Updated Glossary for Chestnut and Rondout

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Adsorb - To take up by absorption.

Adsorption - The accumulation of gases, liquids, or solutes on the surface of a solid or liquid.

Aggradation - The process by which streams are raised in elevation by the deposition of material eroded and transported from other areas. The opposite of degradation.

Alluvium - Loose unconsolidated gravel, sand and finer sediments deposited by flowing water.

Alluvial Channel – A channel developed in sediment transported and deposited by the stream.

Alluvial Fan – A fan-shaped deposit of alluvium found where a stream flows out of a mountain stream onto flat terrain at the base of a mountain. The sudden decrease in stream velocity causes deposition.

Aquatic Habitat – Physical attributes of the stream channel and riparian area that are important to the health of all or some life stages of fish, aquatic insects and other stream organisms. Attributes include water quality (temperature, pH), riparian vegetation characteristics (shade, cover, density, species), stream bed sediment characteristics, and pool/riffle spacing.

Amoring – Natural amoring is the formation of a resistant layer of relatively large particles resulting from removal of finer particles by erosion. Also, this term is used for placement of large rock (i.e. rip-rap) to protect a stream bank from erosion.

Artesian Spring – An artesian spring is created when groundwater in a confined aquifer is pushed out through faults or cracks in the overlying impervious layer on to the surface under pressure. Water from an artesian well or spring is usually cold and free of organic contaminants, making it desirable for drinking.

Avulsion – A rapid change in channel direction when a stream suddenly breaks through its banks typically bisects an overextended meander arc (oxbow cutoff).

Backeddy Scour - Erosive action of water in streams by excavating and transporting bed and bank materials downstream caused by swirling water and reverse current created when water flows past an obstacle.

Backwater – An area in or along a stream where water has been held back by an obstruction, constriction or dam. Condition in which the surface water movement is slowed by downstream flow impediments.

Backwater Effect – The effect that a dam or other obstruction has in raising the surface of the water upstream from it.

Bank – The rising ground bordering a lake or river, or forming the edge of a cut or hollow.

Bank Erodibility Hazard Index (BEHI) – An index for predicting erosion potential on selected stream banks, usually associated with a monitoring cross-section for measurement of actual erosion rates over time (Rosen, 1996).

Bank Erosion Monitoring Site (BEMS) – A location where metal rebar rods have been used to permanently locate an actively eroding stream bank. At this site, detailed data has been gathered to document the stream condition. The site is permanently marked to enable future measurements that, when compared to the existing condition, provide information about the stream's change. Measuring change over time is considered 'monitoring,' and this information provides early warning to stream managers about important but perhaps visually imperceptible changes in the stream.

Bank Height Ratio – The ratio of height of bank to bankfull height, used in stream assessment to determine whether a stream is stable-bank height and bankfull height will be the same in a stable stream.

Bankfull Flow or **Bankfull Discharge** – Typically recurs every 1-3 years. A field estimate of the channel-forming flow or the flow that over time maintains the form of the channel by transporting the majority of the sediment load. This discharge occurs when water just begins to leave the channel and spread into the floodplain (FIWG, 1998).

Bankfull Stage – The elevation at which flooding occurs on a floodplain.

Bankfull Wetted Area – Refers to the area of the wetted cross-section measured at bankfull flow.

Base Flow – The sustained low flow of a stream, usually resulting from groundwater inflow to the stream channel rather than surface water runoff.

Basin, drainage – an area in which the margins dip toward a common center or depression, and toward which surface and subsurface channels drain. The common depression may allow free drainage of water from the basin as in a stream, or may be the end point of drainage as in a lake or pond.

Bed Material – The composite mixture of substrate of which a streambed is composed.

Bed Roughness – A measure of the irregularity of the streambed as it contributes to flow resistance, commonly expressed as a Mannings "n" value.

Bedload – The amount and size of stream bed material or substrate that is mobilized by tractive and erosive forces measured or calculated at a specific discharge and are transported by jumping, rolling or sliding on the bed layer of the stream. Contrast to Suspended Load.

Bedrock – The solid rock or geological surface underlying unconsolidated surface materials (i.e. water, soil, alluvium).

Berm – A mound of earth or other materials, usually linear, constructed along streams, roads, embankments or other areas. Berms are often constructed to protect land from flooding or eroding, or to control water drainage (as along a road-side ditch). Some berms are constructed as a byproduct of a stream management practice whereby stream bed sediment is pushed out of the channel and mounded on (and along the length of) the stream bank—these berms may or may not be constructed for flood control purposes; some are simply piles of excess material. These berms often interfere with other stream processes such as floodplain function, and can exacerbate flood-related erosion or steam instability.

Bioengineering – The use of live vegetation, either alone or in combination with harder materials such as rock or (dead) wood, to stabilize soils associated with stream banks or hillslopes. Roots stabilize the soil, while stems, branches and foliage slow high velocity water, reducing erosion and encourage deposition of fine sediments.

Boulder – In the context of stream assessment surveys, a boulder is stream sediment that measures between 256 mm and 4096 mm (approximately 10 inches to 13.3 feet).

Bridge Scour – Excessive erosion of the stream banks and bottom below a bridge as a result of the concentration and direction of stream flow.

Bridge Scour Depth – The calculated depth at which the streambed and substrate will mobilize and be transported during channel forming flows. Used to determine the safe depth at which to place footings and stable keyways in streambeds that will not erode or be undermined.

Buffer Zone/Buffer Strip – An area of permanent vegetation between waterways and adjoining land uses designed to intercept and filter out pollution before it reaches the surface water resources. Typically, activities such as agriculture or construction are restricted in these areas to protect water quality.

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

Central Bar – A bar found in the mid-channel zone, not extending completely across the channel.

Channel Cross-section – The physical measurements (width and depth) across the channel and floodplain.

Channel Forming Flow – See bankfull flow.

Channel Migration – Lateral or longitudinal (down-valley) migration of the stream channel within the valley by the process of erosion and deposition.

Channel Pattern – The meander geometry of the channel within its active floodplain, readily visible from a top-down view of the channel.

Channel Profile or **Longitudinal Profile** – The plot of the stream bottom elevation (and often the water surface, bankfull and valley elevations) longitudinally along the stream. The change in bottom elevation over distance is called Challen Gradient.

Channel Scour – The erosive action of water and sediment that removes and carries away bed and bank material.

Channel Slope or **Channel Gradient** – The inclination of the channel bottom, measured as the elevation drop per unit length of channel.

Channelization – The modification of a natural river channel; may include deepening, widening, straightening, or altering of the slope, to accelerate conveyance or increase drainage of wet areas. Often referred to as hydromodification.

Clasts - A rock fragment or grain resulting from the breakdown of larger rocks.

Cobble – In the context of stream assessment surveys, cobble material is sediment that measures between 64 mm and 256 mm (about 2.5 inches to 10 inches). Cobbles are smaller than boulders but larger than gravels.

Colluvial Features – Landforms that are formed from sediments moving down slope under the action of gravity. Sediments are typically loosely deposited, angular and jagged.

Confluence – The meeting or junction of two or more streams, each with its own watershed.

Convergence – The downstream end of a split channel, where the stream merges back to one channel; the two channels having the same watershed.

Conveyance – Continuous transport of water.

Corridor – The area of land along a stream between the valley walls including floodplains, riparian areas, and terraces.

Critical Shear Stress – The minimum amount of shear stress required to initiate substrate particle motion along the stream bed or banks.

Cross-Section (see also monitoring cross-section) – In the context of stream assessment surveys, a cross-section is a location on a stream channel where morphology is measured perpendicular to the stream flow direction (as if taking a slice through the stream), including width, depth, height of banks and/or terraces, and area of flow.

Culvert – A closed conduit for the free passage of surface drainage water. Culverts are typically used to control water running along and under the road, and to provide a crossing point for water

from road side drainage ditches to the stream, as well as for routing tributary streams under the road to join the mainstem. Culverts are also used by landowners to route roadside drainage ditch water under their driveways to reduce or prevent erosion.

Degradation – The process by which a stream reach or channel becomes deeper by eroding downward into its bed over time, also called "downcutting," either by periodic episodes of bed scouring without filling, or by longer term transport of sediment out of a reach without replacement. A degrading stream will typically show a bank height ratio greater than 1.0. It is the opposite of aggradation.

Demonstration Stream Restoration Project or **Demonstration Project** – A stream (stability) restoration project that is designed and located to maximize opportunities for monitoring of project success, public and agency education about different stream restoration techniques, and interagency partnerships funding and cooperation.

Deposition – Accumulation of sediment on the channel bed or banks.

Destabilized (see also instability, unstable) – Describing a section of stream that has been made unstable, by natural or human activity.

Differential Seepage - Relates to the movement of water through different sediment compositions, whereas water percolates swiftly through sand layers and seeps much slower through finer sediments.

Discharge or **Stream Flow** – The amount of water flowing in a stream, measured as a volume per unit time, usually cubic feet per second (cfs).

Discontinuous Floodplains (see also Floodplain) – A series of small floodplains, formed as a series of small benches along stream banks. These floodplain features, typically seen in steeper mountain streams, are not connected sequentially following the valley floor, but still provide the critical floodplain functions of reducing water velocity and enhancing sediment deposition and infiltration (water sinking into the ground rather than running straight into the stream).

Divergence – Location where a secondary channel splits off from the main channel; the two channels having the same watershed.

Dominant Channel Materials – A selected particle size index value, the D50, representing the most prevalent of one of six channel material types or size categories, as determined from a channel material size distribution analysis.

Dominant Discharge – The volume of water that is responsible for transporting the majority of the sediment and creating or maintaining the size and shape of the channel. Also known as the channel forming flow.

Downcutting – see degradation.

Drainage Basin – land area where precipitation runs off into streams, rivers, lakes and reservoirs. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large drainage basins, like the area that drains into the Mississippi River contain thousands of smaller drainage basins. Also called a watershed.

Drainage Area – The drainage area of a stream at a specific location is that area, measured in a horizontal plane, which is enclosed by a drainage divide.

Dry Ravel – The downhill movement of individual soil grains, aggregates, and coarse fragments by gravity.

Eddy – A circular current or a current of water running contrary to the main current, usually resulting from an obstruction.

Effective Discharge – The discharge that transports the largest fraction of the annual sediment load. The effective discharge results in the average morphologic characteristics of a channel and at which channel maintenance is the most effective.

Embankment – a linear structure, usually of earth or gravel, constructed so as to extend above the natural ground surface. Similar to a berm, but usually associated with road fill areas, and extending up the hillside from the road, or from the stream up to the road surface.

Embeddedness – The degree to which fine sediments surround coarse substrates on the surface of a streambed is referred to as embeddedness. Generally used to assess fish spawning and macroinvertebrate habitat.

Entrainment – One of three distinct processes involved in erosion. The process of lifting or mobilization of a sediment particle by stream flow.

Entrenchment – A vertical description of the stream that has eroded downward or was constructed such that it no longer has access to its original floodplain during moderate flow events. Flood flows in an entrenched stream are contained within the stream banks or adjacent terraces. Flood flows in a stream that is not entrenched are spread out over a floodplain.

Entrenchment Ratio – The ratio between the flood-prone width and the bankfull width. This ratio is used as part of Rosgen stream classification system to determine stream type. For example, if this number is less than 1.4, the stream is said to be highly entrenched, if between 1.4 and 2.2 it is mildly entrenched, and greater than 2.2 it is not entrenched. Entrenchment ratio is used with other stream shape data to determine stream type, and define baseline data for future monitoring (Rosgen, 1996).

Ephemeral – Referring to a stream that runs only in direct response to rain or snow events and whose channel is above the water table.

Equilibrium (see also stable) – The degree to which a stream has achieved a balance in transporting its water and sediment loads over time without aggrading (building up), degrading (cutting down), or migrating laterally (eroding its banks and changing course).

Erosion – The wearing away of the land surface by detachment and movement of soil and rock fragments during a flood or storm or over a period of years through the action of water, wind, or other geological process. In streams, erosion is a natural process, but can be accelerated by poor stream management practices.

Erosion Potential – The amount of erosion that may be expected under given climatic, topographic, soil, and cultural conditions.

Eutrophication – A process in which the addition of nutrients (primarily nitrogen and phosphorus) to water bodies stimulates algal growth. This is a natural process, but it can be greatly accelerated by human activities.

Evapotranspiration – Is the total volume of water that is lost in the combined processes of evaporation from earth's surfaces and transpiration from plant leaves to the atmosphere.

Fascines – A bioengineering method using bundles of small branches of willow or other riparian tree/shrub species, tied together and laid into shallow trenches along a stream to stabilize and revegetate stream bank areas.

Fill – Soil or other material placed as part of a construction activity. Often used to raise the ground level of a floodplain or wetlands to make it suitable for construction or other human activities.

Flashy Stream – A stream or river that is characterized by dramatic fluctuations in flow, in which sharply higher flows in wet weather can be followed by rapid return to pre-rain conditions shortly after the end of the precipitation. The hydrograph of a flashy stream would depict sharp vertical jumps and equally steep vertical declines. Water within a flashy stream's watershed will make its way quickly from the land into the stream and be flushed through the system rapidly. On the other hand, in watersheds supplying a stream that is not flashy, the transport of water will be slowed through absorption into and seepage through soils, containment on the surface in lakes, and retention in the soil as moisture.

Flood – The temporary inundation of normally dry land areas resulting from the overflowing of the natural or artificial confines of the stream channel.

Flood Attenuation – To lessen the amount, force or severity of high flows.

Flood Peak – The highest value of stage or discharge achieved by the flood. Flood crest is equivalent to peak stage.

Flood Stage – The gage height at which the stream begins to overflow its banks.

Floodplain – The portion of a river valley, adjacent to river channel, which is covered with water when river overflows its banks at flood stage. The floodplain usually consists of sediment deposited b the stream, in addition to riparian vegetation. The floodplain acts to reduce the velocity of floodwaters, increase infiltration (water sinking into the ground rather than running straight to the stream—this reduces the height of the flood for downstream areas), reduce stream bank erosion and encourage deposition of sediment. Vegetation on floodplains greatly improves their function.

Floodplain Bench – A small level area that forms at the effective discharge stage within an over-widened, entrenched channel.

Floodplain Connection – The stream's ability to access the land area adjacent to its active channel during higher flows in order for the stream system to function properly and dissipate energy or velocity.

Floodplain Drainage – The use of culverts under bridge approaches to allow overbank flows to pass from the upstream floodplain to the downstream floodplain.

Flood-Prone Area – A term coined by Rosgen (1996) to describe the area flooded at flows twice the maximum depth of flow at the effective discharge.

Floodway – The stream channel and those parts of the floodplain adjoining the channel that are required to carry and discharge the floodwaters or flood flow of the stream.

Fluvial – 1. Of or pertaining to a river or rivers. 2. Existing, growing, or living in or about a stream. 3. Produced by the action of a stream or river, as in fluvial plain.

Fluvial Geomorphology – The study of the formation of landforms by the action of flowing water.

Function – The physical, chemical, biological processes, services and values that occur in an ecosystem (e.g. floodplain, stream, wetland) as a result of their structure and composition.

Gabions – Large wire-mesh baskets filled with rock material used to harden or stabilize road embankments and sometimes stream banks.

Gaging Station (Gage) – A particular point on a stream of known cross-section where systemic observations of water depth or discharge are obtained.

Geographic Information System (GIS) – Desktop software with graphical user interface that allows loading and querying analysis and presentation of spatial and tabular data that can be displayed as maps, tables and charts.

Geological Control – A local rock formation or clay layer that limits the vertical or lateral movement of a stream at a particular point.

Geomorphic – Pertaining to the form of the earth or of its surface features.

Geomorphology – The branch of geology that studies the nature and origin of land forms. The natural forces that shape landforms include water, ice, wind, gravity, and time.

Geotechnical Failure – Stream bank failure collapse or slippage of a large mass of bank material into the channel caused by stream bank soil and rock properties, including seepage and piping.

Glacial Outwash - Well-sorted sand, or sand and gravel deposited by melt-water from a glacier.

Glide – Shallow, low gradient stream sections with slow current and fine substrate.

Global Positioning System (GPS) – A satellite based positioning system operated by the U.S. Department of Defense (DOD). When fully deployed, GPS will provide all-weather, worldwide, 24-hour position and time information. Information obtained from GPS was added to GIS to produce maps.

Gradient – The rate of change in (vertical) elevation per unit of horizontal distance.

Grading – Term used to denote the variability and distribution of sediments and bed materials. A well-graded material will be sorted by size. A poorly-graded material will consist of a single sediment size or all size materials uniformly mixed.

Gravel – Substrate particles that are smaller than cobbles and larger than sands. They generally measure between 2 mm and 64 mm (approx. 0.08 inches to 2.5 inches).

Hardening – Any structural revetment that fixes in place an eroding stream bank, embankment or hillside by using hard materials, such as rock, sheet piling or concrete, that does not allow for revegetation or enhancement of aquatic habitat. Rip-rap and stacked rock walls are typically considered to be hardening measures, though some revegetation of these areas is possible.

Hydraulic – Relating to the flow or conveyance of water through a channel; movement or action caused by water.

Head cut – An abrupt vertical drop in the bed of a stream channel that is an active bed erosion feature. Head cuts often exhibit rapid upstream movement during periods of high erosion rates.

Headcutting – The process by which the stream is actively eroding the streambed downward (degrading, incising, downcutting) to a new base level. Often suggests adjustment to changing stream hydrology or sediment load.

Headwater – The upstream area in a stream system or area where streams originate.

Hydraulic Erosion - The action that consists of: the destruction of bedrock on sides and bottoms of rivers, the removal of sediment along channel banks, and the breaking down of rock fragments into smaller pieces.

Hydraulic Jump – An abrupt, transition from low depth and high velocity flat water to high depth and low velocity turbulent waters. Commonly occurs at the downstream end of well defined pools. Important for adding oxygen into the stream.

Hydraulic Radius – Ratio of the cross-sectional area, measured perpendicular to stream flow, to the length of the wetted perimeter of the stream channel. A measure of the efficiency of a river in conveying water.

Hydrograph – A graph showing flow, stage, velocity or discharge with respect to time, for a given point in the stream.

Hydrologic Cycle – The natural pathway water follows as it changes between liquid, soil, and gaseous states. The cyclic transfer of water vapor from the Earth's surface via evapotranspiration into the atmosphere, from the atmosphere via precipitation back to the earth, and through runoff into stream, rivers, lakes, and ultimately into the oceans.

Hyrdologic Regmine – The sum total of water that occurs in an area on average during a given period.

Hydrology – The study of properties, movement and behavior of water on the land surface and underground.

Hydro-Morphological Units (MUs) – The physical character of a stream shaped by the movement of water through the channel (riffle, rapid, cascade, run, fast, run, pool, plunge pool, glide, side arm, ruffle, backwater).

Hydrostatic Pressure – Force caused by water under pressure.

Imbricate – Referring to the arrangement of disc-shaped cobble sediments which stack up at an angle, forming an overlapping pattern like fish scales or roof shingles creating a more stable, locked-up stream bed.

Impairment – Impact that damages the biological integrity of a water body such that attainment of the designed use is prevented.

Impervious Surface – Surfaces, such as roads, parking lots, and roofs, whose properties prevent the infiltration of water and increase the amount of stormwater runoff in a watershed.

Impoundment – A body of water, such as a pool, lake or reservoir, formed by confining a stream or other surface flow.

Inboard – Referring to a roadside ditch that is between the road and adjacent hillside, on the higher or uphill side of the road.

Incised Channel or **Incision** – A stream that, through degradation, has cut its channel into the bed of the stream valley. See entrenchment and degradation.

Infiltration – The downward movement of water through soil or porous rock.

Instability (also see Unstable) – An imbalance in the capacity of the stream to transport sediment and maintain its channel shape, pattern and profile.

Intermittent Stream – A stream that only flows for part of the year and is marked on topographic maps with a line of blue dashes and dots.

Invasive Plants – Species that aggressively compete with and replace native species in natural habitats.

Invert – The lowest internal point of any cross section in a culvert, or inside bottom of a culvert.

Japanese Knotweed (*Polygonum cuspidatum*) (see also invasive plants) – An invasive plant, not native to the Catskills region, that colonizes disturbed or wet areas, especially stream banks, road-side ditches and floodplains. This plant out-competes natives and other beneficial plants, and may contribute to unstable stream conditions.

Kame - an irregularly shaped hill or ridge composed of rounded sand, gravel and sediment deposits that flowed downward through shafts in the glacial ice.

Kame Terrace – A remnant geologic feature composed of very well sorted sand and gravel deposited by meltwater in a former glacial lake. Generally forms a flat-topped mound or hill.

Keyed-In – Refers to burying the ends of a rock structure into the bank and bed to prevent water from scouring around it.

Knick-Point – A usually less erosive material, such as bedrock or a fallen log that creates an abrupt change in the longitudinal profile of a stream and controls the streambed elevation, slowing downstream erosion of the stream channel and the upstream migration of a headcut.

Lacustine Sediment - Sediments that are deposited in a lake. In the Catskill Region the solid clay exposures are examples of fine sediments transported and deposited in lakes.

Large Woody Debris – Any woody material, such as from trees or shrubs, that washes into a stream channel or is deposited on a floodplain area. This debris provides important aquatic habitat functions, including nutrient sources and micro-habitats for aquatic insects and fish. Large woody debris is especially influential to stream morphology in small streams, though may be detrimental in the vicinity of structures and infrastructures.

Lateral Migration – The movement of a channel across its floodplain by bank erosion. The outside banks of meanders move laterally across the valley floor and down the valley.

Laterally Unstable Channel – A channel which prone to short-term, side-to-side migration across a floodplain; symptomatic of undeveloped or depleted riparian vegetation.

Leaching – The process by which chemical or mineral materials are removed from a physical matrix (such as soil or mixed sediment materials) by running water through and creating a solution of those chemicals.

Left Bank – The left stream bank as looking or navigating downstream. This is a standard used in stream assessment surveys**.**

Live Stake – Live branch cuttings that are tamped or inserted into the earth to take root and produce vegetative growth.

Lodgement Till - A flat layer of glacially derived, un-sorted, densely packed angular particles that are smeared onto the earth's surface beneath an overriding glacier.

Macroinvertebrates – Stream-dwelling arthropods (insects, crustaceans) without a backbone that can be viewed without magnification. Examples include crayfish, leeches, water beetles and larva of dragonflies, caddisflies, and mayflies. Macroinvertebrates are an important food source for many species of fish.

Mainstem – The common outlet or stream, into which all of the tributaries within a watershed feed.

Manning's "n" – Manning's n-value is a coefficient used to describe boundary roughness of a channel or pipe. "n" incorporates the roughness of the bed material, vegetation, bends, junctions and other irregularities.

Mass Wasting/Failure – Large slope failures associated with downcutting stream channels and undermined support of steep slopes. Contrasts to Rotational Failure (global) or Bank Erosion.

Meander – Bend or Curve in a stream channel.

Meander Belt – The area between lines drawn tangential to the extreme limits of fully developed meanders. The meander belt width is the distance between the tangential lines marking extremes of successive meanders, measured, normal to the downvalley progression of the stream. Meander length is the distance between corresponding points in two successive meanders, or twice the distance between crossover or inflection points.

Meander Width Ratio – The quantitative expression of confinement (lateral containment of rivers) and is determined by the ratio of the belt width/bankfull width.

Mechanical Erosion - The action which loosens and wears away materials and transports them to a new location. Most common cause of mechanical erosion is by running water.

Melt-Out Till - Deposited by the direct release of debris by melting of ice. These are generally associated with stagnant ice.

Monitoring – The practice of taking similar measurements at the same site, or under the same conditions, to document changes over time.

Mounumented – Refers to a location, usually a cross-section that is marked with a permanent or semi-permanent marker or "monument" to enable future monitoring at the same place.

Moraine – A mound or ridge of sediment deposited b a glacier; **lateral moraine** – deposited to the side of a glacier; **terminal moraine** – deposited to the front of a glacier; **ground moraine** – deposited on the land surface.

Morphology – The form (dimension, pattern, and profile) and structure of the stream channel.

Multiflora Rose (*Rosa multifora*), (also see invasive plants) – An invasive plant, not native to the Catskills region, that colonizes disturbed or wet areas such as fields, forest edges, stream banks, and roadsides. This plant spreads quickly and forms impenetrable thickets that exclude native species. It impedes succession and out-competes other plants for soil nutrients.

Native Vegetation – Vegetation indigenous to an area and adapted to local conditions.

Non-Alluvial - Sediment which is deposited by means other than water or ice, such as rocks moving down slope under gravity.

Non-Point Source – Extensive or disperse source of pollution. Examples include agriculture, lawns, parking lots, roads, and septic systems.

Nutrient – The term "nutrient" refers broadly to those chemical elements essential to life on earth, but more specifically to nitrogen and phosphorus in a water pollution context. In a water quality sense, nutrients really deal with those elements that are necessary for plant growth, but are likely to be **limiting**—that is, where used up or absent, plant growth stops.

Outwash Plain - A sandy plain formed when glacial meltwater streams in advance of glaciers spread out over a wide, flat area.

Oxbow – A cut off and abandoned meander of a river.

Particle Size Distribution – See Substrate Analysis.

Pathogen – Disease-causing agent, especially microorganisms such as bacteria, protozoa, and viruses.

Peak Flow – The highest discharge achieved during a storm event.

Pebble Count – Method for determination of the size distribution of channel bed materials.

Perched – To stand, sit, or rest on an elevated place or position. If a tributary is perched at its confluence with the mainstem, it may suggest incisement, or a drop in the stream bed elevation of the mainstem.

Perennial Stream – A stream that normally contains flowing water at all times regardless of precipitation patterns.

Pinch Point – A narrowing can be caused by valley form or infrastructure encroachment.

Piping – Is caused by groundwater seeping out of the bank face. Grains are detached and entrained by the seepage flow (also termed sapping) and may be transported away from the bank face by surface run-off generated by the seepage if there is sufficient volume of flow. Piping is especially likely in high banks or banks backed by the valley side, a terrace, or some other high ground. In these locations the highest head of water can cause large seepage pressures to occur. Evidence includes: pronounced seep lines, especially along sand layers or lenses in the bank; pope shaped cavities in the bank; notches in the bank associated with seepage zones and layers; run-out deposits of eroded material on the lower bank. Note that the effects of piping erosion can easily be mistaken for those of wave and vessel force erosion (Hagerty, 1991 a,b).

Planform – Horizontal stream pattern, including sinuosity, meander radius, and meander width ratio, as seen in plan view (after aerial photo).

Platy - Relates to the shape of most sedimentary rocks found in Catskill Streams, which form flat disk shaped rocks.

Point Bar – A depositional feature with coarse material—usually sand or gravel—caused by a decrease in sediment transport capacity usually located on the inside of a meander bend.

Point Source – Source of pollution from a single, well-defined outlet. Examples include wastewater treatment outfalls, combine sewer overflows, and industrial discharge pipes.

Pool – Deep, flat, areas in the stream created by scour, with slow currents at low flow. Usually pools occur on the outside of a meander bend between two riffles or the bottom of a step. Pools generally contain fine-grain bed materials, such as sand and silt. Natural streams often consist of a succession of pools and riffles.

Pro-Glacial Lakes - a lake formed by the damming action of a moraine or ice dam during the retreat of a melting glacier. Generally responsible for the solid clay deposits common in the Catskill's Valleys.

Quarried - The removal of relatively large fragments of bedrock by different mechanical or natural methods.

Radius of Curvature – The radius of curvature (r) is the radius of the circle defining the curvature of an individual bend in a river measured between adjacent inflection points. The radius of curvature to width ratio (r/w) is a very useful parameter that is often used in the description and comparison of meander behavior, and in particular, bank erosion rates.

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

Rating Curve – See stage-discharge relationship.

Reach – A section of a stream with consistent or distinctive morphological characteristics.

Recessional Moraine - A deposit of unsorted material (clay-boulder sized) that forms in a ridge like shape at the margin of a glacier during a period of temporary stability in its general recession.

Reference Reach/Site – A stable portion of a stream that is used to model restoration on an unstable portion of stream. Stream morphology in the reference reach is documented in detail, and that morphology is used as a blueprint for design of a stream stability restoration project.

Revetment – A facing stone, rootwads, cut trees, or other durable material used to protect a stream bank or hillside.

Reworked Outwash - Well-sorted, moderately well stratified sand and pebble gravel reworked from coarser outwash gravels by perennial streams.

Riffle - A reach of stream that is characterized by shallow, fast-moving water broken by the presence of rocks. Riffles typically occur in areas of increased channel gradient where hydraulic conditions sort transported sediments. Most invertebrates will be found in riffles.

Right Bank – The right stream bank as looking or navigating downstream. This is a standard used in stream assessment surveys.

Riparian – The area of land along stream channels, within the valley walls, where vegetation and other landuses directly influence stream processes, including flooding behavior, erosion, aquatic habitat condition, and certain water quality parameters.

Riparian Buffer – An undisturbed, vegetated strip of land adjacent to a water course.

Riparian Corridor/Zone – Area adjacent to a river or stream. "Those areas that are saturated by ground water or intermittently inundated by surface water at a frequency and duration

sufficient to support the prevalence of vegetation typically adapted for life in saturated soils" (Beschta 1991).

Rip-rap – Broken rock cobbles, or boulders placed on earth surfaces, such as a road embankment or the bank of a stream, for protection against the action of water; materials used for soil erosion.

Riverine – Relating to rivers or streams.

Road Fill (also see embankment) – Typically gravel and sand sized material used to elevate the level of the road, control the road grade, or provide a buffer for the road grade from stream erosion.

Rock Vanes – The two most common types of vanes are the single vanes and cross vanes. Rock vanes protect stream banks by redirecting the thalweg away from the stream bank and towards the center of the channel, and improve in-stream habitat through scour, oxygenation, and cover. Single rock vanes are constructed with large boulders which are oriented upstream with angles off the bank from 20 to 30 degrees, just downstream of the point where the stream flow encounters the stream bank at acute angles. Before installing rock vanes, the designer must first complete a thorough morphological assessment of the steam reach and watershed.

Rotational Failure – A form of bank erosion caused by a slip along a curved surface that usually passes above the toe of the bank. Rotational slips can be caused by a variety of factors. The most common mechanism for them to occur is erosion at the base of the slope which reduces the support for overlying sediments. Erosion at the base of a slope can be caused by the presence of a stream channel.

Rotational Faults - A mass movement of sediment that occurs on a well defined, curved surface, producing a backward rotation in the displaced mass.

Run – A reach of stream that is characterized by swift flowing water with little surface agitation and no major flow obstructions.

Runoff – The portion of rainfall or snowmelt that moves across the land surface into streams and lakes.

Sand – substrate particles are smaller than gravel and larger than silts. They are generally 0.0063 – 2 mm in diameter (up to 0.08 inches).

Scour – Erosive action of water in streams by excavating and transporting bed and bank materials downstream.

Scour Pool – An area of deeper water created by the scouring action of water. These generally occur downstream of obstructions or along the outside of a meander bend.

Sediment – Material such as clay, sand, gravel, and cobble that is transported by water from the place of origin (stream banks or hillsides) to the place of destination (in the stream bed or on the floodplain).

Sedimentological Heterogeneity - Diverse sediment compositions and landforms.

Sediment Transport Discontinuity –A stable stream must be able to consistently transport its sediment load, both in size and type, associated with local deposition and scour. Any interruption in sedimentation, whatever its cause of length, usually a manifestation of non-deposition and accompanying erosion.

Sediment Yield or **Sediment Discharge** – Any interruption in sedimentation, whatever its cause or length, usually a manifestation of non-deposition and accompanying erosion. A stable stream must be able to consistently transport its sediment load, both in size and type, associated with local deposition and scour.

Sedimentation or **Siltation** – The deposition of sediment.

Shear Stress or **Shear Velocity** or **Shear Force** – The force exerted parallel to (rather than normal to) flowing water on the bed or banks of a stream. The tractive force that removes material from a stream bank as flow moves over surfaces. Shear stress may be estimated as the product of mean flow depth or hydraulic radius, channel slope, and the density of water.

Sheet Flow – Water, usually storm runoff, flowing in a thin layer over the ground surface; also one form of overland flow.

Side Castings – Stream bed sediment pushed out of the channel, usually by heavy machinery, and mounded on the stream bank.

Side Channel – A secondary channel of the stream.

Silt – Substrate particles that are smaller than sand and generally measured between 0.0039 and 0.062 mm.

Sinuosity – The relative curviness of a stream channel. Quantified as the total stream length divided by valley length, or the ratio of valley slope to channel slope.

Sluiceway – Chute; an open channel inside a dam designed to collect and divert logs in the stream.

Slump – The product or process of mass-wasting when a portion of hillslope slips or collapses downslope, with a backward rotation (also a rotational failure).

Sorting/Bed Sorting – Natural separation of stream bed substrate into different size classes due to variability in flow velocities and the differential depositional characteristics of those bed materials.

Spherocity - A measure of how round an object is, i.e. stream gravel

Stable Channel (also see equilibrium) – State in which a stream develops a stable dimension, pattern and profile such that, over time, channel features are maintained and the stream system neither aggrades nor degrades (Rosgen, 1996).

Stability – In steam channels, the relative condition of the stream on a continuum between stable (in equilibrium or balance) and unstable (out of equilibrium or balance). Stream stability assessment seeks to quantify the relative stability of stream reaches and can be used to rank or prioritize sections of streams for management.

Stacked Rock Wall – A boulder revetment used to line stream banks for stabilization. Stacked rock walls can be constructed on a steeper angle than rip-rap, so they take up less of the stream cross-section, provide a wider road surface, and provide less surface area for solar heating, allowing stream temperature to remain cooler relative to banks lined with rip-rap. These features can be augmented with bioengineering to enhance aquatic habitat and stability functions.

Stage – In streams, stage refers to the level of height of the water surface, either at the current condition (i.e. current stage) or referring to another specific water level (i.e. flood stage).

Stage-Discharge Relationship/Curve – A graph showing the relation between gage height (or stage) and the amount of water flowing in the channel.

Step – A vertical drop formed by boulders, bedrock, or downed trees. Serves as grade control in high gradient streams.

Step/Pool Morphology – Steps are vertical drops often formed by large boulders, bedrock knickpoints, downed trees, etc. Deep pools are found at the bottom of each step. Step/pool sequences are found in high gradient streams. The step provides grade control and the pool dissipates energy. The spacing of step pools gets closer as the channel slope increases.

Stratified Drift - Clay, silt, sand, and gravel particles that were transported, sorted and deposited in layers of similar grain size by glacial melt-waters.

Stratigraphy - The study of the layers (strata) of rocks, sediments and soils especially their characteristics and sequence of formation.

Stream Assessment or **Stream Assessment Survey** – The methods and summary information gathered in a stream reach or series of reaches, primarily focused on stream morphology. Stream assessments included detailed characterization and mapping of stream channel patterns, cross-section shapes and slope.

Stream Bank – The side of a channel between which the streamflow is normally confined.

Stream Flow (discharge) – The amount of water flowing in a stream, measured as a volume per unit time, usually cubic feet per second (cfs).

Stream Power – Measure of energy available to move sediment, or any other particle in a stream channel. It is affected by discharge and slope.

Stream Profile or **Longitudinal Profile** – A graph of elevation vs. distance along a stream channel. At a minimum, should include channel invert and water surface. Can also include bankfull, floodplain or terrace elevations.

Stream Stability – A stream is stable when it maintains its dimensions, pattern, and profile such that, over time, channel features are maintained and the stream system neither aggrades nor degrades (Rosgen, 1996).

Stream Stability Restoration/Design/Project – An unstable portion of a stream that has been reconstructed, using morphology characteristics obtained from a stable reference reach in a similar valley setting, that returns the stream to a stable form (that is, to shape that may allow the stream to transport its water and sediment load over time without dramatic changes in its overall shape).

Streamflow Regime – The typical pattern of stream discharge over the course of a year.

Stream Type – One of several categories defined in a stream classification system, based on a set of delineative criteria in which measurements of channel parameters are used to group similar reaches (Rosgen, 1996).

Subaqueously - Formed or deposited underwater.

Substrate – The bottom material of a waterway.

Summer Base-Flow – Stream discharge primarily from groundwater (not from surface runoff). Typically this is the lowest flow of the year, occurring in late summer, or following extended periods of drought.

Surficial Geology - The scientific study of unconsolidated material that covers bedrock, primarily glacial deposits and soils in this region.

Suspended Sediment or **Suspended Sediment Load –** The soil particles lifted into and transported within the streamflow for a considerable period of time at the velocity of the flow, free from contact with the stream bed. These materials contribute to turbidity.

Target Fish Community – The desirable composition of fish species in a stream, developed to establish what native fish species were in a stream and at what proportions. This is determined

through a comprehensive literature search followed by an assessment by a regional biologist to determine which of the native species would be most common in a stream under natural conditions.

Terrace or **Floodplain Terrace** or **Low Terrace** – A level area in a stream valley, above the active floodplain, that was deposited by the stream but has been abandoned as the stream has cut downward into the landscape. These areas may be inundated (submerged) in higher floods, but are typically not at risk in more common floods.

Thalweg – Literally means "valley view" and is the deepest point of a cross section. It is the low channel of the stream. In stream assessment, this location is used as a reference location for surveys and other measurements, and is most often associated with the deepest point in the stream cross-section.

Thermal Refugia - Areas along streams where colder waters enter from ground water seeps or tributaries creating colder water patches important for many different kinds of stream life.

Till - Unsorted mixture of material (clay - boulder sized particles) deposited beneath a glacier.

Toe – The bottom, or base, of a stream bank or embankment. The break in slope at the foot of a stream bank where it meets the stream bed.

Tractive Force – The drag or shear stress on a stream bank or stream bed caused by passing water which tends to pull soil particles along with the stream flow.

Transport Capacity – The ability of a stream, for a given flow condition, to transport a volume (or weight) of sediment material of a specific size per unit time.

Transverse Bar – a diagonal bar (see bar)

Tributary – A stream that feeds into another stream; usually the tributary is smaller in size than the main stream (also called "mainstem"). The location of the joining of the two streams is the confluence.

Truncated Meander Bend – A shortened or cut off of a bend in the steam channel usually caused by valley form or infrastructure encroachment.

Turbidity – A measure of opacity of a substance; the degree to which light is scattered or absorbed by a fluid. Streams with high turbidity are often referred to as being "turbid."

Undercutting – The process by which the lower portion or "toe" of the stream bank is eaten away by erosion leaving a concave, overhanging section of stream bank. Often occurs on banks at the outside of stream bends.

Unstable (also see instability) – Describing a stream that is out of balance in its capacity to transport sediment and maintain its channel shape, pattern and profile over time.

Velocity – In streams, the speed at which water is flowing, usually measured in feet per second.

Vertically Unstable Channel – A channel which tends to downcut and abandon its floodplain; symptomatic in a channel where erosion is progressing faster than deposition.

Wash Load – The sediment load that because of its fine size has such a small settling velocity it would be held suspension. It is essentially synonymous with suspended load.

Water Quality – A term used to describe the physical, chemical, and biological characteristics of water with respect to its suitability for a particular purpose.

Watershed – Area that drains to a common outlet. For a stream, it is all the land that drains to it or its tributaries. Also called a basin, drainage basin, or catchment. A sub-basin or sub-watershed is a discriminate drainage basin within a larger watershed, typically defined for planning or modeling purposes. The size of a watershed is termed as its Drainage Area.

Weir – An artificial structure to construct water levels in a stream.

Wet Ravel – The downhill movement of soil and debris during wet periods, caused by hydrological processes of rainsplash and overland flow.

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

Wetted Area – The total area submerged by the flow of a stream.

Wetted Perimeter – The boundary of wetted contract between a stream of flowing water and its containing channel at a given discharge, measured in a direction perpendicular to the flow.

Winter Base Flow – Stream discharge primarily from groundwater (not from surface runoff). Winter base flow is generally higher due to lower rates of evapotranspiration during vegetative dormancy.