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Guidance for Federal Land Management in the Chesapeake Bay Watershed

Glossary

Nonpoint Source Pollution
Office of Wetlands, Oceans, and Watersheds
U.S. Environmental Protection Agency

Glossary

activated sludge. Highly concentrated mass of live bacteria that feed on organic wastes, which are aerated to increase the rate of decomposition.

active/rest cycles (alternating drainfields). Final treatment and soil-based dispersal component of a decentralized treatment system that is composed of multiple soil treatment areas, which are independently dosed under the control of a flow diversion valve according to a preset schedule.

advanced treatment systems. Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients such as phosphorus and nitrogen and a high percentage of suspended solids.

aerobic. Having molecular oxygen (O_2) as a part of the environment, or a biological process that occurs only in the presence of molecular oxygen.

aerobic treatment. A process by which microbes decompose complex organic compounds in the presence of oxygen and use the liberated energy for reproduction and growth. (Such processes include extended aeration, trickling filtration, and rotating biological contactors.)

aggregate. A collective term for sand, gravel, and crushed stone mineral materials in their natural or processed state.

allochthonos. Derived from outside a system, such as leaves of terrestrial plants that fall into a stream.

alluvium. Deposits of clay, silt, sand, gravel, or other particulate material that has been deposited by a stream or other body of running water in a streambed, on a flood plain, on a delta, or at the base of a mountain.

alum. A double sulphate formed of aluminum and some other element (esp. an alkali metal) or of aluminum. It has 24 molecules of water of crystallization. Common alum is the double sulphate of aluminum and potassium. It is white, transparent, very astringent, and crystallizes easily in octahedrons. The term is extended so as to include other double sulphates similar to alum in formula.

alum (aluminum sulfate) treatment. Alum or aluminum sulfate is an acid that is commonly used as a poultry litter treatment. Available in either a dry or liquid form, alum's acidic properties are used to reduce ammonia levels in the poultry house, while its binding properties are used to reduce phosphorus (P) in runoff (Moore et al. No date). Alum is also used to reduce P losses from manure and wastewater, to increasing the efficiency of mechanical separation of manure, and to reduce P losses from grazing land.

ammonia volatilization. A process that commonly takes place when nitrogen is in an organic form known as urea. Urea can originate from animal manure, urea fertilizers and, to a lesser degree, the decay of plant materials. Ammonia volatilization is most likely to take place when soils are moist and warm and the source of urea is on or near the soil surface. Ammonia volatilization will also take place on alkaline soils (pH greater than 8).

anabranching channel. A distributary channel that departs from the main channel, sometimes running parallel to it for several kilometers before rejoining it.

anaerobic. Absence of molecular oxygen (O_2) as a part of the environment, or a biological process that occurs in the absence of molecular oxygen; bound oxygen is present in other molecules, such as nitrate (NO_3-) sulfate (SO_4+) and carbon dioxide CO_2.

anaerobic decomposition. The reduction of the net energy level and change in chemical composition of organic matter caused by microorganisms in an oxygen-free environment.

analyte. A substance that is undergoing analysis or is being measured.

antidegradation. Provisions in the federal Clean Water Act, codified at 40 CFR 131.12, which provide (1) a minimum level of protection for all surface waters; (2) requirements for alternatives analyses, intergovernmental coordination, and social or economic justification before allowing lowered water quality in high-quality waters; and (3) the highest level of protection for outstanding national resource waters. State water quality standards must include both an antidegradation policy and methods for implementation.

applied organic load. The quantity of organic material (e.g., manure) applied to lands or introduced to a receiving waterbody or treatment practice, typically measured as chemical oxygen demand (COD) or biological oxygen demand (BOD).

aquifer. A geologic formation, group of formations, or part of a formation that is saturated and sufficiently permeable to transmit water.

attenuation. For water velocity: the slowing, modification, or diversion of the flow of water as with detention and retention ponds. For water quality: the process of diminishing contaminant concentrations in water because of filtration, biodegradation, dilution, sorption, volatilization, and other processes.

autoventing turbine. A hydroturbine with pressure-relieving ports that are open to the atmosphere.

bank shaping. Re-grading streambanks to a stable slope, placing topsoil and other materials needed for sustaining plant growth, and selecting installing, and establishing appropriate plant species.

bankfull elevation. The water surface elevation within a channel corresponding to bankfull discharge.

bankfull discharge. 1. For a natural channel that is not adapting to hydrologic change in its watershed, it is the discharge that occurs when the water just fills the channel to the top of its banks and begins to overflow onto a floodplain. 2. The discharge at which channel maintenance is most effective, that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels.

baseflow. Sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by groundwater discharges.

bathymetry. The measurement of depths of water in oceans, seas, and lakes; also information derived from such measurements.

bed-load. In-stream sediment transport mode in which individual particles either roll or slide along the stream bed as a shallow, mobile layer a few particle diameters deep (the particle size depends on the energy level of the flowing water).

benthic/benthos. An organism that feeds on the sediment at the bottom of a waterbody such as an ocean, lake, or river.

berm. A low earth fill constructed in the path of flowing water to divert its direction, or constructed to act as a counterweight beside the road fill to reduce the risk of foundation failure.

bioinfiltration. A stormwater management practice where runoff is routed through a soil media that is vegetated. This practice functions in a manner analogous to bioretention systems but has a higher infiltration capacity, and thus would be categorized as an infiltration process.

biological treatment. A treatment technology that uses bacteria to consume organic waste.

bioretention. A stormwater management practice that is designed to provide both temporary surficial water storage and runoff retention subsurface in soil media. Runoff is directed to shallow depressions where it is infiltrated, filtered or evapotranspirated. These systems are typically designed with a soil media selected to promote infiltration and runoff retention and are vegetated with plants picked to withstand both inundation and drought. Bioretention systems also are used to filter runoff to trap and in some cases degrade pollutants such as oils and greases. This practice is often categorized under *filtration* although it has additional functions. Some systems are built with underdrain or overdrain systems to convey excess runoff off-site.

bioswale. A relatively wide, shallow, open channel, typically vegetated with turf grasses, with a slight gradient. These systems are designed to let water flow slowly through the turf grasses. The roughness of the turf slows the runoff velocity and provides some filtration and settling of suspended solids. Runoff volumes can also be reduced through infiltration depending on the porosity of the underlying soils. Swales can be designed with underdrains to convey excess runoff from saturated soils.

blue roofs. A practice that is designed to provide temporary storage of stormwater and slowly release stormwater runoff using the roof surface of a structure. Also referred to as *rooftop detention*.

branch packing. A form of soil bioengineering that uses alternating tiers of live branch cuttings and compacted backfill to repair small localized slumps and holes in slopes and a means of reducing the erosive potential of incoming flows at their source.

breakwater. A wave energy barrier designed to protect the land or nearshore area behind them from the direct assault of waves.

brownfield. An abandoned, idled, or underused industrial and commercial facility/site where expansion or redevelopment is complicated by real or perceived environmental contamination. They can be in urban, suburban, or rural areas. EPA's Brownfields initiative helps communities mitigate potential health risks and restore the economic viability of such areas or properties.

brush layering. A form of soil bioengineering that uses live branch cuttings laid flat into small benches excavated in the slope face perpendicular to the slope contour.

buffer strip. 1. Area between a stream and construction activities that achieves sediment control by using the natural filtering capabilities of the forest floor and litter. 2. Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields.

bulkhead. A structure or partition to retain or prevent sliding of the land. A secondary purpose is to protect the upland against damage from wave action.

catch basin. A device that receives stormwater drainage from an outside surface area. They are usually in parking lots or in areas where the removal of stormwater buildup is desirable.

channel incision and widening. A process of channel degradation that results in a lower elevation channel surrounded by one or more elevated terrace(s) that once were floodplains. The interplay of channel incising (deepening) and widening is caused by changes in streamflow or sediment delivery.

channel reconfiguration. River and stream channel engineering for the purpose of flood control, navigation, drainage improvement, and reduction of channel migration potential; activities include the straightening, widening, deepening, or relocation of existing stream channels, clearing or snagging operations, the excavation of borrow pits, underwater mining, and other practices that change the depth, width, or location of waterways or embayments in coastal areas.

channelization. River and stream channel engineering undertaken for the purpose of flood control, navigation, drainage improvement, and reduction of channel migration potential. Activities such as straightening, widening, deepening, or relocating existing stream channels and clearing or snagging operations fall into this category.

chisel plowing. Preparing croplands by using a special implement that avoids complete inversion of the soil as in conventional plowing. Chisel plowing can leave a protective cover or crops residues on the soil surface to help prevent erosion and improve filtration.

cistern. A tank or storage facility used to store water for a home or farm; often used to store rain water.

clasts. Individual sedimentary particles such as a grain of sand, pebble, or boulder that make up a sedimentary rock or deposit.

clear cut. A silvicultural system in which all merchantable trees are harvested within a specified area in one operation to create an even-aged stand.

cluster treatment system. A wastewater treatment system designed to serve two or more sewage-generating dwellings or facilities with multiple owners that is not part of a centralized collection system that discharges to any point sources and that treats and disperses effluent to soil-based dispersal systems similar to onsite systems.

coarse woody debris (CWD). A large tree part, conventionally a piece greater than 10 cm in diameter and 1 m in length.

coconut fiber roll. Cylindrical structures composed of coconut husk fibers bound together with twine woven from coconut material to protect slopes from erosion while trapping sediment, which encourages plant growth within the fiber roll.

colloids. Very small, finely divided solids (that do not dissolve) that remain dispersed in a liquid for a long time because of their small size and electrical charge.

combined sewer overflow (CSO). A discharge of a mixture of stormwater and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

compost amendment. Organic matter that is added to soil to improve infiltration.

composting. The controlled biological decomposition of organic material in the presence of air to form a humus-like material. Controlled methods of composting include mechanical mixing and aerating, ventilating the materials by dropping them through a vertical series of aerated chambers, or placing the compost in piles out in the open air and mixing it or turning it periodically.

concentrated flow. Rills, ephemeral gullies, gullies, channels, streams and rivers are examples on the landscape of areas where concentrated flow erosion occurs. Concentrated flow erosion is also a culprit in embankment breaching and auxiliary spillway failure on earthen dams.

construction runoff intercepts. A *temporary* berm or channel constructed across a slope to collect and divert runoff.

controlled-release or slow-release fertilizers. Inorganic or organic fertilizers that are characterized by a slow rate of release, long residual, low burn potential, and low water solubility. Several categories of slow-release nitrogen fertilizers are commercially available, including urea-formaldehyde, isobutylidene diurea, sulfur coated urea, plastic coated fertilizers, and natural organics.

conventional tilling. Tillage operations considered standard for a specific location and crop and that tend to bury the crop residues.

core aeration. Increasing air penetration of the soil by removing plugs of soil. A heavy machine with hollow prongs is moved across a lawn pushing the prongs into the soil and pulling out plugs of soil.

cover crop. A crop that provides temporary protection for delicate seedlings or provides a cover canopy for seasonal soil protection and improvement between normal crop production periods.

crown fire. The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.

cross-sectional area. The cross-sectional area of a stream or tributary stream channel is determined by multiplying the stream or tributary stream channel width by the average stream or tributary stream channel depth.

cosspipe or sluice pipe (also called culvert). A conduit used to enclose a flowing body of water to allow it to pass underneath a road, railway, or embankment.

culvert. A metal, wooden, plastic, or concrete conduit through which surface water can flow under or across roads.

curb extension. A section of sidewalk designed to contain soils and vegetation to filter runoff, reduce runoff velocities and in some cases infiltrate runoff. Curb cuts or gaps in the curbs are used to route runoff from street surfaces into this cells.

cut-and-fill. An earth-moving process that entails excavating part of an area and using the excavated material for adjacent embankments or fill areas.

demand-dosing. A configuration in which a specific volume of effluent is delivered to a component (e.g., a drainfield) according to patterns of wastewater generation from the source.

denitrification. The biological reduction of nitrate to nitrogen gas by bacteria in soil.

denitrification enzyme assay. An assay used to quantify the initial rate, or Phase I, of denitrification using the acetylene block technique to prevent the reduction of N_2O to N_2.

design flow. Projected flow through a watercourse that will recur with a stated frequency. The projected flow for a given frequency is calculated using statistical analysis of peak flow data or using hydrologic analysis techniques. (*See* storm return period).

dewater. Removing or draining the water from a site, stream, or trench.

digestion. The biochemical decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization of pollutants.

dispersal. Spreading of effluent through the final receiving environment, typically soil.

distribution box. A level, watertight structure that receives septic tank effluent and distributes it via gravity in approximately equal portions to two or more trenches or two or more laterals in a bed.

dormant post plantings. Plantings of dormant cottonwood, willow, poplar, or other species embedded vertically into streambanks to increase channel roughness, reduce flow velocities near the slope face, and trap sediment as they grow.

dosing and resting. A configuration in which a specific volume of effluent is delivered to a component according to a prescribed interval, regardless of facility water use.

drainage. Improving the productivity of agricultural land by removing excess water from the soil by such means as ditches or subsurface drainage tile lines.

drainage density. In hydrologic terms, the relative density of natural drainage channels in a given area. It is usually expressed in terms of miles of natural drainage or stream channel per square mile of area and obtained by dividing the total length of stream channels in the area in miles by the area in square miles.

drainage intensity (DI). The drainage rate that occurs when the water table is at the soil surface; it increases with drain depth and decreases with drain spacing.

drainage water management. A practice in which the outlet from a conventional drainage system is intercepted by a water control structure that effectively functions as an in-line dam, allowing the drainage outlet to be artificially set at levels ranging from the soil surface to the bottom of the drains.

drainfield (soil treatment area). Physical location where final treatment and dispersal of effluent occurs; includes drainfields, drip fields and spray fields.

duff. The accumulation of needles, leaves, and decaying matter on the forest floor.

effluent. Partially or fully processed liquid flowing out of a sewage treatment component or device.

energy signature. The characteristics of a stream system to allow it to transport the flows of water and sediment provided by its watershed in an efficient and stable manner.

entrapped mixed microbial cells (EMMC) process. A process in which dilute wastewater is passed through a cellulose triacetate matrix containing microbial cells for the purpose of removing carbon and nitrogen.

ephemeral drainage. A channel that carries water only during and immediately following rainstorms. Sometimes referred to as a dry wash.

epilimnion. The upper waters of a thermally stratified lake subject to wind action.

erosion control blankets. A manufactured sheet, typically rolled on a spool consisting of a matrix of straw, coconut fiber, aspen fiber, jute, or polypropylene (plastic) that is woven, stitched, glued, or bound together, which is placed on disturbed areas to provide temporary erosion control and encourage establishment of vegetation.

essential turf. Turf required for the identified needs of the facility or jurisdiction, e.g., security, historic preservation, access, other designated uses such as recreation, mental health restoration or rehabilitation.

eutrophication. The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication the waterbody is choked by abundant plant life because of higher levels of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

evapotranspiration. The loss of water from the soil both by evaporation and by transpiration from the plants growing in the soil.

fast-release fertilizer. A synthetic fertilizer that releases its nutrients (especially N) rapidly (e.g., urea, ammonium nitrate).

feed pump. Mechanical device for driving fluid flow or for raising or lifting a fluid by either suction or pressure or both.

filter strips. Area of vegetation used for removing sediment, organic matter, and other pollutants from runoff or wastewater.

filtration. A treatment process, under the control of qualified operators, for removing solid (particulate) matter from water by means of porous media such as sand or a man-made filter; often used to remove particles that contain pathogens.

first flush. The condition, often occurring in storm-sewer discharges and CSOs, in which a disproportionately high pollutant load is carried in the first portion of the discharge or overflow.

fish ladder or lift. A series of ascending pools, similar to a staircase, that enables fish to migrate up the river past dams. Also called a fishway.

fish runs. The place where fish, such as native steelhead trout and salmon, return from the ocean each spring to spawn in the rivers or streams where they were born. They can also refer to the group of fish that is migrating up the stream.

fish tagging. The placement of identifying tags or markers, typically permanent, on individual captured fish specimens for the purposes of later retrieval and analysis for species migration, growth, and overall health.

floc. A clump of solids formed in sewage by biological or chemical action.

floodplain. The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood.

flow regime. Combinations of river discharge and corresponding water levels and their respective (yearly or seasonally) averaged values and characteristic fluctuations around these values.

flow velocities. The speed, expressed in units of length per unit of time, at which a fluid flows through a culvert, channel or other conveyance.

flue gas desulfurization. A technology that employs a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is current state-of-the art technology for major SO_2 emitters, like power plants.

flume. A natural or man-made channel that diverts water.

fluvial. Of or relating to flowing waters, especially rivers.

fluvial aggradation. General and progressive raising of a stream bed by deposition of sediment carried by the stream.

footer. Stone, concrete or other rigid structural material placed underneath other materials to provide a foundation or bearing surface.

gabion. A rectangular basket or mattress made of galvanized, and sometimes PVC-coated, steel wire in a hexagonal mesh. Gabions are generally subdivided into equal-sized cells that are wired together and filled with 4- to 8-inch-diameter stone, forming a large, heavy mass that can be used as a shore-protection device.

geomorphology. That branch of both physiography and geology that deals with the form of the Earth, the general configuration of its surface, and the changes that take place in the evolution of landform.

geotextile filtration. The use of geotextiles (permeable fabrics) to separate solids and liquids in such materials as lagoon sludge and liquid manure.

grade breaks. An intentional increase in road elevation on a downhill grade that causes water to flow off of the road surface.

grade stabilization structure. A structure used to control the grade and head cutting in natural or artificial channels.

grassed swales. A term to describe a vegetated, open runoff channel planted with grasses or turf. Similar terms include grassed channel, dry swale, wet swale, biofilter, or bioswale. Such systems are designed to treat and attenuate stormwater runoff. As runoff flows along the channels, the vegetation in the channel promotes filtration, settling, and infiltration of runoff into the underlying soils. The specific design features and methods of treatment differ in each of these designs but are improvements on the traditional drainage ditch. The designs incorporate modified geometry and other features for use of the swale as a treatment and conveyance practice.

graywater. Any washwater that has been used in a home or business, except water from toilets. This water is considered to be more reusable, especially for landscape irrigation purposes.

grazing. Feeding on standing vegetation, as by livestock or wild animals.

greenfields. Previously undeveloped land such as forests, meadows or other *natural lands*.

green infrastructure. A term that has two commonly used meanings. The more common usage refers to vegetated landscapes that are conserved or restored for ecological or anthropological reasons, e.g., wildlife habitat, flood protection, drinking water source protection and air quality and urban heat island concerns.

This term is also used to connote practices and strategies used to reduce the impact of wet weather events (rainfall and snow melt) on receiving waters. In this usage, green infrastructure is often also called low impact development or LID and is used to describe an array of strategies, products, technologies, and practices that are designed to mimic the behavior of natural systems as they relate to runoff, watershed and site hydrology and pollutant reduction. These systems are typically designed using an integrated design approach that relies on engineering, hydrological, biological, architectural, and planning concepts and practices to plan, design and manage runoff through plant and soil uptake, filtration, infiltration, evapotransipiration and the harvest and use of runoff.

green roof. Also known as eco-roofs or rooftop gardens, green roofs are engineered soil media systems that are planted on rooftops and designed to reduce runoff, combined sewer overflows, urban heat island impacts and provide other ecological and human benefits such as aesthetics, wildlife habitat and aesthetics. The soil media mix and vegetation are planted over existing roof structures and consist of a waterproof, root-safe membrane that is covered by a drainage system, lightweight growing medium, and plants. Green roofs reduce rooftop and building temperatures, filter pollution, lessen pressure on sewer systems, and reduce the heat island effect.

grid point data. Data that is collected at the intersections of imaginary or real lines laid over a surface in a grid pattern.

grinder pump system. A pump that shreds solids in a waste stream and conveys the resulting mixture under pressure to a subsequent system component.

groin. A shore protection structure built (usually perpendicular to the shoreline) to trap littoral drift or retard erosion of the shore.

ground fuels. All combustible materials below the surface litter, including duff, roots, peat and sawdust dumps that normally support a glowing combustion without flame.

gully. A channel or miniature valley cut by concentrated, non-continuous runoff such as during snowmelt or following heavy rains.

gully erosion. Severe erosion in which trenches are cut to a depth greater than 30 centimeters (one foot). Generally, ditches deep enough to cross with farm equipment are considered gullies.

highly erodible lands (HELs). Land that is very susceptible to erosion, including fields that have at least 1/3 or 50 acres of soils with a natural erosion potential of at least 8 times their T value. More than 140 million acres are classified as HEL. Farms cropping highly erodible land and under production flexibility contracts must be in compliance with a conservation plan that protects this cropland.

hi-input turf. Turf that requires irrigation, frequent mowing, fertilization and/or pesticide treatment.

hillslope. A part of a hill between its crest and the drainage line at the foot of the hill.

hydraulic connectivity. The ability of the soil to transmit water. Also commonly known as the permeability. Darcy found that to relate the flow rate to the hydraulic head and area of flow required a constant of proportionality (termed k) as the hydraulic connectivity. It has units of velocity. Note that the value is a function of both the porous media and the fluid.

hydraulic residence time. The average time an element spends in a given environment between the time it arrived and the time it is removed by some process. In the ocean, residence time is defined as the concentration in sea water relative to the amount delivered to the ocean per year; in groundwater, it is the time elapsed between water being recharged to the aquifer; in lakes and reservoirs, it is the time elapsed between a parcel of water entering the waterbody and leaving it.

hydraulic resistance. In hydraulics, resistance is the condition engendered by an obstruction or restriction in the flow path. Hydraulic resistance in a forest setting is the obstruction of the flow of water. Woody debris, forest litter, and surface irregularities and structures that slow the flow of water increase hydraulic resistance.

hydric soil. A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic (oxygen-lacking) conditions that favor the growth and regeneration of hydrophytic vegetation.

hydrodynamic simulations. Computer simulations of the motion or movement of water in a stream, lake or estuary.

hydrologic cycle. Movement or exchange of water between the atmosphere and earth.

hydrologic extremes. Hydrologic events that change stream flow conditions, such as droughts and floods, of significant magnitude compared to normal baseline conditions.

hydrology. The science dealing with the properties, distribution, and circulation of water.

hydromodification. Alteration of the hydrologic characteristics of landscapes, drainage ways and waters of the United States that result in changes in water balance, stream morphology, habitat, groundwater recharge, evapotranspiration rates and surface runoff.

immobilization and mineralization. In mineralization, the nitrogen (N) in plant tissue is converted by soil microbes into a form (nitrate) that subsequent plants can use. Immobilization is the process by which plant usable forms of N in the soil become unavailable for subsequent crop growth. Because microbial populations increase with the growth of a cover crop, N contained in the cover crop and the soil can be immobilized or *tied up* as part of the physical structure of the microbes. As a result, the cover crop N might not be available for uptake by the following crop. When the microbes die, the N is *mineralized* and becomes available for subsequent crop use.

impervious surfaces. A hard surface area that either prevents or retards the entry of water into the soil mantle or causes water to run off the surface in greater quantities or at an increased rate of flow. Common impervious surfaces include rooftops, walkways, patios, driveways, parking lots, storage areas, concrete or asphalt paving, and gravel roads.

impoundment. A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

incised. A channel that has been cut relatively deep into underlying formation by natural or human-induced processes.

indoor ozone systems. A controversial indoor technique that uses ozone for broiler house cleaning and in-house air contaminant (ammonia) control.

infiltration. The movement of water from the land surface into the soil.

infiltration basin or trench. A drainage facility designed to use the hydrologic process of runoff soaking into the ground, commonly referred to as percolation, to dispose of stormwater. Note: Infiltration trenches are typically not vegetated or designed to significantly filter pollutants from runoff.

inorganic nitrogen. The element nitrogen in combination with other mineral elements and not derived from plant or animal sources.

integrated pest management. The use of pest and environmental information in conjunction with available pest control technologies to prevent unacceptable levels of pest damage by the most economical means and with the least possible hazard to persons, property, and the environment.

intercropping. The growing of two or more species of crops simultaneously, as in alternate rows in the same field or single tract of land.

interstitial. The matrix of air or liquid between sediment particles.

inverts. The bottom of a drainage facility along which the lowest flows pass.

labile carbon. The highly reactive fraction of soil organic carbon with the most rapid turnover times; its oxidation drives the flux of CO_2 between soils and atmosphere. Labile organic carbon decomposes rapidly in the water column or in sediments, on a time scale of days to weeks; refractory organic carbon requires more time.

land applied. The reuse of reclaimed water or the use or disposal of effluents or wastewater residuals on, above, or into the surface of the ground through spray fields, land spreading, or other methods.

landing. A place in or near the forest where logs are gathered for further processing or transport**.**

large wood structures (LWS). *See* large woody debris.

large woody debris. Also called large wood structures. A large tree part, conventionally a piece greater than 10 cm in diameter and 1 m in length.

leaching. The process by which soluble constituents are dissolved and filtered through the soil by a percolating fluid.

leaf litter. Also called duff. Leaves and twigs fallen from forest trees.

livestock exclusion fencing. Fencing that keeps livestock away from rivers and streams.

load. The quantity of sediment transported by a current. It includes the suspended load of small particles and the bedload of large particles that move along the bottom.

longitudinal rutting. Ruts formed along the length of the road from tire pressure.

longitudinal zones. The longitudinal zones of a river corridor include the headwaters (zone 1), the transfer zone (zone 2), and the depositional zone (zone 3).

lotic system. Flowing waters, as in streams and rivers.

low-input turf. Turf that requires little or no maintenance, i.e., fertilization, irrigation, pesticide applications.

low-mow turf. Turf that is only infrequently mowed. Turf under this category would be mowed as little as possible, and mowing frequency would be based on issues such as security, pests, fire hazard, or suppression of woody species.

macroaggregate. A relatively large particle (as of soil).

macropores. Secondary soil features such as root holes or desiccation cracks that can create significant conduits for movement of non-aqueous phase liquid and dissolved contaminants, or vapor-phase contaminants.

matrix based fertilizers (MBFs). Fertilizers formulated to reduce nitrate, ammonium, and total phosphorus leaching through binding of nitrogen (N) and phosphorus (P), and in some cases via mixtures with aluminum sulfate, iron sulfate, starch, chitosan, or lignin. When N and P are released, the chemicals containing these nutrients in the MBF temporarily bind N and P to an aluminum sulfate or iron sulfate starch- chitosan- lignin matrix.

mat/tree collar. A sunlight-blocking device used to block the growth of grass or weeds immediately adjacent to a newly planted tree. It is commonly made of 2.5-mil, UV-stabilized, carbon-black plastic; about 3 feet x 3 feet (1 sq. yard) slit to easily fit around the tree.

mechanical site preparation. The practice of cutting all standing material with blades or choppers to prepare an area for establishing a future forest either by artificial or natural means. Other practices include disking, bedding, and raking.

mesohabitat. Distinct units of habitat within an ecosystem.

microfauna. Soil-dwelling micro-organisms (animals) that cannot be seen with the naked eye.

microfiltration. Using a device with a filter media to physically prevent biological contamination from passing through. Ceramic and solid block carbon are commonly used to provide microfiltration.

miter drain. A drain that is at an angle (e.g., 45 degrees) to the surface that is being drained (e.g., a grassed swale), as opposed to a drain laid flat on the surface that is being drained.

morphology. The branch of geology that studies the characteristics and configuration and evolution of rocks and land forms.

mouldboard ploughing. Conventional tillage using a moldboard plow. It turns over the soil and typically leaves less than 15 percent residue cover after planting.

native landscaping. Landscaping that is designed to use native plants adapted to the specific geographic location of their origin.

nitrate flux. The flow of nitrate (the most soluble and mobile form of nitrogen) out of a system, as from groundwater to streams, streams to rivers, and rivers to bays or oceans.

nitrification. The process whereby ammonia in wastewater is oxidized to nitrite and then to nitrate by bacterial or chemical reactions.

no-mow turf. Grasses that do not need mowing and are allowed to reach their mature state, e.g., switch grasses and other native grasses.

no till. Planting crops without prior seedbed preparation, into an existing cover crop, sod, or crop residues, and eliminating subsequent tillage operations.

no-till disk aeration. Aeration that uses methods similar to no-till or conservation tillage seeding of crops, which disrupts the soil surface in a series of parallel rows. The soil is aerated

using an aeration device fashioned by attaching cores, tines, or metal flashing (disk aeration) to rows on a metal plate and pushing the implement into the soil.

nonessential turf. Turf not necessary to achieve the intended goals of the facility or jurisdiction.

nonpoint source. Diffuse runoff (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). This document uses the term *nonpoint source* broadly, as EPA has in the past, to refer to sources that currently are treated as nonpoint sources in EPA's implementation of section 319 of the Clean Water Act. Some of these sources may legally be made subject to regulation as point sources under section 402(p) of the Clean Water Act. EPA has designated several categories of these stormwater sources for regulation, such as small municipal separate storm sewer systems, and may designate others for regulation in the future.

nutrient. Any substance assimilated by living things that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater but is also applied to other essential and trace elements.

nutrient use efficiency (NUE). A measure of how much crop is produced per unit of nutrient supplied. A greater NUE leaves less nitrogen and phosphorus available for transport to waterbodies.

on-site system. A wastewater treatment system relying on natural processes or mechanical components or both to collect and treat sewage from one or more dwellings, buildings, or structures and disperse the resulting effluent on property owned by the individual or entity.

organic turf management. Turf managed without the use of inorganic fertilizers or pesticides.

organic matter. The organic component of the soil consisting in living organisms, dry plants and residues of animal origin. In a mass unit, this organic component is the most chemically active of the soil. Such a component stores several essential elements, stimulates the proper structure of the soil, is a source with capacity for the exchange of cations and regulates the pH changes, supports the relationship between air and water in the soil, and is a huge geochemical storage of carbon.

oxidation-reduction potential. The electric potential required to transfer electrons from one compound or element (the oxidant) to another compound (the reductant); used as a qualitative measure of the state of oxidation in water treatment systems.

P-saturation. The amount of phosphorus in soil divided by the amount of phosphorus that can be fixed by the soil.

particulate bound. The condition in which a pollutant constituent attaches physically, strongly or weakly, to sediments within a stream system.

pasture. Land used primarily for the production of domesticated forage plants for livestock (in contrast to rangeland, where vegetation is naturally occurring and is dominated by grasses and perhaps shrubs). Rotation pasture or cropland under winter cover crops is not included in this definition. The 1992 national resources inventory recorded 126 million acres of pastureland, 9 percent of all nonfederal rural lands.

peak flow. The maximum flow through a watercourse that will recur with a stated frequency. The maximum flow for a given frequency can be based on measured data, calculated using statistical analysis of peak flow data, or calculated using hydrologic analysis techniques.

permeable reactive barriers. A subsurface emplacement of reactive materials designed as a preferential conduit for treating contaminated groundwater flow.

phase construction. Disturbance of small portions of a site at a time to prevent erosion from the dormant parts.

phreatic surface. The free surface of groundwater at atmospheric pressure.

phytoremediation. A practice used to reduce soil contaminant loadings through the use of plants selected to uptake or breakdown the contaminants. In cases where plants cannot metabolize and breakdown the contaminants, vegetative matter might need to be removed for further processing or disposal.

phytotechnology. A term referring to technologies that use living plants.

planter box. A small, contained vegetated area that is used to collect and treat stormwater through the mechanisms provided by bioretention designs. There are three general types of planter boxes: (1) contained planter that is used for planting trees, shrubs, and ground cover that is placed over an impervious surface; (2) infiltration planter that is a structural landscaped reservoir used to collect, filter, and infiltrate stormwater run-on; and (3) flo-through planter that is similar to an infiltration planter except it has a waterproof lining allowing it to be used next to foundation walls. Other terms used for this practice include stormwater planter, vegetated planter, tree box.

plume. A definable, three-dimensional region of effluent created by the movement of groundwater beneath its source.

plunge pool. A natural or sometimes artificially created pool that dissipates energy of free falling water. The basin is at a safe distance downstream of the structure from which the water is being released.

pore water pressure. The pressure exerted on its surroundings by water held in pore spaces in rock or soil.

porosity. The degree to which soil, gravel, sediment, or rock is permeated with pores or cavities through which water or air can move.

pre-development hydrology. The runoff characteristics in a watershed before urban development in respect to the volume, rate, duration, and temperature of runoff.

production area of an AFO. That part of an animal feeding operation that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal confinement area includes open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes feed silos, silage bunkers, and bedding materials. The waste containment area includes settling basins and areas within berms and diversions that separate uncontaminated stormwater. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of mortalities.

push outs. A type of road drainage structure that drains topographic lows or saddles on a road by directing runoff away from the road from both road directions.

rain garden. A depressed area of the ground planted with vegetation, allowing runoff from impervious surfaces such as parking lots and roofs the opportunity to be collected and infiltrated into the groundwater supply or returned to the atmosphere through evaporation and evapotranspiration. Rain gardens are typically cheaper to build and design than bioretention or bioinfiltration cells because they are often built without specific performance standards and without the assistance of a certified professional to design them.

recirculating media filter. A wastewater treatment system component featuring a layer of sand, gravel, or other material, on which effluent is applied and treated via microbial growth on

the surface of the media, allowing the effluent to trickle through. A portion of the effluent is returned to another system component for further treatment or to facilitate a treatment process.

reforestation. The establishment of a forest through artificial plantings or natural regeneration.

reinforcement planting. Additional trees and shrubs that are planted during the short-term maintenance phase (approximately 2 years after initial plantings) of a riparian forest buffer restoration to replace any plants that did not survive and to enhance the buffer.

retrofits. Installation of a new or redesigned stormwater facility to treat stormwater from existing impervious area, including roofs, patios, walkways, and driving or parking surfaces.

return walls. Walls constructed at the ends of seawalls, bulkheads, or revetments perpendicular to the shoreline to prevent flanking of the primary shore protection structure.

revetment. A facing of stone, concrete, and the like, built to protect a scarp, embankment, or shore structure against erosion by wave action or currents.

ridge tillage. A type of soil conserving tillage in which the soil is formed into ridges and the seeds are planted on the tops of the ridges. The soil and the crop residue between the rows remain largely undisturbed. The practice offers opportunities to reduce crop production costs by banding fertilizers and pesticides and reducing the need for field trips.

riffle. A shallow part of the stream where water flows swiftly over completely or partially submerged obstructions to produce surface agitation.

rill. A small channel eroded into the soil by surface runoff; it can be easily smoothed out or obliterated by normal tillage.

riparian area. Vegetated ecosystems along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of the two, although they will not in all cases have all the characteristics necessary for them to be classified as wetlands.

riparian buffer. A specific area to be managed within a riparian area.

riparian habitat. Areas adjacent to rivers and streams with a differing density, diversity, and productivity of plant and animal species relative to nearby uplands.

road failure. A portion or location along a forest road where generally erosion or poor construction has resulted in the surface of the road falling away and leaving the road impassable or compromising the intended drainage of the road surface.

road prism. All parts of a road including cut banks, ditches, road surfaces, road shoulders, and road fills.

road profile. The cross-sectional shape of the road surface in relation to the road corridor traversing the surrounding landscape.

root wad revetments. Logs with attached root masses that are placed in and on streambanks to provide streambank erosion, trap sediment, and improve habitat diversity.

row crop agriculture. The rows or planting beds are far enough apart to permit the operation of machinery between them for cultural operations.

scour. Soil erosion when it occurs underwater, as in the case of a streambed.

scour pool. Removal of underwater material by waves and currents, especially at the base or toe of a shore structure.

seawalls. A structure separating land and water areas, primarily designed to prevent erosion and other damage due to wave action.

sediment. Topsoil, sand, and minerals washed from the land into water, usually after rain or snow melt.

sediment basin/rock dams. Barriers, often employed in conjunction with excavated pools, constructed across a drainage way or off-stream and connected to the stream by a flow diversion channel to trap and store waterborne sediment and debris.

sediment fence (also called silt fences)**.** A temporary sediment control device used on construction sites to protect water quality in nearby surface waters from sediment (loose soil) in stormwater runoff. A typical fence consists of a piece of synthetic filter fabric (also called a geotextile) stretched between a series of wooden or metal stakes.

sediment transport capacity and competence. The ability or efficiency of a stream system to move sediment.

sediment trap. A structure or vegetative barrier designed to collect soil material transported in runoff and also to reduce water flow velocity and therefore scouring and erosion. Sediment traps mitigate siltation of natural drainage features.

seeding. The establishment of vegetated cover on a disturbed site by applying plant seeds and as appropriate, fertilizer, lime, or other amendments.

septage. Liquid and residuals removed from a septic tank or other sewage pretreatment device or holding facility, such as a seepage pit, cesspool, or portable toilet.

septic tank effluent gravity (STEG) collection system. A collection system that uses septic tanks to separate solids and allow gravity flow of effluent to a subsequent component.

septic tank effluent pump (STEP) collection system. A collection system that uses a septic tank to separate solids and incorporates a pump and associated parts to convey effluent under pressure to a subsequent component.

sequencing batch reactor. A series of components designed to treat wastewater in batches, one process at a time. Typically, it involves activated sludge and other processes carried out in the same tank in stepwise order (e.g., fill, treat, settle, decant, and draw).

setback. A distance between a water resource and an activity (e.g., manure spreading) within which the activity cannot be carried out. The purpose of a setback is to reduce the potential for contaminants to reach ground or surface water. Properly managed setbacks improve water quality by acting as filters for water passing over or through the soil toward a water resource.

shear strength. The internal resistance of a body to shear stress, which typically includes frictional and cohesive components and expresses the ability of soil to resist sliding.

sheetflow. Term used to describe the movement of water laterally across the surface of the ground, rather than flowing in defined channels or depressions.

silt fence (*See* sediment fence.)

silviculture. The management of forest land for timber production.

silvopasture. An agroforestry application establishing a combination of trees or shrubs and compatible forages on the same acreage**.**

single-pass. A wastewater flow configuration wherein effluent moves through a treatment component only once.

site fingerprinting. 1. Site clearing and development using minimal disturbance of existing vegetation and soils. 2. Restricting ground disturbance to areas where structures, roads, and rights of way will exist after construction is completed.

skid trail. A temporary, nonstructural pathway over forest soil used to drag felled trees or logs to the landing.

slag filter. A filter filled with electric arc furnace steel slag, a by-product of making steel, to treat barnyard runoff and milkhouse waste.

slash. The unwanted, unused, and generally unmerchantable accumulation of woody material, such as large limbs, tops, cull logs, and stumps, that remains as forest residue after timber harvesting.

slit aeration. A soil aerator, the most common for agronomic use, in which tines are pushed into the soil to make elongated holes.

slough. A marshy or reedy pool that contains areas of slightly deeper water and a slow current.

sludge. Accumulated solids and associated entrained water within a wastewater pretreatment component, generated during the biological, physical, or chemical treatment; coagulation; or clarification of wastewater.

sluicing. The practice of releasing water through the sluice gate of an impoundment rather than through the turbines.

sodding. A permanent erosion control practice involving laying a continuous cover of grass sod on exposed soils.

soil dispersal field (soil treatment area). A physical location where final treatment and dispersal of effluent occurs; includes drainfields, drip fields and spray fields.

spur road. A short road that branches from a major forest road and that is generally used to access specific areas for harvesting.

stormflow. The portion of streamflow attributable to precipitation that enters the channel (generally as overland flow or shallow subsurface flow) within a short time frame in association with storms (as opposed to baseflow, which enters the channel slowly from groundwater sources).

storm return period. The recurrence interval or an estimate of the interval of time between storms of a certain intensity or size. *See also* design flow.

stream corridor. The area that consists of the stream channel itself, the floodplain, and a transitional zone between the floodplain and the surrounding landscape.

stream geometry. The physical form assumed by a stream system that includes channel depth, width, longitudinal slope, and planform.

stream morphology. The science of analyzing the structural makeup of rivers and streams and how they change over time.

streamside management area. A designated area that consists of the stream itself and an adjacent area of varying width where management practices that might affect water quality, fish, or other aquatic resources are modified. The SMA is not necessarily an area of exclusion but an area of closely managed activity. It is an area that acts as an effective filter and absorptive zone for sediments, maintains shade, protects aquatic and terrestrial riparian habitats, protects channels and streambanks, and promotes floodplain stability.

street sweeping. The use of self-propelled and walk-behind sweeping and vacuum equipment to remove sediment and other debris from streets, roadways, parking lots, and sidewalks.

struvite formation. The common name for magnesium ammonium phosphate hexahydrate ($MgNH_4PO_4 \cdot 6(H_2O)$). Struvite can naturally form and clog pumps and pipes when recycling lagoon liquid, and struvite accumulation is a common problem in pumping systems for anaerobic treatment portions of municipal waste treatment systems. Although components designed to promote struvite formation and collection have been used to remove phosphorus from municipal waste treatment systems, the idea of promoting struvite formation and collection is a relatively new concept for livestock wastewater treatment and nutrient management.

subirrigation. Application of irrigation water below the ground surface by raising the water table to within or near the root zone.

surface roughening (also called soil roughening). Increasing the relief of a bare soil surface with horizontal grooves by either stair-stepping (running parallel to the contour of the land) or using construction equipment to track the surface.

suspended growth or fixed film reactors. A configuration wherein the microorganisms responsible for wastewater treatment are maintained in suspension within a liquid.

suspended sediment. Very fine soil particles that remain in suspension in water for a considerable period without contact with the bottom. Such material remains in suspension because of the upward components of turbulence and currents and/or by suspension.

swales. Vegetated, open-channel management practices designed specifically to treat and attenuate stormwater runoff for a specified water quality volume.

tailwaters. The channel or stream below a dam, often characterized by waters with low dissolved oxygen. Many nonpoint source pollution problems in reservoirs and dam tailwaters frequently result from sources in the contributing watershed (e.g., sediment, nutrients, metals, and toxics).

tank. A watertight structure or container used to hold wastewater for such purposes as aeration, equalization, holding, sedimentation, treatment, mixing, dilution, addition of chemicals, or disinfection.

thalweg. In hydrologic terms, it is the line of maximum depth in a stream. The thalweg is the part that has the maximum velocity and causes cutbanks and channel migration.

thinning. A tree removal practice that reduces tree density and competition between trees in a stand. Thinning concentrates growth on fewer, high-quality trees; provides periodic income; and generally enhances tree vigor. Heavy thinning can benefit wildlife through the increased growth of ground vegetation.

three-zone buffer system. A technique for establishing a buffer, consisting of inner, middle, and outer zones. The zones are distinguished by function, width, vegetative target, and allowable uses.

tile drains. Pipe made of perforated plastic, burned clay, concrete, or similar material laid to a designed grade and depth to collect and carry excess water from the soil.

tillage. Plowing, seedbed preparation, and cultivation practices.

time-dosed pressure drip dispersal (flow equalization). A system configuration that includes sufficient effluent storage capacity to allow for uniform flow to a subsequent component despite variable flow from the source.

time-dosing. A configuration in which a specific volume of effluent is delivered to a component according to a prescribed interval, regardless of facility water use.

topography. The shape and contour of a surface, especially the land surface, usually characterized by slope, aspect, and elevation.

total maximum daily load (TMDL). A calculation of the highest amount of a pollutant that a waterbody can receive and safely meet water quality standards set by the state, territory, or authorized tribe.

total suspended solids. A measure of the suspended solids in wastewater, effluent, or waterbodies, determined by tests for *total suspended non-filterable solids*.

turf. A surface layer of earth containing a dense growth of grass and its matted roots; sod.

turnouts (aka bleeders or cutouts). A drainage ditch that drains water away from roads and road ditches.

urban forest canopy. The land surface area that lies directly beneath the crowns of all trees and tall shrubs.

vegetated swales. A shallow drainage conveyance that has vegetative turf (typically grasses) with relatively gentle side slopes, generally with flow depths of less than one foot.

vertical stability (degradation/aggradation). The ability of a stream system to maintain a constant or balanced profile without deposition of sediment (aggradation) or incision (degredation).

vortex rock weirs. A structure designed to serve as grade control and create a diversity of flow velocities, while still maintaining the bed load sediment transport regime of a stream.

waste treatment lagoon. An impoundment made by excavation or earth fill for biological treatment of wastewater.

water quality standards. State-adopted and EPA-approved ambient standards for waterbodies. The standards prescribe the use of the waterbody and establish the water quality criteria that must be met to protect designated uses.

weir. 1. A wall or plate placed in an open channel to measure the flow of water. 2. A W-Weir is an in-stream structure constructed for the purpose of reducing shear stress on streambanks, controlling the grade of the streambed and establishing fisheries habitat. W-Weirs are typically constructed with two rock vanes on opposing sides of the stream channel forming the outside legs and two opposing vanes in the center of the channel to complete the W-Weir.

weighted usable area (WUA). The total surface area having a certain combination of hydraulic and substrate conditions, multiplied by the composite probability of use by fish for the combination of conditions at a given flow.

wetland. An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries.

windbreaks. A living barrier that usually includes several rows of trees, and perhaps shrubs, located upwind of a farm, field, feedlot, or other area and intended to reduce wind velocities. Windbreaks, also called shelterbelts, can reduce wind erosion, conserve energy or moisture, control snow accumulations, and provide shelter for livestock or wildlife.

windrow. Logging debris and unmerchantable woody vegetation that has been piled in rows to decompose or to be burned; or the act of constructing such piles.

WTR addition. The addition of iron-rich or aluminum-rich drinking water treatment residuals (WTR) to soils to bind with phosphorus and reduce losses of phosphorus via leaching and runoff.