



Salt Spring Island Watershed Protection Authority

Regular Meeting Draft Agenda

Date of Meeting: Friday July 21, 2017 10:30 am - 12:30 pm

Location: School District 64 portable, 112 Rainbow Rd., Salt Spring Island BC

Acronyms:

AGRI - Ministry of Agriculture

CEWG - SSIWPA Conservation and Efficiency Working Group

CRD - Capital Regional District

FLNRO - Ministry of Forests, Lands and Natural Resource Operations

NSSWD - North Salt Spring Waterworks District

MOE (ENV) - Ministry of Environment

SSIWPA - Salt Spring Island Watershed Protection Authority

TWG - SSIWPA Technical Working Group

1. CALL TO ORDER

2. APPROVAL OF AGENDA

3. MINUTES

3.1 Draft minutes of the June 23, 2017 steering committee regular meeting -
attached for approval [Page 3](#)

4. BUSINESS ITEMS

4.1 **Chair's report** - G. Grams

4.2 **St. Mary Lake water quality update** – NSSWD Board Representative

4.3 **Cusheon Lake water quality update** – Beddis Water Commissioner

4.4 **Coordinator's report** – *attached* [Page 9](#)

4.5 **Technical Working Group update** – TWG Co-Chair

- 4.6 **Conservation and Efficiency Working Group update** - CEWG Chair
- 4.7 **Technical Working Group ‘Terms of Reference’** - *facilitated discussion and proposed revision version June 29, 2017 attached* [Page 12](#)
- 4.8 **Technical Working Group ‘Response to Weijs’ review of Safe Yield Report’** - TWG member Fred Beall presents, *attached* [Page 19](#)
- 4.9 **Action 4.10 from Steering Committee meeting June 23, 2017** - TWG member Don Hodgins presents, *attached* [Page 30](#)

TWG was to provide Steering Committee with a method comparison between TWG’s “*Safe Water Yield Analysis*” and Kerr Wood Leidal’s 2015 “*St. Mary Lake Water Availability and Demand Climate Change Assessment*”.

- 4.10 **‘Well Inventory’ project launch update** - Coordinator and Planner Starke
- 4.11 **‘Groundwater Monitoring’ Draft REFBC funding application** - *attached for discussion* [Page 32](#)

4.12 Events and Announcements

- 4.12.1 Royal Roads University - SSI Rainwater Project Final Presentation -
Monday August 28, 2017
Invitation to attend for SSIWPA Steering Committee or Working Group members- *Get details from Shannon on time and carpooling/parking on August 20th.*
- 4.12.2 Salt Spring Fall Fair booth September 16-17, 2017 update - Coordinator
- 4.12.3 Rainwater Home Tour hosted by SSIWPA October 14, 2017 update - S. Bywater

5. OTHER BUSINESS

- 5.1 Questions and Comments from Public

- 6. **UPCOMING MEETING** Friday, August 18, 2017 at 10:30 am
@ School District 112 Rainbow Rd.

7. ADJOURNMENT



Salt Spring Island Watershed Protection Authority

Minutes of a Regular Meeting

- Date of Meeting:** Friday, June 23, 2017
Location: CRD Portable, 145 Vesuvius Bay Road
Salt Spring Island
- Members Present:** George Grams, Chair, Islands Trust Local Trustee
Dale Green, Capital Regional District, Integrated Watershed (via web conferencing)
Doreen Hewitt, Beddis Water Service Area Commissioner
Pat Lapcevic, Ministry of Forests, Lands and Natural Resource Operations (FLNRO) (via web conferencing)
Sharon Bywater, Fernwood Water Service Area Commissioner (Alternate for Lorrie Hunt)
Wayne McIntyre, Deputy Chair, Capital Regional District (CRD) Director
- Regrets:** Lorrie Hunt, Fernwood Water Service Area Commissioner
Derek Masselink, Ministry of Agriculture
Ron Stepaniuk, District Manager, North Salt Spring Waterworks District (NSSWD)
- Staff Present:** Shannon Cowan, Coordinator
Justine Starke, Island Planner (North Pender Island) (via web conferencing)
Sarah Shugar, Recorder
- Technical Working Group Liaison:** Don Hodgins, Co-chair, SSIWPA Technical Working Group
- Conservation Working Group:** Sandra Ungerson, Chair, SSIWPA Conservation and Efficiency Working Group
- Media and Others Present:** 1 member of the public

These minutes follow the order of the agenda although the sequence may have varied.

1. CALL TO ORDER

Chair Grams called the meeting to order at 10:32 a.m. and welcomed Sharon Bywater, Highland and Fernwood Service Area Commissioner.

2. APPROVAL OF AGENDA

The following addition to the agenda was presented for consideration:

4.13.2 Rainwater Harvesting Tour – October 14, 2017

By general consent, the agenda was adopted as amended.

3. MINUTES

3.1 Draft Minutes of the May 19, 2017 Salt Spring Island Watershed Protection Authority Regular Meeting

By general consent, the Salt Spring Island Watershed Protection Authority Minutes of May 19, 2017 were adopted.

4. BUSINESS ITEMS

4.1 Chair's Report

Chair Grams reported he presented an update regarding SSIWPA at the Islands Trust Council on Lasqueti Island. He met with new NSSWD Trustee Michael McAllister regarding the work of SSIWPA. He reported that the LTC has invited the North Salt Spring Waterworks District Board to a meeting. regarding the Kerr Wood Leidal report and other matters. Chair Grams announced the new Islands Trust Freshwater Specialist has been hired and will be based out of the Victoria office. Chair Grams is planning to attend the Islands Trust Well Owner workshop on June 30, 2017.

By general consent, the Salt Spring Island Watershed Protection Authority agreed to invite the new Islands Trust Freshwater Specialist to attend a SSIWPA meeting.

4.2 St. Mary Lake Water Quality Update – NSSWD Board Representative – none

4.3 Cusheon Lake Water Quality Update – Beddis Water Commissioner

Committee Member Hewitt presented an update regarding the Cusheon Lake Watershed and the following highlights were noted:

- The lake level on June 22, 2017 was 1.316 metres; in June 2016 the lake level was 1.098 metres.
- The lake level has increased slightly and is controlled by the beaver dam and salmon enhancement activities.
- Secchi disk was 4 metres on June 22, 2017, while last year it was clearer with a reading of 5 metres.
- Precipitation received at Salt Spring Elementary: Total May 2017: 41.1 mm
Comparison for June 2015: 5.8 mm; Total Apr, May and June 2015 was 46.6 mm; June 2016: 36.8 mm; Total Apr, May and June 2016 was 72.8 mm; June 2017: 28.7 mm; Total Apr, May and June 2017 was 149.3 mm.
- There has been considerable rain in the last 3 months but this does not accumulate very much in the lake.
- The beaver dam is washed away in the winter and the lake flushes in the winter until the beaver dam is built again.

4.4 Coordinator's Report

Coordinator Cowan presented the Coordinator's Report for the period of May 13, 2017 to June 16, 2017 and highlighted the following items:

- Data sharing with the community wells groups (improvement districts and private water systems groups) is ongoing. Interviews are being conducted and the data files inventoried. Six groups are complete and three are outstanding.
- The stream monitoring program is ongoing. The FLNRO Fish and Wildlife aquatic ecologist will be conducting the second site visit, next week, to check on the water level data loggers and temperature data loggers. There was an issue with the Fulford Creek station.
- The Agricultural Land Use Inventory will occur the third week of July, and there was a request for assistance to coordinate volunteers and update the farm list.

The stream monitoring does not include quality measures. The volunteers are measuring depth and width and a data logger is monitoring the temperature (an indicator for fish and wildlife health). Two sites have no volunteers, and they have water level loggers installed instead. All of the data will be logged by FLNRO and SSIWPA. The stream monitoring program will inform the Golder phase two study.

By general consent, the Salt Spring Island Watershed Protection Authority agreed that Coordinator Cowan would continue to assist Derek Masselink with the Agricultural Land Use Inventory to coordinate volunteers and update the farm list.

4.5 Technical Working Group Report

Technical Working Group Co-chair Hodgins presented the following report:

- Safe supply from surface water:
 - The external review has been received and there was nothing noted in the review that has cause for concern regarding the methods. Committee Member Hodgins has looked at the long-term analysis and the completion of the response to the review will likely be received at the July SSIWPA steering committee meeting. The delay is a result of re-evaluating the safe supply values.
- Cusheon Lake Hydrology Study:
 - A TWG member attended the Squires/Bodaly Blackburn Watershed presentation and it was noted there is a need to continue monitoring to achieve a more comprehensive chemistry suite and for continued monitoring for the hydrology of Cusheon Lake. The available chemistry data do not provide a good basis for assessing the long-term change in lake water quality.

Planner Starke noted NSSWD staff and Islands Trust staff met and NSSWD is undertaking an update to the report released in 2015 by Kerr Wood Leidal. The update is expected to consist of St. Mary Lake hydrology, and also to include an analysis of yield from the watershed.

By general consent, the Salt Spring Island Watershed Protection Authority

agreed to request that TWG advise Steering Committee at its next regular meeting on comparative study methods used by Kerr Wood Leidal in the 2015 St. Mary Lake Report, and by TWG's Don Hodgins in the Draft St. Mary Lake Safe Yield Analysis report.

4.6 Conservation and Efficiency Working Group update - CEWG Chair

Conservation and Efficiency Working Group Chair Ungerson presented the SSIWPA Integrated Water Management Program Workplan – Scope of Work Memoranda dated June 13, 2017 and noted the workplan will be as collaborative as possible.

4.7 Approve Scope of Work Memos - CEWG Chair, Sandra Ungerson

4.7.1 IWM Task 8 “Compare Water Conservation and Efficiency Technologies”

4.7.2 IWM Task 8a “Rain Harvesting Alternatives”

4.7.3 IWM Task 8b “Reclaimed Water Feasibility”

By general consent, the Salt Spring Island Watershed Protection Authority approved the Conservation and Efficiency Working Group Integrated Water Management Program Workplan – Scope of Work Memoranda.

By general consent, the Salt Spring Island Watershed Protection Authority request CEWG Chair Ungerson to draft a summary of the CEWG workplan for the Driftwood newspaper and the Watermark newsletter.

It was noted the Ganges Wastewater report would be a resource for the CEWG.

There was discussion regarding public outreach and marketing of SSIWPA activities.

4.8 SSIWPA IWM Budget requests to Local Trust Committee

Planner Starke reported a staff report would be received by the Salt Spring Island Local Trust Committee on June 29, 2017 regarding funding for the well inventory and monitoring and approval for the Islands Trust to be the “home” agency for the REFBC grant funding.

4.9 REFBC Application for funding - IWM Task 5b

Coordinator Cowan reported the REFBC application is 60% complete and would be submitted by the Islands Trust grant coordinator pending approval from Salt Spring Island Local Trust Committee to manage the terms of reference for the project.

The total project costs is estimated at \$21,000 and the REFBC grant application total is approximately \$9,000.

4.10 Revised TWG Terms of Reference

The draft Technical Working Group Terms of Reference was presented.

There was discussion regarding Objective Item 2 “to identify critical information gaps and fill them”.

By general consent, the Salt Spring Island Watershed Protection Authority agreed to amend the terms of reference as follows: “Objective Item 2 – To identify critical information gaps” and include another item as follows “Bring to SSIWPA suggested methods in which those gaps could be filled” and Coordinator Cowan will circulate an amended draft to Committee Members.

4.12 Correspondence

4.12.1 June 8, 2017 - Letter to Steering Committee regarding proposed new regulations related watershed protection and agriculture in Rural Watershed zones 1 and 2

4.12.2 May 17, 2017 - Royal Roads University “SSI Rain Harvesting Survey and Assessment” project quarterly progress report

The final results will be presented August 28 or 29, 2017 at Royal Roads University, and Sandra Ungerson and/or Shannon Cowan will attend on behalf of SSIWPA. SSIWPA Committee Members are welcome to attend.

The correspondence was received.

4.13 Events and Announcements

4.13.1 Well Owner Workshop - Friday, June 30, 2017, 10:00 a.m. to 12:30 p.m. at the Lion’s Hall, 103 Bonnet Avenue

4.13.2 Rainwater Harvesting Tour – October 14, 2017

5. OTHER BUSINESS

5.1 Questions and Comments from Public - none

6. NEXT MEETING

The next regular meeting is scheduled for Friday, July 21, 2017 at 10:30 a.m. to 12:30 p.m. at the School District 64 Boardroom Portable, 112 Rainbow Road.

7. ADJOURNMENT

By general consent the meeting adjourned at 11:48 a.m.

George Grams, Chair

CERTIFIED CORRECT:

Sarah Shugar, Recorder

DRAFT



Coordinator's Report

For the period: Jun 16 - Jul 15, 2017

Meeting Admin:

Steering committee meeting June 23, 2017 – agenda created, circulated, posted to public

Draft Jun 23/17 minutes - received from minute-taker, edited and circulated revised minutes (draft) to Steering Committee

Created adopted steering committee minutes for May 19, 2017; printed for signature

TWG quarterly meeting June 13 - Facilitated, created and circulated agendas, minuted and circulated draft minutes

Informal meetings of CEWG and TWG (one each) – agendas, venue bookings and minute-taking and circulation

Coordinated payments for meeting venues invoiced to People Power Productions (for reimbursement by Islands Trust), and corresponded with vendors for change to invoicing procedures for venue bookings in future.

Project Management/Facilitation:

Integrated Water Management Program

Correspondence with water service area “community wells” (ongoing)

Interview complete and data received as of July 15, 2017 (Reginald Hill, Scott Point, Maracaibo, Mt. Belcher, Merchant Mews, Swan Point, Harbourview)

Data organized and entered in Excel format as of July 15, 2017 (Reginald Hill, Scott Point, Maracaibo, Mt. Belcher, Merchant Mews, Swan Point, Harbourview)

Agreed to share, but interview, signed agreement form or data still outstanding as of July 15, 2017 (Erskine Water Board (have interview), High Hill)

Stream Monitoring

- Data from May 25th transferred from notebook to excel sheet
- Coordinated volunteers for stream field day June 29th

- received and archived photo and measurement data by volunteers each week (3 emails per week), archived
- tracked equipment in stream locations, communications with landowners (2)

Coordinating and networking for AGRI's ALUI and AWDM

coordinated and advertised for accommodation and driver/navigators for July ALUI; sourced contact list for current farmers and farm addresses

REFBC Grant Application 5-19-2017 Action 4.10.2 (draft dated July 14, 2017)

- writing and editing, with S Barroso (TWG)
- matching funding confirmation, coordination

coordinating action 5-19-2017 4.9 – review to Planner Starke’s staff report for funding request for LTC allocation, on two projects coordinated by SSIWPA

5-19-2017 Action 4.11 Revised TWG Terms of reference and circulate to steering for comment, place facilitated discussion of same on upcoming agenda

research - water e-news by Partnerships for Water Sustainability BC, POLIS, etc.

research - Regional District of Nanaimo online information about rainwater harvesting and groundwater monitoring for grant development and related SSI projects

research – federal and provincial online resources for remote groundwater sensing, and pharmaceutical water quality testing in drinking water (for TWG and CEWG work)

Internal correspondence – SSIWPA member agencies:

- Liaised with Islands Trust Staff re Market in the Park (ongoing)
- Fall Fair discussions – Islands Trust Staff

Budget

Working budget (in process) revisions to accommodate IWM program costs approved by SSIWPA agencies, matching funds for grant proposals, Local Trust Committee, and REFBC grant development

Conservation and Efficiency Working Group Projects Coordination

RRU project (Royal Roads) weekly correspondence

CEWG informal meeting agendas, notes, facilitation

Assisted with document revision and consensus for Scope of Work proposals to steering committee, approved June 23rd SSIWPA meeting (COMPLETE)

Co-writing press release with CEWG member, SSIWPA Action 23-6-17 item 4.7 (July 12, 2017 Driftwood publication)

Technical Working Group Projects Coordination

Assisted with access to research articles and documents from library sources, document printing and delivery liaison

Coordinate TWG response to Weijs review and TWG consensus on same ACTION 5-19-17 item 4.7: COMPLETED. Correspondence with affordable housing projects about well driller's records (providing information requested by TWG co-Chair Hodgins for this action item)

Outreach and Educational Event Planning and Coordination

Rainwater Tour and "door prize rainwater assessment" press release writing, in July 12th Driftwood newspaper

Rainwater Tour correspondence with Sharon Bywater, planning

18 Letters sent: Rainwater tour invitations and hosting invitation sent to community environmental groups and each water district / commission for circulation within memberships

Liaised with members of the public at well owner workshop, and with service providers applied for exhibitor space Fall Fair

Corresponded with writer for Vital Signs Report, re: water quality and water management practices on SSI

June 30th well workshop promotion (newsletter, emails), and gave presentation, set up information table for SSIWPA-coordinated groundwater projects

Watermark newsletter

Edited June template and added links of interest, agenda links and referred to news posts about topics in content

Sent June watermark (date of send Jun 19)

Drafted July newsletter (date of send July 18)

Website:

Uploaded Golder study article by from January 2017 newsletter that was lost in website crash for reference

Bmps page from the steering-approved list of links and bmps, in progress.



Salt Spring Island Watershed Protection Authority TECHNICAL WORKING GROUP TERMS OF REFERENCE

Adopted August 29, 2013

Amended March 3, 2014

Amended February 2, 2015

Amended September 14, 2015

Amended January 29, 2016

Draft Proposed Amendments December 8, 2016 - TWG

Coordinator suggestions May 30, 2017

Steering-agreed amendments Jun 23, 2017

Background

The Salt Spring Island Watershed Protection Authority (SSIWPA) was created in 2012 to provide a coordinated approach to watershed management and the protection of fresh water resources on Salt Spring Island. SSIWPA is comprised of agencies and government organizations with responsibility and authority for the use and management of the water and the watershed.

SSIWPA identified the need for a Technical Working Group (TWG) to assist by providing SSIWPA with **objective assessment** of scientific research to date, identifying information gaps, researching solutions, **and making recommendations of a technical nature to SSIWPA**. The SSIWPA is responsible for governing the process and making decisions about contracting, work planning, and milestones.

These Terms of Reference (ToR) outline the roles and responsibilities of the Technical Working Group for the Salt Spring Island Watershed Protection Authority.

Please refer to the Terms of Reference for the Salt Spring Island Watershed Protection Authority. The TWG ToR may be amended by the SSIWPA **Steering Committee (SC)** if required by changes to scope of work, membership, timeline, or other matters.

Purpose

The purpose of the TWG is to provide balanced and science-based, technical advice to the SSIWPA, and through it, to its member agencies. The advice of the TWG is to be impartial and objective, drawing on collective expertise to identify watershed issues and to develop workable solutions that reflect the best available science, innovative technologies and consensus approaches.

Mission

www.ssiwatersheds.ca

c/o SSI Islands Trust ~ 1-500- Lower Ganges Road, Salt Spring Island V8K 2N8

Coordinator Shannon Cowan ssiwpacoord@gmail.com 250-537-4847

The TWG exists to provide science-based, technical advice about water and watershed science to the SSIWPA, and through it, to its member agencies. It aims to be a trusted source of scientific expertise and knowledge on Salt Spring Island for sustainable watershed management and source water quality and quantity assessment. As directed by SSIWPA Steering Committee, TWG may be called on to generate and analyze scientific data, and/or to peer review existing technical information.

Objectives

The TWG's approach is to be science based. The following tasks are among its duties:

1. To assemble and collate existing information and data on causes of the deterioration of source water quality in general, and in Salt Spring Island's drinking water sources in particular.
2. To identify critical information gaps.
3. To bring to SSIWPA Steering Committee suggested methods by which those gaps could be filled.
4. To assess priorities for watershed projects/programs according to technical rationale.
5. To advise on the technical costs, benefits and timetables for water management/remediation projects.
6. To advise on stewardship practices to protect water quality, quantity and other interests, including seasonal flow or contamination issues.
7. To advise on technical aspects of existing or proposed water-related legislation and policies.
8. To evaluate research that supports watershed management recommendations including:
 - i. Proposals to remediate surface water quality and address root causes of watershed ecosystem decline;
 - ii. Needs assessment for fisheries, wildlife and other environmental resources;
 - iii. Reported ecological limits of surface water and ground water watersheds;
 - iv. Emerging research on climate change impacts;
 - v. New technologies and approaches;
9. To assess the value of programs and other implementation tools that conserve or enhance water quality and supply.
10. To submit to SSIWPA as directed, position papers, briefing notes or verbal presentations.
11. To make its reports and its recommendations available to SSIWPA and to the community by means of a digital online library, to be contained within the SSIWPA web site.
12. Changes to these Terms of Reference or to the TWG's scope of work, membership, timeline, or other matters may be made by SSIWPA as it considers appropriate.

Scope and Geographical Areas

Initially, the work of the TWG was peer review, and updating the St. Mary Lake Watershed Management Plan (Schedule A), focusing on a robust assessment of actions that will serve to remediate the raw water and on the protection of the St. Mary Lake watershed. Review of Cusheon Watershed Management Plan (2007), and new recommendations, was added in 2015-16 (Schedule B). In 2017 with an approved Integrated Water Management Program workplan, SSIWPA added new project task areas to the TWG scope of work (Schedule C).

Membership

SSIWPA TWG membership will be comprised of not more than nine members at any time. Membership will be determined by consensus of the SSIWPA, in consultation with each member organization.

Member appointed by SSIWPA will have experience or expertise in one or more of the following areas:

- Limnology
- Aquatic Biology
- Soil science
- Environmental Restoration
- Environmental Science
- Hydrology
- Chemistry
- Toxicology
- Watershed protection
- Water resources Engineering
- Civil Engineering
- Mathematics
- Environmental Engineering

As positions become available, invitations to apply will be extended, but not limited, to representatives from Environment Canada, Fisheries and Oceans Canada, Provincial Ministry of Environment, Ministry of Forest, Lands, and Natural Resource Operations, Capital Regional District, Vancouver Island Health Authority, North Salt Spring Waterworks District, Salt Spring Island resident experts, and academic institutions.

Four of the members shall be appointed to terms of twelve months and three of the members shall be appointed for terms of two years, as specified by SSIWPA at the time of appointment. Thereafter, membership is for a two-year term, with the possibility of renewal.

Members are to serve without remuneration.

Chair

At the initial meeting of the TWG, and then every 3 to 6 months, as determined by general consensus of the TWG, a Chair of the committee will be elected. The chair may serve additional terms, up to a maximum of six consecutive years. The chair is to serve without remuneration.

The Role of the TWG Chair is to include:

1. Liaise with the SSIWPA Steering Committee Chair, Coordinator and TWG members to set agenda topics.
2. Ensure distribution of TWG meeting notes to TWG members through the SSIWPA Coordinator.
3. Liaise with SSIWPA Coordinator, SSIWPA Steering Committee, and Islands Trust to effectively facilitate and coordinate the TWG.
4. Provide TWG progress reports in SSIWPA meetings, with TWG approval of messaging content.

SSIWPA Coordinator will act as facilitator and recorder for formal TWG meetings, unless otherwise arranged and agreed to by both SSIWPA Steering Committee and TWG. TWG Chair and Coordinator may agree to work together to facilitate TWG meetings, to better allow the TWG Chair to participate in the discussions and technical proposals. The SSIWPA Coordinator assists TWG with its group process functions within and outside of TWG regular meetings, to the extent that coordination resources allow.

Guidelines for Decision-making

Decision-making is by consensus. Consensus is defined as agreement by each member, and is achieved through an iterative process: a) proposal, b) clarification and discussion stage, c) proposal modification

(with assistance by those suggesting change; as necessary), and finally, d) agreement by consensus, or withdrawal of proposal, by consensus.

There are two levels of Consensus, Full and Working:

Full consensus – all representatives agree and support the decision;

Working consensus – not all members support the decision, but all can agree to respect the decision. Those standing aside note their reasons for the record.

Where Consensus is not reached on the first go-round, issues/proposals may be tabled at subsequent meetings of the TWG, but no more than three times for a single proposal/issue. If Consensus cannot be achieved at the third tabling, a majority and a minority opinion statement will be recorded in writing in the meeting notes. Every effort will be made to explore, understand and accommodate the interests of dissenting viewpoints.

Meetings

TWG will hold public meetings a minimum of four times per calendar year. TWG Chair will report monthly on TWG progress and current activities in SSIWPA monthly meetings, which are open to the public. Some or all of the TWG members may meet informally to discuss science and technical matters, but not to make decisions or recommendations to SSIWPA, as frequently as required, at a location mutually agreed to by TWG committee members.

Notice of Meetings and Minutes

Notice of the date, time and location of all formal TWG meetings will be posted by the Coordinator to the TWG and SSIWPA Steering Committee Chair by email, and will be posted publicly on the SSIWPA website. Agendas and adopted minutes will also be posted to the SSIWPA website under the TWG agendas and minutes page.

Conduct

TWG members and observers will be expected to behave with due decorum. That is to say:

Meetings will be conducted with decorum, and generally follow Robert's Rules of Order as interpreted by the Chair and/or Facilitator;

Communications at all meetings will be respectful, considerate, honest, and issue-focused;

All viewpoints will be encouraged, respected, and considered;

Participants will make every effort to resolve issues at the table, and will avoid seeking alternative decisions outside this process;

Participants should have a common understanding of the mandate of SSIWPA and the TWG, and demonstrate mutual respect to other participants.

Funding

It is anticipated that the representative agencies of the SSIWPA will contribute funding for a SSIWPA Coordinator, to work with the TWG, as well as the SSIWPA. As appropriate, the representative agencies will also provide additional funding in support of agreed to initiatives for SSIWPA TWG, and in-kind administrative support like meeting rooms, communications, and secretarial services.

Other funding will be pursued opportunistically and as required.

It is anticipated that some of the work cited under “Objectives” will be accomplished by contractors.

Conflict of Interest

TWG members must take a precautionary approach to ensure that issues of potential or perceived conflict of interest are clearly identified as part of the process.

Publication Protocol

1. Raw data (from SSIWPA member agencies, from collaborators, and/or from any SSIWPA-TWG monitoring programs) will be shared amongst all TWG members as they become available, as and if requested.
2. Raw data (SSIWPA-generated) will be logged and stored in hardcopy form and/or electronic form by the Program Manager, or working group members and will be delivered to SSIWPA Steering Committee at the end of the project, in the form of a deliverable for the specific SSIWPA monitoring program.
3. Raw data (generated by SSIWPA member agency or collaborating group or individual) will be stored in hardcopy and/or electronic form by the working group members who have permission to use it, and by the SSIWPA Coordinator (as backup and future reference only). If appropriate, some raw data will be marked sensitive/confidential (e.g. data pertaining to water consumption that is directly related to identifiable individuals or businesses), for SSIWPA use only. It will not be shared with outside groups or individuals, and will be accessed only in reference to a specific SSIWPA project, program or use, as designated by a written memorandum of agreement with the data-generating agency.
4. Data analysis results and working spreadsheets for SSIWPA projects are to be shared amongst working group members at the sole discretion of the person who created them. Once distributed, data contained in such spreadsheets may then be used by the recipients for SSIWPA project-related interpretation, analysis or scientific purposes.
5. Reports dealing with interpretation of the data for SSIWPA project-related purposes will (ideally) be written to acceptable scientific standard and will be authored by the person(s) who create them. Authorship can be worked out on a case-by-case basis.
6. Selection of subject matter and scope of such reports will be determined by the person(s) who write(s) the report, but will generally follow direction by SSIWPA Steering Committee in approved SSIWPA working group project workplans.
7. Reports created under 5 & 6 above may be distributed to working group members for information and/or request for comment, at the discretion of the author. Subject to correction or editing, such reports may be forwarded to the SSIWPA steering committee and published on the SSIWPA website with permission of the author.
8. Reports requested by SSIWPA steering committee, by consultants working for SSIWPA, or required as a deliverable of a SSIWPA monitoring program, will be authored by the person(s) preparing them, or will be considered working group-authored (if collaborative and agreed by all working group authors). Authorship will be worked out on a case-by-case basis in advance of report preparation and/or publication.

9. Copyright for authored reports will remain with the author(s).
10. Any raw data shared with SSIWPA or its' working groups will not be shared publicly without prior consent and written permission from the agency that generated the data.
11. Published reports/ papers will acknowledge all contributions of data, financial support and expertise from others.
12. Scientific papers prepared under 5 & 6 above may be submitted for peer-reviewed publication without permission of SSIWPA, as long as all authors are in agreement. Such papers will acknowledge all contributions of data, financial support and expertise from others.

Schedule A: Role of TWG 2013-15: St. Mary Lake Focus

- In the short term, the TWG will be requested to assess the “Review of St. Mary Lake Restoration Options,” by Ken Ashley (2008) that was prepared for Deborah Epps (Ministry of Environment), and add consideration of any potentially viable solutions that may have been omitted. The TWG will be asked to undertake a cost-benefit analysis of each option, identifying and attempting to fill any information gaps that may exist.
- Subject to funding, assistance from consultants may be required to assist with analyzing data and information that is beyond the capacity of the TWG as a committee of volunteers.
- A major role for the TWG will be to participate in a structured decision-making process and evaluate the recommended options, with stakeholders, in a systematic and thorough way that builds consensus in the process. The final result will be a short list of peer reviewed, community generated actions that can be used to update the St. Mary Lake Watershed Management Plan and that the SSIWPA can seek to implement.
- Other tasks may be assigned as the process unfolds and water quality issues in St. Mary Lake are better understood.

Schedule B: Role of TWG: 2015+: Cusheon Lake Focus

- In the short term, review and assess technical papers and other resources regarding the Cusheon Lake Watershed. Reports include:
 - “Apparent sources of P affecting Cusheon Lake Salt Spring Island, BC, by J. Sprague (2007). Available at <http://ssiwatersheds.ca/technical-and-other/>;
 - “Cusheon Watershed Management Plan” by Cusheon Watershed Management Plan Steering Committee, (2007). Available at: <http://www.islandstrust.bc.ca/lrc/ss/pdf/sscusheonlkwatershedplan.pdf>
- Attendance **to** and consideration of scientific and community values/issues or concerns regarding the Cusheon watershed, as presented to the SSIWPA
- The TWG will be asked to undertake a cost-benefit analysis of each option, identifying and attempting to fill any information gaps that may exist.
- Subject to funding, assistance from consultants may be required to assist with analyzing data and information that is beyond the capacity of the TWG as a **group** of volunteers.
- Other tasks may be assigned as the process unfolds and water quality issues in Cusheon Lake are better understood.

Schedule C: See documents attached.

C-1: Integrated Water Management Program Charter (adopted August 19, 2016; latest version May 19, 2017),

C-2: SSIWPA 2017-18 IWM Workplan.

Draft

Proposed Amendments:

- by TWG - December 8, 2016 **in red**:
 - Typos within body
 - “Schedule B” – addition of “to” and “group”, as indicated, for clarity.

- by Coord May 30, 2017 and Jun 28, 2017 **in green**:
 - Section “Background” – proposed changes in paragraph outlining role and rationale for creation of working group.
 - Section “Objectives” – see items 4, 8 and 11 for changes proposed.
 - Section “Scope and Geographical Areas” – revised to reflect new programs.
 - Section “Membership” – added “As positions become available” to indicate that invitations to apply are not ongoing.
 - Section “Notice of Meetings” – addition of “formal” and “adopted” to describe minutes.
 - Section “Funding” – added “...for SSIWPA TWG” to indicate the use for indicated agency support.

- by consensus of Steering Committee Jun 23, 2017 **in blue**:
 - Objectives 2 and 3 re-written for clarity.

APPENDIX E

Response to the external review of Safe Yield Analysis for Surface Water Resources

By Donald O. Hodgins, Ph.D., P.Eng.

Background

The safe yield analysis report was submitted in draft form to the Technical Working Group of SSIWPA in December 2016 for review and comment. Upon the author's recommendation an independent review of that report was also requested from Professor Steven V. Weijs of the Civil Engineering Department of the University of British Columbia. The Weijs review, a copy of which is part of this appendix, was submitted to the Islands Trust Council and provided to the author in April 2017. Professor Weijs made a number of suggestions designed to reduce the uncertainty in the yield estimates, and raised a couple of potentially substantive issues. The following response was prepared by the author in June-July 2017 and submitted to the Technical Working Group on July 7, 2017.

Response

The points are addressed in the order discussed by Weijs, and referenced by *W* followed by the page number and subject.

W2 rating curve and outflow. Flow measurements for Duck Creek were obtained at a section below the weir so that the discharge from overtopping, and from the fish ladder were captured. One exception was a measurement made by the author and Maggie Squires on the weir itself; however, that value plots on the same curve as the other measurements. Thus it is correct to use the Q-h curve only when $h > 40.7$ m. The linear flow variation applied when $h < 40.7$ m was based on anecdotal information that the 9 L/s environmental flow was unlikely to met as water levels approached 40 m, but this has not been confirmed by direct measurement (to the knowledge of the author at the time of writing).

W3 Numerical solutions to differential equations and monthly data to daily data. In order to check the influence of time discretization on the estimated yields, the input data for water level, evaporation and for withdrawals by CRD and "others", were interpolated to daily values and the water balance equation was integrated with a uniform time step of one day. Figure E1 illustrates the interpolated water level curve, and the resulting daily inflow time-series.

In the diagnostic calculation the summer of 2009 is the limiting year for draw down to 40 m. Four tests were conducted in the order listed below, with the following results for the scale factor *F* and the June-October yield:

1. daily input for *W*: $F = 1.420$, $W = 471 \text{ dam}^3$,
2. daily input for *h* & *W*: $F = 1.415$, $W = 469 \text{ dam}^3$,
3. change *Q* formula to $h < 40.7000$: $F = 1.425$, $W = 472 \text{ dam}^3$,
4. daily input for *E*, *W* & *h*: $F = 1.425$, $W = 472 \text{ dam}^3$.

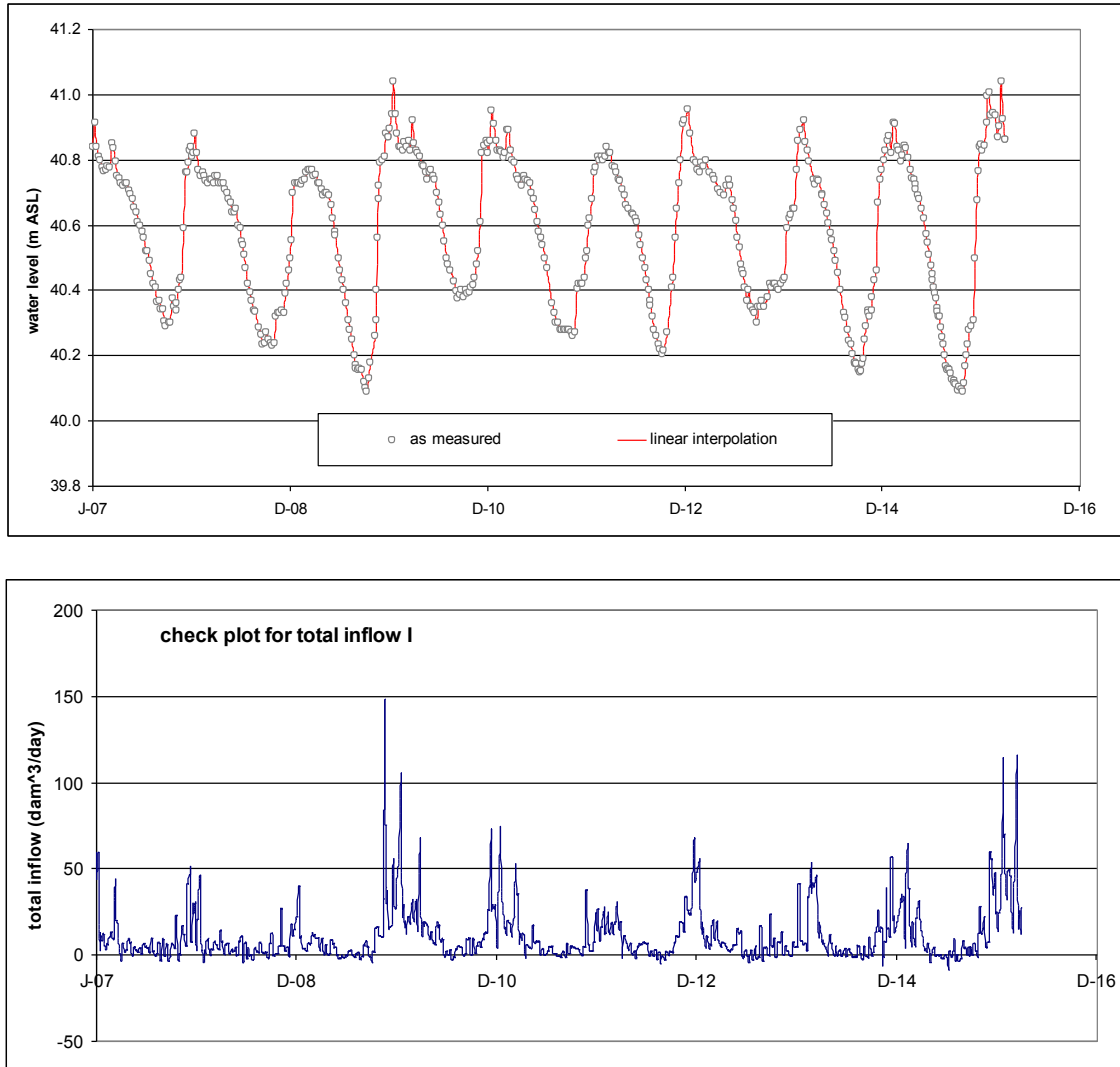


Figure E1 Interpolated daily water level time-series shown with reference to the input data (upper panel) and the diagnostic run check plot for total inflow I using daily input for water level h , withdrawal W and evaporation E (lower panel).

The original solution was $F = 1.405$, $W = 482 \text{ dam}^3$. As expected reducing Δt to 1 day changes the results slightly, by about 2% of the original solution and is not significant given other approximations in the input data.

The evaporation data were not shifted by the two leap years. The daily evaporation data were correctly started on January 1st of each year.

W3 Evaporation data used. As noted in the original report, the Thornthwaite equation for evaporation is quite approximate; however, the monthly estimates agree reasonably well with 30 years of measured evaporation data collected at the Environment Canada Saanichton CDA station (Fig. E2), although perhaps slightly over-estimating the rates from August through October. The Saanichton measurements are widely used in British Columbia as a standard for evaporation.

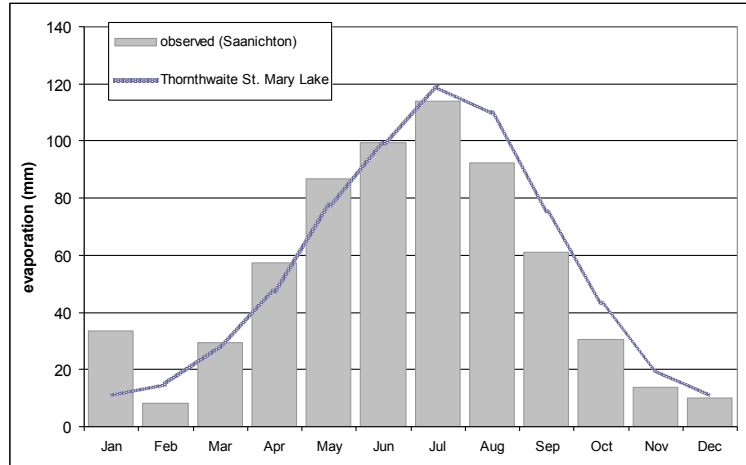


Figure E2 Comparison of the Thornthwaite equation estimates of evaporation for St. Mary Lake with pan measurements made by Environment Canada at the Saanichton CDA station (1960-1990).

As Weijts notes, the multi-year average evaporation rates are used for all years of the simulation, and the actual inter-annual variations are thus reflected in the inflow time-series. The significance of this effect has been examined as follows. The monthly mean temperature data from 1976 to 2015 (Fig. E3 – upper panel) were obtained from Environment Canada (St. Mary Lake station) and used to evaluate the monthly evaporation rates using the Thornthwaite equation (Fig. E3 – lower panel). The total evaporation for the period May-September was calculated for each year using these data; Fig. E4 illustrates their frequency and cumulative distributions.

The statistics show that 83% of the estimated evaporation rates lie between $\pm 40 \text{ dam}^3$ of the mean value of 480 dam^3 , or within about 8%. Ninety percent of the values lie within 11% of the mean. Thus, during the critical time of year when evaporation exceeds rainfall, the inter-annual variation is typically about 10-12% of the long-term mean value. To gauge how important this is on the *diagnostic* solution for inflow I, the model was solved using the Thornthwaite evaporation rates, interpolated to daily values (Fig. E5).

Figure E6 illustrates the *difference* between the solution for I using the multi-year average daily evaporation for input, and the solution for I using the daily time-varying evaporation values from Fig. E5. The frequency and cumulative distributions for the *differences* are plotted in Fig. E7. Here, 92% of the values lie with $\pm 0.4 \text{ dam}^3/\text{day}$. Over winter inflows range from 10 to over $40 \text{ dam}^3/\text{day}$, and the differences between solutions are insignificant. During the summer period, inflows typically decrease to around 1 to $5 \text{ dam}^3/\text{day}$, sometimes less. Thus, differences between the solutions *can* represent a substantial fraction of the inflow from the water balance calculation. However, when accumulated over the draw down period, these differences produce *no measurable effect* on the calculated yields. In fact, the yield values for the diagnostic period are identical to six significant figures.

Finally, the Jun-Oct yields from the diagnostic calculation in its original form with a weekly time step, and the optimized model with daily input and a daily time step are compared in Fig. E8. The differences range from 6.3% to -1.1%, with an average of 2.6% (with the optimum model values in the denominator). Thus, the various changes to optimize the accuracy of the integration procedure for the water balance equation do have a small effect, of roughly 3% or about 10 to $15 \text{ dam}^3/\text{year}$ over the draw down period.

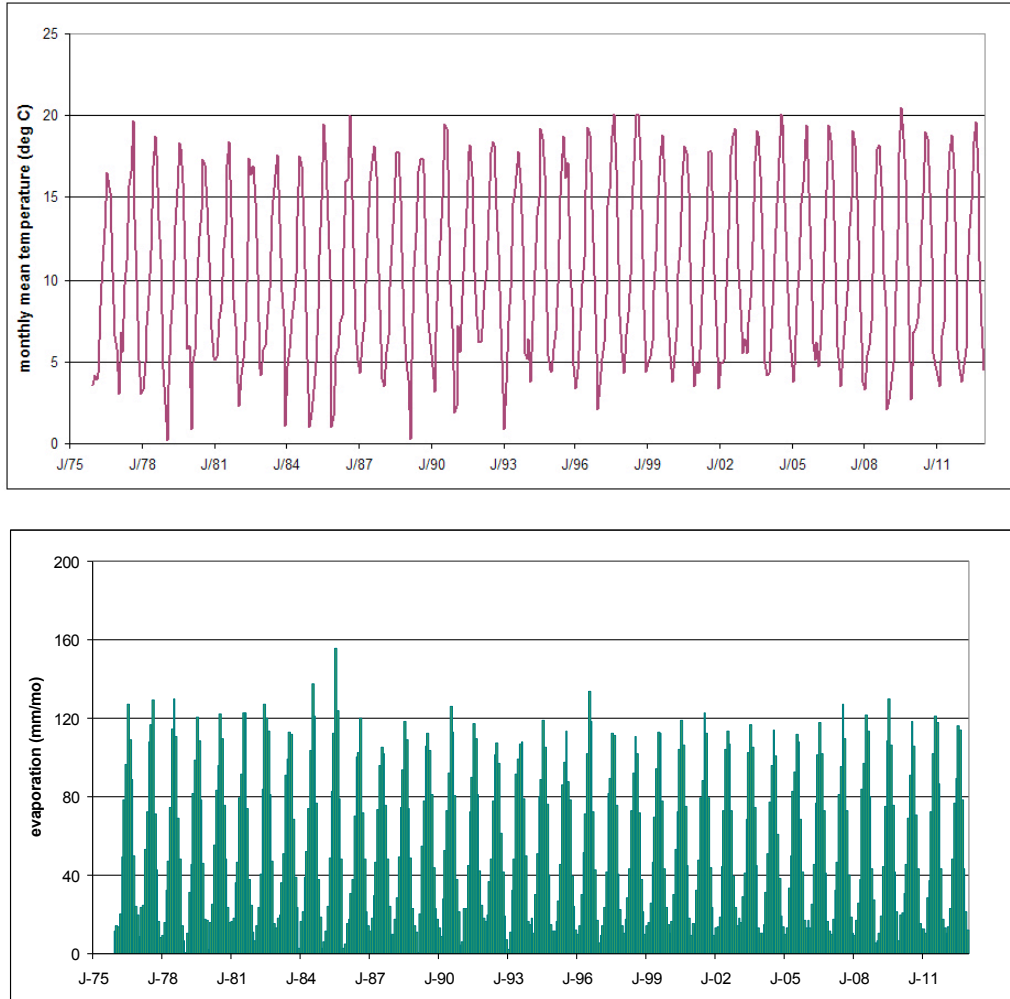


Figure E3 Monthly mean air temperature for St. Mary Lake (upper panel) and corresponding monthly evaporation in mm/month (lower panel). The evaporation was calculated using the Thornthwaite equation (see text).

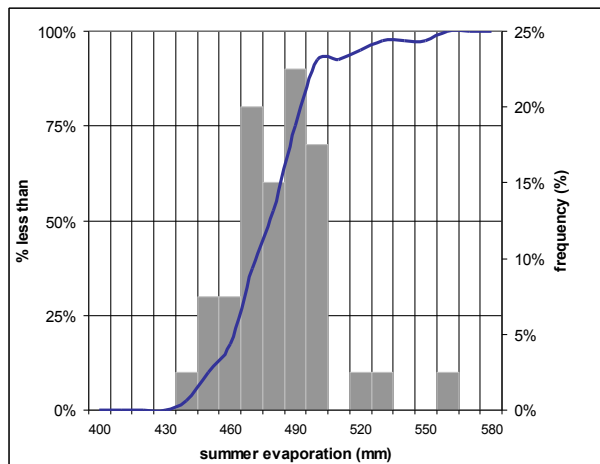


Figure E4 Frequency and cumulative distributions for summer evaporation (May through September) based on the long-term evaporation estimates (see Figure E3).

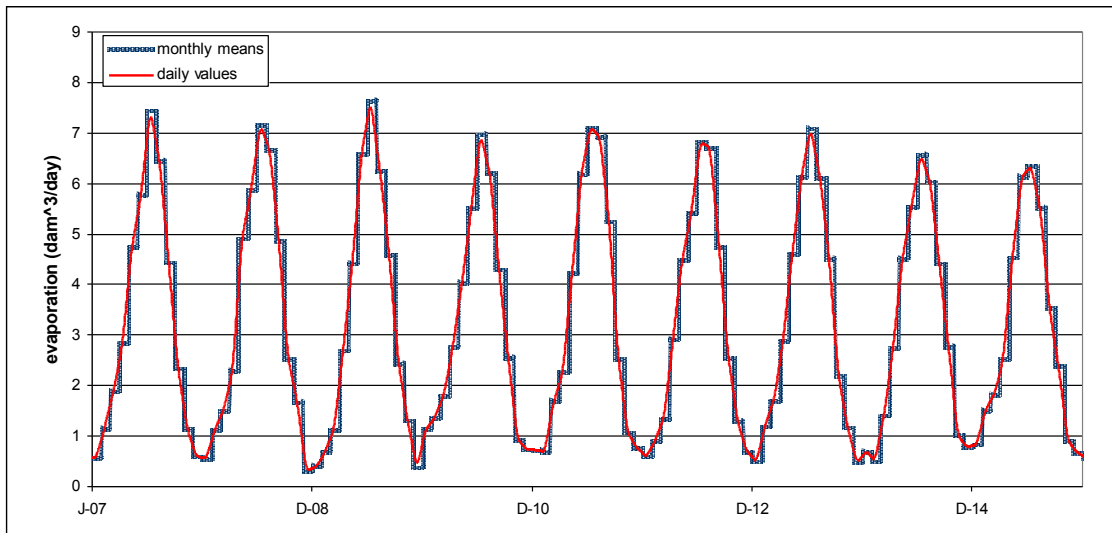


Figure E5 Daily evaporation rate in dam^3/day based on observed monthly mean temperatures and the Thornthwaite equation.

W4 Demand curve. Weijis postulated that a positive correlation between high actual water consumption and dry years (i.e., low precipitation between June to October) would lead to a bias in the predicted yields using the general demand curve. He suggested testing this hypothesis using data from 2007 to 2015. Figure E9 illustrates the monthly time-series of withdrawal volumes by NSSWD and the corresponding total monthly precipitation. There is no obvious visual correlation between the summer withdrawal peaks and the magnitude and duration of the low rainfall periods. The second step was to calculate the total withdrawal for June-October and compare those values with the corresponding precipitation totals for the same period (Table E1, Fig. E10). The scatter diagram for withdrawal vs precipitation anomalies is shown in Fig. E11. These two variables are *uncorrelated* with an r-coefficient of -0.04 . The anomalies are equal to the value minus the mean, excluding 2015 from the mean calculation because of the water restrictions imposed by NSSWD. Note: the NSSWD withdrawal data have been used here because they have uniform sampling for the whole period, and consistent accuracy. Their withdrawals also represent about 70% of the total for the lake, and are thus best suited for examining the correlation with droughty conditions. The CRD withdrawal data, and those for the other license holders have neither uniform sampling nor comparable accuracy over the same period.

In view of the fact that actual demand is not correlated with droughty versus wet conditions, use of the general demand curve is warranted and does not bias the estimated yields. As noted in section 2.4 of the report, variations about the general (averaged) curve derived from measured withdrawals would introduce variations in the predicted yields of about $\pm 3\%$, which is well within the expected accuracy for these calculations.

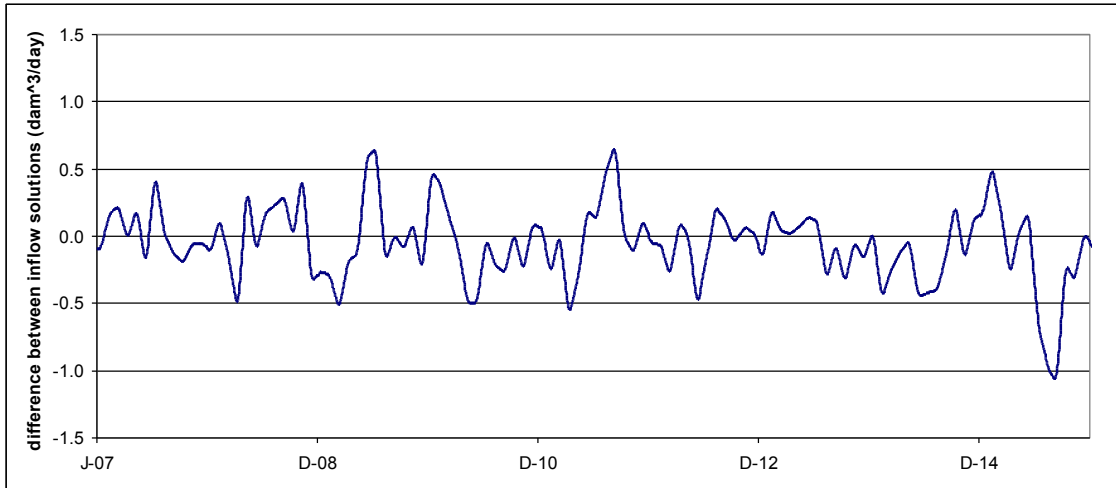


Figure E6 Difference between the inflow solution with inter-annual time-varying evaporation and the inflow solution for the multi-year average evaporation. For both solutions, all input variables were resolved to daily values, and the balance equation was integrated with a time step of one day.

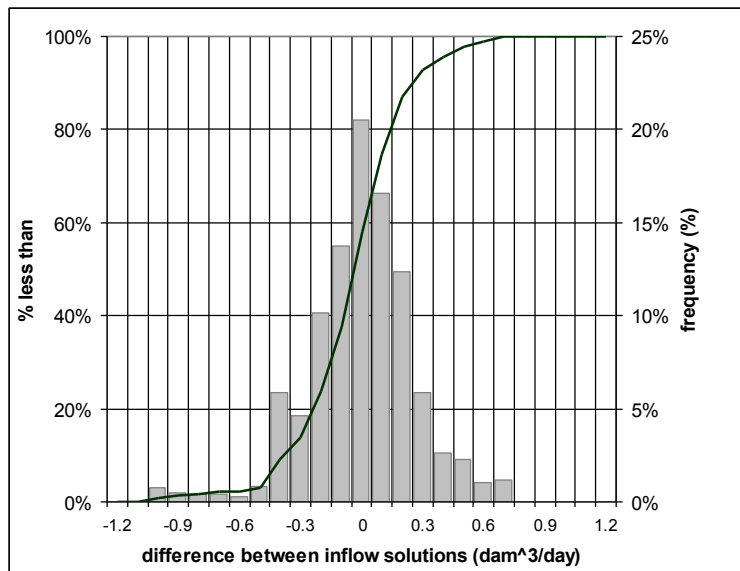


Figure E7 Frequency and cumulative distributions for the solution differences plotted in Figure E6.

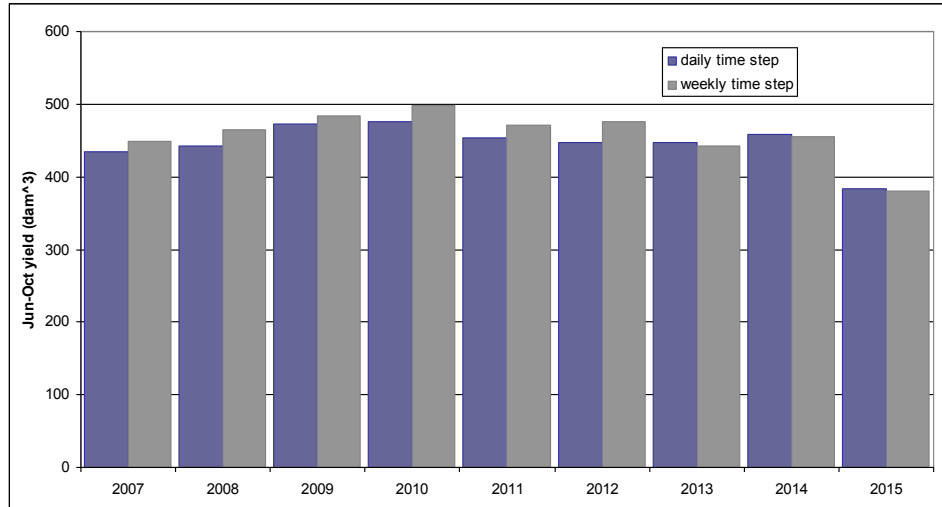


Figure E8 Comparison of the June-October yield for the nine years of the diagnostic solution for the optimized model with daily input and daily time step with the original solution using the weekly time step.

Table E1 June – October withdrawal volume and corresponding precipitation. The respective anomalies, shown in columns 4 and 5, were calculated as the monthly value minus the mean value.

	Jun-Oct	Jun-Oct	Jun-Oct	Jun-Oct
	withdrawal	precip	anomaly	anomaly
	NSSWD		NSSWD	
	(dam ³)	(mm)	(dam ³)	(mm)
2007	194	279	-13	44
2008	199	201	-8	-34
2009	222	231	14	-4
2010	223	237	15	2
2011	205	164	-2	-71
2012	204	260	-4	25
2013	205	220	-3	-15
2014	209	289	1	54
2015	160	173	-47	-62
mean	208	235		

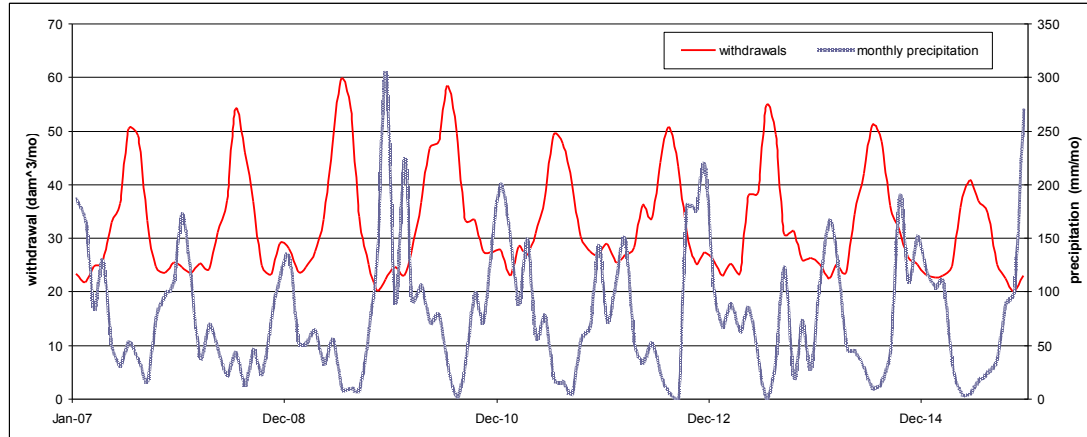


Figure E9 Time-series of monthly withdrawal volume and monthly precipitation. The withdrawal data are for the NSSWD treatment plant only.

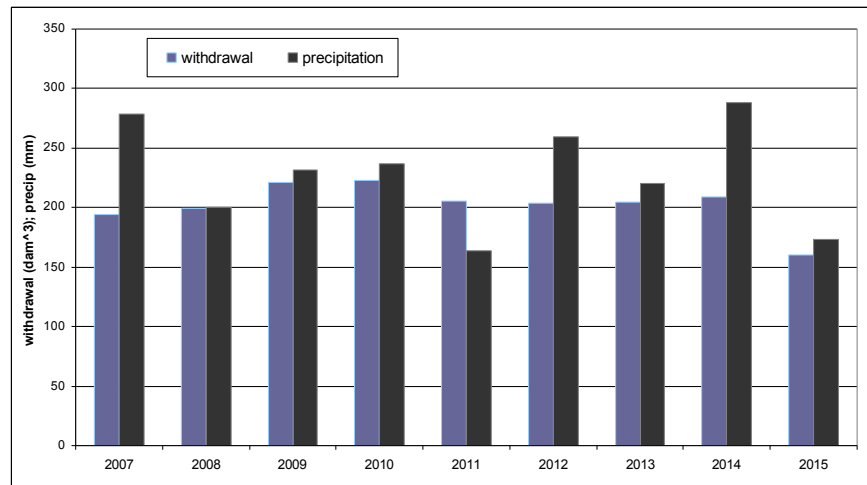


Figure E10 Comparison of Jun-Oct withdrawal volume with Jun-Oct precipitation for 2007-2015.

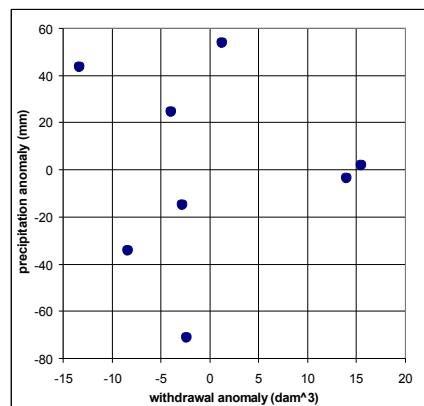


Figure E11 Scatter diagram for summer precipitation anomaly vs withdrawal volume anomaly for the years 2007-2014. The numerical values are shown in Table E1. The variables are *not* correlated.

W4 Evaporation estimates. It is desirable from a hydrological process viewpoint to quantify evaporation as accurately as possible and Weijs so recommends, either with field measurements, a model accounting better for heat storage dynamics or both. However, as the review acknowledges the Thornthwaite equation as applied in the original model is not inaccurate because inter-annual deviations from the multi-year average are contained in the inflows.

This point is important: the purpose of this analysis is to estimate the maximum yield from the lake under drought conditions. It is not to document hydrological physics as accurately as possible, most particularly evaporation. The yield from the lake, and the replenishment of storage during the fall and winter depend on the parameter (I-E), which is termed the *net* inflow I_N . This can be appreciated by letting $I_N = (I-E)$ and recasting equation (3) as follows:

$$\Delta S/\Delta t = (I - E) - (Q + W) = I_N - (Q + W), \text{ or}$$

$$I_N = \Delta S/\Delta t + (Q + W), \quad (\text{E1})$$

where ΔS = change in storage over time step Δt . Equation (E1) is the diagnostic calculation as used in this analysis.

This shows that the *net inflow* is determined only by the change in storage, which we know reasonably accurately from the water levels, the discharge, and the withdrawals.

The prognostic calculation (4), employing the same notation, is:

$$h^{n+1} = h^n + \Delta t \{ [I_N - (Q + F \times W)]/A^n \} \quad (\text{E2})$$

Maximum yield was calculated by scaling up W by F until the draw down on h exceeded the lower limit, using the *same* I_N as determined by the diagnostic calculation. Thus, possible inaccuracies in the estimates of E do *not* affect the yield values as calculated here. It is noted that I and E were calculated individually in the spreadsheet diagnostic model, and transferred identically to the prognostic calculation, thus preserving exactly the net inflow I_N at every time step. The I_N time-series is shown in Fig. E12.

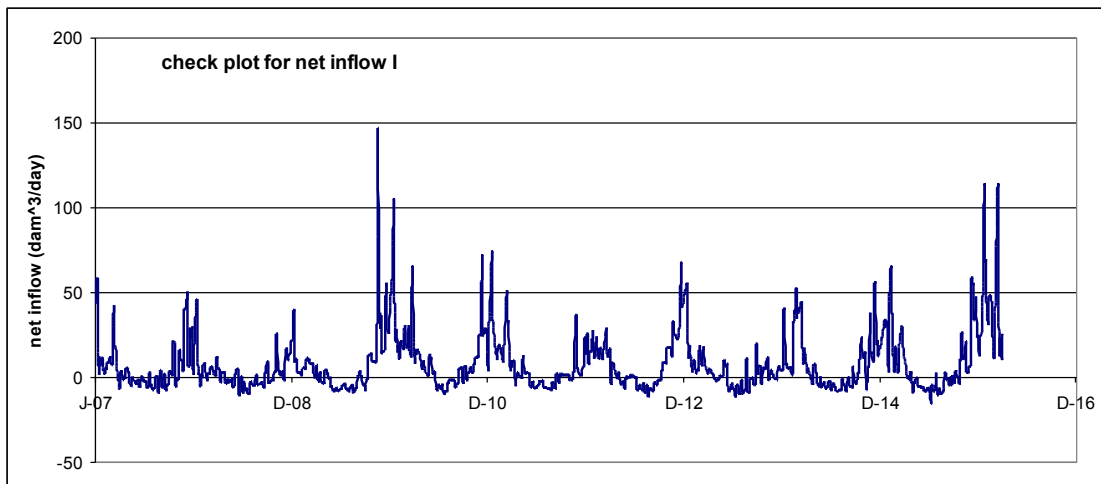


Figure E12 Diagnostic run output time-series for I_N from the daily water balance model.

W5 Long time series of yields. Weijs suggests that the challenge of adjusting the water level series to remove the effects of the beaver dams on discharge could be mitigated with hydrological modelling of the

watershed and lake. This option was considered but set aside in favour of using the water level time-series (a valuable resource) to the greatest extent possible. Hydrological models introduce a different set of problems associated with calibration of process coefficients (e.g., evapotranspiration, evaporation, soil moisture capacity, infiltration rate, groundwater recharge rate), as well as specifying a range of input meteorological variations (e.g., precipitation, air temperature, water temperature, humidity, wind speed) each containing spatial limitations and measurement error. It was felt that the uncertainty with this type of modelling would well outweigh the uncertainties associated with filtering the water level time-series (again keeping in mind that it is net inflow that is the key parameter, not all of the other processes within the watershed). Finally, watershed models that are uncoupled from groundwater models cannot simulate groundwater exchanges with the lake, whereas the methods described by equations E1 and E2 automatically account for groundwater gains or losses.

As Weijs points out, there are two areas of uncertainty in the long-term water balance: the historical demand estimates, and the Q-h discharge relation applied to the beaver dams. It is the author's opinion that further refinement of the demand estimates (by incorporating water consumption trends) is unwarranted based on the overall uncertainty in scaling the NSSWD demand by population increase, and the lack of data available for CRD withdrawals and those by the other license holders.

The Q-h relationship is difficult. In preparing this response, the author acquired all of the measured discharge data (1980-1999) for Duck Creek from the Water Survey of Canada (Fig. E13). The Q observations were sporadic and ceased when the creek dried up each summer, or flows decreased to the point where the measurements were meaningless. In most years, measurements did not include the winter high-flow periods.

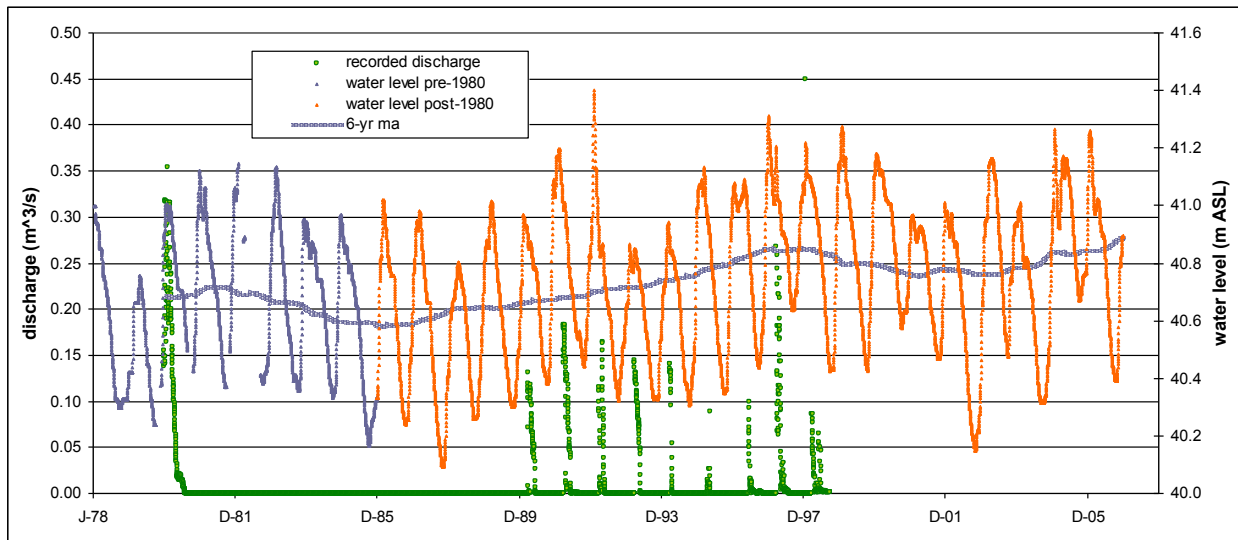


Figure E13 Time-series of Duck Creek discharge measurements and recorded water level. The zeros along the time axis are an artefact of plotting and are not valid measurements.

Attempts to derive a general Q-h relationship that might represent flows over or through a beaver dam were unsuccessful with these data. As noted in the revised section 2.2.3, a broad-crested weir formula with standard coefficients was used in place of the weir formula. This approach provided inflow estimates consistent with precipitation, and with results from the 2007-2015 calculation.

W5-6 Extreme Value Analysis. Corrections noted by Weijts have been made and the calculations checked (see Appendix F of the revised report). Various plotting position formulas were compared (Gumbel, Gringorten, Landwehr) and the last was used because it provided the best linear regression fit.

W6 Yearly yield vs licensed limits. Sections comparing safe yields with licensed limits have been removed from the revised report. The objective of the study is to determine safe yield estimates for planning purposes. Licensed limits are not relevant to this objective.

W6-7 Uncertainties. As in all hydrological studies of this nature, there are large uncertainties. The effect of errors in input data has not been rigorously determined, and Weijts' recommendation has considerable merit. Specifically, the author agrees with the following steps:

- Implement a watershed hydrological model to provide a long-term simulation of drought inflows for input to the water balance calculation.
- Implement the water balance model in a high-level programming language, designed for Monte Carlo simulation.
- Carry out the uncertainty analysis on the estimated drought-year yields, and on the extreme value analysis results (to provide confidence limits on safe yield estimates).

All three steps should be carried out together. The author does *not support* the effort to implement a hydrological model without also doing the uncertainty analysis.

MEMORANDUM

To: Steering Committee, SSIWPA
Date: July 11, 2017
Subject: Comparison of the KWL 2015 hydrology study and the 2017 safe yield analysis
Project: SSIWPA TWG
Submitted by: SSIWPA Technical Working Group – Don Hodgins

This memo responds to the action item from Steering Committee meeting June 2017: That "*TWG advise the steering committee at it's next regular meeting on comparative study methods used by Kerr Wood Leidal in the 2015 St. Mary Lake report, and by Don Hodgins in the draft Safe Yield Analysis Report (St. Mary Lake example).*" The following memo was written by Don Hodgins who carried out the safe yield analysis, and provided a detailed review of the KWL 2015 report (3 drafts) to NSSWD during his tenure as Trustee.

KWL 2015 Water Availability Study

Purpose: water available for withdrawal by license holders, compared with licensed demand, for average rainfall conditions and 10-yr return droughty conditions.

Method: water balance equation for the lake (same as safe yield analysis).

Time Step: monthly (low resolution).

Output: lake storage required to meet licensed demand.

Inflow Input: derived from watershed model using monthly precipitation and temperature input (USGS monthly model).

Other Input: measured withdrawals (NSSWD & CRD) + license limits; discharge curve for Duck Ck.

Model Calibration: watershed model calibrated to average precipitation conditions (not drought).

Meteorological Input (to watershed model): average annual rainfall for calendar year; annual totals extrapolated to 10-year return period; monthly data for model based on averaged monthly distributions (synthetic time-series – see note 1 at bottom of page 2).

Hodgins 2017 Safe Yield Analysis

Purpose: drought-limited (safe) water supply for all license holders with low risk of exceedance (return periods >50 yr).

Method: water balance equation for the lake (same as KWL).

Time Step: daily (high resolution).

Output: maximum water volume available for withdrawal (June-October yield), for drought conditions.

Inflow Input: calculated directly from measured lake level data (actual lake response time-series).

Other Input: measured withdrawals (NSSWD & CRD) + estimated use by other license holders; discharge curve for Duck Ck.

Model Calibration: none required.

Meteorological Input: none required for watershed model;

seasonal precipitation drought statistics used for correlation with expected drought yields for consistency checking.

Extreme Value Analysis: 10-yr return for precipitation, translated into net inflow using watershed model and storage requirement using water balance equation.

Results: in terms of available water:

Avg precip: April-September (6 mo) 992¹ dam³

10-yr drought: April-October (7 mo) 862² dam³

annual equivalents not provided.

Limitations: averaging precipitation data for input to watershed model removes important timing information, and biases droughty conditions to high yields (unsafe direction), and

uncertainty in inflow data due to watershed model error (calibration coefficients and low resolution), and consequent uncertainty in estimated storage requirements.

¹ Licensed limit for draw down period

² Licensed limit for draw down period reduced by storage deficit

Extreme Value Analysis: performed on the 10 drought yields between 1981 and 2015, derived from water balance equation; result – yield by expected recurrence interval from 25 to 100 years.

Results: in terms of limiting available water at varying risk levels:

Recurrence Interval	June-October (5 mo)	Annual ³ (12 mo)
25 yr (2015)	415 dam ³	705 dam ³
50-100 yr	360 - 400 dam ³	600 - 630 dam ³ .

Model and results deemed reliable by external reviewer.

Limitations: uncertainty associated with drought yields for the period 1981-2006, compared with post-2007 results.

³ Annual equivalents equal 1.7 times the 5-mo drought limit for the demand characteristics for St. Mary Lake.

Note to reader: the seasonal yields from the two studies cover different time periods and thus are not equivalent, and cannot be directly compared.

Summary and Recommendation: From a planning perspective, average rainfall years and 10-yr return conditions are inappropriate because those criteria provide an insufficient margin of safety for water consumers. An additional concern with the KWL study is the bias to high yield resulting from data averaging and low time resolution. Accordingly, the Technical Working Group recommends that the safe yield estimates from the 2017 analysis be adopted for planning purposes. Climate trends are currently understood to be reducing recurrence intervals (increasing drought risk) with time. For this reason, recurrence intervals of 50 to 100 years are considered prudent.

Note 1: in order to specify monthly rainfall input to the watershed model for the average and 10-yr return annual precipitation amount, KWL used the average ratio of each month to the long-term average annual total. The effect of the averaging is to smooth out the inter-annual seasonal differences; in effect, transferring precipitation from the wet months into the shoulder months (April, May, June and September, October, November) in dry years. Consequently, the resulting monthly distribution poorly represents real droughty years (e.g., dry spring-summer like 2015), and leads to an under-estimate of net inflow during spring-summer. This, in turn, results in an over-estimate of the storage available for withdrawals, and an over-estimate of the available amount of water for true droughty conditions.

NOTE – THIS FORM IS FOR REFERENCE ONLY. APPLICATIONS NOW HAVE TO BE COMPLETED ONLINE.

**GENERAL GRANT APPLICATION FORM - DRAFT FOR SSIWPA Groundwater Monitoring Project
Islands Trust, FLNRO project leads with CRD and other SSIWPA member agencies as project partners**

The application deadline is 11.59pm on September 6, 2017.

The grant falls into the “Freshwater Sustainability” category of general REFBC grants.

Section 1 - APPLICANT INFORMATION

Black text is draft content.

Green text is instructions from REFBC.

Shannon and Sylvia drafted text for most of this doc and the implementation plan, and the budget between June 5-July 14.

Justine/William - Islands Trust to do

Organization type

Registered non-profit organizations and Community Contribution Companies undertaking projects in British Columbia are eligible to apply for Real Estate Foundation grants. The Foundation is not limited to supporting charitable organizations. Our grants can support the projects of municipalities, regional districts, First Nations, senior government departments, professional associations and other societies. We do not award grants to individuals or for-profit corporations.

1.1. Your organization is a:

- Society
- XCharity
- XOther

**a) If society provide registered provincial society number
n/a**

b) If charity provide registered charitable tax number

Islands Trust - Mike Richards to provide

If other, indicate organizational type

Islands Trust ; Local Government – Land Use Planning - to be provided by Justine or Mike Richards

1.2. Board of Directors

List names only.

Justine to list for Islands Trust

Mention of SSIWPA could be made here, but would make section much more lengthy with names and titles of all member agencies.

1.3. Organizational mandate

The Islands Trust mandate is to preserve and protect the Trust area and its unique amenities and environment for the benefit of the Trust area and the province generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the Government of British Columbia. This mandate underlies the work of the Islands Trust, including the development of official community plans, zoning and other land use bylaws in each of the local Trust areas or island municipalities.

1.4. Brief history of organization

The Islands Trust is a federation of local government bodies representing some 25,000 people that live within the Islands Trust Area. The Islands Trust Area covers the islands and waters between the British Columbia mainland and southern Vancouver Island. It includes 13 major islands, plus more than 450 smaller islands, totalling over 5200 square kilometres in area. In 1974, in recognition of the special nature of the islands in the Strait of Georgia and Howe Sound, the Government of British Columbia enacted the Islands Trust Act to protect this unique part of the world. There are two local trustees elected for each group of islands designated as a Local Trust Area or island municipality. The Salt Spring Island Local Trust Committee has land use jurisdiction over Salt Spring Island and its smaller associated islands and surrounding waters.

According to [Bylaw No. 154](#), for the purpose of preserving and protecting the quality and quantity of water resources within the Salt Spring Island Local Trust Area, Islands Trust Council delegated the following powers to Salt Spring Island Local Trust Committee: the power to coordinate and to assist in the determination of, the implementation of, and the carrying out of regional, improvement district, and government of British Columbia policies.

The Salt Spring Island Local Trust Committee created the [Salt Spring Island Watershed Protection Authority](#) Steering Committee as a mechanism to facilitate Bylaw No. 154 within the Salt Spring Island Local Trust Area, reporting to the Salt Spring Island Local Trust Committee.

1.5. Secondary Project Contact

Secondary Contact Name:

Sylvia Barroso

Secondary Contact Job Title:

Regional Hydrogeologist, Ministry of Forests,
Lands and Natural Resource Operations, West
Coast Region

Secondary Contact Phone Number:

250-751-3265

Secondary Contact Email:

sylvia.barroso@gov.bc.ca

Section 2 - PROJECT INFORMATION

2.1. Project title: Groundwater Monitoring Pilot Program for Salt Spring Island**2.2. Amount applied for: \$9,180****2.3. Total project budget (including cash and in-kind): \$31,640****2.4. Project Start Date: January 15, 2018 2.5. Project End Date: March 31, 2019****2.6. Identify which of the Foundation's mandate areas applies to your project.**

You may check more than one.

- Research
 Law/Policy Analysis and Reform
 Professional Education
 Public Education

2.7. What is the specific project for which funding is requested?

Funds are requested to carry out a groundwater monitoring pilot program coordinated through Salt Spring Island Watershed Protection Authority (SSIWPA), which is administered by the Salt Spring Island Local Trust Committee. The project addresses the need for information about groundwater conditions (quantity and quality) that impact land use planning decisions and water resource management in a region affected by seasonal drought stress and climate change impacts. It will improve knowledge of groundwater conditions in targeted aquifers for which there is currently limited groundwater monitoring data available, and it will augment monitoring data provided by the existing monitoring network (three Provincial observation wells).

2.8. Most projects are part of a broader initiative or context. Provide a brief overview of this.

This project builds upon [ongoing research program](#) related to water management on Salt Spring. SSIWPA is coordinating a multi-year integrated water management program of research, review, decision-making and implementation that spans surface and groundwater, quantity and quality. In the integrated program of work, each of the member agencies is involved with providing in-kind data collection, manipulation and management, and/or funding, and/or analysis, reporting and contractor supervisory roles. Summer 2017 marks the inception of a targeted well inventory to fill identified data gaps in the provincial well registry for Salt Spring Island. This initiative will include an inventory of unregistered wells on cadastral lots outside of improvement district/water service areas that are non-vacant, and an inventory of status of use of wells that are registered/mapped within water service areas, so as to identify potential unused wells for groundwater monitoring locations for this proposed program of work. SSIWPA member agencies are also currently compiling estimates of water use and analysis of aquifer production and demand, through surveys and data-sharing agreements with improvement districts and regional water supply systems (2017). The Ministry of Forests, Lands and Natural Resource Operations and Ministry of Environment have funded [a two year program \(2016-2018\)](#) to revise the mapping and classification of the island's aquifers and to develop a preliminary monthly groundwater budget on an aquifer-by-aquifer scale (Phase 1 results, including a technical memo, revised aquifer worksheets and aquifer boundaries

have been prepared and will be published with completion of the Phase 2 water budget). Concurrently, Ministry of Agriculture are undertaking an agricultural land-use survey and calculating agricultural water demand estimate (2017) that will be a key data input to the water balance model.

2.9. How will the project directly influence land use or real estate practices &/or decision-making?

Character Limit: 2500

Development and economic activity on Salt Spring are constrained by the availability of water for different land uses. Groundwater is a significant component of water supply for the island, and, may increase in importance in the future, as surface water supplies are increasingly constrained. Land use planning for industrial, residential, or other economic developments must be balanced with the delicate needs of this ecologically-sensitive environment. Monitoring groundwater level within existing wells can provide important information on groundwater conditions in targeted areas and provides an essential baseline for evaluating changes over time resulting for differences in precipitation inputs and recharge in response to climatic factors. Areas for groundwater monitoring wells in the proposed pilot project will be selected to fill gaps in existing data that are needed for understanding the seasonal flux and availability of groundwater resources within the different aquifers. The project also seeks to determine ~~empirical~~ if there is evidence of possible anthropomorphic influences (e.g. overpumping resulting in aquifer depletion, saltwater intrusion, or impacts to hydrogeologically connected surface water bodies) and other issues of importance for sustainable land use planning and management. Appropriate existing wells for monitoring in the proposed project will also be selected according results of the [2017-18 aquifer mapping](#) to take into account variability expected by geological influences on groundwater quality and quantity.

2.10. Geographic Impact

Salt Spring Island is the largest of the Southern Gulf Islands, encompassing nearly 20,000 hectares. It has one of the warmest year-round climates in Canada, it is home to [34 rare ecosystems](#), and ranks highly both nation-wide and internationally, as a tourism and retirement real estate destination.

Results of this project will provide regionally-significant baseline groundwater quality and quantity information for groundwater resources on Salt Spring Island that are targeted to be of significant impact to local land use decision-making. Where successful monitoring locations are established by this project, next steps include provisions for ongoing monitoring to expand the public record, scientific study and provision of a long term data record to foster sustainable land use decisions and to improve protection of environmental and economic resources on Salt Spring Island. Monitoring results may also add to aquifer information throughout the Southern Gulf Islands, which share similar topography, climate and precipitation, geology, ecology, including soil types, species-at-risk, etc.

2.11. Implementation Plan

See Google Drive document “REFBC Implementation Plan”.

Next step: Justine or William to please review the Implementation Plan file

File Size Limit: 1 MB

2.12. Describe the organization's specific capacity to carry out the project.*Character Limit: 2000***2.13. How has the need for this project been established?**

e.g. Existing plans or policy direction, previous research, community engagement, etc. How large an area and/or population does the issue affect? What is the significance of the issue or gap being addressed?

Justine/William, Can you help here - please review below?

Salt Spring Island is the most populous of the southern Gulf Islands, with a full-time population of 10,557 (anecdotally increasing to 30,000 during summer months). Sustainable water and watersheds resource management to match population growth has seen the creation of the [Salt Spring Island Watershed Protection Authority](#) (2013-current); it is a roundtable of elected officials from many of the provincial, regional and local governments responsible for monitoring, protection and management of freshwater resources. The Authority works with agency staff for scientific and policy advice and implementation of planning action, and engages with community members through advisory working groups, outreach and education, and multi-stakeholder watershed-level consultations.

Presently there are eight mapped and classified aquifers on the island but only three dedicated Provincial observation wells in which groundwater levels are being monitored. Monitoring of groundwater levels at spatially distributed and strategic locations can: provide information on physical hydrogeologic processes, such as aquifer recharge and discharge; provide evidence of interactions between surface and groundwater systems; evaluate the influence of groundwater extraction on long-term aquifer levels; and assess the risk and impact of saltwater intrusion in vulnerable coastal areas.

Additionally, Salt Spring Island currently has 14 improvement districts which are managed by elected local trustees (and, in three cases also managed by the Capital Regional District). Eleven of the improvement districts rely on one or more groundwater wells as their raw water source. Only some of those eleven groundwater improvement districts maintain records of monitoring well productivity, and/or groundwater levels - approximately 24 producing wells of a total estimated 3500 wells on Salt Spring Island. As such, there are many areas where groundwater is regularly being pumped and not monitored.

Expansion of the monitoring network using existing (unused) wells is a cost-effective strategy for improving resolution of groundwater data.

Chars: 2105

Character Limit: 2500

2.14. How are you ensuring that the project doesn't duplicate work already being done?

Beginning in the 1970's, several studies have examined the hydrogeology of Salt Spring Island. Most recently in 2013-2015 Simon Fraser University, in partnership with Ministry of Forests, Lands and Natural Resource Operations, and Ministry of Environment, obtained funding from Natural Resources Canada to complete the Risk Assessment Framework for Coastal Bedrock Aquifers project. Thus, the hydrogeology of Salt Spring Island was described, test drilling allowed establishment of a new provincial monitoring well in the north of the island, and mapping was completed to identify risks and hazards associated with saltwater intrusion, considering coastal morphology, climate change-related storm surge, and pumping related impacts. In 2016-17 funds were provided from the Ministry of Environment groundwater science program to update the aquifer boundaries on the island using new information ([Golder Phase 1 study](#)). All of these major projects have identified the need for further enhancement of the current monitoring network to improve understanding of local groundwater conditions.

Further, the [Salt Spring Island Official Community Plan](#) Part 1 Section C.3.3.2 and the [Official Community Plan Review Potable Water Focus Group Report \(2007\)](#) have both identified a priority need for developing groundwater conservation strategy, demand management and monitoring to inform regional and local government land use planning and policies.

Salt Spring Island Watershed Protection Authority is a multi-stakeholder decision-making body of agencies responsible for freshwater protection, policy and regulation. As a SSIWPA-coordinated project, this proposal benefits from a foundation of considerable literature review and understanding within partnering agencies. Part of this foundation includes knowledge and application of data from the provincial WELLS database for Salt Spring Island, the information exchange from which is built into related work plan project areas (ie. [aquifer mapping and characterization](#) by MFLNRO 2017-18 and wells inventory by Islands Trust, 2017).

Characters: 2039 (needs trimming)

Character Limit: 2000

Section 3 - EFFECTIVENESS CRITERIA

Your responses under the following four headings will help the Real Estate Foundation understand how your project demonstrates "effectiveness" according to our criteria. We will consider the overall combination of project qualities in our review of your grant application (they are not listed in priority order). In general, the stronger a project is in every category, the more favourably it will be reviewed.

3.1. Leadership & Innovation

On Salt Spring Island, there are presently three wells included in the [Provincial Groundwater Monitoring Network observation wells](#). OW373 in bedrock aquifer 722, which is considered moderately developed and moderately vulnerable to contamination from surface sources, and OW281 and OW438, in bedrock

aquifer 721 which is considered moderately developed and moderate vulnerable to contamination from surface sources. All three are located on the North-eastern or North-central regions of Salt Spring Island.

The project would allow a community led enhancement of the current groundwater monitoring on Salt Spring. The existing [Provincial Groundwater Monitoring Well Network](#) is intended to monitor dedicated and purpose built wells in order to compile a long-term record of groundwater levels. Many of the sites are also equipped with radio telemetry which allows for broadcasting real-time data. For these reasons, site establishment tends to be more costly.

In contrast, a community network allows for flexibility in deployment of equipment at a relatively low cost, to increase the spatial distribution of monitoring sites over target aquifers. If a site is found to be unsuitable after a period of monitoring, the equipment can be easily deployed to a more suitable location. At suitable sites monitoring can be continued for an extended period to build a long-term record, or may be added to the Provincial network if appropriate. This program also provides value by educating well owners on groundwater conditions in their area, and on groundwater protection aspects, if deficiencies in well construction and maintenance are found during the well inventory/site identification phase. This model has been used successfully in the [Regional District of Nanaimo](#).

Characters: 1770

The Foundation gives preference to projects that demonstrate leadership in a field, by presenting an innovative or new approach and/or by meeting an identified need. Please describe how this project demonstrates leadership and innovation.

3.2. Partnerships & Collaboration

See attached - Partnerships and Collaboration Template

3.3. Sustainability & Longevity

(Justine pls check - is this worded accurately to reflect the fact the priority this project has within overall Islands Trust strategy for gw monitoring within the Trust Area?)

Through the engine of Salt Spring Island Watershed Protection Authority, the outcomes of this pilot will have widespread uptake within the agencies responsible, as well as rapid and widespread reporting out to the public through the SSIWPA outreach and education role. It is also anticipated that results of this program will inform the Islands Trust Local Planning Services on Salt Spring Island in the short term, and serve as a template for other Gulf Islands within the Islands Trust Area in the longer term. Notably, Islands Trust has also prioritized enhanced Freshwater Specialization in house during the period July 1, 2017 - March 31, 2018 in order to better assess freshwater land use planning data gaps and needs within the entire Islands Trust Area. The current pilot project is a timely fit for the Islands Trust Freshwater Specialist, William Shulba, and the outcomes of his tenure in the position are likely to be enhanced considerably by the results of this pilot project on Salt Spring Island.

Monitoring data from this pilot in 2018 (and potentially ongoing periodic monitoring in the same locations) will serve directly in the current SSIWPA workplan geared to develop a Water Sustainability Plan for the entire island under the provincial Water Sustainability Act. Data from this project are necessary to inform watershed and groundwater-aquifer budgets, which will be used in sustainable yield modelling currently underway for Salt Spring Island, and potentially as a template for what is possible in other Islands Trust Area locations.

Hydrogeological findings from the Salt Spring Island pilot will be archived in GIS files in a database maintained by Islands Trust, which is intended as a template for similar monitoring and mapping of expanded community groundwater information throughout the Trust Area, and as ongoing up-to-date GIS layers to be made available for public, private and government sectors via the provincial iMap and hydrogeological databases maintained by provincial ministries.

Primary data and reports from this project will be made available in a public archive: the provincial Ecological Reports Catalogue, and on the SSI Watershed Protection Authority's website.

Characters: 2208

How will the outcomes be sustained after the period for which funding requested and over the long-term? What will be the lasting legacy of this project or program?

Character Limit: 2500

3.4. Scalability & Potential to Replicate

Due to limited surface water resources, the Gulf Islands are uniquely dependent on groundwater, the majority of which is obtained from low yielding bedrock aquifers which are vulnerable to over-extraction. With enactment of the *Water Sustainability Act* in February 2016, for the first time non-domestic well owners must obtain a licence for groundwater use, increasing the imperative to understand groundwater conditions, to enable management of the resource in a manner that supports long-term sustainability.

Community groundwater monitoring networks provide critical data on the current state of the aquifers. This program will represent a pilot program, that, if successful, could be extended to other islands in the Trust Area, facing similar groundwater development pressures.

Because the equipment and professional skills are readily available and it is the partnerships, data-sharing, GIS expertise and coordination that are what make this pilot innovative, such community groundwater monitoring networks as the one described in this pilot would be replicable and scaleable to other groundwater monitoring scenarios. The project pilot methods and equipment would be replicable at this scale for groundwater monitoring in other islands with similar bedrock aquifers, but also in larger scales with more coordination and resources, or even on smaller scales in other rural communities that rely wholly or partially on groundwater resources.

Characters: 1447

Strong projects can often be replicated in other communities. Please explain how this project could be modelled by or transferred to other geographic regions, audiences, or practitioner groups.

The Foundation assesses potential projects by examining how they may be replicated in other communities in BC. We ask how the initiative plans to transfer concepts, approaches and/or policies to other geographic regions, audiences and user groups.

Character Limit: 2500

Section 4 – PROJECT COMMUNICATIONS & FOUNDATION RECOGNITION

4.1. How will the project outcomes and learning be shared with the broader community?

Outcomes will include new information on groundwater quantity and seasonal change to targeted aquifers (as daily data represented in 12-month hydrographs of well water levels), expansion of the current provincial observation well data files, and establishment of a shared data resource between SSIWPA member agencies. Conclusion of the pilot monitoring program in March 2019 will include knowledge transfer via well-advertised community presentation of results to well owners and the Salt Spring Island public, as well as publication on Eco-Cat provincial reports online catalogue, which can prove useful for other regions looking to establish similar “expanded community groundwater monitoring” to fulfill local needs where provincial groundwater observation data are constrained to fulfill all land use planning requirements.

Characters: 827

The Foundation usually prefers projects that have strong educational value and include the sharing of outcomes as a major component. How, specifically, will outcomes/findings be disseminated? Who should be aware of your project and how will you strategically reach these audiences? Are there key audiences and stakeholders to engage? Do you have a communications plan?

Character Limit: 3000

4.2. List ways in which the Foundation will be recognized for its support of the project.

The support of the Real Estate Foundation will be recognized in public media announcements about the SSIWPA Integrated Water Management Program [workplan](#), SSIWPA outreach and education events through 2018 (Salt Spring Island Earth Day, Fall Fair, and other related research presentations and public workshops to be determined by SSIWPA Steering Committee for 2018 calendar year), and in public meeting agendas containing updates, interim reports and final reports on this pilot project. In addition, the well owners who participate in the pilot will be asked to display the project title and acknowledgement of support and participation, including colourful logos of participating agencies, including the Real Estate Foundation, on a laminated sign located somewhere publicly- visible on their property, near the site of the well.

Characters: 829

The Foundation appreciates recognition for its contribution to grant funded projects in any press releases, events or publications that describe the project. This assists us in sharing information about our grant program across the Province.

Character Limit: 1000

Section 5 - OUTCOMES

5.1. If your project is successful, what do you think the impact will be?

Currently, more than 4000 homeowners on Salt Spring Island, and an unknown number of businesses and agricultural users rely solely or primarily on groundwater for potable/non-potable, domestic and non-domestic purposes. Community groundwater monitoring in this pilot program on Salt Spring Island will provide knowledge to local, regional and provincial government agencies, as well as to the public, in a manner that promises to fill much needed data gaps about groundwater resource parameters within currently unmonitored aquifer areas.

The data generated are expected to directly impact community land-use planning and provincial water resource management information, providing a first-year (and possibility of a Phase 2, ongoing) data on variability in production capacity and quality in 4-6 groundwater wells within a key drought-affected area of Salt Spring Island. Additionally, the project outcomes will fulfill the need for a pilot to achieve groundwater-related recommendations made in the [Salt Spring Island Official Community Plan](#) Part 1 Section C.3.3.2 and the [Potable Water Focus Group Report \(2007\)](#); namely, to fulfill data gaps necessary in order to undertake a comprehensive water management plan for Salt Spring Island ([page 5, 3.3](#)), to improve the method of proving adequacy of groundwater supplies ([page 5, 3.5](#)) and to undertake water-based island-wide planning recommendations [3.6 through 3.9 \(page 5\)](#).

Together with other initiatives in the Salt Spring Island Watershed Protection Authority's workplan, the impact of this project will be enhanced freshwater sustainability political decision-making, steps towards development of a more cohesive form of resource management through an island-wide water sustainability plan, as well as enhanced public awareness and capacity to understand and to self-regulate groundwater resource consumption and management.

Chars: 1878

i.e. What difference will this project make? Be specific. How will this proposal lead to positive changes?

Character Limit: 2500

5.2. What are the key project deliverables?

- Project report (March, 2018) that will identify target areas and candidate existing drilled unused wells for monitoring, to fill gaps in groundwater data maintained by provincial observation network and to meet freshwater data needs of partner agencies (resource protection, land-use planning, etc.)

- Four to six new groundwater monitoring wells will be activated with installation of dataloggers and in some cases, equipment to measure conductivity (salinity) in site-specific unpumped groundwater resources (May, 2018)
- Quarterly groundwater level data transfer to project partners (once per season, over 4 seasons)
- Progress report to partners (September, 2018); Interim report to REFBC (September, 2018)
- Report on GIS queries intended to analyze variation and co-variation between measured parameters and other parameters (land use zoning data, surface water data, groundwater vulnerability to contamination, soils data, etc.) (end February, 2019)
- Final Project Report to REFBC, to partners and to the public, including evaluation of project success and recommendations for Phase 2 monitoring at each location (March, 2019)
- Knowledge Transfer through outreach and education (public presentation and workshop by experts, Ecological Reports Catalogue publication) (March, 2019)

Characters: 1271

List all project deliverables (these should be specific, measurable, relevant, and within the time frame of this proposal). These should be consistent with the deliverables in Implementation Plan. A high-level list of key deliverables in bullet point form is useful to include, where possible.

Character Limit: 2000

Section 6 - PROJECT BUDGET

Projects should have sources of funding other than the Real Estate Foundation of BC. Typically, the Foundation will not consider being the sole funder of a project and we generally support up to a maximum of 50% of the cash budget.

6.1. Project Budget*

See **DRAFT BUDGET** attached.

File Size Limit: 1 MB

Section 7 – LETTERS OF SUPPORT

Stage 1 (or LOI) - letters of support are not mandatory with the initial submission but may strengthen your proposal if available and included.

CRD, and FLNRO will be approached to include support letters referring to confirmation of matching fund support. – Shannon to get these by August 20th, deliver to Mike Richards at Islands Trust.

Stage 2 - if you are invited to submit a Stage 2 application then at least two current letters of support, specific to this project, are required (more are welcomed). Letters must be from organizations other than your own, which can vouch for the importance of the project and your capacity to complete the project. Other SSIWPA agencies can be approached for letters of support in stage 2

Water Districts (those on SSIWPA, and others will be approached for letters of support in Stage 2, especially those in which any of the targeted monitoring wells might be located.)

Also, letters of support may be requested from Ministry of Environment, Salt Spring Water Preservation Society, Cusheon Lake Stewardship Committee, Island Stream and Salmon Enhancement Society, Salt Spring Island Foundation, Salt Spring Island Conservancy, Transition Salt Spring.

7.1. Letter of Support 1 (File Size Limit: 2 MB each)

CRD

7.2. Letter of Support 2

FLNRO

Section 8 - ADDENDA

None at this stage. All available online as links within application text above.

If there are other documents which are key to comprehending your project and they are not available online, please attach them here and indicate their relevance.

Note: *if they are available online please reference them in your application responses where relevant, including the website URL address where we can find them, instead of uploading them here.*

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Grant Application Budget Form

Name of Organization: Islands Trust

Project Name: Groundwater Monitoring Pilot Program for Salt Spring Island, B.C.

The budget includes both cash and in-kind amounts. Please add and subtract rows, as appropriate and delete the green text which is here purely for instructional and example purposes. Total revenues and expenses must balance.

Itemize all projected revenues and confirmed and pending (including in-kind contributions).

REVENUES:

Funders	Cash Amount	In-kind Amount	Confirmed (C) /Pending (P)	Contact Name & Number
REFBC	\$9,180.00			
Ministry of Forests, Lands and Natural Resources	\$2,000.00	\$9,800.00	(P)	Sylvia Barroso, 250-751-3265, sylvia.barroso@gov.bc.ca
Capital Regional District	\$1,380.00	\$0.00	(P)	Wayne McIntyre, 250-538-0009, directorssi@crd.bc.ca
Islands Trust	\$5,800.00	\$3,480.00	(P)	Justine Starke, 250-405-5189, jstarke@islandstrust.bc.ca
Total Amounts	\$18,360.00	\$13,280.00		
TOTAL REVENUE				\$31,640.00

List all expenses for this project and include a detailed breakdown of salaries, benefits, contractor or consultant's hourly wages, number of hours, programming and administrative expenses, etc.

Be sure to identify the specific component(s) of the project to which Real Estate Foundation funds, if awarded, would be allocated (i.e. what phase, activities, elements, and/or specific expenses of the project would Foundation funds support?). Record them in the "REFBC share of cash" column.

If listing a salaried employee as an expense, please detail how the project work is different than the individual's regular role within the organization. Such information can be described in sentence form below the budget. (Note that the "coordinator" item below is listed as an example.)

EXPENSES:

Expense Items	Details (if applicable)	Cash	In-kind	Total Budget	REFBC share of c
Project Supervision (Sylvia Barroso, Hydrogeologist in Ministry, Water Protection, FLNRO)	120 hrs X \$80/hr incl. research direction for this project, specific project data organization and analysis, contractor management	\$0.00	\$9,800.00	\$9,800.00	\$0.00
GIS Data Management (Mark Van Bakel, Islands Trust)	10 hrs X \$60/hr generation of GIS land use planning tools and maintenance of land use planning products	\$0.00	\$600.00	\$600.00	\$0.00
Coordination (Shannon Cowan, Islands Trust Contractor, Coordinator of Salt Spring Island Watershed Protection Authority)	60 hrs X \$49/hr incl. coordination of research project communications between agencies and individuals, assistance to contractor for data compilation methods, local computer support and data transfer, as well as navigation for travel to sites and coordination of field work, including relationships with landowners	\$0.00	\$2,940.00	\$2,940.00	\$0.00
Equipment	dataloggers and cable transducers (6 of each) (Solinst brand or similar quality instruments)	\$9,000.00	\$0.00	\$9,000.00	\$3,000.00
Labour	\$300 X 6 = \$1,800 for installation of dataloggers (1 per well, by Ministry staff or qualified professional); 216 hrs X \$35/hr = \$7,560 contract labourer with own computer (well inspection as trained by Project supervisor, data collection, data entry, reporting); 100 hrs X \$10/hr volunteer citizen to assist contractor and coordinator with datalogger downloads/site visits and data review and analysis by project supervisor	\$9,360.00	\$1,000.00	\$10,360.00	\$6,180.00
Total Expenses		\$18,360.00	\$14,340.00	\$32,700.00	\$9,180.00

General Grant Application - Implementation Plan

Objectives	Activities	Timeframe	Deliverables
Determine priority areas for groundwater monitoring.	Review and synthesize: i) recent results of phase 1 provincial aquifer mapping project on Salt Spring I., ii) fall 2017 results of Salt Spring Island SSIWPA Targeted Well Inventory and Community Water System Survey, iii) previous studies (e.g. SFU hydrogeology of SSI Larocque, Allen and Kirste, 2015) iv) existing monitoring results at Salt Spring Island provincial observation wells. WHO: Barroso (project lead, FLNRO)	January 15 - January 31, 2018	Report out on potential priority areas for groundwater monitoring pilot to project partners. S. Barroso, Technical Working Group.
Evaluate list of potential monitoring locations.	Evaluate priority area list using criteria for selection: location, accessibility, well lithology, yield and capacity, physical condition of well, reason for not being in use, ownership, etc.	February 1 - February 15, 2018	Generate a short-list of 4-6 existing wells as groundwater monitoring sites. S. Barroso, Technical Working Group.
Multi-stakeholder support and agreement for monitoring locations.	<ul style="list-style-type: none"> a) Secure support for short-list of 4-6 existing wells by project partners at SSIWPA and Local Trust Committee level (with Land Use Planning Staff support). b) Consult with landowners of short-listed well locations and seek consent for well monitoring during term of pilot project (to March 31, 2019). c) Draft and agree on terms of use of private wells for monitoring purposes for the duration of this project (to end March 31, 2019). 	February 15 - March 31, 2018	<p>Project Report confirming final monitoring sites with support of each project partner agency or group, and landowner consent, including signed terms of use agreements between well monitoring technical lead agency (FLNRO) and landowners. S. Barroso, Coordinator Cowan</p> <p>Establish clause in Use Agreement to activate groundwater monitoring extension to a phase 2 by mutual agreement at the end of current project term (March 31, 2019). S. Barroso, Coordinator Cowan</p>
Source labourer with skills appropriate to the project.	Hire local contractor with qualifications for data collection, entry and environmental monitoring (Islands Trust)	RFP: February, 2018 Start date: April 1, 2018	

General Grant Application - Implementation Plan

Activate groundwater monitoring at 4-6 confirmed locations	Purchase equipment (S. Barroso) Hire professional to install dataloggers Train contractor to download and enter data into provincial WELLS database and SSIWPA database Mount laminated signs with partner logos at well sites.		Contractor, Coordinator, S. Barroso, SSIWPA-TWG.
Data collection and transfer	Periodic download from Solinst dataloggers at 4-6 monitoring wells to contractor's laptop; data entry and organization	Approximately quarterly: i) April 30 - May 31, 2018 ii) July 31 - August 31, 2018 iii) Oct 31 - Nov 30, 2018 iv) Jan 1 - Jan 31, 2019	Quarterly reports to project lead S. Barroso. Contractor. Quarterly data transfer to Islands Trust GIS staff. Contractor.
Data analysis	Organizing and interpreting data files from contractor. Generate hydrographs (change in groundwater level over time in a single well).	September, 2018	Technical progress report to well owners and project partners (Islands Trust, FLNRO, SSIWPA-TWG) S. Barroso (with SSIWPA-TWG). Coordinator to coordinate report writing.
Interim Report	Reporting out.	September, 2018	Interim progress report to REFBC. Islands Trust - William Shulba and S. Barroso FLNRO Project Lead (with SSIWPA Coordinator)
GIS Data analysis	Generate GIS queries to analyze spatial variation and co-variation between monitoring well data hydrographs and conductivity data, with other parameters (surface water resources, land use zoning, soils data,	December 1, 2018 - February 28, 2019	GIS output, as co-directed by SSIWPA steering committee and Islands Trust Planning Staff in consultation with project lead S. Barroso and SSIWPA-TWG. S. Barroso, Islands Trust GIS and Planning Staff.

General Grant Application - Implementation Plan

	groundwater DRASTIC vulnerability data, vegetative cover, other).		
Final Project Report	Report out describing methods, results, and recommendations for Phase 2 monitoring. Send draft report for internal review by project partner agencies: FLNRO, Islands Trust, SSIWPA-TWG before publicizing. Create final report and presentations.	March 31, 2019	Report and presentations by S. Barroso and SSIWPA-TWG. Knowledge transfer via presentation of final report to: well owners, and the public via community presentation to Salt Spring Island, and publication on Eco-Cat provincial reports online catalogue.