Gabriola Island Local Trust Committee
Special Meeting Agenda

Date: November 28, 2023
Time: 2:30 pm
Location: Electronic Meeting

Pages

1. CALL TO ORDER 2:30 PM - 2:35 PM

"Please note, the order of agenda items may be modified during the meeting. Times are provided for convenience only and are subject to change."

2. APPROVAL OF AGENDA

3. BUSINESS ITEMS 2:35 PM - 4:00 PM

3.1 Major Project: Gabriola Visioning Engagement Process and Water Balance Assessments 2 - 6

4. ADJOURNMENT 4:00 PM - 4:00 PM

BRIEFING

To:	Regional Planning Committee	**For the Meeting of:**	November 15, 2023
From:	William Shulba, P.Geo. Senior Freshwater Specialist	**Date Prepared:**	November 7, 2023
SUBJECT:	Island Trust Area Water Balance Assessment		

PURPOSE

The purpose of this briefing is to provide information on water balance assessments in the Islands Trust Area. Provided in this briefing is a background, a conceptual methodology, comment on cost, regulatory considerations, and the relevancy to the Islands Trust Freshwater Sustainability Strategy.

BACKGROUND

Water resources are natural assets of the Islands Trust Area primarily on privately managed lands such as rural residential areas, agricultural operations, and privately managed forest lands.

The Islands Trust Policy Statement identifies that islands in the Trust Area should be self-sufficient in their supply of freshwater. Directive policies indicate that neither density nor intensity of land use may be increased in areas which are known to have a problem with the quality or quantity of the supply of freshwater. Water quality is to be maintained, and existing, anticipated and seasonal demands for water must be considered and allowed for.

Water balance (also known as water budgets or water availability assessments) are an accounting of the rates of water movement and the change in water storage in all or parts of the atmosphere, land surface, and subsurface. Water balance is an essential analysis to evaluate the distribution, availability, and sustainability of water resources. These analyses are used in water resource management, drought/flood preparedness, infrastructure planning, groundwater management, agricultural planning, watershed conservation, land-use planning, climate change adaptation, regulatory compliance, political decision support, and education.

The Islands Trust has been involved in water balance focused projects directly and as external project members. Local trust committees in the southern gulf islands supported regional groundwater availability assessments in 2021. Similar projects in the Islands Trust Area were conducted by the Province in a Water Science Series No.2019-01 "*Aquifer Mapping and Monthly Groundwater Budget Analysis for Aquifers on Salt Spring Island*", by the Capital Regional District *"Lake Weston Water Availability and Climate Change Assessment",* and the Regional District of Nanaimo *"Water Budget Project: Phase One – Gabriola, DeCourcy & Mudge Islands".*

In the development of the Islands Trust Freshwater Sustainability strategy, the Strategic Advisory Roundtable agreed on actions to undertake water balance assessments and for this information to be publically available. Islands Trust staff have been exploring funding and partnerships to continue this work.

ANALYSIS

Water Resource Management

Water balance analyses are essential for the planning, development, distribution, and responsible use of water resources to meet the various needs of communities while ensuring the sustainability of these resources and protection of the environment. Careful and efficient management is needed of both surface water and groundwater to support various sectors and purposes, including drinking water supply, agriculture, industry, commercial production, recreation, and environmental conservation.

Effective water resource management is critical to ensure a sustainable and reliable supply of water for present and future generations. In agricultural areas, water balance assessments help farmers optimize water use for irrigation. By assessing water balance, it's possible to identify potential environmental impacts, such as over-extraction, which can lead to habitat destruction and the endangerment of ecosystems.

By understanding the natural variability of water availability, local trust committees and island municipalities can develop strategies to mitigate water shortages during dry periods. For areas heavily reliant on groundwater, monitoring water balance is essential to understand groundwater recharge, prevent over extraction, saltwater intrusion, and ecological impacts. Understanding the water balance is important for maintaining water quality. By assessing how water flows through a region it's possible to identify potential sources of pollution and take appropriate measures to protect water quality.

Sustainable Water Policy and Regulation

Assessing water availability and protecting watersheds is a shared responsibility between government agencies and water users. The Province is responsible for water regulation through the *Water Sustainability Act* and *Drinking Water Protection Act*. Local governments may have to provide information to the province on the state of water resources if directed by the provincial water manager.

In the context of sustainable development, water balance assessments help ensure that a region's water resources are used in a manner that meets the current needs of the community without compromising the ability of future generations to meet their own needs. Water balance assessments are often required for compliance with local, regional, provincial, and national regulations.

Accurate data on water resources are necessary for regulatory authorities to make informed decisions about water allocation and usage. Water balance assessments contribute to scientific research and education providing valuable data for studying the hydrology of a region and for educating the public about the importance of water resource management and conservation. The Islands Trust plays a direct role in water regulation through proof of water requirements in land-use bylaws and island specific policies in official community plans that guide intensity of water use.

The 2017 Young Anderson report *"Water Law: The Water Sustainability Act and More"* provides this analysis of local government responsibility to the *Act: "[Local governments] have a role to play in the regulation of water. Local governments may advocate on behalf of local water issues that arise and ensure provincial decision-makers are adequately informed of issues or information affecting local water sources or ecosystems. At its core, the regulation of water under the WSA relies on administrative action in which several actors have abilities to require mitigation measures to be taken, to make orders or develop new regulations. Such a structure requires these decision makers to be and stay informed on issues affecting all streams and groundwater sources in BC. Keeping continually informed of these issues will require assistance from those who have information, which is where local governments that are interested in protecting local water sources may assist."*

Water Balance Methodology

Water balance uses accounting to compare how much water goes into and out of a watershed. Much like a bank account, if more water is leaving than is coming in, the supply will be depleted. A level of reserve is included in the balance. The water use is sustainable when supply and demand are in balance by sustainably using storage so it does not deplete over time. When demand is great enough to not replenish storage annually, a watershed or aquifer can experience stress. On the islands, there is an inherent stress of water resources since the majority of water enters the system during the winter months and the majority of water is used in the summer by community, agriculture, and ecosystems thus users are reliant on storage, either naturally in aquifers and lakes or in engineered reservoirs and tanks.

Figure 1: Elements of an Island Water Balance (adapted from Healy et al., (2007).

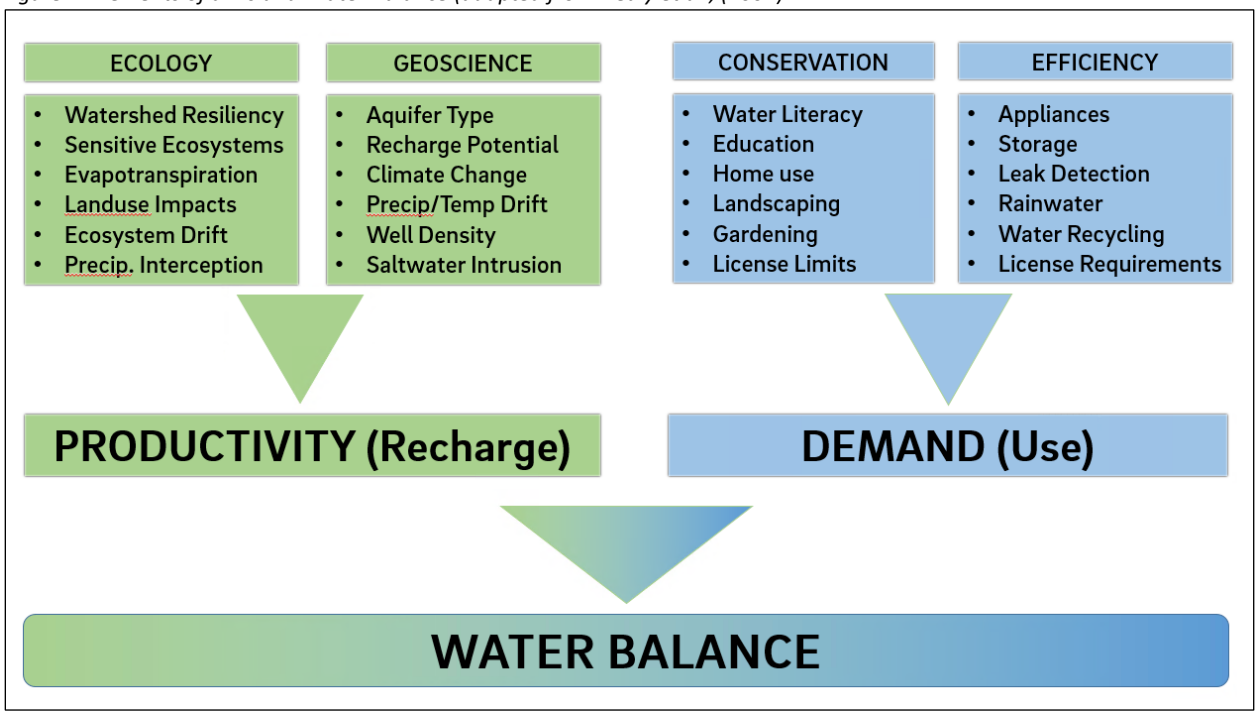
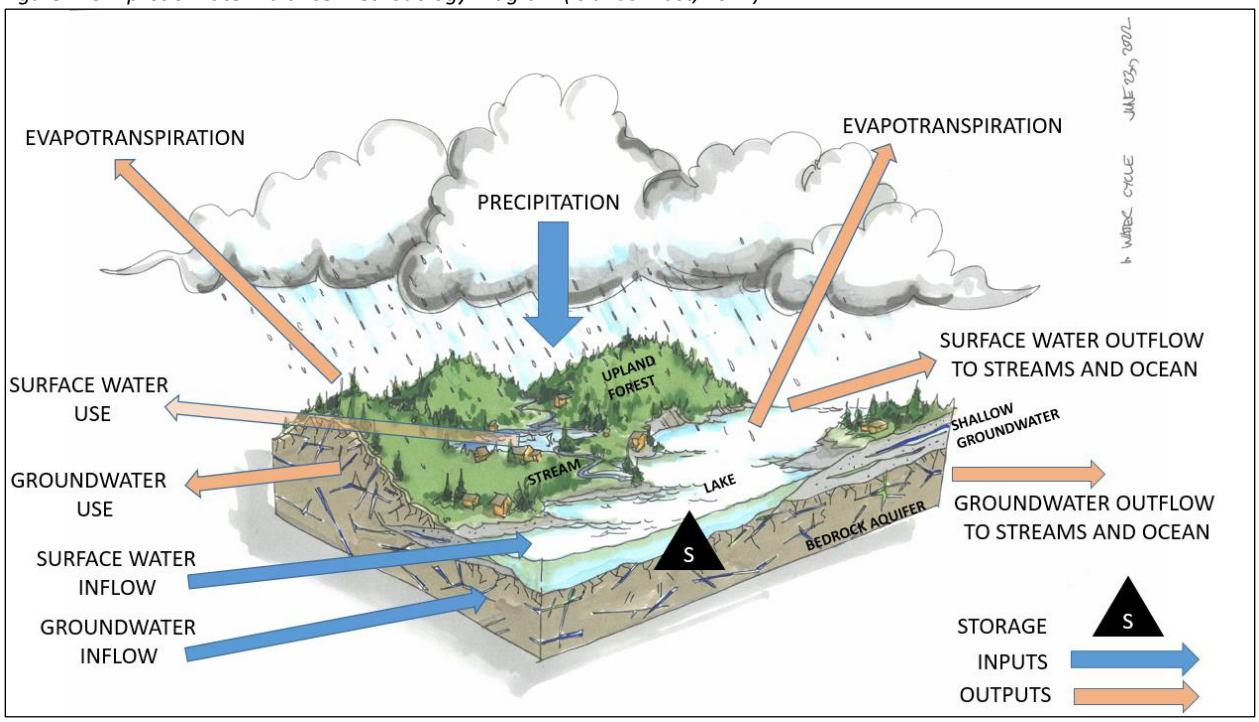


Figure 2: Simplistic Water Balance Methodology Diagram (Islands Trust, 2022)



Key components of island water balance include:

- *Precipitation* is the amount of water that falls on the island in the form of rain or snow and is the primary source of freshwater for islands.
- *Evapotranspiration* is the process by which water is returned to the atmosphere from surface water, the ground surface, and through plants in the form of water vapor. The rate of evaporation depends on factors such as temperature, humidity, wind, and water body surface area.
- *Runoff* is the portion of precipitation that flows over the surface of the island and eventually enters rivers, streams, other water bodies, and ultimately into the ocean.
- *Groundwater recharge* is the amount of precipitation that infiltrates into the ground and into the groundwater system.
- *Groundwater withdrawal* is the extraction of groundwater for various purposes, such as drinking water, irrigation, and industrial use, that has a significant influence on an island's water balance.
- *Surface water storage* on islands such as lakes and ponds contribute to not only water supply but also play an important role in groundwater recharge.
- *Climate and weather patterns* significantly impact an island's water balance through the distribution of precipitation spatially and temporally. Climate change has altered the distribution and availability of water resources and will continually shift the behavior of island watersheds.
- *Anthropogenic activities*, such as deforestation, subdivision, and agriculture, affect an island's water balance by altering runoff patterns and recharge from changing land cover and water use.

Watersheds as Natural Assets

Balancing water resources are crucial for meeting the needs of its residents, ecosystems, and industries while ensuring the sustainability of water availability. Analyzing and maintaining community assets such as roads, wastewater treatment, watermains, and bridges is required for a sustainable community. In this context, watersheds and aquifers should be referred to as “infrastructure assets” as they provide essential water delivery services similar to municipal watermains and treatment plants. In many coastal urban cities watersheds are often remote from the population and protected for the sole purposes of water supply. On rural islands, watersheds are in the fabric of the community, where residents, farmers, and industry live, work, and recreate on the watersheds that generate water for the community and thus needs additional care and concern to the protection of its health to not be a detriment to water balance.

A strategic direction to focus on outcomes that reduce life-cycle costs and risks is needed. To use less water, support natural flows in streams, preserve natural pathways by which water reaches streams, and reduce runoff from land-use benefits the watersheds and aquifers as a water resource assets.

The Federation of Canadian Municipalities states that *“[to] make good decisions, you need accurate data. You also need to know how your community may grow and how changing weather patterns could affect your assets. Asset management helps communities manage assets to make better planning decisions by reducing risk to ensure reliable and affordable services and a high quality of life to your residents.”*

A 2019 “Sustainable Service Delivery Primer: Integrating Natural Assets into Asset Management”, Asset Management BC states that *“[natural] assets support the delivery of core local government services, while doing so much more. The functions that nature provides to communities beyond core services, such as recreation, climate regulation, clean air, habitat, and biodiversity are invaluable to the overall health and well-being of a community. Including natural assets in asset management processes provides an integrated approach to maintaining or enhancing the natural assets in a community. Asset management processes have traditionally been applied only to engineered infrastructure. However, there is growing evidence that by considering natural assets within asset management processes, local governments can decrease capital, operations, and maintenance costs; increase levels of service; enhance their ability to adapt to climate change; and reduce the community’s unfunded liabilities – all while protecting or enhancing the multitude of other benefits that natural asset bring to communities.”*

Conducting Water Balance Assessments in the Islands Trust Area

There is a need to strengthen water balance assessments in the Islands Trust Area to address carrying capacity, Climate Emergency and Reconciliation Declaration. The carrying capacity of the Islands in the Islands Trust Area is directly related to water balance. Water is critical to survival of communities and the environment. Adapting to climate change requires understanding the status quo and future projections related to water availability. The islands cannot rely on trucking in water from other regions which may also be experience water balance challenges in a changing climate. While rainwater catchment should be encouraged to offset the use of groundwater, rainwater cannot be solely relied upon for water sustainability. The availability of groundwater is critical to thousands of existing users to support daily activities, for fire suppression, and to environmental flow needs of watersheds. Any contemplation of additional density should consider water availability.

A number of First Nations have expressed interest in returning to the islands. Currently the only opportunity for consideration of their interests with respect to water is a responsibility of Provincial water authorizations. Through the referral process First Nations are asked if they are directly affected by water related to specific applications. In the adjudication of the water use, future water demand of the First Nation is not directly analyzed. The Water Sustainability Act allows for the creation of water reservations.

It is advisable that water balance assessments in the Islands Trust Area consider coordination with First Nations, Regional Districts, local water champion organizations, and the Province to ensure that water is not being over allocated to residential development. Over allocation puts communities in a vulnerable position from a climate change adaptation perspective. It also impact waters availability for the potential re-emergence of First Nation communities to the Islands Trust Area.

Cost Estimates for Water Balance in the Islands Trust Area

The cost of water balance assessments are dependent on the specific water resources and water users. Each island is unique in water use and will have specific costs and complexity. On-island coordination is needed for collection of current water use and coordination is needed with First Nations to understand the future needs of water on the islands. The cost for water balance assessment for a single LTC has ranged from $10,000 to $100,000 depending on the scope, resolution, and complexity of the assessment.

It is likely that a water balance assessment that considers climate change and First Nations interests will be higher than average of historical cost for this work. Gabriola island has an abundance of data from the Regional District of Nanaimo Drinking Water and Watershed Protection program, which would make it a good candidate for an advanced water balance assessment that leverages the information and data. Islands such as Denman, Lasqueti, Thetis, and Gambier may have data collection challenges and although the water demand overall is lower than Gabriola or Salt Spring, the cost of assessment may be higher due to lack of available data.

Recommended Next Steps

Staff consider that undertaking a water balance assessment using two case study islands with varying data and information sources would be beneficial in developing a methodology that can be consistently used across the Islands Trust Area. Islands that staff are considering good candidates for this methodology development are Gabriola and Denman. Staff suggest that following methodology development water balance assessments are advanced on Salt Spring and Hornby.

FOLLOW-UP

Staff will follow up on any recommendation from the Regional Planning Committee to further this work if requested.

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Reviewed By/Date: Robert Kojima, Regional Planning Manager / November 8, 2023