

Key Documents

Acts & Regulations

Clean Water Act, S.O. 2006. c.22

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Ontario Regulation 170/03 under the *Safe Drinking Water Act*, 2002. *Drinking Water Systems*.

Ontario Regulation 284/07 under the *Clean Water Act*, 2006. *Source Protection Areas and Regions*.

Ontario Regulation 287/07 under the *Clean Water Act*, 2006. *General*.

Ontario Regulation 288/07 under the *Clean Water Act*, 2006. *Source Protection Committees*. *Safe Drinking Water Act*, S.O. 2002, c.32.

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*Omissions from this comprehensive list may be corrected for the Proposed Assessment Report for the North Bay-Mattawa Source Protection Area. In many cases, proper citations are available in source documents, which are available on the www.actforcleanwater.ca website.

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Glossary

100-Year Monthly Mean Lake Level (Great Lakes-St. Lawrence River system and large inland lakes) - the monthly mean lake level having a total probability of being equaled or exceeded during any year of one per cent. Monthly mean level refers to the average water level occurring during a month computed from a series of readings in each month.

100 Year Storm - a frequency based storm that on average will occur once every hundred years; however, has a one percent chance of occurring or being exceeded in any given year.

100-Year Wind Setup (Great Lakes-St. Lawrence River system and large inland lakes) - the wind setup having a total probability of being equaled or exceeded during any year of one percent. Wind setup refers to the vertical rise above the normal static water level on the leeward side of a body of water caused by wind stresses on the surface of the water.

Abandoned Well - a well that is deserted because it is dry, contains non potable water, was discontinued before completion, has not been properly maintained, was constructed poorly, or it has been determined that natural gas may pose a hazard.

Absorption – a physical or chemical process in which atoms, molecules or ions enter a solid, liquid or gas bulk phase.

Activity - one or a series of related processes, natural or anthropogenic that occurs within a geographical area and may be related to a particular land use.

Adsorption – the adhesion in an extremely thin layer of molecules (as of gases, solutes, or liquids) to the surfaces of solid bodies or liquids with which they are in contact.

Adverse Environmental Impacts - those physical, biological and environmental changes which are of long-term duration, where the rate of recovery is low, where there is a high potential for direct and/or indirect effects and/or where the area is considered to be critical habitat or of critical significance to the protection, management and enhancement of the ecosystem.

Adverse Water Quality Incident (AWQI) - an event in which a municipal or private drinking water system receives an adverse test result. This can trigger a process of notification and corrective measures.

Aggregate - refers to gravel which is any loose [rock](#) that is at least two millimeters in its largest dimension (about 1/12 of an inch), and no more than 75 millimeters (about 3 inches). Sometimes gravel is restricted to rock in the 2-4 millimeter range, with [pebble](#) being reserved for rock 4-75 millimeters (some say 64 millimeters). The next smaller size class in geology is [sand](#), which is 0.063 mm to 2 mm in size. The next larger size is [cobble](#), which is 75 (64) millimeters to 256 millimeters (about ten inches).

Agricultural Managed Land - managed land that is used for agricultural production purposes including areas of cropland, fallow land and improved pasture where agricultural source material (ASM), commercial fertilizer or non-agricultural source material (NASM) is applied or may be applied.

Agricultural Source Material - material used for land application of nutrients that originate from agricultural activities such as livestock operations. May include manure, livestock bedding, runoff water from animal yards or manure storage and compost (see *Nutrient Management Act, 2002* for legal description).

Algal Bloom - refers to rapid growth of small aquatic plants on the surface of lakes and rivers, usually as a result of excessive nutrients.

Alkalinity – of, relating to, containing, or having the properties of an alkali or alkali metal. Having a pH of more than 7.

Alluvium Deposits - sediments consisting of silt, sand, clay, and gravel in varying proportions that are deposited by flowing water.

Alteration to a Watercourse - any watercourse, whether flowing all year or not, requires a Conservation Authority permit to be altered. Typical alterations include bridge or culvert installations, channelization and diversion.

Anthracite-Sand Filtration - filter sand used to separate suspended matter from the water. Anthracite is a type of “hard” coal, with a high percentage of fixed carbon.

Anthropogenic - influenced by human activity or of human origin.

Aphotic Zone - the depth of a waterbody that is not exposed to sunlight. The depth of the aphotic zone can be greatly affected by such things as turbidity and the season of the year. The benthic layer is located here. The aphotic zone generally underlies the photic zone, which is that portion of the waterbody directly affected by sunlight.

Aquifer - a water-bearing layer (or several layers) of rock or sediment capable of yielding supplies of water; typically consists of unconsolidated deposits of sandstone, limestone or granite, and can be classified as confined, unconfined or perched. The water in an aquifer is called groundwater.

Aquifer System - a group of two or more aquifers that are separated by aquitards or aquicludes.

Aquifer Vulnerability Index (AVI) - a numerical indicator of an aquifer’s intrinsic or inherent vulnerability to contamination expressed as a function of the thickness and permeability of overlying layers.

Aquitard - a confining bed and/or formation composed of rock or sediment that retards but does not prevent the flow of water to or from an adjacent aquifer. It does not readily yield water to wells or springs, but stores ground water.

Area of Influence of a Well - the area covered by the drawdown curves of a given well or combination of wells at a given time when pumped.

Assessment Report - the Assessment Report is a science based report generated locally for each Source Protection area to comply with the “*Clean Water Act, 2006*”. The Report will identify the watersheds and the vulnerable areas within the Source Protection Area. Threats to the vulnerable areas will be assessed and determined whether they pose a significant threat to Municipal residential drinking water systems.

Attenuation - the soil's ability to lessen the amount of, or reduce the severity of groundwater contamination. During attenuation, the soil holds essential plant nutrients for uptake by agronomic crops, immobilizes metals that might be contained in municipal sewage sludge, and removes bacteria contained in animal or human wastes.

Average Annual Recession Rate - refers to the average annual linear landward retreat of a shoreline or river bank.

Bankfull Discharge - the formative flow of water that characterizes the morphology (shape) of a fluvial channel. In a single channel stream, bankfull is the discharge which just fills the channel without flowing onto the floodplain.

Baseflow - the sustained flow (amount of water) in a stream that comes from groundwater discharge or seepage. Groundwater flows underground until the water table intersects the land surface and the flowing water becomes surface water in the form of springs, streams/ivers, lakes and wetlands. Baseflow is the

continual contribution of groundwater to watercourses and is important for maintaining flow in streams and rivers between rainstorms and in winter conditions.

Basin - the area drained by a river or a watershed with a common outlet.

Batholith - a very large mass of igneous rock (e.g. granite) formed deep within the earth.

Beach - a geological formation consisting of loose rock particles such as sand, gravel, shingle, pebbles, cobble, or even shell along the shoreline of a body of water.

Bedrock - solid or fractured rock usually underlying unconsolidated geologic materials; bedrock may be exposed at the land surface.

Benthic Organisms - occur at the bottom of a body of water.

Benthic Region - the bottom of a body of water, supporting the benthos.

Benthos - the plant and animal life whose habitat is the bottom of a body of water.

Berm - a narrow shelf or ledge can be used at the bottom of a slope to reinforce and stabilize it against slumping and erosion or to direct overland flow.

Best Management Practices (BMPs) - structural, non-structural and managerial techniques that are recognized to be the most effective and practical means to control non-point source pollutants yet are compatible with the productive use of the resource to which they are applied. BMPs are used in both urban and agricultural areas.

Bioaccumulation - continuous build up of chemicals in the body tissues resulting from direct ingestion or ingestion of contaminated food sources. Chemicals are not flushed from the body but rather remain in the tissues throughout the lifetime of the individual.

Biochemical Oxygen Demand (BOD) - is a measure of the quantity of oxygen used by micro-organisms (e.g. aerobic bacteria) in the decomposition (oxidation) of organic solids.

Biodegradation - decomposition of a substance into more elementary compounds by the action of micro-organisms such as bacteria.

Bog - peatland with the water table at or near the surface. The surface of the bog may often be raised above the surrounding terrain. Bogs are isolated from mineral-rich soil waters, therefore nutrient input is from atmospheric deposition. They are strongly acidic and nutrient poor. Peat is usually greater than 40 centimetres deep. Groundcover is usually moss, *Sphagnum spp.* and ericaceous shrubs and may be treed or treeless. Bog water is derived from groundwater or precipitation.

Bored Well - a well drilled with a large rig-mounted boring auger, usually 3658 millimetres or more in diameter and seldom deeper than 30 metres.

Boulder - a sedimentary rock fragment that is usually rounded and has a diameter over 256 millimetres.

Calibration - the process whereby a numerical model is adjusted so that the calculated and observed parameters converge. When the parameters converge, the calibration process is complete.

Capillary Action - the movement of water in the interstices of a porous medium due to capillary forces.

Capillary Forces - the forces between water molecules and the clay (or any soil particle) surfaces. Capillary flow refers to water that moves in response to differences in capillary forces.

Capture Zone - a term used to represent an area where water originates and moves to a water well. Typically, capture zones are a two dimensional representation of a three dimensional space.

Carbonate - a compound(s) containing $\text{CO}_3(2)$, also known as a salt of carbonic acid. When heated, yields the gas carbon dioxide (calcite, dolomite and siderite are examples of carbonates).

Channel Capacity - the ability of a watercourse at a given cross-section to convey flows of water, or how much water can be carried at a particular place; floods occur when the channel capacity is exceeded.

Channelization - the smooth realignment and regarding of a creek or stream bed; implies modification of the watercourse to increase channel capacity; channelized banks are usually reinforced with stone, concrete or rip-rap.

Chemical Contaminant - a substance used in conjunction with, or associated with, a land use activity or a particular entity, and with the potential to adversely affect water quality.

Chlorine Disinfection - the destruction or elimination of disease carrying micro-organisms through the use of a chlorinated solution.

Chlorite - a rock-forming mineral, usually greenish in colour and platy (like mica). A hydrous silicate of aluminium, iron and magnesium.

Circumneutral – term applied to solutions (normally water) with a pH of 5.5 (acidic) to 7.4 (alkaline).

Clean Water Act - the “*Clean Water Act, 2006*” was passed as Bill 43 to protect drinking water at the source. The *Act* requires the development of a watershed based Source Protection Plan.

Coagulation-Flocculation - a term used to describe a process where water is purified at a water treatment plant.

Coliforms - bacteria found only in human and animal wastes; presence in a river may indicate pollution by sewage or farmyard runoff.

Conceptual Water Budget - a written description of the overall system flow dynamics for each watershed in the Source Protection Area, taking into consideration surface water and groundwater features, land cover (e.g. proportion of urban vs. rural uses), man-made structures (e.g. dams, channel diversions, water crossings) and water takings.

Condition – the presence of a substance in a vulnerable area that results from a past activity and that also constitutes a drinking water threat.

Cone of Depression - the zone (around a well in an unconfined aquifer) that is normally saturated but becomes unsaturated as a well is pumped; an area where the water table dips down forming a "V" or cone shape due to a pumping well.

Confined Aquifer - also commonly called an artesian aquifer. A confined aquifer is bounded above and perhaps below by layers of geological material that do not transmit water readily. It is the saturated formation between impermeable layers that restrict movement of water vertically into or out of the saturated formation. In this layer, water is confined under pressure, similar to water in a pipeline. Drilling a well into this type of aquifer is similar to puncturing a pressurized pipeline. If the pressure is great enough, the well will flow, and this is called a flowing artesian well.

Confining Layer (aquitard) - a layer of geologic material with little to no permeability or hydraulic conductivity that functions as a container for an aquifer. Water does not rapidly pass through this layer or the rate of movement is extremely slow.

Conservation Authorities - local watershed management agencies that deliver services and programs that protect and manage water and other natural resources in partnership with government, landowners and other organizations.

Consumptive Use - the portion of water withdrawn or withheld from the water source and assumed to be lost or otherwise not returned to the water source due to evaporation, incorporation into products, or other processes.

Contaminant (pollutant) - an undesirable substance that makes water unfit for a given use when found in sufficient concentration.

Contaminant of Concern - a chemical or pathogen that is or may be discharged from a Drinking Water Threat, a chemical or pathogen that is or may become a Drinking Water Threat as identified by the Ontario Ministry of Environment.

Control Structure - a structure that serves to control the flow of water, generally a dam or weir.

Corrective Action - steps that must be taken following an adverse water quality incident as specified by O.Reg. 170/03, Schedules 17 & 18, or O. Reg. 252/05, Schedule 5 and/or as directed by the local Medical Officer of Health or drinking water inspector that are necessary to protect human health.

Cosmetic Pesticide Ban Act - the “*Cosmetic Pesticide Ban Act, 2008*” recognizes that the cosmetic use of pesticides to improve the appearance of lawns and gardens presents health and environmental risks. The *Act* restricts the use and sale of specific pesticides for cosmetic purposes on specific land uses.

Cumulative Effects (water quality) - the consequence of multiple threats sources, in space and time, which affect the quality of drinking water sources.

Cumulative Effects (water quantity) - the consequence of multiple threats sources, in space and time, which affect the quantity of drinking water sources.

DDT (dichlorodiphenyltrichloroethane) - a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odour or taste. Since the 1970's, use of DDT as a pesticide has been banned in North America.

Dam - structure used to hold back water.

Data Gaps - the lack of site specific information for a geological area and/or specific type of information.

Decommissioned Wells - decommissioned wells are capped, plugged and sealed in compliance with regulatory requirements by the Ministry of the Environment.

Dense Non-Aqueous Phase Liquid (DNAPL) - an organic chemical in concentrations greater than its aqueous solubility and more dense than water. Such a chemical will sink in groundwater and accumulate in aquifer depressions.

Designated System - a drinking water system that is included in a Terms of Reference, pursuant to resolution passed by a municipal council under subsection 8(3) of the proposed “*Clean Water Act, 2006*”.

Discharge - the flow of surface water in a stream or canal, or the outflow of groundwater to a well, ditch or spring. It is the volume of water in cubic metres per second (m³/s) running in a watercourse.

Discharge Area - an area where groundwater emerges at the surface; an area where upward pressure or hydraulic head moves groundwater towards the surface to escape as a spring, seep, or base flow of a stream.

Disposal Well - a well used for the disposal of waste into a subsurface stratum.

Diversión - a redirection of water from one drainage or watercourse to another.

Drainage Area - the area which supplies water to a particular point.

Drainage Basin - the area of land, surrounded by divides, that provides runoff to a fluvial network that converges to a single channel or lake at the outlet.

Drainage Well - a well pumped in order to lower the water table; a vertical shaft to a permeable substratum into which surface and subsurface drainage is channeled.

Drawdown - lowering of the water level of a lake or reservoir.

Drilled Well - a well usually 10 inches or less in diameter, drilled with a drilling rig and cased with steel or plastic pipe. Drilled wells can be of varying depth.

Drinking Water - 1. Water intended for human consumption. 2. Water that is required by an Act, regulation, order, municipal by-law or other document issued under the authority of an Act, (a) to be potable, or (b) to meet or exceed the requirements of the prescribed drinking water quality standards.

Drinking Water Concern - a purported drinking water issue that has not at this time been substantiated by monitoring, or other verification methods. Concerns may be identified through consultations with the public, stakeholder groups, and technical experts (e.g. water treatment plant operators).

Drinking Water Issue - a substantiated condition relating to the quality or quantity of water that interferes or is anticipated to soon interfere with the use of a drinking water source by a municipality. As defined in *Technical Rule 114*, regarding the quality of water in a vulnerable area: 1) The presence of a parameter in water at a surface water intake or well, at a concentration that may result in deterioration of the water quality or where there is a trend of increasing concentrations of a parameter. 2) The presence of a pathogen at a concentration that may result in deterioration of the water quality or there is a trend of increasing concentrations of the pathogen.

Drinking Water Source Protection - a program of education, stewardship, planning, infrastructure, and regulation activities that together serve to help prevent the contamination or overuse of source water.

Drinking Water System - a system of works, excluding plumbing, that is established for the purpose of providing users of the system with drinking water and that includes, (a) anything used for the collection, production, treatment, storage, supply or distribution of water, (b) anything related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the treatment system, and (c) a well or intake that serves as the source or entry point of raw water supply for the system.

Drinking Water Threat: Has the same meaning as in the “*Clean Water Act, 2006*.” An existing activity, possible future activity or existing condition that results from a past activity, (a) that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water, or (b) that results in or has the potential to result in the raw water supply of an existing or planned drinking-water system failing to meet any standards prescribed by the regulations respecting the quality or quantity of water, and includes an activity or condition that is prescribed by the regulations as a drinking water threat.

Draught - drought is a complex term that has various definitions, depending on individual perceptions. For the purposes of low water management, drought is defined as weather and low water conditions characterized by one or more of the following: a) below normal precipitation for an extended period of time (for instance three months or more), potentially combined with high rates of evaporation that result in lower lake levels, streamflows or baseflow, or reduced soil moisture or groundwater storage;

b) streamflows at the minimum required to sustain aquatic life while only meeting high priority demands for water, water wells becoming dry, surface water in storage allocated to maintain minimum streamflows;
c) socio-economic effects occurring on individual properties and extending to larger areas of a watershed or beyond. As larger areas are affected and as low water and precipitation conditions worsen, the effects usually become more severe.

Dug Well - a large diameter well dug by hand, excavator or by an auguring machine, often cased by concrete or hand-laid bricks.

E. Coli - an enterobacterium (*Escherichia coli*) that is used in public health as an indicator of fecal pollution (as of water or food) and in medicine and genetics as a research organism and that occurs in various strains that may live as harmless inhabitants of the human lower intestine or may produce a toxin causing intestinal illness.

Ecology - an interdependent community of plants and animals living in a recognizable area; humans are a major part of most Ontario ecosystems.

Effluent - the discharge of a pollutant in a liquid form, often from a pipe into a stream or river.

Environmental Protection Act - the purpose of this Act is to provide for the protection and conservation of the natural environment. R.S.O. 1990, c. E.19, s. 3.

Erosion - a physical process causing the deterioration and transport of soil surfaces and river channel materials by the force of flowing water or wind, ice or other geological agents, including such processes as gravitational creep. Geological erosion is naturally occurring erosion over long periods of time.

Esker - a ridge of glacial sediment deposited by a stream flowing in and under a melting glacier.

Euphotic Zone - the lighted region of a body of water that extends vertically from the water surface to the depth at which photosynthesis fails to occur because of insufficient light penetration.

Eutrophication - a means of aging lakes whereby aquatic plants are abundant and waters are deficient in oxygen. The process is usually accelerated by enrichment of waters with surface runoff containing nitrogen and phosphorus.

Eutrophic Lakes - lakes that are rich in nutrients and organic materials, therefore highly productive for plant growth. These lakes are often shallow and seasonally deficient in oxygen in the hypolimnion.

Evaporation - the process by which water or other liquids change from liquid to vapour; evaporation can return infiltrated water to the atmosphere from upper soil layers before it reaches groundwater or surface water, and occur from leaf surfaces (interception), water bodies (lakes, streams, wetlands, oceans), and small puddled depressions in the landscape.

Evapotranspiration - the combined loss of water from a given area and during a specific period of time by evaporation from the soil surface and by transpiration from plants.

Event - an occurrence of an incident (isolated or frequent) with the potential to promote the introduction of a threat into the environment. An event can be intentional, as in the case of licensed discharge or accidental, as in the case of a spill.

Existing Drinking Water Source - the aquifer or surface water body from which municipal residential systems or other designated systems currently obtain their drinking water. This includes the aquifer or surface water body from which back-up wells or intakes for municipal residential systems or other designated systems obtain their drinking water when their current source is unavailable or an emergency occurs.

Exposure - the extent to which a contaminant or pathogen reaches a water resource. Exposure, like a drinking water threat, can be quantified based on the intensity, frequency, duration and scale. The degree of exposure will differ from that of a drinking water threat dependent on the nature of the pathway or barrier between the source (threat) and the target (receptor) and is largely dependent on the vulnerability of the resource.

Fault - a fracture in the crust of the earth accompanied by a displacement of one side of the fracture with respect to the other usually in a direction parallel to the fracture.

Feldspar - common rock-forming minerals (e.g. orthoclase, microcline, plagioclase). Aluminum silicates of one or more of calcium, sodium and potassium.

Fen - peatland with the water table at or just above the surface. Very slow internal drainage by seepage and usually enriched by nutrients from upslope mineral water, therefore more nutrient- and oxygen-rich than bogs. Peat substrate is usually greater than 40 centimetres deep. Can sometimes be a floating mat, with vegetation consisting of sedges, mosses, shrubs and sometimes a sparse tree layer.

Field Capacity - the capacity of soil to hold water at atmospheric pressure. It is measured by soil scientists as the ratio of the weight of water retained by the soil to the weight of the dry soil.

Fill - rubble, earth, rocks or other imported material that is used to raise or alter the existing elevation.

Filtering - the soil's ability to attenuate substances, which includes retaining chemicals or dissolved substances on the soil particle surface, transforming chemicals through microbial biological processing, retarding movement and capturing solid particles.

Flood - an overflow or inundation that comes from a river or other body of water and causes or threatens damage. It can be any relatively high streamflow overtopping the natural or artificial banks in any reach of a stream. It is also a relatively high flow as measured by either gauge height or discharge quantity.

Floodplain - a strip of relatively level land bordering a stream or river. It is built of sediment carried by the stream and dropped when the water has flooded the area. It is called a water floodplain if it is overflowed in times of high water, or a fossil floodplain if it is beyond the reach of the highest flood.

Floodway - the channel of a river and those parts of the adjacent floodplain which are required to carry and discharge flood water.

Flow - the volumetric rate of water discharged from a source, given in volume with respect to time. Measured in cubic metres per second (m³/s); see also "discharge".

Flow Regime - the basin's flow magnitude and duration given a particular precipitation event (amount and intensity) and also the frequency of the events. Given the temporal component of frequency, a basin's flow regime would encompass baseflow, low magnitude (high frequency events) and high magnitude (low frequency events).

Flow System - groundwater flow from the recharge area to a discharge area; three levels - regional, intermediate, and local. In a regional flow system, the recharge area is at the basin or watershed divide and the discharge area is at a river in the valley bottom. In a local flow system, the recharge area is at a topographical high spot and the discharge area is at a nearby topographical low spot.

Fluvial - pertaining to rivers and streams or to features produced by the actions of rivers and streams.

Food Chain - the passing of nutrients and energy through an ecosystem by animals eating other animals and plants.

Forest Management - the intelligent use and control of the forest and its products for a specific purpose; may be for wood production, wildlife habitat, maple syrup, nature trails or any combination of these uses and others.

Fractures - cracks in bedrock that may result in high permeability values.

Fresh Water - water that contains less than 1,000 milligrams per litre (mg/L) of dissolved solids; generally more than 500 milligrams per litre is undesirable for drinking and many industrial uses.

Freshet - the occurrence of a water flow resulting from sudden rain or melting snow. Most commonly used to describe a spring thaw resulting from snow and ice melt.

Future Municipal Water Supply Areas - an area corresponding to a wellhead protection area or a surface water intake protection zone, or an aquifer or groundwater area identified for future municipal water supply infrastructure (either a well or a surface water intake pipe).

Gauging Station - a site on a stream, lake or canal where hydrologic data is collected.

Geology - the study of science dealing with the origin, history, materials and structure of the earth, together with the forces and processes operating to produce change within and on the earth.

GIS (Geographic Information System) - an electronic map-based database management system which uses a spatial reference system for analysis and mapping purposes.

Glacial Drift - all material transported and deposited by glacial ice and glacial meltwater.

Glacial Lake - a lake created when glacial meltwaters are ponded in a basin scoured out by glacial ice, or from the damming of natural drainage by glacial materials such as till.

Glacial Outwash - well-sorted sand, or sand and gravel deposited by water melting from a glacier.

Glacial Till - nonsorted, nonstratified sediment deposited or transported by glacial activity.

Glaciofluvial - pertaining to rivers and streams flowing from, on or under melting glacial ice, or to sediments deposited by such rivers and streams.

Glaciolacustrine - a term used to describe fine-grained glacial materials deposited in glacial lake environments.

Gneiss - a type of rock containing bands rich in granular materials alternating with bands rich in platy or micaceous minerals.

Gradient - the rate of change of elevation between one section of a river and another section further downstream.

Granite - a coarse-textured igneous rock made up of quartz, feldspar, and one or both of mica and hornblende; usually found in batholiths. It is an acid rock with a high content of silica.

Great Lakes Basin - refers to the watershed of the Great Lakes and the St. Lawrence River upstream from Trois-Rivieres, Quebec.

Greywacke - a variety of sandstone with tiny fragments of rock and rock minerals (quartz and feldspar), resulting from rapid erosion and sedimentation.

Grey Water - domestic wastewater other than that containing human excrete, such as sink drainage, washing machine discharge or bath water.

Groundwater - the water below the water table contained in void spaces (pore spaces between rock and soil particles, or bedrock fractures). Water occurring in the zone of saturation in an aquifer or soil.

Groundwater Barrier - rock or artificial material with a relatively low permeability that occurs (or is placed) below ground surface, where it impedes the movement of groundwater and thus may cause a pronounced difference in the hydraulic head on opposite sides of the barrier.

Groundwater Basin - the underground area from which groundwater drains. The basins could be separated by geologic or hydrologic boundaries.

Groundwater Divide - the boundary between two adjacent groundwater basins, which is represented by a high point in the water table.

Groundwater Flow - the rate of groundwater movement through the subsurface.

Groundwater Recharge - inflow of water to a ground water reservoir from the surface. Infiltration of precipitation and its movement to the water table is one form of natural recharge.

Groundwater Recharge Area - the area where an aquifer is replenished from: (a) natural processes, such as the infiltration of rainfall and snowmelt and the seepage of surface water from lakes, streams and wetlands, (b) from human interventions, such as the use of storm water management systems, and; (c) whose recharge rate exceeds a specified threshold.

Groundwater Reservoir - an aquifer or aquifer system in which groundwater is stored. The water may be placed in the aquifer by artificial or natural means.

Groundwater Storage - the storage of water in groundwater reservoirs.

Groundwater Vulnerability - the probability of contaminants propagating to a specified region in the groundwater system after introduction at some location above the uppermost aquifer.

Hardness - a characteristic of water that contains various dissolved salts, calcium, magnesium and iron (e.g. bicarbonates, sulfates, chlorides and nitrates).

Hazard - a contaminant and/or pathogen threat.

Hazard Lands - areas designated unsuitable for commercial or residential development because of some natural limitation such as flooding, unstable soil or high ground water levels.

Hazard Rating - the numeric value which represents the relative potential for a contaminant of concern to impact drinking water sources at concentrations significant enough to cause human illness. This numeric value is determined for each contaminant of concern in the Threats Inventory and Issues Evaluation of the Assessment Report.

Headwater - the source of a river or water immediately upstream of a structure. The source waters of a stream or river.

Heavy Metals - a general term used to describe more than a dozen metallic elements. Some heavy metals, such as zinc, copper and iron, although harmful at high concentrations are essential parts of our diets at trace levels. Others, like lead and mercury, have no known health benefits and can have harmful effects on human health and the environment at very low concentrations.

Herbicide - chemicals used to kill undesirable vegetation.

Heterotrophs - those microorganisms that use organic compounds for most or all of their carbon requirements. Most bacteria, including many of the bacteria associated with drinking water systems, are heterotrophs.

Heterotrophic Plate Count [HPC] - is a microbial method that uses colony formation on culture media to approximate the levels of heterotrophic flora.

High Magnitude - an event that is of great importance in terms of its impacts.

Highly Vulnerable Aquifer [HVA] - an aquifer that can be easily changed or affected by contamination from both human activities and natural process as a result of: a) its intrinsic susceptibility, as a function of the thickness and permeability of overlaying layers, or; b) by preferential pathways to the aquifer.

Hummocky - landscape terrain that is characterized by numerous small hills and ridges. Frequently found at the edges of glaciers or in areas of landslide deposits or glacial deposition.

Hydraulic Conductivity - the term used to describe the rate at which water moves through a medium; a controlling factor on the rate at which water can move through a permeable medium.

Hydraulic Flow - the flow of water in a channel as determined by such variables as velocity, discharge, channel roughness and shear stress.

Hydraulic Gradient - rate of change of pressure head per unit of distance of flow at a given point and in a given direction.

Hydraulic Head (Head) - the energy that causes groundwater to flow; the total mechanical energy per unit weight; the sum of the elevation head and the pressure head.

Hydrodynamics – the study of fluid in motion

Hydrogeologic Conditions - conditions stemming from the interaction of groundwater and the surrounding soil and rock.

Hydrogeologic Cycle - the circulation of water in and on the earth and through the earth's atmosphere through evaporation, condensation, precipitation, runoff, groundwater storage and seepage and re-evaporation into the atmosphere.

Hydrologic Cycle - the cycle of water movement from the atmosphere to the earth and its return to the atmosphere through various stages, such as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transpiration.

Hydrology - Scientific study of the properties, distribution and effects of water on the Earth's surface, in the soil, underlying rocks and in the atmosphere.

Hydropower - power produced by falling water.

Hypolimnion - the lowermost, non-circulating layer of water in a thermally stratified lake.

Igneous Rock - a rock formed by the crystallization of molten or partially molten matter or magma.

Impact - often considered the consequence or effect. The impact should be measurable and based on an agreed set of parameters. In the case of Drinking Water Source Protection, the parameters may be an acceptable list of standards which identify maximum raw water levels of contaminants and pathogens of concern. In the case of water quantity, the levels may relate to a minimum annual flow, piezometric head or lake level.

Impermeable - not allowing water to pass through.

Impervious - a term denoting the resistance to penetration by water or plant roots.

Impoundment - a body of water, such as a pond, confined by a dam, dyke, floodgate or other barrier. It is used to collect and store water for future use or treatment.

Indicator Graph - plot of monthly values of streamflow or precipitation vs. time at a station that has been designated as an indicator of conditions in that geographical location.

Infiltration - the process of water moving from the ground surface vertically downward into the soil.

Infiltration Capacity - the maximum rate at which a given soil in a given condition can absorb rain as it falls.

Infiltration Rate - the quantity of water that enters the soil surface in a specified time interval. Often expressed in volume of water per unit of soil surface area per unit of time (eg. centimetres per hour, cm/hr).

Inflow - the water that flows into a lake, reservoir or forebay.

Inland Lake - a body of standing water, usually fresh water, larger than a pool or pond or a body of water filling a depression in the earth's surface.

Inland Rivers - a creek, stream, brook and any similar watercourse inland from the Great Lakes that is not a connecting channel between two Great Lakes.

Input Parameters - a term used in groundwater modelling to describe a number of physical parameters used to generate the numerical model.

Interception Loss - precipitation that is intercepted by trees, vegetation, and/or buildings and evaporates quickly back into the atmosphere before reaching the ground.

Interflow (subsurface stormflow) - water that travels laterally or horizontally through the zone of aeration (vadose zone) during or immediately after a precipitation event and discharges into a stream or other body of water.

Intrinsic Susceptibility - a measure of the natural protection of an aquifer from overlying layers with low permeability.

Intrinsic Susceptibility Index (ISI) - a numerical indicator of an aquifer's intrinsic susceptibility to contamination expressed as a function of the thickness and permeability of overlying layers.

Intrinsic Vulnerability - the potential for the movement of a contaminant(s) through the subsurface based on the properties of natural geological materials.

Irrigation - the controlled application of water for agricultural purposes through man-made systems to supply water requirements not satisfied by rainfall.

Kame - a steep-sided hill of stratified glacial drift. Distinguished from a drumlin by lack of unique shape and by stratification.

Karst - areas that have underlying dissolvable bedrock such as limestone or dolomite. There is generally much more interaction between groundwater and surface water in karst regions than in non-karst regions.

Knowledge Gaps - lack of referenced materials or expertise to assess certain characteristics of the specific watershed that can be adequately described without tabular or spatial data.

Lacustrine - pertaining to lakes, or to sediments that have either settled from suspension in standing bodies of fresh water or have accumulated at their margins through wave action.

Lagoon - water impoundment in which organic wastes are stored or stabilized, or both.

Land Use - a particular use of space at or near the earth's surface with associated activities, substances and events related to the particular land use designation.

Leachate - liquid formed by water percolating through contaminated soil or soluble waste as in a landfill.

Leaching - the downward transport of dissolved or suspended minerals, fertilizers and other substances by water passing through a soil or other permeable material.

Limnetic Zone - the open water area away from the shore of a lake or pond. In this zone, there is less light penetration and fewer producers.

Listed Parameter – sampled substances or conditions, as listed in the Ontario Drinking Water Quality Standards, O.Reg 169/03 under the *Safe Drinking Water Act, 2002*.

Littoral - along and close to the shore, particularly describing aquatic plants, animals, currents and water deposits.

Livestock Density - the number of nutrient units over a given area, and is expressed by dividing the nutrient units by the number of acres in the same area, where, (a) in respect of land used for the application of nutrients, the number of acres of agricultural managed land in the vulnerable area; and (b) in respect of land that is part of a farm unit and that is used for livestock, grazing or pasturing, the number of acres that is used for those purposes.

Loam - a rich soil containing sand, silt, and clay.

Macroinvertebrates - aquatic animals without backbones, visible to the naked eye, that are monitored as indicators of environmental conditions.

Manganese - a gray-white or silvery brittle, metallic element which resembles iron but is not magnetic. It is found abundantly in the ores pyrolusite, manganite, and rhodochrosite and in nodules on the ocean floor. Manganese is alloyed with iron to form ferromanganese, which is used to increase strength, hardness, and wear resistance of steel.

Marsh - standing or slow-moving water with emergent plants covering greater than 25%. Permanently flooded, intermittently exposed, or seasonally flooded. Nutrient-rich water generally remains within the rooting zone for most of the growing season. Substrate is mineral soil or well-decomposed sedimentary organic material, often held together by a root mat.

Mass Balance - a term used to describe a process of inputs and outputs, which must equal in quantity.

Measure - a tangible direction or course of action. For example, a measure associated with the "risk management plan" policy approach may be one of the specific required actions set out in the risk management plan. In the "education and outreach" policy approach, a measure may be an educational pamphlet or training course that sets out best practices. In "incentive programs", a measure may be the financial incentives provided toward the purchase of low-flow toilets or water restricting showerheads.

Membrane Filtration - process where semi-permeable membranes let water through while catching even sub-micron size suspended solids.

Meteorology - the science of the atmosphere; the study of atmospheric phenomena.

Metamorphic Rock - a rock that has undergone chemical or structural changes. Heat, pressure, or a chemical reaction may cause such changes.

Metamorphism - the process by which conditions within the Earth, below the zone of diagenesis, alter the mineral content, chemical composition, and structure of solid rock without melting it. Igneous, sedimentary, and metamorphic rocks may all undergo metamorphism. This gives rise to the terms metavolcanic, Metasedimentary, etc.

Micrograms per Litre (ug/l) - a measure of the amount of dissolved solids in a solution in terms of micrograms of solid per litre of solution; Equivalent to part per billion in water or $1\mu\text{g/l}=1\text{ppb}$.

Milligrams per Litre (mg/l) - a measure of the amount of dissolved solids in a solution in terms of milligrams of solid per litre of solution; equivalent to part per million in water or $1\mu\text{g/l}=1\text{ppm}$.

Minimum Streamflow - the specific amount of water required to support aquatic life, minimize pollution and support recreational use.

Model - an assembly of concepts in the form of mathematical equations or statistical terms that portrays the behaviour of an object, process or natural phenomenon.

Model Calibration - the process for generating information over the life cycle of the project that helps to determine whether a model and its analytical results are of a quality sufficient to serve as the basis of a decision.

Model Validation - a test of a model with known input and output information that is used to adjust or estimate factors for which data are not available.

Moisture - water diffused in the atmosphere or the ground.

Monitoring Well - a non-pumping well, generally of small diameter, that is used to measure the elevation of a water table or water quality. A piezometer is one type of monitoring well.

Moraine - an accumulation of earth and stones carried by a glacier which is usually deposited into a high point like a ridge.

Municipal Residential System - all municipal drinking-water systems that serve or are planned to serve a major residential development (i.e. six or more private residences).

Municipal Well (Public or Community Well) - a pumping well that serves five or more residences.

Natural Flow - the rate of water movement past a specified point on a natural stream. The flow comes from a drainage area in which there has been no stream diversion caused by storage, import, export, return flow, or change in consumptive use caused by man-controlled modifications to land use. Natural flow rarely occurs in a developed area.

Nitrate (NO_3) - a chemical formed when nitrogen from ammonia (NH_3), ammonium (NH_4) and other nitrogen sources combine with oxygenated water. An important plant nutrient and type of inorganic fertilizer (most highly oxidized phase in the nitrogen cycle). In water, the major sources of nitrates are septic tanks, livestock feed lots and fertilizers.

Nitrite (NO_2) - product in the first step of the two-step process of conversion of ammonium (NH_4) to nitrate (NO_3).

Non-Agricultural Source Materials - used to apply to land as nutrients that do not originate from agricultural activities. Includes pulp and paper biosolids, sewage biosolids, non-agricultural compost and any other material capable of being applied to land as a nutrient that is not from an agricultural source (see *Nutrient Management Act, 2002* for legal description).

Non-Municipal Year-Round Residential Systems - non-municipal drinking water systems that serve a major residential development (more than five private residences) or a trailer park or campground that has more than five service connections.

Non-Point Source Pollution - pollution of the water from numerous locations that are hard to identify as point source, like agricultural activities, urban runoff and atmospheric deposition.

Normal Operating Range - this is a specified range that lake elevations would be regulated to during typical conditions.

Nutrient Management Act - the purpose of this *Act* is to provide for the management of materials containing nutrients in ways that will enhance protection of the natural environment and provide a sustainable future for agricultural operations and rural development. 2002, c. 4, s. 1.

Nutrients - chemicals (particularly phosphorus) which stimulate the growth of aquatic plants; the nutrients act as fertilizers and contribute to heavy weed growth and algae blooms.

Nutrient Unit - the amount of nutrients that give the fertilizer replacement value of the lower of 43 kg of nitrogen or 55 kg of phosphate as nutrient as established by reference to the Nutrient Management Protocol (*Nutrient Management Act, 2002*).

Official Plan - a land use policy document adopted by a municipality to guide the wise and logical development of its area for the benefit of its citizens.

Oligotrophic Lakes - deep lakes that have a low supply of nutrients, thus they support very little organic production. Dissolved oxygen at or near saturation throughout the lake during all seasons of the year.

Ontario Drinking Water Quality Standards - regulated standards (O.Reg. 169/03, Ontario Drinking Water Quality Standards made under the Safe Drinking Water Act, 2002) for microbiological, chemical and radiological parameters that, when present above certain concentrations in drinking water, have known or suspected adverse health effects and require corrective action.

Organic Compounds - natural or synthetic substances based on carbon.

Operational Plan - a document based on the requirements of the Drinking Water Quality Management Standard. The plan will document the owner and operating authority's quality management system.

Organic Soil - soil materials that have developed predominately from organic deposition (i.e. containing >17 percent organic carbon or approximately 30 percent organic matter by weight).

Organism - an individual form of life that includes bacteria, protozoa, fungi, viruses and algae.

Orthophoto Mapping - the ortho process corrects distortions caused by the terrain, the orientation of the airplane and the camera lens. In simplest terms, an ortho image is like a photo that has been draped over the ground similar to spreading a blanket over an uneven surface.

Outflow - the flow out of or through a waterpower facility, control structure, pond, reservoir or lake.

Outwash - sediments deposited by glacial meltwater creating stratified layers of gravel, sand and fines. The terms fluvial and outwash are used interchangeably.

Overburden - used to describe the soil and other material that lies above a specific geologic feature.

Paleolimnology – studies concerned with reconstructing the history (from the Greek: old lake study) of inland waters, especially changes associated with climate change, human impacts, and internal processes.

Parcel Level - a conveyable property, in accordance with the provisions of the Land Titles Act. The parcel is the smallest geographic scale at which risk assessment and risk management are conducted.

Pathogen - an organism capable of producing disease.

Part Per Billion (ppb) - a measure of the amount of dissolved matter in a solution in terms of a ratio between the number of parts of matter to a billion parts of total volume; equivalent to microgram per litre in water or one part per billion = one microgram per litre ($\mu\text{g/l}$).

Part Per Million (ppm) - a measure of the amount of dissolved matter in a solution in terms of a ratio between the number of parts of matter to a million parts of total volume; equivalent to milligram per litre in water or one part per million = one milligram per litre ($\mu\text{g/l}$).

Peak Flow - the greatest rate of flow of water (highest recorded level) in a river within a defined time interval (e.g. annual peak flow, daily peak flow).

Percolation - the actual movement of subsurface water either horizontally or vertically; lateral movement of water in the soil subsurface toward a nearby surface drainage feature (e.g., stream) or vertical movement through the soil to the groundwater zone.

Permeable - a porous surface through which water passes quickly.

Permeability - the property or capacity of a soil or rock for transmitting a fluid, usually water; the rate at which a fluid can move through a medium. The definition only considers the properties of the soil or rock, not the fluid. See also hydraulic conductivity.

Permit to Take Water - any person that takes more than 50,000 litres of water per day from any source requires a permit issued by the Ministry of the Environment Director under the Ontario Water Resources Act, unless they meet the criteria for certain exempted water takings.

Pesticides - chemicals including insecticides, fungicides, and herbicides that are used to kill living organisms.

pH - a numerical measure of acidity, or hydrogen ion activity used to express acidity or alkalinity. Neutral value is pH 7.0, values below pH 7.0 are acid, and above pH 7.0 are alkaline.

Physiography - the study of the landforms – form and process.

Pluton - an intrusive rock, as distinguished from the pre-existing rock that surrounds it.

Point Source Pollution - pollution from a distinct source, such as an industrial discharge pipe, underground storage tank, septic system, or spills.

Policy - a statement of intention. A policy may be designed to guide current and future actions and decisions, and to achieve a desired goal or outcome. A policy may refer to the policy approaches or the measures that will be used to achieve it.

Policy Approach - the approach a threat policy relies upon to reduce the risk posed by drinking water threats. The various policy approaches provided in the Act are: education and outreach activities; incentive programs; land use planning approaches (e.g., official plans, zoning by-laws, site plan controls); new or amended provincial instruments (e.g., Certificates of Approval); risk management plans; prohibition; restricted land uses.

Porosity - the ratio of the volume of void or air spaces in a rock or sediment to the total volume of the rock or sediment.

Potable Water - water that is safe for drinking.

Precambrian Shield - rocks formed during the Precambrian era of earth's history, which have become exposed to the surface in what are called shield areas.

Precipitation - moisture falling from the atmosphere in the form of rain, snow, sleet or hail.

Precipitation Indicators - precipitation is the most important and convenient indicator. Reviewing the precipitation data and comparing it to trends will warn of an impending water shortage. Two precipitation indicators are used: Percent of average = $100 \times \text{total monthly precipitation} / \text{total average precipitation}$ for those months. Average precipitation for the month is calculated by summing the monthly precipitation amounts for each year they were recorded at that station and dividing by the total number of years. The percent of average will be calculated for each month and indicators will be determined for the previous 18 months (long term) and the previous three months (seasonal). Under a Level I condition or higher, the previous month (short-term) will also be used, with weekly updates. If a watershed is under a Level I or Level II condition, MNR will add up the number of consecutive readings that register no rain (less than 7.6mm).

Precipitation Indicator Graph - each month the actual and average monthly precipitation in millimetres (mm) are plotted for the previous 18 months. One plot shows the monthly total amounts and the other plots show the accumulated monthly totals, month by month over the 18 month period.

Preferential Pathway - any structure of land alteration or condition resulting from a naturally occurring process or human activity which would increase the probability of a contaminant reaching a drinking water source. Formerly known as transport pathway.

Private Well - groundwater that serves one home or is maintained by a private owner.

Quality Assurance - the procedural and operational framework used by modelers to assure technically and scientifically adequate execution of the tasks included in the study to assure that all analysis is reproducible and defensible.

Quaternary Geology - the study of all geologic activity and events which took place during the Quaternary geologic period (the last 1.8 million years).

Rainfall - the quantity of water that falls as rain only.

Rain Gauge - any instrument used for recording and measuring time, distribution and the amount of rainfall .

Raw Water - water in its natural state, prior to any treatment; not the same as 'pure' water which does not exist in nature. Raw water is water that is in a drinking-water system or in plumbing that has not been treated in accordance with: (a) the prescribed standards and requirements that apply to the system, or (b) such additional treatment requirements that are imposed by the license or approval for the system.

Raw Water Supply - water outside a drinking water system that is a source of water for the system (see source water).

Recharge Area - an area in which water infiltrates and moves downward into the zone of saturation of an aquifer; area that replenishes groundwater.

Recharge Zone - the area of land, including caves, sinkholes, faults, fractures and other permeable features, that allows water to replenish an aquifer. This process occurs naturally when rainfall filters down through the soil or rock into an aquifer.

Regulated Area - is the area near a watercourse which is subject to Conservation Authority regulations (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation).

Reserve Amounts - minimum flows in streams that are required for the maintenance of the ecology of the ecosystem.

Reservoir - a water body, either natural or artificial, for the storage, regulation and control of water. Large bodies of groundwater are called groundwater reservoirs or aquifers; water behind a dam is also called a reservoir.

Riparian - situated along the bank of a stream or other body of water.

Riparian Area - the area that lies as a transition zone between upland areas such as fields and streams, wetlands, lakes, rivers, etc. The zone is intermittently inundated and usually supports wet meadow, marshy or swampy vegetation, and prevents erosion or scouring of a structure or embankment.

Riparian Buffers - a relatively narrow strip of land that borders a stream or river, often coincides with the maximum water surface elevation of the one-hundred year storm.

Risk - the likelihood of a drinking water threat: (a) rendering an existing or planned drinking water source impaired, unusable or unsustainable, or; (b) compromising the effectiveness of a drinking water treatment process, resulting in the potential for adverse human health effects.

River - a natural stream of water of considerable volume.

River and Stream System - a system that includes all watercourses, rivers, streams and small inland lakes (lakes with a surface area of less than 100 square kilometres) that have a measurable and predictable response to a single runoff event.

River Basin - a term used to designate the area drained by a river and its tributaries.

Root Zone - the depth of soil penetrated by crop roots.

Runoff - the portion of precipitation which is not absorbed by the ground surface and finds its way into surface stream channels and becomes the flow of water from the land to oceans or interior basins by overland flow and stream channels.

Runoff-Direct - the sum of surface runoff and interflow.

Runoff-Total - includes the sum of surface runoff (overland flow), baseflow, and interflow that moves across or through the land and enters a stream or other body of water.

Safe Drinking Water Act - the “*Safe Drinking Water Act, 2002*” provides for the protection of human health and prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing.

Saturation - occurs when all pore spaces in a soil are filled with water.

Saturation Zone - the portion that’s saturated with water is called the zone of saturation. The upper surface of this zone, open to atmospheric pressure, is known as the water table (phreatic surface).

Scarps – a steep slope, especially one formed by erosion or faulting (escarpment).

Scour - removal of soil material by waves and currents especially at the base or toe of a shore structure or bluff.

Sediment - transported and deposited particles derived from rocks, soil or biological material. Sediment is also referred to as the layer of soil, sand and minerals at the bottom of surface water, such as streams, lakes and rivers.

Sedimentary Peat - peat that is formed beneath a body of standing water. It is primarily derived from aquatic mosses, plant and algae. The material is slightly sticky, dark brown to black and is usually well decomposed (humic).

Sedimentation - silt and other suspended particles in a stream settling to the bottom. A natural river line process that creates point bars.

Seepage - the appearance and disappearance of water at the ground surface. Seepage designates the type of movement of water in saturated material. It is different from percolation, which is the predominant type of movement of water in unsaturated material.

Semi-Permeable - partially permeable.

Semi-Quantitative - an approach or methodology that uses measurable or ranked data, derived from both quantitative and qualitative assessments, to produce numerical values for articulating results.

Sensitivity Analysis - evaluates the effect of changes to input values or assumptions on a model's results.

Septic System (Conventional) - used to treat household sewage and wastewater by allowing solids to decompose and settle in a tank, then flow by gravity or pump/siphon to a drainage or tile field for soil absorption.

Serviced Area – area where municipal water and/or sewage systems are provided by a local board or municipality.

Setback Requirement - a distance measured inland from an edge of a slope or watercourse where construction is prohibited except for purpose of erosion, flood or pollution control.

Significant Groundwater Recharge Area - an area in which (a) there is a high volume of water moving from the surface into the ground and (b) groundwater serves either as source water or the water that supplies a coldwater ecosystem such as a brook trout stream.

Significant Threat Policy - defined in the Act to mean: (a) a policy set out in a source protection plan that, for an area identified in the assessment report as an area where an activity is or would be a significant drinking water threat, is intended to achieve an objective referred to in paragraph 2 of subsection 22 (2), or (b) a policy set out in a source protection plan that, for an area identified in the assessment report as an area where a condition that results from a past activity is a significant drinking water threat, is intended to achieve the objective of ensuring that the condition ceases to be a significant drinking water threat.

Snow Course - an established, standard course of stations where the water content of the average snowpack can be determined; used to forecast spring flooding potential.

Snow Cover - a general term for the presence of snow on the surface of a watershed. Use of the term should include acknowledgement of the area and temporal variation of snowpack amounts on the watershed surface.

Snow Depth - the vertical distance between the upper surface of a snowpack and the ground surface beneath.

Snowfall - the amount of snow, hail, sleet or other precipitation occurring in solid form which reaches the earth's surface. It may be expressed in depth in inches after it falls, or in terms of inches or millimetres in depth of the equivalent amount of water.

Snowmelt - conversion of water from solid (ice) to liquid in the snowpack.

Snowpack - the seasonal accumulation of snow on the ground surface.

Snow Water Equivalent (also equivalent water content, or total water content) - depth of water layer produced, after melting of snow at a given place.

Soil Moisture - water diffused in the soil and remaining as a measurable quantity, as the volume of water divided by the total volume.

Soil Moisture Storage - water diffused in the soil. It is found in the upper part of the zone of aeration from which water is discharged by transpiration from plants or by soil evaporation.

Source Area - an area of land which absorbs and transmits surface and groundwater into nearby streams.

Source Protection Area - those lands and waters that have been defined under Ontario Regulation 284/07 as the "study area" for an Assessment Report and a Source Protection Plan under the "*Clean Water Act, 2006*".

Source Protection Authority - A Conservation Authority or other person or body that is required to exercise powers and duties under the "*Clean Water Act, 2006*".

Source Protection Committee - a group of individuals who have been appointed under the "*Clean Water Act*" by a Source Protection Authority to coordinate Source Protection Planning activities for a Source Protection Area. The North Bay-Mattawa Source Protection Committee is composed of a provincially appointed Chair plus nine other members who were appointed from within the watershed by the North Bay-Mattawa Source Protection Authority.

Source Protection Plan - a document that is prepared by a Source Protection Committee under Section 22 of the "*Clean Water Act, 2006*" (and a forthcoming regulation) to direct Source Protection activities in a Source Protection Area. Each Source Protection Plan is approved by the Minister of the Environment.

Source Protection Region - two or more Source Protection Areas that have been grouped together under Ontario Regulation 284/07.

Source Water - untreated water in streams, rivers, lakes or underground aquifers which is used for the supply of raw water for drinking water systems (see raw water supply).

Source Water Protection - action taken to prevent the pollution and overuse of municipal drinking water sources, including groundwater, lakes, rivers and streams. Source water protection involves developing and implementing a plan to manage land uses and potential contaminants.

Specific Conductance - a measure of conductivity of liquids.

Spring Runoff - snow melting in the spring causes water bodies to rise. This, in streams and rivers, is called "spring runoff".

Static Water Level - the water level in a well that is not being pumped or influenced by pumping.

Storm - a change in the ordinary conditions of the atmosphere, which may include any or all meteorological disturbances such as wind, rain, snow, hail or thunder.

Stormwater Management - planning for the effective discharge of stormwater without causing harmful effects on surface features, river levels or water quality.

Stratification – formation or deposition of layers, as of rocks or sediments, or a layered configuration. Also may be used to describe the process of hydrological layering (of warmer water over colder water in a lake system).

Stream - a general term for a body of flowing water. In hydrology , the term is generally applied to the water flowing in a natural channel as distinct from a canal. More generally, it is applied to the water flowing in any channel, natural or artificial.

Some types of streams are: 1. Ephemeral: A stream which flows only in direct response to precipitation, and whose channel is at all times above the water table. 2. Intermittent or seasonal: A stream which flows only at certain times of the year when it receives water from spring(s) or rainfall, or from surface sources such as melting snow. 3. Perennial: A stream which flows continuously. 4. Gaining: A stream or reach of a stream that receives water from the zone of saturation . 5. Insulated: A stream or reach of a stream that neither contributes water to the zone of saturation nor receives water from it.

Stream Flow - the discharge that occurs in a natural channel. The term streamflow is more general than runoff , as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Stream Flow Indicators - gauges in streams measure stream flow and are used to provide indicators to show there is enough stream flow in the river to meet basic needs of the ecosystem and to show that water is available for other uses such as recreation, hydropower generation or irrigation. One stream flow indicator will be used, percentage of lowest average summer month flow. The average monthly flow for July, August and September for the stream flow station is determined and the lowest of these 3 values is the lowest average summer month flow. Monthly flow for each stream-gauge station will be compared with the lowest average summer month flow for the station to determine the stream flow indicator.

Stream Flow Indicator Graph - each month the average flow in cubic meters per second (m³/sec) for that month is plotted on a 1 year graph.

Stream Gauge - a measuring device for water elevation at selected points; the water elevation is then changed into flow measurements by the use of a conversion table.

Sub-Catchment - secondary or subordinate area for catching water, reservoir or basin developed for flood control or water management.

Subwatershed - a watershed subdivision of unspecified size that forms a convenient natural unit.

Surface Runoff (overland flow) - precipitation that cannot be absorbed by the soil because the soil is already saturated with water (soil capacity); precipitation that exceeds infiltration; the portion of rain, snow melt, irrigation water, or other water that moves across the land surface and enters a wetland, stream, or other body of water (overland flow). Overland flow usually occurs in urban settings (pavement, roofs, etc.) or where the soils are very fine textured or heavily compacted.

Surface to Well Advection Time (SWAT) - the average time required by a water “particle” to travel from a point at the ground surface to the well, including both vertical and horizontal movement.

Surface Water - all water above the surface of the ground including, but not limited to lakes, ponds, reservoirs, artificial impoundments, streams, rivers, springs, seeps and wetlands.

Surface Water Intake Protection Zone (IPZ) - the contiguous area of land and water immediately surrounding a surface water intake, which includes: the distance from the intake; a minimum travel time of

the water associated with the intake of a municipal residential system or other designated systems, based on the minimum response time for the water treatment plant operator to respond to adverse conditions or an emergency; the remaining watershed area upstream of the minimum travel time area (also referred to as the Total Water Contributing Area), applicable to inland water courses and inland lakes only.

Surficial (Geology) – pertaining to or occurring on or near the earth’s surface.

Sustainable Development - development that meets the needs of the present without compromising the ability of future generations to meet their own and future needs.

Swamp - wooded mineral wetland or peatland with standing or gently flowing water in pools or channels, or subsurface flow. The water table may drop below the rooting zone of vegetation, creating aerated conditions at the surface. The substrate is often woody, well decomposed peat, or a mixture of mineral and organic material. Vegetation includes deciduous or coniferous trees or shrubs, herbs and mosses.

Systems Serving Designated Facilities - drinking water systems that serve designated facilities such as schools (elementary and public), universities, colleges, children and youth care facilities (including day nurseries), health care facilities, children’s camps and delivery agent care facilities (including certain hostels).

Table of Drinking Water Threats - a document released by the MOE that contains a listing of all potential threat activities and circumstances under which these activities may be considered to be significant, moderate or low risks to water supply sources in the province of Ontario.

Targets - in the context of draft technical guidance documents, targets are detailed goals that are often expressed as numeric goals (e.g., to reduce contaminant X in this aquifer by X per cent by 2112).

Terms of Reference - the work plan and budget, as approved by the Minister of Environment, for the preparation of Assessment Report and Source Protection, as defined by the “Clean Water Act”. The Terms of Reference outlines the responsibilities assigned to the Source Protection Committee, Source Protection Authority, Conservation Authority and Member Municipalities in each Source Protection Area, in order to produce the Assessment Report and Source Protection Plan.

Thorntwaite Method - a method to estimate soil water budget, based on air temperature, latitude and date.

Threat Assessment - Tier 1 - preliminary examination of drinking water threats based on readily accessible information.

Threat Assessment - Tier 2 - advanced examination of drinking water threats through accessing more detailed information, interviews and perhaps when warranted, additional monitoring, modeling or studies.

Threat Policies - policies in a source protection plan that address a drinking water threat of any risk level (significant, moderate or low), including policies that address activities and conditions.

Tier 1, 2 and 3 Water Budgets - numerical analysis at the watershed (Tier 1), subwatershed (Tier 2) or local (Tier 3) level considering existing and anticipated amounts of water taken from the watershed, as well as quantitative flow between components such as recharge/discharge areas and rates.

Till - glacier deposits composed primarily of unsorted sand, silt, clay and boulders laid down directly by the melting ice.

Time Lag - the time required for processes and control systems to respond to a signal or to reach a desired level. (Also referred to as lag time.)

Time of Travel - the length of time it takes groundwater or surface water to travel a specified horizontal distance. For the purposes of Source Protection Planning, a timeframe of 2, 5 and 25 years is used for groundwater and a 2 hour timeframe is used for surface water.

Topography - the contour of the land surface; the configuration of the land surface including its relief and the position of its natural and man-made features.

Total Water Contributing Area - the area around a water source that includes all the surface and groundwater that provides recharge to that water source. The total water contributing area can be calculated for an entire watershed or on a sub-watershed basis.

Transmissivity – the capacity of a material to transmit radiant energy.

Transpiration - the process by which plants take up water through their roots and then give off water vapour through their leaves (open stomata). This water then enters the atmosphere.

Transport Pathways - any structure of land alteration or condition resulting from a naturally occurring process or human activity which would increase the probability of a contaminant reaching a drinking water source.

Transportation Corridors – established vehicle infrastructure, including roadways, highways and railways, which have the potential to be routes for transporting commercial loads of hazardous chemicals or other anthropogenic substances, including waste.

Tributary - any stream that contributes water to another water body.

Trophic State – measure of nitrogen, phosphorous, and other biologically useful nutrients which are present in a Lake.

Turbidity - a measure of water cloudiness caused by suspended solids.

Turnover (mixing) – an in-lake process brought on by a cooling of the upper water layer, especially in a deep body of water, which makes the layer more dense and heavier. This heavier layer will gradually sink, displacing the lower level which is forced to rise.

Type I, Type II and Type III Systems - water supply systems as described in the *Clean Water Act*, 2006. Type I systems are municipal residential drinking water systems that serve a major residential development (15(2)(e)(ii)). Type II systems are water supply systems that have been included in the Source Protection Planning process by Municipal or Band Council Resolution (15(2)(e)(iii)). Type III systems are water supply systems that are included in the Source Protection Process by the Minister of Environment (15(2)(e)(iv)).

Ultraviolet Disinfection - commonly used, non-chemical method of disinfection by applying ultraviolet light (UV) to water. UV rays are able to destroy bacteria, parasite cysts and most viruses in water that is free of large particles, turbidity and colour.

Unconfined Aquifer (water table aquifer) - an aquifer with continuous layers of permeable soil and rock that extends from the land surface to the base of the aquifer. The water table forms the upper boundary of the aquifer and is directly affected by atmospheric pressure.

Undercutting - erosion of material at the foot of a cliff or bank.

Unstable Slopes - banks or sloping land with the potential for landslides or slumping due to steepness of the slope, erosion at the bottom, type of soil or proposed use of the land.

Vertical Hydraulic Conductivity - vertical measure of the ratio of flow velocity to driving force for viscous flow under saturated conditions of a specified liquid in porous medium.

Vulnerable Area - areas related to a water supply source that are susceptible to contamination and for which it is desirable to regulate or monitor drinking water threats that may affect the water supply source. Vulnerable areas are (a) a significant groundwater recharge area, (b) a highly vulnerable aquifer, (c) a surface water intake protection zone, or (d) a wellhead protection area.

Waste Disposal Site - any land upon, into, in or through which, or building or structure in which waste is deposited, disposed of, handled, stored, transferred, treated or processed, and any operation carried out or machinery or equipment used in connection with the depositing, disposal, handling, storage, transfer, treatment or processing of the waste (*Environmental Protection Act*, R.S.O. 1990).

Water Balance - the accounting of water input and output and change in storage of the various components of the hydrologic cycle .

Water Budget - a description and analysis of the overall movement of water within each watershed in the Source Protection Area, taking into consideration surface water and groundwater features, land cover (e.g. proportion of urban versus rural uses), human-made structures (e.g. dams, channel diversions, water crossings), and water takings.

Water (Hydraulic) Conductivity - a property of plants, soil or rock that describes the ease with which water can move through pore spaces or fractures.

Watercourses - depressions formed by runoff moving over the surface of the earth; any natural course that carries water.

Water Cycle (Hydrologic Cycle) - the continuous circulation of water from the atmosphere to the earth and back to the atmosphere including condensation, precipitation, runoff, groundwater, evaporation, and transpiration.

Water Diversion - redirecting part of a stream flow to a location where the water will be used (e.g. to a site where it is convenient to build a water treatment plant).

Water Quality - a term used to describe the chemical, physical and biological characteristics of water, usually in respect to its suitability for a particular purpose, such as drinking.

Watershed - the land area from which surface water and groundwater drains into a stream system; the area of land that generates total runoff (surface flow, interflow, and baseflow) for a particular stream system. Also referred to as drainage area, basin or catchment area for a watercourse.

Watershed Characterization - a characterization of the physical geography and human geography of the watershed and the characterization of the interactions between the physical geography and human geography.

Water Supply - any quantity of available water.

Water Table - the point where the unsaturated zone meets the zone of saturation is known as the water table. Water table levels fluctuate naturally throughout the year based on seasonal variations and are the reason why some wells go dry in the summer. In addition, the depth to the water table varies. For example, in (select an area in the watershed or community) the water table is “x” metres below the surface. The water table is the surface below which the soil is saturated with water.

Water Table Aquifer - an aquifer whose upper boundary is the water table; also known as an unconfined aquifer.

Water Table Contour - a line in a groundwater map that connects points of equal groundwater elevation.

Weir - a small dam, often temporary and removable, which raises the water level upstream for aesthetic, recreational or industrial uses.

Well - a vertical bore hole in which a pipe-like structure is inserted into the ground in order to discharge (pump) water from an aquifer.

Wellhead - the structure built above a well.

Wellhead Protection Area (WHPA) - the surface and subsurface area surrounding a water well or well field that supplies a municipal residential system or other designated system through which contaminants are reasonably likely to move so as to eventually reach the water well or wells. Wellhead Protection Area (WHPA) is the surface and subsurface area within which the Municipal well's groundwater sources are vulnerable to surface threats.

Well Yield - the volume of water that can be pumped from a well during a specific period.

Wetlands - lands such as a swamp, marsh, bog or fen (not including land that is being used for agricultural purposes and no longer exhibits wetland characteristics) that, (a) is seasonally or permanently covered by shallow water or has the water table close to or at the surface, (b) has hydric soils and vegetation dominated by hydrophytic or water-tolerant plants, and (c) has been further identified, by the Ontario Ministry of Natural Resources (MNR) or by any other person, according to evaluation procedures established by the Ontario Ministry of Natural Resources , as amended from time to time.

Wetland Complex - an area consisting of several kinds of wetlands potentially including open water marsh, marsh, swamp, bogs and fens.

Withdrawal - the removal or taking of water from surface water bodies or groundwater sources.

Winter Drawdown - the water level reduction in a lake or reservoir during the winter.

Yield - the quantity of water expressed either as a continuous rate of flow (cubic feet per second, etc.) or as a volume per unit of time. It can be controlled for a given use, or uses, from surface water or groundwater sources in a watershed.

Zone of Aeration (vadose zone or unsaturated zone) - the zone between the land surface and the water table in which the pore spaces between soil and rock particles contain water, air, and/or other gases.

Zone of Saturation (saturated zone) - the zone in which the pore spaces between soil and rock particles are completely filled with water. The water table is the top of the zone of saturation. Water in the zone of saturation is called groundwater.