

## **SALT SPRING ISLAND WATERSHED WORKING GROUP**

Summary of meeting held on Monday 30 July 2012 at 10am.

Present:

Wayne McIntyre	CRD Director
Peter Grove	Islands Trust trustee
George Grams	Islands Trust trustee
Wayne Lee	Commissioner - North Salt Spring Water District
Erwyn Dyck	Vancouver Island Health Authority
Dave Fishwick	Ministry of Health
Keri Laughlin	Ministry of Health
Leah Hartley	Islands Trust Salt Spring Island Planning Manager

Apologies were received from Deb Epps, Ministry of Environment.

### **1.00 Introductions**

- 1.01 Each attendee described their role and responsibilities.  
1.02 It was recommended that CRD Water Group be invited to participate in the working group.

### **2.00 Election of chair/vice chair**

- 2.01 George Grams was unanimously elected chair of the working group.  
2.02 Wayne McIntyre was unanimously elected vice chair of the working group.

### **3.00 Purpose of group, scope of works and terms of reference**

- 3.01 It was agreed that the purpose of the group is to devise a plan of action to restore the quality of raw water in St Mary's Lake to health.  
3.02 VIHA observed that although the problem of lake eutrophication was prevalent in other localities, St. Mary's Lake was among the worst and was considered in many respects to be the 'canary in the coal mine'.  
3.03 After some discussion about process and methodology, it was agreed that the proposal to undertake a cost/benefit analysis was the correct means of sorting and prioritizing the various solutions proposed to date.  
3.03 There is currently a substantial list of actionable items, although none have been costed nor been rated in accordance with their assessed potential benefit.  
3.04 A risk analysis to determine the environmental and health consequences of each proposed solution should be undertaken. VIHA and MoH would assist with the risk analysis.  
3.05 Provincial staff contributed well in bringing forward clear information about jurisdiction and legislation. They will aim to bring forward historical records and examples from other jurisdictions and confirmed they can resource technical expertise from within their organization.  
3.06 The ministries do not have an immediate "fix" in mind, but expressed a willingness to work towards analysis of the various options.  
3.07 Cost benefit/analysis would best be undertaken by the community.

### **4.00/ ctd.**

## **WATERSHED WORKING GROUP**

### **4.00 Any other business**

- 4.01 It was recommended that the working group draw upon the assistance of community organizations and volunteers in order to undertake the various cost/benefit analyses.
- 4.02 It was suggested that the working group network with other community organizations to solicit their assistance to help promote education and information initiatives. For example, the Farmers' Institute could help broadcast an advisory about using non-phosphate based fertilizer and the Chamber of Commerce might advocate on behalf of the businesses dependent on recreational use of the lake.
- 4.03 VIHA and MoH were cautionary about what could be achieved through septic legislation and land use bylaws. There are significant difficulties with burden of proof and with enforcement that would imply these potential solutions are not likely to realize significant benefits.
- 4.04 It was suggested that DFO be invited to participate in the risk analysis and to comment on proposed solutions.

### **5.00 Next meeting**

- 5.01 Date to be determined.

## **SALT SPRING ISLAND WATERSHED WORKING GROUP**

### **Draft Agenda: Meeting no. 1**

1.00 Introductions

2.00 Elect chair, vice chair

3.00 Agree purpose of group, scope of work and terms of reference

4.00 Discussion on the adoption of a review process

5.00 Review relevant material received

6.00 Any other business

7.00 Next meeting

GFG/23 July 2012

## **WATERSHED WORKING GROUP - TERMS OF REFERENCE**

### **1.00 Background**

- 1.01 Freshwater sources of potable water on Salt Spring Island have been increasingly subject to algal blooms which, in turn, have led to serious water quality problems and health advisories. Urgent upgrades to water treatment facilities in Highland District were necessary as a result of toxic blooms last year and a health advisory has been issued by VIHA for St Mary's lake this year as a result of dangerous toxin levels which threaten health, the environment and the island's economy. In addition, a health advisory was issued for Beddis Water District.
- 1.02 Over the years, various study groups have proposed solutions intended to mitigate the main source of the problem: rising phosphorous levels in island lakes. Whilst excellent management plans have been prepared for two of the island's lakes, St Mary's and Cusheon, the solutions proposed in those management plans have not yet been subject to independent critical analysis and review with the intended aim of undertaking a cost/benefit assessment to accurately gauge the cost of each proposal and its likely chances of effecting an improvement. If the lake is to be restored to a condition that negates the risk from further algal blooms, such an analysis is overdue.

### **2.00 Proposal**

- 2.01 The Local Trust Committee agreed to support an initiative which was recommended by staff, to assemble a watershed working group comprising all legislators or regulators with responsibilities for environmental or health issues related to the lakes or sources of pollution that might contaminate them. Those bodies comprise:

Islands Trust Local Trust Committee (LTC).  
Capital Regional District (CRD).  
North Salt Spring Water District (NSSWD).  
Vancouver Island Health Authority (VIHA).  
Ministry of Environment (MoE).  
Ministry of Health (MoH).

- 2.02 LTC, CRD and NSSWD have already agreed to participate in this exercise and invitations are to be extended to VIHA, MoE and MoH.

### **3.00 Terms of Reference**

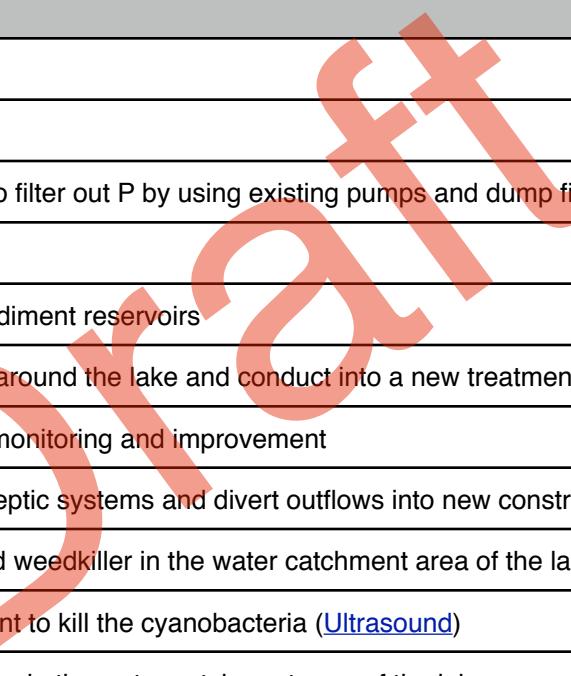
- 3.01 It is proposed that:
- i the working group assemble and, with objective expert help, assess the considerable volume of material already available on the cause of the lake eutrophication and to agree a methodology for having that material peer reviewed;
  - ii the numerous solutions proposed to date be analyzed and that an itemized schedule of actions for restoring the lake be prepared based on cost /benefit principles;

## **WATERSHED WORKING GROUP - TERMS OF REFERENCE**

- iii an assessment be made of the anticipated contribution each solution makes to phosphate and/or toxin reduction. This will be necessary if we are to evaluate the cost and potential benefit of each solution;
- iv local, provincial and federal funding routes be identified to help pay for the restoration.

3.02 In no particular order, the list below itemizes some of the ideas offered to date to reduce levels of phosphates entering the lake. These ideas have not yet been accurately costed, have not been subject to peer review nor been measured to gauge their likelihood in achieving a successful result.

3.03 A second list has been prepared by the Water Council that includes some of the above and also adds to it. These lists to be amalgamated.



<b>Item</b>	<b>Suggestion</b>
1	Spray alum
2	Eradicate perch
3	Recirculate water to filter out P by using existing pumps and dump <del>filtered</del> material off site
4	Dredging
5	Suction pipes in sediment reservoirs
6	Collect all <del>sewage</del> around the lake and conduct into a new treatment plant to be built
7	Septic inspection, monitoring and improvement
8	Upgrade existing septic systems and divert outflows into new constructed wetlands
9	Ban all fertilizer and weedkiller in the water catchment area of the lakes
10	Ultrasound treatment to kill the cyanobacteria ( <a href="#">Ultrasound</a> )
11	Stop all land clearing in the water catchment area of the lakes
12	Education and information programme for island residents and visitors



335 Woodland Drive  
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July 21, 2012

To: The Salt Spring Island Local Trust Committee  
CRD Director

At the Water Council meeting on June 29, 2012, Trustee Peter Grove suggested that Water Council prepare an Action Plan for dealing with potable water issues surrounding St.Mary Lake. This report summarizes various actions, identifies lead groups, and suggests a timeline (short-, medium-, or long-term) for undertaking or accomplishing those actions.

The table appended below summarizes recommended actions drawn from the St. Mary Lake Watershed Management Plan. This plan was developed over the course of several years of study by scientists and other experts in the field, as well as by island residents with considerable local knowledge. It also relied on the similar plan previously developed for Cusheon Lake. The St. Mary Lake Management Plan represents a comprehensive, thoughtful analysis of the issues confronting our community's major surface water supply.

The great majority of the recommendations involve the participation of local government. To accomplish these goals, the Local Trust Committee and the CRD Regional Director must be actively involved. The responsibility for implementing other recommendations rests with provincial agencies and local commissions.

That said, Water Council can play an important role in helping to bring responsible parties together and to educate the public about a wide range of water issues. Despite its limited funding, Water Council has demonstrated its capacity to produce reliable information, share knowledge and raise awareness.

In the short term, Water Council will undertake the following actions:

1. In July, Water Council will distribute the revised brochure on St. Mary Lake door-to-door to property owners surrounding the lake. As this is being done, a volunteer will also collect information about residents' management of their septic systems, and about their use of fertilizers or other products that contain phosphorus.

The North Salt Spring Waterworks District will also mail the brochure to customers in its service area in early September (subject to final confirmation by the District trustees).

Water Council acknowledges the work of the Water Preservation Society in revising the brochure, and is grateful for the financial support of the Local Trust Committee and the CRD Regional Director toward the cost of printing and distributing the brochure.

2. Water Council will also prepare a series of articles (likely five) for publication in the Driftwood on potable water issues. These articles will cover topics such as the quality, quantity, and fragility of our existing surface water supply; the science and biology behind the recent cyanobacteria bloom (blue-green algae) on St. Mary Lake; the nutrient loading caused by phosphorous in the lake sediments, water and in the watershed soil – and how people can reduce their own impact; how other communities have attempted to address the issue of cyanobacteria and algal blooms through alum treatment, introduction of predator fish species, and other possible remedies.
3. Water Council will host a public event in the fall (following publication of the series of articles) to present community members with an opportunity to learn more about surface water issues, share their own information, and ask questions. While using the problems encountered in St. Mary Lake as a point of departure, the event will be of interest even to property owners who do not depend on the lake as a source of their potable water.
4. Water Council will actively support the proposed groundwater study to be conducted by Dr. Diana Allen and a graduate student from Simon Fraser University over the course of the next two years, assessing the linkage between well data and geology as well as the effects of climate change on groundwater.

5. Water Council will continue to meet to bring together the people most directly engaged in the distribution of potable water on Salt Spring Island, and to share their knowledge about a broad range of topics related to water quantity and quality. It will also continue to provide feedback on referrals from the Local Trust Committee, to the provincial government on its proposed amendments to the Water Act, on the implementation of the Riparian Areas Regulation, and other matters.

The Local Trust Committee has already implemented a number of recommendations made in the Cusheon Lake and St. Mary Lake Watershed Management Plans. Revisions to the Official Community Plan in 2008 and other measures have addressed several important areas. Nevertheless, many recommendations still require further action.

Water Council is hopeful that the Local Trust Committee, the Capital Regional District, and the other agencies with the appropriate jurisdiction will take action as soon as possible

Yours respectfully,

George Ehring  
President, SSI Water Council Society

# St Mary Lake Watershed Management Plan: Recommended Actions

(By Short, Medium and Long-term Actions)

July 20, 2012

Objectives and Actions	Lead Group	Short Term	Medium Term	Long Term
<b>Short-Term Actions</b>				
1.1. Complete the mapping of the location of all streams, creeks, and ditches in the watershed	Islands Trust	X		
2.1. The SML Stewardship group should be put on the list of recipients for phosphorus level data.	NSSWD CRD	X		
2.2. The SML Stewardship group should be put on the list of recipients for stormwater sampling data.	CRD	X		
3.1. Consider any other remedial actions through: <ul style="list-style-type: none"> <li>• expert panel</li> <li>• review of other comparable community initiatives.</li> </ul>	NSSWD CRD MOE	X		
4.1. Opt into the CRD septic monitoring program	CRD	X		
4.2. Inspect all existing septic systems in the watershed and identify phosphorus inputs.	VIHA	X		
4.3. Ensure that new disposal facilities meet or exceed VIHA and building code requirements	VIHA CRD	X		
4.4. Provide public information and education on septic system design, use and maintenance through brochures, workshops, etc.	CRD Water Council	X		
4.5. Explore incentives to assist property owners to upgrade failing or inadequate septic systems.	CRD	X		
4.6. Investigate funding for an engineering study of options and costs for septic effluent collection system and treatment facility for residences around St. Mary Lake.	CRD (New Service Commission) Water Council	X (Study)		
5.6. Roadside hedgerows should be preserved or restored.[Added: Roadside ditch maintenance should be conducted during dry weather]	MOTI Mainroad	X		
6.1. Designate St.Mary Lake watershed as a Development Permit Area.	Islands Trust	X		
6.2. Establish guidelines to comply with the RAR (OCP A.5.2.8 a.)	Islands Trust	X		
6.3. Establish guidelines for new developments through best management practices. (OCP A.5.2.13)	Islands Trust	X		
6.7. Continue to use Development Permit Area designations for the protection of the natural environment to protect watersheds used for community surface water supplies or within the capture zone of community water supply wells. (OCP A.5.2.9)	Islands Trust	X		

7.1. Monitor phosphorus levels achieved by aeration to determine whether targets and remedial actions need to be adjusted.	NSSWD CRD	X		
Objectives and Actions	Lead Group	Short Term	Medium Term	Long Term
8.1. Initiate an ongoing Watershed Awareness Program, including the following elements: <ul style="list-style-type: none"> <li>• Host a public gathering to discuss community water issues, options and priorities.</li> <li>• Contribute frequent articles on the issue to the Gulf Islands Driftwood</li> <li>• Support for Watershed Stewardship groups.</li> <li>• Organise a CRD “Septic Savvy” workshop on septic system management to all watershed residents.</li> <li>• Promote and encourage water conservation measures.</li> <li>• Educate Islands Trust and CRD planning and enforcement staff on water quality protection measures.</li> <li>• Provide workshops and lectures co-sponsored by stewardship groups.</li> <li>• Create a “best practices” guide for builders and developers who will be carrying out their projects on lands within watersheds. (see 6.3 above)</li> <li>• Purchase and donate books on watershed protection to the library for community use</li> <li>• Distribute watershed stewardship literature to new residents.</li> <li>• Make watershed residents aware of the uses of protective covenants, including the Natural Areas Protection Tax Exemption Program (NAPTEP).</li> </ul>	Islands Trust CRD SML Stew'ship Group Water Council	X		
<b>Medium Term Actions</b>				
1.2. Map: <ul style="list-style-type: none"> <li>• the location of buried --abandoned fuel tanks</li> <li>• the identification of dams, barriers or diversions of watercourses</li> <li>• the “status of riparian vegetation”</li> </ul>	Islands Trust	X		
1.3. Use above mapping to <b>redefine</b> watershed zoning within OCP and land use bylaw (LUB) designations.	Islands Trust	X		
3.2. Plan for other remedial actions, including: <ul style="list-style-type: none"> <li>• alum/iron/ultrasound/barley straw/etc treatment,</li> <li>• fishery program</li> <li>• sewage collection and treatment system (see 4.6 below)</li> </ul>	CRD DFO MOE	X		

5.1. The Islands Trust-MOTI Letters of Agreement should be revised to define best management practices for amelioration of direct runoff from roads, including ditching practices, especially those related to roads in drinking watersheds.	Islands Trust MOTI		<b>X</b>	
<b>Objectives and Actions</b>	<b>Lead Group</b>	<b>Short Term</b>	<b>Medium Term</b>	<b>Long Term</b>
5.2. Encourage new developments to use drainage techniques that rely on infiltration, such as pits or ponds for groundwater recharge.	Islands Trust CRD		<b>X</b>	
5.3. Storm water drainage ditches should not have a "straight tube" construction, but rather have small pools and steps built in, to slow water flow. Allowing vegetation to grow in ditches also slows water and absorbs nutrients.	MOTI CRD		<b>X</b>	
5.4. Storm water drainage ditches should not cross agricultural lands, where they might pick up nutrients from fertilizer or livestock waste.	CRD		<b>X</b>	
5.7. Oil/sediment water separators should be installed in all culverts that discharge toward the lake and maintained on an annual basis.	MOTI		<b>X</b>	
5.8. Require re-vegetation of lakeside riparian areas	Islands Trust		<b>X</b>	
6.4. Implement a Development Approval Information bylaw for the watershed (OCP G, 1.4.1/2/3)	Islands Trust		<b>X</b>	
6.6. Encourage protection of Crown foreshore, wetland, stream and riparian corridor habitats, other sensitive ecosystems, and wildlife habitat through the Development Permit process. (OCP A.5.2.8)	Islands Trust Water Council		<b>X</b>	
6.8. Ban the use of phosphorus in drinking watersheds, especially in fertilisers.	CRD		<b>X</b>	
8.2. Require docks to have environmentally safe materials and minimize damage to shorelines	DFO Islands Trust		<b>X</b>	
<b>Long Term Actions</b>				
4.6. Investigate funding for an engineering study of options and costs for septic effluent collection system and treatment facility for residences around St. Mary Lake.	CRD (New Service Commission) Water Council			<b>X</b> (Build?)
5.5. Narrow roads should be constructed rather than wide ones, to limit impervious surfaces.	MOTI			<b>X</b>
6.5. Develop property tax exemptions as an incentive for the protection of riparian habitat (OCP A.5.2.6)	Islands Trust Min of Finance			<b>X</b>
8.3. Seek registration of the Watershed Management Plan under the Drinking Water Protection Plan.	Islands Trust CRD			<b>X</b>

## Draft

July 19 2012

To: George Grams Island Trustee  
Peter Grove Island trustee  
Wayne McIntyre CRD Director  
From: Peter Lake  
Subject: St Mary Lake

Summary: Use of Ultra sound for lower cost control of cyanobacter/algae blooms in St Mary Lake.

The recent severe algae/cyanobacter blooms have raised concerns about the current and future health of the lake and the effect on the present and future quality of drinking water as well as possible health hazards for recreational uses. It is generally agreed that the prevention of seepage of phosphorus and other nutrients into the lake is a necessary for the long term health of the lake. This does not address the problem of dealing with the phosphorus that is already in the lake and which must be inactivated or removed to prevent future cyanobacter/algae blooms. Dredging has been used successfully but presents the problem of very high cost and how and where to dispose of the spoils. The addition of buffered alum has been used successfully in the USA as a medium term solution and would also be expensive to implement and would need repeated applications over time. Other algicides may be effective but would be unsuitable in a source of drinking water.

Tracey Shaver of the local PARC office came across a web site in New Zealand (Google Alpha Environmental New Zealand) offering the use of ultra sound as a means of control for cyanobacter. I phoned the company in New Zealand and spoke to the principal a Mr. Ivory who put me in touch with a Mr. Andre Proulx President of Les Traitements Bio- Bac, the Canadian operation. What follows is extracted from those conversations and the web site.

Recent developments claimed by Alpha Environment have modified the ultra sound technology providing 79 alternating frequencies with a band width of 40 kHz instead of 16 and 24 kHz respectively used previously. The principle is that the frequencies are matched to the resonance frequencies of the organisms to be attacked at which they suffer metabolic damage by altering the internal osmotic pressure and flow of liquids interrupting the metabolism of algae which then die. For cyanobacter the vacuoles are imploded causing them to sink to the bottom away from light thus killing them. The ultra sound frequencies used are said to be harmless to vegetation, fish, other aquatic life and humans. The system is expected to control from 75 to 90% of the algae and cyanobacteria within the operating range of the machine. The machines have NSF, UL and CE certification as well as EPA (USA) registration #074929-MA-001. The units are powered either 110 volt @ 18 watts or can be solar powered. Mr Proulx has provided a conceptual layout based on the Google Earth map to cover the entire lake. It might be possible to site some units on private property and connect with hydro under some rental agreement with the owners and at the water treatment plants and aeration site to avoid the problem of vandalism while solar could be used for the balance. The mix would affect final costs. The 110 volt units are \$5000 each FOB plus taxes while solar power would add another \$3000 per unit complete with batteries and posts. So with taxes and freight and installation maybe \$100- \$150,000 might be a very, very rough budget estimate.

The ultra sound might allow immediate control of blooms as they happen for the quick fix. An expert analysis of the problem and consultation to determine whether St Mary Lake is amenable to this solution and to define costs would be needed as a first step. This would require examination of the available data on the types of cyanobacteria, P levels over time and so on. Mr. Proulx has indicated a willingness to undertake this work for which a consulting fee would have to be negotiated. Based on the results and experience Les Traitements Bio – Bac could undertake the installations.

The following references were made available for checking with others also available.

Agnico – Eagle Gold mine  
NioBec mine  
City of Matane WWTP  
Memphramagog Golf Course  
Levis Golf Course St Michel Golf Course

Prior consultation with the appropriate Governing bodies would be necessary to see if any of these approaches can be allowed. If there is no official impediment references could be checked for the practical results and client satisfaction to see if further action would be justified.

Grant and Wendy Wickland <[wendygrant@shaw.ca](mailto:wendygrant@shaw.ca)>  
To: George Grams  
Re: ST MARY'S LAKE

25 July, 2012 4:34 PM

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Hi George

I was thinking about the dewatering and disposal issues.

Leasing the large field next to the east end of the lake would allow dewatering the material that has been dredged with the silty water to be filtered thru hay bales prior to flowing into the creek while the organics and mud from the bottom could be machine composted in long rows. The cutter suction dredge will move 250 cubic yards an hour or 2000 yards in a 10 hour day with time for moving the rig and breaks. The key is to not remove the clay under the bottom silt. Portions of the lake are underlaid with electric blue creamy clay... this should remain.

Composting would produce a saleable soil product without weed seeds. I would estimate that the finished compost volume would be on the order of about 5% of the original organic volume. But a detailed survey of the depth of the organics on the lake bottom would help to quantify the actual volumes that would arrive from the dredge. And a survey of the shallow areas of the lake most afflicted would help with the overall quantities.

I hate to be too positive but the compost could be a motherlode for the farmers and gardeners on the island. It is almost impossible to find garden ready topsoil here or on Vancouver island.

So if done properly, the dredging depth would be tightly controlled so that clay is not dredged and moved to the upland to be mixed with the organics. The sale of the composted soil could cover part of the cost.

To control fines in the lake it is possible to construct a floating curtain around the rig that would contain the fines. The beauty of a suction dredge is that the bulk of the fines go up the pipe to be settled out on land. Clam shell dredging produces a huge plume of fines.

I guess that although this dredging proposal is expensive, the costs of abandoning St Mary's lake as a water source is frightening.

Let's see ... perhaps piping water from Vancouver island and storing it in a concrete reservoir ... not cheap ... or storing Fulford creek water in a concrete reservoir, also not cheap

But when it comes to potable water it's the one thing we can't do without. Although, I have talked to long-time residents of the island who would be delighted to see the population decrease by 80% due to lack of water. Back to the 40's

Best regards,  
Grant Wickland

On 2012-07-25, at 10:13 AM, George Grams wrote:

Grant, thank you for your email of 21 June regarding possible dredging of St Mary's Lake.

The Local Trust Committee and CRD have assembled a working group comprising all legislators and regulators with responsibility for the lake. We will be convening our first meeting shortly. The group aims to evaluate all suggestions and solutions that might help lead to phosphate reductions and thereby the elimination of algal blooms and toxins from the lake. Dredging is included among the potential solutions that we will examine. There are difficulties with it - the cost is high and disposing of the dredged material is an issue. However, we will evaluate the potential of the suggestion to contribute to remediation of water quality on the lake. Bottom sediment is assessed as contributing 63% of the phosphates that enter the lake and it makes sense to remove the single biggest source of that phosphates, if practical and financial difficulties can be overcome.

George Grams  
Salt Spring Island Local Trustee  
250 537 5439