DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

1999

Glossary of Stream Restoration Terms

by Craig Fischenich[1]

OVERVIEW

Following is a glossary of terms commonly used in stream restoration. Not all of the terms appear in the Stream Restoration Technical Note series and the glossary is intended as a general reference.

TERMS

Abatement -- Reducing the degree or intensity of, or eliminating, pollution.

Ablation -- The process by which ice and snow waste away as a result of melting and/or evaporation.

Acid rain -- Rainfall with a pH of less than 7.0. Long-term deposition of these acids is linked to adverse effects on aquatic organisms and plant life in areas with poor neutralizing (buffering) capacity.

Acidic -- The condition of water or soil in which the amount of acid substances are sufficient to lower the pH below 7.0.

Acre -- A measure of area equal to 43,560 ft^2 (4,046.87 m^2). One square mile equals 640 acres.

Acre-foot (af) -- A quantity or volume of water covering 1 acre to a depth of 1 ft; equal to 43,560 ft^3 or 325,851 gal.

Active storage capacity -- The total usable reservoir capacity available for seasonal or cyclic water storage. It is gross reservoir capacity minus inactive storage capacity.

Aeration -- Any active or passive process by which intimate contact between air and liquid is assured, generally by spraying liquid in the air, bubbling air through water, or mechanical agitation of the liquid to promote surface absorption of air.

Aerobic -- Characterizing organisms able to live only in the presence of air or free oxygen, and conditions that exist only in the presence of air or free oxygen. Contrast with anaerobic.

Affluent (stream) -- A stream or river that flows into a larger one; a tributary.

Afterbay -- A reservoir that regulates fluctuating discharges from a hydroelectric power plant or a pumping plant.

Aggradation -- A progressive buildup or raising of the channel bed and floodplain due to sediment deposition. The geologic process by which streambeds are raised in elevation and floodplains are formed. Aggradation indicates that stream discharge and/or bed-load characteristics are changing. Opposite of degradation.

Algae -- Microscopic plants that grow in sunlit water containing phosphates, nitrates, and other nutrients. Algae, like all aquatic plants, add oxygen to the water and are important in the fish food chain.

Alluvial -- Deposited by running water.

Alluvium -- A general term for detrital deposits make by streams on riverbeds, floodplains, and alluvial fans; esp. a deposit of silt or silty clay laid down during time of flood. The term applies to stream deposits of recent time. It does not include subaqueous sediments of seas or lakes.

Anabranch -- A diverging branch of a river that re-enters the main stream.

Anadromous -- Pertaining to fish that spend a part of their life cycle in the sea and return to freshwater streams to spawn.

Angler-day -- The time spent fishing for any part of a day by one person.

20000228 162

[1] USAE Research and Development Center, Environmental Laboratory, 3909 Halls Ferry Rd., Vicksburg, MS 39180

DTIC QUALITY INSPECTED 3

Aquaduct -- A pipe or conduit made to bring water from a source.

Aquatic ecosystem -- Any body of water, such as a stream, lake, or estuary, and all organisms and nonliving components within it, functioning as a natural system.

Aquatic habitat -- Habitat that occurs in free water.

Aquifer -- A body of rock that is sufficiently permeable to conduct groundwater and to yield economically significant quantities of water to wells and springs.

Arid -- A term describing a climate or region in which precipitation is so deficient in quantity or occurs so infrequently that intensive agricultural production is not possible without irrigation.

Armoring -- A natural process where an erosion-resistant layer of relatively large particles is established on the surface of the streambed through removal of finer particles by stream flow. A properly armored streambed generally resists movement of bed material at discharges up to approximately 3/4 bank-full depth.

Artificial recharge -- Addition of surface water to a groundwater reservoir by human activity, such as putting surface water into spreading basins. See also groundwater recharge, recharge basin.

Augmentation (of stream flow) -- Increasing stream flow under normal conditions, by releasing storage water from reservoirs.

Average annual runoff -- For a specified area, it is the average value of annual runoff amounts calculated for a whole hydrologic cycle of record that represents average hydrologic conditions.

Average year supply -- The average annual supply of a water development system over a whole hydrologic cycle.

Average year water demand -- Demand for water under average hydrologic conditions for a defined level of development.

Avulsion -- A change in channel course that occurs when a stream suddenly breaks through its banks, typically bisecting an overextended meander arc.

Backwater -- (1) A small, generally shallow body of water attached to the main channel, with little or no current of its own, or (2) A condition in subcritical flow where the water surface elevation is raised by downstream flow impediments.

Backwater pool -- A pool that formed as a result of an obstruction like a large tree, weir, dam, or boulder.

Bank stability -- The ability of a streambank to counteract erosion or gravity forces.

Bank-full channel depth -- The maximum depth of a channel within a riffle segment when flowing at a bank-full discharge.

Bank-full channel width -- The top surface width of a stream channel when flowing at a bank-full discharge.

Bank-full discharge -- The stream discharge corresponding to the water stage that first overtops the natural banks. This flow occurs, on average, about once every 1 to 2 years.

Bank-full width -- The width of a river or stream channel between the highest banks on either side of a stream.

Bar -- An accumulation of alluvium (usually gravel or sand) caused by a decrease in sediment transport capacity on the inside of meander bends or in the center of an overwide channel.

Barrier -- A physical block or impediment to the movement or migration of fish, such as a waterfall (natural barrier) or a dam (man-made barrier).

Base flow -- The sustained portion of stream discharge that is drawn from natural storage sources, and not affected by human activity or regulation.

Bed load -- Sediment moving on or near the streambed and transported by jumping, rolling, or sliding on the bed layer of a stream. See also suspended load.

Bed material -- The sediment mixture that a streambed is composed of.

Bed material load -- That portion of the total sediment load with sediments of a size found in the streambed.

Bed roughness -- A measure of the irregularity of the streambed as it contributes to flow resistance. Commonly expressed as a Manning "n" value.

Bed slope -- The inclination of the channel bottom, measured as the elevation drop per unit length of channel.

Benthic invertebrates -- Aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water. Examples: clams, crayfish, and a wide variety of worms.

Benthos -- All plants and animals living on or closely associated with the bottom of a body of water.

Best management practice (BMP) -- Conservation measures intended to minimize or mitigate impacts from a variety of land-use activities.

Biota -- All living organisms of a region, as in a stream or other body of water.

Blowdown -- Trees felled by high winds.

Bog -- Freshwater wetlands that are poorly drained and characterized by a buildup of peat.

Boulder -- A large substrate particle that is larger than cobble, 256 mm in diameter.

Brackish water -- Generally, water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than seawater. Also, marine and estuarine waters with mixohaline salinity (0.5 to 17 ppt due to ocean salts). Water containing between 500-17,000 parts per million (PPM) total dissolved solids TDS). The term brackish water is frequently interchangeable with saline water. The term should not be applied to inland waters.

Braided channel -- A stream characterized by flow within several channels, which successively meet and divide. Braiding often occurs when sediment loading is too large to be carried by a single channel.

Braiding (of river channels) -- Successive division and rejoining of riverflow with accompanying islands.

Buffer strip -- A barrier of permanent vegetation, either forest or other vegetation, between waterways and land uses such as agriculture or urban development, designed to intercept and filter out pollution before it reaches the surface water resource.

Canal -- A constructed open channel for transporting water.

Canopy -- A layer of foliage in a forest stand. This most often refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multistoried stand. Leaves, branches and vegetation that are above ground and/or water that provide shade and cover for fish and wildlife.

Cascade -- A short, steep drop in streambed elevation often marked by boulders and agitated white water.

Catchment -- (1) The catching or collecting of water, especially rainfall. (2) A reservoir or other basin for catching water. (3) The water thus caught. (4) A watershed.

Channel -- An area that contains continuously or periodically flowing water that is confined by banks and a streambed.

Channelization -- The process of changing (usually straightening) the natural path of a waterway.

Clay -- Substrate particles that are smaller than silt and generally less than 0.003 mm in diameter.

Closed basin -- A basin whose topography prevents surface outflow of water. It is considered to be hydrologically closed if neither surface nor underground outflow of water can occur.

Coarse woody debris (CWD) -- Portion of a tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20 in. in diameter.

Cobble -- Substrate particles that are smaller than boulders and larger than gravels, and are generally 64-256 mm in diameter. Can be further classified as small and large cobble.

Confined aquifer -- A water-bearing subsurface stratum that is bounded above and below by formations of impermeable, or relatively impermeable, soil or rock.

Confluence -- (1) The act of flowing together; the meeting or junction of two or more streams; also, the place where these streams meet. (2) The stream or body of water formed by the junction of two or more streams; a combined flood.

Conifer -- A tree belonging to the order Gymnospermae, comprising a wide range of trees that are mostly evergreens. Conifers bear cones (hence, coniferous) and have needle-shaped or scalelike leaves.

Conjunctive use -- The operation of a groundwater basin in combination with a surface water storage and conveyance system. Water is stored in the groundwater basin for later use by intentionally recharging the basin during years of above-average water supply.

Conservation -- The process or means of achieving recovery of viable populations.

Conservation area -- Designated land where conservation strategies are applied for the purpose of attaining a viable plant or animal population.

Conservation recommendations -- Suggestions by conservation agencies regarding discretionary measures to minimize or avoid adverse effects on a proposed action of federally listed threatened or endangered species or designated critical habitat.

Conservation strategy -- A management plan for a species, group of species, or ecosystem that prescribes standards and guidelines that, if implemented, provide a high likelihood that the species, groups of species, or ecosystem, with its full complement of species and processes, will continue to exist well-distributed throughout a planning area, i.e., a viable population.

Contaminate -- To make impure or unclean by contact or mixture.

Contiguous habitat -- Habitat suitable to support the life needs of a species that is distributed continuously or nearly continuously across the landscape.

Core area -- The area of habitat essential in the breeding, nesting, and rearing of young, up to the point of dispersal of the young.

Creel census survey -- The collection of data concerning the number of fish caught by sport fishers on a particular stream or in a particular area.

Critical habitat -- Under the Endangered Species Act, critical habitat is defined as (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protections; and (2) specific areas outside the geographic area occupied by a listed species, when it is determined that such areas are essential for the conservation of the species.

Critical shear stress -- The minimum amount of shear stress exerted by stream currents required to initiate soil particle motion. Because gravity also contributes to streambank particle movement but not on streambeds, critical shear stress along streambanks is less than for streambeds.

Crown -- The upper part of a tree or other woody plant that carries the main system of branches and the foliage.

Crown cover -- The degree to which the crowns of trees are nearing general contact with one another.

Cubic feet per second (cfs) -- A unit used to measure water flow. One cubic foot per second is equal to 449 gallons per minute.

Culvert -- A buried pipe that allows flows to pass under a road.

Debris flow -- A rapidly moving mass of rock fragments, soil, and mud, with more than half of the particles being larger than sand size.

Debris torrent -- Rapid movement of a large quantity of materials (wood and sediment) down a stream channel during storms or floods. This generally occurs in smaller streams and results in scouring of the streambed.

Deciduous -- Trees and plants that shed their leaves at the end of the growing season.

Decomposer -- Any of various organisms (as many bacteria and fungi) that feed on and break down organic substances (such as dead plants and animals).

Decomposition -- The breakdown of matter by bacteria and fungi, changing the chemical makeup and physical appearance of materials.

Deep percolation -- The percolation of water through the ground and beyond the lower limit of the root zone of plants into a groundwater aquifer.

Degradation -- (1) A progressive lowering of the channel bed due to scour. Degradation is an indicator that the stream's discharge and/or sediment load is changing. The opposite of aggradation. (2) A decrease in value for a designated use.

Dependable supply -- The annual average quantity of water that can be delivered during a drought period.

Depletion -- A water use term. The water consumed within a service area and no longer available as a source of supply. For agriculture and wetlands, it is evapotranspiration of applied water (ETAW) and evapotranspiration (ET) of flooded wetlands, plus irrecoverable losses. For urban water use, it is ETAW (water applied to landscaping or home gardens), sewage effluent that flows to a salt sink, and incidental ET losses. For instream use, it is the amount of dedicated flow that becomes groundwater and is not available for reuse.

Dike -- (1) (Engineering) An embankment to confine or control water, especially one built along the banks of a river to prevent overflow of lowlands; a levee. (2) A low wall that can act as a barrier to prevent a spill from spreading. (3) (Geology) A tabular body of igneous (formed by volcanic action) rock that cuts across the structure of adjacent rocks or cuts massive rocks.

Discount rate -- The interest rate used in evaluating water (and other) projects to calculate the present value of future benefits and future costs or to convert benefits and costs to a common time basis.

Dissolved gas concentrations -- The amount of chemicals normally occurring as gases, such as nitrogen and oxygen, that are held in solution in water, expressed in units such as milligrams of the gas per liter of liquid. Supersaturation occurs when these solutions exceed the saturation level of the water (beyond 100 percent).

Dissolved organic compounds -- Carbon substances dissolved in water.

Dissolved oxygen (DO) -- The amount of free (not chemically combined) oxygen dissolved in water, wastewater, or other liquid, usually expressed in milligrams per liter, parts per million, or percent of saturation.

Ditch -- A long narrow trench or furrow dug in the ground, as for irrigation, drainage, or a boundary line.

Diversion -- The transfer of water from a stream, lake, aquifer, or other source of water by a canal, pipe, well, or other conduit to another watercourse or to the land, as in the case of an irrigation system.

Diversion channel -- (1) An artificial channel constructed around a town or other point of high potential flood damages to divert floodwater from the main channel to minimize flood damages. (2) A channel carrying water from a diversion dam.

Drainage area -- The total surface area upstream of a point on a stream that drains toward that point. Not to be confused with watershed. The drainage area may include one or more watersheds.

Drainage basin -- The total area of land from which water drains into a specific river.

Dredging -- Removing material (usually sediments) from wetlands or waterways, usually to make them deeper or wider.

Drought -- Generally, the term is applied to periods of less than average or normal precipitation over a certain period of time sufficiently prolonged to cause a serious hydrological imbalance resulting in biological losses (impact flora and fauna ecosystems) and/or economic losses (affecting man). In a less precise sense, it can also signify nature's failure to fulfill the water wants and needs of man.

Dry wash -- A streambed that carries water only during and immediately following rainstorms.

Ecology -- The study of the interrelationships of living organisms to one another and to their surroundings.

Economic demand -- The consumer's willingness and ability to purchase some quantity of a commodity based on the price of that commodity.

Ecosystem -- Recognizable, relatively homogeneous units, including the organisms they contain, their environment, and all the interactions among them.

Ecosystem management -- A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual species.

Eddy -- A circular current of water, usually resulting from an obstruction.

Effluent -- (1) Something that flows out or forth, especially a stream flowing out of a body of water. (2) (Water Quality) Discharged wastewater such as the treated wastes from municipal sewage plants, brine wastewater from desalting operations, and coolant waters from a nuclear power plant.

Embankment -- An artificial deposit of material that is raised above the natural surface of the land and used to contain, divert, or store water, support roads or railways, or for other similar purposes.

Energy dissipation -- The loss of kinetic energy of moving water due to internal turbulence, bottom friction, large rocks, debris, or other obstacles that impede flow.

Enhancement -- Emphasis on improving the value of particular aspects of water and related land resources.

Environment -- The sum of all external influences and conditions affecting the life and development of an organism or ecological community; the total social and cultural conditions.

Environmental analysis -- An analysis of alternative actions and their predictable short-term and long-term environmental effects, incorporating physical, biological, economic, and social considerations.

Environmental assessment (EA) -- A systematic analysis of site-specific activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary.

Environmental impact -- The positive or negative effect of any action upon a given area or resource.

Environmental impact statement (EIS) -- A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major federal action.

Ephemeral streams -- Streams that flow only in direct response to precipitation and whose channel is at all times above the water table.

Erosion -- Wearing away of rock or soil by the gradual detachment of soil or rock fragments by water, wind, ice, and other mechanical, chemical, or biological forces.

Estuary -- A coastal body of water that is semi-enclosed, openly connected with the ocean, and mixes with freshwater drainage from land.

Eutrophic -- Usually refers to a nutrient-enriched, highly productive body of water.

Eutrophication -- The process of enrichment of water bodies by nutrients.

Evaporation -- The physical process by which a liquid (or a solid) is transformed to the gaseous state. In hydrology, evaporation is vaporization that takes place at a temperature below the boiling point.

Evapotranspiration (ET) -- The quantity of water transpired (given off), retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces. Quantitatively, it is usually expressed in terms of depth of water per unit area during a specified period of time.

Evapotranspiration of applied water (ETAW) -- The portion of the total evapotranspiration provided by irrigation.

Fill -- (1) (Geology) Any sediment deposited by any agent such as water so as to fill or partly fill a channel, valley, sink, or other depression. (2) (Engineering) Soil or other material placed as part of a construction activity.

Final environmental impact statement (FEIS) -- The final report of environmental effects of proposed action on an area of land. This is required for major federal actions under Section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement to include public and agency responses to the draft.

Flash Flood -- A sudden flood of great volume, usually caused by a heavy rain. Also, a flood that crests in a short length of time and is often characterized by high velocity flows.

Floodplain -- Land built of sediment that is regularly covered with water as a result of the flooding of a nearby stream.

Floodplain (100-year) -- The area adjacent to a stream that is on average inundated once a century.

Flow -- The amount of water passing a particular point in a stream or river, usually expressed in cubic feet per second (cfs).

Flow augmentation -- Increased flow from release of water from storage dams.

Fluvial -- Migrating between main rivers and tributaries. Of or pertaining to streams or rivers.

Ford -- A shallow place in a body of water, such as a river, where one can cross by walking or riding on an animal or in a vehicle.

Forebay -- A reservoir or pond situated at the intake of a pumping plant or power plant to stabilize water levels; also a storage basin for regulating water for percolation into groundwater basins.

Fry -- A recently hatched fish.

Gabion -- A wire basket or cage that is filled with gravel or cobble and generally used to stabilize streambanks.

Gaging station -- A particular site in a stream, lake, reservoir, etc., where hydrologic data are obtained.

Gallons per minute (gpm) -- A unit used to measure water flow.

Geographic information system (GIS) -- A computer system capable of storing and manipulating spatial data.

Geomorphology -- A 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 due to erosion of the primary elements and the buildup of erosional debris.

Glide -- A section of stream that has little or no turbulence.

Gradient -- Vertical drop per unit of horizontal distance.

Grass/forb -- Herbaceous vegetation.

Gravel -- An unconsolidated natural accumulation of rounded rock fragments, mostly of particles larger than sand (diameter greater than 2 mm), such as boulders, cobbles, pebbles, granules, or any combination of these.

Gray water -- Wastewater from a household or small commercial establishment that specifically excludes water from a toilet, kitchen sink, dishwasher, or water used for washing diapers.

Groundwater -- Subsurface water and underground streams that can be collected with wells, or that flow naturally to the earth's surface through springs.

Groundwater basin -- A groundwater reservoir, defined by an overlying land surface and the underlying aquifers that contain water stored in the reservoir. In some cases, the boundaries of successively deeper aquifers may differ and make it difficult to define the limits of the basin.

Groundwater overdraft -- The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average.

Groundwater prime supply -- Long-term average annual percolation into major groundwater basins from precipitation falling on the land and from flows in rivers and streams.

Groundwater recharge -- Increases in groundwater storage by natural conditions or by human activity. See also artificial recharge.

Groundwater storage capacity -- The space or voids contained in a given volume of soil and rock deposits.

Groundwater table -- The upper surface of the zone of saturation, except where the surface is formed by an impermeable body.

Habitat -- The local environment in which organisms normally live and grow.

Habitat conservation plan (HCP) -- An agreement between the Secretary of the Interior and either a private entity or a state that specifies conservation measures that will be implemented in exchange for a permit that would allow taking of a threatened or endangered species.

Habitat diversity -- The number of different types of habitat within a given area.

Habitat fragmentation -- The breaking up of habitat into discrete islands through modification or conversion of habitat by management activities.

Hardpan -- A layer of nearly impermeable soil beneath a more permeable soil, formed by natural chemical cementing of the soil particles.

Hard water -- Water high in multivalent cations, such as calcium and magnesium. This type of water does not lather easily when used with soap and forms a scale in containers when allowed to evaporate.

Hatch box -- A device used to incubate relatively small numbers of fish eggs. The hatch box is usually located adjacent to a stream, which supplies the box with water.

Hazardous materials -- Anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Headwater -- Referring to the source of a stream or river.

Heavy metals -- Metallic elements with high atomic weights, e.g., mercury, chromium, cadmium, arsenic, and lead. They can damage living things at low concentrations and tend to accumulate in the food chain.

Hydraulic gradient -- The slope of the water surface. See also streambed gradient.

Hydraulic radius -- The cross-sectional area of a stream divided by the wetted perimeter.

Hydric -- Wet.

Hydrograph -- A curve showing stream discharge over time.

Hydrologic balance -- An accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period of time.

Hydrologic region -- A study area, consisting of one or more planning subareas, that has a common hydrologic character.

Hydrologic unit -- A distinct watershed or river basin defined by an 8-digit code.

Hydrology -- The scientific study of the water of the earth, its occurrence, circulation and distribution, its chemical and physical properties, and its interaction with its environment, including its relationship to living things.

Hyporheic zone -- The area under the stream channel and floodplain where groundwater and the surface waters of the stream are exchanged freely.

Incised river -- A river that erodes its channel by the process of degradation to a lower base level than existed previously or is consistent with the current hydrology.

Infiltration (soil) -- The movement of water through the soil surface into the soil.

Inflow -- Water that flows into a stream, lake, reservoir, or forebay during a specified period.

Instream cover -- The layers of vegetation, like trees, shrubs, and overhanging vegetation, that are in the stream or immediately adjacent to the wetted channel.

Instream flows -- (1) Portion of a flood flow that is contained by the channel. (2) A minimum flow requirement to maintain ecological health in a stream.

Instream use -- Use of water that does not require diversion from its natural watercourse. For example, the use of water for navigation, recreation, fish and wildlife, aesthetics, and scenic enjoyment.

Intermittent stream -- Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Invertebrate drift -- Stream and terrestrial invertebrates that float with the current.

Irrigation diversion -- Generally, a ditch or channel that deflects water from a stream channel for irrigation purposes.

Irrigation efficiency -- The efficiency of water application and use. Computed by dividing evapotranspiration of applied water by applied water and converting the result to a percentage. Efficiency can be computed at three levels: farm, district, or basin.

Irrigation return flow -- Applied water that is not transpired, evaporated, or deep-percolated into a groundwater basin but returns to a surface water supply.

Key watershed -- As defined by National Forest and Bureau of Land Management District fish biologists, a watershed containing (1) habitat for potentially threatened species or stocks of anadromous salmonids or other potentially threatened fish, or (2) greater than 6 square miles with high-quality water and fish habitat.

Lake – An inland body of standing water deeper than a pond, an expanded part of a river, a reservoir behind a dam.

Landscape -- A heterogenous land area with interacting ecosystems that are repeated in similar form throughout.

Landscape diversity -- The size, shape, and connectivity of different ecosystems across a large area.

Landscape features -- The land, water, vegetation, and structures that compose the characteristic landscape.

Landslide -- A movement of earth mass down a steep slope.

Large woody debris (LWD) -- Pieces of wood larger than 10 ft long and 6 in. in diameter, in a stream channel.

Leaching -- The flushing of minerals or pollutants from the soil or other material by the percolation of applied water.

Leaf area index -- a measure of the total area of leaves, twigs, stems, etc. relative to the area of the canopy in a forest.

Levee -- An embankment constructed to prevent a river from overflowing (flooding).

Limiting factor -- A requirement such as food, cover, or another physical, chemical, or biological factor that is in shortest supply with respect to all resources necessary to sustain life and thus "limits" the size or retards production of a population.

Limnology -- The study of life in lakes, ponds, and streams.

Loading -- The influx of pollutants to a selected water body.

Lotic -- Meaning or regarding things in running water.

Macroinvertebrate -- Invertebrates visible to the naked eye, such as insect larvae and crayfish.

Macrophytes -- Aquatic plants that are large enough to be seen with the naked eye.

Mainstem -- The principal channel of a drainage system into which other smaller streams or rivers flow.

Mass movement -- The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not however, include surface erosion by running water. It may be caused by natural erosional processes, or by natural disturbances (e.g., earthquakes or fire events) or human disturbances (e.g., mining or road construction).

Maximum contaminant level (MCL) -- The highest concentration of a constituent in drinking water permitted under federal and State Safe Drinking Water Act regulations.

Mean annual discharge -- Daily mean discharge averaged over a period of years. Mean annual discharge generally fills a channel to about one-third of its bank-full depth.

Mean velocity -- The average cross-sectional velocity of water in a stream channel. Surface values typically are much higher than bottom velocities. May be approximated in the field by multiplying the surface velocity, as determined with a float, times 0.8.

Meander -- The winding of a stream channel, usually in an erodible alluvial valley. A series of sine-generated curves characterized by curved flow and alternating banks and shoals.

Meander amplitude -- The distance between points of maximum curvature of successive meanders of opposite phase in a direction normal to the general course of the meander belt, measured between center lines of channels.

Meander belt width -- the distance between lines drawn tangential to the extreme limits of fully developed meanders. Not to be confused with meander amplitude.

Meander length -- The lineal distance downvalley between two corresponding points of successive meanders of the same phase.

Mesic -- Moderately wet.

Milligrams per liter (mg/l) -- The weight in milligrams of any substance dissolved in 1 liter of liquid; nearly the same as parts per million by weight.

Mineralization -- The process whereby concentrations of minerals, such as salts, increase in water, often a natural process resulting from water dissolving minerals found in rocks and soils through which it flows.

Moisture stress -- A condition of physiological stress in a plant caused by lack of water.

Morphology -- The form, shape, or structure of a stream or organism.

Multipurpose project -- A project designed to serve more than one purpose. For example, one that provides water for irrigation, recreation, fish and wildlife, and, at the same time, controls floods or generates electric power.

National Pollutant Discharge Elimination System (NPDES) -- A provision of Section 402 of the Federal Clean Water Act of 1972 that established a permitting system for discharges of waste materials to watercourses.

Natural flow -- The flow past a specified point on a natural stream that is unaffected by stream diversion, storage, import, export, return flow, or change in use caused by modifications in land use.

Net water demand (net water use) -- The amount of water needed in a water service area to meet all requirements. It is the sum of evapotranspiration of applied water (ETAW) in an area, the irrecoverable losses from the distribution system, and the outflow leaving the service area; does not include reuse of water within a service area (such as reuse of deep-percolated applied water or use of tailwater).

Non-point source pollution (NPS) -- Pollution that does not originate from a clear or discrete source.

Normalization -- The mathematical manipulation of a variable to allow comparisons with an otherwise different variable.

Normalized demand -- The process of adjusting actual water use in a given year to account for unusual events such as dry weather conditions, government interventions for agriculture, rationing programs, or other irregularities.

Nutrient depletion -- Detrimental changes at a site in the total amount of nutrients and/or their rates of input, uptake, release, movement, transformation, or export.

Off-channel area -- Any relatively calm portion of a stream outside of the main flow.

Off-site enhancement -- The improvement in conditions for fish or wildlife species away from the site or development activities that may have detrimental effects on fish and/or wildlife, as part or total compensation for those effects.

Outfall -- The mouth or outlet of a river, stream, lake, drain or sewer.

Oxbow -- An abandoned meander in a river or stream, caused by cutoff. Used to describe the U-shaped bend in the river or the land within such a bend of a river.

Pathogens -- Any viruses, bacteria, or fungi that cause disease.

Peat -- Partially decomposed plants and other organic material that build up in poorly drained wetland habitats.

Per capita water use -- The water produced by or introduced into the system of a water supplier divided by the total residential population; normally expressed in gallons per capita per day (gpcd).

Perched groundwater -- Groundwater supported by a zone of material of low permeability located above an underlying main body of groundwater with which it is not hydrostatically connected.

Percolation -- the downward movement of water through the soil or alluvium to a groundwater table.

Perennial streams -- Streams that flow continuously.

Perennial yield -- The maximum quantity of water that can be annually withdrawn from a groundwater basin over a long period of time (during which water supply conditions approximate average conditions) without developing an overdraft condition. Sometimes referred to as sustained yield.

Permeability -- The capability of soil or other geologic formations to transmit water.

pH -- The negative logarithm of the molar concentration of the hydrogen ion, or, more simply acidity.

Phytoplankton -- Minute plants, usually algae, that live suspended in bodies of water and that drift about because they cannot move by themselves or because they are too small or too weak to swim effectively against a current.

Point bar -- The convex side of a meander bend that is built up due to sediment deposition.

Point source (PS) -- (1) A stationary or clearly identifiable source of a large individual water or air pollution emission, generally of an industrial nature. (2) Any discernible, confined, or discrete conveyance from which pollutants are or may be discharged, including (but not limited to) pipes, ditches, channels, tunnels, conduits, wells, containers, rolling stock, concentrated animal feeding operations, or vessels. Point source is also legally and more precisely defined in federal regulations. Contrast with non-point source (NPS) pollution.

Point source (PS) pollution -- Pollutants discharged from any identifiable point, including pipes, ditches, channels, sewers, tunnels, and containers of various types. See non-point source (NPS) pollution.

Pollutant -- (1) Something that pollutes, especially a waste material that contaminates air, soil, or water. (2) Any solute or cause of change in physical, chemical, or biological properties that renders water unfit for a given use.

Pollution (of water) -- The alteration of the physical, chemical, or biological properties of water by the introduction of any substance into water that adversely affects any beneficial use of water.

Pond -- A body of water smaller than a lake, often artificially formed.

Pool -- A reach of stream that is characterized by deep, low-velocity water and a smooth surface.

Pool/riffle ratio -- The ratio of surface area or length of pools to the surface area or length of riffles in a given stream reach; frequently expressed as the relative percentage of each category. Used to describe fish habitat rearing quality.

Probability of exceedence -- The probability that a random flood will exceed a specified magnitude in a given period of time.

Pumped storage project -- A hydroelectric power plant and reservoir system in which water released for generating energy during peak load periods is stored and pumped back into the upper reservoir, usually during periods of reduced power demand.

Rapids -- A reach of stream that is characterized by small falls and turbulent, high-velocity water.

Reach -- A section of stream between two defined points.

Rearing habitat -- Areas in rivers or streams where juvenile fish find food and shelter to live and grow.

Rearing pond -- An artificial impoundment in which juvenile fish are raised prior to release into the natural habitat.

Recharge basin -- A surface facility, often a large pond, used to increase the percolation of surface water into a groundwater basin.

Recreational rivers -- Rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shoreline, and that may have undergone some impoundment or diversion in the past.

Recreation-day -- Participation in a recreational activity, such as skiing, biking, hiking, fishing, boating, and/or camping, for any part of a day by one person.

Recycled water -- Urban wastewater that becomes suitable, as a result of treatment, for a specific direct beneficial use. See also water recycling.

Reforestation -- The natural or artificial restocking of an area with forest trees.

Regime theory -- A theory of channel formation that applies to streams that make a part of their boundaries from their transported sediment load and a portion of their transported sediment load from their boundaries. Channels are considered in regime or equilibrium when bank erosion and bank formation are equal.

Reservoir capacity -- The storage capacity available in a reservoir for all purposes, from the streambed to the normal maximum operating level. Includes dead (or inactive) storage, but usually excludes surcharge (water temporarily stored above the elevation of the top of the spillway).

Restoration -- The return of an ecosystem to a close approximation of its condition prior to disturbance.

Return flow -- The portion of withdrawn water not consumed by evapotranspiration or system losses that returns to its source or to another body of water.

Reuse -- The additional use of previously used water.

Riffle -- A reach of stream that is characterized by shallow, fast-moving water broken by the presence of rocks and boulders.

Rift -- A shallow or rocky place in a stream, forming either a ford or a rapid.

Riparian area -- An area of land and vegetation adjacent to a stream that has a direct effect on the stream. This includes woodlands, vegetation, and floodplains.

Riparian habitat -- The aquatic and terrestrial habitat adjacent to streams, lakes, estuaries, or other waterways.

Riparian -- Located on the banks of a stream or other body of water.

Riparian vegetation -- The plants that grow adjacent to a wetland area such as a river, stream, reservoir, pond, spring, marsh, bog, meadow, etc., and that rely upon the hydrology of the associated water body.

Ripple -- (1) A specific undulated bed form found in sand bed streams. (2) Undulations or waves on the surface of flowing water.

Riprap -- Rock or other material with a specific mixture of sizes referred to as a "gradation," used to stabilize streambanks or riverbanks from erosion or to create habitat features in a stream.

River channels -- Large natural or artificial open streams that continuously or periodically contain moving water, or which form a connection between two bodies of water.

River miles -- Generally, miles from the mouth of a river to a specific destination or, for upstream tributaries, from the confluence with the main river to a specific destination.

River reach -- Any defined length of a river.

River stage -- The elevation of the water surface at a specified station above some arbitrary zero datum (level).

Riverine -- Relating to, formed by, or resembling a river including tributaries, streams, brooks, etc.

Riverine habitat -- The aquatic habitat within streams and rivers.

Rock -- A naturally formed mass of minerals.

Rootwad -- The mass of roots associated with a tree adjacent to or in a stream that provides refuge for fish and other aquatic life.

Run (in stream or river) -- A reach of stream characterized by fast-flowing, low-turbulence water.

Runoff -- Water that flows over the ground and reaches a stream as a result of rainfall or snowmelt.

Salinity -- The concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity, or osmotic pressure. Where seawater is known to be the major source of salt, salinity is often used to refer to the concentration of chlorides in the water.

Salinity intrusion -- The movement of salt water into a body of fresh water. It can occur in either surface water or groundwater bodies.

Salt marsh -- Saltwater wetlands that occur along many coasts.

Saltwater barrier -- A physical facility or method of operation designed to prevent the intrusion of salt water into a body of fresh water.

Sand -- Small substrate particles, generally from 0.06 to 2 mm in diameter. Sand is larger than silt and smaller than gravel.

Scenic rivers -- Rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive, and shorelines largely undeveloped, but accessible in places by roads.

Scour -- The erosive action of running water in streams, which excavates and carries away material from the bed and banks. Scour may occur in both earth and solid rock material and can be classed as general, contraction, or local scour.

Seasonal application efficiency (SAE) -- the sum of evapotranspiration of applied water and leaching requirement divided by the total applied water, expressed as a percentage: SAE = (ETAW+LR)/AW.

Secchi depth -- A relatively crude measurement of the turbidity (cloudiness) of surface water. The depth at which a Secchi disc (disk), which is about 10-12 in. in diameter and with a black and white pattern, can no longer be seen.

Secchi disc -- A circular plate, generally about 10-12 in. (25.4-30.5 cm) in diameter, used to measure the transparency or clarity of water by noting the greatest depth at which it can be visually detected. Its primary use is in the study of lakes.

Secondary treatment -- In sewage, the biological process of reducing suspended, colloidal, and dissolved organic matter in effluent from primary treatment systems. Secondary treatment usually involves the use of trickling filters or the activated sludge process.

Sediment -- Soil or mineral material transported by water or wind and deposited in streams or other bodies of water.

Sedimentation -- (1) The combined processes of soil erosion, entrainment, transport, deposition, and consolidation. (2) Deposition of sediment.

Seepage -- The gradual movement of a fluid into, through, or from a porous medium.

Sewage -- The liquid waste from domestic, commercial, and industrial establishments.

Silt -- Substrate particles smaller than sand and larger than clay (3 to 60 μm).

Siltation -- The deposition or accumulation of fine soil particles.

Sinuosity -- The ratio of channel length to direct down-valley distance. Also may be expressed as the ratio of down-valley slope to channel slope.

Slope -- The ratio of the change in elevation over distance.

Slope stability -- The resistance of a natural or artificial slope or other inclined surface to failure by mass movement.

Slough -- A shallow backwater inlet that is commonly exposed at low flow or tide.

Snag -- Any standing dead, partially dead, or defective (cull) tree at least 10 in. in diameter at breast height and at least 6 ft tall. Snags are important riparian habitat features.

Soft water -- Water that contains low concentrations of multivalent cations, such as calcium and magnesium. This type of water does not precipitate soaps and detergents.

Soluble minerals -- Naturally occurring substances capable of being dissolved.

Spawning -- The depositing and fertilizing of eggs (or roe) by fish and other aquatic life.

Spillway -- A channel for reservoir overflow.

Stable channel -- A stream channel with the right balance of slope, planform, and cross section to transport both the water and sediment load without net long-term bed or bank sediment deposition or erosion throughout the stream segment.

Stone -- Rock or rock fragments used for construction.

Stream -- A general term for a body of water flowing by gravity; natural watercourse containing water at least part of the year. In hydrology, the term is generally applied to the water flowing in a natural narrow channel as distinct from a canal.

Stream channel -- A long narrow depression shaped by the concentrated flow of a stream and covered continuously or periodically by water.

Stream gradient -- A general slope or rate of change in vertical elevation per unit of horizontal distance of the bed, water surface, or energy grade of a stream.

Stream morphology -- The form and structure of streams.

Stream order -- A hydrologic system of stream classification. Each small unbranched tributary is a first-order stream. Two first-order streams join to make a second-order stream. A third-order stream has only first- and second-order tributaries, and so forth.

Stream reach -- An individual segment of stream that has beginning and ending points defined by identifiable features such as where a tributary confluence changes the channel character or order.

Streambank erosion -- The removal of soil from streambanks by flowing water.

Streambank stabilization -- The lining of streambanks with riprap, matting, etc., or other measures intended to control erosion.

Streambed -- (1) The unvegetated portion of a channel boundary below the baseflow level. (2) The channel through which a natural stream of water runs or used to run, as a dry streambed.

Streamflow -- The rate at which water passes a given point in a stream or river, usually expressed in cubic feet per second (cfs).

Substrate -- (1) The composition of a streambed, including either mineral or organic materials. (2) Material that forms an attachment medium for organisms.

Subsurface drainage -- Rainfall that is not evapotranspirated or does not become surface runoff.

Superfund list -- A list of the hazardous waste disposal sites most in need of cleanup. The list is updated annually by the U.S. Environmental Protection Agency (EPA) based primarily on how a site scores using the Hazard Ranking System. Also referred to as the National Priorities List (NPL).

Supply augmentation -- Alternative water management programs-such as conjunctive use, water banking, or water project facility expansion-that increase supply.

Surface erosion -- The detachment and transport of soil particles by wind, water, or gravity. Or a group of processes whereby soil materials are removed by running water, waves and currents, moving ice, or wind.

Surface supply -- Water supply from streams, lakes, and reservoirs.

Surface water -- All waters whose surface is naturally exposed to the atmosphere, for example, rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc., and all springs, wells, or other collectors directly influenced by surface water.

Surplus water -- Developed water supplies in excess of contract entitlement or apportioned water.

Suspended sediment -- Sediment suspended in a fluid by the upward components of turbulent currents, moving ice, or wind.

Suspended sediment load -- That portion of a stream's total sediment load that is transported within the body of water and has very little contact with the streambed.

Tailwater -- (1) The area immediately downstream of a spillway. (2) Applied irrigation water that runs off the end of a field.

Tertiary treatment -- In sewage, the additional treatment of effluent beyond that of secondary treatment to obtain a very high quality of effluent for reuse.

Thalweg -- (1) The lowest thread along the axial part of a valley or stream channel. (2) A subsurface, groundwater stream percolating beneath and in the general direction of a surface stream course or valley. (3) The middle, chief, or deepest part of a navigable channel or waterway.

Tidal flats -- Saltwater wetlands that are characterized by mud or sand and daily tidal fluctuations.

Torrent -- (1) A turbulent, swift-flowing stream. (2) A heavy downpour; a deluge.

Total dissolved solids -- A quantitative measure of the residual minerals dissolved in water that remain after evaporation of a solution. Usually expressed in milligrams per liter. Abbreviation: TDS. See also salinity.

Tractive Force --The drag on a streambed or bank caused by passing water, which tends to pull soil particles along with the streamflow.

Transpiration -- An essential physiological process in which plant tissues give off water vapor to the atmosphere.

Tributary -- A stream that flows into another stream, river, or lake.

Turbidity -- A measure of the content of suspended matter that interferes with the passage of light through the water or in which visual depth is restricted. Suspended sediments are only one component of turbidity.

Urban runoff -- Storm water from city streets and gutters that usually carries a great deal of litter and organic and bacterial wastes into the sewer systems and receiving waters.

Velocity -- In this concept, the speed of water flowing in a watercourse, such as a river.

Viscosity -- A measure of the resistance of a fluid to flow. For liquids, viscosity increases with decreasing temperature.

Visitor-day -- See recreation-day.

Wash -- (1) To carry, erode, remove, or destroy by the action of moving water. To be carried away, removed, or drawn by the action of water. Removal or erosion of soil by the action of moving water. (2) A deposit of recently eroded debris. (3) Low or marshy ground washed by tidal waters. A stretch of shallow water. (4) (Western United States) The dry bed of a stream, particularly a watercourse associated with an alluvial fan, stream, or river channel. Washes are often associated with arid environments and are characterized by large, high-energy discharges with high bed-material load transport. Washes are often intermittent and their beds sparsely vegetated. (5) Turbulence in air or water caused by the motion or action of an oar, propeller, jet, or airfoil.

Washout -- (1) Erosion of a relatively soft surface, such as a roadbed, by a sudden gush of water, as from a downpour or floods. (2) A channel produced by such erosion.

Wastewater -- The used water, liquid waste, or drainage from a community, industry, or institution.

Water conservation -- Reduction in applied water due to more efficient water use such as implementation of Urban Best Management Practices or Agricultural Efficient Water Management Practices. The extent to which these actions actually create a savings in water supply depends on how they affect net water use and depletion.

Water demand schedule -- A time distribution of the demand for prescribed quantities of water for specified purposes. It is usually a monthly tabulation of the total quantity of water that a particular water user intends to use during a specified year.

Water pollution -- Generally, the presence in water of enough harmful or objectionable material to damage the water's quality.

Water quality -- A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Water reclamation -- Includes water recycling, seawater desalting, groundwater reclamation, and desalting agricultural brackish water.

Water recycling -- The treatment of urban wastewater to a level rendering it suitable for a specific, direct, beneficial use.

Water right -- A legally protected right to take possession of water occurring in a natural waterway and to divert that water for beneficial use.

Water table -- See groundwater table.

Water year -- A continuous 12-month period for which hydrologic records are compiled and summarized. In California, it begins on October 1 and ends September 30 of the following year.

Water yield -- The quantity of water derived from a unit area of watershed.

Waterfall -- A sudden, nearly vertical drop in a stream, as it flows over rock.

Watershed -- An area of land whose total surface drainage flows to a single point in a stream.

Watershed management -- The analysis, protection, development, operation, or maintenance of the land, vegetation, and water resources of a drainage basin for the conservation of all its resources for the benefit of its residents.

Watershed project -- A comprehensive program of structural and nonstructural measures to preserve or restore a watershed to good hydrologic condition. These measures may include detention reservoirs, dikes, channels, contour trenches, terraces, furrows, gully plugs, revegetation, and possibly other practices to reduce flood peaks and sediment production.

Watershed restoration -- Improving current conditions of watersheds to restore degraded habitat and provide long-term protection to aquatic and riparian resources.

Weir -- A structure to control water levels in a stream. Depending upon the configuration, weirs can provide a specific "rating" for discharge as a function of the upstream water level.

Weir (fish trap) -- Usually a barrier constructed to catch upstream migrating adult fish.

Wild rivers -- Rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.

Windfall -- Trees or parts of trees felled by high winds.

Wildlife tree -- A live tree retained to become future snag habitat.

Windthrow -- A tree or trees uprooted or felled by the wind.

Woody debris -- Referring to wood in streams.

ACKNOWLEDGEMENTS

Research presented in this technical note was developed under the U.S. Army Corps of Engineers Ecosystem Management and Restoration Research Program. Technical reviews were provided by Dr. Paul R. Schroeder, and Messrs. E.A. (Tony) Dardeau, Jr., and Jerry L. Miller, all of the Environmental Laboratory.

POINTS OF CONTACT

For additional information, contact the author, Dr. Craig Fischenich, (601-634-3449, *fischec@wes.army.mil*), or the manager of the Ecosystem Management and Restoration Research Program, Dr. Russell F. Theriot (601-634-2733, *therior@wes.army.mil*). This technical note should be cited as follows:

> Fischenich, C. (1999). "Glossary of stream restoration terms," *EMRRP Technical Notes Collection* (TN EMRRP-SR-1), U.S. Army Engineer Research and Development Center, Vicksburg, MS. *www.wes.army.mil/el/emrrp*