

## A Glossary of Water-Related Terms

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The definitions and associated explanations of water-related terms presented here are intended to provide the reader with a working knowledge of terms that apply to Virginia's water resources. The list is designed to assist the user in understanding and interpreting water related information that may come from sources as varied as governmental agencies, environmental groups, or the news media. While terms and definitions are fairly consistent, some terminology presented here could be defined differently to describe water resources issues in other locations.

### A

**Absorption** –the process by which chemicals in gaseous, liquid or solid phases are incorporated into and included within another gas, liquid, or solid chemical. For example, a sponge absorbs water.

**Acid mine drainage** –water draining from areas that have been mined for coal or other mineral ores. The drainage water is acidic, sometimes having a pH less than 2.0, because of its contact with sulfur-bearing material.

**Acid rain** – precipitation that has a low pH (here, low pH is defined as anything less than 5.6). The precipitation becomes acidic when moisture in the air reacts with sulfur and nitrogen pollutants in the atmosphere.

**Acre-foot** – the volume of water required to cover an area of one acre of land with 12 inches (1 foot) of water depth. One acre-foot equals 325,851 gallons of water.

**Activated carbon** – A material produced by heating coal or wood in such a manner as to yield a porous structure, creating a very large internal surface area. Activated carbon filters are widely used to adsorb organic compounds from water and wastewater and to remove tastes and odors from drinking water.

**Adsorption** – the attachment of gas molecules, ions, or solutions to the surface of solids. For example, odors from freezers and refrigerators are adsorbed to baking soda.

**Advection** – the process by which chemicals and heat are transported along with the bulk motion of flowing gas or liquid. For example, nitrate moves through soils and aquifer formations due predominantly to advection (the bulk movement of water).

**Algal bloom** – large, visible masses of algae that develop in bodies of water during warm weather. Algal blooms are the result of excessive levels of nutrients (generally phosphorus or nitrogen) in water.

**Anion** – a negatively charged ion. Nitrate ( $\text{NO}_3^-$ ) and chloride ( $\text{Cl}^-$ ) are examples of anions.

**Anion exchange** – the chemical process where negative ions of one chemical are preferentially replaced by negative ions of another chemical. In water treatment, the net effect is the removal of an unwanted ion from a water supply. For example, some water treatment facilities or homeowners install an anion exchange system to remove nitrate ( $\text{NO}_3^-$ ) from their water supplies.

**Aquifer** – a geologic formation that holds and yields usable amounts of water. The water in an aquifer is called groundwater. Aquifers may be categorized into confined aquifers and unconfined aquifers.

**Aquifer (confined)** – an aquifer whose upper and lower, boundary is defined by a layer of natural material that does not transmit water readily. Water is “confined” under pressure similar to water in a pipeline. Drilling a well into this type of aquifer is analogous to puncturing a pressurized pipeline. In some areas confined aquifers produce water without pumps (flowing artesian well).

**Aquifer (unconfined)** – an aquifer whose upper boundary consists of a relatively porous material that transmits water readily from the ground surface. The water level in an unconfined aquifer is the water table.

## B

**Bank** – the margins of a stream or river channel. Banks are called right or left as viewed facing downstream, in the direction of the flow.

**Baseflow** – that part of streamflow derived from groundwater flowing into a stream or river.

**Biosolids** – an organic material resulting from the treatment of wastewater, often applied to the land as an amendment. In Virginia, land application of biosolids or sewage sludge is regulated through the “Nutrient Management Program” administered by the Virginia Department of Conservation and Recreation.

**Brook** – a natural stream of water, smaller than a river or creek; especially a small stream that breaks directly out of the ground, as from a spring or seep.

## C

**Capillary fringe** – a zone of partially saturated soil just above the water table. The depth of the fringe depends upon the size and distribution of the pore spaces within the soil media.

**Cation** – a positively charged ion. For example, calcium ( $\text{Ca}^{+2}$ ) and magnesium ( $\text{Mg}^{+2}$ ) are cations.

**Cation exchange** – a process where positively charged ions of one chemical are preferentially replaced by positive ions of another chemical. For example, water softeners replace  $\text{Ca}^{+2}$  and  $\text{Mg}^{+2}$  ions with sodium ( $\text{Na}^{+2}$ ) ions.

**Channel (watercourse)** – an open conduit either naturally or artificially created that periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. River, creek, stream, run, reach, branch, and tributary are some of the terms used to describe natural channels.

**Coliform bacteria** – A group of nonpathogenic organisms (*Colon bacilli*) usually found in the digestive tract of all warm-blooded animals and humans. The presence of coliform bacteria in water is an indicator of possible

pollution by fecal material and the presence of pathogenic bacteria that can cause diseases such as intestinal infections, dysentery, hepatitis, typhoid fever and cholera. Generally reported as colonies or colony forming units (cfu) per 100 milliliters (ml) of sample. (see *fecal coliform*)

**Concentration** – the amount of a given chemical or pollutant in a particular volume or weight of air, water, soil, or other medium – often expressed as *milligrams per liter* (mg/l) or *parts per million* (ppm).

**Cone of depression** – the lowering in groundwater levels around a well in response to groundwater withdrawal (the pumping of water). The extent of the cone of depression defines the area of influence of a well.

**Consumptive use** – the total amount of water taken up by vegetation for transpiration and/or building of plant tissue, plus any associated, unavoidable evaporation of soil moisture.

**Contaminant** – an undesirable substance not normally present, or an usually high concentration of a naturally-occurring substance, in water, soil, or other environmental medium. In more restricted usage, a substance in water that may be harmful to human health.

**Creek** – small *stream* of water which serves as the natural drainage course for a drainage basin; a flowing stream normally smaller than a *river* and larger than a *brook*. The term is often relative according to size and locality.

**Cubic feet per second (cfs)** – a rate of the flow. One *cfs* is equal to a volume of water one foot deep and one foot wide flowing a distance of one foot in one second. One *cfs* is equal to approximately 450 gallons per minute (gpm).

## D

**Depression storage** – the volume of water contained in natural depressions on the land surface, such as puddles.

**Diffusion** – a process where chemicals or heat move in response to differences in chemical concentration or temperature gradient. Movement is from high concentration (or temperature) to low concentration (or temperature). This process could involve liquids, gases, and solids.

**Discharge area** – an area or position where groundwater is delivered to the ground surface. Groundwater can flow as springs or seeps, or contribute *baseflow* to streams or rivers.

**Discharge** – the volume of water that passes a given point during a given period. It is an all-inclusive out-flow term, describing a variety of flows such as from a pipe to a stream, or from a *stream* or *river* to a *lake* or ocean.

**Dispersion** – the spreading and mixing of chemical constituents in both surface and groundwaters caused by diffusion and mixing due to microscopic variations in densities and velocities.

**Distillation** – the separation of different substances in a solution by boiling off those of a lower boiling point first. For example, water can be distilled and the steam condensed back into a liquid that is almost pure water. Impurities remain in the concentrated residue. Distillation can be used to remove inorganic chemicals, some nonvolatile organic chemicals, and bacteria.

**Doctrine of Prior Appropriation** – system for allocating water to private individuals used in most western states. The prior appropriation doctrine is based on the concept of “First in Time, First in Right.” The first person to take a quantity of water and put it to “beneficial use” has a higher priority of right than a subsequent user. The right of appropriation is generally acquired by filing a claim in accordance with state laws. Under drought conditions, higher priority users are satisfied before junior users receive water. Appropriative rights can be lost through nonuse; they can also be sold or transferred apart from the land. Contrast with *Riparian Doctrine*.

**Domestic water use** – water used for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. About 85% of domestic water is delivered to U.S. homes by a public-supply facility, such as a county water department. About 15% of the nation’s population obtains their domestic water from wells.

**Drawdown** – the distance between the static water level in well and the surface of the *cone of depression*.

**Drainage** – (1) the natural movement of surface water over a land area to a river, lake or ocean (surface drainage), (2) removal of water from a soil using buried pipelines that are spaced regularly and perforated (sub-surface drainage).

## E

**Effluent** – (1) something that flows out or forth, especially a stream flowing out of a body of water. (2) discharged wastewater such as the treated wastes from animal production facilities, industrial facilities, or wastewater treatment plants.

**Ephemeral stream** – a *stream* that flows in response to runoff producing *precipitation* events and thus discontinuing its flow during dry seasons. Such flow is usually of short duration.

**Estuarine waters** – deepwater tidal habitats and tidal wetlands that are usually enclosed by land but have access to the ocean and are at least occasionally diluted by freshwater runoff from the land (such as bays, mouths of rivers, salt marshes).

**Erosion** – the detachment and transport of soil particles by water and wind. Sediment resulting from soil erosion represents the single largest source of *nonpoint source pollution* in the United States.

**Eutrophication** – the process of nutrient enrichment causing a water body to fill with aquatic plants and algae. Eutrophic lakes often are undesirable for recreation and may not support normal fish populations.

**Evaporation** – the process by which a liquid is transformed to the gaseous state.

**Evapotranspiration (ET)** – the process of transforming soil water into water vapor through the combination of evaporation from the soil surface and plant water use (*transpiration*).

## F

**Fecal coliform** – a portion of the coliform bacteria group originating in the intestinal tract of warm-blooded animals that passes into the environment in feces. Fecal coliform often is used as an indicator of the bacteriological safety of a water supply. Generally reported as colonies or colony forming units (cfu) per 100 milliliters (ml) of sample. (see *coliform bacteria*)

**Field capacity** – the amount of water a saturated soil contains after rapid internal drainage has ceased (approximately 2 days).

**Flood** – a temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters or from the unusual and rapid accumulation of runoff, an overflow or inundation that comes from a river or other body of water.

**Floodplain** – land area adjacent to a river or stream that can be covered by water when a river or stream overflows its banks. The extent of the flood plain depends on topography and the magnitude of a given flood event.

## G

**Gaining stream** – a stream or portion of a stream where flow increases because of discharge into the stream from groundwater.

**Groundwater (sometimes written as two words)** – water that fills voids, cracks, or other spaces between particles of clay, silt, sand, gravel or rock within a saturated zone or formation (*aquifer*) below the soil surface.

**Groundwater mining** – the removal of groundwater from an aquifer in excess of the rate of natural or artificial recharge. Continued groundwater mining reduces the groundwater supply until it is no longer an economical source of water.

**Groundwater recharge** – the process where water enters the soil surface and eventually reaches the saturated zone. Recharge varies from place to place due to the amount of rainfall, *infiltration rate*, and surface vegetation.

## H

**Hardness (water)** – a measure of the amount of dissolved calcium (Ca) and magnesium (Mg) in water. Hardness is often reported as ppm or milligrams per liter (mg/l) of CaCO<sub>3</sub>. If hardness is reported in grains per gallon, one grain per gallon of hardness equals 17.1 ppm of hardness as CaCO<sub>3</sub>. Hard water can produce scale deposits in pipes and water heaters. Additionally, compared to soft water, hard water requires that additional soaps and detergents be used to produce foam or lather. Hardness scale: *Soft* – 0-60 mg/l; *Moderately Hard* – 61-120 mg/l; *Hard* – 121-180 mg/l; and *Very Hard* – over 180 mg/l.

**Health advisory level (HAL)** – a nonregulatory, health-based, chemical concentration in drinking water that results in no adverse health risks when ingested over exposure periods ranging from one day to a lifetime.

**Hydraulic conductivity** – a term used to describe the ease with which water moves through soil or a saturated geologic material.

**Hydraulic gradient** – the slope of the water surface in an aquifer. The hydraulic gradient indicates the direction of groundwater flow. Water always flows from higher elevations to lower elevations. All other factors being equal, flow is greater when the hydraulic gradient is steeper.

**Hydrologic cycle** – describes the constant movement of water above, on, and below the earth's surface. Processes such as precipitation, evaporation, condensation, infiltration, and runoff comprise the cycle.

## I

**Infiltration** – the downward entry of water through the soil surface.

**Infiltration rate** – the quantity of water that enters the soil surface in a specified time interval. Often expressed as a volume per unit of soil surface per unit of time (in<sup>3</sup> per in<sup>2</sup> per hour). Soil surface wetness, soil texture, residue cover, precipitation rate, irrigation application, topography, and other factors control the infiltration rate.

**Irrigation** – the controlled application of water to arable lands to supply crop water requirements not satisfied by rainfall.

## K

**Karst topography** – a type of topography that is formed on limestone, gypsum, and other rocks by dissolution, and is characterized by sinkholes, caves, and underground drainage.

## L

**Lake** – A considerable body of inland water or an expanded part of a river.

**Leaching** – the removal of dissolved chemicals from soil caused by the movement of a liquid (like water) through the soil.

**Limiting factor** – any factor such as temperature, light, water, or chemical that limits the existence, growth, abundance, or distribution of an organism. For example, an increase in phosphorus loading to a lake, stream, or river can trigger the growth of algae.

**Losing stream** – a stream or portion of a stream that discharges water into the groundwater, resulting in a smaller flow volume within the stream.

## M

**Maximum contaminant levels (MCLs)** – highest level of a contaminant in drinking water that the Environmental Protection Agency (EPA) has determined will not endanger human health over a lifetime of exposure. The EPA sets MCLs at levels that are economically and technologically feasible. People drinking a typical amount of water per day (two liters for adults, one for children) during their average lifetime (70 years) should not be endangered by ingesting a contaminant at or below the MCL. For example, the MCL for nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ) is 10 milligrams per liter of water (mg/l).

**Maximum Contaminant Level Goal (MCLG)** – as set by the EPA, the level of a contaminant in drinking water at which there would be no risk to human health. This goal is not always economically or technologically feasible, and the goal is not legally enforceable.

**Micrograms per liter ( $\mu\text{g/l}$ )** – a measure of concentration. One thousand micrograms per liter is equivalent to 1 milligram per liter. Micrograms per liter is equivalent to parts per billion (ppb)

**Milligrams per liter (mg/l)** – a measure of concentration. In very dilute solutions, 1 mg/l is equivalent to 1 part per million (ppm).

**Methemoglobinemia (blue baby syndrome)** – a condition that limits the oxygen-carrying capacity of red blood cells. The resulting oxygen starvation causes a bluish discoloration of the body. The condition is largely confined to infants less than 9 months old. To prevent *methemoglobinemia*, the EPA has set a nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ) MCL of 10 part mg/l for public water supplies.

## N

**Nitrate** – an inorganic nitrogen compound. Nitrate may be naturally present in water, but high concentrations (greater than 2 or 3 ppm) are most likely due to fertilizer runoff, livestock facilities, sanitary wastewater discharges, and/or atmospheric deposition (nitrate dissolved in precipitation). High levels of nitrate in drinking water (greater than 10 mg/l) are associated with *methemoglobinemia* and possibly an increased risk for some cancers.

**Nonpoint source pollution (NPS)** – pollution originating from diffuse sources on the landscape. Examples include runoff from fields receiving manure applications, stormwater runoff from urban landscapes, or roadbed erosion in forestry. It has been estimated that NPS pollution accounts for more than one-half of the water pollution in the United States today.

**Nutrient** – (1) an element or compound essential to life, including carbon, oxygen, nitrogen, phosphorus, and many others; (2) as a pollutant, any element or compound, such as phosphorus or nitrogen that in excessive amounts contributes to abnormally high organic growth in aquatic ecosystems.

## P

**Part per million (ppm)** – a measure of concentration of a dissolved material in terms of a mass ratio (milligrams per kilogram,  $\mu\text{g/kg}$ ). For water analysis, part per million often is presented as a mass per unit volume (milligrams per liter,  $\mu\text{g/l}$ ), 1 ppm = 1 mg/l.

**Part per billion (ppb)** – a measure of concentration of a dissolved material in terms of a mass ratio (micrograms per kilogram,  $\text{mg/kg}$ ). For water analysis, part per million often is presented as a mass per unit volume (micrograms per liter,  $\text{mg/l}$ ). There are one billion micrograms of water in one liter.

**Perched water table** – water that occurs underground when a low permeability material, located above the water table, blocks or intercepts the downward flow of water from the land surface. Water accumulates above the impermeable material, creating a saturated zone.

**Percolation** – the movement of water through saturated soil layers, often continuing downward to *groundwater*.

**Permeability** – a measure of the ease with which liquids or gases will move through soil or other porous material. Permeability is a characteristic of the soil media and does not depend on the type of fluid being transmitted.

**pH** – a numerical measure of acidity or alkalinity. The pH scale ranges from 1 (acidic) to 14 (alkaline). A pH of 7 is neutral.

**Point-of-entry (POE) treatment** – the treatment of all water entering a house, farmstead or other facility. Anion exchange is an example of POE treatment to remove nitrate.

**Point-of-use (POU) treatment** – treatment of water at the point it is used. A common example would be water treatment at the kitchen sink for drinking and cooking uses. Reverse osmosis, distillation and ozonation are examples of POU treatment methods.

**Point source pollution** – pollutant loads discharged at a specific location from pipes, outfalls, and conveyance channels. Point source discharges are generally regulated through the National Pollution Discharge Elimination System (NPDES) permitting procedures established by the EPA. Point sources can also include *pollutant* loads contributed by tributaries to the main receiving stream or river.

**Pollutant** – any substance of such character and in such quantities that when it reaches a body of water the effect is to degrade the receiving water perhaps to a point rendering it unfit for some specified designated use.

**Pollution** – alteration of the physical, biological, chemical, and radiological integrity of water due to human activities – any unwanted contaminating property that renders a water supply unfit for its designated use.

**Polychlorinated biphenyls (PCBs)** – a group of synthetic, toxic, industrial chemical compounds once used in making paint and electrical transformers, which are chemically inert and not biodegradable. PCBs were frequently found in industrial wastes, and subsequently found their way into surface and ground waters. As a result of their persistence, they tend to accumulate in the environment. In streams and rivers, PCBs can attach to bottom sediment and can remain there indefinitely. Although banned in 1979, PCBs continue to appear in the flesh of fish and other animals.

**Porosity** – the ratio of the volume of open spaces or voids to the total volume of a material. For example, a sand and gravel deposit may have 20 % porosity. Porosity determines the amount of water that can be stored in a saturated formation. A saturated formation 100 feet thick with a porosity of 20 % could store an equivalent water depth of approximately 20 feet.

**Potable water supply** – a source of water that is of adequate quality to be used for human consumption.

**Precipitate** – a solid that has been deposited from an aqueous solution. For example, iron precipitates from groundwater to form a rust colored solid when exposed to air.

**Precipitation** – rain, sleet, snow, or hail that falls to the earth as the result of water vapor condensing in the atmosphere.

**Pumping water level** – The water level in a well when the pump is operating and water is being withdrawn.

## R

**Recharge area** – the area where water predominantly flows downward through the unsaturated formation (zone) to become groundwater.

**Reference dose (RFD)** – the maximum daily exposure to a chemical that is judged to be without risk of adverse systemic health effects over a person's lifetime; formerly called the Acceptable Daily Intake.

**Reservoir** – a pond, lake, tank, or basin (natural or human made) where water is collected and stored. Large bodies of groundwater are called groundwater reservoirs; water behind a dam is also called a reservoir.

**Return period** – the average elapsed time between occurrences of a hydrologic event with a specified magnitude or greater. For example, a 100-year discharge measured on a given river is equaled or exceeded, on average, once every 100 years. This does not mean that the 100-year discharge occurs once every 100 years, but that the **average time** between events of that magnitude or greater is 100 years. Stated another way, there is a 1% chance of a discharge equal to or greater than the 100-year flood event occurring in any given year.

**Reverse osmosis (RO)** – a water treatment process used to remove dissolved inorganic chemicals and suspended particulate matter from a water supply.

Water, under pressure, is forced through a semipermeable membrane that removes molecules larger than the pores of the membrane.

**Riparian** – pertaining to the banks of a river, stream, or other typically, flowing body of water as well as to plant and animal communities along such bodies of water. This term is also commonly used for other bodies of water, e.g., ponds, lakes.

**Riparian Doctrine** – states that persons who own land adjacent to a stream have the right to make reasonable use of the stream's flow on riparian lands, defined to be individual tracts in contact with the stream. Portions of such tracts extending outside the watershed are generally considered nonriparian. Riparian rights, which apply to lakes and streams alike, are similar from state to state but differ in some of the details due to alternative interpretations by the state courts. Riparian users of a stream share the streamflow among themselves, and the concept of priority of use (*Doctrine of Prior Appropriation*) is not applicable. Under drought conditions, riparian rights users share shortages. Enforcement of the riparian doctrine requires a lawsuit by a holder of riparian rights who is injured by the water use of another party. This fact, together with the absence of administrative agency jurisdiction, means that nonriparian and other water uses not recognized by the doctrine often occur in riparian states through use of surplus water not needed to satisfy riparian rights, perhaps by means of reservoirs that impound water during periods of higher flow. Although riparian rights can be severed from the riparian land, rights with respect to transfer for use on nonriparian land have not been well defined in most states. Reliance on the doctrine of riparian rights for water allocation has declined substantially in recent decades as many of the eastern states have replaced it with administration permitting programs based on state-specific, water allocation legislation.

**River** – A natural *stream* of water of considerable volume, larger than a *brook* or *creek*.

**River basin** – the area drained by a river and its tributaries. (see *watershed*)

**Runoff** – that part of rainfall or snowmelt that does not infiltrate the soil but flows over the land surface toward a surface drain, eventually making its way to a stream, river, lake or an ocean. It can carry pollutants into receiving waters.

## S

**Saturated formation** – the portion of a soil profile or geologic formation where all voids, spaces or cracks are filled with water. No air is present. (see *aquifer*)

**Saturated thickness** – the total thickness of a saturated formation.

**Sediment** – in the context of water quality, soil particles, sand, and minerals dislodged from the land and deposited into aquatic systems as a result of erosion.

**Shock chlorination** – the addition of chlorine for disinfecting a water supply system including the well and all distribution pipelines. Shock chlorination is recommended when coliform bacteria are detected, or after system repairs. Treated water, with a free chlorine concentration of at least 200 ppm, is pumped throughout the distribution system and allowed to set for at least 24 hours before flushing with nonchlorinated water.

**Specific capacity** – a measure of the productivity of a well. Specific capacity is obtained by dividing the well discharge rate (gallons per minute) by the well drawdown (feet) while pumping.

**Spring** – a point of natural groundwater discharge to the ground surface into a *brook, stream, river, or lake*.

**Static water level** – the water level in a *well* drilled in an unconfined aquifer when the pump is not operating. The static water level is the surface of the water-bearing formation and typically is synonymous with the water table.

**Stream** – a general term for a body of flowing water; natural water course containing water at least part of the year.

**Sublimation** – the direct change of a solid to a vapor without the appearance of a liquid, as in the changing of snow directly into water vapor without melting

## T

**Transpiration** – the physiological process by which water vapor escapes from a living plant, principally through the leaves, and enters the atmosphere.

**Transmissivity** – the capacity of an *aquifer* to transmit water. It is dependent on the water-transmitting characteristics of the saturated formation (*hydraulic conduc-*

tivity) and the *saturated thickness*. For example, sand and gravel formations typically have greater hydraulic conductivities than sandstone formations. The sand and gravel will have a greater transmissivity if both formations are the same thickness.

**Total dissolved solids (TDS)** – a measure of the concentration of dissolved inorganic chemicals in water. TDS can be measured indirectly by how water conducts electricity. A water quality analysis will sometimes report electrical conductivity (EC), usually in units of micromhos per centimeter ( $\mu\text{mho}/\text{cm}$ ). To estimate parts per million (ppm) of dissolved solids multiply the EC reading in  $\mu\text{mho}/\text{cm}$  by 0.64. Dissolved solids commonly found in Virginia are calcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride and silica.

**Turbidity** – a measure of the cloudiness or opacity of the water expressed in nephelometric turbidity units (ntu). The turbidity is influenced by the amount and nature of suspended organic and inorganic material in water. Typically, higher concentrations of the suspended material equal greater turbidity. The source of turbidity could be sediment (fine sand, silt, and clay), organic material, particles of iron and manganese or other metal oxides, rust from corroding piping, algae, carbonate precipitates, etc.

## U

**Unsaturated zone** – that part of the soil profile in which the voids are not completely filled with water, some air is present.

## V

**Vadose zone** – zone of unsaturated soil that extends from the soil surface to the groundwater table.

## W

**Watershed** – area that drains or contributes water to a particular point, stream, river, lake or ocean. Watersheds are also referred to as basins. Watersheds range in size from a few acres for a small stream basin, to large areas of the country like the Chesapeake Bay Basin that includes parts of six states. (see *river basin*)

**Water table** – the upper level of a saturated formation where the water is at atmospheric pressure. The water table is the upper surface of an unconfined aquifer.

**Water quality standards** – a group of statements that constitute a regulation describing specific water quality requirements. In Virginia, water quality standards must have at least the following three components: *designated uses*, *water quality criteria* to protect designated uses, and an *antidegradation policy*. Every state is required to develop water quality standards and revise them periodically.

*Designated uses* – those uses specified in water quality standards for each water body or segment whether or not they are being attained. All Virginia waters are designated for the following uses: recreational uses, e.g., swimming and boating; the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources, e.g., fish and shellfish, generally stated as fishable and swimmable. Through the protection of these minimum uses, other uses such as industrial water supply, irrigation and navigation also are protected.

*Water quality criteria* – include general narrative statements that describe good water quality and specific numerical concentration limits that are known to protect aquatic life and human health. These numerical and narrative criteria describe water quality necessary to protect designated uses.

*Antidegradation policy* – Virginia’s antidegradation policy protects water quality at three levels or “tiers.” Tier 1 specifies that existing instream water uses and the level of water quality to protect the existing uses shall be maintained and protected. This means that, as a minimum, all waters should meet adopted water quality standards. Tier 2 protects water that is better than specified water quality standards. Only in limited circumstances may water quality be lowered in these waters. Tier 3 are exceptional waters where no new, additional or increased discharge of sewage, industrial wastes or other pollution are allowed. These waters must be specifically listed in the regulation.

**Well** – (water) any artificial excavation constructed for the purpose of exploring for or producing groundwater

**Water year** – in U.S. Geological Survey (USGS) reports dealing with surface-water supply, the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ended September 30, 1960, is called the “1960 water year.”

**Wetlands** – transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. Wetlands are those areas where water saturation is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the surrounding environment.

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## References

- ASAE. 1998. S526.1 soil and water terminology. ASAE Standards 1998. American Society of Agricultural Engineers, St. Joseph, MI, 49085.
- Driscoll, F.G., 1986. Groundwater and wells. Johnson Screens, St. Paul, Minnesota, 55112.
- Haan, C.T. 1991. Statistical methods in hydrology. Iowa State University Press, Ames, Iowa 50010.
- Horton, G.A, Water words dictionary, 1999, Nevada Division of Water Planning, Department of Conservation and Natural Resources, Carson City, NV 89706-7921
- Kranz, W., D.G. Gosselin, D. Hay, J. Goeke. 1993. Glossary of water-related terms, NebGuide – G93-1191. University of Nebraska Cooperative Extension, Lincoln, NE, 68588.