

Appendix 3:

Watershed Data and Information Resources

BY L.J. BEAUDRY, J. McCONNACHIE, P.G. BEAUDRY AND R.G. PIKE

Discussion Draft

This appendix has been made available for discussion purposes in advance of the final *Compendium* publication. While the material has been peer-reviewed, we encourage your comments on this draft. Feedback may be forwarded to Robin.Pike@forrex.org until July 31, 2006.

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APPENDIX 3: WATERSHED DATA AND INFORMATION RESOURCES

Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Climate	Temperature, relative humidity, precipitation, wind speed, and wind direction.	1970–present	B.C.	Ministry of Forests and Range, Protection Branch, Protection Program	Over 200 hourly reporting automated weather stations operated April–November by the B.C. Fire Weather Network, with some year-round. Web site has locations of stations and data at 14:00 and 16:00 hr in fire season.	Complete dataset kept by Protection Program. One can subscribe to receive current data, or historic dataset can be purchased on CD. Fire weather: http://www.for.gov.bc.ca/protect/weather/	Protection Program, Ministry of Forests and Range, PO Box 9502, Stn Prov Govt, Victoria, BC V8W 9C1 Tel: 250-387-5965 Eric Meyer, Fire Weather Specialist Tel: 250-387-8744 Eric.Meyer@gov.bc.ca
Climate	Temperature, relative humidity, precipitation, wind speed, and wind direction.	Unknown	B.C.	Ministry of Forests and Range, Forest District Offices	Manual, daily fire weather data for field operations, number of stations and time operated varies annually.	No web site, data kept at Forest District Offices, some transferred to Fire Protection Program.	Ministry of Forests and Range, District Offices Tel: 250-387-5965 Forests.ProtectionBranchOffice@gov.bc.ca Radha Fisher, Provincial Fire Information Officer Tel: 250-356-5249 Radha.Fisher@gov.bc.ca
Climate, Snow	Precipitation, temperature, wind, air pressure, humidity, snowpack conditions, and frost.	Some since 1974	B.C.	Ministry of Transportation, Snow Avalanche & Weather Program	Historically manual stations, now automated (hourly) weather stations used. <ul style="list-style-type: none"> • 46 RAWs stations for avalanches at high elevations • 54 RWS stations for road conditions • 50 frost probe stations on roads. 	Data kept at headquarters. Construction Maintenance Branch, Snow Avalanche Programs: http://www.th.gov.bc.ca/mot_org/const_maint/snowavalanche/snow_av.htm	Snow Avalanche & Weather Programs, Ministry of Transportation, PO Box 9850, Stn Prov Govt, Victoria, BC V8W 9T5 Ted Weick, Avalanche & Weather Systems Manager Tel: 250-387-7513 Ted.Weick@gov.bc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Climate, Water	Rainfall, snow accumulations, water inflow to reservoirs, sediment input from sub-drainages, and periodic water samples for water quality of city drinking water, including micro-organisms.	~1960s	B.C.	Greater Vancouver Regional District	Water Monitoring and Forecasting – monitoring over 20 meteorological stations in GVRD watersheds and sampling over 20 reservoirs.	Data kept at Watershed Management Department. Daily values updated online. Water turbidity info: http://www.gvrd.bc.ca/water/default.asp GVRD home page: http://www.gvrd.bc.ca/index.html	Greater Vancouver Regional District, 4330 Kingsway, Burnaby, BC V5H 4G8 Tel: 604-432-6200 Scott Stuart, Watershed Engineering Technologist, Watershed Management Department Tel: 604-432-6428 ssstuart@gvrd.bc.ca
Climate, Water quality	Reservoir depths, rainfall, and water quality, including physical, chemical, and biological parameters.	~1960s; online since 2000	B.C.	Capital Regional District, Water Services	Data records from above and below treatment facilities.	Water quality data (since 2000): http://www.crd.bc.ca/water/water_quality_data.htm Monthly bacteriological reports (since 2000): http://www.crd.bc.ca/water/water_quality/water_quality_reports.htm Sooke Reservoir historical storage (since 2000): http://www.crd.bc.ca/water/levels/summary/index.htm Older data available from Water Services. Capital Regional District Water Services: http://www.crd.bc.ca/water/index.htm	Capital Regional District Water Services, 479 Island Highway, Victoria, BC V9B 1H7 Tel: 250-474-9600 Jack Hull, General Manager, Water Services (water quantity data) Tel: 250-474-9604 jhull@crd.bc.ca Stewart Irwin, Manager, Water Quality (water quality data) Tel: 250-474-9603 sirwin@crd.bc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Climate, Snow, Water	Reports and data on daily snow water equivalent, maximum and minimum temperature, and cumulative precipitation by station.	Snow surveys 1935–present; snow pillow mid 1980s – present	B.C.	Ministry of Environment, Water Stewardship Division, River Forecast Centre	River Forecast Centre provides reports on snowpack. Snow Data Archives include historical snow survey data and snow pillow data for over 150 stations. Near real-time automatic snow pillow (ASP) data from remote monitoring stations (subject to errors).	Snow data archives: http://www.env.gov.bc.ca/rfc/archive/ River Forecast Centre: http://www.env.gov.bc.ca/rfc/index.htm Near real-time snow pillow data: http://www.env.gov.bc.ca/rfc/river_forecast/pilldat.htm	River Forecast Centre, Water Stewardship Division, Ministry of Environment, PO Box 9342 Stn Prov Govt, Victoria, BC V8W 9M1 Tel: 250-387-9472 Manual snow surveys: Allan Chapman, Head, River Forecast Centre Tel: 250-387-9472 Allan.Chapman@gov.bc.ca
Climate	Daily temperatures and monthly precipitation.	1874–present	Canada	Environment Canada, Meteorological Service of Canada, Climate Research Branch	Rehabilitated precipitation and homogenized temperature data sets: <ul style="list-style-type: none"> • daily temperatures from 1895 to present for 210 locations • monthly precipitation (snow and rain) for 495 sites from 1900 to present • sites in the Canadian Arctic since the 1940s. 	Environment Canada, AHCCD – adjusted historical Canadian climate data: http://www.cccma.bc.ec.gc.ca/hccd/	Climate Research Branch, Meteorological Service of Canada, Environment Canada, 4905 Dufferin St., Downsview, ON M3H 6H9 Éva Mekis, Research Climatologist Tel: 416-739-4374 eva.mekis@ec.gc.ca
Climate	Temperature, precipitation, relative humidity, atmospheric pressure, wind speed, wind direction, visibility, cloud types, cloud heights and amounts, soil temperature, evaporation, solar radiation, sunshine, and weather phenomena.	Some 1900s – present; online 1953–present	Canada	Environment Canada, Meteorological Service of Canada	National Climate Data (CD) and Information Archive – hourly data for specific locations and dates. Includes climate averages and extremes. Will respond to customized requests.	Welcome to the national climate data and information archive: http://www.climate.weatheroffice.ec.gc.ca/welcome_e.html Geographic location of weather stations including buoys (active and inactive) – British Columbia and Yukon environmental monitoring networks, Station Information Centre: http://scitech.pyr.ec.gc.ca/climhydro/welcome_e.asp	Pacific and Yukon Region, Meteorological Service of Canada, Environment Canada, Suite 201–401 Burrard St., Vancouver, BC V6C 3S5 Climate Services Tel: 604-664-9067 ClimatePYR@ec.gc.ca

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Climate, Snow	Precipitation, temperature, snow water equivalent, and depth of snow.	1997–present	U.S., some states	US Department of Agriculture, Natural Resources Conservation Service	Over 200 stations located in the western United States.	Snow course data: http://www.wcc.nrcs.usda.gov/snowcourse/sc-data.html SNOTEL snow – precipitation update reports: http://www.wcc.nrcs.usda.gov/snow/newupdate.html SNOTEL precipitation data: http://www.wcc.nrcs.usda.gov/snow/snotel-precip-data.html SNOTEL temperature data: http://www.wcc.nrcs.usda.gov/snow/snotel-temp-data.html	Natural Resources Conservation Service, USDA, 2021 E. College Way, Suite 214, Mt. Vernon, WA, 98273, USA Scott Pattee, Hydrologic Technician and Water Supply Specialist Tel: 360-428-7684 ext. 141 scott.pattee@wa.usda.gov
Fish	Salmon escapements, fish stocking records for streams and lakes, depth maps for over 2500 lakes, and reports.	1950s – present	B.C.	Freshwater Fisheries Society of BC, BC Ministry of Environment, and Fisheries and Oceans Canada	Current information on fish in B.C. lakes and streams. <ul style="list-style-type: none"> FishWizard queries an interactive map. Fisheries Information Summary System (FISS) queries the database and documents. New data are recorded at Field Data Information System (FDIS) for uploading of field data collected to RISC standards. 	Interactive map – welcome to FishWizard: http://www.fishwizard.com/ FISS database query – welcome to the fisheries inventory data queries (FIDQ): http://srmapps.gov.bc.ca/apps/fidq/ Fisheries inventory (FISS database): http://www.bcfisheries.gov.bc.ca/fishinv/fiss.html To record new data in field data information system (FDIS): http://www.bcfisheries.gov.bc.ca/fishinv/fdis.html Welcome to the libraries of Fisheries and Oceans Canada (WAVES): http://inter01.dfo-mpo.gc.ca/waves2/index2.html	Government of BC web sites (FishWizard, FIDQ, FISS, FDIS) fish.issues@gov.bc.ca Libraries of Fisheries and Oceans Canada (central) oofi@dfo-mpo.gc.ca DFO Pacific Region, Vancouver Library 200-401 Burrard St., Vancouver, BC V6C 3S4 Tel: 604-666-3851 paclibrary@pac.dfo-mpo.gc.ca
Fish	Reports on fish habitat, fish, wetlands, riparian, and streams.	1987–present	B.C.	Ministry of Environment, Environmental Stewardship Division, Biodiversity Branch	Fish habitat information, including fish fact sheets, best management practices for works in and adjacent to streams, and wetland evaluations.	Fish and habitats: http://www.env.gov.bc.ca/wld/fishhabitats/index.html B.C. fish facts factsheets: http://www.env.gov.bc.ca/wld/fishhabitats/fishfactsheets.html Guidelines and best management practices (BMPs): http://www.env.gov.bc.ca/wld/BMP/bmpintro.html	Biodiversity Branch, Environmental Stewardship Division, Ministry of Environment, PO Box 9338, Stn Prov Govt, Victoria, BC V8W 9M1 www.wlapmail@gov.bc.ca

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Fish, Animals	Species at risk, location maps, and level of protection.	1991–present	B.C.	Ministry of Environment, BC Conservation Data Centre	Information on animals, plants, and plant communities at risk in B.C. Computerized database with status list, map of known locations, and list of levels of protection.	BC Conservation Data Centre Home: http://srmwww.gov.bc.ca/cdc	BC Conservation Data Centre, Ministry of Environment, PO Box 9358, Stn Prov Govt, Victoria, BC V8W 9M2 Tel: 250-356-0928 cdcdata@gov.bc.ca
Fish	Fish species presence and distribution, marine habitat, administrative boundaries, CHS charts, and orthophoto imagery.	Unknown	B.C., Yukon	Fisheries and Oceans Canada	Access to fish and fish habitat information (over 200 datasets) queried through an interactive map interface.	Mapster: http://www.canbcdw.pac.dfo-mpo.gc.ca/ows/imf.jsp?site=mapster	Fisheries and Oceans Canada, B.C. and Yukon Regional Headquarters, 200–401 Burrard St., Vancouver, BC V6C 3S4 Dwight McCullough, GIS co-ordinator Tel: 604-666-2044 hebgis@pac.dfo-mpo.gc.ca
Fish, Geography	Orthophotos, base maps, fisheries resources, fish distribution, and legal boundaries.	Some from 1992	B.C., Yukon	Fisheries and Oceans Canada	DFO Spatial data holdings – orthophotos, base maps, and datasets (from many sources) on DFO regions.	Spatial data holdings: http://www-heb.pac.dfo-mpo.gc.ca/maps/datahold_e.htm	Fisheries and Oceans Canada, B.C. and Yukon Regional Headquarters, 200–401 Burrard St., Vancouver, BC V6C 3S4 Dwight McCullough, GIS co-ordinator Tel: 604-666-2044 hebgis@pac.dfo-mpo.gc.ca
Fish, Animals	Species at risk, and species occurrence and ranges.	Unknown	Canada	Environment Canada, Canadian Wildlife Service, Species at Risk Branch	<i>Species at Risk Act</i> (SARA) – maps and lists of species at risk, produced from species occurrence and other data.	Search by map: http://www.speciesatrisk.gc.ca/map/default_e.cfm Search by species: http://www.speciesatrisk.gc.ca/search/default_e.cfm	Species at Risk Branch, Canadian Wildlife Service, Environment Canada, Ottawa, ON K1A 0H3 Tel: 819-997-1095

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Geography, Water bodies	Unique water body identification.	Unknown	B.C.	Ministry of Environment, Environmental Stewardship Division, Ecosystems Branch, Ecosystem Information Section	Watershed Atlas – 1:50 000 digital maps of B.C. stream networks with watershed boundaries of 3rd-order and larger streams provided in downloadable files. Provides unique identification of all water bodies, 1:20 000 mapping is currently being compiled.	Watershed atlas FTP site: ftp://ftp.env.gov.bc.ca/dist/arcwhse/watershed_atlas/ 1:50 000 watershed atlas maps (and links): http://srmwww.gov.bc.ca/fish/watershed_atlas_maps/index.html	Ecosystem Information Section, Ecosystems Branch, Environmental Stewardship Division, Ministry of Environment, PO Box 9358, Stn Prov Govt, Victoria, BC V8W 9M2 Tel: 250-387-2735 Don Philip, Aquatic Spatial Information Specialist Tel: 250-387-9558 Don.Philip@gov.bc.ca Dan Grant, Aquatic Base Mapping Tel: 250-387-9562 Dan.Grant@gov.bc.ca
Geography, Land use	Historical maps, plans, architectural drawings, and charts.	1848–present	B.C.	Royal British Columbia Museum Corporation, BC Archives	BC Archives provides online access to cartographic records.	Cartographic records: http://www.bcarchives.gov.bc.ca/cartogr/general/maps.htm	Royal British Columbia Museum, 675 Belleville St., Victoria, BC V8W 9W2 Tel: 250-387-1952 access@www.bcarchives.gov.bc.ca
Geography, Mapping, Imaging	Maps, orthophotos, digital mapping references, air photo index, and geographical names.	Air photos 1936–present	B.C.	Ministry of Agriculture and Lands, Integrated Land Management Bureau, Base Mapping and Geomatic Services Branch	Provides a range of mapping services including: <ul style="list-style-type: none"> • Provincial baseline atlas – digital road atlas (TRIM) and orthophotos • Geospatial reference – location of control monuments • Air photo inventory (1979–2003 online) • Geographical names • Digital maps of BC • GPS corrections – CDGPS. 	Provincial baseline atlas: http://srmwww.gov.bc.ca/bmgs/baseline_atlas/index.html British Columbia airphoto inventory – web mapping application: http://srmwww.gov.bc.ca/bmgs/airphoto/IMF/Index.htm B.C. geographical names: http://srmwww.gov.bc.ca/bcnames/ Free stuff, digital maps: http://srmwww.gov.bc.ca/bmgs/freestuff.html MSRM base mapping and geomatic services (home page): http://srmwww.gov.bc.ca/bmgs/	Base Mapping and Geomatic Services Branch, Integrated Land Management Bureau, Ministry of Agriculture and Lands, PO Box 9355, Stn Prov Govt, Victoria, BC V8W 9M2 Tel: 250-387-6316 BMGS.info@gov.bc.ca Amin Kassam, Branch Director Amin.Kassam@gov.bc.ca Tel: 250-387-9321

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Geography, Maps, Land use	Maps, air photos, legal survey data, publications, and software.	Air photos 1936–present	B.C.	Ministry of Agriculture and Lands, Integrated Land Management Bureau, Base Mapping and Geomatic Services Branch	Online location to order provincial digital and paper maps, air photos, survey data, reports, and software until March 2006, when links will be provided to the replacement web site offering an online base map store. Site has free and priced information.	Land Data BC: http://www.landdata.gov.bc.ca/	Base Mapping and Geomatic Services Branch, Integrated Land Management Bureau, Ministry of Agriculture and Lands, PO Box 9355, Stn Prov Govt, Victoria, BC V8W 9M2 Marc Poire, LandData BC Information Officer Tel: 250-952-4050 Marc.Poire@gov.bc.ca
Geography, Metadata	Administrative boundaries, ecosystem mapping, and wildlife habitat.	Unknown	B.C.	Ministry of Agriculture and Lands, Integrated Land Management Bureau, Land and Resource Data Warehouse	Published ARC/Info GIS datasets on an ftp site.	MSRM GIS data ftp site: http://srmwww.gov.bc.ca/gis/arcftp.html Land and Resource Data Warehouse (LRDW): http://www.lrdw.ca	Land & Resource Data Warehouse, Integrated Land Management Bureau, Ministry of Agriculture and Lands, 2nd Floor, 780 Blanchard St., Victoria, BC V8W 2H1 Al Sutherland, Sr. Spatial Data Administrator Tel: 250-387-1304 Al.Sutherland@gov.bc.ca Al Becker, Team Leader, LRDW Tel: 250-387-8451 lrwproj@Victoria1.gov.bc.ca
Geography, Ecosystems	Ecosystem maps.	2003	B.C.	Ministry of Forests and Range, Research Branch, Ecology and Earth Sciences Group, BEC Program	Downloadable digital and information on ordering paper copies of biogeoclimatic ecosystem classification maps.	BECWeb maps and mapping: http://www.for.gov.bc.ca/hre/becweb/mapping.htm	BEC Program, Ecology and Earth Sciences Group, Research Branch, Ministry of Forests and Range Bag 6000, 3333 Tatlow Rd., Smithers, BC V0J 2N0 Will MacKenzie, Research Ecologist Tel: 250-847-6388 Will.Mackenzie@gov.bc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Geography, Fish	Water body mapping, fish distribution maps, and coastal resource maps.	1993	B.C.	Community Mapping Network (provincial and local government and community groups)	Provides mapping of community natural resource themes, includes provincial maps and more detailed information for Georgia Basin and Central Okanagan.	Community Mapping Network: http://www.shim.bc.ca/	Rob Knight, Project Coordinator, Ministry of Environment, Lower Mainland Region, 10470 152nd St., Surrey, BC V3R 0Y3 Tel: 604-582-5317 rknight@telus.net
Geography	Maps, satellite photos, and administrative boundaries.	Landsat 1984–1989; RADAR-SAT 1989–1999	Canada	Natural Resources Canada, Earth Sciences Sector, Canada Centre for Remote Sensing	Geospatial data of Canada. Databases include: <ul style="list-style-type: none"> • Landsat • RADARSAT • atlas of federal boundaries • Canadian Land Inventory. Distributes small-scale geospatial data for Canada at no charge.	GeoGratis: http://geogratiss.cgdi.gc.ca/clf/en	GeoGratis Client Services, Canada Centre for Remote Sensing, GeoAccess Division, 650–615 Booth St., Ottawa, ON K1A 0E9 Steve Smith, Physical Scientist Tel: 613-947-3499 info@geogratiss.cgdi.gc.ca
Geography	Maps, spatial mapping references, and climate change information.	~1905–present	Canada	Natural Resources Canada, Earth Sciences Sector, Canada Centre for Remote Sensing	Provides links to: <ul style="list-style-type: none"> • The Atlas of Canada (general Canada-wide maps) • The geodesic survey division (spatial referencing information and databases) • Information on climate change and northern development 	Atlas of Canada (home page): http://atlas.gc.ca/site/english/index.html Canadian spatial reference system: http://www.geod.nrcan.gc.ca/index_e.php Canada Centre for Remote Sensing: http://www.ccrs.nrcan.gc.ca/index_e.php	Canada Centre for Remote Sensing, 588 Booth St., Ottawa, ON K1A 0Y7 Tel: 613-947-1218
Land use	Crown land registry and survey parcel numbers.	1850–present	B.C.	Ministry of Agriculture and Lands, Integrated Registry Branch	Searches by survey parcel, interest parcel, or map sheet number. Cost for information retrieval.	GATOR – government access tool for on-line retrieval of Crown land information: https://tantaliss.clrs.gov.bc.ca/home_page.htm	Integrated Registry Branch, Ministry of Agriculture and Lands, PO Box 9352, Stn Prov Govt, Victoria, BC V8W 9M1 Tel: 250-952-4026 gator@gov.bc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Land use	Community watersheds and maps.	1995–present	B.C.	Ministry of Environment, Water Stewardship Division, Science and Information Branch	Locates community watersheds by forest district, location, source, and other parameters. Maps of watersheds available.	Community watershed query: http://srmwww.gov.bc.ca/wat/cws/query/cws.htm Data access – community watershed maps: http://srmwww.gov.bc.ca/wat/cws/data.html	Science and Information Branch, Water Stewardship Division, Ministry of Environment, PO Box 9358, Stn Prov Govt, Victoria, BC V8W 9M2 Tony Cheong, Manager, Forecasting and Information Tel: 250-387-9585 Tony.Cheong@gov.bc.ca
Monitoring	Monitoring methods (fish habitat, water quality, lake, groundwater, estuary, ecosystems), measurements, and mapping standards.	Various	B.C.	Ministry of Agriculture and Lands, Integrated Land Management Bureau, Resources Information Standards Committee	Provincially approved standards and methods for monitoring: <ul style="list-style-type: none"> • aquatic resources (fish habitat, water quality, sediment fish species keys, biological sampling, lake sampling) • earth sciences (groundwater, terrain) • coastal ecosystems (estuary mapping) • terrestrial ecosystems (amphibians, etc.) • other (GPS standards, map projections). 	RISC – Resources Information Standards Committee: http://ilmbwww.gov.bc.ca/risc/index.htm	Publications Coordinator, Corporate Operations, Integrated Land Management Bureau, Ministry of Agriculture and Lands, PO Box 9365, Stn Prov Govt, Victoria, BC V8W 9M3 Evert Kenk (after 17 February 2006) Tel: 250-356-5798 riscweb@victoria1.gov.bc.ca
Organization, Riparian	Reports (monitoring) and web links.	1996–present	B.C.	The Pacific Streamkeepers Federation	Volunteers committed to protecting and restoring aquatic habitats in B.C.	The Pacific Streamkeepers Federation: http://www.pskf.ca/home.html	The Pacific Streamkeepers Federation, 720 Orwell St., North Vancouver, BC V7J 2G3 Tel: 604-986-5059 pskf@direct.ca
Organization, Extension	Newsletter, web links, and bibliography (water quality).	1998–present	B.C.	FORREX, Watershed Management Extension Program	FORREX publishes a newsletter (Streamline), online articles and a forest water quality bibliography containing over 800 articles sorted by topic.	Streamline: http://www.forrex.org/streamline/ Water quality bibliography: http://www.forrex.org/program/water/wmbib.asp FORREX watershed management: http://www.forrex.org/programs/program7.asp	Ministry of Forests and Range, 1st Floor, 722 Johnson St., Victoria, BC V8W 1N1 Robin Pike, Coastal Specialist, Watershed Management Tel: 250-387-5887 robin.pike@forrex.org

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Organization, Sustainability	Trade shows, publications (groundwater, wells, aquifers), lists of suppliers, and legislation.	1970–present	B.C.	BC Ground Water Association	Provincial association to promote sustainable groundwater guidelines and strategies.	BC Ground Water Association: http://www.bcgwa.org/	BC Ground Water Association, 1708–197A St., Langley, BC V2Z 1K2 Tel: 604-530-8934 secretary@bcgwa.org
Organization, Hydrology, Water quality	Journal, publications (water supply, water quality, hydrology) conferences, newsletter, and bookstore.	1976–present	Canada	Canadian Water Resources Association	National organization interested in management of Canada's water resources. Co-ordinates conferences, publishes a journal (Canadian Water Resources Journal) and a newsletter (Water News), and operates a bookstore.	Canadian Water Resources Journal (2004– online): http://pubs.nrc-cnrc.gc.ca/cwrj/cwrj.html Canadian Water Resources Association: http://www.cwra.org/index.html	CWRA Membership Services, 280 Albert St., Suite 900, Ottawa, ON K1P 5G8 Tel: 613-237-9363 services@AIC.ca
Organization, Water quality	Journal (pollutants, surface water, groundwater, organisms, conservation), conferences, and web links.	1967–present	Canada	The Canadian Association on Water Quality	CAWQ publishes a journal (Water Quality Research Journal) with a cost to access, and organizes conferences focused on water quality.	The Canadian Association on Water Quality: http://www.cawq.ca/	Canadian Association on Water Quality, PO Box 5050, Burlington, ON L7R 4A6 Eric Hall, Vice President (Western) Tel: 604-822-2707 ehall@civil.ubc.ca
Organization, Engineering	Conferences, proceedings (water supplies, floods, design of hydraulic structures and distribution systems) and web links.	1988–present	Canada	Canadian Society for Civil Engineering, Hydrotechnical Division	Division of a national organization involved in development of water supplies. Organizes conferences, publishes proceedings, and provides web links to journals and associations.	CSCCE activities and conferences: http://www.hydrotechnics.ca/activities.html	Hydrotechnical Division, Canadian Society for Civil Engineering, 4920 de Maisonneuve Blvd. W. #201, Montreal, QC H3Z 1N1 Tel: 514-933-2634 Arbind Mainali, Division Chair Arbind.Mainali@gov.ab.ca

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Appendix 3 – Watershed Data and Information Resources

Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Organization, Biology	Conferences and publications (reclamation, fish, impacts of development).	1958–present	Canada	Canadian Society of Environmental Biologists	National organization advancing the conservation and management of Canada's natural resources. Publishes proceedings from national and chapter meetings (some available to purchase online).	CSEB home page: http://www.cseb-scbe.org/english.html	Canadian Society of Environmental Biologists, National Office, PO Box 962, Stn F, Toronto, ON M4Y 2N9 Shawn Martin, President Tel: 780-831-7331 smartin@gartnerlee.com
Organization, Geography	Newsletter and conferences.	1993–present	Canada	Canadian Geophysical Union	National organization dedicated to the aspects of the physical study of Earth and its space environment. Holds meetings and has a newsletter (Elements), which can be downloaded free.	Canadian Geophysical Union home page: http://www.cgu-ugc.ca/	CGU Secretariat Dept. of Geology and Geophysics, University of Calgary, ES278, 2500 University Drive NW, Calgary, AB T2N 1N4 Tel: 403-220-2794 cgu@ucalgary.ca
Organization, Sustainability	Trade shows, information for the general public, lists of suppliers, conferences, and legislation.	Unknown	Canada	Canadian Ground Water Association	National association to promote sustainable groundwater guidelines and strategies.	Welcome to the Canadian Ground Water Association: http://www.cgwa.org/index.htm	Canadian Ground Water Assn., 1600 Bedford Highway Suite 100–409, Bedford, NS B4A 1E8 Tel: 902-845-1885 info@cgwa.ca
Organization, Wetlands	Publications (wetlands, wildlife, habitat), educational information, and migration map.	1938–present	Canada	Ducks Unlimited Canada	A wetland and wildlife conservation organization that has 520 projects in B.C. Involved in habitat conservation and public education, supporting “the sustainable use and harvest of renewable resources based on sound science.”	Ducks Unlimited Canada: http://www.ducks.ca/	Ducks Unlimited Provincial Office, 954 A Laval Cres., Kamloops, BC V2C 5P5 Tel: 250-374-8307 du_kamloops@ducks.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Organization, Biology	Journals (invertebrates, fish, riparian) educational material, bibliographies (since 1959), and web links.	1953– present	Canada, U.S.	North American Benthological Society	Scientific society focused on biotic communities of lake and stream bottoms and their role in aquatic ecosystems. Publishes two journals (Journal of the NABS and Bulletin of the NABS) that require subscription (purchase).	North American Benthological Society: http://www.benthos.org/index.cfm NABS publications: http://www.benthos.org/Publications/index.cfm	North American Benthological Society, PO Box 1897, Lawrence, KS, 66044-8897, USA Antoine Morin, NABS web site editor amorin@uottawa.ca
Research, Fish and ecology	Publications (fish, fish habitats, riparian, streams).	Report summary 1950s – present	B.C.	Ministry of Environment, Ecosystem Information Section	EcoCat – the Ecological Reports Catalogue provides access to digital reports and files. FishInfo BC provides information on fish resource and internet links, including FishWizard, inventory, and project documentation.	EcoCat: http://srmapps.gov.bc.ca/apps/acat/ FishInfo BC: http://www.bcfisheries.gov.bc.ca/fishinv/fishinfobc.html FishWizard: http://maps.gov.bc.ca/imf406/imf.jsp?site=libc_awiz	Ecosystem Information Section, Ministry of Environment, PO Box 9358, Stn Prov Govt, Victoria, BC V8W 9M2 Gord Oliphant, Aquatic Information Specialist Tel: 250-356-9938 Gord.Oliphant@gov.bc.ca
Research, Watersheds	Reports (hydrology, water supply, water quality, forestry practices, wetlands, riparian), watersheds, other research topics, and web links.	1930s – present	B.C.	Ministry of Forests and Range, Forest Stewardship Division, Research Branch	Variety of research programs at the Branch and Region level including a number of research watersheds (Carnation Creek, Queen Charlotte Islands, Stuart-Takla, Slim-Tumuch, Upper Penticton Creek, Redfish Creek). Regional web sites provide summary publications, current research and links to publications from research watersheds and other research projects with water components.	Coast Region research group publications: http://www.for.gov.bc.ca/rco/research/vanpublicat.htm Northern Interior Forest Region (research links): http://www.for.gov.bc.ca/rni/research/index.htm Southern Interior Forest Region Forest Science Program: http://www.for.gov.bc.ca/rsi/research/index.htm	Research Branch, Forest Stewardship Division, Ministry of Forests and Range, PO Box 9519, Stn Prov Govt, Victoria, BC V8W 9C2 Tel: 250-387-6721 Forests.ResearchBranchOffice@gov.bc.ca Also see contact information on individual Forest Region web sites

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Research, Hydrology	Bibliography, (hydrology).	Listings 1949–present	B.C.	Ministry of Forests and Range, Southern Interior Forest Region	The Kamloops Forest Hydrology Abstracts Library contains abstracts of over 3000 references.	The Kamloops forest hydrology abstracts library: http://foresthdrology.gov.bc.ca/	Rita Winkler, Research Hydrologist, Ministry of Forests and Range, 515 Columbia St., Kamloops, BC V2C 2T7 Tel: 250-828-4169 rita.winkler@gov.bc.ca
Research	Reports (hydrology, forest practices, stream ecosystems, riparian, geomorphology, geotechnical and hydrotechnical engineering), journal articles, and current research.	1908–present; some older references	B.C.	UBC Forest Sciences and Forest Resource Management Depts., Dept. of Geography, Dept. of Civil Engineering	Numerous researchers and graduate students. UBC library system contains access and links to many databases, articles, journals, and other resources.	The Department of Forest Resource Management: http://www.forestry.ubc.ca/dept/frm/ Department of Geography: http://www.geog.ubc.ca/research/index.html Civil Engineering: http://www.civil.ubc.ca/research.htm	Faculty of Forestry, 2424 Main Mall, UBC, Vancouver, BC V6T 1Z4 Tel: 604-822-2727 for.recep@ubc.ca Department of Geography, 1984 West Mall, UBC, Vancouver, BC V6T 1Z2 Tel: 604-822-2663 lapsky@geog.ubc.ca Dept. of Civil Engineering, 6250 Applied Science Lane, Room 2010, UBC, Vancouver, BC V6T 1Z4 Tel: 604-822-2637 info@civil.ubc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Research	Journals (hydrology, forest practices, fish, fish habitat, riparian, geomorphology, hydro-technical engineering) and other publications.	1901–present; journals online since 1997	Canada	National Research Council of Canada	Publishes a series of journals including: <ul style="list-style-type: none"> • Canadian Journal of Civil Engineering (since 1973) • Canadian Journal of Earth Sciences (since 1963) • Canadian Journal of Fisheries and Aquatic Sciences (since 1901) • Canadian Journal of Forest Research (since 1971). Online material is freely available. Also publishes monographs, conference proceedings, and other books.	Select a journal: http://pubs.nrc-cnrc.gc.ca/cgi-bin/rp/rp2_jour_e Welcome to NRC Research Press: http://pubs.nrc-cnrc.gc.ca/	NRC Research Press, National Research Council of Canada, Ottawa, ON K1A 0R6 Tel: 613-993-0362 pubs@nrc-cnrc.gc.ca
Research, Fisheries and fish habitat	Publications (fish, fish habitat, forest practices, impacts of development) and other literature (fisheries, aquatic science, nautical science).	Online 1993–present	Canada	Fisheries and Oceans Canada (formerly DFO), Science Branch, Salmon and Freshwater Ecosystems Division	Conducts research on anadromous fish and fish habitat. Site includes summary of ongoing research projects and a publications list. Searchable database accessing the 12 DFO libraries across Canada for published and unpublished literature.	Research programs: http://www-sci.pac.dfo-mpo.gc.ca/mehsd/projects/projects_e.htm	Fisheries and Oceans Canada, B.C. and Yukon Regional Headquarters, 200–401 Burrard St., Vancouver, BC V6C 3S4 Tel: 604-666-6614 hebw@pac.dfo-mpo.gc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Research, Watersheds	Publications (watershed hydrology, streams, riparian, salmonids, monitoring, storm water), bibliographies (riparian, temperature, salmon recovery), and conferences.	Online publications 1998–present; bibliographies 1940s – present	U.S., Pacific NW	University of Washington, The Water Center (formerly Center for Water and Watershed Studies)	The Water Center – searchable bibliographies including: <ul style="list-style-type: none"> • Riparian • Temperature effects • Type 5 streams • <i>Endangered Species Act</i> (ESA) salmon recovery library and database. 	Bibliographies: http://depts.washington.edu/cwws/Outreach/Resources/bibliographies.html The Water Center: http://depts.washington.edu/cwws/Outreach/outreach.html	The Water Center, University of Washington, Box 352100, Seattle, WA, 98195–2100, USA Tel: 206-543-6920 cwws@u.washington.edu
Research, Forestry	Publications (watershed hydrology, aquatic habitat).	1976–present	U.S., Pacific NW	University of Oregon, College of Forestry, Department of Forest Science	Ongoing research on coastal and interior areas. Collaborative research with university departments and the USDA Forest Service. Projects include: <ul style="list-style-type: none"> • Watershed process group – focused on steep forested landscapes • CLAMS – watershed processes and aquatic habitat. 	Corvallis Forestry Research Community, research projects: http://www.fsl.orst.edu Watershed Processes Group: http://www.fsl.orst.edu/wpg/ Coastal Landscape Analysis and Modeling Study (CLAMS): http://www.fsl.orst.edu/clams/	Oregon State University, Department of Forest Science, 321 Richardson Hall, Corvallis, OR, 97331–5752, USA Tel: 541-737-2244 fsdept@oregonstate.edu
Research, Riparian and watershed	Reports (watershed hydrology, streams, water supply, water quality), professional aids, and educational material.	Online 1995–present	U.S.	U.S. Dept. of Agriculture, Forest Service	Stream Systems Technology Center – focuses on stream systems and watershed hydrology. Site includes research publications, training, operational tools, and technology transfer. USDA FS has a searchable database of research publications.	Stream Systems Technology Center: http://www.stream.fs.fed.us/index.html USDA FS research publications: http://216.48.37.142/	Stream Systems Technology Center, USDA Forest Service, Rocky Mountain Research Stn., 2150 Centre Ave, Bldg. A, Suite 368, Fort Collins, CO, 80526, USA Tel: 970-295-5983 rmrs_stream@fs.fed.us

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Appendix 3 – Watershed Data and Information Resources

Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Research, Water	Publications (groundwater, river hydraulics, sediment transport, reservoirs, water supply), software, and courses.	1964–present	U.S.	U.S. Army Corps of Engineers, Institute for Water Resources	Specialty areas include: <ul style="list-style-type: none"> Hydrologic Engineering Center – technical expertise in surface and groundwater, river hydraulics, sediment transport, reservoirs, and real-time water control Water Use – forecasting and water conservation. 	Hydrologic Engineering Center: http://www.hec.usace.army.mil/ Institute for Water Resources: http://www.iwr.usace.army.mil/	Department of the Army Corps of Engineers, Institute for Water Resources, Hydrologic Engineering Center, 609 Second St., Davis, CA, 95616–4687, USA Tel: 530-756-1104 Webmaster- HEC@usace.army.mil
Research, Climate, Water	Information on stream flow, precipitation, groundwater, publications (groundwater, surface water, water quality, water use), software, maps, and bibliographies.	1879–present	U.S.	U.S. Geological Survey, Water Resources Division	National research program and USGS water programs have 1.5 million stations.	Water resources of the United States: http://water.usgs.gov/index.html Real-time data for the nation: http://waterdata.usgs.gov/nwis/rt	Water Resources, USGS, 1201 Pacific Ave., Suite 600, Tacoma, WA, 98402, USA Tel: 253-428-3600 Luis Fuste, Information Officer Tel: 253-428-3600, ext 2653 la_fuste@usgs.gov
Research	Publications (water resources) and journals (hydrology, water research).	1963–present	World	Elsevier B.V.	Publisher of journals and scientific books including: <ul style="list-style-type: none"> Advances in Water Resources (1979–) Journal of Hydrology (1963–) Water Research (1967–). 	Elsevier B.V. (home page): http://www.elsevier.com	Customer Service Department, Elsevier Journals, 6277 Sea Harbor Drive, Orlando, FL, 32887–4800, USA Tel: 407-345-4020 usjcs@elsevier.com

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Water, Climate	Precipitation, air temperature, hourly lake levels, hourly stream levels/flows, and snow water equivalents.	Online is current; historical ~1960s	B.C.	BC Hydro	Reservoir and Hydromet data – automated data collection stations in or near reservoir systems: <ul style="list-style-type: none"> • across B.C. (over 100 stations) • Columbia (seven basins) • Lower Mainland/Interior (nine basins) • Peace (one basin) • Vancouver Island (four basins) 	Reservoir and Hydromet data (current): http://www.bchydro.com/info/res_hydromet/res_hydromet825.html Historical data available from headquarters.	BC Hydro, 6911 Southpoint Dr., Burnaby, BC V3N 4X8 Fraser Valley reservoir generation information line Tel: 604-462-5409
Water, Groundwater	Groundwater levels, ground water quality, bedrock lithology, educational material, publications (groundwater, aquifers), and web links.	1961– present	B.C.	Ministry of Environment, Water Stewardship Division, River Forecast Centre	Groundwater conditions in B.C. from 56 wells monitoring bedrock aquifers and 109 wells monitoring unconsolidated sand and gravel. Groundwater home page provides database links, reference library, lists of contacts, legislation, and issues.	Wells application options: http://srmapps.gov.bc.ca/apps/wells/ River Forecast Centre, groundwater conditions in British Columbia: http://www.env.gov.bc.ca/rfc/river_forecast/grwater.html Groundwater (home page): http://www.env.gov.bc.ca/wat/gws/index.html	Watershed and Aquifer Science, Water Stewardship Division, Ministry of Environment, PO Box 9341, Stn Prov Govt, Victoria, BC V8W 9M2 Tammy Blair, Ground Water Data Technician Tel: 250-387-0014 Tammy.Blair@gov.bc.ca For the River Forecast Centre, see listing above (Climate, snow, water)
Water, Aquifers	Aquifers and maps (electronic resource only).	1994– present	B.C.	Ministry of Environment, Water Stewardship Division, Watershed and Aquifer Science	Aquifer classification system and database providing mapped locations, delineation of over 600 aquifers, and data query option.	Aquifers in British Columbia: http://www.env.gov.bc.ca/wat/aquifers/index.html	Watershed and Aquifer Science, Water Stewardship Division, Ministry of Environment, PO Box 9341, Stn Prov Govt, Victoria, BC V8W 9M2 Kevin Ronneseth, Groundwater Specialist Tel: 250-356-5180 Kevin.Ronneseth@gov.bc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Water, Floodplains	Floodplain maps and associated design briefs.	1984–present	B.C.	Ministry of Environment, Environmental Protection Division	Floodplain mapping of over 110 rivers and more than 10 lakes. Note: this project terminated in 2003, so there is no direct contact or updating at present.	Canada – British Columbia floodplain mapping program: http://srmwww.gov.bc.ca/aib/fpm/index.html Now available through EcoCat (see above listing)	Environmental Protection Division, Ministry of Environment, PO Box 9339, Stn Prov Govt, Victoria, BC V8W 9M1 Tel: 250-953-3802 envprotdiv@Victoria1.gov.bc.ca
Water, Water quality	Stream flow and water level data and software packages.	1908–present	Canada	Environment Canada, Water Survey of Canada (WSC)	National Surface Water Data (HYDAT) surface water quantity data (daily, monthly, and instantaneous) for over 2900 active stations and 5100 discontinued sites. CD-ROM of data and analysis software can be ordered.	Data products and services: http://www.wsc.ec.gc.ca/products/main_e.cfm?cname=products_e.cfm Welcome to the station information map viewer (locations of WSC data stations): http://scitech.pyr.ec.gc.ca/climhydro/welcome_e.asp	Atmospheric Monitoring and Water Survey Directorate, Environment Canada, 4905 Dufferin St., Downsview, ON M3H 5T4 Lily Fung, Technical Support and Client Services Tel: 416-739-4441 Lily.Fung@ec.gc.ca
Water quality	Water quality data reports, guidelines, publications (water quality, aquatic life, sediment, monitoring), and legislation.	1979–present	B.C.	Ministry of Environment, Watershed & Aquifer Science	Water quality reports, legislation, and policy; also area-specific reports.	Water quality: http://www.env.gov.bc.ca/wat/wq/index.html	Ministry of Environment, PO Box 9341, Stn Prov Govt, Victoria, BC V8W 9M1 Narender Nagpal, Water Quality Science Specialist Tel: 250-387-9507 Narender.Nagpal@gov.bc.ca
Water quality	Legislation, water testing suppliers, and publications (drinking water, sanitation, sewage disposal).	1999–present	B.C.	Ministry of Health, Health Protection	Drinking Water Program – lists legislation, approved water testing laboratories, and information on drinking water.	Public Health Protection, Drinking Water Program: http://www.healthservices.gov.bc.ca/protect/water.html	Health Protection, Ministry of Health, 4–2 1515 Blanshard St., Victoria, BC V8W 3C8 Pat Watkins, Secretary Tel: 250-952-1469 Pat.Watkins@gov.bc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Water quality	Reports (acid rain, pesticides, restoration, groundwater, waste water, climate change) and seminars.	1967–present	Canada	Environment Canada, The National Water Research Institute	Canada's freshwater research facility with two main centres in Ontario and Saskatchewan.	The National Water Research Institute: http://www.nwri.ca/nwri-e.html	National Water Research Institute, Environment Canada, 867 Lakeshore Rd, P O Box 5050, Burlington, ON L7R 4A6 Tel: 905-336-4911 nwriscience.liaison@ec.gc.ca
Water quality, Monitoring	Publications (monitoring, standards, restoration, testing, groundwater, drinking water, wastewater, wetlands, watersheds).	1970–present	U.S.	US Environmental Protection Agency (EPA)	Federal agency that provides monitoring protocols, standards, management and restoration practices, and testing methods. ECOTOX is a database of single chemical toxicity information for aquatic and terrestrial life.	US EPA, water: http://www.epa.gov/water/ ECOTOX database: http://www.epa.gov/ecotox/	U.S. Environmental Protection Agency, Office of Water (4101M), 1200 Pennsylvania Ave NW, Washington, DC, 20460, USA OW-GENERAL@epa.gov Ecotox support Tel: 218-529-5225 ecotox.support@epa.gov
Water use	Water licence registry and maps.	1960s – present	B.C.	Ministry of Agriculture and Lands and Ministry of Environment, Corporate Services Division	Water Licences Query – searches by stream, watershed, licence number, and other parameters for existing water licences in B.C.	Water licence web query: http://www.elp.gov.bc.ca:8000/pls/wtrwhse/water_licences.input	Corporate Services Division, Ministry of Agriculture and Lands and Ministry of Environment, PO Box 9364, Stn Prov Govt, Victoria, BC V8M 9W3 Maureen Moore, Business Analyst Tel: 250-387-9448 Maureen.Moore@gov.bc.ca

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Category	Types of data	Years produced	Geographic region	Agency	Description	Data location, Web site title, Current URL	Contact
Water use	Publications (water licences, water users), legislation, and web links.	1983–present	B.C.	Ministry of Environment, Water Stewardship Division, Management and Standards Branch, Licensing and Allocation	Information on water legislation, licences, water users. Links to water rights web sites.	Water rights information: http://www.lwbc.bc.ca/03water/licencing/index.html	Licensing and Allocation, Management and Standards Branch, Water Stewardship Division, Ministry of Environment, PO Box 9340, Stn Prov Govt, Victoria, BC V8W 9M1 Chris Morgan, Water Resource Specialist Tel: 250-387-9447 Chris.Morgan@gov.bc.ca
Water use	Water use, water pricing, water works, and water treatment facilities.	1975–2001	Canada	Environment Canada, Environmental Stewardship Branch, Sustainable Water Management Division	Water use data include municipal water use for 1200 municipalities with populations over 1000. Industrial water use compiled from six surveys.	Water use data: http://www.ec.gc.ca/water/en/manage/use/e_data.htm	Sustainable Water Management Division, Environmental Stewardship Branch, Environment Canada, 351 St. Joseph Blvd., 7-PVM, Gatineau, QC K1A 0H3 Tel: 819-953-6161 H2O-info@ec.gc.ca David Burke, Policy Analyst Tel: 819-934-5103 david.burke@ec.gc.ca