

Source Water Protection 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.

Ablation - the process by which a glacier decays; the zone of ablation is the part of a glacier where melting exceeds accumulation of snow and ice.

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

Accepted Engineering Principles - those current engineering principles, methods and procedures that would be judged by a peer group of qualified engineers (by virtue of their training and experience), as being reasonable for the scale and type of project being considered, the sensitivity of the location, and the potential threats to life and property.

Accepted Geotechnical Principles - those current geotechnical engineering principles, methods and procedures that would be judged by a peer group of qualified engineers (by virtue of their training and experience), as being reasonable for the scale and type of project being considered, the sensitivity of the location, and the potential threats to life and property.

Accepted Scientific Principles - those current principles, methods and procedures, which are used and applied in disciplines such as geology, geomorphology, hydrology, botany and zoology, and would be judged by a peer group of qualified specialists and practitioners (by virtue of their training and experience), as being reasonable for the scale and type of project being considered, the sensitivity of the location, and the potential threats to life and property.

Acid Rock - an igneous rock containing at least 66 percent silica.

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.

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.

Aeolian - pertaining to the erosive and transporting action of the wind, or to sediments that have been transported and deposited by wind action.

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.

Alluvium Sediments - 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.

Amphiboles - rock forming minerals of complex composition. Hydrous silicates, usually with aluminum, calcium, iron and magnesium.

Andalusite - a polymorph with two other minerals; kyanite and sillimanite, from the silicate family. A polymorph is a mineral that shares the same chemistry but a different crystal structure with another, or other minerals. A unique variety of andalusite is called "chiastolite". It contains black or brown clay and/or carbonaceous material included in the crystal. These inclusions are arranged in regular symmetrical shapes.

Animal Husbandry - animal husbandry is the agricultural practice of breeding and raising livestock. The science of animal husbandry, called animal science, is taught in many universities and colleges around the world.

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.

Apiaries - a place where honey bees are kept, usually for the purpose of breeding and honey production, but sometimes to aid the pollination of seed and fruit crops.

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.

Aquifuge - a geologic formation which has no interconnected openings and cannot hold or transmit water.

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.

Archean Volcanics - older Precambrian rocks formed from ancient volcanic activity.

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.

Aromatic Hydrocarbons - the major group of cyclic petroleum hydrocarbons such as benzene and toluene that are moderately soluble in water and are generally highly toxic to aquatic organisms.

Artesian Aquifer - an aquifer that contains water under pressure resulting in a hydrostatic head, which stands above the local water table or above the ground level. For artesian conditions to exist, an aquifer must be overlain by a confining material and receive a supply of water.

Artesian Well – a well located in an artesian aquifer that will flow upwards without the need for pumping.

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.

Assimilative Capacity - the capacity of a body of water to receive waste waters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water.

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.

Barbel - a whisker-like sense organ of certain fishes, including catfish and carp. These fish use their barbels to "feel" along the bottom for food.

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/streams, 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 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.

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.

Biosphere - all living organisms (plant and animal life).

Biotransformation - conversion of a substance into other components by organisms; includes biodegradation.

Bluff (Great Lakes-St. Lawrence River system and large inland lakes) - those actions of the shoreline formed in non-cohesive or cohesive sediments where the land rises steeply away from the water such that the elevation of the top of the slope above the base or toe of the slope is greater than two metres and the average slope angle exceeds 1:3 (=18 degrees).

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.

Calcareous - soil, chalky in appearance, containing calcium carbonate or magnesium carbonate.

Calcite - a vein and rock-forming mineral having the composition of calcium carbonate.

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.

Capillary Fringe - saturated zone immediately above the water table where saturation is maintained by capillary forces exerted within soil pores.

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 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).

Carbonate Rock - a rock made up largely of carbonate minerals.

Chalcopyrite - an ore mineral of copper, the chemical formula for which is CuFeS_2 .

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.

Channel Configuration - the type or morphology of a river or stream channel as determined by the interaction of a number of channel related factors, including width, depth, shape, slope and pattern.

Channel Improvements - the improvement of the flow characteristics of a channel by clearing, excavation, realignment, lining, or other means, in order to increase its capacity to carry water.

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.

Chert - when qualifying as mineral, a chert is considered a cryptocrystalline type of quartz whose matrix is indiscernible under the microscope. As rocks, cherts are silicon-based and have different colors made of micro-organisms or precipitated silica grains.

Chert-Carbonate - a sedimentary rock in which layers of carbonate minerals alternate with layers of chert.

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.

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.

Cliff - those sections of the shoreline normally formed in bedrock where the land rises steeply away from the water such that the elevation of the top of the slope above the base or toe of the slope is greater than two metres and the average slope angle exceeds 1:3 (=18 degrees).

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

Coal Tar - a viscous liquid mixture of hydrocarbon compounds obtained as a by-product in the production of coke (a solid coal product with a high pure carbon content used as fuel in iron ore smelting) by destructive distillation of coal in cooking ovens. While some medicinal ointments contain small amounts of coal tar for the treatment of skin problems, some of its components are known to be carcinogenic.

Colluvium - a heterogeneous mixture of minerals that has reached its present position as a result of direct, gravity-induced movement, usually associated with steep slopes.

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.

Condensation - the process by which water or other liquids change from gas vapour to a liquid; process that occurs when water droplets form on surfaces or around the nuclei of a particle.

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.

Conglomerate (also referred to as Puddingstone) - the hard compacted equivalent of a sedimentary deposit, made up of pebbles and boulders in a matrix of sand, silt or clay.

Conservation - the wise use of natural resources.

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.

Conservation Lands - lands which are considered to be regionally significant, such as valleys or environmentally sensitive areas, and are best managed by a public agency to retain their natural characteristics.

Conservation Strategy - an overall policy and development statement covering all aspects of a Conservation Authority's work; updated regularly.

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.

Contaminant Plume - a term used to describe a mass of contamination moving underground.

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.

Critical Flood Depth and Velocity - a maximum depth and velocity of flooding water in a floodplain such that further increases in depth and/or velocity may result in threats to life and property damage.

Cubic Feet per Second (cfs) - the volume of water in cubic feet (one foot X one foot X one foot) that passes a given point in one second of time; U.S. Geological Survey uses this measurement in reporting stream flow values. Cubic meters per second are commonly used in countries employing the metric system.

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.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) - chemicals similar to DDT. Both are metabolites of

DDT. DDE has no commercial use. DDD was used to kill pests, but its use as a pesticide has since been banned in North America.

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.

Delta - a low, nearly flat accumulation of sediment deposited at the mouth of a river or stream, commonly triangular or fan-shaped.

Deltaic - an alluvial deposit formed where a stream or river drops its sediment load upon entering a quieter body of water.

Deltaic or Stratified Drift Deposits - all drift deposits originate as an accumulation of glacial material. Deltaic drift deposits originate as an alluvial deposit, usually triangular in shape, at the mouth of a river. Stratified drift exhibits both sorting and stratification, implying deposition from a fluid medium such as water and air. An alluvial deposit formed where a stream or river drops sediment load upon entering a quieter body of water.

Dendritic ("treelike") - resembles the pattern of branches and twigs that you can see in any deciduous tree, such as a maple or an elm. This pattern develops when streams flow over rocks that are fairly uniform in their resistance to erosion. Because streams can cut as easily in one place as another, their actual network pattern is the result of random flow.

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*".

Detritus – particulate organic material suspended in water or intermixed with soil.

Developed / Developable - reference to the useable portion of a parcel of land that meets the regulatory zoning provisions, particularly those pertaining to defining the area of occupation for buildings, structures, facilities and infrastructure.

Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation - a set of provincially-approved laws administered by the Conservation Authority which restrict the filling, construction of buildings or alterations to the waterways within the identified flood plain.

Diabase - a slightly metamorphosed medium-grained basic igneous rock having the composition of gabbro and usually characterized by the presence of lath-shaped feldspar crystals.

Dike (Dyke) - a tabular mass of igneous rock extending obliquely or transversely across older rocks. Can also be a manmade structure, either a wall or earth mound built around a low-lying area to prevent flooding.

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.

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

Dolomite - a vein and rock-forming mineral having the composition of calcium, magnesium and carbonate. Also a sedimentary rock made up largely of the mineral dolomite.

Dolostone - a sedimentary carbonate rock that contains a high percentage of the mineral dolomite. It is usually referred to as dolomite rock or as magnesium limestone. Most dolostone formed as a magnesium replacement of limestone or lime mud prior to lithification. It is resistant to erosion and can either contain bedded layers or be unbedded. It is less soluble than limestone in weakly acidic groundwater, but it can still develop solution features over time. The term dolostone was introduced to avoid confusion with the mineral dolomite.

Downgradient - a term used in hydrogeology to describe a point at a lower hydraulic head.

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 Water - water which has been collected by a gravity drainage or dewatering system.

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 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.

Drinking Water Works Permit (DWWP) - permit to establish or alter a municipal residential drinking water system (the DWWP and licence will replace the certificates of approval).

Drought - 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.

Drumlin - an elongated mound of glacial sediment deposited parallel to ice flow.

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

Dynamic Balance or Nature - a system that is continuously altering itself to adjust to constant changes of its component parts.

Easement - a legal right to cross over and work on someone else's property for a specific purpose.

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

Ecosystem Approach - a holistic way of planning and managing natural resources; it means that the consequences of an action (including the cumulative effect of many small actions) on all other parts of the ecosystem will be considered and evaluated before the action is undertaken.

Effective Precipitation - the part of precipitation which produces runoff; a weighted average of current and past precipitation correlating with runoff. It is also that part of the precipitation falling on an irrigated area which is effective in meeting the requirements of consumptive use.

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

End Moraine (Terminal Moraine) - a linear, slightly curved ridge of rocky debris deposited at the front end, or snout, of a glacier. It represents the furthest point of advance of a glacier, being formed when deposited material (till), which was pushed ahead of the snout as it advanced, became left behind as the glacier retreated.

Entity - one or a series of related objects, natural or anthropogenic, that may be related to a specific process. Examples: storage tank, bird colony, abandoned well, mine tailing, natural radiation source.

Environmental Bill of Rights, 1993 - a statute of Ontario that provides a number of legal rights and formal procedures for the public to participate in environmental decision-making.

Environmental Commissioner of Ontario - an Officer of the Legislative Assembly of Ontario with responsibility for monitoring government compliance with the Environmental Bill of Rights, 1993.

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.

Environmentally Sound - refers to those principles, methods and procedures involved in addressing the protection, management and enhancement of an ecosystem which are used in disciplines such as geology, geomorphology, hydrology, botany and zoology.

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.

Equipotential - a series of points of equal hydraulic head or elevation.

Era - a division of geological time of the highest order.

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.

Factor of Safety - the ratio of resistance or strength of a material or structure to the applied load. In geotechnical engineering, it refers to the ratio of the available shear strength to shear stress on the critical failure surface.

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

Felsic - a term used to describe a characteristically light-coloured silicate mineral such as quartz or feldspar.

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.

Fibric - the least decomposed of all organic materials, usually with a large amount of well-preserved organic fibre that can be identified as to its biological origin.

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.

Fill Line - now referred to as the Approximate Regulated Area as noted in the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation. It is a line that may take into account the flood line and any characteristic of the adjacent lands which makes them inappropriate for traditional development (e.g. unstable slopes or soils, environmentally sensitive areas, unique habitats, etc.).

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.

Financial Plan - in order to receive a Municipal Drinking Water Licence, a municipal residential drinking water system will need to have a financial plan as required under the Financial Plans Regulation (O. Reg. 453/07).

Floating Mat - a mat of peat held together by roots and rhizomes underlain by loose peat, fluid or water.

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.

Flood Allowance - the upper portion of an absolute operating range that would be used if water were abnormally high. This would normally go up to the maximum legislated elevation of the lake.

Flood Damage Reduction - any combination of structural and non-structural additions, changes or adjustments to existing flood vulnerable structures which reduce or eliminate flood damage.

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.

Flood-Proofing - the installation of structural or other adjustments to properties subject to flooding in order to reduce flood damages.

Flood Risk - the probability of a flood event occurring.

Flood Warning System - a service provided by Conservation Authorities to member municipalities forewarning of potential flooding situations.

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 Line - The general path that a particle of water follows under laminar flow conditions. Line indicating the direction followed by groundwater toward points of discharge. Flow lines generally are considered perpendicular to equipotential lines.

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.

Forage - herbaceous plants or plant parts fed to domestic animals.

Forebay - impoundment immediately upstream from a dam or waterpower facility. See also: Headpond.

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.

Freedom of Information and Protection of Privacy Act - the “*Freedom of Information and Protection of Privacy Act*” (FIPPA) was created for the following purposes: To provide a right of access to information under the control of institutions in accordance with the principals that information should be available to the public, necessary exemptions from the right of access should be limited and specific, and decisions on the disclosure of government information should be reviewed independently of the government. To protect the privacy of individuals with respect to personal information about themselves held by institutions and to provide individuals with a right of access to that information (R.S.O. 1990, c.F31, s1.)

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).

Gabbro - a coarse textured igneous rock, having the same composition as basalt but occurring as dikes and sills.

Gabion Basket - a rectangular or cylindrical wire mesh cage filled with rock and used as an erosion control structure.

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.

Goals - high-level achievements for which to aim (e.g. to protect drinking water sources). Provides an opportunity to add value statements.

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.

Great Lakes Basin Water Resources - refers to the Great Lakes and all other bodies of water (streams, rivers, lakes, connecting channels, tributary groundwater) within the Great Lakes Basin.

Greenstone - an altered or metamorphosed basic igneous rock, usually basalt, rich in greenish minerals such as chlorite and some amphiboles.

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.

Habitat Improvement - the purposeful alteration of the land and vegetation to encourage wildlife use of an area.

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.

Headpond - impoundment immediately upstream from a dam or waterpower facility. See also: Forebay.

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.

Herpetofauna, or "Herps," - amphibians and reptiles.

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 overlying layers, or; b) by preferential pathways to the aquifer.

Hornblende - a variety of amphibole, dark green or black in colour.

Hornblende Schist - a schistose or foliated metamorphic rock having a high content of hornblende.

Humic - highly decomposed organic material with small amounts of vegetative fibres present, which can be identified as to their biological origin.

Humification - the soil forming process that transforms plant tissues into organic matter, on or in soil.

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.

Hydrodynamic Parameters - of or relating to the force or pressure of water or other fluids.

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.

Hydrogeologist - a person who works with and studies groundwater.

Hydrogeology - the study of the interrelationships of geologic materials and hydraulic processes.

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.

Hydrosphere - water held in oceans, rivers, lakes, glaciers, groundwater, plants, animals, soil and air.

Hydrostratigraphic - a term used to describe a geological unit with similar hydrogeological parameters.

HYMO - a computer model that computes runoff and soil loss from precipitation and basin characteristics.

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

Ice Monitoring - a system of measuring and recording the type, thickness and condition of ice and snow cover on local rivers; carried out regularly at pre-determined stations to gather data on ice jamming and ice jam forecasting.

Igneous - rocks produced under intense heat associated with volcanic activity.

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

Imminent Threat to Health - a contaminant of concern that can affect human health in a short period of time.

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.

Integrated Resource Management - management of natural resources (water, trees, soil, wildlife) in a comprehensive, co-ordinated, cost-effective way; usually done on a watershed basis with the goal of ensuring that the resource base does not deteriorate.

Interbedded Argillites - argillite is a type of rock having a higher degree of induration (cementation of hardness) than mudstone but less than shale.

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.

Interlobate Moraine - if large glaciers and continental ice sheets advance irregularly so that their margins are lobate, when the margins retreat by melting the resulting terminal moraines of boulders, clay and sand simulate the original interlobate shape of the glacier or glaciers, therefore such moraines are called interlobate moraine.

Intermediate Facility - a generating station that operates as a peaking facility when river flows and available storage permit, otherwise it operates as a run-of-the-river system.

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.

Irrigation Return Flow - the part of artificially applied water that is not consumed by evapotranspiration and that migrates to an aquifer or surface water body.

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

Kame-like - like a conical hill or short irregular ridge of gravel or sand deposited in contact with glacial ice.

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.

Karst Formations - limestone regions where underground drainage has formed cavities and passages that cave in, causing craters on the surface. The name comes from the karst, a limestone region along the northern Adriatic coast in the former Yugoslavia.

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.

Kyanite - a polymorph with two other minerals; andalusite and sillimanite, from the silicate family. A polymorph is a mineral that shares the same chemistry but a different crystal structure with another, or other, minerals. Kyanite is an attractive mineral that has a near sapphire like blue color in some especially nice specimens. Kyanite has a unique characteristic in that it has a wide variation in hardness in the same crystal.

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.

Lakeward - a perspective from the land towards the lake or river.

Landbase - a general term for the environment of the earth not covered completely by water, often referring to a geographic area with common characteristics or defined boundaries.

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.

Landward - a perspective from the lake or river towards the land.

Largest Amplitude Meander - the meander with the largest measured amplitude in a meandering reach. Amplitude is measured mid-channel to mid-channel and is the horizontal distance perpendicular to the longitudinal axis between two bends in the fluvial system.

Late Wisconsinan Age - the later portion of the Wisconsin stage, which is the last of four classical glacial stages (Kansan, Nebraskan, Illinoian) in the Pleistocene of North America.

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

Leachate Impacted - area affected by leachate contamination.

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

Lepidolite - an uncommon mica. Lepidolite is an ore of lithium and forms in granitic masses that contain a substantial amount of lithium. The lithium content in lepidolite varies greatly.

Limestone - a sedimentary rock made up largely of the carbonate mineral calcite.

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.

Lithification - includes all the processes which convert unconsolidated sediments into solid sedimentary rocks. Essentially, lithification is a process of porosity destruction through compaction and cementation.

Lithologic - the composition and physical features of rocks.

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

Littoral Cell - a self-contained shoreline sediment system that has no movement of sediment across its boundaries. The alongshore limits are defined by natural formations or artificial barriers where the net sediment movement changes direction or becomes zero.

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.

Lotic - pertaining to flowing waters, such as streams and rivers.

Low Flow Augmentation - increasing low flows by releasing stored water to a stream; usually done during dry late summer weather to keep the water level in a river up to an acceptable level for other uses.

Low Plain (Great Lakes-St. Lawrence River system and large inland lakes) - those sections of the shoreline formed in non-cohesive or cohesive sediments where the land rises gently away from the water.

Luvizols - an order of soils that have a clay accumulation in the B horizon. These soils develop under forests or forest-grassland transition areas in a cool climate.

Mafic - term used to describe a characteristically dark-coloured subsilicic mineral, usually contrasted to felsic.

Magma - a hot mass of molten or partially molten rock constituents formed at high temperatures within the earth.

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.

Maximum Acceptable Concentration (MAC) - the term used for limits applied to substances above which there are known or suspected adverse health effects.

Meandering System - a dynamic system where semi-circular curves or bends develop in a fluvial system resulting from erosion of a sediment on the outer-bank and deposition of sediment on the inner-bank of the curves or bends. Erosion and deposition processes are themselves dynamic in response to channel configuration, hydraulic flow and sediment yield.

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.

Mesa - a flat-topped hill bounded on one or more sides by steep cliffs.

Mesic - organic material in an intermediate stage of decomposition. It contains intermediate amounts of organic fibre that can be identified as to its biological origin.

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.

Metasedimentary - partly metamorphosed sedimentary rock.

Metavolcanics - partly metamorphosed volcanic rocks.

Mica - a rock forming mineral that splits into thin sheets.

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 $1\mu\text{g/l}=1\text{ppb}$.

Migmatite - the same material as gneiss, but has been brought to melting or near-melting so that the veins and layers of minerals have become warped. In many cases the darker rock has been intruded by veins of lighter rock consisting of quartz and feldspar. This rock is classified as metamorphic.

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 $1\mu\text{g/l}=1\text{ppm}$.

Minerotrophic - referring to wetlands that receive nutrients from mineral groundwater in addition to precipitation by flowing or percolating water, indicating that nutrients are brought to the peat by water that has previously extracted them from a mineral soil.

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 Domain - the boundaries of a numerical model.

Model Evaluation - a comparison of model results with numerical data independently derived from experiments or observations of the environment.

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.

Model Verification - the examination (normally performed by the model developers) of the numerical technique in the computer code to ascertain that it truly represents the conceptual model and that there are no inherent numerical problems with obtaining a solution.

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.

Morphoedaphic Index (MEI) - the ratio of dissolved solids (measured as total dissolved solids, alkalinity, or conductivity) to mean lake depth; Morphoedaphic Index has been used to predict the total fish production, phytoplankton standing crop and total phosphorus concentration of lakes not subject to cultural eutrophication.

Multi-Variant Analysis - a statistical analysis technique in which multiple variables are analyzed separately to determine the contribution made by each variable to an observed result.

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.

Nephelene Syenite - a holocrystalline plutonic rock that consists largely of nepheline and alkali feldspar. The rocks are mostly pale colored, grey or pink, and in general appearance they are not unlike granites, but dark green varieties are also known.

Nitrate (NO₃) - a chemical formed when nitrogen from ammonia (NH₃), ammonium (NH₄) 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 (NO₂) - product in the first step of the two-step process of conversion of ammonium (NH₄) to nitrate (NO₃).

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.

Ombrotrophic - referring to areas that are entirely dependant on nutrients from rain.

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.

Open Water Marsh - standing or flowing water with emergent plant cover of less than 25%. Submergent and/or floating-leaved plant cover normally greater than 25%, but includes sites with lower submergent cover and sparse emergents. Permanently flooded or intermittently exposed. Includes shallow lakeshores, ponds, pools, oxbows and channels. Distinguished from deep water aquatic systems by mid-summer water depths of less than two metres.

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.

Outwash Sand - sand drift, which becomes deposited by melt-water streams.

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

Over-Withdrawal - withdrawal of groundwater over a period of time that exceeds the recharge rate of the supply aquifer.

Oxbow - a crescent-shaped lake or slough formed in an abandoned stream bend that has become separate from the main stream by a change in its course.

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.

Pathogenic Contaminant - a microscopic organism that is capable of producing infection or infectious disease in humans.

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 ($\mu\text{g}/\text{l}$).

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 ($\mu\text{g}/\text{l}$).

Parthenogenesis (parthenogenically) - in biology, a form of reproduction in which the ovum develops into a new individual without fertilization.

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).

Peatland - generic term to include all types of peat-covered terrain. Many peatlands are a complex of swamps, bogs, and fens, sometimes called a “mire complex”.

Perched Aquifer - a saturated zone within the zone of aeration that overlies a confining layer; a perched aquifer is above the main water table.

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.

Petalite - also known as castorite, is a lithium aluminum tectosilicate mineral which is a member of the feldspathoid group. Occurring in lithium-bearing pegmatites with spodumene, lepidolite, and tourmaline. Petalite is an important ore of lithium. It occurs as colorless, grey, yellow, yellow grey, to white tabular crystals and columnar masses.

Petrification - used to describe the replacement of organic material by minerals in the formation of fossils.

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.

Piezometer - a type of monitoring well that is used to measure the height of a column of fluid which is open only at the top and bottom of its casing.

Piezometric Surface - the imaginary surface that coincides with the head of the water in an aquifer.

Piping - the internal erosion and carrying away of fine material from within a soil as the result of a flow of water. It refers to the pipe-shaped discharge channel left by erosion which starts at the point of exit of a flow line which exits on the ground surface; typically beneath embankments or on slopes where perched groundwater may seep out.

Placer Mining - the extraction of non-aggregate minerals from sand and gravel or other loose, unconsolidated surface materials.

Plume - an underground pattern of contaminant concentrations created by the movement of groundwater beneath a contaminant source. Contaminants spread in the direction of groundwater movement. The spill/source site is the highest concentration, and the concentration decreases away from the source.

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

Plutonic Rock - an intrusive rock formed inside the earth.

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.

Pollution Plume - an underground pattern of contaminant concentrations created by the movement of groundwater beneath a contaminant source. Contaminants spread in the direction of groundwater movement. The spill/source site has the highest concentration, the concentration decreases as the plume moves away from the source. An area of a stream or aquifer containing degraded water resulting from migration of a pollutant.

Polymer - a compound whose matrix is an accumulation of millions of identical, interwoven patterns of molecules.

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.

Potentiometric Contour - elevation at the potentiometric surface.

Potentiometric Surface - a theoretical surface to which water in an aquifer can rise by hydrostatic pressure.

Profundal Zone - the part of a water body below the depth to which sunlight penetration can support aquatic plants.

Promontory - area of high land jutting out into the water.

Provincial Risk Management Catalogues - databases that will contain information on risk management measures (RMM) to reduce the risk that drinking water threats pose to source water.

Precambrian Era - an informal name for the eons of the geologic timescale that came before the current Phanerozoic eon. It spans from the formation of Earth around 450 million years ago (Ma) to the evolution of abundant macroscopic hard-shelled fossils, which marked the beginning of the Cambrian, the first period of the first era of the Phanerozoic eon, some 542 million years ago.

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.

Protozoa - a very diverse group comprising some 50,000 species that consist of one cell. Most of them are able to move on their own. Some are a health concern in drinking water.

Provincial Officer Order - an order issued by a Ministry of the Environment Provincial Officer to any person for contraventions of an Act administered by the Ministry of the Environment. Provincial officers may also issue preventative orders under the “*Safe Drinking Water Act, 2002*” where the provincial officer considers it necessary for the purposes of the *Act*.

Pukaskwa Pits - dish-shaped hollows in the ground created by the Paleo Indians.

Pulse Crops - crops grown for food for human or animal consumption and include field beans, field peas, lentils, soybeans and fababeans.

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).

Reach (river and streams) - a length of channel over which the channel characteristics are stable or similar. All geomorphological features and types of aquatic habitat should be proportionately represented in the section of the river or stream being assessed.

Receptor - the exposed target in danger of incurring a potential impact. An example would be any aquifer or surface water body used for drinking water consumption.

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.

Refined Oil - a product of distillation of crude oil into light or heavy components. Light refined oils include gasoline, kerosene, diesel oil and individual components such as benzene and toluene. Heavy refined oils include fuel oil Numbers 4 (heating oil), 5 and 6 (Bunker C).

Reforestation - the planting of trees, saplings or seedlings on land that has been cleared of trees in the past.

Regional Storm - the Regional Storm refers to a storm centred event on record that has the potential to occur over other watersheds in the general area. The Regional Storm in the Lakehead Source Protection Area is the Timmins Storm, which was an actual storm that occurred in 1961, that resulted in 193 mm of rainfall in 12 hours.

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).

Regulatory Limit - the area defined by the Conservation Authority for floodplain mapping purposes. Regulated areas are those areas for which Conservation Authorities delineate and restrict land uses by making regulations under subsection 28(1) of the

Conservation Authority Act. This subsection applies to water courses, streams, lakes, valleys, flood plains and wetlands in Ontario.

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.

Response Factor - typical factors affecting the response include dilution, rate of discharge, absorption, and degradation of the contaminant or pathogen in question. Because of the nature of the water resource, certain contaminants and pathogens may not have an impact (see definition) great enough to warrant concern or responsive action. The level of impact may not effectively degrade the water resource and therefore would not require a mitigative action.

Retrogressive Failure - an unstable slope condition whereby an initial small slip in slope material results in subsequent successive segments of the slope to continue to fail, or slide, in a short period of time.

Return Frequency - the statistical chance that a certain event will reoccur at the stated rate; for example, the 1:10 year flood is the most serious flood expected in any ten year period, but not necessarily once every ten years (it could occur twice or more times in a row and then not reoccur for several years); more accurately the 1:10 year event has a 10 percent chance of occurring in any given year.

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.

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.

Riparian Zone - the transitional zone between the forest and the water's edge and is situated along the bank of a stream or other body of water, and prevents erosion or scouring of a structure or embankment.

Rip-Rap - a layer of broken rock, cobbles, boulders, or fragments of sufficient size and thickness to resist the erosive forces of flowing water.

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.

Run-of-the-River Facility - generating station that generally has little forebay storage capacity and passes inflows through one or more turbines on a continuous basis. Any inflows that are greater than the station capacity must be passed through a spillway.

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.

Salt Water Intrusion - the process by which an aquifer is over-drafted, creating a flow imbalance within an area that results in salt water encroaching into the fresh water supply.

Sandspit - a small sandy point of land or a narrow shoal projecting into a body of water from the shore.

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).

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.

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.

Severity - the degree to which an impact is measured compared to an idealized value of some parameter of concern. In the case of water quality, the severity may relate to the degree of measurable exceedence of some contaminant or pathogen. In the case of water quantity, deviation from some measurable parameter (e.g. minimum annual flow, piezometric head or lake level) must also be established.

Shoreline Sediment Compartment - a shoreline sediment system which encompasses two littoral cells supplying depositional material to a common sink zone.

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.

Sillimanite - is one of three alumino-silicate polymorphs, the other two being andalusite and kyanite. A common variety of sillimanite is known as *fibrolite*, so named because the mineral appears like a bunch of fibres twisted together when viewed under thin section or even by the naked eye. Both the fibrous and traditional forms of sillimanite are common in metamorphosed sedimentary rocks.

Site-Level - the most refined scale at which technical assessment of hydrological and hydrogeological conditions can be conducted. These assessments may contribute to water budgets, vulnerability assessments, and issues evaluation.

Slope Stability - the ability of the slope to resist slumping or land sliding; generally, the steeper the slope the less stable it is, especially with a stream at the toe.

Slump - a failure and collapse of a slope causing massive land sliding to a lower level; a landslide.

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

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 Lakehead Source Protection Committee is composed of a provincially appointed Chair plus nine other members who were appointed from within the watershed by the Lakehead Source Protection Authority. The nine members of the Committee represent the watershed as the following: three municipal representatives - the City of Thunder Bay (2) and Municipality of Oliver Paipooonge (1); three economic/industry sector representatives - Thunder Bay Port Authority (1), forest industry(1) and agriculture industry (1); and three public members who represent education (1), tourism (1) and the general public (1). The Lakehead Source Protection Committee also includes one non-voting liaison representative from each of the following: the Lakehead Source Protection Authority, Thunder Bay District Health Unit and Ontario Ministry of the Environment. A First Nations Representative seat for an individual from Fort William First Nation remains vacant to date.

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.

Spodumene - occurs in lithium rich granites and pegmatites and is a pyroxene mineral consisting of lithium aluminum inosilicate and is a source of lithium. It occurs as colourless to yellowish, purplish or lilac kunzite yellowish-green or emerald-green hiddenite prismatic crystals, often of great size.

Spring - a place where groundwater naturally comes to the surface, resulting from the water table meeting the land surface.

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.

Stem Flow - water that is intercepted by vegetation and then runs down plant stems or tree trunks to the soil surface.

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.

Stratigraphy - the branch of geology that deals with the definition and interpretation of stratified rocks; the conditions of their formations; their character, arrangement, sequence, age and distribution; and especially their correlation by the use of fossils and other means. The term is applied both to the sum of the characteristics listed and a study of these characteristics.

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.

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.

Tailwater - water immediately downstream from a structure.

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).

Tar Sands (bituminous sands) - a combination of clay, sand, water, and bitumen. Technically speaking, the bitumen is neither oil nor tar, but a semisolid degraded from oil. Tar sands are mined to extract the oil-like bitumen which is upgraded into synthetic crude oil or refined directly into petroleum products by specialized refineries.

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.

Thornthwaite 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.

Toe - the bottom of a slope often where it contacts a watercourse.

Topographic Divide - a high point in the land surface that provides a boundary between adjacent watersheds or basins.

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.

Toxic - a substance which is poisonous to an organism.

Toxicant - a harmful substance or agent that may injure an exposed organism.

Toxicity - the quality or degree of being poisonous or harmful to plant, animal or human life.

Toxic Pollutants - materials contaminating the environment that cause death, disease, birth defects in organisms that ingest or absorb them.

Toxic Substance - a chemical or mixture that may represent an unreasonable risk of injury to health or the environment.

Toxin - a poisonous compound that causes certain diseases or health problems.

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.

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

Tuff - the compacted and consolidated equivalent of ash (fine-grained debris) resulting from explosive volcanic discharge.

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

Tussock - a thick tuft of sedge or other vegetation forming a small hummock of solid ground in a wetland.

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)).

Ultramafic Rocks - are igneous rocks with very low silica content (less than 45 percent) and are composed of usually greater than 90 percent mafic minerals (dark coloured, high magnesium and iron content). Ultramafic rocks are typical of the Earth's mantle.

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.

Valuation of the Supply - an evaluation of the importance of a particular Municipal well or intake to the whole Municipal drinking water supply. For example, where there are multiple supplies, value may be smaller, versus a single supply where value may be greater.

Varved - any form of repetitive layered sediment that was deposited within a one-year time period. This annual deposit may comprise paired contrasting laminations of alternately finer and coarser silt or clay, reflecting seasonal sedimentation (summer and winter) within the year.

Vaporization - the change of a substance from a liquid or solid state to a gaseous state.

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.

Vugs - small cavities inside rock that are formed when crystals form inside a rock matrix and are later removed through erosive processes, leaving behind voids. A common cause of vugs is minerals precipitating from solution in water and then later being dissolved again by less saturated water. The inner surfaces of vugs are often coated with some of the mineral matter that formed them. Fine crystals are often found in vugs where the open space allows the free development of external crystal form. Goeodes are a common vug formed rock.

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.

Washoff - storm water runoff at surface level.

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 Control Structure - a man-made dam, weir or other structure used to regulate the natural flow of water.

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 Pollution - industrial and institutional waste and other harmful or objectionable material in sufficient quantities to result in a measurable degradation of the water quality.

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-Soluble Fraction (WSF) - the portion of an oil that is soluble in water under equilibrium conditions. The water-soluble fraction of petroleum hydrocarbons is composed mostly of aromatic hydrocarbons such as benzene or toluene.

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.

Water Table Well - a well whose water is supplied by a water table or unconfined aquifer.

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.

Well Head 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.

White Paper - the term commonly applied to official documents presented by Ministers of the Crown which state and explain the government's proposed policy on a certain issue, usually to provide opportunity for stakeholder consultations.

Windbreak - one or more rows of trees planted around buildings or fields to reduce the force of winds; rows are planted at right angles to the direction of the prevailing winds; an energy conservation measure.

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.

Wollastonite - a common mineral in skarns or contact metamorphic rocks. Skarns can sometimes produce some wonderfully rare and exotic minerals with very unusual chemistries. Wollastonite forms from the interaction of limestones, that contain calcite with the silica, SiO₂, in hot magmas. This happens when hot magmas intrude into and/or around limestones or from limestone chunks that are broken off into the magma tubes under volcanoes and then blown out of them.

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.