

Appendix 3: Comparison Table of Ecosystem Health vs Human Health Indicators (as of March 2009)

This comparison table includes Canadian federal, provincial and large-scale watershed (regional level) fresh-water ecosystem health and human health 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	ECOSYSTEM HEALTH INDICATORS	HUMAN HEALTH INDICATORS
FEDERAL LEVEL		
Agriculture and Agri-Foods Canada - Agri-Environmental Indicators (AEIs)	Water Quality <ul style="list-style-type: none"> • Risk of Water Contamination by Nitrogen • Risk of Water Contamination by Phosphorus • Risk of Water Contamination by Pesticides - <i>under development</i> • Risk of Water Contamination by Pathogens - <i>early stages of development</i> 	-
Canadian Council of Ministers for the Environment (CCME)	Water Quality Index (WQI) for the protection of aquatic life	-
Canadian Councils of Resource Ministers (CCRM)	<ul style="list-style-type: none"> • Freshwater Quality Index for the Protection of Aquatic Life - <i>under development</i> 	-
Canadian Environmental Sustainability Indicators (CESI)	Freshwater Quality Index for the Protection of Aquatic Life	-
		<ul style="list-style-type: none"> • Source and treated water quality - <i>under development</i> • Agricultural Water Quality - <i>under development</i>
Canadian Water Sustainability Index (CWSI)	Ecosystem Health <ul style="list-style-type: none"> • Stress • Quality • Fish 	Human health <ul style="list-style-type: none"> • Reliability • Access
Convention on Biological Diversity	Water quality of freshwater ecosystems	-

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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)	<ul style="list-style-type: none"> Freshwater quality Indicator (water suitability for major uses such as aquatic life, recreation and agriculture) Extent of wetlands Indicator (a comprehensive national wetland inventory. The area covered by wetlands is used as a proxy indicator for biodiversity) 	-
Environment Canada: National Environment Indicator Series (NEIS) - Urban Water Use Indicator	Wastewater Treatment <ul style="list-style-type: none"> Phosphorous loadings in municipal wastewater effluents 	Wastewater Treatment <ul style="list-style-type: none"> Levels of municipal wastewater treatment (primary, secondary or tertiary)
Statistics Canada - Human Activity and the Environment:	<ul style="list-style-type: none"> Substances Released into Water (by quantity) Total stream flow Water Intake as share of stream flow in major basins 	-
North American Commission for Environmental Cooperation (CEC) - State of the North American Environment	Water Quality	-
North American Commission for Environmental Cooperation (CEC) - Children's Health and the Environment	-	Drinking Water: <ul style="list-style-type: none"> Percentage of children (households) without access to treated water Percentage of children living in areas served by public water systems in violation of local standards Sanitation: <ul style="list-style-type: none"> Percentages of children (households) that are not served with sanitary sewers Waterborne Disease: <ul style="list-style-type: none"> Morbidity: number of cases of childhood

North American Commission for Environmental Cooperation (CEC) - Children's Health and the Environment	-	Drinking Water: <ul style="list-style-type: none"> Percentage of children (households) without access to treated water Percentage of children living in areas served by public water systems in violation of local standards Sanitation: <ul style="list-style-type: none"> Percentages of children (households) that are not served with sanitary sewers Waterborne Disease: <ul style="list-style-type: none"> Morbidity: number of cases of childhood illnesses attributed to waterborne diseases (Canada, Mexico, United States)
AGENCY INITIATIVE	ECOSYSTEM HEALTH INDICATORS	HUMAN HEALTH INDICATORS
PROVINCIAL LEVEL:		
Alberta Environment	Alberta River Water Quality Index (RWQI) <ul style="list-style-type: none"> River Pesticide Index River Nutrient Index River Bacteria Index Metals Lake Level Index Lake Trophic Status River Flow Quantity Index Water Allocations - compared to natural flows	Drinking Water Safety Indicator <ul style="list-style-type: none"> Facility Design Facility Operational Requirements Drinking Water Quality - - - -
BC Ministry of Environment	<ul style="list-style-type: none"> Water Quality Index for surface water bodies in BC Trends in Surface Water Quality Percentage of Observation Wells that show declining water levels due primarily to human activity 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	Level of Municipal Wastewater Treatment in BC - - -

	The Species Conservation Indicators include information on either freshwater or marine species	-
BC Ministry of Environment, Environment Canada, Universities of BC and Western Ontario plus 3 forest licensees	Benthic Macroinvertebrate Sustainability Indicator Development Project (Benthic invertebrates are an indicator of water quality and ecosystem health) <ul style="list-style-type: none"> Water quality biological assessment – Northern, British Columbia - <i>under development</i> 	-
Manitoba Conservation	Water Quality (based on the CCME WQI)	The level of water treatment needed for potable purposes – <i>under development</i>
	Fish Species Biodiversity & Population	
	Commercial Fish Harvest Trends	
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 Post Treatment Tests for Municipal Water Supplies Exceeding Guidelines for Drinking Water Quality
	-	Percentage of New Private Wells Exceeding Guidelines for Canadian Drinking Water Quality
Newfoundland and Labrador Department of Environment & Conservation	Water Quality Index (CCME WQI) for the Protection of Aquatic Life	Drinking Water Quality Index (WQI)
	Site Specific Water Quality Index	The Agri-food Water Quality Index (AFWQI)
	Forestry Water Quality Index	Safe Drinking Water Indicators – <i>under development</i>
	Aquaculture Water Quality Index – <i>under development</i>	-
Northwest Territories	Freshwater Fish – 7 indicators to monitor population sizes and trends: SIZE: 1) Population size, 2) number of occurrences, 3) distribution TREND: 4) Trend in Population, 5) Trend in Distribution THREAT: 6) Threats to population 7) Threats to habitat	-
Northwest Territories –	Surface water quality	-

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Environment Canada & INAC		
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	Principle indicators (nitrate and pesticide concentrations) for drinking & surface water quality – <i>under development</i>	
	Source Water Protection Plans Reporting Guidelines: Watershed: <ul style="list-style-type: none"> • Water Quality Indicators • Indicators of vulnerable aquifers • Microbial Indicators – source water Groundwater Vulnerability: <ul style="list-style-type: none"> • Water Quality • Wellhead protection • Vulnerability mapping • Geochemical indicators (water) Surface Water Vulnerability: <ul style="list-style-type: none"> • Water Quality • Vulnerability Indicators 	-
Prince Edward Island	Surface Water Quality <ul style="list-style-type: none"> • Nitrate concentrations in surface water • Shellfish closures 	Drinking Water Quality <ul style="list-style-type: none"> • Nitrate Concentrations in Private Wells • Escherichia coli in Private Wells • Water and wastewater central servicing (the number of single family homes that are serviced by a central water supply system and a central wastewater collection and treatment system)
	Pesticides <ul style="list-style-type: none"> • Numbers of suspected pesticide-related fish kills in Island rivers 	-
	Air Quality	-

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	<ul style="list-style-type: none"> • Acid Rain 	
	Biodiversity <ul style="list-style-type: none"> • Protected Land Area 	-
Environment Quebec	CCME WQI	Bathing Water Quality
Quebec (various partners): Monitoring the St. Lawrence River	<ul style="list-style-type: none"> • Contamination of sediments • Invasive plant species in freshwater wetlands • Quality of shellfish waters in the estuary and gulf • 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 and flow
Saskatchewan Environment	<ul style="list-style-type: none"> • Number of sewage effluent discharges that represent a risk to source waters • Water Quality Index ratings for lakes • Water Quality Index ratings for rivers 	<ul style="list-style-type: none"> • Per cent of communities with human consumptive waterworks whose operators have received some level of certification • Per cent of facilities that meet bacteriological guidelines 90 per cent of the time

		<ul style="list-style-type: none"> Per cent of waterworks [regulated by Saskatchewan Environment] that meet disinfection requirements 90 per cent of the time Number of waterworks that do not meet Saskatchewan Environment's minimum treatment requirements [broken down by pre and post regulatory changes]
	-	Number of accredited drinking water testing laboratories
	-	Number and percentage of municipalities with bylaws in place to protect their drinking water supplies
	-	<ul style="list-style-type: none"> Per cent of survey respondents indicating that they are willing to pay more for their drinking water Per cent of survey respondents indicating that they are very or somewhat confident in the quality of their tap water Number of system owners that publicly release water quality results
Saskatchewan Water Authority	Water Quality Index Values and Ratings for Lakes	-
	Three Year Average Water Quality Index Values and Ratings for Rivers	-
CABIN (Yukon)	Stream Health Indicator	-
AGENCY INITIATIVE	ECOSYSTEM HEALTH INDICATORS	HUMAN HEALTH INDICATORS
REGIONAL LEVEL:		
Great Lakes (Superior, Huron, Michigan, Erie and Ontario) Management Plans	<ul style="list-style-type: none"> Contamination Biotic Communities Coastal Zones Aquatic Habitats Invasive Species Resource Utilization (pollution) 	<ul style="list-style-type: none"> Human Health Resource Utilization (wastewater treatment)
Upper Great Lakes Region: GEM Center for Science and	<ul style="list-style-type: none"> Groundwater Quality 	Wastewater Treatment

Environmental Outreach		
Mackenzie River Basin	CCME WQI – State of the Mackenzie River Aquatic Ecosystem	-
The Arctic Water Resource Vulnerability Index (AWRVI)		An Integrated Assessment Tool for Community Resilience and Vulnerability with respect to Freshwater
The Georgia Basin Puget Sound Ecosystem Indicators Project	<ul style="list-style-type: none"> • River, stream and lake Quality • Marine Water Quality • Shellfish Indicator 	-
Gulf of Maine Council on the Marine Environment (GoMC)	<p>The Ecosystem Indicators Partnership (ESIP) is developing indicators of ecosystem integrity. The six indicator areas:</p> <ul style="list-style-type: none"> • Coastal development • Contaminants and pathogens • Eutrophication • Aquatic habitat • Fisheries and aquaculture, and • Climate change <p><i>– under development</i></p>	-
AGENCY INITIATIVE	ECOSYSTEM HEALTH INDICATORS	HUMAN HEALTH INDICATORS
COMMUNITY LEVEL:		
Canadian Index of Wellbeing	Ecosystem health	-
British Columbia Environmental Network (BCEN) – Toward Sustainability Indicators for BC:	Freshwater & natural resources	-
Fraser Basin Council – Sustainability Indicators	<ul style="list-style-type: none"> • Water Quality Index • Water Quality Trends • Wastewater Treatment 	-
Okanagon Basin Water Board (OBWB)	Environmental base flow in streams and creeks (Kokanee salmon and rainbow trout)	-
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	
British Columbia Progress Board – Benchmark Report	BC Water Quality Index	-
Petitcodiac Watershed Alliance (New Brunswick)	7 different indicators are used to assess the health of the Petitcodiac River ecosystem.	-
NWT Land Use Planning Boards	Water Quality	-
Genuine Progress Index (GPI) (Nova Scotia)	Drinking Water Quality (based on the Guidelines for Drinking Water Quality)	-
Clean Annapolis River Project (CARP) (Nova Scotia)	River water quality	-
Grand River Conservation Authority	Water Quality (using the CCME WQI)	<ul style="list-style-type: none"> • Stream flow • Rainfall • Reservoir levels
Ontario – City of Hamilton Sustainability Indicators	<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” 	<ul style="list-style-type: none"> • Total Water Consumption for All Uses (metered accounts)
Association of Public Health Epidemiologists in Ontario	-	<ul style="list-style-type: none"> • The number of boil water advisories (BWAs) by household-days affected • The number of drinking water advisories (DWAs) by household-days affected • Drinking water quality exceedences for health parameters • Trihalomethanes (THMs) in drinking water • Coliform bacteria in drinking water • E.coli in drinking water • Fluoride in drinking water

<p>Association of Public Health Epidemiologists in Ontario</p>	<p>-</p>	<ul style="list-style-type: none"> • The number of boil water advisories (BWAs) by household-days affected • The number of drinking water advisories (DWAs) by household-days affected • Drinking water quality exceedences for health parameters • Trihalomethanes (THMs) in drinking water • Coliform bacteria in drinking water • E.coli in drinking water • Fluoride in drinking water • Percentage of households on private wells • Percentage of households with a shallow/bored well • Percentage of households with a deep drilled well <p>Percentage of households with a private well that has been tested for bacteria at least three times in the past 12 months</p>
<p>Pembina Institute: Ontario Community Sustainability Report (The Smart Growth Index)</p>		<p>% of population served with tertiary water treatment</p>
<p>The CLEAR Network: Community of London Environmental Awareness Reporting Network</p>	<ul style="list-style-type: none"> • Sewage plant efficiency (removing phosphorus) • Sewage treatment bypass 	<ul style="list-style-type: none"> • Consumption per person • Drinking water testing (adverse samples) • Drinking water losses (non-revenue water) • Volume of Sewage per person (per capita)