Appendix A

Glossary

Absorption:
The penetration of a substance into or through another, such as the dissolving of a soluble gas into a liquid or solid.

Advection:
In hydrogeology, the movement of ground water in response to pressure gradients.

Aerobic:
A life form or process that requires oxygen (air) to proceed.

Algae:
Microscopic aquatic plants. May be single cells or colonial forms, either free floating or attached to substrates.

Algal bloom:
An unusual or excessive abundance of algae.

Alkalinity:
Generally, a liquid's ability to buffer acids.

Alluvium:
A general term for all detrital material deposited, or in transit by streams, including gravel, sand, silt, clay and all variations and mixtures of these. Unless otherwise noted, alluvium is assumed to be unconsolidated.

Ammonia:
A compound of nitrogen and hydrogen (NH3) which when present in water suggests that human or animal wastes have been recently introduced. It can cause nutrient enrichment and eutrophication, and in sufficient quantities can be toxic to aquatic animals.

Ammonification:
The biochemical process whereby ammoniacal nitrogen is released from nitrogen-containing organic compounds.

Ammonium ion:
The cation NH_4 which caries a +1 charge.

Anaerobic:
A life form or process that will only proceed in the absence of oxygen air).

Anthropogenic:
Related to, or influenced by human beings.

Anion:
An ion with a net negative charge.

Aquatic vascular plant:
Plants that grow and live in water. They possess roots, stems, leaves, flowers and a vascular system.

Aquifer:
A geologic formation (or group of formations, or part of a formation) or structure that yields water in sufficient quantities to supply the needs for a water development; usually saturated sand, gravel, fractures, and cavernous and vesicular rock. The term water bearing is sometimes used synonymously with aquifer when a stratum furnishes water for a specific use.

Aquitard:
A geologic unit with relatively low permeability that retards the flow of water and is stratigraphically adjacent to one or more aquifers. The aquitard may lie above or below the aquifers. Synonym: confining layer.

Artesian aquifer:
An aquifer that is overlain by an aquitard and whose piezometric surface is above the top of the aquifer. All artesian aquifers are confined aquifers.

Assimilation:
1. In biology, the conversion or incorporation of adsorbed nutrients into protoplasm.
2. In water pollution, the ability of a body of water to purify itself of (particularly organic) pollution.

Atmosphere:
The layer of air (gases) surrounding the earth.

Atom:
The smallest divisible particle of an element, which retains all the characteristics of that element.

Automatic sampler:
A device designed to collect samples at preset times or when triggered by some other parameter such as water level.

Available nutrient:
That portion of any element or compound that readily can be absorbed and assimilated by growing plants.

Background level:
The amount, or concentration, of a substance naturally present in the environment.

Bacteria:
Single-cell microscopic organisms that possess rigid cell walls. They may be aerobic, anaerobic, or facultative; they can cause disease; and some are important in the stabilization of solid wastes.

Base flow:
The portion of a stream's discharge that comes from groundwater discharge. During dry periods the flow in many streams is entirely do to groundwater discharge.

Basin:
A basin (or drainage basin) is an area of land that drains to a particular river or lake. A basin typically is divided into major and minor watersheds (see *watershed*).

Bedrock:
The in-place portions of rock formations that have not been moved by surficial processes.

Bed load:
The sediment that moves by sliding, rolling, or bounding on or very near the streambed.

Best Management Practice (BMP):
The management practice or combination of practices that is determined to be the most effective and most technically and economically practicable after problem assessment, examination, of alternative practices, and appropriate public participation (EPA Regulation 40CFR).

Biological monitoring:
The measuring of biological parameters to evaluate the condition of some portion of the environment.

Biomass:
1. The total amount of living material per unit area in a particular habitat.
2. An expression of the total weight of a given population of organisms.

Biota:
The flora and fauna of a region.

Biological oxygen demand (BOD):
A measure of the oxygen used in meeting the metabolic needs of aerobic microorganisms in water (particularly in water rich in organic matter); also called biochemical oxygen demand.

Blue-Green algae:
Algal form that may cause water to turn green, gray or brown during late summer periods. Some forms may be toxic in large concentrations.

Cation:
An ion with a net positive charge.

Channel:
A natural stream or excavated ditch that conveys water.

Channel stabilization:
Erosion prevention and control of velocity distribution in a channel using jetties, drops, revetments, vegetation, and other measures.

Chloride:
The common anionic form of chlorine carrying one net negative charge. A common anion in many waters.

Chemical oxygen demand (COD):
A measure of the amount of oxygen required to oxidize the organic and oxidizable inorganic compounds in water. The COD test, like the BOD test, is used to determine the amount of pollution in an effluent.

Chlorophyll A:
A green photosynthetic pigment present in many plant and some bacterial cells. It is used to measure aquatic productivity.

Climate:
The long term average of the meteorological parameters, temperature, moisture, wind, pressure, and evaporation, of a specific point or region. Climate determines the nature of an area's vegetation and influences its landforms, soils and land use. Climate can and has changed on time-scales of decades to centuries.

Cohesion:
The tendency of a material to hold together. The force of attraction between like molecules in solids and liquids. This force generally decreases with increasing temperature.

Colluvium:
1. In geology, material consisting of alluvium and coarse angular fragments of bedrock; also talus and cliff debris.
2. In soils, material that has moved downhill and has accumulated on lower slopes and/or at the bottom of the hill; the downhill motion is produced by the force of gravity and to some extent by frost action, erosion, and biological activity.

Composting:
A controlled process of degrading organic matter by microorganisms.

Conduit:
Any open or closed channel whose intended purpose is the conveyance of water.

Confined aquifer:
An aquifer that is overlain by an aquitard. Some, but not all, confined aquifers are artesian aquifers.

Control:
In research studies, an object or group of objects known to be, or intentionally caused to be, isolated from certain factors which influence other objects in the study. The control group is used as a comparison standard in the evaluation of the impact of the experimental factors upon the non-control objects.

Cone of depression:
The lowering of a water table or potentiometric surface by the extraction of water from a well. In homogeneous aquifers, a cone of depression is roughly conical in shape.

Confining layer:
See *aquitard*.

Conservation tillage:
Any tillage system that reduces loss of soil or water compared to conventional tillage.

Cretaceous:
The geologic period of time between 135 and 65 million years ago. The end of the period was marked by the extinction of the dinosaurs.

Cross-section:
A representation of a surface or line cutting through an object. In hydrogeology, cross-sections typically show the vertical structure along a line or in a boring.

Cover:
Any vegetation or other material, which provides protection from erosion, predators, weather, etc.

Debris:
The loose material arising from the disintegration of rocks and vegetative materials; transportable by streams, ice or floods.

Deciduous plant:
A plant that sheds all its leaves every year at a certain season.

Decomposition:
The breakdown of organic waste materials by biological or chemical processes.

Deep percolation:
In soil science, water which moves below the root zone and can not be utilized by plants, and eventually may recharge groundwater.

Demonstration area:
An area of land with definite boundaries and of sufficient size to illustrate, usually to the public, the results of specific practices in soil and water conservation and land use.

Denitrirification:
The chemical or biochemical reduction of nitrate or nitrite to gaseous molecular nitrogen or oxides of nitrogen.

Deuterium (2H or D):
A rare, stable isotope of hydrogen, which has one proton and one neutron in its nucleus, and thus has an atomic weight close to 2.

Discharge:
In hydraulics, the rate of flow, specifically fluid flow; a volume of fluid passing a point per unit time. Often represented by the symbol Q.

Dispersion:
The act of separating, spreading or scattering. In hydrogeology, it is the dilution of a parameter by mixing into a larger volume of water.

Dissolved oxygen:
State of oxygen that is available to fish and other aquatic life. Produced by aquatic vascular plants and algae.

Dissolved solids:
Dissolved material, organic or inorganic, contained in water or wastes. Excessive dissolved solids make water unpalatable for drinking and unsuitable for industrial uses.

Drainage:
1. The removal of excess surface water or groundwater from land by means of surface runoff or subsurface infiltration.
2. Soil characteristics that affect natural runoff or infiltration.

Drainage basin:
A region or area bounded by a surface runoff divide from which the water is removed by a integrated system (usually a river or stream depending on the scale). More specifically, it is the area that gathers water from precipitation and contributes it to a particular stream channel, system of channels, or to a lake, reservoir, or other body of water.

Draw down:
A lowering of the water table of an unconfined aquifer or the piezometric surface of a confined aquifer by the pumping of ground water from wells.

Drift:
1. In geology, a catchall term that includes all geologic materials that were deposited by glaciers (or their meltwater streams). Drift is composed of stratified and unstratified materials ranging in size from clay to boulders.
2. In agriculture, the unwanted spread, usually by wind, to adjacent fields of pesticides during application.

Easement:
A limited right over land owned by someone else. An easement may be for a certain number of years or be perpetual in duration. An affirmative easement gives the owner the right to use the land for a stated purpose. A negative easement is an agreement with a private property owner to limit the development of his land in specific ways.

Ecoregion:
An area with similar soils, land surface, natural vegetation, and current land use.

Elevation:
The vertical distance of an object from a known datum plane (usually mean sea level or NGVD [National Geodetic Vertical Datum]).

Emergent vegetation:
Aquatic vegetation growing in shallow water, standing up and above the surface; e.g., bulrush, tule grass, cattail.

Equivalent weight:
In chemistry, the molecular weight divided by the valence.

Erosion:
1. The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.
2. Detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Eutrophication:
The aging process by which lakes are fertilized with nutrients. *Natural eutrophication* will very gradually change the character of the lake. *Cultural eutrophication* is the accelerated aging of a lake as the result of human activities.

Evapotranspiration:
The combined loss of water from a given area and during a specific period of time, by evaporation from a soil and/or water surface and transpiration by plants on that surface.

Facultative:
A life form or process that can proceed in either the presence or absence of oxygen (air).

Fall overturn:
A physical phenomenon that may take place in a body of water during early autumn. The sequence of events leading to fall overturn include:
1) cooling of surface waters,
2) a density increase in surface waters which produces an unstable density inversion in the water column, and
3) convective mixing of the surface and deep waters often aided by wind action. The overturn mixes and homogenizes the physical and chemical properties of the entire water mass.

Farm management:
The organization and administration of farm resources, including land, labor, crops, livestock, and equipment.

Fault:
A fracture or fracture zone of the earth along which there has been displacement of one side with respect to the other.

Fauna:
The animal life in a region.

Fecal coliform:
A group of bacteria normally present in large numbers in the intestinal tract of humans and other warm-blooded animals.

Fecal streptococcus:
A group of bacteria normally present in large numbers in the intestinal tracts of warm-blooded animals other than humans. By assessing the ratio of coliforms to streptococci in a water sample, a rough estimate can be made of the relative contribution of fecal contamination from human versus animal sources.

Feedlot:
Any area where livestock are fed that concentrates manure and prevents vegetation from growing. Also referred to as a *livestock operation*.

Fertilizer:
Organic and inorganic materials of natural or synthetic origins that are added to soil to supply elements essential to plant growth.

Filamentous green algae:
Algal form that in severe bloom conditions creates long strings or floating mats.

Flocculation:
The process by which suspended colloidal or very fine particles, are assembled into larger masses or floccules which eventually settle out of suspension.

Flood:
An overflow or inundation that comes from a river or other body of water and causes or threatens damage.

Flora:
The plant life in a region.

Flushing rate:
Time required for a lake to exchange its water; may be days, months or years.

Fluvial:
Of or pertaining to rivers; growing or living in streams or ponds, produced by river action, as a fluvial plain.

Forage fish:
Minnows and other small fish that are food for larger predator fish.

Formation:
Any igneous, sedimentary, or metamorphic body of rock or other geologic materials sufficiently homogeneous or distinctive to be represented as a unit.

Geochemistry:
All parts of geology that involve chemical changes. The study of:
1) the relative and absolute abundances of the elements and isotopes in the earth and
2) the distribution and migration of elements or chemical compounds in the various parts of the earth (the atmosphere, hydrosphere, lithosphere, etc.) and in minerals and rocks.

Geologic time:
Scale of time from the formation of the earth to the present.

Grab sampler:
A device that collects sediment from the bottom of a body of water.

Graded stream:
A stream, which over a period of years, delicately adjusts it profile to provide, with available discharge and with prevailing channel characteristics, just the velocity required for the transportation of the load (of sediment) supplied from the drainage basin.

Gradient:
The change of elevation, velocity, pressure, concentration or other characteristics per unit length.

Ground truthing:
On-site inspection of features located on a map.

Groundwater:

The water located below the water table in an unconfined aquifer or located in a confined aquifer. (Phreatic water or subsurface water in the zone of saturation).

Groundwater discharge:

That part of the groundwater that is discharged into a stream channel as spring or seepage water (also known as groundwater runoff).

Half-life:

The period of time during which one half of the atoms of a radioactive element or isotope will disintegrate.

Hardness:

In hydrology, the dissolved materials in water that cause the formation of an insoluble residue when the water is used with soap or that form a scale if the water is heated or allowed to evaporate. Hardness is primarily due to the presence of calcium and magnesium ions but in lesser degrees other ions in solution also contribute. Hardness of water is generally expressed as ppm or mg/l as CaCO3. For example, 40 ppm of Ca produces a hardness of 100 ppm as $CaCO_3$, while 24 ppm of Mg produces the same hardness.

Hazardous waste:

Waste materials, which by their nature are inherently dangerous to handle or dispose of, such as old explosives, radioactive materials, some chemicals, and some biological wastes. Hazardous wastes are produced not only in industrial operations and institutions but are an increasing problem in household and agricultural wastes.

Head:

In hydrogeology,

1) the height of water above some plane of reference.
2) The energy, either kinetic or potential, possessed by each unit weight of a liquid, expressed as the vertical height through which a unit weight would have to fall to release that energy; used in various compound terms such as pressure head, velocity head, and lost head.
3) The internal pressure expressed in feet (of water) or pounds per square inch of an enclosed conduit.

Heavy metals:

Metals present in municipal and industrial wastes that pose long term environmental hazards; they include: boron, cadmium, cobalt, chromium, copper, mercury, nickel, lead, and zinc. These toxic metals accumulate in the tissues of animals.

Heterogeneous:

Variable; differing in kind; having unlike qualities; possessing different characteristics. The opposite of homogeneous.

Homogeneous:

Uniform; off the same kind or nature; consisting of similar parts or of elements of a like nature. The opposite of heterogeneous. Very few things in nature are truly homogeneous on any scale.

Humidity:
The actual quantity or mass of water vapor present in a given volume of air, generally expressed in grams per cubic foot or in grams per cubic meter. Synonym: absolute humidity.

Hydrocarbons:
Chemical compounds, which contain hydrogen and carbon. Hydrocarbons are subdivided into many groups based on their chemical activity and atomic structure.

Hydrograph:
In surface water, a record of the variation in stage (depth) or discharge of a stream over period of time. In ground water, a record of the water level or piezometric surface in an aquifer over a period of time.

Hydraulic communication:
Interconnection between distinctively different aquifers. Water levels within different aquifers change in direct response to water level changes of another aquifer.

Hydraulic conductivity:
The rate of flow of water through a unit cross-section under a unit hydraulic gradient, at the prevailing temperature (or adjusted to a standard temperature).

Hydrologic cycle:
The circuit of water movement from the atmosphere to the earth and return to the atmosphere through various stages or processes as precipitation, runoff, infiltration, percolation, storage, evaporation, and transpiration.

Hydrostatic pressure:
The force per unit area exerted by a liquid at rest.

Infiltration:
The downward flow of water from the surface through soil to ground water and water table reservoirs.

Inorganic:
In chemistry, chemical compounds that do not contain carbon. in situ: In place and undisturbed.

Interflow:
That portion of rainfall that infiltrates into the soil and moves laterally through the upper soil horizons until intercepted by a stream channel or until it returns to the surface at some point down slope from its point of infiltration.

Invertebrate:
Animals without backbones: e.g., insects, mollusks, crustaceans, etc.

Ion:
An atom or group of atoms, which have become electrically charged either by loss or by gain of one or more electrons.

Irrigation:
Application of water to lands for agricultural purposes.

Isotopes:
Atoms of the same element that have different numbers of neutrons in their nuclei. (Since all atoms of a given element have the same number of protons the difference in atomic mass within an element is due to the variation in the number of neutrons in the nucleus).

Joint:
A fracture or parting that abruptly interrupts the physical continuity of the rock mass and along which no relative movement has occurred.

Lacustrine:
In or pertaining to lakes.

Lacustrine deposit:
Material deposited in lake water and later exposed either by lowering of the water level or by the elevation of the land.

Lamination:
A layer of bedding less than one cm thick in sedimentary rocks.

Light attenuation:
Absorption of light by water.

Limnology:
Scientific study of the physical, chemical and biological factors that influence the productivity of fresh waters.

Littoral area:
The shallow areas around a lake's shoreline where light can penetrate the water to the bottom.

Livestock operation:
See *feedlot*.

Lysimeter:
A device to measure the quantity or rate of water movement through or from a block of soil, usually undisturbed and in situ, or to correct such percolated water for analysis.

Maximum depth:
Deepest point of a lake basin.

Mean depth:
In hydraulics, the average depth of a body of water. In a stream or channel it is the cross-sectional area divided by its surface or top width. In a lake it is the volume divided by the surface area. Also referred to as *median depth*.

Median depth:
See *mean depth*.

Molality (m):
The number of moles of a substance per kilogram of solvent. The concentration unit use in most geochemical calculations.

Molarity (M):
The number of moles of a substance per liter of solution. A concentration unit commonly used in analytical chemistry.

Mole:
A chemical unit that is the mass (in grams) of a specific number (Avogadro's number = 6.023 x 1023) of the atoms or molecules in a given sample of matter. The number of moles in a sample can be obtained by dividing the mass of the sample (in grams) by the substance's molecular weight.

Monitoring well:
A well used to obtain water quality or level information.

Montmorillonite:
A clay mineral with a layer structure that expands when hydrated.

Moraine:
An accumulation of till with an initial topographic expression of its own, built by the direct action of glacial ice.

Morphometry:
Physical feature of a lake basin or stream bed, e.g., surface area, shape, maximum depth, etc.

Muck:
Highly decomposed organic material in which the original plant parts are not recognizable. Contains more mineral matter and is darker than peat.

Nitrate:
The $N0_3$ anion. Nitrate is the most oxidized form of nitrogen and is a form readily used as a nutrient by plants.

Nitrate-nitrogen:
The weight or concentration of the nitrogen in the nitrate ion. The ppm (or mg/1) of nitrate-nitrogen = 0.226 times the ppm of nitrate. The ppm of nitrate = 4.43 times the ppm of nitrate-nitrogen.

Nitrate reduction:
The chemical or biochemical reduction of nitrates to the nitrite form.

Nitrite:
The $N0_2$ anion.

Nitrification:
The biological oxidation of ammonium to nitrite and the further oxidation of nitrite to nitrate.

Nitrogen (N):
A chemical element, which makes up about 78 percent of the atmosphere and which is essential for life.

Nitrogen assimilation:
The incorporation of nitrogen compounds into cen substances by living organisms.

Nitrogen fixation:
The conversion of elemental nitrogen (N_2) to organic or inorganic compounds readily usable in biological processes.

Nitrogen to phosphorus ratio (N:P):
Comparison of the concentrations of nitrogen and phosphorus in lake water.

Nonpoint source pollution:
Pollution whose sources can not be pinpointed; the sources for this type of pollution are thought to be a series of many small sources or sources spread out across the landscape such as agricultural pollution.

Normality (N):
The number of equivalent weights of a substance per liter of solution. A concentration unit commonly used in analytical chemistry.

Nutrients:
1. Elements or compounds, essential as raw materials for organism growth and development such as carbon, oxygen, nitrogen, phosphorus, potassium, etc.
2. More generally, the essential elements and compounds as dissolved solids and gases in the water.

Nutrient loading:
Input of nutrients to a waterbody from all natural and cultural sources.

Observation well:
A well, ideally nonpumped, used to observe the ground water level or piezometric surface in an aquifer.

Organic:
In chemistry, a chemical compound containing carbon atoms. In agriculture, farming techniques that use no or limited amounts of artificial fertilizers and pesticides. The original root of use of the word means derived from or pertaining to life processes.

Outwash:
Stratified drift deposited by melt water flowing from a glacier. It is mostly sand and gravel, but clay to boulder sizes may be included.

Oxidant:
Elements or compounds, which are capable of oxidizing other compounds.

Oxidation:

In chemistry, any process in which an atom or molecule loses an electron and thereby becomes more positively charged. A very common form of oxidation is the chemical reaction of a substance with oxygen to form an oxide.

Oxygen:

The reactive gas that makes up about 21 percent of air. Oxygen is the most common element in the surface of the Earth and rocks and soils are about half oxygen by weight.

Oxygen 18 (180):

A rare, stable isotope of oxygen, which has eight protons and ten neutrons for a total atomic weight of about 18. It is heavier than the more abundant form, oxygen 16 (160).

Paleozoic:

The geologic era between 600 and 230 million years ago. The Paleozoic was characterized by the extensive development of shells by marine life forms and the first fish, amphibians, reptiles and land plants appeared during this era.

Parent material:

In soil science, the unconsolidated, more or less chemically weathered mineral or organic matter from which the solum of soils has developed by pedogenic processes. The C horizon may or may not consist of materials similar to those from which the A and B horizons developed. perched water table: The surface of a local zone of saturation held above the main water table by an aquitard, often clay or shale, and separated from the main body of groundwater by an unsaturated zone.

Peat:

Unconsolidated soil material consisting largely of undecomposed or only slightly decomposed organic matter accumulated under conditions of excessive moisture.

Permeability:

The capacity of a porous rock, sediment, or soil to transmit fluid, it is a measure of the relative ease of fluid flow in response to a pressure gradient.

Pesticide:

The general term for agents used for control of unwanted organisms or pests. The term includes insecticides used to control insects, herbicides used to control plants, fungicides used to control fungi, etc.

pH:

A numerical measure of the hydrogen ion activity or acidity in a solution. The pH is the negative logarithm of the hydrogen ion activity and each unit represents a ten fold decrease in the hydrogen ion activity (pH = -log [H]). Neutral pH is 7, pH values below 7 are acidic, pH values above 7 are basic or alkaline.

Phosphate:

An essential nutrient containing phosphorous (P) and oxygen. Phosphates occur in a number of different chemical forms, the simplest is the phosphate anion, $P0_4$, which carries a -3 charge. Phosphate is often a critical nutrient in lake eutrophication management.

Phosphate fixation:
In soils, the process or processes by which phosphate are converted from a soluble or exchangeable form to a much less soluble or nonexchangeable form in a soil.

Phosphorus:
A nutrient essential to plant growth. It is abundant in the environment and usually the limiting nutrient in lakes.

Phreatic zone:
See *saturated zone*.

Phytoplankton:
Algae, the base of a lake's food chain, it can also produce oxygen.

Piezometer:
A tube for measuring the pressure head or water level in ground water or some other fluid.

Piezometric surface:
The imaginary surface that is the height to which water would rise in wells completed in an aquifer. Synonym: *potentiometric surface*.

Plankton:
Free-floating and swimming microscopic aquatic plants and animals.

Point source pollution:
Specific sources of nutrients or polluted discharges to a water body: e.g., storm water outlets, wastewater discharges, etc.

Pollution:
The condition caused by the presence in the environment of substances of such character and quantities that the quality of the environment is impaired or rendered offensive to life.

Potentiometric surface:
See *piezometric surface*.

Pore space:
The total space not occupied by solid particles in a bulk volume of soil, sediment, or rock, commonly expressed as a percentage.

Porosity:
The ratio of the volume of void spaces in a rock or sediment to the total volume of the rock or sediment, usually expressed as a percentage.

Prairie:
A tract of level to hilly land whose vegetation is dominated grasses and forbs with scarce shrubs and which is treeless. The natural plant community consists of various mixtures of tall, mid, and short growing native species, also known as true prairie, mixed prairie, and shortgrass prairie, respectively.

Precipitation:
A general term for all forms of moisture which falls from the atmosphere to the surface including: rain, snow, hail, and sleet.

Predator fish:
Generally the game fish that prey on smaller fish; e.g., bass, northerns, walleye, etc.

Productivity:
Measure of the relative fertility of a lake.

Radioactive isotope:
An unstable isotope whose nuclei spontaneously decay at an exponential rate to one or more other isotopes. These daughter isotopes may be either stable or radioactive. The spontaneous exponential decay can be described in terms of a half-life. Each radioactive isotope has a characteristic half-life that is immutable.

Rating curve:
Generally, a graphic or tabular representation of performance or output under a stated series of conditions. In hydraulics, it is a graph that relates volumes of flow per unit time to various stages or depths of flow.

Recharge:
Water added to the saturated zone; the main source of recharge is precipitation.

Recharge area:
An area from which infiltrating water eventually reaches the zone of saturation in one or more aquifers.

Redox:
Acronym for oxidation-reduction potential. Generally, it is a substance's potential to oxidize (accept electrons) or reduce (donate electrons). Specifically, it is the activity of the electrons in a substance.

Reducing environment:
An environment conducive to the addition of electrons, often via the removal of oxygen.

Reduction:
In chemistry, the addition of electrons to an atom or molecule.

Regolith:
The unconsolidated mande of weathered rock and soil material on the earth's surface; loose earth materials above solid rock.

Relative humidity:
The ratio of the amount of water vapor present in the portion of the atmosphere under consideration to the quantity that would be there if the air were saturated at the given temperature.

Remedial action:
Corrective measures to actively deal with a problem area; e.g., rip rap, chemical treatments, dredging, etc.

Restoration:
The process of returning site conditions to the condition they were in before a disturbance.

Root zone:
The part of the soil that is penetrated by plant roots.

Runoff:
In hydraulics, that portion of the precipitation on a drainage area that is discharged from the area in stream channels. Types include: surface water runoff and ground water runoff, or seepage.

Siltation:
Particle movement in water or wind where particles slip or bounce along the stream bed or soil surface.

Sand lens:
A lenticular band of sand in heterogeneous deposit of sedimentary material.

Saturated zone:
The zone in which all the voids in the rock or soil are filled with water at a pressure greater than atmospheric. The water table is the top of the saturated zone in an unconfined aquifer.

Saturation point:
In soil science and hydrogeology, that point at which a soil or an aquifer will no longer absorb any amount of water without losing an equal amount of water. In biology, the maximum organism density under which a species can normally live.

Scour:
To abrade or wear; used to describe the wearing away of terraces, channels or stream beds.

Secchi disc:
A simple device to measure the depth of light penetration in the water of a lake.

Sediment:
Fine particles of soil and organic material that are easily transported by water.

Sedimentation:
The process or manner in which mineral, dissolved, or organic material comes to rest on the earth's surface after being transported by a fluid.

Seepage velocity:
The rate at which seepage water is discharged through a porous medium per unit area of pore space perpendicular to the direction of flow.

Septic tank and drain Field:
An underground tank used for the disposal of domestic wastes. Bacteria in the wastes decompose the organic matter to sludge in the septic tank. The sludge settles to the bottom and should be pumped out at regular intervals. The effluent flows through drain field into the ground.

Sewage:

The total organic waste and wastewater generated by residential and commercial establishments.

Soil:

1. The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.
2. The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by the genetic and environmental factors of parent material, climate, (including moisture and temperature effects), macro- and micro-organisms and topography. Over time these factors produce a soil material which differs physically, chemically, biologically, and morphologically from the parent material.

Solid waste:

Unwanted or discarded material with insufficient liquid content to be free flowing.

Spring overturn:

A physical phenomenon that may take place in a body of water during the early spring. The sequence of events leading to spring overturn include:

1) melting of ice cover,
2) warming of surface water,
3) density changes in surface waters producing convection currents,
4) circulation of the total water volume by wind action, and
5) vertical temperature homogenization.

The overturn mixes the water mass and results in a lake that is physically and chemically more uniform.

Stabilized grade:

The slope of a channel at which neither erosion or deposition occurs.

Stable isotope:

An isotope of an element whose nucleus does not spontaneously decay to nuclei of other elements.

Static head:

Pressure resulting strictly from elevation differences for given volumes of water.

Static water level:

The water level in a well that is not being affected by withdrawal of groundwater.

Stratigraphy:

A branch of geology that deals with the definition and interpretation of stratified rocks (especially sedimentary rocks); the conditions of their formation, character, arrangement, sequence, age, and distribution, and especially their correlation by use of fossils and other means.

Stream:

Any body of running water that moves under gravity to progressively lower levels, in a relatively narrow but well defined channel on the surface of the ground, in a subsurface cavern, or beneath or in a glacier. Streams carry a mixture of water, and dissolved, suspended or entrained material.

Stream gauging:
The quantitative determination of stream flow using: gages, current meters, weirs, or other measuring instruments at selected location.

Submergent vegetation:
Aquatic plants growing below or up to the surface of the water: e.g., coontail, pondweed, milfoil, etc.

Surface runoff:
Water that flows over the surface of the land during storm events and spring snowmelt.

Surface to volume ratio:
Comparison of the surface area of a lake to its volume of water.

Suspended solids:
Small particles that hang in the water column and create turbid, or cloudy, conditions.

Terrestrial:
Things that are on the land. In the case of plants, those that are not aquatic.

Till:
In geology, unstratified glacial sediments deposited directly by ice which contain clay, sand, gravel, and boulders mixed in any proportion. In agriculture, to plow and prepare for seeding, to seed or cultivate the soil.

Titration:
The determination of the volume of a solution needed to react with a known volume of a sample, usually involving the progressive addition of the solution to the sample until the sample has reacted fully.

Total coliform:
The Escheria coli and other gram negative bacteria that are normal inhabitants of fecal material. The total coliform group is a recognized indicator of fecal contamination in drinking water for public health purposes.

Topographic map:
A map that displays elevations by means of contour lines.

Total dissolved solids (TDS):
The sum of all of dissolved solids in a given water sample. TDS is usually expressed in ppm or mg/l and is a very generalized measure of water quality.

Transpiration:
The photosynthetic and physiological process by which plants release water into the air in the form of water vapor.

Tributary:
A secondary part or branch of a stream, drain, or channel that contributes flow to the main channel.

Tritium (3H):
A radioactive isotope of hydrogen, which has a half-life of 12.43 years. The isotope is used in a wide variety of hydrogeologic, chemical, and biological tracer applications.

Trophic:
Relating to the processes of energy and nutrient transfer from one or more organisms to others in an ecosystem.

Trophic status:
The level of growth or productivity of a lake as measured by phosphorus concentration, algae abundance and light penetration.

Trophic Status Index:
A numeric scale from 1 to 100 covering, ranking the trophic status of a lake.

Unconfined aquifer:
An aquifer connected with the atmosphere either directly or through the unsaturated zone above the water table. Synonym: *water table aquifer*.

Unsaturated zone:
The zone between the land surface and the water table. The pore spaces contain water at less than atmospheric pressure as well as other gases. Saturated areas, such as perched groundwater, may exist within the unsaturated zone. The thickness of the unsaturated zone ranges from zero to thousands of feet. Synonyms: *zone of aeration, vadose zone*.

Vadose zone:
See *unsaturated zone*.

Valence:
The capacity of an element to form chemical bonds with other elements. In ionic bonding, valence can be expressed as the number of hydrogen atoms the element can accommodate. In covalent bonding, valence can be expressed as the number of electron pairs the element is sharing.

Vegetation:
Plants in general or the sum total of plant life in the area.

Voids:
A general term for pore space or other openings in rock. In addition to pore spaces, the term includes vesicles, solution cavities, or any openings, either primary or secondary; also called interstices.

Waste:
Unwanted byproducts of human or biological metabolism or activities; damaged or defective articles of manufacture or superfluous or rejected matter or refuse.

Water quality standards:
Minimum requirements of purity of water for various uses; for example water for agricultural use in irrigation systems should not exceed specific levels of sodium bicarbonates, pH, tow dissolved salts, etc..

Water resources:
The supply of ground and surface water in a given area. water table: The surface in an unconfined aquifer or soils below which the pores are water filled.

Watershed:
The surrounding land area that drains into a lake, river or river system.

Water table aquifer:
See *unconfined aquifer*.

Winterkill:
A condition of low dissolved oxygen causing fish to die. Usually associated with shallow lakes during winters of heavy snow accumulation.

Woodland:
Any land used primarily for growing trees and shrubs. Woodland includes, in addition to what is ordinarily termed forest or forest plantations, shelter-belts, windbreaks, wide hedgerows containing woodland species for wildlife food or cover, stream and other banks with woodland cover, etc. It also includes farm and other lands on which woody vegetation is to be established and maintained.

Zone of aeration:
See *unsaturated zone*.

Zooplankton:
Microscopic aquatic animals.

Appendix B

Acronyms

Acronyms were invented to save time and space in written communications. As long as they are explicitly defined when they are used, they accomplish their purpose. Unfortunately, acronyms are often used without definition in written communications and are almost never defined when used in verbal communications. In such situations, acronyms can quickly become an arcane jargon that hinders rather than facilitates the exchange of information.

To prevent the misuse and abuse of acronyms a few simple rules should be followed.

1) In written text the first occurrence of an acronym must be preceded by the full, written version.

   For example, this set of acronym rules is provided by the Acronym Abusers Anonymous (AAA). Following references to the AAA can be typed as AAA. This rule should be followed in all written text; including short memos.

2) Verbal communications should avoid acronyms.

   It does not take much longer to say the entire phrase and insure that everyone understands what you are talking about. As a listener it is your responsibility to ask what an acronym stands for. Don't feel dumb that you don't know what it is. Remember that acronyms where invented to simplify written text. Since they tend to produce an unintelligible jargon they really have n . o place in oral communication.

   Perhaps the ultimate test of a good acronym is its acceptance into everyday language as a word. Two examples of this are RADAR and SCUBA; RAdio Detection And Ranging and Self Contained Underwater Breathing Apparatus, respectively.

3) Acronyms are most effective when they spell out a word with relevance to the term.

   Mothers Against Drunk Driving (MADD) is a particularly effective acronym. A corollary to this rule is that acronyms that are already in use for something else should be avoided. Two extreme examples of this are CD and PM.

AA	Atomic Adsorption
AAA	Acronym Abusers Anonymous
AAA	American Automobile Association
AAA	AntiAircraft Artillery
ACT	Accelerated Column Testing
AGNPS	Agriculture Non-Point Source (model)
AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
ARCS	Alternative Remedial Contracting Strategy
ASIWPCA	Association of State and Interstate Water Pollution Control Agencies

ASTSWMO	Association of State and Territorial Solid Waste Management Officials
ATSDR	Agency for Toxic Substances and Disease Registry
BANANA	Build Absolutely Nothing Anywhere Near Anything
BMP	Best Management Practice
BOD	Biological Oxygen Demand
BOWSR	Board of Water and Soil Resources
BWSR	Board of Water and Soil Resources
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BTU	British Thermal Unit
CA	Cooperative Agreement
CAA	Clean Air Act
CBI	Confidential Business Information
CD	Certificate of Deposit
CD	Compact Disc
CD	Consent Decree
CD	Contract for Deed
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CO	Commanding Officer Consent Order Contracting Officer
COD	Chemical Oxygen Demand
CPAHs	Carcinogenic Polyaromatic Hydrocarbons
CPM	Critical Path Method
CPSR	Contract Procurement System Review
CRP	Community Relations Plan-Conservation Reserve Program
CWA	Section 319 - Nonpoint Source Section of the Federal Clean Water Act of 1988
CWAP	Clean Water Action Plan
CWP	Clean Water Partnership
DBMS	Database Management System
DCE	Dichloroethylene
DCF	Document Coding Forms
DCP	Direct Current Plasma (Atomic Emission Spectroscopy)
DCP/AES	Direct Current Plasma / Atomic Emission Spectroscopy
DIR	Determinations of Inadequate Response
DL	Detection Limits
DNAPL	Dense Non-Aqueous Phase Liquid (sinkers)
DNR	Department of Natural Resources
DO	Dissolved Oxygen
ERLA	Environmental Response and Liability Act
ERRIS	Emergency Response and Recovery Information System
ERT	Emergency Response Team
ESD	Environmental Services Division (U.S. EPA)
ESI	Expanded Site Investigation
ESP	ElectroStatic Precipitator
ESP	Extra Sensory Perception
FAR	Federal Acquisition Regulations
FEMA	Federal Emergency Management Agency

FFA	Federal Facility Agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIT	Field Investigation Team (U.S. EPA)
FOIA	Freedom of Information Act
FS	Feasibility Study
FSP	Field Sampling Plan
FTS	Federal Telephone System
GAC	Granular Activated Carbon
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
HAP	Hazardous Air Pollutants
HHE	Human Health and Environment
HPLC	High Performance Liquid Chromatography
HRA	Health Risk Assessment
HRL	Health Risk Limit
HRS	Hazard Ranking System
HSCD	Hazardous Site Control Division (U.S. EPA)
HSED	Hazardous Site Evaluation Division (U.S. EPA)
HSL	Hazardous Substance List
IC	Ion Chromatography
ICP	Inductively Coupled Plasma (Atomic Emission Spectroscopy)
ICP/AES	Inductively Coupled Plasma/Atomic Emission Spectroscopy
IFB	Invitation for Bid
IRM	Interim Remedial Measure
ISTS	Individual Sewage Treatment Systems
LCMR	Legislative Commission on Minnesota Resources
LGU	Local Government Units
LMIC	Land Management Information Center
LNAPL	Light Non-Aqueous Phase Liquid (floaters)
LOD	Limit of Detection
LOQ	Limit of Quantification
LSI	Listing Site Inspection
LSP	Land Stewardship Project
LTRA	Long Term Remedial Action
LULU	Local Undesirable Land Use
LUST	Leaking Underground Storage Tank
LWRPMP	Local Water Resource Protection and Management Program
MCAR	Minnesota Code of Administrative Rules
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDA	Minnesota Department of Agriculture
MDF	Minnesota Department of Finance
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MEEB	Minnesota Environmental Educational Board
MEK	Methyl Ethyl Ketone
MERLA	Minnesota Environmental Response and Liability Act
MES	Minnesota Extension Service (or MnExt)
MGS	Minnesota Geological Survey

MNDOT	Minnesota Department of Transportation (also Minot)
MN	Minnesota
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
MRAP	Minnesota River Assessment Project
MSCA	Multi-Site Cooperative Agreement
MSPA	Minnesota State Planning Agency
MWCC	Metropolitan Waste Control Commission
N	Nitrogen (chemical element)
NBAR	Non-Binding Preliminary Allocation of Responsibility
NCP	National Contingency Plan (National Oil and Hazardous Substances
NCP	Pollution Contingency Plan-40 CFR Part 300)
NEIC	National Enforcement Investigation Center
NFRAP	No Further Remedial Action Planned
NGVD	National Geodetic Vertical Datum (sea level for elevations)
NIABY	Not in Anybody's Back Yard
NIMBY	Not In My Back Yard
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
MPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
O&M	Operation and maintenance
OARM	Office of Administration and Resources Management (U.S. EPA)
OECM	Office of Enforcement and Compliance Monitoring
OERR	Office of Emergency and Remedial Response
OPM	Office of Program Management (U.S. EPA)
ORC	Office of Regional Counsel (U.S. EPA)
ORP	Oxidation Reduction Potential
OSC	On-Site Coordinator (U.S. EPA)
OSHA	Occupational Safety and Health Administration
OSI	On-Site Inspector
OSWER	Office of Solid Waste and Emergency Response
OVA	Organic Vapor Analyzer
OWPE	Office of Waste Programs Enforcement
P	Phosphorus (chemical element)
PAH	Polyaromatic Hydrocarbons
PA/SI	Preliminary Assessment/Site Inspection
PCA	Pollution Control Agency
PCA	Production Credit Association
PCB	Polychlorinated Biphenyls
PCP	Pentachlorophenol
PIC	Planning Information Center
PLP	Permanent List of Priorities
PM	Personnel Manager
PM	Post Meridian
PM	Project Manager

PM	Prime Minister
POTW	Publicly Opeated Treatment Works
ppb	Parts per billion
PPM	Parts per million
ppt	Parts per trillion
ppt	Parts per thousand
PRP	Potential Responsible Party
PSI	Pounds per Square Inch
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/ Quality Control
RA	Remedial Action
RA	Research Assistant
RA	Resident Assistant
RACT	Reasonably Available Control Technology
RAL	Recommended Allowable Limit
RAP	Remedial Action Plan
RAS	Routine Analytical Services
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDV	Reference Dose Values
REM	Roentgen Equivalent, Man
RFI	Request for Information
RFP	Request for Proposals
RFQ	Request for Qualifications
RFRA	Request for Response Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Responsible Party
RPM	Regional Project Manager (U.S. EPA)
RPM	Remedial Project Manager
RPM	Revolutions per minute
RPO	Regional Project Officers
SAP	Sampling and Analysis Plan
SAR	Search and Rescue
SAR	Structural Activity Relationship
SARA	Superfund Amendments Reauthorization Act
SAS	Special Analytical Services (U.S. EPA) (CLP)
SAS	Statistical Analysis System (a common statistical package)
SCAP	Superfund Comprehensive Accomplishments Plan
SCS	Soil Conservation Service (USDA)
SDWA	Safe Drinking Water Act
SETS	Site Enforcement Tracking System
SFFAS	Superfund Financial Assessment System
Si	Site Inspection System International (metric system)
sic	Standard Industrial Classification
SMOA	Superfund Memorandum of Agreement
SOP	Standard Operating Procedure
SOW	Statement of Work

SSM	Synthetic Soil Matrix
STORET	STOrage and RETrieval (of water quality data, a computer data system)
ST/SAS	Septic Tank/Soil Absorption Systems
SW	Solid Waste
SWCD	Soil and Water Conservation District
TA	Teaching Assistant
TA	Technical Analyst
TAT	Technical Assistance Team (U.S. EPA)
TCA	Trichloroethane (III, trichloroethane; 1 12, trichloroethane)
TCE	Trichloroethane (I 1 1, trichloroethane; 1 12, trichloroethane)
TCE	Tetrachloroethane (111,2 tetrachloroethane, 11,22, tetrachloro-ethane)
TCE	Tetrachloroethylene (I 1,22 tetrachloroethene)
TCE	Trichloroethylene (I 12, trichloroethene)
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TEGD	Technical Enforcement Chemicals Guidance Document
TES	Technical Enforcement Support
TFS	Total Fixed Solids
TKN	Total Kjeldahl Nitrogen
TLP	Temporary List of Priorities
TMC	Toxicity, Mobility and Volume
TMDL	Total Maximum Daily Load
TNTC	Too Numerous To Count (bacteria colonies)
TOC	Total Organic Carbon
TOH	Total Organic Hydrocarbons
TOX	Total Organic Halides
TPH	Total Petroleum Hydrocarbon
TS	Total Solids
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage and Disposal
TSS	Total Suspended Solids
TVS	Total Volatile Solids
UCC	Universal Commercial Code
U of M	University of Minnesota
US	United States
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UV	Ultraviolet
VOC	Volatile Organic Compound
VOH	Volatile Organic Hydrocarbons
WD	Watershed District
VMP	Wellhead Protection
WAG	Wild Ass Guess
WRPA	Water Resource Protection Area
WRPR	Water Resource Protection Requirements
WUPN	December 1988 "a strategy for the wise use of pesticides and nutrients."
XRD	X-Ray Diffraction
XRF	X-Ray Fluorescence

Appendix C

Data Source List (DSL)

The Data Source List (DSL) is available as a Microsoft Access 97 database on the 3 1/2" diskette attached to the document cover. Also available in a searchable format on the Rainy River Basin web page, at: http://www.pca.state.mn.us/water/basins/rainy.

Appendix D

Data Source List (DSL)

GIS data is available on request by contacting the Rainy River Basin Coordinator at:

Nolan Baratono
P.O. Box 61
International Falls, MN 56649
218-283-2240
nolan.baratono@pca.state.mn.us