

A Summary of Online Water Science Resources for BC

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Introduction

Water information in BC is highly distributed. Many players hold and generate data and information of different types and at different scales across the province. Much of the information is scale dependent with interplay between variables (e.g. climate, land use decisions) linking small watersheds and the larger watersheds they are nested within.

Given the diversity of water and watershed activities, no one individual or organization holds all water related information in BC. This poses a challenge to sustainable water management where the efficient sharing of data, information, and expertise across watersheds and organizations is essential.

One possibility for improving the sharing of information across BC's many watersheds is to utilize online tools. A new generation of interactive web-based tools allows users to customize and contribute information (see Box 1 for examples).

This survey investigates the current range of BC online information resources for water science practitioners to help facilitate a conversation about the types of online tools that could improve the sharing of data, information and expertise among BC's water science practitioners.

Survey Objectives

Key objectives of this survey were to review BC online water science resources to:

- identify online tools that allow for the sharing of:
 - data (raw, unorganized observations),
 - information (data that is interpreted in a given context to give meaning) and/or,
 - expertise among water science practitioners through building connections among individuals; and
- characterize the range of BC websites relevant to water science practitioners.

An additional objective was to identify websites from other jurisdictions that could model possibilities for online BC water science resources.

Methods

To begin the search for BC websites and sites hosting BC data, an online search was conducted using Google and the following broad search terms, "BC, B.C., British Columbia, water, watershed". Links recommended within each website were then followed to identify further sites. A website was recorded if it targeted audiences at a provincial or at least a drainage basin scale. The survey did not capture watershed specific groups or local government initiatives.

Sites external to BC were searched via Google using the keywords, "water, watershed, cyberinfrastructure, data, portal". Again, this provided a starting list of websites and links within these websites were followed to identify further sites. Websites were recorded if they demonstrated an online tool that may serve as a useful model for BC water practitioners.

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As a final step, the list of websites was circulated to individuals familiar with the water community in BC to ask for additional sites.

Results

Overview

- In total, 92 websites were found using the search methods and criteria listed above. A list of all websites can be found in Appendix A.
- Fifty-five websites from BC were catalogued representing stewardship groups and non-government organizations (NGOs; 15 sites), professional associations (5 sites), academic centres (6 sites), partnerships (10 sites) and federal (1 site), provincial (14 sites), and regional (4 site) governments that provide data and/or information relevant to water science practitioners. Table 1 provides a summary of the strengths and weaknesses or gaps of this collection of BC websites.
- Eleven of the BC sites surveyed offered web mapping applications, mostly hosted by government (e.g. [iMap](#)). One site, [The Aquatic Partnership](#), supports a wiki and online discussion forum. Blogs were also hosted on a few sites. The other 38 sites did not host interactive tools (for a description of interactive online tools with examples see Box 1).
- Six Canadian and 13 international sites were also cataloged – 12 from the US and 1 from Europe – that offer examples of the potential use of online tools.

Data Hosts and Data Portals

- Websites that support data sharing typically allow users to browse, search, view and download data. Sites may host a particular database or act as a portal to search multiple data repositories. Data portals usually host meta-data and a link to the data source.
- Government held water data is accessible through open data initiatives such as [DataBC](#) and [Open Data Canada](#) and other searchable databases.
- While there is reference to monitoring and other data collection initiatives on various stewardship webpages, this information is not available online. Also, there is no site for locating datasets held by universities, NGOs and industry.

Websites Providing Information

- Most websites host information resources such as reports, educational material, protocols and other relevant and useful information for water science practitioners. Keyword searches on Google do not commonly return the information resource, so without previous knowledge of a specific report or website, it would be difficult for a water science practitioner to locate the information.

Websites That Help Make Connections

- Websites that build connections allow individuals to connect with others sharing common interests. Examples include wikis, online discussion forums and social networks.
- The ability to network across disciplines would improve the flow of information, yet the membership lists of most professional association are not searchable by non-members thus limiting the capacity to build relationships across disciplines.
- Our survey of BC websites revealed that there is no widely used online discussion forum for water science practitioners to ask questions and share expertise. Some organizations are

making use of social networks to build connections among members. For an example see the [BC Water and Waste Association Facebook page](#).

Model Sites

- A number of sites were identified that showcase the potential of online tools. Some of our favorite examples are given below.
- The [Water and Environment Hub](#) provides users with a web mapping application to search for water and environmental data specific to geographical areas. It also allows users to upload data to share with others through this site.
- The [Nearshore Wiki](#) allows members to create content related to conservation science in the Salish Sea. Conservation scientists share relevant evidence, observations and theories on topic specific pages. The site is governed by a social contract that contributors agree to when they sign up, similar to Wikipedia.
- [The Pacific Northwest Aquatic Monitoring Partnership Monitoring Methods](#) website hosts monitoring protocols developed by members. It also hosts lists of data repositories, organizations and web resources where members can add content. An online discussion forum allows members to ask and answer questions and share information.

Table 1: Summary of strengths and gaps represented in BC online water science resources

Online Resource	Strengths	Weaknesses/Gaps
Data	An abundance of websites to access government monitoring and inventory data	With so many sites it is difficult to understand the difference between them and limitations of each site
	Multiple sites that support stewardship groups	Data collected by stewardship groups are not available on websites
		Data collected by university researchers and industry are not accessible online
Information	Provincially, EcoCat and CLIR are useful tools for searching water related reports	These databases host only government generated reports. Also, reports are most often pdf files and data within these reports are not easily accessible in a usable form
	Most professional organizations, NGOs and government websites have topic specific reports, publications and workshop proceedings available	Not all of these sites are searchable. Also, without knowing about the publication it would be difficult to find it
	A number of websites list freshwater sampling and monitoring protocols	No easy way to search or compare protocols
Connecting Expertise	There are many professional associations that have membership lists	Most membership lists kept by professional organizations are searchable only by members
	Some websites have the ability to host discussion forums and create member profile pages	These websites are not well used

Box 1 – What types of interactive online tools could support data and information sharing and build connections among BC water science practitioners?

The online tools below are organized along a spectrum with those that promote data analysis and sharing at the top of the list and those tools that help connect expertise near the bottom.

- **Data hosts** are commonly individual organizations that maintain data within a consolidated data repository that is searchable through a web interface. Data hosts are responsible for the quality of the data and may pose restrictions on the use of the data through licensing agreements. An example is the [BC Geographic Warehouse](#).
- **Data portals** act as a gateway to multiple data hosts and allow users to search a data catalogue. Data portals typically host meta-data and a link to take users to the source of the data. For an example, see the [National Groundwater Monitoring Network Data Portal](#).
- **Open data** refers to the licensing agreement under which data can be used. Data hosts may impose specific limitations described in the terms of use or licensing agreements. Open data, however, allows the use of data for most purposes without further consent. [DataBC](#), for example, secures an [Open Government License](#) for all data accessed on this data portal.
- **Applications:**
 - Web applications are accessed using a browser connected to the Internet. Online mapping tools such as [iMap](#) and [Hectares BC](#) are web applications.
 - Mobile Device Applications are downloaded to a portable device. There is a list of water relevant mobile device applications provided by [Alberta Water Portal](#).
 - Downloadable applications run off your PC and may be able to access data hosted online. For example, [Environment Canada Data Explorer](#) is a Windows based program that allows users to interact with Environment Canada's [HYDAT database](#).
- **Blog** – A blog is an online article with the ability for users to post comments. The [Living Water Smart Blog](#) is an example.
- **Wikis** – The most well known wiki is [Wikipedia](#). Wikis allow users to create and edit content together online. Some examples of natural resource wikis include the [Salish Sea Nearshore Wiki](#) and the [IWA Water Wiki](#).
- **Social bookmarking** tools help web users tag websites with keywords and share these sites with other site members. The tool can also allow users to vote on the best links. For an example of this tool visit [Digg](#) or [Technorati](#).
- **Video sharing** – [YouTube](#) is the site that has revolutionized our access to online videos. Video sharing sites can allow a user or group to create a channel to hold all content created by a user. An [example](#) using [Vimeo](#) can be found at [The Living Water Policy Project](#).
- **Social network** sites are more diverse than just [Facebook](#) and [LinkedIn](#). Social network sites allow users to connect with other individuals that share similar interests. Mechanisms within social networking sites to help build this connection include search tools, direct messaging, profile pages, discussion forums, and event posting. [MyWash](#) is an example of a social network with a focus on water supply. Customizable social networks can also be built on platforms such as [Ning](#).