

Appendix 4: Comparison Table of Surface water vs Groundwater vs Integrated (surface and ground) water Indicators (as of March 2009)

This comparison table includes Canadian federal, provincial and large-scale watershed (regional level) surface water, groundwater and integrated (surface and ground) 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, whereas the grey text refers to water monitoring and reporting tools. Since these are not indicators per se, these reporting tools (grey text) are not included in the final indicator count.

AGENCY	SURFACE WATER	GROUNDWATER	INTEGRATED
FEDERAL LEVEL			
Canadian Council for Ministers of the Environment (CCME)	Water Quality Index (CCME WQI) for the Protection of Aquatic Life		
Canadian Environmental Sustainability Indicators (CESI)			Source and treated water quality - <i>under development</i>
Environment Canada			Source Water Vulnerability Index - <i>under development</i>
Natural Resources Canada		Groundwater Vulnerability (Hazard Assessment) Index - <i>under development</i>	
Statistics Canada - Human Activity and the Environment:	<ul style="list-style-type: none"> Total stream flow Surface Fresh Water Intake (divided into: Municipal, Industrial, Agricultural) Water Intake as share of stream flow in major basins 		
PROVINCIAL LEVEL			
Alberta Environment	Alberta River Water Quality Index (RWQI)	Groundwater Observation Wells	
	Lake Level Index	Groundwater Well Density	
	Lake Trophic Status	Water Used for Oilfield Injection	
	Reservoir Index		
	River Flow Quantity Index		
BC Ministry of Environment	<ul style="list-style-type: none"> Water Quality Index for surface water bodies in BC 	<ul style="list-style-type: none"> Percentage of Observation Wells that show declining 	

	<ul style="list-style-type: none"> Trends in Surface Water Quality 	water levels due primarily to human activity <ul style="list-style-type: none"> Number of Heavily Developed Aquifers in BC 	
	Trend in the number of road crossings of streams in B.C.		
	Economic and conservation tenures in the inter-tidal areas of B.C. Estuaries		
Manitoba Conservation	Surface water quantity (based on level of allocation)	Groundwater quality and quantity – <i>under development</i>	The level of water treatment needed for potable purposes – <i>under development</i>
New Brunswick Department of Environment	Quality of Major River Systems as Measured by Annual Average Dissolved Oxygen, Nitrates, and pH Dissolved Oxygen (D.O.)	Percentage of New Private Wells Exceeding Guidelines for Canadian Drinking Water Quality	
Northwest Territories – Environment Canada & INAC	Surface Water Quality and Quantity		
Nova Scotia Department of Environment	Surface Water Management Programs <ul style="list-style-type: none"> Track long-term trends in surface water quality and quantity Establish resource inventories for surface water quality and quantity Allocate available water resources amongst various users (through approval processes) Source Water Protection (e.g. watershed plans and BMPs) 	<ul style="list-style-type: none"> Groundwater Observation Well Network Groundwater Mapping Website & Groundwater Resource Assessment (interactive groundwater maps) 	Determining Groundwater Under the Direct Influence of Surface Water (GUDI) - Protocol
Ontario Ministry of Environment	Microbial Indicators – source water	Indicators of vulnerable aquifers	

	<p>Surface Water Vulnerability:</p> <ul style="list-style-type: none"> • Water Quality • Vulnerability Indicators 	<p>Groundwater Vulnerability:</p> <ul style="list-style-type: none"> • Water Quality • Wellhead protection • Vulnerability mapping • Geochemical indicators (water) 	
	<p>Principle indicators (nitrate and pesticide concentrations) for drinking & surface water quality – <i>under development</i></p>		
	<p>Low water response protocol:</p> <ul style="list-style-type: none"> • Rainfall indicator • Streamflow indicator 		
Prince Edward Island Ministry of Environment	<p>Drinking Water Quality:</p> <ul style="list-style-type: none"> • Nitrate Concentrations in Private Wells • Escherichia coli in Private Wells 		
	<p>Surface Water Quality</p> <ul style="list-style-type: none"> • Nitrate concentrations in surface water 		
	<p>Pesticides</p> <p>Numbers of suspected pesticide-related fish kills in Island rivers</p>		
Environment Quebec	<p>Bathing Water Quality</p> <p>Bacteriological water quality</p>		
Quebec (various partners): Monitoring the St. Lawrence River	<p>Currently there are 22 monitoring activities (divided by 6 government partners) include:</p> <ul style="list-style-type: none"> • Contamination of sediments • Invasive plant species in freshwater wetlands • Quality of shellfish waters 		

	<p>in the estuary and gulf</p> <ul style="list-style-type: none"> • Surface area of freshwater wetlands • Toxic substances at the inlet and outlet of the fluvial section • Contamination of marine resources by toxic substances • Monitoring of toxic algae in the estuary and gulf • Physico-chemical parameters of water (estuary and gulf) • Contamination of freshwater fish by toxic substances • Organic toxic substances at the mouths of the Richelieu and Yamaska rivers • Physico-chemical and bacteriological parameters of water (river) • Water quality in potential freshwater swimming areas • Monitoring of freshwater fish communities • Reintroduction of Striped Bass • Water level (hydrometric network) • Water flow (hydrometric network) 		
Saskatchewan Environment	<p>Source Water:</p> <ul style="list-style-type: none"> • Number of sewage effluent discharges that represent a 		

	risk to source waters <ul style="list-style-type: none"> • Water Quality Index ratings for lakes • Water Quality Index ratings for rivers 		
Saskatchewan Water Authority	The number of dams requiring upgrades to meet dam safety criteria	Number of 1:250,000 map sheets for which Geographic Information System-based digital ground water maps have been completed	Number of completed watershed and aquifer plans
	Proportion of surface water industrial projects with detailed assessments completed that comply with licensing and approval requirements		
	<ul style="list-style-type: none"> • Number of flood plain development audits for communities involved in the Flood Damage Reduction Program • Per cent of flood susceptibility studies on new subdivisions forwarded to Municipal Affairs (formerly Government Relations) within 30 days • Number of flood susceptibility studies on new subdivision forwarded to Municipal Government 		
	Water Quality Index Values and Ratings for Lakes		
	Three Year Average Water Quality Index Values and Ratings for Rivers		
CABIN: Canadian Aquatic	Stream Health Indicator		

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Biomonitoring Network			
REGIONAL (i.e large-scale watershed)			
Mackenzie River Basin	CCME WQI – State of the Mackenzie River Aquatic Ecosystem		
Great Lakes Management Plans	Open lake	Groundwater	
Upper Great Lakes Region: GEM Center for Science and Environmental Outreach		<ul style="list-style-type: none"> Groundwater Quality 	
The Georgia Basin Puget Sound Ecosystem Indicators Project	<ul style="list-style-type: none"> River, stream and lake Quality Marine Water Quality Shellfish Indicator 		
COMMUNITY LEVEL (i.e. Municipal, NGO, or small-scale watershed)			
Southeast False Creek Steering Committee – Sustainability Indicators (BC)	Storm Water Drainage (Effective Impervious Area (EIA), as % of total site area)		
Okanagon Basin Water Board (OBWB) (BC)	Environmental base flow in streams and creeks	Groundwater levels	
Canada West Foundation – State of the West	Percentage of Canada's total streamflow		
Columbia Basin Trust - Water Quality Report on the Columbia Basin	<ul style="list-style-type: none"> Point source pollution: municipal wastewater effluent, industrial effluent, spills and releases Non-point source pollution: impacts from dams, forestry, agricultures, air pollution, landfills and waste disposal, urban land development, urban runoff 		
Petitcodiac Watershed Alliance (New Brunswick)	7 indicators to measure the health of the Petitcodiac River ecosystem.		

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Clean Annapolis River Project (CARP) (Nova Scotia)	River Water Quality		
Grand River Conservation Authority (Ontario)	<ul style="list-style-type: none"> • Stream flow • Reservoir levels 		
Association of Public Health Epidemiologists in Ontario		<ul style="list-style-type: none"> • Percentage of households on private wells • Percentage of households with a shallow/bored well • Percentage of households with a deep drilled well • Percentage of households with a private well that has been tested for bacteria at least three times in the past 12 months 	
City of Hamilton Sustainability Indicators (Ontario)	<ul style="list-style-type: none"> • Total Loading of Ammonia to Hamilton Harbour (measured at Municipal Woodward Avenue Sewage Treatment Plant) • Total Loading of Phosphorus to Hamilton Harbour (measured at Municipal Woodward Avenue Sewage Treatment Plant) • Percentage of “Beaches Days Open for Swimming” 		