Assessment Report – Amended May 2011

List of Abbreviations and Acronyms

Ausable Bayfield Maitland Valley Drinking Water Source Protection Region

Appendix B

List of Abbreviations and Acronyms and Glossary for Assessment Reports

For local information purposes – subject to change – current official definitions can be found in legislation, regulation and most recent rules and guidance

ABMV – Ausable Bayfield Maitland Valley Drinking Water Source Protection Region
ANSI – Area of Natural and Scientific Interest
AO – Aesthetic objective
AR – Assessment report
BMP – Best management practice or beneficial management practice
BOD – Biological oxygen demand
CA – Conservation authority
CLI – Canada Land Inventory
CO – Conservation Ontario
CWA – Clean Water Act, 2006
DFO – Department of Fisheries and Oceans Canada
DNAPL – Dense non-aqueous phase liquid
DWS – Drinking water system
DWSP – Drinking water source protection
EBR – Environmental Bill of Rights, Environmental Bill of Rights Registry
ER – Environmental Registry
FIPPA – Freedom of Information and Protection of Privacy Act
GAWSER – Guelph All-Weather Sequential-Events Runoff Model
GIS – Geographic information system(s)
GPS – Global positioning system(s)
GUDI – Groundwater under the direct influence of surface water
GVA Groundwater vulnerability analysis
HRU – Hydrological response unit
HVA – Highly vulnerable aquifer
ISI – Intrinsic susceptibility index
IPZ – Intake protection zone
LaMP – Lakewide Management Plans
MFIPPA – Municipal Freedom of Information and Protection of Privacy Act
MMAH – Ontario Ministry of Municipal Affairs and Housing
MNR – Ontario Ministry of Natural Resources
MOE – Ontario Ministry of the Environment
MOEE – Ontario Ministry of the Environment and Energy
MTO – Ontario Ministry of Transportation

List of Abbreviations and Acronyms

NAICS – North America Industrial Classification System
ODWS – Ontario Drinking Water Standards
ODWSP – Ontario Drinking Water Stewardship Program
OMAFRA – Ontario Ministry of Agriculture, Food and Rural Affairs
MOHLTC – Ontario Ministry of Health and Long Term Care
OMNR – Ontario Ministry of Natural Resources
OMTO – Ontario Ministry of Transportation
OPG – Ontario Power Generation
PCB – Polychlorinated biphenyls
PCE – Perchloroethylene, tetrachloroethylene
PGMN – Provincial Groundwater Monitoring Network
PPB – Parts per billion
PTTW – Permit to take water
PWQMN – Provincial Water Quality Monitoring Network
PWQO – Provincial water quality objective(s)
RAP – Remedial action plan(s)
RMO – Risk management official
ROMA – Rural Ontario Municipal Association
SAAT – Surface to aquifer advective time
SGRA – Significant groundwater recharge area
SP – Source protection
SPA – Source protection area or source protection authority
SPC – Source protection committee
SPP – Source protection plan or source protection planning
SPR – Source protection region
STP – Sewage treatment plant
SWAT – Surface to well advection time
SWOOP – Southwestern Ontario ortho-photography
SWP – Source water protection
SWVA – Surface water vulnerability analysis
TCE – Trichloroethylene
TDS – Total dissolved solids
TEC – Technical Experts Committee
ToR – Terms of Reference
TOT – Time of Travel area
TR – Technical Rule(s)
TWCA – Total water contributing area
UST – Underground storage tank
WHPA – Wellhead protection area
WWIS – Water Well Information System
WWTP – Wastewater treatment plant(s)

Assessment Report - Amended May 2011

Glossary

For local information purposes – as of May, 2011

The following definitions have been gathered from multiple sources and are provided for local information purposes to assist the public in understanding the assessment reports as amended and updated for the Ausable Bayfield and Maitland Valley source protection areas. Where there is a discrepancy between the definitions here and those in the Clean Water Act, 2006 (and associated regulations and Technical Rules and guidance), those legal and regulatory definitions take precedence over the ones in this glossary. This glossary is subject to review and update. More recent versions of the glossary may be posted from time-to-time online at **sourcewaterinfo.on.ca**

A

Aggregate risks

Aggregate risks are multiple risks, especially in a protection area around a municipal water supply, considered together relative to the overall risk to drinking water sources.

Abandoned well

An abandoned well has been deserted – perhaps because it has been replaced by another source of drinking water or because it is dry, contains non-potable water, was discontinued before completion, has not been properly maintained, was constructed poorly, or is susceptible to contamination. Abandoned wells can provide pathways for surface water to contaminate groundwater sources – for this reason they should be properly decommissioned and capped.

Ablation

Ablation is 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

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

Accepted engineering principles

Accepted engineering principles are 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.

Glossary

Accepted geotechnical principles

Accepted geotechnical principles are 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

Accepted scientific principles are 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

Acid rock is an igneous rock containing at least 66 per cent silica.

Activity

An activity is 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

Adverse environmental impacts are 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 adverse water quality incident (AWQI) is 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

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

Glossary

Aggregate

Aggregate refers to gravel which is any loose rock that is at least two millimetres in its largest dimension (about 1/12 of an inch), and no more than 75 millimetres (about three inches). Sometimes gravel is restricted to rock in the 2-4 millimetre range, with pebble being reserved for rock 4-75 millimetres (some say 64 millimetres). 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) millimetres to 256 millimetres (about ten inches).

Agricultural managed land

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

Agricultural source material

Agricultural source material is material used for land application of nutrients that originate from agricultural activities such as livestock operations. This 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

An algal bloom refers to rapid and/or prolific growth of small aquatic plants on the surface of lakes and rivers, usually as a result of excessive nutrients.

Allocated quantity of water

Allocated quantity of water means:

(a) In respect of a surface water intake or well relating to a planned system, the annual mean quantity of water that is anticipated to be taken by the intake or well, and;

(b) In respect of an existing surface water intake or well, the lesser of A and B:

A. The maximum annual quantity of water that can lawfully be taken by the intake or well.

B. The sum of the mean annual quantity of water taken by the intake or well and any additional quantity of water that would have to be taken annually by the intake or well to meet the committed demand of the system.

Alluvium sediments

Alluvium sediments consist of silt, sand, clay, and gravel in different proportions and 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 – other permissions may also be required. Typical alterations include bridge or culvert installations, channelization and diversion.

Glossary

Amphiboles

Amphiboles are rock forming minerals of complex composition: hydrous silicates, usually with aluminum, calcium, iron and magnesium.

Andalusite

Andalusite is 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 inclusioned 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

Anthracite-sand filtration is a means to 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

'Anthropogenic' means to be influenced by human activity or of human origin.

Aphotic zone

The aphotic zone indicates the depth of a water body 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 water body directly affected by sunlight.

Apiaries

Apiaries are 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.

Aquiclude

An aquiclude is a geologic unit that is full of water, or 'saturated,' that may slowly absorb water but can't transmit significant supplies of water in normal conditions.

Aquifer

An aquifer is an underground area of porous, permeable soil or rock – almost like a sponge – that has enough water inside it to support a well. Shallow aquifers exist in the overburden, the sedimentary rock and soil above bedrock. Bedrock aquifers are found in the bedrock itself, under overburden. 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.

Glossary

Aquifer system

An aquifer system is a group of two or more aquifers that are separated by aquitards or aquicludes.

Aquifer vulnerability index (AVI)

An aquifer vulnerability index shows, using numbers, the intrinsic or inherent vulnerability of underground water sources (aquifers) and their susceptibility to contamination by measuring the thickness of overlying layers and how easily it allows water to flow (how 'porous' it is and how 'permeable.') The AVI is 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

An aquifuge is a geologic formation which has no interconnected openings and cannot readily hold or transmit water.

Aquitard

An aquitard is a layer of geological material that prevents or slows the transmission of water in a confined aquifer. It is a confining bed and/or formation composed of rock or sediment that slows 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 groundwater. It is 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. See also 'confining layer.'

Archean volcanics

Archean volcanics are older Precambrian rocks formed from ancient volcanic activity.

Area of influence of a well

The area of influence of a well is the area covered by the drawdown curves of a given well or combination of wells at a given time when pumped.

Aromatic hydrocarbons

Aromatic hydrocarbons are 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 artesian aquifer is 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.

Glossary

Artesian well

An artesian well is 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 technical report generated locally, by a source protection region's source protection committee, for each source protection area. These reports are requirements of Ontario's *Clean Water Act, 2006*. The report identifies the source protection areas (usually the rough equivalent of the jurisdictional area of a conservation authority), the watersheds and the vulnerable areas within the source protection area. The report also assesses and ranks potential drinking water threats in each vulnerable area in order to determine which threats constitute potential significant drinking water threats to a municipal residential drinking water system. An assessment report looks at an entire watershed and the factors influencing the quality and amount of water (quantity) found there. They include information such as the physical characteristics of the land, land uses, where drinking water supplies are located, how much water is being used and how much is available for future uses, where vulnerable water supply areas are located, what issues already compromise drinking water sources and what threatens drinking water sources from overuse and contamination. Assessment reports provide source protection committees with information that will help determine how best to protect the quality and supply of their local water resources. They are the basis for developing source protection plans in 2012 and making local policy decisions for protecting drinking water. Each proposed report is prepared by the SPC following public consultation and considered for approval by the Ontario Minister of the Environment. Assessment Report - Amended May 2011s for the Ausable Bayfield and Maitland Valley source protection areas will be made public and posted online at **sourcewaterinfo.on.ca** and a hard copy will be available for viewing in each source protection area. The source protection committee has created the assessment reports after considering public comments received during public consultation between January 5 and March 12, 2010. Additional public comments on the Assessment Report - Amended May 2011s can be sent to the region within 30 days of the posting of the *Assessment Report - Amended May 2011* and those comments will be forwarded to the Ontario Ministry of the Environment.

The assessment reports will:

- Identify the vulnerable areas near wells and intakes;
- Identify the types and number of threats to water quality near wells and intakes;
- List the number of significant drinking water threats.

After the Assessment Report - Amended May 2011s are complete and approved by the Ontario Minister of the Environment, work will start on source protection plans for each watershed. These plans will outline what needs to be done to reduce the risk posed by significant threats and to prevent new ones from developing. Those plans will be complete by 2012.

Assimilative capacity

Assimilative capacity is 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.

Glossary

Attenuation

Attenuation is flow that is lessened or weakened, or the severity reduced. Attenuation is 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.

Ausable Bayfield Maitland Valley Drinking Water Source Protection Region

Ausable Bayfield Maitland Valley Drinking Water Source Protection Region is one of 19 drinking water source protection regions in Ontario, created under Ontario's *Clean Water Act, 2006*. The region is made up of two source protection areas:

1) Ausable Bayfield Source Protection Area (an area roughly equivalent to the jurisdiction of the Ausable Bayfield Conservation Authority), and;

2) Maitland Valley Source Protection Area (an area roughly equivalent to the jurisdiction of the Maitland Valley Conservation Authority).

The region has one source protection committee made up of 15 voting members of the watershed communities plus the Chair and liaison members for First Nations, health, source protection authorities and Ontario Ministry of the Environment. There are two source protection authorities, the Ausable Bayfield SPA (administrative lead) and the Maitland Valley SPA. See also 'source protection committee.'

Average annual recession rate

Average annual recession rate refers to the average annual linear landward retreat of a shoreline or river bank.

Average maximum water velocity

Average maximum water velocity is the average highest speed of a surface water body.

Average annual pumping rate

The average annual pumping rate on the surface water intake table is expressed in cubic metres/day because it is an average daily pumping rate for the year.

B

Bankfull discharge

Bankfull discharge is 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.

Bank stability

Bank stability is the ability of a stream bank to resist change.

Barbel

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

Glossary

Baseflow

Baseflow is the water that flows into a stream through the subsurface. It is 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/rivers, 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

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

Batholith

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

Beach

A beach is a geological formation consisting of loose rock particles such as sand, pebbles, cobble, gravel, shingle or shell along the shoreline of a watercourse.

Bedrock

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

Bedrock geology

Bedrock geology is the study of the solid rock underlying unconsolidated surface material. Also refers to description of bedrock types.

Beneficial management practice

A beneficial management practice (BMP) is a practice that helps reduce the risk of contamination. See also 'best management practice.'

Benthic

Benthic means occurring at the bed or base of watercourses (e.g., streams, rivers, and other bodies of water such as lakes, oceans and seas).

Benthic region

The benthic region is the bottom of a body of water, supporting the benthos.

Benthos

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

Berm

A berm is a narrow shelf or ledge that can be used at the bottom of a slope to reinforce and stabilize it against slumping and erosion or to direct overland flow. A berm can be a linear mound of earth, or raised barrier, that separates two areas.

Glossary

Benthic invertebrates

Benthic invertebrates are mall aquatic organisms that live in stream sediments and are a good indicator of water quality and stream health.

Best management practices (BMPs)

Best management practices – or beneficial management practices – are 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 rural areas including farm and non-farm land.

Biochemical oxygen demand (BOD)

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. It is a measurement used to assess the rate at which water is deoxygenated. High BOD general corresponds to water containing high amounts of organic pollution.

Biodegradation

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

Bioengineering

Bioengineering is the application of biological science to engineering principles. It is the use of living or organic plant material to achieve engineering solutions.

Biological diversity

Biological diversity is the variability among organisms and the ecological complexes of which they are a part.

Biomass

Biomass is the amount of living matter, usually measured per unit area or volume of habitat.

Biosphere

The biosphere is all living organisms (plant and animal life).

Biotic

Biotic is relating to or caused by living beings.

BOD

See 'biochemical oxygen demand.'

Biotransformation

Biotransformation is the conversion of a substance into other components by organisms; includes 'biodegradation.'

Glossary

Bluff

A bluff occurs where 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 a set amount (for instance, two metres and the average slope angle exceeds 1:3 or 18 degrees).

Bog

Bogs are peat-covered areas or peat-filled depressions with a high water table and a surface carpet of mosses, chiefly sphagnum. The water table is at or near the surface in the spring, and slightly below during the remainder of the year. The mosses often form raised hummocks, separated by low, wet interstices. The bog surface is often raised, or, if flat or level with the surrounding wetlands, it is virtually isolated from mineral soil waters. Hence, the surface bog waters and peat are strongly acid and upper peat layers are extremely deficient in mineral nutrients. 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 bored well is 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 boulder is a sedimentary rock fragment that is usually rounded and has a diameter over 256 millimetres.

Broader landscape

The broader landscape refers to the watershed or drinking water source protection area as a whole. This term applies to area-wide, rather than local aquifer vulnerability assessments usually using an indices method of vulnerability assessment.

C

Calcareous

Calcareous soil contains calcium carbonate or magnesium carbonate and looks chalky.

Calcite

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

Calibration

Calibration is the process where a numerical model is adjusted so the calculated and observed parameters converge and the calibration process is complete.

Capillary action

Capillary action is the movement of water in the interstices of a porous medium due to capillary forces.

Glossary

Capillary fringe

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

Capillary forces

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

Capture zone

A capture zone is 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

Carbonate is a compound(s) containing CO3(2), also known as a salt of carbonic acid. When heated, it yields the gas carbon dioxide (calcite, dolomite and siderite are examples of carbonates).

Carbonate rock

Carbonate rock is rock made up largely of carbonate minerals.

Carbon sequestration

Carbon sequestration is a process by which carbon is removed from the environment and held within, for example, a wetland.

Chalcopyrite

Chalcopyrite is ore mineral made of copper, the chemical formula for which is CuFeS2.

Channel capacity

Channel capacity is 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

Channel configuration is 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

Channel 'improvements' are changes to the flow characteristics of a channel by clearing, excavation, realignment, lining, or other means, in order to increase its capacity to carry water.

Channelization

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

Glossary

Chemical

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.

Chemical contaminant

A chemical contaminant is 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.

Chemical threats

Chemical threats include things like solvents, fuels, fertilizers, pesticides and similar products. They may be found in factories, storage depots, gasoline stations, farms or other sites.

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

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

Chlorine disinfection

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

Chlorite

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

Circumstance

For each threat there are different circumstances which make the threat more or less of a risk. Factors considered include the quantity of a chemical, and – for example – whether storage if above or below ground.

Glossary

Clean Water Act, 2006 (CWA)

The *Clean Water Act, 2006* (CWA), formerly *Bill 43*, was passed by the Province of Ontario to add a new and added level of security and protection for drinking water – at the source, implementing the first barrier of protection in a multi-barrier approach (The multi-barrier approach also includes treatment, testing, monitoring, distribution and training) on a watershed basis as recommended by the O'Connor Inquiry following the water-related tragedy in Walkerton, Ontario. The legislation outlines the rules and regulations for the drinking water source protection program and is designed to protect existing and future sources of municipal drinking water from contamination or overuse. The law was brought into effect in October 2006 and its first set of regulations was passed on July 3, 2007. The CWA and its associated regulations provide a framework for establishing a source protection committee (SPC) and boundaries for the source protection areas. Studies have been completed to identify the potential threats to municipal drinking water in vulnerable areas such as wellhead protection areas near municipal wells and intake protection zones around surface water intakes. Vulnerable areas are areas where particular care must be taken in the use and storage of materials that could contaminate water. Activities on properties in these vulnerable areas are being evaluated and ranked according to rules developed by the Ontario government looking at types of threats and the circumstances in which they may be potential significant drinking water threats. Potential threats to water are placed into one of three categories based on the level of risk: low, moderate or significant. The law requires development of source protection plans for each source protection area (larger watershed area). Those plans will be developed, based on the assessment reports, by 2012.

Cliff

A cliff is 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 a set amount (for example, two metres and the average slope angle exceeds 1:3 or 18 degrees).

Climate

The average weather conditions of a place or region throughout the seasons.

Climate change

Climate change is a significant shift in long-term average weather patterns, which can include changes in temperature, precipitation and wind patterns. Changes to our climate last for an extended period of time and can reflect a combination of natural and human impacts. There is broad agreement in the scientific community that human activities are altering the chemical composition of the atmosphere through the build-up of greenhouse gases that trap heat and reflect it back to the earth's surface – resulting in changes to our climate, including a rise in global temperatures and more frequent extreme weather events.

Climate variability

Climate variability, or 'climatic variability,' refers to temporal variations of the atmosphere for periods of time longer than those associated with normal weather events. The term 'natural climate variability' is used to identify climate variations not attributable to or influenced by human activity. Climate variability refers to the normal ups and downs (warm periods, cool periods, wet periods, dry periods). Climate variability may be in the form of cycles, major floods (25 year) and major droughts (30 years). Climate change may amplify these extremes.

Glossary

Coagulation-flocculation

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

Coal tar

Coal tar is 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 (cancer-causing).

Cold water

Cold water is water with a temperature of approximately 14 C. This thermal habitat is typically considered ideal for brook and brown trout.

Colluvium

Colluvium is 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

Coliforms are bacteria found only in human and animal wastes. Presence in a river may indicate pollution by sewage or runoff. Coliforms are threats to human health and may be indicators of the presence of other pathogen contaminants.

Conceptual water budget

A conceptual water budget is a written description of the overall flow system 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), human-made structures (e.g., dams, channel diversions, water crossings), and water takings.

Concern

A drinking water concern refers to a matter that has been raised informally but is not yet supported by scientific information or recorded evidence. See 'drinking water concern.'

Condensation

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

Condition

Conditions reflect the presence of a substance in a vulnerable area that results from a past activity and that also constitutes a drinking water threat. Conditions include contaminated lands, either abandoned or still in use, in vulnerable areas. See 'drinking water condition.'

Conductivity

Conductivity is a measurement of the electrical conductance of water that can be used to estimate the total concentration of dissolved ions in the water.

Glossary

Cone of depression

The cone of depression is 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.

Cone of influence

A 'cone of influence' means:

(a) In respect of one or more wells that draw water from a unconfined aquifer, the area within the depression created in the water table when the wells are pumped at a rate equivalent to their allocated quantity of water, and;

(b) In respect of one or more wells that draw water from a confined or semi-confined aquifer, the area within the depression created in the potentiometric surface when the wells are pumped at a rate equivalent to their allocated quantity of water;

Confined aquifer

Confined aquifer is 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. A confined aquifer is an aquifer that is bounded above, and perhaps below, by layers of geological material that don't easily transmit water. See also 'aquitard.'

Confluence

Confluence is where a branch of a watercourse joins the main channel.

Conglomerate (also referred to as Puddingstone)

Conglomerate is the hard compacted equivalent of a sedimentary deposit, made up of pebbles and boulders in a matrix of sand, silt or clay.

Conservation

Conservation is the wise use of natural resources including the protection of natural or human-made resources and landscapes for later use.

Conservation Authorities

Conservation Authorities are 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. They have legal responsibilities and powers under the Conservation Authorities Act and other legislation. Conservation Authorities have special responsibilities and powers under the Clean Water Act, 2006 in their roles as source protection authorities.

Conservation lands

Conservation lands are 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.

Glossary

Conservation Lands
Conservation Lands are lands owned by a conservation authority.

Conservation strategy
A conservation strategy is an overall policy and development statement covering all aspects of a conservation authority's work. It is updated regularly.

Consortium
Consortium refers, for purposes of this project, to a group of consultants.

Consumptive activity
'Consumptive activity' means an activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.

Consumptive use
Consumptive use is 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)
A contaminant is an undesirable substance that makes water unfit for a given use when found in sufficient concentration. Chemicals, pathogens and dense non-aqueous phase liquids are types of substances that can contaminate water. See also 'contaminant of concern.'

Contaminant of concern
A contaminant of concern is 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 the Environment.

Contaminant plume
A contaminant plume is a term used to describe a mass of contamination moving underground.

Contamination
Contamination is the mixing of harmful elements, compounds or microorganisms with surface or groundwater. Contamination can occur naturally (e.g., an aquifer flowing through mineral deposits that contain heavy metals) or through human activity (e.g., sewer water flowing into a river). Nutrients, such as nitrogen and phosphorus, can also cause water contamination when they are present in excessive amounts.

Contiguous
Contiguous is having contact with, or touching along a boundary or point.

Glossary

Control structure

A control structure is a structure that serves to control the flow of water, generally a dam or weir.

Corrective action

Corrective action includes steps that must be taken following an adverse water quality incident as specified by Ontario Regulation 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

The critical flood depth and velocity is the 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)

Cubic feet per second measures 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. This measurement may be used in reporting stream flow values. Cubic metres per second are commonly used in countries employing the metric system.

Cubic metres per Second (cms)

Cubic metres per second measures the volume of water in cubic metre (one metre X one metre X one metre) that passes a given point in one second of time. This measurement may be used in reporting stream flow values. Cubic metres per second are commonly used in countries employing the metric system.

Cumulative (water quality) effects

Cumulative water quality effects relate to the consequence of multiple threats sources, in space and time, which affect the quality of drinking water sources.

Cumulative (water quantity) effects

Cumulative water quantity effects related to the consequence of multiple threats sources, in space and time, which affect the quantity of drinking water sources. The consequence of multiple threats sources, in space and time, which affect the quantity of drinking water sources.

Glossary

D

Dam
A dam is a structure used to hold back water.

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

DDD (dichlorodiphenyldichloroethane), DDE (dichlorodiphenyldichloroethylene)
DDD (dichlorodiphenyldichloroethane) and DDE (dichlorodiphenyldichloroethylene) are 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)
DDT (dichlorodiphenyltrichloroethane) is a pesticide which was 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 1970s, use of DDT as a pesticide has been banned in North America.

Decommissioned wells
Decommissioned wells are capped, plugged and sealed in compliance with regulatory requirements by the Ontario Ministry of the Environment. Decommissioning a well can prevent contamination by closing a potential pathway by which surface water can contaminate groundwater.

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

Deltaic
Deltaic is 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
Deltaic or stratified drift deposits are 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.

Glossary

Dendritic (treelike)

Dendritic, or '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)

Dense non-aqueous phase liquids (DNAPLs) include some adhesives, cleaning chemicals, paint removers and other liquids – they are often carcinogenic (cancer-causing), are heavier than water and can sink below the water table where they might not be detected by monitoring wells. For these, and other, reasons a precautionary approach needs to be taken when recording their presence in the watershed. A DNAPL is an organic chemical in concentrations greater than its aqueous solubility and denser than water. The Province of Ontario gives DNAPLs a special category in the table of threats. These substances are generally toxic and are expensive and almost impossible to remove. They can be found in homes, businesses, farms, landfills, municipal and other properties. For more information consult fact sheets produced by your local planning project.

Designated system

A designated system is a drinking water system that is included in a terms of reference, pursuant to resolution passed by a municipal council under the Clean Water Act, 2006.

Detritus

Detritus is articulate organic material suspended in water or intermixed with soil.

Developed / developable

Developed or developable refers 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

The *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation* is a set of provincially-approved regulations, administered by conservation authorities, which restricts the development in, or alterations to, waterways or shorelines or that interfere with wetlands within conservation authority boundaries.

Glossary

Diabase

Diabase is 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

See 'dyke.'

Discharge

Discharge is 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

A discharge area is an area where water leaves the saturated zone across the water table surface. It is an area where groundwater emerges at the surface and 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 disposal well is a well used for the disposal of waste into a subsurface stratum.

Diversion

A diversion is a redirection of water from one drainage or watercourse to another.

Diversions of the Ausable River

The Ausable River has had two diversions. The first, 'The Cut,' was dug in the 1870s. This channel south of Pinery Provincial Park bypassed the original loop through Grand Bend and drained shallow lagoons in the Thedford Marsh. In 1892, the second diversion routed Parkhill Creek, the remaining flow in the loop, straight west to Lake Huron at Grand Bend. The two diversions isolated the original Ausable River between Grand Bend and 'The Cut,' restricting the Old Ausable Channel to local drainage.

Divide

The divide marks the high point of land that separates one watershed from another

Dolomite

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

Glossary

Dolostone

Dolostone is 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 is 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

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

Drainage area

The drainage area is the area that supplies water to a particular point.

Drainage density

Drainage density is the length of watercourse per unit drainage area.

Drainage basin

A drainage basin is 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 system (under the Drainage Act)

A drain system, under the Drainage Act, is a system constructed by any means, including works necessary to regulate the water table or water level. This broad definition allows for features to be included in drainage systems to restore wetlands while still protecting the agricultural interests of the private landowners.

Drainage Water

Drainage water is water which has been collected by a gravity drainage or dewatering system.

Drainage Well

A drainage well is 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.

Drained

Drained is a condition in which the level or volume of groundwater or surface water has been reduced or eliminated from an area by artificial means.

Drawdown

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

Drilled well

A drilled 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.

Glossary

Drinking water

Drinking water means:

(a) Water intended for human consumption, or;

(b) Water that is required by an Act, regulation, order, municipal by-law or other document issued under the authority of an Act,

(i) to be potable, or;

(ii) to meet or exceed the requirements of the prescribed drinking water quality standards.

Drinking water concern

A drinking water concern refers to a matter that has been raised informally but is not supported by scientific information or recorded evidence. It is a purported drinking water issue that has not been substantiated by monitoring, or other verification methods. Drinking water concerns are identified through consultations with the public, stakeholder groups, and technical experts (e.g., water treatment plant operators).

Drinking water condition

An existing drinking water condition could be legacy contamination – for instance, of a 'brownfield.'

Drinking water issue

A drinking water issue is a threat that currently interferes with, or could interfere with, the use or availability of a drinking water source. It is a substantiated condition relating to the quality of quantity of water that interferes or is anticipated to soon interfere with the use of a drinking water source by a municipal residential system or designated system. Drinking water issues can be chronic, which means they have existed over a long period of time or reoccur seasonally and are likely to continue if nothing is done to address the activities that cause them. Through the source protection planning process, issues that impact water quality will be linked to specific land uses and/or areas so that actions can be taken to manage them. 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.

Glossary

Drinking water quality threats analysis

The drinking water quality threats analysis examines existing water quality issues in a drinking water system and identifies and describes threats that contribute to, or have the potential to impact, municipal drinking water sources. It also identifies what activities would pose a threat to drinking water if they were located in a vulnerable area in the future. For the drinking water quality threats analysis, drinking water threats are classified as significant, moderate or low. In order for a threat to be included in the assessment report, it must first be recognized by the provincial government in the official threats table. Threats not listed by the provincial government can be included with proper approval. To add a threat, it must be proven, using science and professional experience, that the threat has the ability to impact human health.

Drinking water risk

Drinking water risk means the likelihood of a drinking water threat:

(a) Rendering a 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.

Drinking water source protection

Drinking water source protection is the Province of Ontario's effort to protect surface water sources such as lakes, rivers and streams, and groundwater sources from contamination or overuse, particularly through the planning process under the *Clean Water Act, 2006*. It is the first step in the multi-barrier approach to protecting drinking water. Other barriers include water testing and monitoring, reliable water treatment and distribution systems and training of water managers and staff. At this time, the emphasis of the project is to identify and address existing or potential threats to municipal water supplies by concentrating on zones immediately surrounding municipal wellheads and surface water intake zones in Lake Huron near Goderich and Grand Bend (Port Blake).

Drinking water system

Drinking water system means 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) Any thing used for the collection, production, treatment, storage, supply or distribution of water;

(b) Any thing 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.

Glossary

Drinking water threat

A drinking water threat has the same meaning as in the Ontario *Clean Water Act, 2006*. It is 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. When combined with vulnerability of the land, it could become a significant drinking water threat.

Drinking water works permit (DWWP)

A drinking water works permit is a permit to establish or alter a municipal residential drinking water system (the DWWP and licence replaces the certificates of approval).

Drought

Drought is a complex term that has various definitions. 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

A drumlin is an elongated mound of glacial sediment deposited parallel to ice flow.

Dug well

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

Glossary

Dyke

A dyke is a tabular mass of igneous rock extending obliquely or transversely across older rocks. It can also be a human-made structure, either a wall or earth mound built around a low-lying area to prevent flooding.

Dynamic balance or nature

The dynamic balance or nature is a system that is continuously altering itself to adjust to constant changes of its component parts.

E

Easement

An easement is a legal right to cross over and work on someone else's property for a specific purpose.

Early actions

The Ontario Drinking Water Stewardship Program (ODWSP) was created to provide some financial assistance to property owners to help them take action on their land to protect drinking water sources. Early actions are voluntary efforts by property owners, prior to the creation of source protection plans, that are protective of drinking water. Early-actions grants have been made available, prior to the adoption of assessment reports, for a variety of projects to those who own land near municipal wells and surface water intakes, and may include:

- Replacing or upgrading old septic systems
- Decommissioning of old private wells, or upgrading wells still in use
- Free and confidential pollution prevention reviews for small and medium sized businesses to identify problems and develop solutions
- A range of agricultural best management practices to protect water quality

To learn more, go to **sourceprotectionstewardship.on.ca** or **sourcewaterinfo.on.ca** or contact your local Conservation Authority or, if you are an agricultural property owner, you can also contact your local field representative with the Ontario Soil and Crop Improvement Association (OSCIA).

Early Response

Early Response is a post-assessment report financial assistance initiative (pending) of the Ontario Drinking Water Stewardship Program (ODWSP). It follows the early actions program and is a precursor to source protection planning policies and it provides financial incentives to landowners to undertake actions protective of water where potential significant drinking water threats have been identified.

E. coli

See 'Escherichia coli.'

Ecological

Ecological relates to the totality or pattern relations between organisms and their environment.

Glossary

Ecology

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

Ecosystem

An ecosystem is the natural community of plants and animals within a particular physical environment, which is linked by a flow of materials throughout the non-living (abiotic) as well as the living (biotic) section of the system.

Ecosystem Approach

The ecosystem approach is 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

Effective precipitation is the part of precipitation that produces runoff. It is 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

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

Elevation

Elevation is the height of a portion of the Earth's surface in relation to its surroundings.

End moraine (terminal moraine)

End moraine, or terminal moraine, is a linear, slightly curved ridge of rocky debris deposited at the front end, or snout, of a glacier. It represents the furthest point of advancement 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.

Enhancement

Enhancement is to add to, or to make greater. For example, to add additional water to a wetland, in order to make greater its environmental functionality, would be an enhancement.

Entity

An entity is one or a series of related objects, natural or anthropogenic, that may be related to a specific process. Examples include an abandoned well, a storage tank, bird colony, mine tailing, or a natural radiation source.

Glossary

Entrain

Entrain is to draw in and transport through water.

Environmental Bill of Rights, 1993

The Environmental Bill of Rights, 1993 is a statute of the Province 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

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

Environmental Farm Plan

The Environmental Farm Plan (EFP) is an assessment voluntarily prepared by farm families to increase their environmental awareness in up to 23 different areas on their farm. Through the EFP local workshop process, farmers highlight their farm's environmental strengths, identify areas of environmental concern, and set realistic action plans with time tables to improve environmental conditions. Environmental cost-share programs are available to assist in implementing projects. In many cases, farm property owners located in key vulnerable areas may be able to combine funding through the Ontario Drinking Water Stewardship Program with funding from EFP-related programs.

Environmental Protection Act

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

Environmentally sound

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.

Episodic

Episodic means made up of separate loosely connected episodes.

Erosion

Erosion is the wearing away of the land by the action of water, wind or glacial ice. It is 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.

Glossary

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

Era
An era is a division of geological time of the highest order.

Escherichia coli (E. coli)
Escherichia coli (E. coli) are pathogens, or types of bacteria, found in human and animal waste. Their presence in water indicates the potential presence of fecal contamination or other harmful pathogens. Different strains of E. coli pose different levels of hazards to human health. The 0157:HT strain is a significant hazard to human health.

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

Euphotic Zone
Euphotic Zone is 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
Eutrophication is generally associated with increased plant productivity due to increased nutrient presence, mainly phosphorous, and sometimes nitrate concentrations in lakes, streams, rivers or other water bodies. Sources such as run-off can contribute to the presence of phosphorous or nitrates. Nutrients can contribute to the growth of algae, weeds or other nuisance plants. The growth of algae, or algal blooms, lowers dissolved oxygen in the water. Other organisms can die as plants decompose.

Eutrophic lakes
Eutrophic lakes are 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
Evaporation is 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
Evapotranspiration is 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.

Glossary

Event

An event is the 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

An existing drinking water source is 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

Exposure is 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.

Extreme event

'Extreme event' means:

(a) A period of heavy precipitation or winds up to a 100 year storm event;

(b) A freshet, or;

(c) A surface water body exceeding its high water mark.

F

Factor of safety

The factor of safety is 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.

Federal lands

Section 16(2)(e) of the *Technical Rules* seeks to identify federally-regulated lands, not federal buildings in a municipally or provincially regulated area.

Feldspar

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

Felsic

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

Glossary

Fen

Fens are peatlands characterized by surface layers of poorly to moderately decomposed peat, often with well-decomposed peat near the base. The waters and peat in fens are less acid than in bogs, and often are relatively nutrient rich and minerotrophic since they receive water through groundwater discharge from adjacent uplands. Fens usually develop in situations of restricted drainage where oxygen saturation is relatively low and mineral supply is restricted. Usually very slow internal drainage occurs through seepage down very low gradient slopes, although sheet surface flow may occur during spring melt or periods of heavy precipitation or if a major local or regional aquifer discharges into the wetland. Some fen wetlands develop directly on limestone rock where minerotrophic waters are emerging through constant groundwater discharge.

Future municipal water supply areas

A future municipal water supply area is 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).

Fibric

Fibric is 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

Field capacity is 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

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

Fill Line

The term 'Fill Line,' was associated to the former '*Fill, Construction and Alteration to Waterways Regulation*' and was used to define the area regulated by a conservation authority within which 'fill' could not be placed without conservation authority approval. The current regulation is the *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation* (Ontario 97/04) and it has a similar effect.

Filtering

Filtering is 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* (Ontario Regulation 453/07).

Glossary

Floating mat

A floating mat is a mat of peat held together by roots and rhizomes underlain by loose peat, fluid or water.

Flood

A flood is 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 damage reduction

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

Floodplain

Floodplain is the area bordering a river, which has been formed from deposits of sediment carried down the river. When a river rises and overflows its banks, the water spreads over the floodplain. It is 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

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

Flood pulse

Flood pulse is the peak flow during a flooding event.

Floodway

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

Flow

Flow is the volumetric rate of water discharged from a source, given in volume with respect to time. Measured in cubic metres per second. See 'discharge.'

Flow line

The flow line is 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.

Glossary

Flow regime

Flow regime is the pattern of how water levels change in a stream. The flow regime is 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).

Flood risk

Flood risk is the probability of a flood event occurring.

Flow system

Flow system is the 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.

Flood warning system

The flood warming system is a service provided by conservation authorities to member municipalities forewarning of potential flooding situations.

Flow stability

Flow stability is determined by measuring the ratio of surface discharge to groundwater discharge on an annual basis.

Fluvial

Fluvial is relating to a stream or river, o to features produced by the actions of streams and rivers.

Food chain

The food chain is the passing of nutrients and energy through an ecosystem by animals eating other animals and plants.

Forage

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

Forebay

Forebay is impoundment immediately upstream from a dam or waterpower facility. See also 'headpond.'

Glossary

Forest conditions

Forest conditions relate to the health and extent of a forest based on ecological indicators and other parameters including assessment by professionals and community stakeholders.

Forest cover

Forest cover is the percentage of the watershed that is forested.

Forest interior

Forest interior is the portion of a woodlot which remains when a 100-metre buffer is removed from the inside perimeter (e.g., 100 metres from the outside edge).

Forest management

Forest management is 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

Fractures are cracks in bedrock that may result in water passing through – i.e., having a high degree of permeability, or high 'permeability value.'

Fragment

See 'property fragment'

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 principles 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. The law is 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.). Source protection committee members and source protection authorities follow freedom of information and protection of privacy legislation. See also 'MFIPPA.'

Fresh water

Fresh water is water with less than 1,000 milligrams per litre (mg/L) of dissolved solids. More than 500 milligrams per litre is undesirable as a drinking water source or for many industrial uses.

Freshet

Freshet is 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.

Function

A function is an ecological role for human benefit.

Glossary

Future development

'Future development' means the development of an area in accordance with the official plans applicable to the area to an extent that would have the most significant impact on the quality of water used for drinking water purposes and the quantity of water available from sources of drinking water.

Future municipal water supply areas

A future municipal water supply area is 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).

G

Gabbro

A gabbro is a coarse textured igneous rock, having the same composition as basalt but occurring as dikes and sills.

Gabion basket

A gabion basket is a rectangular or cylindrical wire mesh cage filled with rock and used as an erosion control structure.

Gaps

See 'Knowledge gaps.'

Gauging station

A gauging station is a site on a stream, lake, canal or other watercourse where hydrologic data is collected.

Geographic Information System(s)

A 'geographic information system' means a computer-based system that has the capability to input, store, retrieve, manipulate, analyze, and output geographically referenced data. See 'GIS.'

Geology

Geology is the science of the composition, structure and history of the Earth. This includes the study of the material that makes up the planet the forces which act upon these materials and the structures which are formed from this relationship. It is 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.

Geomorphology

Geomorphology is the scientific study of the origin of land, riverine and ocean features on the Earth surface.

Glossary

GIS – Geographic Information System(s)

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

Glacial drift

Glacial drift is all material transported and deposited by glacial ice and glacial meltwater.

Glacial lake

A glacial lake is 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

A glacial outwash is well-sorted sand, or sand and gravel deposited by water melting from a glacier.

Glacial till

Glacial till is non-sorted, non-stratified sediment deposited or transported by glacial activity.

Glaciation

Glaciation is the covering of an area or the action on that area, by an ice sheet or by glaciers.

Glaciofluvial

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

Glaciolacustrine

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

Gneiss

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

Goals

Goals are high-level achievements for which to aim with respect to drinking water source protection. They provide an opportunity to add value statements. They are not always measurable through numeric means.

Glossary

Gradient

Gradient is the rate or regular graded ascent or descent. It is the rate of change of elevation between one section of a river and another section further downstream.

Granite

Granite is 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.

Granular

Granular is having a texture composed of small particles.

Great Lakes

The Great Lakes are the five large lakes located in Canada and the United States of America: Lake Ontario; Lake Superior; Lake Huron, Lake Michigan; and Lake Erie.

Great Lakes agreement

'Great Lakes agreement' means an agreement to which subsection 14(1) of the Act applies.

Great Lakes Basin

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

Great Lakes Basin water resources

Great Lakes Basin water resources refer to the Great Lakes and all other bodies of water (streams, rivers, lakes, connecting channels, tributary groundwater) within the Great Lakes Basin.

Great Lakes connecting channels

Great Lakes connecting channels are the large rivers that connect the Great Lakes (e.g., St. Clair River, St. Lawrence River).

Greenstone

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

Greywacke

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

Glossary

Grey water

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

Groundwater

Groundwater is subsurface water that occurs beneath the water table in soils and geological formations that are fully saturated. It is the water below the water table contained in void spaces (pore spaces between rock and soil particles, or bedrock fractures). It is water occurring in the zone of saturation in an aquifer or soil.

Groundwater barrier

The groundwater barrier describes 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 groundwater basin is the underground area from which groundwater drains. The basins could be separated by geologic or hydrologic boundaries.

Groundwater discharge

Groundwater discharge is the function of a wetland to accept subsurface water and hold it for release over long periods of time.

Groundwater divide

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

Groundwater flow

Groundwater flow is the rate of groundwater movement through the subsurface.

Groundwater recharge

Groundwater recharge is the 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

A groundwater recharge area is an 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.

A significant recharge area is one of four vulnerable areas identified in Ontario's *Clean Water Act, 2006*. See 'significant recharge area.'

Glossary

Groundwater reservoir

A groundwater reservoir is 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

Groundwater storage is the storage of water in groundwater reservoirs.

Groundwater table

The groundwater table is the meeting point between the groundwater and the unsaturated layer above it.

Groundwater vulnerability

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

Groundwater vulnerability analysis

The groundwater vulnerability analysis is the second part of the overall vulnerability analysis. It looks at underground sources of drinking waste. Areas that are vulnerable to contamination include wellhead protection areas, highly vulnerable aquifers and significant recharge areas. This study identifies and maps these vulnerable areas and assigns vulnerability scores. An uncertainty assessment is also conducted to identify where improvement of the science in the assessment report may be necessary in future source protection planning cycles. To determine the vulnerability score for a well, the researchers answers the questions, 'How quickly does water move horizontally through the aquifer to the well?' and 'How quickly does water move vertically from the surface down to the aquifer?' (This is called 'intrinsic vulnerability.') The information is used to draw wellhead protection areas (WHPA) around each municipal well. Wellhead protection areas (WHPAs) are divided into rings called time-of-travel zones. The innermost zone is a 100-metre circle. The other zones are set at times of travel of two years, five years, 10 years, and 25 years. The answers to the two questions are combined to come up with vulnerability scores on a 10-point scale for all the land within wellhead protection areas for every well.

- An area of high vulnerability has a score of 8 or 10.
- An area of moderate vulnerability has a score of 6.
- An area of low vulnerability has a score of 4.

H

Habitat

Habitat is an environmental area where an organism lives and the place where it is usually found.

Glossary

Habitat improvement

Habitat improvement is the purposeful alteration of the land and vegetation to encourage wildlife use of an area.

Hardness

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

Hazard

A hazard is a contaminant that can be a chemical or pathogen threat or dense non-aqueous phase liquid.

A drinking water health hazard – means, in respect of a drinking-water system:

a) A condition of the system or a condition associated with the systems' waters, including any thing found in the waters;

b) That adversely affects, or is likely to adversely affect, the health of the users of the system;

c) That deters or hinders, or is likely to deter or hinder, prevention or suppression of disease, or;

d) That endangers or is likely to endanger public health;

e) A prescribed condition of the drinking-water system, or;

f) A prescribed condition associated with the system's waters or the presence of a prescribed thing in the waters.

Hazard lands

Hazard lands are 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

A hazard rating is 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. Hazard rating factors for chemicals are: toxicity, environmental fate, quantity, release to environment and type of vulnerable area (groundwater or surface water). Hazard rating factors for pathogens are: frequency of association with pathogens, release to environment and type of vulnerable area (groundwater or surface water). Not all threats are equal. The danger posed by particular chemicals or pathogens depends on several factors including the amount, its toxicity and how it behaves in the environment. The Ontario Ministry of the Environment has identified many materials that could contaminate water. It has assigned a hazard rating to each using a 10-point scale based on the nature of the material and how it is used or stored. The level of hazard, combined with the circumstances present which determine the likelihood of that hazard reaching a water source, help determine whether a threat is a significant drinking water threat.

Glossary

Headpond

A headpond is an impoundment immediately upstream from a dam or waterpower facility. See also 'Forebay.'

Headwater

Headwater is the source waters of a stream or river.

Heavy metals

Heavy metal is 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

Herbicides are chemicals used to kill undesirable vegetation.

Herpetofauna, or 'Herps'

Herpetofauna are amphibians and reptiles.

High magnitude

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

Highly vulnerable aquifer (HVA)

A highly vulnerable aquifer is one of four types of vulnerable areas identified in the Ontario *Clean Water Act, 2006*. A highly vulnerable aquifer is an aquifer (an underground water source) on which external sources have or are likely to have a significant adverse effect, and includes the land above the aquifer. A highly vulnerable aquifer is an area where:

(a) Water is conveyed through the ground, and;

(b) Pollutants on the surface could readily enter the groundwater and contaminate it.

It is an aquifer that can be easily changed or affected by contamination from both human activities and natural processes as a result of:

(a) Its intrinsic susceptibility, as a function of thickness and permeability of overlaying layers, or;

(b) By preferential pathways to the aquifer.

Hornblende

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

Hornblende Schist

Hornblende schist is a schistose or foliated metamorphic rock having a high content of hornblende.

Glossary

Human geography

Human geography refers to human land uses. Early guidance modules for watershed characterization and human characteristics sections provide guidance.

Humic

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

Humification

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

Hummocky

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

Hydraulic conductivity

Hydraulic conductivity is 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

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

Hydraulic gradient

Hydraulic gradient is the rate of change of pressure head per unit of distance of flow at a given point and in a given direction.

Hydraulic head

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

Hydric soil

Hydric soil is soil characterized by an abundance of moisture and much reduced oxygen levels, to the extent that the soil supports water-tolerant vegetation.

Hydrogeology

Hydrogeology is the study of the movement and interactions of groundwater in geological materials.

Glossary

Hydrodynamic parameters

Hydrodynamic parameters are parameters of, or relating to, the force or pressure of water or other fluids.

Hydrogeologic conditions

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

Hydrogeologic Cycle

The Hydrogeologic Cycle is 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. See 'Hydrologic cycle.'

Hydrogeologist

A hydrogeologist is a person who works with, and studies, groundwater.

Hydrogeology

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

Hydrologic Cycle

Hydrologic Cycle is 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. See also 'Hydrogeologic Cycle.'

Hydrology

Hydrology is the study of the Earth's water, particularly of water on and under the ground before it reaches the ocean or before it evaporates into the air. It is the scientific study of the properties, distribution and effects of water on the Earth's surface, in the soil, underlying rocks and in the atmosphere.

Hydro-period

Hydro-period is the seasonal pattern of the water level of a wetland that is a hydrologic signature of each wetland type. It defines the rise and fall of a wetland surface and subsurface water.

Hydrophytic plants

Hydrophytic plants are vegetation adapted to growing in water or in hydric soils.

Glossary

Hydro power
Hydro power, or hydroelectric power, is power produced by falling water.

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

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

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

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

I

Ice monitoring
Ice monitoring is 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
Igneous describes the type of rocks produced under intense heat associated with volcanic activity.

Igneous rock
Igneous rock is rock formed by the crystallization of molten or partially molten matter or magna.

Imminent threat to health
Imminent threat to health refers to a contaminant of concern that can affect human health in a short period of time.

Impact
Impact is often considered the consequence or effect, the impact should be measurable and based on an agreed set of indicators. In the case of drinking water source protection, the parameters may be an acceptable list of standards which identify a 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.

Glossary

Impermeable
Impermeable means not allowing water to pass through.

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

Implementation
After the creation of source protection plans in 2012, policies will need to be put into practice and monitored.

Impoundment
Impoundment is 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
An indicator graph shows 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
Infiltration is the movement of water into soil pores from the ground surface.

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

Infiltration rate
Infiltration rate is 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 (e.g., centimetres per hour, cm/hr).

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

Inland lake
An inland lake is an inland body of standing water, usually fresh water, larger than a pool or pond or a body of water filling a depression in the earth surface.

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

Glossary

Input parameters

An input parameter is a term used in groundwater modelling to describe a number of physical parameters used to generate the numerical model.

Intake protection zone (IPZ)

A surface water intake protection zone is one of four types of vulnerable areas identified in the Ontario Clean Water Act, 2006. Intake protection zone (IPZ) means the area of land and water that contributes source water to a drinking water system intake within a specified distance, period of flow time (for example, two hours), and/or watershed area. River and lake intakes can be contaminated when dangerous materials are spilled into the water or on nearby land and make their way to the intake. Intake protection zones are areas where dangerous materials may get to an intake so quickly the operators of the municipal water treatment plant may not have enough time to shut down the intake before the pollutant reaches it. See also 'Surface water intake protection zones'

Integrated resource management

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

Integrated watershed management

See 'integrated resource management.'

Interbedded Argillites

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

Interception loss

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

Interflow (subsurface stormflow)

Interflow, or subsurface stormflow, is 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

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.

Glossary

Intermediate facility

An intermediate facility is 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.

Intermittent

Intermittent is stopping and beginning again, pausing at intervals. An intermittent stream is a watercourse that does not flow permanently year-round.

Invertebrates

Invertebrates are animals lacking a spinal column.

Intrinsic

Something 'intrinsic' is by its very nature.

Intrinsic susceptibility

Intrinsic susceptibility is a measure of the natural protection of an aquifer from overlying layers with low permeability. See 'Intrinsic Susceptibility Index.'

Intrinsic Susceptibility Index (ISI)

Intrinsic Susceptibility Index (ISI) is a calculated value that estimates the susceptibility of a given groundwater aquifer to contamination by activity or water on the surface at a given point. It is 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

Intrinsic vulnerability is the potential for the movement of a contaminant(s) through the subsurface based on the properties of natural geological materials. How quickly does water move vertically from the surface down to the aquifer? This is called 'intrinsic vulnerability.'

Irrigation

Irrigation is the controlled application of water for agricultural purposes through man-made systems to supply water requirements not satisfied by the fall of rain or snow.

Irrigation return flow

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

ISI

See 'Intrinsic Susceptibility Index.'

Issue

An issue is a threat that currently interferes with, or could interfere with, the use or availability of a drinking water source. See also 'drinking water issue.'

Glossary

JK

Kame

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

Kame-like

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

Karst

Karst relates to 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

Karst formations occur in 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

Knowledge gaps refer to a lack of referenced materials or expertise to assess certain characteristics of the specific source protection area (study area or watershed) that can be adequately described without tabular or spatial data.

Kyanite

Kyanite is 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.

L

Lacustrine

Lacustrine means 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

A lagoon is a water impoundment in which organic wastes are stored or stabilized, or both. One type is a sewage lagoon.

Lakeward

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

Glossary

Land base

Land base is 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 conservation measure

Land conservation measures could include land purchases, easements or leasing of land in areas of highest vulnerability to reduce risk to drinking water sources. See also 'land securement.'

Landform

Landform defines the physical shape of the landscape and the materials based on how the geologic material was deposited by glaciers.

Land securement

Land securement could include land purchases, easements or leasing of land in areas of highest vulnerability to reduce risk to drinking water sources.

Land use

Land use is particular use of space at or near the earth surface with associated activities, substances and events related to the particular land use designation.

Landward

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

Largest Amplitude Meander

The Largest Amplitude Meander is 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 Late Wisconsian Age is 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

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

Leachate-impacted

Leachate-impacted is an area affected by leachate contamination.

Leaching

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

Glossary

Lead source protection authority

Ontario Regulation 284/07 designates a lead source protection authority (SPA) for each source protection region. The lead SPA coordinates the efforts of all the source protection authorities within that region and takes on unique roles and responsibilities, some of which are outlined in the *Clean Water Act, 2006* and regulations and some of which are set out in an agreement between the source protection authorities in the region. The Act requires that there be an agreement between the source protection authorities in a region to govern the relationship between the lead and the other source protection authorities. Ausable Bayfield CA is the lead authority in the ABMV region but the Ausable Bayfield and Maitland Valley source protection authorities work in close partnership through a joint management committee. See also 'source protection authority.'

Lepidolite

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

Liaising

Liaising is a business act to refine logistics around gathering data and information.

Limestone

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

Limnetic Zone

Limnetic Zone is 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

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

Lithologic is he composition and physical features of rocks.

Littoral

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

Littoral cell

Littoral cell is 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.

Glossary

Livestock density

Livestock density means the number of farm animals grown, produced or raised per square kilometre of an area, separated by type of farm animals specified in section 3.1 of the Nutrient Management Protocol. It is 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

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

Lotic

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

Local area

Local area means:

(a) In respect of a surface water intake, the drainage area that contributes surface water to the intake and the area that provides recharge to an aquifer that contributes groundwater discharge to the drainage area, and;

(b) In respect of a well, the area that is created by combining the following areas:

(i) The cone of influence of the well;

(ii) The cones of influence resulting from other water takings where those cones of influence intersect that of the well, and;

(iii) The areas where a reduction in recharge would have a measurable impact on the cone of influence of the well;

Local discharge

Local discharge is discharge to a watercourse that originates nearby. The water moves through the upper layers of the groundwater system.

Lowflow

Lowflow is the flow that exists in a stream channel in dry conditions.

Lowflow augmentation

Lowflow augmentation is increasing lowflows 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)

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

Glossary

Luvizols

Luvizols are 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.

M

Macroinvertebrates

Macroinvertebrates are animals lacking a spinal column that are visible with the unaided eye.

Mafic

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

Magma

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

Managed lands

'Managed land' means land to which materials are applied as nutrients. See also 'managed agricultural land.' Managed lands are defined in the rules (section 1, page 3) and refer to any land where nutrients are applied. Golf courses and tree farms may be counted unless they don't apply nutrients (some do not, but most do). Further details on what is to be done with them are in the glossary for the tables of drinking water threats. The definition is not what is in the Nutrient Management Act; for source protection is has been defined specifically. It includes all lands where nutrients are applied, which means the application of non agricultural source material (NASM), agricultural source material (ASM) or commercial fertilizer. This has nothing to do with storage, which is handled separately within the threats list. Thus, it is usually crop land, possibly pasture land (if they apply nutrients), golf courses (where they apply fertilizer), etc. Land used for pasture only would not fall into the managed lands count unless nutrients are applied by the agricultural property owner. If the land is pasture one year, but could be crop land another year where nutrients are applied, then it would go in the count.

Manganese

Manganese is a grey-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.

Glossary

Marsh

Marshes are wet areas periodically inundated with standing or slowly moving water, and/or permanently inundated areas characterized by robust emergents, and to a lesser extent, anchored floating plants and submergents. Surface water levels may fluctuate seasonally, with declining levels exposing drawdown zones of matted vegetation or mud flats. Standing or slow-moving water with emergent plants covering greater than 25 per cent. 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

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

Maximum acceptable concentration (MAC)

Maximum acceptable concentration (MAC) is the term used for limits applied to substances above which there are known or suspected adverse health effects.

Meandering

Meandering is a curve in the course of a river which continually swings from side to side.

Meandering system

A meandering system is 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 measure is 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.

Meltwater channel

A meltwater channel is the path of drainage and leftover sedimentary deposits from ice or snow melt.

Membrane filtration

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

Glossary

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

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

Metamorphism
Metamorphism is 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
Metasedimentary is partly metamorphosed sedimentary rock.

Metavolcanics
Metavolcanics is partly metamorphosed volcanic rocks.

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

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

Micrograms per litre
Micrograms per litre is a measure of the amount of solids, or dissolved solids, in a solution in terms of micrograms of solid per litre of solution. It is equivalent to a part per billion in water.

Migmatite
Migmatite is 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)
Milligrams per litre (mg/l) is a measure of the amount of solids, or dissolved solids, in a solution in terms of milligrams of solid per litre of solution; equivalent to a part per million in water.

Glossary

Minerotrophic

Minerotrophic refers 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

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

Model

A model is an assembly of concepts in the form of mathematical equations or statistical terms that portrays a behavior of an object, process or natural phenomenon.

Model calibration

Model calibration is 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

Model domain is the boundaries of a numerical model.

Model evaluation

Model evaluation is the comparison of model results with numerical data independently derived from experiments or observations of the environment.

Model validation

Model validation is the 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

Model verification is 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

Moisture is water diffused in the atmosphere or the ground.

Monitoring

Monitoring is periodic evaluation of a site to determine success in achieving goals.

Monitoring well

Monitoring well is 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.

Glossary

Morphoedaphic Index (MEI)

A Morphoedaphic Index (MEI) is 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.

Mouth

The mouth marks the end of a watercourse at a body of water, usually a lake or the sea.

Moraine

Moraine is an accumulation of earth and stones carried by a glacier which is usually deposited into a high point like a ridge. The debris or rock fragments brought down with the movement of a glacier.

Multi-barrier approach

The multi-barrier approach creates several barriers of protection, beginning with drinking water protection at the source. This preventive approach to risk reduction also includes treatment, testing, monitoring and training.

Multi-variant analysis

Multi-variant analysis is 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

Municipal residential system refers to all municipal drinking-water systems that serve or are planned to serve a major residential development (i.e., six or more private residences). A municipal residential drinking water system is a large municipal residential system or a small municipal residential system as defined in Ontario Reg. 170/03.

Municipal well (public or community well)

A municipal well refers to a pumping well that serves five or more residences.

Municipal residential drinking water system

A municipal residential drinking water system is a water treatment facility that is either owned and or operated by the municipality to provide drinking water to residents in that community. This may be water from groundwater (wells) or surface water sources like rivers and lakes. See 'drinking water system.'

Glossary

N

Natural flow

Natural flow is 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.

Naturalize

To make a part of the physical environment natural, free from conventional characteristics.

Naturally occurring processes

Naturally occurring processes are processes that occur in nature and that are not the result of human activity. For example, erosion along a stream that provides a source of drinking water or the leaching of naturally occurring metals found in bedrock into groundwater.

Nephelene syenite

Nephelene syenite is 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)

Nitrate (NO3) is 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 rural water bodies, major sources of nitrates may include septic tanks, livestock wastes, and fertilizers.

Nitrite (NO2)

Nitrite (NO2) is a product in the first step of the two-step process of conversion of ammonium (NH4) to nitrate (NO3).

Non-agricultural source materials

Non-agricultural source materials are used to apply to land as nutrients that do not originate from agricultural activities. These include 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 year-round residential systems are 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

Glossary

Non-point source pollution

A source of pollutants from a wide geographic area, such as manure runoff, stream bank erosion, and storm water runoff, which threatens the quality of surface and groundwater sources of drinking water. Pollution of the water from numerous locations that are hard to identify as point source, like agricultural activities, urban runoff and atmospheric deposition.

Non-renewable resources

Non-renewable resource is a resource that is not capable of being replaced by natural ecological cycles or sound management practices within the timeframe of a human life.

Normal operating range

Normal operating range is a specified range that lake elevations would be regulated to during typical conditions.

Nutrient Management Act

The purpose of the *Nutrient Management Act, 2002* 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.

Nutrients

Nutrients are elements or chemicals (particularly phosphorus) that stimulate the growth of aquatic plants and may lead to eutrophication.

Nutrient unit

A nutrient unit is 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).

O

O'Connor Inquiry

In May 2000, drinking water contaminated with E. coli and campylobacter bacteria killed seven people and made more than 2,300 ill in Walkerton, Ontario. After the tragedy, the Ontario government established a public inquiry led by the Honourable Dennis O'Connor. Commissioner O'Connor's findings were released in two volumes. The Report of the Walkerton Inquiry, Part One: The Events of May 2000 and Related Issues reported on the events in Walkerton and the causes of the tragedy. It was released in January 2002 and contained 28 recommendations. Part Two: A Strategy for Safe Drinking Water was released in May 2002 and contained 93 recommendations. The following passage is from Part Two of the Report, page 5: "While it is not possible to utterly remove all risk from a water system, the recommendations' overall goal is to ensure that Ontario's drinking water systems deliver water with a level of risk so negligible that a reasonable and informed person would feel safe drinking the water." In its efforts to address all of the recommendations of the O'Connor Inquiry, the Ontario government has introduced numerous new pieces legislation and regulations. These include the *Clean Water Act, 2006*, the *Safe Drinking Water Act* (SWDA), the *Sustainable Water and Sewage Systems Act*, the *Nutrient Management Act, 2002* and the Drinking Water Systems Regulation.

Glossary

Official plan (OP)

An official plan (OP) is 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. It is an official plan prepared in accordance with part III of the Planning Act.

Oligotrophic lakes

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

Ombortrophic

Ombortrophic refers to areas that are entirely dependant on nutrients from rain.

100-Year monthly mean lake level (Great Lakes-St. Lawrence River system and large inland lakes)

100-year monthly mean lake level (Great Lakes-St. Lawrence River system and large inland lakes) is 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

100-year storm is a frequency-based storm that on average will occur once every hundred years but has a one per cent chance of occurring or being exceeded in any given year.

100-year wind setup (Great Lakes-St. Lawrence River system and large inland lakes)

100-year wind setup (Great Lakes-St. Lawrence River system and large inland lakes) is the wind setup having a total probability of being equaled or exceeded during any year of one per cent. 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.

Ontario Drinking Water Quality Standards

Ontario Drinking Water Quality Standards are regulated standards (Ontario Regulation 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.

Ontario Ministry of the Environment (MOE)

The Ontario Ministry of the Environment (MOE) is that provincial ministry that is spearheading drinking water source protection in Ontario. The *Clean Water Act, 2006* was proclaimed into full effect in July of 2007, and ensures that communities are able to identify potential risks to their supply of drinking water, and take action to reduce or eliminate these risks through source protection plans to be enacted in 2012s. For more information visit **ene.gov.on.ca**

Glossary

Organic compounds

Organic compounds are natural or synthetic substances based on carbon.

Open-water marsh

An open-water marsh is standing or flowing water with emergent plant cover of less than 25 per cent. Submergent and/or floating-leaved plant cover is normally greater than 25 per cent, but includes sites with lower submergent cover and sparse emergents. It is permanently flooded or intermittently exposed. It includes shallow lakeshores, ponds, pools, oxbows and channels. It is distinguished from deep water aquatic systems by mid-summer water depths of less than two metres.

Operational plan

An operational plan is 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 matter

Organic matter is of, relating to, or derived from living organisms.

Organic soil

Organic soil is soil materials that have developed predominately from organic deposition (i.e., containing greater than 17 per cent organic carbon or approximately 30 per cent organic matter by weight).

Organism

An organism is an individual form of life that includes bacteria, protozoa, fungi, viruses, algae, plants and animals.

Orthophoto mapping

The orthophotographic 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

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

Outwash

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

Outwash sand

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

Glossary

Overburden

Overburden is unconsolidated geologic material above the bedrock. It is used to describe the soil and other material that lies above a specific geologic feature.

Over-withdrawal

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

Oxbow

An oxbow is 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.

P

Parcel

A parcel is a conveyable property, in accordance with the provisions of the *Land Titles Act*. See 'property parcel.'

Parcel level

The parcel is the smallest geographic scale at which risk assessment and risk management are conducted.

Parthenogenesis (parthenogenically)

In biology, parthenogenesis a form of reproduction in which the ovum develops into a new individual without fertilization.

Part per billion (ppb)

Part per billion (ppb) is 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 (µg /l).

Part per million (ppm)

Part per million (ppm) is 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.

Pathogen

A pathogen is a bacterial or virus that is dangerous to human health. It can found in human or animal waste. Human pathogens can be found in septic tanks. Manure contains animal pathogens. A pathogen is an organism capable of producing disease. See also 'E. coli.'

Glossary

Pathogenic contaminant

A pathogenic contaminant is a microscopic organism that is capable of producing infection or infectious disease in humans. See also 'pathogen' and 'contaminant.'

Pathways

See 'preferential pathways' and 'transport pathways.'

Peak flow

Peak flow is the greatest rate of flow of water (highest recorded level) in a river within a defined time interval (for example, annual peak flow, daily peak flow).

Peatland

Peatland is a 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."

Percolation

Percolation is the downward movement of water in the ground through porous soil and cracked or loosely-packed rock.

Perched aquifer

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

Percolation

Percolation is 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

Permeable is a porous surface through which water passes quickly.

Permeability

Permeability is the quality of having pores or openings that allow liquids to pass through. 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 (PTTW)

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

Glossary

Pesticides

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

Petalite

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

Petrification

The word petrification is used to describe the replacement of organic material by minerals in the formation of fossils.

pH

pH is 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.

Phosphorus

Phosphorous is an essential nutrient that contributes to plant productivity and, in excessive amounts, pollutes and leads to eutrophication of a water system. Phosphorus accumulates along the entire length of a river from a variety of point and non-point sources.

Photic Zone

The Photic Zone is that portion of the water body directly affected by sunlight. See also 'Aphotic Zone.'

Physiography

Physiography is the study or description of landforms– form and process.

Planned drinking water source

A planned drinking water source is the drinking water source (i.e., aquifer or surface water body) from which planned municipal residential systems or other planned designated systems are projected to obtain their drinking water from in the future and for which specific wellhead protection areas and surface water intake protection zones have been identified.

Piezometer

A piezometer is 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 Piezometric surface is the imaginary surface that coincides with the head of the water in an aquifer.

Glossary

Piping

Piping is 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

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

Plume

A plume is a pattern of contaminant concentrations created by the movement of water. The spill/source site is the highest concentration, and the concentration decreases away from the source. See 'contaminant plume' and 'pollution plume.'

Pluton

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

Plutonic rock

Plutonic rock is an intrusive rock formed inside the earth.

Point-source pollution

Point-source pollution comes from a distinct source, such as an industrial discharge pipe, underground storage tank, septic system, or spills. An example of a source of pollutants would be a municipal treatment plant or an industrial facility, often by way of a pipe.

Policy

A policy is 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 policy approach is an approach to a threat policy which relies upon the reduction of risk posed by drinking water threats. The various policy approaches that can be used by a source protection committee, according to the *Clean Water Act, 2006*, are, depending on the presence of potential significant drinking water threats or not: 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.

Glossary

Pollution plume

A pollution plume is a pattern of contaminant concentrations created by the movement of water – an area of a stream or aquifer containing degraded water resulting from migration of a pollutant. Contaminants spread in the direction of the water movement. The spill/source site has the highest concentration, the concentration decreases as the plume moves away from the source.

Polymer

A polymer is a compound whose matrix is an accumulation of millions of identical, interwoven patterns of molecules.

Poorly drained

Poorly-drained soils are soils that are saturated at or near the surface during a sufficient part of the year such that field crops cannot be grown without drainage.

Porosity

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

Porous

Porous is having 'pores' or 'holes' – allowing liquid or gas to pass through.

Potable water

Potable water is water that is safe for drinking.

Potentiometric contour

Potentiometric contour is the elevation at the potentiometric surface.

Potentiometric surface

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

Precambrian Era

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

Precambrian Shield

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

Glossary

Precipitation

Precipitation is the deposits of water, in either liquid or solid form, which reach the Earth from the atmosphere. It includes rain, sleet, snow and hail. Precipitation is moisture falling from the atmosphere in the form of rain, snow, sleet or hail.

Precipitation indicator graph

A precipitation indicator graph shows 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.

Precipitation indicators

Precipitation indicators measure 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: Per cent of average = 100 times total monthly precipitation/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 percentage 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, the Ontario Ministry of Natural Resources will add up the number of consecutive readings that register no rain (less than 7.6 millimetres).

Preferential pathways

Preferential pathways are 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

A private well is a groundwater source that serves one home or is maintained by a private owner.

Productivity

Productivity is the rate of production, especially of food or solar energy by primary producer organisms.

Profundal Zone

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

Promontory

Promontory is an area of high land jutting out into the water.

Glossary

Property

Property is a piece of land – it may be a residential, industrial, agricultural, commercial, municipal or other site.

Property fragment

A property fragment is a part of a property. Drinking water threats have been identified by parcel fragment. Any given property may have several 'fragments.' Parcel fragment refers to the different land uses that can take place on one property or within one or more groundwater vulnerability scoring zones. A property may be fragmented by two groundwater vulnerability vulnerable area zones. A farm may be divided into the fields, the buildings and storage area and the farmstead. An industrial property may have an outdoor storage fragment and a building fragment. Possible threats have been identified for these fragments based on the intrinsic risk.

Property parcel

A parcel is a conveyable property, in accordance with the provisions of the Land Titles Act.

Protozoa

Protozoa are 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 risk management catalogues

Provincial risk management catalogues are databases that will contain information on risk management measures (RMM) to reduce the risk that drinking water threats pose to source water.

Provincial Table of Circumstances

The Ontario Ministry of the Environment has developed tables showing the level of risk posed by hundreds of combinations of threats and vulnerability in certain circumstances. These tables are available at **sourcewaterinfo.on.ca** and the province's Drinking Water Ontario site.

QR

Raw water

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 imposed by the license or approval for the system.

Raw water supply

Raw water supply is water outside a drinking-water system that is a source of water for the system.

Glossary

Receptor

A receptor is 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

A recharge area is an area where water enters a saturated zone at the water table surface.

Regional discharge

Regional discharge is water that has traveled deep beneath the ground through the saturated zone and resurfaces at the water table.

Regulated areas

Regulated areas are those areas for which conservation authorities delineate and restrict alterations to lands, watercourses, wetlands and development by making regulations under the *Conservation Authorities Act* and *The Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation* (Ontario Regulation 97/04).

Regulation limit

'Regulation limit' means the area delineated on a map or series of maps filed at the head office of a Conservation Authority in accordance with a regulation made under subclause 28(1)(c) of the *Conservation Authorities Act* and subsection 4(4) of Ontario Regulation 97/04 (Content of Conservation Authority Regulations Under Subsection 28(1) of the Act: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) made under that Act.

Renewable resources

Renewable resources are resources that are capable of being replaced through ecological processes or sound management practices.

Reserve amounts

Minimum flows in streams that are required for the maintenance of the ecology of the ecosystem.

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.

Glossary

Restoration

Restoration is changing existing function and structure of wetland habitat so that it is similar to historical conditions.

Return period

Return period is the frequency in which a flow event in a stream is likely to repeat itself.

Riffle/pool system

A riffle/pool system is a riverine system that alternates cycles of shallow broken water (riffle) and deeper still water (pool).

Riparian area

The riparian area is the area that lies as a transition zone between upland areas (such as fields). and other areas (such as streams, wetlands, lakes, rivers, etc.) The zone is intermittently inundated and usually supports wet meadow, marshy or swampy vegetation.

Riverine

Riverine is relating to or resembling a river.

Runoff

Runoff is water that moves over land rather than being absorbed into the ground. Runoff is greatest after heavy rains or snowmelts, and can pick up and transport contaminants from landfills, farms, sewers, industrial or commercial operations or other sources.

Risk

See 'significant drinking water threat' and 'drinking water risk' and 'risk score.'

Risk score

Risk score = Hazard rating X Vulnerability score

To decide which threats are significant, the Ontario Ministry of the Environment has developed a formula to calculate a risk score based on:

- Hazard rating of the threat, on a 10-point scale
- Vulnerability of the water source, on a 10-point scale

The risk score is calculated by multiplying the hazard rating by the vulnerability score. The result will be a number on a 100-point scale.

S

Safe Drinking Water Act

Safe Drinking Water Act, 2002 (SDWA) means the legislation passed by the Ontario government which recognizes that the people of Ontario are entitled to expect their drinking water to be safe and provides for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing.

Glossary

Saturated soil
Saturated soil is soil that is full of moisture.

Scale
A graduated series or scheme of rank or order.

Security of well or intake infrastructure
Security of well or intake infrastructure is an evaluation of structures/measures that are in place or are needed to protect a municipal groundwater supply well or surface water intake from potential contamination from external sources.

Sediment
Sediment is material deposited by water, wind or glaciers.

Sedimentary bedrock
Sedimentary bedrock is rock formed of mechanical, chemical or organic sediment such as rock formed from sediment transported from elsewhere, by chemical precipitation from solution or from inorganic remains of living organisms.

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

Sensitivity analysis
Sensitivity analysis evaluates the effect of changes in input values or assumptions on a model results.

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

Glossary

Sinkhole

A sinkhole is a depression in the surface of the ground, with or without collapse of the surrounding soil or rock, which provides a means through which surface water can enter the ground and therefore come in contact with groundwater. Sinkholes often allow this contact to occur quite rapidly and do little to filter any contaminants the surface water may contain.

Site-level

Site-level is 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

Slope is ground that forms a natural or artificial incline.

Source protection

Source protection means a program of education, stewardship, planning, infrastructure, and regulation activities that together serve to help prevent the contamination or overuse of source water. See 'drinking water source protection.'

Source protection area

Generally, source protection areas are based on the existing 36 conservation authority boundaries (however there are exceptions). For administrative efficiency, some source protection areas (SPAs) have been grouped together to form source protection regions. Source protection areas and regions have been defined in *Ontario Regulation 284/07*. Source protection area means 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

Source protection authority (SPA) means a conservation authority or other person or body that is required to exercise powers and duties under the *Clean Water Act, 2006*. Source protection authority refers to the role that conservation authorities play in drinking water source protection. Generally, where a conservation authority exists it becomes the source protection authority for the area, but they have additional roles and responsibilities as laid out in the *Clean Water Act, 2006*. *Ontario Regulation 284/07* establishes source protection authorities across Ontario. See also 'lead source protection authority.'

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Glossary

Source protection committee

Source protection committee (SPC) means a group of individuals who have been appointed under the *Clean Water Act, 2006* by a source protection authority to coordinate source protection activities for a source protection region. The Ontario Ministry of the Environment (MOE), through the *Clean Water Act, 2006*, has introduced source protection committees for 19 watershed-based regions of the province. These committees were created locally and include representatives of municipal, economic and other interested sectors of the region. These committees involve almost 290 locally-recruited members across Ontario, including:

93 Municipal representatives (one third of Source Protection Committees are made up of representatives from local municipalities);

93 Agriculture, commercial, industrial and small business representatives (one third of source protection committees are made up of representatives from the following sectors: agriculture, industry, aggregates, commerce, tourism and recreation, land developers, golf courses, mining, petrochemical, forestry and transportation);

93 members who fall under the category of 'other' representatives (one third of source protection committees are made up of representatives from landowner and lake associations, environmental groups, the public at large and topic experts).

The Ausable Bayfield Maitland Valley Drinking Water Source Protection Committee (SPC) is made up of the following member representation:

Municipal representatives (5)
Agricultural representatives (3)
Public-at-large representatives (2) – Maitland Valley and Ausable Bayfield SPAs
Environmental representatives (2)
Industrial representative (1)
Commercial representative (1)
Property owner associations representative (1)
There are also non-voting liaison members:
First Nations
Ontario Ministry of the Environment
Health
Source protection authorities

Glossary

Source protection plan (SPP)

The source protection plan for each source protection area (roughly equivalent to a conservation authority's jurisdiction) must set out policies intended to ensure that all significant drinking water threats cease to be significant and that potential threats are managed in such a way that they will not become significant drinking water threats. The source protection committee must consult with municipalities/public and make the source protection plans available to the public. The source protection committee will create plans in 2012 for both the Ausable Bayfield and Maitland Valley source protection areas. In general, a source protection plan builds on the information collected in the assessment reports to establish policies to protect drinking water supplies. The *Clean Water Act, 2006* states that the plans must address significant threats to drinking water. There are various tools and approaches that may be included in a source protection plan. Many of these are already available to people who manage land uses and activities, such as municipalities, for the protection of drinking water. Some of these will be familiar to people, such as land-use planning (by-laws and zoning), regulations (e.g., you may need a nutrient management plan to apply animal waste), and stewardship (e.g. education and best management practices). Others may be less familiar, such as monitoring water quality to make sure an activity is not impacting the local area in a way that would negatively impact the drinking water supply. Each plan is approved by the Ontario Ministry of the Environment. The plans will outline policies and programs to eliminate significant threats to the water supply as well as reduce the opportunity for low and moderate threats to become significant. The plan will be a document which specifies the actions required to protect and enhance drinking water sources in the source protection area (watershed). The source protection committee will establish criteria for policy development, priority areas based on the assessment report, along with monitoring and implementation requirements. Source protection plans will outline the steps that must be taken in a watershed to reduce the risk posed by significant threats. They could propose a variety of approaches such as incentive programs, monitoring activities, risk management plans, changes to municipal land use policies and others. However, there are actions that property owners can take now to decrease the risk that an activity on their lands could pollute a drinking water source. For more information on early actions grants for owners of homes, farms, businesses and other properties, see **sourceprotectionstewardship.on.ca**

Source protection planning

Source protection planning is the process of creating local, watershed-based, science-based plans for the protection of the quality and quantity of municipal drinking water sources, now and in the future. Plans will created by local stakeholders on the source protection committee (SPC). See 'source protection plan.'

Source protection region

Source protection region (SPR) means two or more source protection areas that have been grouped together under *Ontario Regulation 284/07*. This region is made up of two areas: the jurisdiction of the Maitland Valley Conservation Authority / Source Protection Authority and the jurisdiction of the Ausable Bayfield Conservation Authority / Source Protection Authority.

Glossary

Source water

Source water means untreated water that is found in groundwater aquifers and surface water lakes and rivers that is used to supply a drinking water system. Communities rely on wells (groundwater) or intakes (surface water) for their water supply. Both can be vulnerable to pollution.

Spawn

Spawn is the mass of eggs deposited by fish, amphibians, mollusks, crustaceans and like animals. Spawn can be to produce and deposit eggs or sperm directly into the water, as fish do; to produce in large number. To spawn is to produce and deposit eggs in the reproductive process (particularly in aquatic animals).

Spillway

A spillway is the valley that results when glacial meltwater cuts into the landscape. Spillways are often composed of sand and gravel.

Stratigraphy

Stratigraphy is the geology that deals with the origin, composition, distribution and succession of layers of the Earth.

Stream

A stream is a body of water flowing on the surface of the Earth.

Study area

The study area for drinking water source protection refers to the source protection areas. For instance, watershed characterization information may be collected for the entire watershed area while policies will concentrate on vulnerable areas and those property fragments where potential significant drinking water threats may be present.

Study year

'Study year' means the calendar year immediately before the year in which the most recent terms of reference related to the source protection area was required to be submitted to the Ontario Minister of the Environment in accordance with section 10 of the *Clean Water Act, 2006*.

Substrate

Substrate is the base on which an organism lives.

Subwatershed

A subwatershed is an area that is drained by an individual tributary into the main watercourse of a watershed.

Glossary

Surface to aquifer advection time (SAAT)

The surface to aquifer advection time is the average time required by a water particle to travel from a point at the surface to the aquifer of concern. The SAAT is approximated by using the vertical component of the advective velocity integrated over the vertical distance and the average porosity.

Surface to well advection time (SWAT)

Surface to well advection time is 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

Surface water is the water that is present on the surface of the Earth, and may occur as rivers, lakes, wetlands, ponds, etc.

Surface water intake protection zone (IPZ)

A surface water intake protection zone is means an area that is related to a surface water intake and within which it is desirable to manage, regulate or monitor potential drinking water threats. Intake protection zones were drawn around the intakes and assigned vulnerability scores on a 10-point scale:

- IPZ-1: For a lake intake, a one-kilometre circle around the intake except where it meets shore – at which point it is drawn 120 metres from shore or the extent of the regulation limit, whichever is greater.
- IPZ-2: The area where water can reach the intake in a specified time, usually two to six hours.
- IPZ-3: Areas where there are activities further away from the intake which could have an impact on water quality.

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 system, 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. See also 'intake protection zone.'

Glossary

Surface water vulnerability analysis

Surface water vulnerability analysis is the vulnerability analysis that includes looking at both surface water and groundwater vulnerability. Because it is above ground, surface water, or water that is found in lakes, rivers and streams, is vulnerable to many types of contaminants. The surface water vulnerability analysis is the part of the assessment reports that looks at the likelihood that surface water will become contaminated, especially in the areas around drinking water intake pipes. The surface water vulnerability analysis requires that vulnerable areas around intake pipes (also known as intake protection zones or IPZs) be identified, mapped and given vulnerability scores. An uncertainty assessment is also done to identify where the science may need to be improved in future source protection planning cycles. Researchers studied how water moves in the area around each intake. For a river intake, they looked at how quickly it gets to the intake during high and low flows. For a lake intake, they studied how the movement of water is affected by currents and winds. For both types of intakes they identified streams, municipal storm sewers and rural drains that enter the river or lake near the intake. Intake protection zones were drawn around the intakes and assigned vulnerability scores on a 10-point scale.

Surficial geology

Surficial geology deals with the study and description of the forms on the outer layer of the Earth.

Susceptibility

Susceptibility is the likelihood of water in an area to be contaminated by a potential source of contamination based on factors including hydrogeologic sensitivity.

Swamp

Swamps are wooded wetlands with 25 per cent cover or more of trees or tall shrubs. Swamps are standing, to gently flowing, waters that occur seasonally or persist for long periods on the surface. Many swamps are characteristically flooded in spring, with dry relict pools apparent later in the season.

T

Table of drinking water threats

See 'Provincial Table of Circumstances.'

Targets

In the context of technical guidance documents, these are detailed goals that are often expressed as numeric goals (e.g., to reduce contaminant X in this aquifer by 10 per cent by 2009).

Glossary

Terms of reference

The terms of reference (ToR) are work plans for the two source protection areas (Ausable Bayfield and Maitland Valley) for the source protection committee to guide its work in preparation of assessment reports and source protection plans. The terms of reference describes the tasks required for the assessment reports including a description of the task, the lead responsibility for the task, and timeline. The Ontario Minister of the Environment has approved the terms of reference documents for the Ausable Bayfield and Maitland Valley source protection areas.

Terrestrial

Terrestrial is living on or growing on land.

Thermal regime

Thermal regime is the characteristic behaviour and pattern of temperature.

Threat

See 'drinking water threat' and 'significant drinking water threat.'

Threats identification

Researchers working for source protection authorities (conservation authorities) or municipalities have used a variety of means to identify the possible location of potential threats. They have examined documents such as publicly available industrial databases and land classification systems. In some cases, they have obtained information directly from property owners. They have also taken care and precaution by making assumptions in certain cases, such as that a rural home would have a septic system or that a home might store home heating oil, until such time as information can be updated to indicate otherwise. Site visits to industrial, agricultural and commercial properties have been taking place to verify that information and a survey has been distributed to households located in key vulnerable areas. The location of properties containing potential significant threats are not identified in the assessment reports. The reports only identify the number and type of potential threats in the wellhead and intake protection areas. Individual property owners have been notified if it is believed their land is the site of a potential significant drinking water threat. Field-verification site visits have begun with staff visiting property owners and conducting surveys to assess the potential of threats on the property. Household surveys have also been distributed, and a large percentage returned, in the case of residential properties in key vulnerable areas.

Threats table

The threats table refers to the Ontario Ministry of the Environment's list of 21 threat activities or conditions under the *Clean Water Act, 2006*. See 'Provincial Table of Circumstances.'

Tier 1 water budget

Tier 1 water budget means the simplified, structured means to estimate water flow volumes and compared to consumptive demand. 'Tier One' in respect of a water budget means a water budget developed using a geographical information system or equivalent to assess groundwater flows and levels, surface water flows and levels, and the interactions between them.

Glossary

Tier Two water budget

Tier Two water budget means the use of more detailed and complex tools to estimate water flow volumes and to compare them to consumptive demand. 'Tier Two' in respect of a water budget means a water budget developed using computer based three-dimensional groundwater flow models and computer based continuous surface water flow models to assess groundwater flows and levels, surface water flows and levels, and the interactions between them

Tier Three water budget

'Tier Three' in respect of a water budget means a water budget developed using computer based three-dimensional groundwater flow models and computer based continuous surface water flow models to assess groundwater flows and levels, surface water flows and levels, and the interactions between them, and that includes consideration of the following circumstances:

(a) Current and future land cover within the area;

(b) Hydraulic flow controls within the area;

(c) Water taken by the surface water intakes and wells related to the area;

(d) Other uses of water within and downstream of the area;

(e) Steady and transient states in groundwater;

(f) Drought conditions;

(g) The average daily supply and demand for surface water within the area, and;

(h) Average monthly supply and average monthly demand for groundwater within the area;

Till

Till is a tough unstratified clay loaded with stones originating from finely ground rock particles that were deposited by glacial activity.

Time of travel (TOT)

Time of travel is an estimate of the time required for a particle of water to move in the saturated zone from a specific point in an aquifer into the well or intake. 'Time of travel' means:

(a) In respect of groundwater, the length of time that is required for groundwater to travel a specified horizontal distance in the saturated zone, and;

(b) In respect of surface water, the length of time that is required for surface water to travel a specified distance within a surface water body.

Tolerance of a water supply system

Tolerance of a water supply system is a measure of the ability to sustain required pumping levels even during exposure events.

Topography

Topography is a detailed description or representation of the features, both natural and artificial, or an area. Also the physical and natural features of an area, and their structural relationships.

Glossary

Transport pathway
See 'preferential pathway.'

Transportation corridor
Current rules around adding threats do now allow for the addition of transportation corridors. However, source protection committees can ask for the addition of the transportation of specific substances, within routes or transportation corridors, to be added. The rules to allow for this are specified in an April 2009 technical bulletin on addressing transportation threats, from the Ontario Ministry of the Environment.

Tributary
A tributary is a segment of a watercourse that joins with the main branch.

Type 1 System
'Type I system' means a drinking water system described in subclause 15(2)(e)(i) of the *Clean Water Act, 2006*.

Type 2 System
'Type II system' means a drinking water system described in subclause 15(2)(e)(ii) of the *Clean Water Act, 2006*.

Type 3 System
'Type 3 system' means a drinking water system described in subclause 15(2)(e)(iii) of the *Clean Water Act, 2006*.

U

Uncertainty analysis
Uncertainty analysis investigates the effects of lack of knowledge and other potential sources of error in the model.

Uncertainty score
Uncertainty score addresses known gaps in data/information about, or deficiencies in methods of assessment for, threats and/or vulnerability. It reflects the degree of confidence in the semi-quantitative data used to calculate risk.

Unconfined aquifer
An unconfined aquifer is an aquifer for which the upper boundary is the water table.

V

Valley
A valley is a long, narrow depression on the Earth surface, usually with a fairly regular downward slope. A river or stream usually flows through it.

Glossary

Valuation of the supply

The valuation of the supply is 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.

Vulnerable area

Vulnerable areas under the *Clean Water Act, 2006* 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.

Vulnerability

The word vulnerability describes how easily a well or intake can become polluted with a dangerous material. Researchers have studied each municipal well and intake to determine how vulnerable they are.

W

Water budget

The movement of water within the hydrologic cycle can be described through a water budget or water balance. It is a tool that when used properly allows the user to determine the source and quantity of water flowing through a system. From a groundwater perspective the key components of a water budget are: infiltration, contribution to baseflow, deeper groundwater flow outside the study area and groundwater taking. Water budget is 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 budgets are a critical component of the assessment report for each source protection area. A water budget looks at how much water enters a watershed, how much water is stored and how much water leaves. This information helps determine how much water is available for human uses, while ensuring there is still enough left for natural processes (for example, there has to be enough water in a watershed to maintain streams, rivers and lakes and to support aquatic life). A water budget is similar to your household budget. How much money do you make? How much have you saved? How much can you afford to spend? The water budget process can include up to four tiers, which start simple and get more complex if there are problems with how much water is available in the area. The higher the level or tier, the more complex the science involved and the smaller the area of study. The purpose of moving from one tier of water budget to another is so those involved in source protection planning can be certain about the amount of stress a water supply is under and be sure the complex work is focused on areas that really need it.

Glossary

Water control structure

A water control structure is an engineered structure designed to hold back water and mimic a natural water regime that promotes wetland restoration, without affecting adjacent agricultural practices.

Water cycle

The water cycle is the continuous movement of water from the surface water sources to the atmosphere (by evaporation), from the atmosphere to the land by condensation and precipitation, and from the land back to the surface water source (via stream flow).

Water quality indicator

A water quality indicator is an entity that provides information on the condition and quality of water through its life cycle patterns. Water quality can also be determined through non-living sources, like chemical sampling.

Water quantity threats assessment

The water quantity threats assessment is completed for areas where there are existing problems, or where there may be problems meeting the water needs of a community in the future. The water quantity threats assessment builds on information gathered during the water budget process. It looks at the vulnerable areas around municipal wells and water supply intakes to assess and identify existing water quantity threats as significant threats, or future activities as moderate threats. It also examines water uses, water-using activities and activities that could reduce groundwater recharge in a watershed where moderate or significant stresses have been identified. The water quantity threats assessment is an important component of the assessment report because when more water is taken from an area than can be naturally replenished, such as for human consumption, irrigation or industrial activities, water supplies are threatened and water shortages are possible.

Watershed characterization

The introductory part of the assessment report is a characterization of the watershed. It provides a snapshot of the watershed today. It answers questions such as: What is the land's surface like? Where are the rivers and wetlands located? Where are the roads? What types of soils are there? What types of bedrock are there? Where are the factories? Where do people live? Watershed characterization means a general description of the watersheds, communities, source water, drinking water systems, patterns of water use, and drinking water problems within a given source protection area.

Watershed

A watershed is the area of land that contributes water to a lake, river, or stream.

Water table

The water table is the surface below which the soil is saturated with water.

Glossary

Water taking
'Water taking' has the same meaning as in the Ontario Water Resources Act.

Water well
See 'well.'

Weathering
Weathering is the disintegration of the Earth crust by exposure to the atmosphere, most importantly, rain.

Well
A well is a hole in the Earth surface used to obtain water from an aquifer. For a bored well, an earth auger is used to bore a hole carry earth to the surface. The casing is usually steel, concrete or plastic pipe. Modern dug wells are dug by power equipment and typically are lined with concrete tile. Dug and bored wells have a large diameter and expose a large area to the aquifer. These wells are able to obtain water from less-permeable materials such as very fine sand, silt, or clay. Drilled wells are constructed by either percussion or rotary-drilling machines. Drilled wells that penetrate unconsolidated material require installation of casing and a screen to prevent inflow of sediment and collapse. A flowing, or Artesian, well is completed in a confined aquifer that has a water level higher than the ground surface at the location of the well. This causes water to flow out of the well.

Well capture zone
The well capture zone is an area in the aquifer that will contribute water to a well in a certain time period. It is often measured in days and years. The area at the ground surface is also included if the time period chosen is longer then the travel time for water in the aquifer and the groundwater recharge area is incorporated. See 'wellhead protection area.'

Wellhead protection area (WHPA)
A wellhead protection area (WHPA) is one of four main types of vulnerable areas identified in the Ontario *Clean Water Act, 2006*. A wellhead protection area means an area that is related to a wellhead and within which it is desirable to regulate or monitor drinking water threats. The surface and underground 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 means the surface and subsurface area surrounding a well that supplies a drinking water system, through which contaminants are reasonably likely to move so as to eventually reach the well. Wells draw water from underground areas called aquifers where water fills cracks in bedrock or spaces between grains of sand, gravel or dirt. Aquifers are replenished when water from rain and melting snow soaks into the ground. Sometimes, the water also carries pollutants. It can take years, or even decades, for water to reach a well. The speed depends on the characteristics of the soil and bedrock in the area.

Glossary

Wetlands

Wetlands are 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 or by any other person, according to evaluation procedures established by the Ministry of Natural Resources, as amended from time to time.

Wetland values

Wetland processes or attributes which are beneficial to society.

Working groups

Six local, multi-stakeholder community working groups, a municipal subcommittee of elected municipal representatives, were established in the Ausable Bayfield Maitland Valley Drinking Water Source Protection Region to learn about source protection planning, and review and comment on technical work to date of the source protection project.