

**Appendix 2: Comparison Table of Water Quality vs Water Quantity Indicators (as of March 2009)**

*This comparison table includes Canadian federal, provincial and large-scale watershed (regional level) fresh-water quality and water quantity indicators. Some examples of small-scale watershed (community level) indicators are also included. Note: Indicators under development (red text) are included in the final tally in the main report.*

AGENCY INITIATIVE	WATER QUALITY INDICATORS	WATER QUANTITY INDICATORS
<b>FEDERAL LEVEL</b>		
Agriculture and Agri-Foods Canada - Agri-Environmental Indicators (AEIs)	<ul style="list-style-type: none"> <li>• Risk of Water Contamination by Nitrogen</li> <li>• Risk of Water Contamination by Phosphorus</li> <li>• Risk of Water Contamination by Pesticides - <i>under development</i></li> <li>• Risk of Water Contamination by Pathogens - <i>early stages of development</i></li> </ul>	Water use efficiency in irrigation
Canadian Council of Ministers for the Environment (CCME)	Water Quality Index (WQI)	-
Canadian Councils of Resource Ministers (CCRM)	Ecosystem Status and Trends - <i>under development</i>	-
Canadian Environmental Sustainability Indicators (CESI)	Freshwater Quality Index for the Protection of Aquatic Life	-
Canadian Environmental Sustainability Indicators (CESI)	<ul style="list-style-type: none"> <li>• Source and treated water quality - <i>under development</i></li> <li>• Agricultural Water Quality</li> <li>• Freshwater Quality Indicator for Recreational Use</li> </ul>	• Industrial Water Use (disbanded)
Policy Research Initiative (PRI)	Canadian Water Sustainability Index (CWSI) Ecosystem Health <ul style="list-style-type: none"> <li>• Stress</li> <li>• Quality</li> <li>• Fish</li> </ul> Infrastructure <ul style="list-style-type: none"> <li>• Treatment</li> </ul> Human health <ul style="list-style-type: none"> <li>• Reliability</li> <li>• Impact</li> </ul>	Canadian Water Sustainability Index (CWSI) Resources <ul style="list-style-type: none"> <li>• Availability</li> <li>• Supply</li> <li>• Demand</li> </ul> Infrastructure <ul style="list-style-type: none"> <li>• Demand</li> </ul> Condition (system losses) <ul style="list-style-type: none"> <li>• Condition (system losses)</li> </ul> Human health <ul style="list-style-type: none"> <li>• Reliability</li> </ul>

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		<ul style="list-style-type: none"> <li>• Access</li> </ul>
Convention on Biological Diversity	Water quality of freshwater ecosystems	-
Environment Canada	Source Water Vulnerability Index - <i>under development</i>	Source Water Vulnerability Index - <i>under development</i>
Natural Resources Canada	Groundwater Vulnerability Index - <i>under development</i>	Groundwater Vulnerability Index - <i>under development</i>
The Environment & Sustainability Development Indicators Initiative (ESDI) <i>appears to overlap with...</i>	<ul style="list-style-type: none"> <li>• Freshwater quality Indicator (water suitability for major uses such as aquatic life, recreation and agriculture)</li> </ul>	-
National Roundtable on the Environment & the Economy (NTREE) - State of the Debate <i>appears to overlap with...</i>		-
Canadian Information System for the Environment (CISE)		-
Canadian Information System for the Environment (CISE) <i>appears to overlap with...</i>	Wastewater Treatment <ul style="list-style-type: none"> <li>• Municipal population served by wastewater treatment</li> <li>• Levels of municipal wastewater treatment (primary, secondary or tertiary)</li> <li>• Phosphorous loadings in municipal wastewater effluents</li> </ul>	Municipal Water Use: <ul style="list-style-type: none"> <li>• Daily municipal water use</li> <li>• Level of metered residential water use</li> </ul>
Environment Canada: National Environment Indicator Series (NEIS) - Urban Water Use Indicator		
Statistics Canada - Human Activity and the Environment:	<ul style="list-style-type: none"> <li>• Substances Released into Water (by quantity)</li> </ul>	<ul style="list-style-type: none"> <li>• Total stream flow,</li> <li>• Surface Fresh Water Intake (divided into: Municipal, Industrial, Agricultural)</li> <li>• Water Intake as share of stream flow in major basins</li> </ul>
North American Commission for Environmental Cooperation (CEC) - State of the North American Environment	Water Quality (including shared water resources)	Water Quantity & Use (including shared water resources)
North American Commission for Environmental Cooperation (CEC) - Children's Health and the	Drinking Water: <ul style="list-style-type: none"> <li>• Percentage of children (households) without access to treated water</li> </ul>	

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Environment	<ul style="list-style-type: none"> <li>Percentage of children living in areas served by public water systems in violation of local standards</li> </ul> Sanitation: <ul style="list-style-type: none"> <li>Percentages of children (households) that are not served with sanitary sewers</li> </ul> Waterborne Disease: <ul style="list-style-type: none"> <li>Morbidity: number of cases of childhood illnesses attributed to waterborne diseases (Canada, Mexico, United States)</li> </ul>	-
<b>AGENCY INITIATIVE</b>	<b>WATER QUALITY INDICATORS</b>	<b>WATER QUANTITY INDICATORS</b>
<b>PROVINCIAL LEVEL:</b>		
Alberta Environment	Alberta River Water Quality Index (RWQI) <ul style="list-style-type: none"> <li>River Pesticide Index</li> <li>River Nutrient Index</li> <li>River Bacteria Index</li> <li>Metals</li> </ul>	Lake Level Index
	Drinking Water Safety Indicator <ul style="list-style-type: none"> <li>Facility Design</li> <li>Facility Operational Requirements</li> <li>Drinking Water Quality</li> </ul>	Reservoir Index
	Lake Trophic Status	River Flow Quantity Index
	Pulp Mill Effluent Loads	Groundwater Observation Wells
	-	Groundwater Well Density
	-	Water Allocations - compared to natural flows
	-	Water Allocations by Sector
	-	Hydrometric Monitoring Network
	-	Water used for oilfield injection
	-	Water used for irrigation
	-	Sharing water
BC Ministry of Environment	<ul style="list-style-type: none"> <li>Water Quality Index for surface water bodies in BC</li> <li>Trends in Surface Water Quality</li> </ul>	<ul style="list-style-type: none"> <li>Percentage of Observation Wells that show declining water levels due primarily to human activity</li> <li>Number of Heavily Developed Aquifers in BC</li> </ul>

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BC Ministry of Environment	<ul style="list-style-type: none"> <li>Water Quality Index for surface water bodies in BC</li> <li>Trends in Surface Water Quality</li> </ul>	<ul style="list-style-type: none"> <li>Percentage of Observation Wells that show declining water levels due primarily to human activity</li> <li>Number of Heavily Developed Aquifers in BC</li> <li>Daily Municipal Water Use per capita in BC</li> </ul>
	Trends in shellfish closures due to sewage contamination	Level of Municipal Wastewater Treatment in BC
BC MoE State of the Environment Reporting	Total on-site discharge of toxic substances in BC (this includes many types of discharge, but some are discharge to water)	Precipitation changes in BC
	Trends in dioxin and furan levels in pulp and paper mill effluent, sediments and Dungeness crab tissues	Changes in the spring snow-pack in BC
	The Species Conservation Indicators include information on either freshwater or marine species	-
	Benthic Macroinvertebrate Sustainability Indicator Development Project - <i>under development</i>	-
Manitoba Conservation	Water Quality (based on the CCME WQI)	Water Allocation/Consumption, by municipal, industrial and agricultural users
	Groundwater quality – <i>under development</i>	Groundwater quantity – <i>under development</i>
	The level of water treatment needed for potable purposes – <i>under development</i>	Surface water quantity (based on level of allocation)
New Brunswick Department of Environment	Percentage of Post Treatment Tests for Municipal Water Supplies Exceeding Guidelines for Drinking Water Quality	Proportion of Water Used by Major Sectors
	Percentage of New Private Wells Exceeding Guidelines for Canadian Drinking Water Quality	-
	Quality of Major River Systems as Measured by Annual Average Dissolved Oxygen, Nitrates, and pH Dissolved Oxygen (D.O.)	-

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	Forestry Water Quality Index	-
	Langlier Index	-
	The Agri-food Water Quality Index (AFWQI)	-
	Safe Drinking Water Indicators – <i>under development</i>	-
	Aquaculture Water Quality Index – <i>under development</i>	-
Northwest Territories	Freshwater Fish – of the 7 indicators to monitor population sizes and trends: 6) Threats to population 7) Threats to habitat	-
Northwest Territories – Environment Canada & INAC	Water Quality	Water Quantity
Nova Scotia Department of Environment	CCME WQI for the protection of Aquatic Life	-
	Drinking Water Quality Index	-
	Percentage of population served by municipal water supplies that meet the health-based criteria for bacteriological quality, as stated in the Guidelines for Canadian Drinking Water Quality, at all times during the calendar year.	-
Ontario Ministry of Environment (including the Surface Water Monitoring Centre)	<ul style="list-style-type: none"> <li>Water Quality Indicators</li> <li>Indicators of vulnerable aquifers</li> <li>Microbial Indicators – source water</li> </ul>	Low water response protocol <ul style="list-style-type: none"> <li>Rainfall indicator</li> <li>Streamflow indicator</li> </ul>
	<ul style="list-style-type: none"> <li>Water Quality</li> <li>Wellhead protection</li> <li>Vulnerability mapping</li> <li>Geochemical indicators (water)</li> </ul>	-
	<ul style="list-style-type: none"> <li>Water Quality</li> <li>Vulnerability Indicators</li> </ul>	-
	Principle indicators (nitrate and pesticide concentrations) for drinking & surface water quality – <i>under development</i>	Water withdrawal rates in areas subject to high volume extraction for industrial, municipal and irrigation purposes – <i>under development</i>
Prince Edward Island	Drinking Water Quality <ul style="list-style-type: none"> <li>Nitrate Concentrations in Private Wells</li> <li>Escherichia coli in Private Wells</li> </ul>	-
	Surface Water Quality	

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	<ul style="list-style-type: none"> <li>Nitrate concentrations in surface water</li> <li>Shellfish closures</li> </ul>	-
	Pesticides <ul style="list-style-type: none"> <li>Numbers of suspected pesticide-related fish kills in Island rivers</li> </ul>	-
Environment Quebec	CCME WQI <ul style="list-style-type: none"> <li>Including sediment quality criteria</li> </ul>	-
	Bathing Water Quality <ul style="list-style-type: none"> <li>Bacteriological water quality</li> </ul>	-
Quebec (various partners): Monitoring the St. Lawrence River	<ul style="list-style-type: none"> <li>Contamination of sediments</li> <li>Invasive plant species in freshwater wetlands</li> <li>Quality of shellfish waters in the estuary and gulf</li> <li>Surface area of freshwater wetlands</li> <li>Toxic substances at the inlet and outlet of the fluvial section</li> <li>Contamination of marine resources by toxic substances</li> <li>Monitoring of toxic algae in the estuary and gulf</li> <li>Physico-chemical parameters of water (estuary and gulf)</li> <li>Contamination of freshwater fish by toxic substances</li> <li>Organic toxic substances at the mouths of the Richelieu and Yamaska rivers</li> <li>Physico-chemical and bacteriological parameters of water (river)</li> <li>Water quality in potential freshwater swimming areas</li> <li>Monitoring of freshwater fish communities</li> <li>Reintroduction of Striped Bass</li> </ul>	Water level and flow
Saskatchewan Environment	Source Water: <ul style="list-style-type: none"> <li>Number of sewage effluent discharges</li> </ul>	Average per capita consumption of water (gallons per day)

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	<ul style="list-style-type: none"> <li>that represent a risk to source waters</li> <li>• Number and percentage of municipalities with bylaws in place to protect their drinking water supplies</li> <li>• Water Quality Index ratings for lakes</li> <li>• Water Quality Index ratings for rivers</li> </ul>	
	<ul style="list-style-type: none"> <li>• Per cent of facilities that meet bacteriological guidelines 90 per cent of the time</li> <li>• Per cent of waterworks (regulated by Saskatchewan Environment) that meet disinfection requirements 90 per cent of the time</li> <li>• Number of waterworks that do not meet Saskatchewan Environment's minimum treatment requirements [broken down by pre and post regulatory changes]</li> <li>• Number of sewage effluent discharges that represent a risk to source waters</li> </ul>	-
Saskatchewan Water Authority	<ul style="list-style-type: none"> <li>• Water Quality Index Values and Ratings for Lakes</li> <li>• Three Year Average Water Quality Index Values and Ratings for Rivers</li> </ul>	<ul style="list-style-type: none"> <li>• Total municipal per capita water consumption (data is collected on a calendar year basis)</li> <li>• Winter municipal per capita water consumption. (The winter measure uses the same methodology as annual consumption, except it sums total water consumption for November 1 to March 31 only)</li> </ul>
Environment Yukon	CCME WQI	-
Canadian Aquatic Biomonitoring Network (CABIN)	Stream Health Indicator <ul style="list-style-type: none"> <li>• Assess biological health of fresh water (using bioassessment methods)</li> </ul>	-
<b>AGENCY INITIATIVE</b>	<b>WATER QUALITY INDICATORS</b>	<b>WATER QUANTITY INDICATORS</b>
<b>LARGE-SCALE WATERSHED (REGIONAL) LEVEL:</b>		
Great Lakes (Superior, Huron, Michigan, Erie and Ontario) Management Plans	<ul style="list-style-type: none"> <li>• Contamination</li> <li>• Biotic Communities</li> <li>• Coastal Zones</li> </ul>	Resource Utilization <ul style="list-style-type: none"> <li>• Withdrawals</li> <li>• Commercial/industrial efficiency</li> </ul>

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	<ul style="list-style-type: none"> <li>• Aquatic Habitats</li> <li>• Human Health</li> <li>• Invasive Species</li> <li>• Resource Utilization (wastewater treatment and pollution)</li> </ul>	Climate Change (ice duration)
GEM Center for Science and Environmental Outreach (Upper Great Lakes Region)	Socioeconomic sustainability indicators: <ul style="list-style-type: none"> <li>• Groundwater Quality</li> <li>• Wastewater Treatment</li> </ul>	Socioeconomic sustainability indicators: <ul style="list-style-type: none"> <li>• Water Use</li> <li>• Availability</li> </ul>
Composite Index of Vulnerability for Prairie Water Resources (Alberta Saskatchewan and Manitoba)	Water Quality Stresses: <ul style="list-style-type: none"> <li>• Total Livestock Animal Units per km<sup>2</sup> cattle, pigs, horses, sheep, goats, bison, poultry, etc per km<sup>2</sup></li> <li>• % total land with agricultural Chemical Units applied, Fertilizer, Herbicide, Insecticide, Fungicide applied</li> </ul>	Water Availability Stresses: <ul style="list-style-type: none"> <li>• Precipitation surplus/deficit (total Precip-PE)</li> <li>• Soil available water holding capacity</li> <li>• % Area of Fresh Water</li> </ul>
		Water Use Stresses: <ul style="list-style-type: none"> <li>• % Total hectares of seeded land with irrigation</li> <li>• Total human water flow (m<sup>3</sup> per year) per km<sup>2</sup> (dom., indus., comm.)</li> <li>• Total Livestock water use (m<sup>3</sup> per year) per km<sup>2</sup> )</li> </ul>
		Water Policy Programs <ul style="list-style-type: none"> <li>• Industrial, commercial advice of water conservation</li> <li>• Public Advert on water conservation in RM</li> <li>• Installation of water efficiency equipment</li> <li>• Lawn watering bylaws</li> <li>• Other water conservation programs</li> </ul>
The Georgia Basin Puget Sound Ecosystem Indicators Project (British Columbia, Washington State)	<ul style="list-style-type: none"> <li>• River, stream and lake Quality</li> <li>• Marine Water Quality</li> <li>• Shellfish Indicator</li> </ul>	-
Gulf of Maine Council on the Marine Environment (GoMC) (New Brunswick, Nova Scotia, Maine, Massachusetts and New Hampshire) - The Ecosystem	<ul style="list-style-type: none"> <li>• Contaminants and pathogens</li> <li>• Eutrophication</li> <li>• Aquatic habitat</li> <li>• Fisheries and aquaculture</li> </ul> <p><i>- under development</i></p>	<ul style="list-style-type: none"> <li>• Climate change</li> </ul> <p><i>- under development</i></p>



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Indicators Partnership (ESIP)		
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<b>SMALL-SCALE WATERSHED (COMMUNITY) LEVEL:</b>		
City of Leduc: Genuine Well-being Report (Alberta)	-	Resource Consumption and Conservation <ul style="list-style-type: none"> <li>• Water use per resident per day</li> <li>• Water storage capacity</li> </ul>
Fraser Basin Council – Sustainability Indicators (BC)	<ul style="list-style-type: none"> <li>• Water Quality Index</li> <li>• Water Quality Trends</li> </ul>	<ul style="list-style-type: none"> <li>• Municipal Water Consumption</li> <li>• Wastewater Treatment</li> </ul>
Southeast False Creek Steering Committee – Sustainability Indicators (BC)	-	<ul style="list-style-type: none"> <li>• Water Consumption (residential) litre/capita/day</li> <li>• Storm Water Drainage (Effective Impervious Area (EIA), as % of total site area)</li> </ul>
Vancouver Foundation – Vancouver’s Vital Signs (BC)	-	<ul style="list-style-type: none"> <li>• Residential Water Consumption (included in the 2006 &amp; 2007, but not the 2008)</li> </ul>
Okanagon Basin Water Board (OBWB) (BC)	-	<ul style="list-style-type: none"> <li>• The standardized precipitation index</li> <li>• Snow pack</li> <li>• Stream levels</li> <li>• Groundwater levels</li> </ul>
Canada West Foundation – State of the West	-	A comparison of provinces & territories in terms of: <ul style="list-style-type: none"> <li>• Percentage of jurisdictions covered by freshwater</li> <li>• Percentage of Canada's freshwater and</li> <li>• Percentage of Canada's total stream flow</li> </ul>
Columbia Basin Trust - Water Quality Report on the Columbia Basin (BC)	<ul style="list-style-type: none"> <li>• Point source pollution: municipal wastewater effluent, industrial effluent, spills and releases</li> <li>• Non-point source pollution: impacts from dams, forestry, agricultures, air pollution, landfills and waste disposal, urban land development, urban runoff</li> </ul>	-
British Columbia Progress Board – Benchmark Report	<ul style="list-style-type: none"> <li>• BC Water Quality Index</li> </ul>	<ul style="list-style-type: none"> <li>• Per Capita Municipal Water Use</li> <li>• Climate Change (precipitation levels)</li> </ul>
Metro Vancouver (BC)		<ul style="list-style-type: none"> <li>• Infrastructure Leakage Index</li> <li>• Peak per day capita water use by all customers</li> </ul>

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Petitcodiac Watershed Alliance (New Brunswick)	<ul style="list-style-type: none"> <li>(Indicators) to assess the health of the Petitcodiac River ecosystem.</li> </ul>	-
Land Use Planning Boards (Northwest Territories)	Water Quality	-
Genuine Progress Index (GPI) (Nova Scotia)	Drinking Water Quality (based on the Guidelines for Drinking Water Quality)	-
Clean Annapolis River Project (Nova Scotia)	River Water Quality	-
Grand River Conservation Authority (Ontario)	<ul style="list-style-type: none"> <li>Water Quality (using the CCME WQI)</li> </ul>	<ul style="list-style-type: none"> <li>Stream flow</li> <li>Rainfall</li> <li>Reservoir levels</li> </ul>
Association of Public Health Epidemiologists in Ontario	<ul style="list-style-type: none"> <li>The number of boil water advisories (BWAs) by household-days affected</li> <li>The number of drinking water advisories (DWAs) by household-days affected</li> <li>Drinking water quality exceedences for health parameters</li> <li>Trihalomethanes (THMs) in drinking water</li> <li>Coliform bacteria in drinking water</li> <li>E.coli in drinking water</li> <li>Fluoride in drinking water</li> <li>Percentage of households on private wells</li> <li>Percentage of households with a shallow/bored well</li> <li>Percentage of households with a deep drilled well</li> <li>Percentage of households with a private well that has been tested for bacteria at least three times in the past 12 months</li> </ul>	-
Ontario – City of Hamilton Sustainability Indicators	<ul style="list-style-type: none"> <li>Total Loading of Ammonia to Hamilton Harbour (measured at Municipal Woodward Avenue Sewage Treatment</li> </ul>	<ul style="list-style-type: none"> <li>Total Water Consumption for All Uses (metered accounts)</li> </ul>

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Ontario – City of Hamilton Sustainability Indicators	<ul style="list-style-type: none"> <li>• Total Loading of Ammonia to Hamilton Harbour (measured at Municipal Woodward Avenue Sewage Treatment Plant)</li> <li>• Total Loading of Phosphorus to Hamilton Harbour (measured at Municipal Woodward Avenue Sewage Treatment Plant)</li> <li>• Percentage of “Beaches Days Open for Swimming”</li> </ul>	<ul style="list-style-type: none"> <li>• Total Water Consumption for All Uses (metered accounts)</li> </ul>
Pembina Institute Ontario Community Sustainability Report (The Smart Growth Index)	Tertiary Water Treatment: <ul style="list-style-type: none"> <li>• % of population served with tertiary water treatment</li> </ul>	-
Hydro Quebec (Global Reporting Initiative G3 Guidelines)	EN 25 Water bodies and habitats affected by discharges (additional).	EN 8 Total water withdrawal (core). EN 9 Water sources affected by withdrawal (additional). EN 10 Water recycled and reused.
Peel Watershed Planning	<ul style="list-style-type: none"> <li>• Water Quality Indices (for human life)</li> </ul>	