Integrated watershed planning for freshwater sustainability on Salt Spring Island, BC, Canada

William Shulba
Islands Trust, Canada, wshulba@islandstrust.bc.ca

Justine C. Starke
Islands Trust, Canada, jstarke@islandstrust.bc.ca

Follow this and additional works at: https://cedar.wwu.edu/ssec

Part of the Fresh Water Studies Commons, Marine Biology Commons, Natural Resources and Conservation Commons, and the Terrestrial and Aquatic Ecology Commons


This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.
Session Presentation

Achieving an Integrated Watershed Approach for Freshwater Ecosystems in the Salish Sea

Salish Sea Ecosystems Conference
Seattle, Washington
Wednesday 4 April 2018

Justine Starke, MCIP, RPP
Island Planner

William Shulba, P.Geo
Senior Freshwater Specialist
Licensed Scientific Officer
Integrated Watershed Planning for Freshwater Sustainability
Salt Spring Island, BC, Canada

The Central Salish Sea
The Salish Sea extends from the north end of the Strait of Georgia to the south end of the Puget Sound and west to the mouth of the Strait of Juan de Fuca.

Data Sources:
SRTM (CGIAR-CSI), NOAA, Wa. DFW, Wa. DNR, BC Digital Atlas, ESRI
Islands Trust Object

“To preserve and protect the islands trust area and its unique amenities and environment for the benefit of residents of the trust area and of the province generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the Government of British Columbia.”
Salt Spring Island Watershed Protection Alliance
Member Agencies

**Islands Trust**
Land-use Planning
Zoning and Official Community Planning

**Ministry of Environment and Climate Change Strategy**
Effective protection, management and conservation of water, land, air and living resources.

**Ministry of Forests, Lands, and Natural Resources**
Surface Water and Groundwater Quantity Licensing

**Ministry of Health**
Water Quality Licensing

**Capital Regional District**
Water and Environmental Services

**North Salt Spring Waterworks Improvement District**
Water Purveyor and Largest Improvement District in the Province

**Other Water Commissions**
Drinking Water Purveyors
Framework for freshwater resource management

Considers both human and ecosystem needs

Integrated planning and policy development

Implementation by member agencies

Advise on policies of regional, local and provincial government organizations

Coordinate the implementation of those policies.

Salt Spring Island Watershed Protection Alliance

Purpose
Integrated Watershed Planning for Freshwater Sustainability
Salt Spring Island, BC, Canada
Integrated Watershed Planning for Freshwater Sustainability
Salt Spring Island, BC, Canada
(1981 - 2010 Climate Normal)

Data Source: Environment Canada Climate Station ID: 1016995

Average Monthly Precipitation

Average Monthly Temperature
### Capital Regional District

**Projected Change in 20-Year Annual Maximum One Day Precipitation**

CMIP5 Ensemble RCP85 (2041-2070)

---

### Top 10 Wettest Days in Seattle, 1948-2013

<table>
<thead>
<tr>
<th>Rank</th>
<th>Date</th>
<th>Precipitation (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oct. 20, 2003</td>
<td>5.02</td>
</tr>
<tr>
<td>2</td>
<td>Dec. 3, 2007</td>
<td>3.77</td>
</tr>
<tr>
<td>3</td>
<td>Nov. 20, 1959</td>
<td>3.41</td>
</tr>
<tr>
<td>4</td>
<td>Nov. 6, 2006</td>
<td>3.29</td>
</tr>
<tr>
<td>5</td>
<td>Feb. 8, 1996</td>
<td>3.06</td>
</tr>
<tr>
<td>6</td>
<td>Nov. 25, 1998</td>
<td>3.04</td>
</tr>
<tr>
<td>7 (tie)</td>
<td>Jan. 18, 1986</td>
<td>2.98</td>
</tr>
<tr>
<td>7 (tie)</td>
<td>Feb. 9, 1951</td>
<td>2.98</td>
</tr>
<tr>
<td>9</td>
<td>Nov. 9, 1990</td>
<td>2.95</td>
</tr>
<tr>
<td>10</td>
<td>Nov. 24, 1990</td>
<td>2.93</td>
</tr>
</tbody>
</table>

---

**Changing Climate:** More Rain in Winter

Salt Spring Island, BC, Canada
Lake level on Mar 21/18 was 40.783 m asl.
Groundwater Resource Development Challenges
Salt Spring Island, BC, Canada

**How over-pumping can impact neighbours and streams**

- **well not affected**
- **well goes dry**
- **well is over-pumped**
- **stream goes dry**
- **sand and gravel**
- **lowered water table**

**Salt water intrusion**

- **fresh water**
- **salty water**
- **fresh groundwater**
- **advanced saltwater boundary**
- **salty groundwater**
- **original boundary**

Salt Spring Island Watershed Protection Alliance
Islands Trust
Saltspring - Overview

Overview:
- 6 mapped aquifers
- 3 x sand and gravel
- 3 x fractured bedrock
- 300 observation wells

<table>
<thead>
<tr>
<th>Aquifer Type</th>
<th>Productivity</th>
<th>Development</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand &amp; Gravel</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Bedrock</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Well Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>278</td>
</tr>
<tr>
<td>2000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 200 ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>~6.5 USGPM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saltwater intrusion</td>
</tr>
<tr>
<td>Low Yields</td>
</tr>
<tr>
<td>Dissolved minerals (As)</td>
</tr>
</tbody>
</table>

Image Sourced from iMapBC: http://maps.gov.bc.ca/ess/sv/imapbc
Domestic and Agricultural Water Demand Modelling
Salt Spring Island, BC, Canada
Overview:

- 6 mapped aquifers
- 3 sand and gravel
- 3 fractured bedrock
- 30 observation wells

Sand & Gravel

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Development</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Bedrock

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Development</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Well Records

- 278
- 2000

Mean Depth

- > 200 ft

Mean Yield

- ~6.5 USGPM

Issues

- Saltwater intrusion
- Low Yields
- Dissolved minerals (As)
Session Presentation
Achieving an Integrated Watershed Approach for Freshwater Ecosystems in the Salish Sea

Salish Sea Ecosystems Conference
Seattle, Washington
Wednesday 4 April 2018

Justine Starke, MCIP
Island Planner

William Shulba, P.Geo
Senior Freshwater Specialist
Groundwater Resource Development Planning
Salt Spring Island, BC, Canada