

GROUND WATER PRIMER - Glossary

abandoned well

a well that has been permanently disconnected and filled. Most States have regulations or guidelines for abandoned well to ensure that contamination cannot move from the surface in the aquifer.

acute toxicity

any poisonous effect produced within a short time after exposure to the toxic compound, usually within 24 to 96 hours

alkalinity

the total measurable bases (OH, HCO₃, CO₃) in a volume of water; a measure of a material's capacity to neutralize acids; pH > 7

alluvium

a general term for clay, silt, sand, gravel or similar unconsolidated material deposited by a stream or other body of running water

aquifer

a water-bearing layer of rock or sediment capable of yielding supplies of water; typically is unconsolidated deposits or sandstone, limestone or granite. Can be classified as confined or unconfined.

aquitard

underground geological formation that is slightly permeable and yields inappreciable amounts of water when compared to an aquifer

artesian aquifer

an aquifer that contains water under pressure as a result of hydrostatic head. For artesian conditions to exist, an aquifer must be overlain by a confining material and receive a supply of water. The free water surface stands at a higher elevation than the top of the confining layer thus if the aquifer is tapped by a well, the water in the well will raise above the level of the aquifer.

artesian well

a well whose water is supplied by a artesian aquifer.

atmosphere

the gaseous layer that surrounds the earth (air)

available soil moisture

the portion of water in a soil that can be readily absorbed by plant roots. It is the amount of water released between in situ field capacity and the permanent wilting point.

bedrock

a general term for any consolidated rock

best management practices (BMP)

structural, nonstructural, and managerial techniques recognized to be the most effective and practical means to reduce surface water and ground water contamination while still allowing the productive use of resources.

biosphere

all living organisms (plant and animal life)

black water

water containing liquid and solid human body waste generated through toilet use

bored well

a well drilled with a large truck-mounted boring auger, usually 12 inches or more in diameter and seldom deeper than 100 feet

blue baby syndrome

blood related condition found in babies due to nitrate poisoning (poisoning limits blood's ability to carry oxygen thereby causing baby to look blue hued); known as methemoglobinemia.

calorie

the amount of heat required to raise the temperature of one gram of water by one degree centigrade

capillary fringe

a zone in the soil just above the watertable that remains saturated or almost saturated.

carcinogenic

event, condition or effect that produces cancer

chlorination

the application of chlorine to water, sewage, or industrial wastes, generally to disinfect, to oxidize, or to improve settling.

coliform bacteria

a group of bacteria that mostly inhabits the intestinal tract of humans and animals, but also found in soil. While harmless in themselves, coliform bacteria are used as indicators of the possible presence of pathogenic organisms.

condensation

the process in which water vapor is cooled to the liquid phase

confined aquifer

an aquifer whose upper, and perhaps lower, boundary is defined by a layer of natural material that does not transmit water readily

confining layer

geological material through which significant quantities of water can not move; located below unconfined aquifers, above and below confined aquifers. Also known as a confining bed.

consolidated rock

bedrock

consumption

water that is actually consumed, transpired, or incorporated into new products as it is used

consumptive use

the total amount of water taken up by vegetation for transpiration or building of plant tissue, plus the unavoidable evaporation of soil moisture, snow, and intercepted precipitation associated with vegetal growth.

deep percolation

water that moves downward through the soil profile below the root zone and cannot be used by plants

degradation

to wear down, reduce to lower quality, by erosion or reduce the complexity of a chemical compound

depression storage

water stored in surface depressions and therefore not contributing to surface runoff

dew point

The temperature to which air must be cooled to cause condensation of the water vapor it contains. The higher the dew point, the higher the moisture content of the air.

discharge

the flow of surface water in a stream or canal or the outflow of ground water from a well, ditch, or spring

drainage well

(1) a well pumped in order to lower the watertable;

drawdown

(1) lowering of the watertable, surface water, or piezometric surface resulting from the withdrawal of water from a well or drain;

drilled well

a well usually 10 inches or less in diameter, drilled with a drilling rig and cased with steel or plastic pipe. Drilled wells can be of varying depth.

dug well

a large diameter well dug by hand, usually old and often cased by concrete or hand-laid bricks. Such wells typically reach less than 50 feet in depth and are easily and frequently contaminated.

effluent

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

erosion

the wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. Geological erosion is natural occurring erosion over long periods of time. Accelerated erosion is more rapid than normal erosion and results primarily from man's activities. Erosion is further classified by the amount and pattern of soil removal and transport as gully, interrill, rill, sheet, and splash or raindrop erosion.

eutrophication

the natural or artificial process of nutrient enrichment whereby a water body becomes filled with aquatic plants and low oxygen content. The low oxygen level is detrimental to fish.

evaporation

the process in which liquid water is transferred into the atmosphere

evapotranspiration

the combined loss of water to the atmosphere from land and water surfaces by evaporation and from plants by transpiration

grey water

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

ground water

water occurring in the zone of saturation in an aquifer or soil

half life

the time it takes certain materials, such as persistent pesticides, to become chemically altered

hardness

a characteristic of water caused by various salts, calcium, magnesium and iron (e.g. bicarbonates, sulfates, chlorides and nitrates) hazardous waste which because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause mortality (death), injury, or serious illness

herbicide

chemicals used to kill undesirable vegetation

hydrograph

a graph which illustrates hydrologic measurements over a period of time, such as water level, discharge or velocity

hydrologic cycle

the circulation of water in and on the earth and through earth's atmosphere through evaporation, condensation, precipitation, runoff, ground water storage and seepage, and re-evaporation into the atmosphere

hydrosphere

water held in oceans, rivers, lakes, glaciers, ground water, plants, animals, soil, and air

infiltration

the downward entry of water through the soil surface into the soil

infiltration rate

the quantity of water that enters the soil surface in a specified time interval. Often expressed in volume of water per unit of soil surface area per unit of time (in/hr, cm/hr).

insecticide

chemicals used to control undesirable insects

lagoon

water impoundment in which organic wastes are stored or stabilized or both

latent heat

the heat (energy) absorbed or released as water changes between the gas (water vapor), the liquid (water droplets), and the solid (ice) states

LD50

the dosage of a toxic substance required to kill one half of the organisms under study in a given period of time

leachate

liquids that have percolated through a soil and that carry substances in solution or suspension

leaching

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

lethal dose (LD)

the amount of a toxic substance required to cause death of an organism under study in a given period of time

lithosphere

a general term for the outer layer of the earth

loess

a wind blown deposit of silty soil having little or no stratification.

manure

the fecal and urinary defecation of livestock and poultry

MCL

maximum contaminant level, the maximum concentration of specific contaminants that is allowed under the Federal Safe Drinking Water Act

nitrate (NO₃)

an important plant nutrient and type of inorganic fertilizer (most highly oxidized phase in the nitrogen cycle). In water, the major sources of nitrates are septic tanks, feed lots and fertilizers.

nitrite (NO₂)

product in the first step of the two-step process of conversion of ammonium (NH₄) to nitrate (NO₃)

non-point source pollution

pollution of the water from numerous widespread locations that are hard to identify and pin-point. Ex. agri-chemicals through leaching or runoff

non-transient non-community water systems

public water system which:

serves 15 or more service connections that are used by the same person for at least 6 months per year; or

serves the same 25 or more persons for at least 6 months per year

Examples of NTNC water systems include schools, churches, and workplaces. The same individuals use the water from month to month, but do not live at this facility.

organic compounds
natural or synthetic substances based on carbon

overwithdrawal
withdrawal of ground water over a period of time that exceeds the recharge rate of the supply aquifer

perched aquifer
an aquifer containing unconfined (unpressurized) ground water held above a lower body of ground water by an unsaturated zone; often a result of clay lenses in the soil strata

percolation
water that moves through the soil at a depth below the root zone

permeability
the degree to which soils and rock are interconnected, depends upon size and shape of pores; size and shape of interconnections and their extent

pesticide
a chemical substance used to kill or control pests such as weeds, insects, fungus, mites, algae, rodents, and other undesirable agents

pH
a numerical measure of acidity, or hydrogen ion activity used to express acidity or alkalinity; neutral is pH 7.0, values below 7.0 are acid, and above 7.0 are alkaline

point-source pollution
pollution of water from one place in a concentrated manner that is easy to identify. Ex. leaking underground storage tank or discharge pipe from a sewage treatment plant.

pollution plume
an area of a stream or aquifer containing degraded water resulting from migration of a pollutant

porosity
the degree to which the total volume of soil, gravel, sediment or rock is permeated with pores or cavities through which fluids (including air) can move

potable water
water that is fit to drink

ppm
parts-per-million; a common basis for reporting water analysis. One ppm equals one unit of measurement per million units of the same measurement.

precipitation
moisture falling from the atmosphere in the form of rain, snow, sleet or hail

principal aquifer
the aquifer in a given area that is the important economic source of water to wells for drinking, irrigation, etc.

recharge zones

the area of land that allow water to replenish an aquifer; this process occurs naturally when rainfall filters down through the soil or rock into an aquifer, usually in the higher gradient section overlying the aquifer; artificial recharge is through injection wells or by spreading water over ground water reservoirs reservoir for any given area

reverse osmosis

treatment that uses a very fine molecular sieve that permits water to pass through but not contaminants. Useful for nitrate removal.

root zone

the depth of soil penetrated by crop roots

runoff

the flow of water from the land to oceans or interior basins by overland flow and stream channels

salinity

the concentration of dissolved salts in water

salt-water intrusion

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

secondary aquifer

any aquifer that is not the main source of water to wells in a given area - includes shallow and perched aquifers

spring

a place where ground water naturally comes to the surface resulting from the watertable meeting the land surface

sole source aquifer

designated under the Safe Drinking Water Amendments (1986), an aquifer of critical value as the main or only supplier of drinking water for a specific area

sorb

to take up and hold either by absorption or adsorption

surface water

water found over the land surface in streams, ponds, marshes,

total dissolved solids

the total amount in milligrams of solid material dissolved in one liter of water (mg/l)

transient non-community water systems

public water system which:

serves 15 or more service connections but does not serve 15 service connections used by the same persons for more than six months per year; or serves an average of at least 25 persons per day for at least 60 days per year, but doesn't serve the same 25 persons for more than 6 months per year.

Examples of TNC water systems include campgrounds, rest stops, parks, or

restaurants. Different individuals use the water from one day to the next, and they do not live at this facility.

transmissivity

a measure of the ability of an aquifer to transmit water

turbidity

a measure of water cloudiness caused by suspended solids

unconfined aquifer

an aquifer in which the water table is at or near atmosphere pressure; the aquifer may or may not be saturated to the top of the aquifer

underground storage tank (UST)

a tank system, including its piping, that has at least 10% of its volume underground

volatile organic compound

a carbon based substance which wastes away on exposure to the atmosphere

volatilization

loss of a substance through evaporation or sublimation. When manure is spread on a field, ammonia-nitrogen in the manure may volatilize quickly and be lost as fertilizer unless it is incorporated into the soil.

water budget

The depth of annual precipitation to cover an area. In the U.S. it is 30 inches.

watershed

all land and water within the confines of a drainage divide

water table

the water level of an unconfined aquifer, below which the pore spaces are generally saturated

water table aquifer

an aquifer whose upper boundary is the water table; also known as an unconfined aquifer

water table well

a well whose water is supplied by a water table or confined aquifer

withdrawal

water withdrawal from the surface and ground water sources for various human uses