

RainGrow's Glossary of Terms

A	
Abiotic	Nonliving aspects of environments.
Absorption	The integration of one substance into another, as water into a sponge; the term sorption is used when the distinction between absorption and adsorption (surface sorption) cannot be made.
Activated Carbon	Powdered charcoal that has been steam-treated to greatly increase its surface area.
Adsorption	The adhesion of a substance to the surface of a solid substance.
Advection	The process where liquids or gases are transported by the velocity of the medium.
Aeration	The exposure or introduction of air to a substance. Often used to support the oxidation or volatilization of a substance.
Aerobic	An environment that includes oxygen; process occurring in the presence of oxygen.
Aerobe	An organism that lives and grows in the presence of oxygen.
Air-Sparging	The process in which air is injected into the groundwater of a contaminated area.
Air-Stripping	A treatment process that removes VOCs from contaminated groundwater by forcing air through water, causing the compounds to evaporate.
Anaerobic	A process or organism functioning in a reducing (very low oxygen) environment.
Anaerobe	An organism that lives and grows in the absence of oxygen or air.
Anaerobic Respiration	The use of inorganic electron acceptors, other than oxygen, for energy yielding anaerobic reactions.
Anion	A negatively charged ion.
Anoxic	Used to describe an environment absent of oxygen.
Aquifer	An underground geological formation composed of permeable material that contains and stores groundwater; typical source of water for wells, springs, etc.
Aquitard	An almost impermeable barrier that impedes, but does not prevent, the movement of groundwater between aquifers.
Aromatic	Describing a substance or compound containing the six-carbon benzene ring related to organic groups; large aromatic compounds are difficult to decompose.
Autotroph	An organism that uses carbon dioxide for growth.

B	
Bioaccumulation	Intracellular accumulation of environmental pollutants such as heavy metals by the feeding of living organisms; this results in the progressive concentration of the pollutant over time and up the food chain until toxicity occurs to that species.
Bioaugmentation	The introduction of microorganisms to the environment to increase the decomposition rate of contaminants.
Bioavailability	The availability of chemicals and nutrients to biodegradative microorganisms.
Biochemical Oxygen Demand (BOD)	The amount of oxygen required to oxidize biological substances in water; the BOD test measures the oxygen consumed (in mg/L) over five days at 20°C.
Biocide	A chemical poison that destroys life; includes pesticides, herbicides and disinfectants.
Biodegradation	The breakdown of organic substances or pollutants by living organisms.
Biofilter	An apparatus that passes volatile organic compounds (VOCs) present in air through a medium containing biodegrading microbes.
Biomass	The amount of living matter present in a given habitat.
Bioremediation	The process or set of processes which utilize living organisms to sequester, break down or transform hazardous materials into less toxic or nontoxic substances.
Biostimulation	Any process that increases the activity of microorganisms and the according biodegradation of contaminants.
Biotic	Living; having life.
Biotic Layer	A barrier layer in a landfill cap used to prevent penetration by animals through the layer.

Biotransformation	The chemical alteration of a compound by a living organism or via enzymatic activity.
Bioventing	The process of supplying oxygen to microorganisms by introducing air into contaminated soils; this technique is meant to enhance biodegradation in-situ.
Brownfield	An underused, idled, or abandoned industrial or commercial site where redevelopment is hindered or prevented due to real or supposed environmental contamination.
BTEX (BTXE)	Benzene, toluene, ethylbenzene, and xylenes.

C

Capillary Fringe	The zone directly above the water table; in shallow aquifers this zone may extend to the surface.
Carbon Adsorption	A treatment system that removes pollutants by surface adhesion from groundwater or vapor as it is forced through activated carbon.
Cation	A positively charged ion.
Cation Exchange Capacity (CEC)	The ability of a compound or substance to retain or exchange cations; units are cmol (+ per kg) of material.
Chemical Oxygen Demand (COD)	The amount of oxygen in mg/L required to oxidize both organic and inorganic compounds.
Cometabolism	The decomposition of a pollutant by an organism while using other compound(s) for growth or energy.
Confining Layer	A geological layer characterized by lower permeability that obstructs the vertical flow of water.
Consortium	Two or more members in a symbiotic relationship where each member benefits from the other; consortiums may collectively complete a decomposition process that either single member cannot achieve on its own.
Creosote	An oily wood derivative used as a wood preservative; creosote contains phenols, PAHs and other contaminants.

D

De-halogenation	The removal of halogens such as chlorine, fluorine, bromine, iodine from organic compounds.
Denitrification	The development of gaseous nitrogen from nitrate or nitrite by some bacteria; occurs under anaerobic or microaerophilic conditions.
Dense Non-Aqueous Phase Liquid (DNAPL)	"A DNAPL is one of a group of organic substances that are relatively insoluble in water and denser than water; DNAPLs tend to sink vertically through sand and gravel aquifers to the underlying layer." - U.S. Environmental Protection Agency, 2010
Desiccated	Dehydrated; thoroughly dried
Desorption	The removal of an absorbed or adsorbed substance from its absorbent or adsorbent, respectively.
Diffusion	The natural movement of liquid or gas molecules, as influenced by kinetic energy, from high concentration to low concentration.
Dioxins	Any of a family of compounds known chemically as dibenzo-p-dioxins; these chemicals formed during combustion and are extremely toxic and long-lived.
Dispersion	The forced mixing or movement of a substance; often carried out by differences in temperature, pressure, and other chemical forces; diffusion is a specific instance of dispersion solely regulated by differences in concentration of the substance.

E

Enhanced Rhizosphere Biodegradation	The increased rate of biodegradation of contaminants by microorganisms through the support of compounds secreted by plant roots.
Enzyme	Proteins that produce chemical changes through catalytic biological actions.

Eutrophication	The enrichment of natural waters with inorganic nutrients especially nitrogen and phosphorous such that they support excessive growth of plants and algae.
Evapotranspiration	The loss of water into the atmosphere due to the combination of transpiration from plants and the evaporation of water from soil.
Ex-Situ	Off-site; moved from its original position; excavated.

F

Facultative Organism	An organism that proliferates in both aerobic and non-aerobic environments.
Fermentation	A microaerophilic energy yielding process that involves a series of redox reactions in which the substrate and terminal electron acceptor are organic compounds.
Filtration	The process of removing a substance(s) from solids, liquids, or gases by passage through a medium such as sand or a synthetic filter.
Flocculation	The aggregation or coalescence of particles into larger masses.
Fungi	A group of diverse eukaryotic, non-photosynthetic, unicellular and multicellular organisms which are important in the decomposition of nitrogen-poor organic materials.
Furan	Compounds formed as byproduct of combustion; they are extremely toxic.

G

Granulated Active Carbon (GAC)	A prilled form of highly porous activated carbon for the adsorption of pollutants.
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H

Halogenated Organic Compound	A compound containing molecules of chlorine, bromine, iodine, and/or fluorine; many of these compounds are long-lived, toxic or both.
Halophilic	Descriptive of an organism that requires or proliferates at atypically high levels of salt.
Hazardous Waste	By definition, a waste exhibiting one or more of the following characteristics: ignitability, corrosivity, reactivity, toxicity.
Heavy Metal	Any metal with a specific gravity of 5.0 or greater including arsenic, cadmium, chromium, copper, lead, mercury, silver and zinc; typically toxic at various quantities.
Heterotroph	Any organism that gets its carbon from organic substances.
Hydrocarbon	Any of the organic compounds containing hydrogen and carbon; common occurrence in coal, natural gas, and petroleum.
Hydrogen Sulfide	A gas emitted during the anaerobic decomposition of organic compounds; toxic with a rotten-egg odor.
Hydrogeology	The scientific study of the occurrence, origin, movement, and qualities of groundwater.
Hydrology	The scientific study of the occurrence, properties, distribution, and effects of water in the on earth and in the atmosphere.

I

In-Situ	On-site; unmoved from its original position; not excavated
Inoculum	Source of microbial cells used to introduce a microorganism into a suitable environment for growth.
Inorganic Compound	A compound typically defined by its lack of carbon; carbonate and bicarbonate are exceptions to this rule as they are not directly created via biological processes.

Ion	An electrically charged atom or group of atoms created by the loss or gain of one or more electrons; the resulting charge is either positive (cation) or negative (anion).
Ion Exchange	A treatment method used to remove and exchange ions from water.
Isotope	One of two or more forms of an elemental atom having an equal number of protons but a difference in neutrons.

L

Landfarming	The practice of incorporating wastes into soil for biological decomposition.
Leachate	The liquid passing through then out of a soil zone or landfill.
Leaching	The process of percolating water through a polluted medium to dissolve contaminants into solution for their removal.
Light Nonaqueous Phase Liquid (LNAPL)	A LNAPL is one of a group of organic substances that are relatively insoluble in water and lighter than water; consequently LNAPL's migrate to the top of a polluted aquifer.
Lignin	An organic polymer occurring in woody material; lignin is greatly resistant to both chemical and enzymatic degradation.

M

Mass Spectroscopy	An analytical process used to determine the relative masses of atoms in a compound; a sample is ionized and passed through an electromagnetic field; different ions can be identified by their characteristic patterns.
Mesophilic	Descriptive of an organism that grows best at moderate temperatures (20°C to 40°C).
Methane	A flammable gas produced during anaerobic decomposition of organic compounds.
Methanogen	Methanogens are microorganisms (Archea) living in anaerobic environments that convert organic materials into methane and water.
Microaerophilic	Descriptive of an organism that prospers in a low-oxygen environment.
Microbe	A microorganism.
Microflora	All microorganisms associated with a particular environment.
Microgram(ug)/kg	1 ug/kg equals one part per billion.
Micronutrient	A chemical element, generally in small or trace amounts, needed by microorganisms and plants.
Microorganisms	Includes bacteria, protozoa, and viruses, as well as certain algae and fungi and archea.
Milligrams(mg)/kg	1 mg/kg equals one part per million.
Mineralization	The conversion or breakdown of organic matter into inorganic material; also, the release of mineral elements from biomass.
Mutagenic	A substance or agent that can cause genetic mutation; examples include radioactive elements and ultraviolet light.
Mycelium	The mass of hyphae that form the vegetative body of numerous fungi.
Mycobacterium	A genus of aerobic bacteria, pathogenic for humans and animals, capable of biodegrading multi-ring compounds such as PAHs.
Mycorrhiza	The fungi that form a symbiotic association with the roots of plants; other microorganisms exhibit the same association.

N

Natural Attenuation	An approach to cleanup that allows natural subsurface processes to contain and reduce the concentrations and amounts of pollutants in contaminated soil and groundwater; these processes include volatilization, biodegradation, adsorption, and chemical reactions with subsurface materials.
NAPL	Non Aqueous Phase Liquid. One of a group of organic substances that is relatively insoluble in water.

Nitrification	The oxidation of ammonia to nitrite, and then nitrate, by bacterial species such as Nitrosomonas and Nitrobacter, respectively; Nitrate is easily leached.
Non-point Source	A term used to identify contaminants that do not have a specific, tangible source; examples would include pollution caused by rainfall or snowmelt that has passed over a contaminated site.
Nonaqueous Phase Liquid (NAPL)	One or a group of organic substances that are relatively insoluble in water; (LNAPL; Light Nonaqueous Phase Liquid) is lighter and less dense; (DNAPL, Dense Nonaqueous Phase Liquid) is denser and heavier.

O

Oligotrophic	Used to describe a body of water lacking sufficient amounts of inorganic nutrients to support the vigorous growth of plants and algae.
Organic Chemical or Compound	A substance, chemical or compound that contains both carbon and hydrogen.
Oxidation	The combination of a substance with oxygen or any reaction in which the atoms in an element lose electrons and the valence of the element is made more positive.
Oxygenate	The process of infusing oxygen from various sources into an environment.

P

Pathogen	A disease producing agent.
PAH	See Polynuclear Aromatic Hydrocarbon.
PCB	See Polychlorinated Biphenyls.
PCE	Perchloroethylene.
PCP	Pentachlorophenol; used in chemical manufacturing and feed stock.
Permeability	The relative ability to permit the flow of a gas or a fluid through a substance.
pH	The measure of acidity or alkalinity of a substance; the pH scale ranges from 0 (extremely acidic) to 14 (extremely alkaline); a neutral pH is equal to 7.
Phenol	Compound composed of a benzene ring and a hydroxyl group, (C ₆ H ₅ OH); used as antimicrobial agents.
Phytodegradation	The breakdown of organic pollutants supported via plant metabolic processes.
Phytomining	The use of plants to extract inorganic substances; often pollutants or economically valuable materials.
Phytoremediation	The practice of using plants to remediate contaminated soil or groundwater.
Phytovolatilization	The use of plants to volatilize contaminants.
Plasmid	Supplemental DNA within a cell that is often dispensable but may provide an advantage to the cell, such as the ability to biodegrade certain compounds.
Polychlorinated Biphenyl (PCB)	A biphenyl where hydrogen atoms on the benzene ring are replaced with chlorine; resilient and resistant compounds used in electrical transformers and capacitors.
Polynuclear Aromatic Hydrocarbon (PAH)	A multi-ring benzene compound used in fuels, oils, and other coal products; they are very slow to degrade.
Psychrophilic	Descriptive of an organism that grows best at temperatures below 20°C.
Plume	Refers to the area of contamination in groundwater, soil, or air.
Point source	The origin of contamination where pollutants are first introduced into the environment; often a specific site.
Porosity	A measure of the total void space of a substance; expressed as a ratio of that space to the total volume of the substance.
Pump-and-treat	A groundwater treatment process that pumps water to the surface where it is treated to remove or destroy pollutants.

R

Recalcitrant	Resistant to biodegradation.
Redox Potential	The oxidation-reduction potential of a substance or aqueous environment; the measurement of tendency of the substance to be reducing (electron donor) or oxidizing (electron acceptor).
Reduction	The change of valence in a negative direction through the gaining of electrons.
Respiration	It is the set of the metabolic reactions that transfers biochemical energy from organic compounds into adenosine triphosphate (ATP) for energy use; oxygen or other materials are used as electron acceptors.
Rhizosphere	Area in soil immediately surrounding the root zone of plants; typically higher in nutrients and carbonaceous exudates, with an increase in microbial activity.
Risked-based Analysis	An evaluation concerned with identifying the human health and environmental risks by identifying the fate, transport, and exposure of contaminants to animals or humans.

S

Saturated Zone	The subsurface zone where all pore space is filled with water at greater than atmospheric pressure.
Sludge	A semisolid residue from petroleum or water treatment processes.
Slurry	An emulsion of a liquid with another phase that can be used to deliver chemicals and biological agents to a medium.
Solute	A substance that is dissolved in another substance to form a solution.
Solvent	A substance used to dissolve another substance to form a solution.
Sorption	The adherence of chemicals to particles or substances; term used when absorption or adsorption cannot be distinguished.
Sparge	To introduce air or gas into a liquid.
Sump	The lowest point of a drainage system where solutions are to be pumped out.
Surfactant	A natural or synthetic chemical that when dissolved in water reduces its surface tension and thus promotes the wetting, solubilization and emulsification of nonpolar compounds.

T

Thermal Desorption	The process of heating soil to release contaminants.
Thermophile	Descriptive of an organism that grows best at temperatures above 40°C.
TPH	Total petroleum hydrocarbons.
Tracer	An identifiable substance that can be traced through a mechanical or biological process that provides information on the process.

U

Unsaturated Zone	Also called the vadose zone, the area between the land surface and the saturated zone; the soil pores in a unsaturated zone are filled with both air and water.
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V

Vadose Zone	See Unsaturated Zone.
VC	Vinyl chloride.
Viable	Capable of living or growing.
Viscosity	The measure of the quality of a fluid being gluey, and resistant to flow.
Volatile Organic Compound (VOC)	One of a group of carbon-containing compounds that easily evaporate at room temperature; many of these compounds are toxic.
Volatilization	The process of passing a chemical from the liquid phase to the gas phase as a vapor.

W

Weathering	The physical and chemical decomposition of substances due to climatic and biotic agents.
White Rot Fungi	A specific fungus that decomposes wood; instrumental in the biodegradation of Polycyclic Aromatic Hydrocarbons (PAH) and other bioresistant wastes.

X

Xenobiotic	Manufactured compounds that do not exist in nature and are thus foreign to biological systems.
Xerophilic	Descriptive of an organism that is capable of growing in environments with a very low water potential.