in total and involves separate funding

1 d) Document vegetative changes along the foreshore		
Item in Specific Objective	Details	Cost (\$)
Consultation with landowners	SBS, Ecological Design Panel members and volunteers	No cost
	TOTAL 1 d)	No cost

2) Increase the amount of forest and wetlands under public ownership.		
Item in Specific Objective	Details	Cost (\$)
Separate project	Work with CVRD and Koksilah Watershed Group to acquire ecologically sensitive lands within Shawnigan & Koksilah River Watersheds	Separate funding
	TOTAL annual increase forest and wetlands	Separate funding

3) Restoring the Integrity of the Watershed		
a) Engage with landowners		
Item in Specific Objective	Details	Cost (\$)
Foreshore restoration	Engage with landowners	
Promote good forestry practises	Work with Mosaic See letter of support (Appendix 1)	No cost?
Promote eco-friendly farming practises	Work with groups such as Cobble Hill Farmers Institute	
	TOTAL engage with landowners	unknown

Budget – 2. Annual costs for specific objectives (cont.)

3 b) Promote relationships with the Malahat Nation to enhance the watershed		
Item in Specific Objective	Details	Cost (\$)
Enhance the watershed	Work with Malahat Nation See letter of support (Appendix 2)	No cost

	TOTAL enhance the watershed	No cost
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3 c) Monitor the biota within and around the Lake. We will depend upon both upon SBS members and community volunteers to report on changes within the watershed.

Item in Specific Objective	Details	Cost (\$)
Assemble monitoring data	SBS and volunteers will provide data to SBS The administrative assistant will record and provide the data to others as needed	Included in Budget1 Annual Funding
	The administrative assistant will record and provide the data to others as needed	Administrative Assistant (see office expenses)
	TOTAL monitoring biota around the lake	Administrative Assistant (see office expenses)

4) Public Education

a) Office use	Administrative assistant and volunteers	
b) Public talk	The third Tuesday of each month – no charge Advertised in newsletter, which requires the administrative assistant	Administrative Assistant input
c) Watershed tours	SBS in consultation with Mosaic Letter of support (Appendix 1)	
d) Newsletter	Update of activities Advertise the public talk	Administrative Assistant input
e) Pubic education talks	Primarily with Ecological Design Panel member and on-site	No cost
	TOTAL Public education	Administrative Assistant (see office expenses)

Budget – 3. Summary of first year and five-year costs

Item	Cost (\$) for first year	COST (\$) for five years
Annual and administrative costs – see Budget 1 for details.	32,038	160,190
Costs for specific objectives – see Budget 2 for details.		
1) Monitoring the Watershed involving CVRD and Shawnigan Lake School		
a) Shawnigan Lake, South Shawnigan Creek and Shawnigan Inflows and Outflows Water and Sediment Chemistry	Year 1 = 38,308 Years 2–5 = 21,800	125,508
b) Silt/Sediment Inflow to the Lake	162	810
c) Monitor invasive species	No cost	No cost
d) Document vegetative changes along the foreshore	No cost	No cost
2) Increase the amount of forests and wetlands under public ownership	Separate funding	
3) Restore the integrity of the watershed		
a) Engage with landowners work with Mosaic (see letter of intent) and with Cobble Hill Farmers Institute	unknown	unknown
b) Promote relationships with Malahat Nation (see letter of intent)	unknown	unknown
c) Monitor biota within and around the lake Requires administrative assistant to record and retain data	Included in office expenses	Included in office expenses
4) Public education		
Requires administrative assistant	Included in office expenses	Included in office expenses
Work with Mosaic (see letter of support)	unknown	unknown
3% contingency	2,115	8,595
TOTALS	72,623	295,103

Volunteer Value Added Value

If one were to hire people to carry out the work done by the volunteers of the Shawnigan Basin Society we are looking to well over \$75,000 dollars worth of work.

Concluding Remarks

The Shawnigan Basin Society provides a valuable public service and deserves support from the CVRD.

Literature Cited in Text and Appendices

Associated Environmental, 2017. South Shawnigan Vreek Water Quality Study Final Report. Prepared for BC Ministry of Environment.

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Riegerger, K. 2007. Water Quality Assessment and Objectives for Shawnigan lake. Science and Information Branch. Water Stewardship Division, Ministry of Environment, Province of BC. www.gov.bc.ca/wat/wq/objectives/shawnigan/shawnigan_tech07.pdf

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Appendix 1

Letter of Support from Mosiac

Page 1 of 3

MEMORANDUM OF UNDERSTANDING

Dated October 15, 2019

BETWEEN:

MOSAIC FOREST MANAGEMENT LTD.

(hereinafter referred to as “Mosaic”)

AND:

SHAWNIGAN BASIN SOCIETY (“SBS”), a registered, non-profit, volunteer organization.

(together, the “Parties”)

WHEREAS:

- A. Mosaic and SBS have built a relationship based on trust, mutual support, open communication, fair dealing, and mutual respect.
- B. Mosaic conducts forestry operations and related business activities on its privately owned land in the Shawnigan Basin and has an interest in sustainable stewardship of the watershed.
- C. Shawnigan Basin Society’s goals include promoting sustainable stewardship of the watershed and protecting it from any activities that may damage it.
- D. The Parties wish to sign a Memorandum of Understanding (“MOU”) effective October 15, 2019.

NOW THEREFORE, the Parties agree as follows:

1. Communications

- a) The Parties recognize that good communication is essential to maintaining a good working relationship and to implementing the intent of this MOU.
- b) Upon signing this MOU, the Parties agree to meet at least once annually to ensure efficient and effective communication between the Parties and to further the implementation of this MOU.

- c) The Parties will appoint a principal representative. The Parties may re-appoint their representative from time to time. The Parties may invite additional persons to meetings where such persons may assist in discussions between the Parties.
- d) The Parties will schedule meetings as they deem necessary by mutual agreement.

2. **Potential Opportunities for Discussion**

The Parties agree that the purpose of the meetings should be to discuss the following and other opportunities and issues that may arise from time to time to determine how both Parties will work together towards mutual understandings regarding:

- a) Mosaic support of SBS interests in stewardship and restoration objectives for Electoral Area B through an annual discretionary and voluntary cash contribution by Mosaic of up to \$2,000 payable on February 1st each year, with the first payment to be made February 1st, 2020. Except for the first payment contemplated above, upon request from the SBS by May 1st each year, Mosaic will confirm the proposed funding amount for the next year by December 15th. Confirmation of the cash contribution in any one year will not give rise to any commitment to provide the same or similar contribution in the following year.
- b) Forestry business opportunities for Mosaic and river/lake restoration opportunities for SBS within the Shownigan Basin;
- c) The need for stable and profitable private land forest operations that do not have significant negative impacts on fish habitat or channel stability, including discussing means by which both Parties can more effectively communicate and support each other;
- d) Collaboration on projects of mutual interest (such as fish habitat assessments and restoration projects) including the sharing of non-confidential information where appropriate;

3. **Mutual Commitments**

- a) The Parties agree to work together in a cooperative, diligent and timely manner to investigate and pursue discussions relating to the development of the potential opportunities set out in section 2 of this MOU and others as they may arise;
- b) The Parties further agree to devote a reasonable amount of time and resources to carry out the terms of this MOU and will do so in good faith.
- c) The Parties further agree to review any concerns each Party may have about the other Party's activities directly with such Party to help ensure any concerns that might ultimately be expressed in public are presented in a manner that includes

the fundamental acknowledgement that both Parties are committed to resolving such matters in good faith.

4. Term

- a) This MOU will expire on October 14, 2024
- b) Notwithstanding section 4 a) above, either Party may terminate this MOU by providing 30 days written notice.

5. Notices

Any notices or communications given pursuant to this MOU will be in writing and will be delivered to or sent by confirmed facsimile or electronic mail, addressed as follows:

- a) in the case of communication to Mosaic:

Pam Jorgenson, RPF
Land Use Forester
Mosaic Forest Management Ltd.
#201-648 Terminal Ave.
Nanaimo, B.C. V9R 5E2
Email: Pam.Jorgenson@MosaicForests.com
Phone: (250) 716-3797
Fax: (250) 716-3763

- b) in the case of communication to Shawnigan Basin Society:

Name: David Munday, President of SBS
Address: Unit 102 – 1760 Shawnigan Mill Bay Road, PO Box 189
Shawnigan Lake, BC V0R 2W0
Email: director@shawniganbasinsociety.org
Phone: 250-709-0367
Office: 250-880-8245

IN WITNESS WHEREOF, the Parties have executed this MOU on the 16 day of Oct, 2019.

MOSAIC FOREST MANAGEMENT LTD.

By: David Munday

Shawnigan Basin Society

By: Germario Jimenez

Appendix 2

Letter of Support from Malahat Nation



Malahat Nation

110 Thunder Road | Mill Bay, BC | V0R 2P4

Tel: (250) 743-3231 | Fax: (250) 743-3251

Malahat

August 15, 2019

info@malahatnation.com | www.malahatnation.ca

Shawnigan Basin Society

#102 – 1760 Shawnigan Lake – Mill Bay Road

Shawnigan Lake, BC

To SBS Directors,

RE: Letter of Support For A Sustainable Ecosystem for the Shawnigan Lake Watershed

The Malahat Nation supports the concept of a sustainable ecosystem for the Shawnigan Lake watershed, which is included in our traditional territory. We encourage the development of a five year plan to deliver volunteer services towards improving the function of the watershed, which includes the following objectives:

1. Preservation of forest functions including water retention;
2. Preservation of wildlife and aquatic habitat for the animals that populate the forests and streams in the watershed;
3. Management of industrial, residential, and agricultural activities in the watershed in a way that allows for sustainable watershed functions;
4. Establish sustainable water balance to support continued function of surface water streams, lakes and groundwater aquifers and,
5. Incorporation of our traditional knowledge to achieve Malahat Nation's objectives for preservation of watershed function to support our traditional ways.

We have concerns with the current activities taking place in the watershed that are not consistent with achieving these objectives. We disagree in principle with the location of a contaminated landfill in the watershed, as well as uncontrolled disposal of soils from construction activities in a way that endangers the terrestrial and aquatic resources in the watershed. Urban development and other development pressures require guidelines that ensure the achievement of our objectives.

We appreciate the opportunity to work with Shawnigan Basin Society towards our common goals. Malahat Nation has limited human resources to meet our consultation objectives. We will endeavor to allocate a representative to take part in your process, including recommending activities that will support our efforts towards improving the watershed.

Thank you for considering Malahat Nation in your planning process.

George Harry, Chief, Malahat Nation

Appendix 3

Details of water & sediment sampling testing

Water quality sample stations will include stations from the Associated Environmental (2017) and Rieberger (2007). The Associated Environmental (2017) sites on South Shawnigan Creek are:

- S-1 Upstream reference;
- S-3 Ephemeral Creek downstream of Lot 23;
- S-4 South Shawnigan Creek downstream of Lot 21 and Lot 23
- S-5 South Shawnigan Creek just upstream of Van Horn Creek; and
- S-6B Van Horne Creek near the confluence with South Shawnigan Creek.

Lake inflow sites from Rieberger (2007) include:

- S-8 Near the mouth of South Shawnigan Creek;
- S-9 At the mouth of McGee Creek; and
- S-10 At the inflow to the West Arm.

The one outflow station from Rieberger (2007):

- S-11 Near the weir used to help maintain the water level of the lake.

The four lake sites from Rieberger (2007) are:

- L-1 Shawnigan Lake South Basin;
- L-2 Shawnigan Lake North Basin;
- L-3 Shawnigan Lake basin in the West Arm; and,
- L-4 Shawnigan Lake North Beach.

Each Lake station will be sampled one meter below the surface, and one meter above the bottom for water quality analysis. Each sampling event will result in 17 samples for water quality analysis (9 stream samples and 8 lake samples).

Sediment quality sampling is focused on identifying contaminants, if present, in the upper South Shawnigan Creek watershed. Sediment sampling stations will be selected in areas that show deposition of material in the silt/clay size fraction. It is this size fraction along with associated organic deposits that tend to be associated with contaminants, which are adsorbed and otherwise contained in these finer components of the sediment.

Sediment quality sites will be located near selected water quality stations, with the understanding that sediments will most likely come from pooling areas where sediment deposition is occurring.

Sediment samples will be taken from the following sample locations:

- S-1 Upstream reference site (Elkington)
- S-3 Ephemeral Creek downstream of Lot 23
- S-4 South Shawnigan Creek downstream of Lot 21 and Lot 23

S-5 Downstream of the confluence with the Ephemeral Creek and Upstream of Van Horne Creek

S-6B Van Horne Creek near the confluence with South Shawnigan Creek

S-8 South Shawnigan Creek near the inflow to Shawnigan Lake

L-1 Shawnigan Lake South Basin

L-2 Shawnigan Lake North Basin

L-3 Shawnigan Lake West Arm Basin

L-4 Shawnigan Lake North Beach

Sediment sampling in streams will entail field separation and retention of the silt- plus clay-sized material. Samples scooped from the upper 5 cm of the stream bottom will be wet-sieved with local stream water through a 2 mm mm stainless steel sieve using as little water as possible. This will limit sediment collection to the sand/silt/clay fraction. Material passing the screen will be transferred to 120 mL containers (2) for shipment to the laboratory. If settling of the solids allows, any overlying clear water will be decanted prior to shipment. The laboratory will be asked to measure % clay (<0.004 mm), % silt (>0.004 to 0.063 mm) and % sand (>0.063 to 2 mm), and the specified constituents (TOC, metals, LEPH/HEPH, PAHs) in the field-processed samples.

We will use a core sampling device to collect the **lake sediment samples**. This device can be viewed on line at:

<https://envcoglobal.com/catalog/water/limnology/field-equipment/universal-core-head-sediment-sampler-kit>

Two samples will be collected at each lake sample station. These will include a sample of the surface of the consolidated layer, and a deep sample at the maximum penetration of the coring device.

The frequency of water quality sampling will be twice annually. One sampling event will take place in late summer when the lake is stratified. A second sampling event will take place when the lake is not stratified: this lake condition usually occurs in March.

The frequency of sediment sampling will be annually in October/November. Sediment samples will be shipped with water quality samples to ALS, which is a qualified laboratory for analysis of environmental samples to the appropriate levels of detection. There will be a total of 14 sediment samples taken annually for this program (six stream samples and eight lake samples).

In addition to taking samples for water and sediment quality analysis, a **profiling multiprobe instrument** (YSI ProDSS with a 60 meter cable) will be used to measure lake and stream profiles. Parameters will include temperature, pH, conductivity, dissolved oxygen ORP/Redox and turbidity. Secchi depth (water transparency) will also be determined at each station.

The YSI ProDSS is an expensive probe but is a one-time purchase. We are willing to provide use of the probe to other interested, qualified parties as well as provide our technical expertise to other parties wishing to test their watershed.

Lake profiles will include sampling from surface to bottom at an appropriate interval. The frequency for lake profiling would preferably be monthly, so that the period when there is no thermocline can be identified for scheduling water quality sampling for the late winter/spring sampling event.

Water samples collected at the water quality stations noted above will be analyzed at the ALS Environmental laboratory as follows:

Water chemistry

- Total suspended solids (TSS)
- Hardness
- Sodium
- Chloride
- Sulphate
- Alkalinity

Nutrients

- Ammonia N
- Nitrite N
- Nitrate N
- Total Kjeldahl N
- Organic N
- Total N
- Total Phosphorus
- Dissolved Ortho Phosphorus

*Chlorophyll *a**

Total and Dissolved organic carbon (TOC/DOC)

Total and Dissolved Metals

Organic Contaminants will include light and heavy extractable petroleum hydrocarbons (LEPH/HEPH), which includes polycyclic aromatic hydrocarbons (PAHs).

Water quality parameters are intended to directly compare to those parameters measured for water quality samples taken as part of the MOE Attainment Monitoring Program. The exception is that the SBS/SRG water quality samples will NOT be analyzed for biological components including phytoplankton, zooplankton, E. coli, enterococci, and fecal coliforms.

This monitoring program is planned for each of five years in the five-year plan. The outcome of each sampling event may result in more or less sampling frequency and scope, depending on results relative to attainment objectives.

Sediment samples will be analyzed at the laboratory as follows:

- light and heavy extractable hydrocarbons (LEPH/HEPH) including Polycyclic aromatic hydrocarbons (PAHs) ;
- Total metals;
- Total organic carbon (TOC); and

- Percent organic content (i.e., Loss on Ignition @400C).

Cost Estimate for Sampling Program

The estimated unit cost for the water samples (from ALS) is \$500 and for the sediment samples it is \$300. For the water samples in the lake there are four sites, 2 samples per site, and two sample times per year. The estimated annual cost is \$8,000. There are nine stream sites, one sample per site and two samples per year for an estimated annual cost of \$9,000. For the sediment samples in the lake there are four sites, one sample per site and one sample time per year for an estimated annual cost of \$2,400. There are six stream sites, one sample per site and one sample time per year for an estimated annual cost of \$1,800. In addition, there are consumable costs for the water samples: yearly replacement of the pH probe (\$400) and additional calibration standards \$(200).

Mr. Munday will provide a Zodiac inflatable complete with 20 horsepower motor and appropriate safety equipment to achieve compliance with boating safety standards. This vessel will be provided to the program at no cost.

Dr. Turner will provide sampling equipment including sediment corer, water pumping apparatus and meters (as described in the proposal) at no cost to the program other than consumables.