

Water Security: Briefing Note

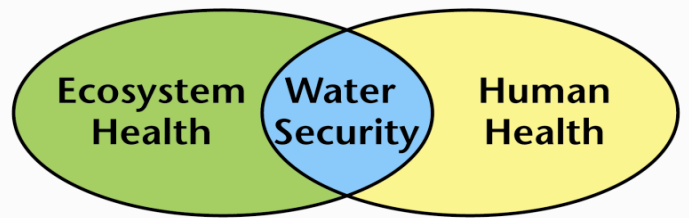
Freshwater-related issues are of growing concern throughout Canada, both in terms of availability and quality.

- According to Environment Canada, one quarter of all Canadian communities have experienced water shortages since the mid-nineties.¹
- Water quality in more than one thousand rural communities is as bad as or, in some cases, worse than many developing countries. In 2007 alone, there were 1766 boil water advisories across Canada in small towns, cities and townships, and a further 93 in First Nations communities.²
- Some ecosystems are showing signs of stress due to compromised water quality, declining water levels, and reduction of habitat.³

These issues will be affected by global climate change impacts (the full scope of which is still unknown).

These disparate water management challenges demand a holistic approach that accounts for multiple stressors and cumulative effects. We suggest that the concept of water security, broadly defined, is one promising approach.

We define **water security** as:
“sustainable access, on a watershed basis, to adequate quantities of water of acceptable quality, to ensure human and ecosystem health”.



Assessing Water Security requires an initial assessment of the current status of water, combined with longer-term assessment through repeated evaluation, in order to assess the risk of water quality and quantity becoming degraded in the foreseeable future. As such, risk assessment is associated with water security assessment, taking into account uncertainties associated with stressors, such as development or climate change.

As part of a four-year research project funded through the Canadian Water Network, our project team is developing tools to help communities in their efforts to assess water security.

Water Security Status Indicators: The WSSI assessment method is a new approach designed to help communities assess their water security status. The WSSI assessment method provides practitioners with a framework to select water quality and quantity indicators that address ecosystem and human health.

The table below shows the general framing of the WSSI assessment matrix, which is populated by indicators identified by the community, specific to their needs.

¹ Environment Canada. 2004. Threats to Water Availability in Canada: National Water Resource Institute Scientific Assessment Report Series no. 3 and ACSD Science Assessment Series No. 1. Burlington, Ontario: National Water Research Institute.

² Eggerston, L. 2008. Investigative Report: 1766 boil-water advisories now in place across Canada. Canadian Medical Association Journal May 6, 2008: 178(10) 985.

³ Schindler, D. 2001. The Cumulative Effects of Climate Warming and Other Human Stresses on Canadian Freshwaters in the New Millennium. Canadian Journal of Fisheries and Aquatic Sciences 58: 18-29



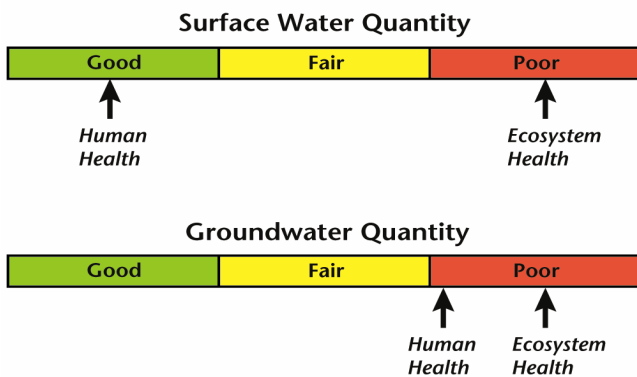
Table 1: Water Security Status Indicators Assessment Matrix - Township of Langley (ToL)

Indicators that define safe water for	Water Quality	Water Quantity
Human Health	1) <i>Water Quality Index (WQI)</i> , Canadian Council of Ministers for the Environment (CCME)	1) <i>Water Availability Index (WAI)</i> , Environment Canada (EC) 2) <i>ToL Water Management Plan</i>
Ecosystem Health	1) <i>WQI, CCME</i> 2) <i>Community Assessment, British Columbia Fish Protection Act</i>	1) <i>WAI, EC</i> 2) <i>Community Assessment, British Columbia Fish Protection Act</i>

Water Security Risk Indicators: Risks to water quality and quantity associated with current land use practices, changes in land use, climate change, or changes in water demand can be evaluated by considering these various stressors. For example, within a groundwater quality context, the intrinsic vulnerability of an aquifer can be mapped using information on the soils, geology, water table depth, etc. To assess “risk” the threat of contamination (such as application of fertilizer or sudden release via a spill) and the associated uncertainty of occurrence must be taken into account. Risk analysis also requires some estimate of loss, such as the cost to replace a water supply well, or the cost to the public health care system if people get sick.

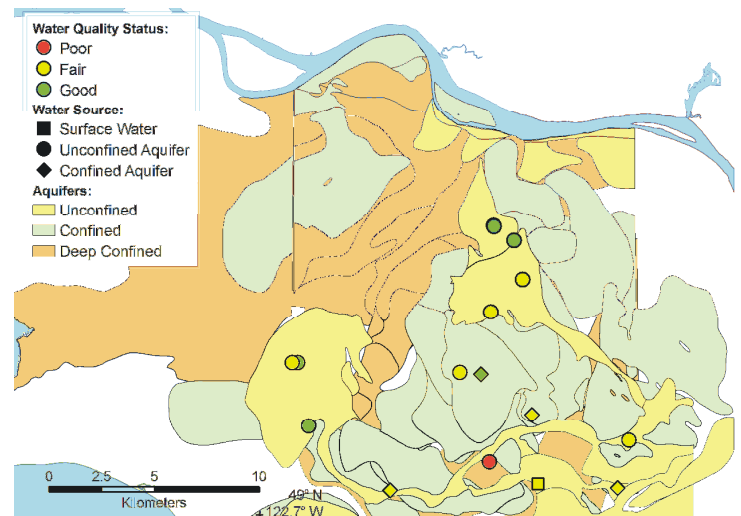
Good Governance: Relaying information back to community stakeholders and decision makers is an essential component of good governance. Visualization tools can be a valuable resource for communities in knowledge translation, helping them update and refine practices as conditions change. The figures below illustrate two potential ways to present the status of water in the Township of Langley, British Columbia. Geospatial maps have also been developed to communicate risk so that more informed choices can be made in terms of land use planning, water allocation, etc. Applying good governance practices to adapt behaviour, in light of the assessment and identified community goals, is the next step.

Figure 2: Water Security Status Indicators slider bar



- **Ecosystem Habitat** is **poor** as preferred egg-laying sites are at groundwater discharge areas, which are declining.
- **Surface water** quantity for **human health** is **good** with drinking water available from Greater Vancouver Water District (although at a high price)
- **Groundwater** quantity for **human health** (drinking water) is **poor/fair** with growing demands and declining well levels

Figure 3: Map of drinking water quality



For further information on the Water Security Assessment Framework project visit our website:

www.watersecurity.ca or email water.security@ubc.ca.