

GLOSSARY AND ACRONYMS

acre-foot	enough water to cover 1 acre to a depth of 1 foot; equal to 43,560 cubic feet or 325,851 gallons
adsorption	the attraction and adhesion of a layer of ions from an aqueous solution to the solid mineral surfaces with which it is in contact
advection	the process by which solutes is transported by the bulk motion of the flowing groundwater
alluvium	a general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during comparatively recent geologic time by a stream or other body of running water as sorted or semisorted sediment in the bed of the stream or on its floodplain or delta, or as a cone or fan at the base of a mountain slope
anisotropic	<i>hydraulic conductivity</i> ("K"), differing with direction
aquifer	a geologic formation, group of formations, or a part of a formation that contains sufficient permeable material to yield significant quantities of groundwater to wells and springs. Use of the term should be restricted to classifying water bodies in accordance with stratigraphy or rock types. In describing hydraulic characteristics such as transmissivity and storage coefficient, be careful to refer those parameters to the saturated part of the aquifer only.
aquifer test	a test involving the withdrawal of measured quantities of water from, or the addition of water to, a well (or wells) and the measurement of resulting changes in <i>head</i> (water level) in the aquifer both during and after the period of discharge or addition
aquitard	a saturated, but poorly permeable bed, formation, or group of formations that does not yield water freely to a well or spring
artesian	confined; under pressure sufficient to raise the water level in a well above the top of the aquifer
artesian aquifer	see <i>confined aquifer</i>
artificial recharge	recharge at a rate greater than natural, resulting from deliberate or incidental actions of man

BTEX	benzene, toluene, ethylbenzene, and xylenes
capillary zone	negative pressure zone just above the water table where water is drawn up from saturated zone into matrix pores due to cohesion of water molecules and adhesion of these molecules to matrix particles. Zone thickness may be several inches to several feet depending on porosity and pore size.
capture	the decrease in water discharge naturally from a <i>ground-water reservoir</i> plus any increase in water recharged to the reservoir resulting from pumping
coefficient of storage	the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head
cone of depression	depression of heads surrounding a well caused by withdrawal of water (larger cone for confined aquifer than for unconfined)
confined aquifer	geological formation capable of storing and transmitting water in usable quantities overlain by a less permeable or impermeable formation (confining layer) placing the aquifer under pressure
confining bed	a body of "impermeable" material stratigraphically adjacent to one or more aquifers
diffusion	the process whereby particles of liquids, gases, or solids intermingle as a result of their spontaneous movement caused by thermal agitation
discharge velocity	an apparent velocity, calculated from Darcy's law, which represents the flow rate at which water would move through the aquifer if it were an open conduit (also called specific discharge)
discharge area	an area in which subsurface water, including both groundwater and water in the <i>unsaturated zone</i> , is discharged to the land surface, to surface water, or to the atmosphere
dispersion	the spreading and mixing of chemical constituents in groundwater caused by diffusion and by mixing due to microscopic variations in velocities within and between pores

DNAPL	dense, non-aqueous phase liquid
drawdown	the vertical distance through which the water level in a well is lowered by pumping from the well or nearby well
effective porosity	the amount of interconnected pore space through which fluids can pass, expressed as a percent of bulk volume. Part of the total porosity will be occupied by static fluid being held to the mineral surface by surface tension, so effective porosity will be less than total porosity.
evapotranspiration	the combined loss of water from direct evaporation and through the use of water by vegetation (transpiration)
flow line	the path that a particle of water follows in its movement through saturated, permeable materials
gaining stream	a stream or reach of a stream whose flow is being increased by inflow of groundwater (also called an effluent stream)
gpm	gallons per minute
groundwater reservoir	all rocks in the zone of <i>saturation</i> (see also <i>aquifer</i>)
groundwater divide	a ridge in the <i>water table</i> or other <i>potentiometric surface</i> from which groundwater moves away in both directions normal to the ridge line
groundwater system	a groundwater reservoir and its contained water; includes hydraulic and geochemical features
groundwater model	simulated representation of a groundwater system to aid definition of behavior and decision-making
groundwater	water in the zone of saturation
head	combination of elevation above datum and pressure energy imparted to a column of water (velocity energy is ignored because of low velocities of groundwater). Measured in length units (i.e., feet or meters).
heterogeneous	geological characteristics varying aurally or vertically in a given system
homogeneous	geology of the aquifer is consistent; not changing with direction or depth

hydraulic conductivity volume flow through a unit cross-section area per unit decline in head

hydraulic gradient change of head values over a distance

$$\frac{H_1 - H_2}{L}$$

where:

H = head

L = distance between head measurement points

hydrogeology the study of interactions of geologic materials and processes with water, especially groundwater

hydrograph graph that shows some property of groundwater or surface water as a function of time

impermeable having a texture that does not permit water to move through it perceptibly under the head difference that commonly occurs in nature

infiltration the flow of movement of water through the land surface into the ground

interface in hydrology, the contact zone between two different fluids

intrinsic permeability pertaining to the relative ease with which a porous medium can transmit a liquid under a hydrostatic or potential gradient. It is a property of the porous medium and is independent of the nature of the liquid or the potential field.

isotropic *hydraulic conductivity ("K")* is the same regardless of direction

K hydraulic conductivity (measured in velocity units and dependent on formation characteristics and fluid characteristics)

laminar flow low velocity flow with no mixing (i.e., no turbulence)

LNAPL light, non-aqueous phase liquid

losing stream a stream or reach of a stream that is losing water to the subsurface (also called an influent stream)

mining	in reference to groundwater, withdrawals in excess of natural replenishment and capture. Commonly applied to heavily pumped areas in semiarid and arid regions, where opportunity for natural replenishment and capture is small. The term is hydrologic and excludes any connotation of unsatisfactory water-management practice
MSL	mean sea level
non-steady state	(also called non-steady shape or unsteady shape) the condition when non-steady shape the rate of flow through the aquifer is changing and water levels are declining. It exists during the early stage of withdrawal when the water level throughout the cone of depression is declining and the shape of the cone is changing at a relatively rapid rate.
steady state	(also called steady shape) is the condition that exists during the intermediate stage of withdrawals when the water level is still declining but the shape of the central part of the cone is essentially constant
optimum yield	the best use of groundwater that can be made under the circumstances; a use dependent not only on hydrologic factors but also on legal, social, and economic factors
overdraft	withdrawals of groundwater at rates perceived to be excessive and, therefore, an unsatisfactory water-management practice (see also mining)
perched aquifer	a zone of saturation in a formation that is discontinuous from the water table and the unsaturated zones surrounding this formation. Some regulatory agencies include an upper limit on the hydraulic conductivity of the perched aquifer
permeability	the property of the aquifer allowing for transmission of fluid through pores (i.e., connection of pores)
permeameter	a laboratory device used to measure the intrinsic permeability and hydraulic conductivity of a soil or rock sample
piezometer	a non-pumping well, generally of small diameter, that is used to measure the elevation of the water table or potentiometric surface. A piezometer generally has a short well screen through which water can enter.

porosity	the ratio of the volume of the interstices or voids in a rock or soil to the total volume
potentiometric surface	imaginary saturated surface (potential head of confined aquifer); a surface that represents the static head; the levels to which water will rise in tightly cased wells
recharge	the processes of addition of water to the <i>zone of saturation</i>
recharge area	an area in which water that enters the subsurface eventually reaches the <i>zone of saturation</i>
safe yield	magnitude of yield that can be relied upon over a long period of time (similar to <i>sustained yield</i>)
saturated zone	zone in which all voids are filled with water (the water table is the proper limit)
slug-test	an aquifer test made by either pouring a small instantaneous charge of water into a well or by withdrawing a slug of water from the well (when a slug of water is removed from the well, it is also called a bail-down test)
specific yield	ratio of volume of water released under gravity to total volume of saturated rock
specific capacity	the rate of discharge from a well divided by the drawdown in it. The rate varies slowly with the duration of pumping, which should be stated when known.
steady-state	the condition when the rate of flow is steady and water levels have ceased to decline. It exists in the final stage of withdrawals when neither the water level nor the shape of the cone is changing.
storage coefficient "S"	volume of water taken into or released from aquifer storage per unit surface area per unit change in head (dimensionless) (for confined, $S = 0.0001$ to 0.001 ; for unconfined, equal to porosity)
storage	in groundwater hydrology, refers to 1) water naturally detained in a groundwater reservoir, 2) artificial impoundment of water in groundwater reservoirs, and 3) the water so impounded

storativity	the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head (also called coefficient of storage)
sustained yield	continuous long-term groundwater production without progressive storage depletion (see also <i>safe yield</i>)
transmissivity	the rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient
unsaturated zone (vadose zone)	the zone containing water under pressure less than that of the atmosphere, including soil water, intermediate unsaturated (vadose) water, and capillary water. Some references include the capillary water in the saturated zone. This upper limit of this zone is the land surface and the lower limit is the surface of the zone of saturation (i.e., the water table).
water table	surface of saturated zone area at atmospheric pressure; that surface in an unconfined water body at which the pressure is atmospheric. Defined by the levels at which water stands in wells that penetrate the water body just far enough to hold standing water.