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RICHMOND LAKE WATER QUALITY PROJECT

Citizen's Guide to Environmental Terminology

Introduction

In recent years, environmental issues have received considerable media coverage. Yet, because of the technical terms that often accompany such stories, it is sometimes difficult to analyze these reports.

This guide will provide you with a concise reference to many environmental terms used in the news, especially those referenced with water pollution issues. It is hoped that with this guide, you will be able to more objectively view not only popular press news items, but also technical reports that may be prepared at the local, state or national level.

Glossary

A

Absorption. The process of taking up one substance into the body of another, such as a sponge absorbing water.

Adsorption. Attraction and holding of one substance on the surface of another; this often involves the attraction of molecules in gases and liquids to the surface of a solid.

Acid Mine Drainage. Drainage of water from areas that have been mined for coal or other mineral ores; the water has a low pH , sometimes less than 2.0 (is acid), because of its contact with sulfur-bearing material; acid mine drainage is harmful because it often kills aquatic organisms.

Acid Rain. Precipitation that has a low pH (less than pH 5.6, which is normal for "natural" precipitation); the precipitation becomes acidic when moisture in the air reacts with sulfur and nitrogen pollutants in the atmosphere; because of its low pH, acid rain has a harmful effect on some plants, soils and surface waters, buildings and, indirectly on some organisms that live in surface waters.

Aerobic. Living or active only in the presence of oxygen (atmospheric air).

Aerobic Decomposition. To decay by aerobic microorganisms.

Aggregate. A mass or cluster of soil particles often having a characteristic shape.

Agrochemical. Synthetic chemicals (pesticides and fertilizers) used in agricultural production.

Algae. Nonvascular plants, usually aquatic and capable of using carbon dioxide by photosynthesis; algae can also survive in damp soil.

Algal Bloom. Large, readily visible, masses of algae (usually green algae), found in bodies of water (usually lakes or ponds) during warm weather.

Algicide. Any substance that will kill or control algal growth.

Alkalinity. The capacity of water to neutralize acids by its content of bicarbonates, carbonates or hydroxides (alkaline substances).

Ammonium. One form of nitrogen that is usable by plants.

Anaerobic. Living or active in the absence of oxygen.

Anaerobic Decomposition. Reduction of organic matter by anaerobic microorganisms in an oxygen-free environment.

Aquatic. Plants or animal life living in, growing in, or adapted to water.

Aquifer. A geologic formation that can hold—and provide—large quantities of water readily. Aquifers can be classified as confined or unconfined.

Assimilative Capacity. Natural ability of soil, surface water or ground water to accept (use and decompose) potential pollutants without harmful effects to the environment.

Atoms. The basic "building blocks" of all matter on earth; the smallest particle of an element that can exist either alone or in combination with similar particles of the same or a different element.

Available Nitrogen. Forms and/or quantities of nitrogen that are immediately available for plant uptake; that is, nitrate and ammonium.

Available Nutrient. The portion of any element or compound in the soil that can be readily absorbed and assimilated by growing plants.

B

Background Level. Generally, the amount of a substance that occurs naturally in the environment.

Bacteria. Microscopic one-celled organisms that have no chlorophyll, are aerobic or, for very brief periods, anaerobic, and multiply by simple cell division. Bacteria exist essentially everywhere and perform a variety of functions; not always useful to people. While decomposing organic matter in water, bacteria can greatly reduce the quantity of oxygen in the water.

Best Management Practices (BMP's). Structural, nonstructural and managerial techniques that are recognized to be the most effective and practical means to control nonpoint source pollutants yet are compatible untie the productive use of the resource to which they are applied. BMP's are used in both urban and agricultural areas.

Biochemical Oxygen Demand (BOD). A laboratory measurement of the "strength" or potency of an organic or inorganic waste; the test determines the amount of oxygen used by microorganisms as they biochemically degrade (reduce to simple by-products) the waste. BOD values provide a somewhat standard measure of how much oxygen will be required to degrade a waste, and therefore reflect the effect the waste may have on fish or other aquatic organisms that require oxygen to live.

Biodegradable. Capable of being broken down (decomposed} by microorganisms.

Biodegradation. Breaking down of natural or synthetic organic materials by microorganisms in soils, natural bodies of water, or wastewater treatment systems.

Black Water. Liquid and solid human body waste and the carriage water generated through toilet usage.

Buffer Strips. Strips of grass or other close-growing vegetation that separate a waterway (ditch, stream, creek) from an intensive landuse area (subdivision, farm); also referred to as filter strips, vegetated filter steps and grassed buffers.

C

Cation. A positively charged ion.

Carcinogenic. Capable of producing cancers in people and animals.

Chemical Oxygen Demand (COD). An indirect measure of the amount of oxygen used by inorganic and organic matter in water. The measure is a laboratory test based on a chemical oxidant and therefore does not necessarily correlate with biochemical oxygen demand.

Chisel Plowing. Cropland preparation by a special implement (chisel) that avoids complete inversion of the soil (as occurs with conventional moldboard plowing). Chisel plowing can leave a protective cover of crop residues on the soil surface that helps prevent erosion and improve infiltration.

Chloramines. Compounds of inorganic or organic nitrogen and chlorine.

Chlorinated Hydrocarbons. Synthetic compounds that contain chlorine, hydrogen, and carbon; often a main ingredient in pesticides.

Chlorination. One method of disinfecting water (either drinking water or wastewater). There is some concern that chlorine used in wastewater disinfection may be harmful to sensitive aquatic organisms inhabiting the waters that receive the treated wastewater.

Chlorine Residual. The total amount of chlorine remaining in water, sewage, or industrial wastewater following chlorination for a specified period of time.

Chromosome. A gene-containing filamentous structure in a cell nucleus; the number of chromosomes per cell nucleus is constant for each species.

Clay. One type of soil particle with a diameter of approximately one ten-thousandth of an inch.

Clay Soil. A soil containing more than 40 percent clay, but less than 45 percent sand, and less than 40 percent silt.

Cohesion. Molecular attraction which holds two particles together.

Coliform Bacteria. A special kind of bacteria that produces acid and gas when decomposing lactose (a carbohydrate also known as milk sugar) under anaerobic conditions. Coliform bacteria typically inhabit the intestines of warm-blooded animals, as well as the surfaces of plants and soil.

Combined Sewer. A sewer that transports surface runoff and human domestic wastes (sewage), and sometimes industrial wastes.

Combined Sewer Overflow. Plow of wastewater and runoff in a combined sewer in excess of the sewer capacity. It represents the flow that cannot be treated immediately and is frequently discharged directly to a receiving stream without treatment, or to a holding basin for subsequent treatment and disposal.

Composting. A controlled microbial degradation of organic waste yielding an environmentally sound nuisance-free product of potential value as a soil conditioner.

Compound. A chemical substance consisting of several molecules.

Confined Aquifer. An aquifer whose upper, and perhaps lower, boundary is defined by a (confining) layer of natural material that does not transmit water readily.

Contour Fanning. A conservation-based method of farming in which all farming operations (for example, tillage and planting) are performed across (rather than up and down) the slope. Ideally, each crop row will follow a contour line; that is, every row is planted at right angles to the ground slope

Contour Strip Cropping. A kind of contour farming in which row crops are planted in strips, between alternating strips of close-growing, erosion-resistant forage (grass, grate or hay) crops.

Conventional Tillage. The traditional method of farming in which soil is prepared for planting by completely inverting it with a moldboard plow. Subsequent working of the soil with other implements is usually performed to smooth the soil surface. Bare soil is exposed to the weather for some varying length of time depending on soil and climatic conditions.

Cost Effectiveness. A measure used to compare alternatives on the basis of-cost inputs per unit of resulting benefits.

Cost Sharing. A publicly financed program through which society, as the beneficiary of environment protection, shares part of the cost of pollution control with those who must actually install the controls.

Cover Crop. A crop that provides temporary protection for delicate seedlings and/or provides a canopy for seasonal soil protection and improvement between normal crop production periods. Except in orchards where permanent vegetative cover is maintained, cover crops usually are grown for 1 year or less. When plowed under and incorporated into the soil, cover crops are also referred to as green manure crops.

Crop Rotation. A system of farming in which a regular succession of different crops are planted on the same land area, as opposed to growing the same crop time after time (monoculture).

D

Deep Percolation. Downward movement of water through the soil profile to ground water.

Denitrification. The biochemical conversion of nitrate and nitrite nitrogen in the soil or dissolved in water to gaseous nitrogen

Digestion. The biochemical decomposition of organic matter in sludge resulting in a somewhat stable (humus-like) mass (depending on how long digestion is allowed to proceed).

Disinfection. A process whereby most microorganisms in or on a substance are killed; there is a high probability that pathogenic (disease causing} bacteria are killed in the process but depending on the process, destruction of viruses is not as certain.

Dissolved Oxygen. Oxygen dissolved in water and readily available to fish and other aquatic organisms

Diversion. A structural conveyance (or ditch) constructed across a slope to intercept runoff flowing down a hillside, and divert it to some convenient discharge point.

Drainage. A technique to improve the productivity of some agricultural land by removing excess water from the soil; surface drainage is accomplished with open ditches; subsurface drainage uses porous conduits (drainable) buried beneath the soil surface.

E

Ecosystem. An interactive group of organisms that exist in the same natural community or environment.

Effluent. Wastewater as it leaves some type of treatment system, such as septic tank effluent or municipal wastewater treatment plant effluent.

Enzyme. A molecule naturally produced by living cells that aids in the chemical alteration of organic substances.

Epidemic. A disease affecting large numbers of people over a wide area.

Escherichia cold. A species of fecal coliforms that inhabit the intestines of people and other vertebrates.

Erosion. Wearing away of soil by running water, wind, or ice; erosion is the process by whIch the earth's surface is shaped and occurs even in remote, uninhabited areas at a slow rate (geologic erosion); of more concern is accelerated erosion caused by people's activities.

Eutrophication. The natural aging process of surface waters (such as rivers, streams, reservoirs) through enrichment by nutrients. Eutrophication is accelerated by people's activities; in the end, eutrophication results in the complete filing and drying up of a water body.

Evaporation. The conversion of a liquid into a gas through the addition of energy.

Evapotranspiration. Loss of water to the atmosphere from the earth's surface by evaporation and by transpiration through plants.

F

Facultative Anaerobe. A bacterium that grows under either aerobic or anaerobic conditions.

Fauna. The animal life characteristic of a region or environment.

Fecal Coliform. Coliform bacteria that originate in the intestinal tract of humans and other warm-blooded animals; fecal coliform are not harmful to humans by themselves, but are used to indicate the potential presence of other harmful bacteria.

Fermentation. Anaerobic oxidation of compounds by enzyme action of microorganisms.

Filamentous. Characterized by threadlike structures.

Filter Strip. See Buffer Strip.

Floodplain. The net or nearly flat land on the floor of a stream valley or tidal area that is covered by water during floods

Flora. Plants and microorganisms present in a given environment.

Formation. A group of similar consolidated (that is relatively solid) rocks or unconsolidated (that is, relatively loose) minerals.

Fungi. Microorganisms that lack chlorophyll and are filamentous in structure.

Fungicides. Agrochemicals (pesticides) used to control soil fungi.

G

Gene. A segment of a chromosome that carries hereditary information.

Giardia. Giardia lamblia, a protozoa that move in a liquid by a whip-like tail, and cause diarrhea in humans.

Giardiasis. Presence of the Giardia lamblia protozoan in the human small intestine.

Grassed Waterway. A natural or constructed conveyance for surface runoff, lined with an erosion-resistant grass, that transports runoff to a suitable discharge point at a non-erosive rate.

Gully. A deep channel cut into the soil surface by accelerated erosion; a gully is so deep and/or wide that it cannot be smoothed out by tillage operations.

Grey Water. Wastewater other than sewage such as sink drainage or washing machine discharge.

Ground Water. Water beneath the earth's surface at varying depths; in reservoirs called aquifers.

H

Habitat. The natural environment of an organism.

Half-life. The time required for one-half of a specified substance to disappear.

Hardness. Condition of water, caused mostly by naturally occurring mineral impurities, that prevents suds formation by soap.

Hazardous Waste. Any waste material that is potentially dangerous, including, but not limited to, explosives, radioactive materials and chemicals.

Hemoglobin. The constituent in red blood cells that carries oxygen.

Herbicides. Agrochemicals (pesticides) used to control undesirable plants.

Household Hazardous Waste. Any number of commonly used household cleaning products, workshop and outdoor chemicals automotive fluids and personal care products that are potentially dangerous to the environment.

Humus. Organic portion of the soil remaining after prolonged microbial decomposition.

Hydrologic Cycle. A term used by scientists to describe the constant movement of water in and on the earth and atmosphere; numerous processes (such as precipitation, evaporation, runoff) comprise the hydrologic cycle.

I

Infiltration. The entry of water (from precipitation, irrigation or runoff) into the soil profile.

Infiltration Rate. The quantity of water that can enter the soil surface in a specified time interval.

Inorganic Chemicals. Naturally occurring or synthetic chemical compounds that contain no carbon.

In Situ. In place, the original location, in the natural environment.

Interflow. Lateral movement of water in the upper layer of soil.

In Vitro. In glass; a laboratory experiment performed in a test tube or other vessel.

In Vivo. Within a living organism; a laboratory experiment performed in which the substance under study i5 inserted into a living organism.

Ion. An atom or molecule, or fraction of an organic substance, that has an electrical charge, positive or negative ions are a key factor in holding compounds together.

Ion Exchange. A reversible interchange of ions between a liquid and a solid without causing any significant change in the structure of the solid.

Insecticides. Agrochemicals (pesticides) used to control undesirable insects.

L

Lactose. A carbohydrate commonly called milk sugar.

Labile. Easily changed or moved, not fixed.

Landfill. Facility in which solid waste from municipal and/or industrial sources is disposed; sanitary landfills are those landfills that are operated in accordance with environmental protection standards.

Leachate. Water containing dissolved substances that moves downward through some specified material, such as landfill leachate—subsurface drainage from a landfill.

Leaching. The removal of soluble materials from substance as water moves through it.

Lethal Dose (LD). The amount of substances required to cause death of an organism under study.

LD50. The amount of a substance that is required to kill one-half of the organisms under study.

Loading. The quantity of a substance entering the environment (soil, water, or air)

M

Managerial Controls. Methods of nonpoint source pollution control that are derived from managerial decisions, such as changes in application times or rates for agrochemicals.

Microbial. Relating to microbes (microorganisms).

Microorganism. A simple form of life with microscopic dimensions; microbes.

Mineralization. The microbial conversion of an element from an organic to an inorganic state.

Molecule. The smallest individual part of a chemical compound, consisting of one or more atoms.

MPN. Most probable number; a statistical expression for estimating the number of microorganisms in a culture (or, for example, a quantity of water).

Municipal Sewage. Wastes (mostly liquid) originating from a community; may be composed of domestic wastewaters and/or industrial wastewaters

Mulch. Any substance spread or allowed to remain on the soil surface to conserve soil moisture and shield soil particles from the erosive forces of raindrops and runoff.

Mutagen. A substance that causes an increased mutation rate.

Mutant. An organism with a changed or new gene.

Mutation. A stable change of a gene, such that the changed gene is inherited by offspring cells.

N

Nematodes. Roundworms, many of which are pathogenic for plants, and sometimes animals.

Nitrification. The biochemical transformation of ammonium nitrogen to nitrate nitrogen.

Nitrification Inhibitor. A chemical that slows down the conversion of ammonium to nitrate nitrogen.

Nitrogen Fixation. The biological or chemical process by which elemental nitrogen, from the air, is converted to organic or available nitrogen.

Nonpoint Source (NPS) Pollution. Pollution of surface or ground water supplies originating from landuse activities and/or the atmosphere, having no well defined point of entry.

No-tillage. A method of crop production in which seedbed preparation involves only opening a small slit in the soil (when plowing is eliminated) for seed and agrochemical placement; pest control is subsequently achieved through the use of agrochemicals, rather than tillage; also often referred to as "no-till" or "zero-till".

Nutrients. Chemical elements or substances, such as nitrogen and phosphorus, that are essential for plant and animal growth.

Nutrient Pollution. Contamination of water resources by excessive inputs of nutrients; in surface waters, excess algal production is a major concern.

O

Organic Chemicals. Any number of natural or synthetic chemical compounds containing the element carbon in combination with other elements (such as hydrogen, chloride, phosphorus); organic chemicals are used in a variety of everyday applications from fuel to pest control; many are safe but some may be toxic and also carcinogenic.

*Organic Materials (*Organics). Substances that contain carbon, as well as other chemical elements. Plants are a primary form of organic material. Secondary forms include human and animal excrement.

Organic Phosphorus Compounds. Compounds that are derivatives of phosphoric acid, often used as a basis for pesticides.

Overland Flow. See Surface Runoff.

Oxidation. The process of combining with oxygen.

P

Particulates. Solids sufficiently small to be susceptible to being windblown or suspended in air or gas.

Partition Coefficient. A measure of the extent to which a pesticide is divided between the soil and water phases.

Pathogenic. Capable of causing disease.

Pathogens. Disease causing microorganisms.

Percolation. Downward movement of water through the soil profile or other substance.

Percolation Rate. The rate at which water moves through saturated granular material, such as soil.

Persistence. The resistance to degradation as measured by the period of time required for complete decomposition of a material.

Pesticides. Chemical compounds used to control specific pests (plants or animals). Insecticides control insects; herbicides control plants.

pH. A measure to indicate an acid or alkaline condition; pH values can range from zero (extremely acid) to 14 (extremely basic or alkaline); pH near 7 (neutrality) is preferred by many aquatic organisms; pH measurements use a non-linear scale such that pH 6 is 10 times more acidic than pH 7, and pH 5 is 100 times more acidic than pH 7; seawater has a pH of approximately 7.5 to 8.5, coffee has a pH slightly above 5.

Plankton. Collective term for the passively floating flora and fauna of a body of water.

Point Source Pollution. Pollution of ground or surface water supplies at well-defined, usually manufactured, '"points" or locations; discharges of treated wastewater from municipal and industrial treatment plants are common point sources of pollution.

Pollutant. Any substance of such character and in such quantities that upon reaching the environment (soil, water, or air), is degrading in effect so as to impair the environment's usefulness or render it offensive.

Pollution. The occurrence of contaminating materials in the environment (water, soil or atmosphere) above natural, background levels.

Potable. Suitable for drinking.

Protozoa. One-celled microorganisms, without chlorophyll, that are associated with animals.

R

Receiving Waters. All distinct bodies of water that receive runoff or wastewater discharges, such as streams, rivers, ponds, lakes, and estuaries.

Recharge Area. Land area over which precipitation infiltrates into the soil and percolates downward to replenish an aquifer; for unconfined aquifers, essentially the entire land surface overlaying the aquifers is a recharge area; for confined aquifers, recharge areas may be only a small part of the overlaying area.

Reduced Tillage. Any system of tillage that disturbs the soil less, and leaves more plant residue on the soil surface, than does conventional tillage; also referred to as "conservation tillage" and "minimum tillage"

Rill. A small channel eroded into the soil surface by runoff; rills easily can be smoothed out (obliterated) by normal tillage.

Runoff. The portion of precipitation, snow melt, or irrigation that flows over and through the soil, eventually making its way to surface water supplies (such as streams, rivers, ponds); runoff includes surface runoff, interflow and ground water flow.

S

Salinity. The quality of water based on its salt content; seawater contains approximately 18,000 parts of salt in each million parts of water.

Sand. Soil particles between 0.05 and 2 mm in diameter.

SCD (SWCD). Soil Conservation District (also called Soil and Water Conservation District in some areas); a local governmental entity within a defined water or soil protection area that provides assistance to farmers and other local residents in conserving natural resources, especially soil and water.

SCS. Soil Conservation Service. An agency of the United States Department of Agriculture that provides technical assistance for resource conservation to farmers, other Federal, state and local agencies, and to local soil conservation districts.

Sanitary Sewer. A sewer that transports only wastewaters (from domestic residences and/or industries) to a wastewater treatment plant.

Sediment. Eroded soil and rock material, and plant debris, transported and deposited by runoff.

Sediment Yield. The quantity of sediment arriving at a specific location.

Seepage. The percolation of wafer through the soil from unlined channels, ditches, watercourses and water storage facilities.

Septage. The liquid and semisolid contents removed by pumping from a septic tank.

Septic System. An onsite system designed to treat and dispose of domestic sewage; a typical septic system consists of a tank that receives wastes from a residence or business and a system of tile lines or a pit for disposal of the liquid effluent that remains after decomposition of the solids by bacteria in the tank.

Sewage. Liquid and solid wastes carried in sewers.

Sewer. An underground system of conduits (pipes and/ or tunnels) that collect and transport wastewaters and/or runoff; gravity sewers carry free-flowing water and wastes; pressurized sewers carry pumped wastewaters under pressure.

Sewerage System. The network of sewers that carries sewage from point of origin to point of treatment.

Silt. Soil particles between 0.05 and 0.002 millimeter in approximate diameter.

Sludge. In wastewater treatment, the semisolid part of sewage and bacterial mass that has been acted upon by bacteria and settled and/or been removed from the treated wastewater.

Soil Erodibility. A measure of the soil's susceptibility to raindrop impact, runoff and other erosional processes.

Soil Profile. A vertical section of the earth's highly weathered upper surface often showing several district layers, or horizons

Soil Structure. The arrangement of soil particles into aggregrates.

Soil Texture. The proportions of soil particles (sand, silt, and clay) in a soil profile.

Storm Sewer. A sewer that collects and transports surface runoff to a discharge point (infiltration basin, receiving stream, treatment plant).

Strip Cropping. A crop production system that involves planting alternating steps of row crops and close-growing forage crops; the forage strips intercept and slow runoff from the less protected row crop strips.

Submerged Aquatic Vegetation (SAV). Aquatic vegetation, such as sea grasses, that cannot withstand excessive drying and therefore live with their leaves at or below the water surface. SAV's provide an important habitat for young fish and other aquatic organisms.

Surface Runoff. Precipitation, snow melt, or irrigation in excess of what can infiltrate the soil surface and be stored in small surface depressions; runoff is a major transporter of nonpoint source pollutants.

T

Terrace. A broad channel, bench, or embankment constricted across the slope to intercept runoff and detain or channel it to protected gullets, thereby reducing erosion from agricultural areas.

Tillage. Plowing, seedbed preparation, and cultivation practices.

Total Dissolved Phosphorus. Total phosphorus content of material that will pass through a filter of a specific size.

Total Dissolved Solids. All material that passes a filter of a specified size.

Total Nitrogen. The sum of all nitrogen forms.

Total Particulate Phosphorus. Total phosphorus content of material retained on a filter of a specific size.

Total Phosphorus. The sum of all phosphorus forms.

Toxic Substance. Any substance that can be harmful to plant or animal life; such substances may cause chronic (long-term) toxicity in which harmful levels of the substance accumulate over fume, or cause acute toxicity with immediate, harmful effects.

Toxin. A poisonous substance produced by certain organisms.

Treated Wastewater. Wastewater that has been subjected to one or more physical, chemical and biological processes to reduce its pollution or health hazard.

Turbidity. A condition in water or wastewater caused by the presence of suspended material resulting in scattering and absorption of light rays.

U

Urban Runoff. Surface runoff from urban areas (such as streets, parking lots, residential developments).

Unconfined aquifer. An aquifer whose upper boundary (the water table) is made up of relatively loose, unconsolidated natural material that transmits water readily; unconfined aquifers also are often referred to as water {able aquifers.

Underground Storage Tank (UST). A container buried in the soil designed to store venous liquids, especially fuels; UST's are prevalent in rural areas (for example, home heating oil tanks) and in urban areas (for example, gasoline storage tanks); UST's can pose a hazard to the environment if their contents leak.

V

Variable Costs. Input costs that change as the nature of the production activity or its circumstances change; for example, as production levels vary.

Vegetative Controls. Nonpoint source pollution control practices that involve plants (vegetative cover) to reduce erosion and minimize the loss of pollutants.

Volatilization. Loss of a substance through evaporation.

W

Wastewater. Literally, water that has been used for some purpose and discarded, or wasted; typically liquid discharged from domestic residential, business and industrial sources that contains a variety of wastes (fecal matter,by-products).

Wastewater Treatment Plant. A facility that receives wastewaters (and sometimes runoff) from domestic and/or industrial sources, and by a combination of physical, chemical, and biological processes reduces (treats) the wastewaters to less harmful by-products; known by the acronyms WWTP, STP (sewage treatment plant), and POTW (publicly owned treatment works).

Watershed. An area of land that contributes runoff to one specific delivery point; large watersheds may be composed of several smaller "subsheds", each of which contributes runoff to different locations that ultimately combine at a common delivery point.

Water Table. The upper level of a saturated zone below the soil surface often the upper boundary of a water table aquifer.

Water Table Aquifer. See Unconfined Aquifer.

Waste Storage Pond. An impoundment for containing liquid wastes.

Waste Treatment Lagoon. An impoundment for liquid wastes, so designed as to accomplish some degree of biochemical treatment of the wastes.

Wetlands. Any of a number of tidal and non-tidal areas characterized by saturated or nearly saturated soils most of the year that form an interface between terrestrial (land-based) and aquatic environments; include freshwater marshes around ponds and channels (rivers and streams, brackish and salt marshes; other common names include swamps and bogs.

Units of Measurement

Environmental measurements generally are expressed in terms of mass, concentration, or rate. Often measurements are given in metric terms, as opposed to our English system of weights and measures (see Table 1 for applications and abbreviations}.

Acre (ac). An area equal to 43,560 square feet, approximately 0.4 hectare; an average residential building lot might be 0.5 acre (approximately 150 feet long by 150 feet wide) or 0.2 hectare.

Centimeter (cm). One one-hundredth of a meter, equivalent approximately to two-fifths of an inch.

Concentration. The ratio of the amount of one substance in another substance. For example, in seawater, the amount of chloride dissolved in water is approximately 18, 000 milligrams per liter.

English System. Traditional system of measurement using inches as the base unit for length, pounds as the base unit for mass, for example.

Gram (g). One one-thousandth of a kilogram.

Hectare (ha). Metric measurement for area equivalent to 10,000 square meters or approximately 2.5 acres; an average residential building lot might be 0.2 of a hectare (45 meters long by 45 meters wide) or 0.5 of an acre.

Kilogram (kg). The base unit for mass in the metric system; 1000 grams or approximately 2.2 pounds; a 150-pound person weighs 68 kilograms.

Liter (L). A unit of metric measurement for volume; roughly equivalent to 1 quart or 0.25 gallon.

Mass. In common usage, mass is used synonymously with weight; the common English unit for mass is pounds (lb), whereas in the metric system the unit is the kilogram (kg).

Meter (m). The basic metric unit for length; equivalent approximately to 3.25 feet, a 5-foot person is approximately 1.5 meters tall.

Metric System. An international system of scientific measurements based on multiples of 10, somewhat analagous to our system of currency; for example, 10 pennies = 1 dime; 100 pennies - 10 dimes = 1 dollar. The base unit for length is the meter and for mass, the kilogram.

Milligram (mg). One one-thousandth of a gram.

Milligrams per liter (mg/L). An expression for concentration, usually in reference to a liquid, roughly equivalent to parts per million; for example, 1 gallon of food coloring placed in 1 million gallons of water would result in a concentration of food coloring in the water of 1 mg/L. Water from the ocean has a salt concentration of approximately 18,000 mg/L.

Million Gallons per Day (MGD). Common expression for flow rate of wastewater or streamflow.

Millimeter (mm). One one-thousandth of a meter; a dime is approximately 1 millimeter thick; 1 inch equals approximately 25 millimeters.

Parts per billion (ppb). An expression for concentration; one one-thousandth of a pad per million; the magnitude of this quantity can be related to 8 ounces of a substance dissolved in 4 inches of water ponded on a 1 square mile area; roughly equivalent in scale to 2 seconds in a lifetime.

Parts per million (ppm). An expression for concentration (see Milligrams per Liter); the quantity of one substance contained in 1 million units of another substance when both are measured by identical terms. For solutions (substances dissolved in liquids), it is the number of units of the substance contained in 1 million units of solution.

Pound (lb). 16 ounces or approximately 0 45 kilogram.

Rate. The frequency of occurrence of some quantity, such as the flow rate of gallons per minute.

Table 1. Preferred metric units and abbreviations for expressing physical quantities*

Quantity	Application	Preferred Unit	Abbreviations
Area	Land, lake and reservoir area	hectare	ha
		square meter	m^2
	Pond area Open water channel area	square meter	m^2
	Pipe and conduit area	square millimeter, square centimeter, square meter	mm^2, cm^2, m^2
Length	Pipe diameter Field drainage, runoff Evaporation and evapotranspiration, daily and seasonal Precipitation, daily and seasonal	millimeter	mm
	Field dimensions Water channel and reservoir depth	meter	m
Mass	Quantity of crop	megagram or metric ton	Mg, t
Mass per area	Fertilizer, pesticide application rate	kilogram per hectare	kg/ha
	Crop yield Soil erosion	megagram per hectare or metric ton per hectare	Mg/ha t/ha
Volume	Earth	cubic meter	m^3
	Liquid volume	liter	L
Volume per area	Pesticide application rate	liter per hectare	L/ha
Volume per time	River and channel flow	cubic meter per second	m^3/s
	Sprayer calibration	milliliter per minute	mL/min
	Sprinkler flow	liter per second	L/s

* Adapted from *Use of Customary and SI (Metric) Units*. 1972. ASAE Engineering Practice ASAE EP 285.3. Agricultural Engineers Yearbook

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