TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS - 9 SPOKANE, WASHINGTON
FEBRUARY, 2005

TERMINOLOGY AND DEFINITIONS ASSOCIATED WITH REVEGETATION

This Technical Note is a compilation of several old Technical Notes.

Technical Note #9 is subdivided into the following Sections:

Section 9.1 Ecological Definitions
Section 9.2 A Technical Glossary of Stream & River Stabilization, Restoration, and Bioengineering Terms
Section 9.3 Glossary of Terminology commonly used in Mining & Reclamation Technology

SECTION 9.1 Ecological Definitions

(S.M. Lambert, 1994; revised/updated M.E. Stannard, 2005)

ECOSYSTEM
A biological community together with the physical, social and chemical environment with which it interacts.

ECOREGIONS
Regions that have broad ecological similarities with respect to soil, relief, and dominant vegetation. Ecoregions are less commonly used by NRCS in its day-to-day terminology. NRCS uses Major Land Resource Areas and Conservation Resource Areas.

MAJOR LAND RESOURCE AREAS (MLRA)
Geographically associated land resource units, usually encompassing several thousand acres. They are characterized by particular patterns of soils, geology, climate, water resources, and land use. A unit may be one continuous area or several separate nearby areas.

CONSERVATION RESOURCE AREAS (CRA)
A geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area.

ECOTYPE
The individuals of a species that are adapted to a particular environment

BIOTYPE
Synonymous with Ecotype

INTRODUCED SPECIES
Does not naturally occur in an area defined by soil, relief, and climate.
Arrived in an area with human activity: an introduced species may or may not reproduce by human fostering.
Introduced is <u>not</u> synonymous and should not be confused with the term "invasive species".

ALIEN SPECIES
Synonymous with Introduced Species.

INVASIVE SPECIES
An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

ALIEN SPECIES
Synonymous with Introduced Species.

NATIVE SPECIES
1) Naturally occurs in an area defined by soil, relief and climate; not introduced by human activity.
2) A species that, other than as a result of an introduction, historically occurred or currently occurs in a particular

NATURALIZED SPECIES
Not native; of foreign origin, but reproducing without human fostering.

REVEGETATION
General expression used for the process of planting bare areas (raw mineral soils) to perennial plants and less often annual plants. It encompasses three levels:

Rehabilitation – Simplest revegetation process
Reclamation – Moderate simply revegetation process
Restoration – Complex revegetation process

REHABILITATION
The process of making land "productive" again. An alternative ecosystem is created with different structure and function than the original ecosystem. It usually has low species diversity and includes introduced species. It requires maximal human input to exist. Land uses include parklands, croplands, and commercial forests.

RECLAMATION
The process designed to adapt a natural ecosystem to serve a utilitarian human purpose. It may put a natural ecosystem to a new or altered use, most often using introduced plants. It is often used to refer to processes that replace native ecosystems and convert them to agricultural, mining or urban uses.

RESTORATION

1. The return of an ecosystem to a close approximation of its natural condition prior to disturbance. The goal is to emulate a natural functioning, self-regulating system that is integrated with the ecological landscape in which it occurs. It may involve manipulation of natural processes of ecological succession to create a self-sustaining indigenous ecosystem. The restored ecosystem should simulate the natural condition before it was damaged, or some other native ecosystem appropriate for the new conditions of the landscape. It must be stable with minimal human input after the initial efforts that may involve hastening the rate of succession, reverting to an earlier stage, or altering the direction of succession.
2. The process of renewing and maintaining ecosystem health
3. The process of intentionally altering a site to establish a defined, indigenous, historic ecosystem. The goal of this process is to emulate the structure, function, diversity, and dynamics of the specified ecosystem.

RIPARIAN AREAS

Lands between the upland and palustrine or riverine zones; adjacent to creeks, rivers, streams, ponds and lakes where the vegetation is strongly influenced by the presence of water and the physical properties of flooding or ponding.

WETLAND

A dynamic ecosystem that often occurs between deep water habitats and uplands. A wetland may have standing water no deeper than two meters. Some wetlands are wet year-round, and others are only seasonally.

CONSTRUCTED WETLAND

A specifically designed ecosystem, usually a non-wetland area, to treat both non-point ad point sources of water pollution.

WETLAND CREATION

A conversion of a non-wetland area into a wetland area where a wetland never existed.

WETLAND ENHANCEMENT

The improvement, maintenance, and management of existing wetlands for a particular function or value, possibly at the expense of others.

WETLAND MITIGATION

Replacing wetland areas destroyed or adversely impacted by land disturbances with artificially created wetland areas.

SECTION 9.2 A Technical Glossary of Stream & River Stabilization, Restoration, and Bioengineering Terms

(W.J. Edelen and Habitat Restoration Group, 1997)

INTRODUCTION:
Among natural resource professionals, agencies, and organizations, the use of riparian revegetation and stream restoration jargon is often confusing and improperly used in description of ecological applications. The following list focuses on these definitions in effort to clarify terminology and provide consistency in communication.

A A A

Abstraction
1. The long-term to permanent removal of surface flow from a channel.
2. A simple type of stream capture.

Accession (plant) A plant collected and assigned a number to maintain identity during evaluation in controlled trials.

Accretion
1 . Water accretes to a stream when shallow groundwater seeps from the ground into a streambed.
2. Multiple sources of surface water spilling into a stream may also be referred to as surface water accretions.
3. Sediments carried by a stream and deposited as additions to banks or low ground are accretions to land.
4. Outward growth of bank or shore by sedimentation.

Acre-foot-of-water The amount of water needed to cover one acre to a depth of one foot. It consists of 326,000 gallons of water.

Adjacent Wetlands The term adjacent means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes, and the like are adjacent wetlands. *Source: 33 CFR § 328.3(c).*

Aggradation The geologic process by which stream beds, floodplains, and the bottoms of other water bodies are raised in elevation by the deposition of material eroded and transported from other areas (opposite of degradation).

Aggrading Stream A stream which is depositing more material than it is removing (or eroding). It is said to be depositional.

Alkali Sink A land basin in which water evaporation produces high salt concentrations that may, or may not, support salt marsh vegetation.

Alluvial Deposited by running water.

Alluvium
1. Material deposited by running water, including the sediments laid down in riverbeds, flood plains, lakes and estuaries.
2. Deposit of stream-borne materials in and along a channel.

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

Anchor Ice Ice formed below the surface of a stream, on the stream bed, or upon a submerged body or structure.

Angle of Repose

1. The angle at which gravel, boulders, or other loose materials cease to slide downhill on a slope. The angle of repose is the angle between the horizontal plane and the angle of the slope at rest. The angle of repose will vary with soil type and moisture content.
2. The condition reached when an embankment fails, slips, or slides and the toe of the embankment moves out to equalize the pressure from the area above, causing the slide to come to rest or cease to move further.

Annual Flood The average of the highest annual peak discharges of a stream (normal maximum high water).

Annual (plant) A plant which germinates, flowers, and seeds in a single season.

Aquic Moisture Regime A moisture condition associated with a seasonal reducing environment that is virtually free of dissolved oxygen because the soil is saturated by ground water or by water of the capillary fringe as in soils in Aquic suborders and Aquic subgroups.

Aquifer

1. A subsurface layer of rock permeable by water. Although gravel, sand, sandstone and limestone are the best conveyers of water, the bulk of the earth's rock is composed of clay, shale and crystalline.
2. A saturated permeable material (often sand, gravel, sandstone or limestone) that contains or carries groundwater.
3. An underground, water-bearing layer of earth, porous rock, sand, or gravel, through which water can seep or be held in natural storage. Aquifers generally hold sufficient water to be used as a water supply.

Armor Artificial surfacing of bed, banks, shore, or embankment to resist erosion or scour.

Armor Layer Erosion-resistant layer of relatively large particles on the surface of a streambed. Such layers typically result from removal of finer particles by erosion.

Armoring

1. The formation of an erosion-resistant layer of relatively large particles on the surface of the stream bed which resists degradation by water currents, resulting from removal of finer particles by erosion.
2. The application of various materials to protect stream banks from erosion.

Arroyo
1. A gully, ravine, or canyon created by a perennial or intermittent stream, with characteristic steep slopes frequently covered with vegetation.
2. Waterway of ephemeral stream deeply carved in rock or ancient alluvium.

Artificial Wetlands Wetlands created by the activities of man, either purposefully or accidentally.

Aspect (also Exposure) Direction that an area, especially a slope, faces.

Avulsion Sudden shift in location of a channel.

B B B

Backfill Earth, overburden, mine waste or imported material used to replace material removed during mining. *Source: State of California Surface Mining Reclamation Act.*

Backwater
1. Water backed-up or retarded in its course as compared with it's normal or natural condition of flow.
2. Ponding of a stream above an unnatural constriction; the incremental depth caused thereby.

Backwater Pool Pool formed by an eddy along a channel margin downstream from an obstruction such as a bar, rootwad or boulder, or by back-flooding upstream from an obstruction; sometimes separated from the channel by sand or gravel bars. Also, a body of water whose stage is controlled by some downstream channel feature, or a cove or flooded depression with access to the main stream.

Baffle A pier, vane, sill, fence, wall, or mound built on the bed of a stream to parry, deflect, check, or disturb the flow or to float on the surface to deflect or dampen cross currents or waves.

Bank
1. The slope of land bordering the river.
2. The margins of a channel.
3. Lateral boundary of a stream, especially between low and high water marks.

Bankfull Discharge The discharge corresponding to the stage at which the flood plain of a particular stream reach begins to be flooded. The point at which bank overflow begins.

Bankfull Stage The discharge which by moving sediment, forming or removing bars, forming or changing bends and meanders, etc. results in the average morphologic characteristics of channels. The bankfull stage is the dominate channel-forming flow, and has a recurrence interval of approximately 1.5 years.

Bankfull Width The cross-section width of the bankfull channel, typically identified as the upper limit of stream channel scour below which perennial vegetation does not occur.

Bank, Left (Right) The bank of the left (right) side of a channel looking downstream.

Bank Protection
1. In a narrow sense, revetment or other armor stabilizing a bank against erosion.
2. More generally, any means to accomplish the purpose, including devices deflecting the forces of erosion away from the bank.

Bank Storage Infiltration of water into stream bank material during periods of high flow.

Bar
1. Ridge-like accumulation of sand, gravel or other alluvium formed in the channel, along the banks or at the mouth of a stream where a decrease in water velocity induces deposition.
2. A structure (of alluvium, bedrock or other material) that obstructs flow and induces deposition.

Bar Types

Junction Bar A bar formed at the junction of two streams, usually because sediment transported by a tributary is deposited in the slower-moving water of the main stream.

Lee Bar A bar caused by eddies and lower current velocities and formed in the lee of large immovable objects (e.g., boulders or logs).

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

Point Bar
1. A bar found on the island of meander bends.
2. The bar on the inside of a bend that has built up due to sediment deposition.

Side Bar A bar located at the side of a river channel, usually associated with the inside of slight curves.

Transverse Bar A bar that extends diagonally across the fill width of the active stream channel.

Barrier A low dam or rack built to control the flow of debris.

Base Flow See *Flow*.

Baseline A line, generally a highway, unimproved road or some other evident feature, from which sampling transects extent into a site for which a jurisdictional wetland determination is to be made.

Basin
1. The region of land drained by a river and its tributaries. (See also *drainage area*.)
2. The surface of the area tributary to a stream or lake.
3. Space above or below ground capable of retaining or detaining water or debris.

Beaded Stream A stream consisting of a series of small pools or lakes connected by short stream segments.

Bed
1. The ground at the bottom of the river.
2. The earth below any body of water, limited laterally by bank or shore.

Bedform Roughness (also Bed Roughness). Measure of the irregularity of streambed materials that contributes resistance to streamflow. Commonly represented by Manning's roughness coefficient.

Bed Load

1. Sediment moving on or near the streambed.
2. Consists of particles which mainly are in contact with the streambed. Movement of these particles occurs by rolling, sliding, or jumping along the bed. That part of the load which is so heavy that it is never actually in suspension (e.g., gravel, rock, etc.), as opposed to suspended sediment (e.g., sand, silt, and clay). Bedload is used to describe material which is actually being moved by a stream, not for the material as it sits on a gravel bar.
3. Detritus transported along the bed of a stream by rolling, sliding, gliding, or saltation; expressed by size of particle or rate of transport.

Bed-load Discharge The quantity of bed load passing a given point in a unit of time, expressed as dry weight.

Bed-load Sediment That part of a stream's total sediment load moved along the bottom by running water.

Bed Roughness A measure of the irregularity of stream bed materials as they contribute to resistance to flow. Commonly measured in terms of Manning's roughness coefficient.

Bench Mark A fixed, more or less permanent reference point or object of known elevation; the U.S. Geological Survey (USGS) installs brass caps in bridge abutments or otherwise permanently sets bench marks at convenient locations nationwide; the elevations on these marks are referenced to the National Geodetic Vertical Datum (NGVD), also commonly known as mean sea level (MSL); locations of these bench marks on USGS topographic maps are shown as small triangles; since the marks are sometimes destroyed by construction or vandalism, the existence of any bench mark should be field verified before planning work which relies on a particular reference point; the USGS or local state surveyors office can provide information on the existence, exact location and exact elevation of bench marks.

Bench planting Vegetation establishment on a horizontal surface or step in a slope.

Berm

1. A bench or terrace between two slopes [proper usage].
2. A levee, shelf, ledge, or bench along a stream bank that may extend laterally into the channel to partially obstruct the flow, or parallel to the flow to contain the flow within its stream banks. May be natural or man-made.
3. Vegetated or paved embankment, somewhat dike-like in appearance, used for enclosure and separation purposes [usage common to landscape architecture].

Best Management Practices (BMP) The most environmentally, socially, and economically appropriate instream or land treatment measure which can be applied to help contribute to solving a resource problem such as; bank erosion, water quality degradation, loss of fish or wildlife habitat, etc.

Biennial (plant) A plant that completes its life cycle in 2 years. The first year it produces leaves and stores food. The second year it produces fruits and seeds.

Bioengineering Branch of engineering in which live and dead plant materials are utilized to stabilize hillslopes or stream banks. It often involves fascines, bundles, logs, root wads and other “hard” structures such as rock revetments or wooden crib structures in conjunction with plant materials.

Biogeotechnology The application of biological, ecological, and geotechnical engineering data to slope and erosion problems. Applied Biogeotechnology © focuses on using vegetation and structures to control erosion, protect slopes, and restore environmental quality.

Source: © University of Wisconsin Board of Regents. 1992.

Biotechnical Engineering Civil engineering methods incorporating organic materials to produce functional structures that are also aesthetically pleasing, provide wildlife habitat, and provide sites for revegetation.

Bog

1. Perched wetland with vegetation on cold acidic peat soil, rain water supplies nutrients.
2. A shrub peatland dominated by ericaceous shrubs (Family *Ericaceae*), sedges and peat moss *(Sphagnum spp*.) and usually having a saturated water regime or a forested peatland dominated by evergreen trees (usually spruces and firs) and/or larch *(Larix laricina).*

Boil Turbulent break in a water surface by upwelling.

Bole See *Large Woody Debris-Affixed Logs.*

Boom Floating log or similar element designed to dampen surface waves or control the movement of drift.

Boulders

1. Largest rock transported by a stream or rolled in the surf, arbitrarily heavier than 50 pounds and larger than 8 inches.
2. Substrate particles greater than 256 mm (10 inches) in diameter. Often subclassified as small (256 to 1,024 mm) and large boulders (>1,024 mm).

Braided Stream Stream that forms an interlacing network of branching and recombining channels separated by branch islands or channel bars. (See also *channel braiding*.)

Braiding (of stream channels). Successive division and rejoining of streamflow with accompanying islands. (A braided stream is composed of anabranches).

Branch packing Consists of alternating layers of live branch cuttings and compacted backfill to repair small localized slumps and holes in slopes. Similar to brush layering except that branch layers are very close together rather than spaced along the slope.

Brush Mattress A combination of units (live stakes, fascines and a mattress-like branch cover) which provide bank protection and erosion control. Involves placing cut branches parallel to slope and anchoring them with wire and soil. Generally, a live fascine is placed at the bottom of the brush mattress, then the basal ends of the branches are tucked under the fascine. Ten to fifteen branches per foot are used.

Brush Layering See *Fascine.* The branches act to hold the soil in place and to absorb momentum from water flowing over the area. The orientation of the branches are usually perpendicular to bank contour. Branches are placed in a trench with the basal end toward the back of the trench. Soil is packed over the branches. Trenches with branches are spaced several feet or more along the slope.

Buffer Zone (also Buffer Strip, or Leave Strip). An area situated between two zones that are managed differently. As applied to streams, a narrow strip of natural vegetation along stream banks to reduce the possibility of adverse effects from upland land-use on riparian zones.

Bypass Channel or Conduit

1. A man-made channel constructed to carry water around a stretch of natural stream during flood-level flows to prevent overbank flooding and/or damage to the stream bed.
2. A flood control channel (or large diameter pipe) running parallel to a natural channel and designed to provide the extra capacity needed to carry flood flows. These should be designed such that low flows are retained in the natural channel.

C C C

Canal An artificial open channel.

Canopy The overhead branches and leaves of stream-side vegetation.

Canopy A vegetative structure (spatial) consisting of trees, shrubs and /or herbs which provides shade (thermoregulation).

Canopy cover (of a stream) The vegetation that extends over the stream. Can be arbitrarily divided into two levels: Crown cover - > 1 meter above water surface. Overhanging cover - < 1 foot above water surface (for fish cover and shading of thermal input) (1).

Canopy Density The percentage of the stream covered by the canopy of plants, sometimes expressed by species.

Canyon A deep gorge or ravine.

Cascade Stream segment with a stepped series of drops characterized by exposed rocks and boulders, high gradient, swift current and much turbulence.

Catchment Area See *drainage area.*

Caving The collapse of a stream bank by undercutting due to wearing away of the toe or an erodible soil layer above the toe.

Cavitation Erosion by suction, especially in the partial vacuum of a diverging jet.

Celerity Velocity of a moving wave, as distinguished from velocity of particles oscillating in the wave.

Channel

1. The space above the bed and between banks occupied by a stream.
2. Natural or artificial waterway of perceptible extent that periodically or continuously contains moving water. It has a definite bed and banks that serve to confine water. (River, stream, creek, run, branch, anabranch, and tributary are some of the terms used to describe natural channels. Canal, ditch, and floodway are some of the terms used to describe artificial channels.)

Channel Braiding See *Braided Stream.*

Channelization The straightening and/or deepening of a watercourse for purposes of storm-run-off control or ease of navigation. Channelization often includes lining of stream banks with a retaining material such as concrete or rock.

Channel Pattern The configuration of a stream as seen from above. Described in terms of its relative curvature, it includes:

Irregular No repeatable pattern.

Irregular Meander A repeated pattern vaguely present in the channel plan. The angle between the channel and the general valley trend is less than 90 degrees.

Regular Meander Characterized by a clearly repeated pattern.

Straight Very little curvature within the reach.

Sinuous Slight curvature within a belt of less than approximately two channel widths.

Tortuous Meander A more or less repeated pattern characterized by angles greater than 90 degrees

Channel Stability A relative measure of the resistance of a stream to erosion. Stable streams do not change markedly in appearance from year to year. An assessment of stability helps determine how well a stream will adjust to and recover from changes in flow or sediment transport.

Channel Width The horizontal distance along a transect line from bank to bank at the high water marks, measured at right angles to the direction of flow. Multiple channel widths are summed to represent total channel width.

Check A sill or weir in a channel to control stage or velocity.

Check Dam (also Checkdam)

1. A barrier installed in a stream or gully to absorb energy from the flow of water and to reduce the downstream velocity of the flow.
2. A structure placed across a watercourse from bank to bank downstream of a headcut to stop channel degradation.

Clay Substrate particles generally smaller than 0.004 mm in diameter.

Coarse Particular Organic Matter (CPOM) See *Organic Materials.*

Coarse Sediment Sediment with particle sizes greater than 2.0 mm, including gravel, cobbles and boulders.

Cobble (also Rubble)

1. Rock smaller than boulder and larger than gravel; arbitrarily 1 to 50 pounds or 2 to 8 inches in diameter.
2. Substrate particles 64 to 256 mm (2.5 to 10 inches) in diameter. Often subclassified as small (64 to 128 mm) and large cobble (128 to 256 nun).

Coir (fiber) Natural coconut fiber.

Colluvium A general term for loose deposits of soil and rock moved by gravity (e.g., talus).

Competence The maximum size of particle that a stream can carry. This is governed by water velocity.

Comprehensive Wetland Determination A type of wetland determination that is based on the strongest possible evidence, requiring the collection of quantitative data for all three wetland identification criteria.

Cone Physiographic form of detrital deposits washed from a gorge channel onto an open plain; a debris cone, also called an alluvial fan.

Confinement The relationship of a channel to the valley walls or terrace. It describes how restrictive the valley's walls are in limiting the channel's lateral movement (meandering).

Confluence The convergence of two streams of comparable size into a single channel.

Conjunctive Use Combined use of surface and groundwater to maximize management flexibility and availability of water.

Constriction An obstruction narrowing a waterway.

Consumptive Water Use Water made unavailable for recapture and reuse as a result of direct surface evaporation or being taken up by plants.

Continuous Stream See *Stream.*

Contour An imaginary line of constant elevation on the ground surface; the corresponding line on a map is called a "contour line."

Conveyance Relative capacity of a channel, measured by $Q/\sqrt{S}$.

Cool Season Plant A Plant that makes its major growth during the cool part of the year, mainly in spring or even winter.

Core Central zone of dike, levee, rock groin, jetty, etc.

Corrasion Erosion or scour by abrasion in flowing water.

Corrosion Erosion by chemical action.

Creek
1. A small stream, usually active.
2. A naturally occurring swale or depression, which carries water either seasonally or year-round, and which appears as an above-ground creek on the Geological Survey Map.

Crest
1. Peak of a wave or a flood.
2. Top of a levee, dam, weir, spillway, or other water barrier or control.

Crib An open-frame structure loaded with earth or stone ballast to act as a baffle in bank protection.

Cribbing A framework of logs, rock, rock gabions, or other solid material used to support the outside portion of a road on a steep slope or used to support a fill on a road, stream bank, or bridge abutment, etc. The cribbing is placed under the road, bank, etc., for support.

Crib Wall A structure built from horizontal pieces of lumber separated by smaller wooden spacers; sometimes used as a revetment wall on stream banks.

Critical Flow
1. Very high velocity water flow at which point fish migration can be severely hampered or impeded.
2. Minimum flows required to prevent death of a specified species of fish in a stream during periods of extremely low flows.

Cross-drain A water bar.

Cross-sectional Area The area of a stream, channel, or waterway opening, usually taken perpendicular to the centerline.

Cubic Feet Per Second (cfs or ft 3/sec) A unit of measurement expressing rates of water flow or discharge. One cubic foot per second is equal to the discharge of a stream of rectangular cross section, one foot wide and one foot deep, flowing at an average velocity of one foot per second. (Equals approximately 450 gallons per minute.)

Cultivar A variety, strain, or race that has originated and persisted under cultivation or was specifically developed for the purpose of cultivation.

Culvert
1. Buried pipe structure that allows streamflow or road drainage to pass under a road.
2. A large-diameter pipe used to transport water under a roadway or through a levee, or a buried cement channel used to transport water a long distance through an urban area.

Culverting The placement or construction of a pipe or box-shaped conduit in a creek bed for the purpose of conducting water.

Current
1. The continuously downstream flow of water in a river, resulting from the tendency of water to move downhill toward sea level.
2. Flow of water, both as a phenomenon and as a vector (usually qualified by adjectives like downward, littoral, tidal, etc. to show relation to a pattern of movement).

Cut-off Wall A subsurface wall on an instream structure installed to prevent the structure from being undercut.

Cutting Portion of a stem, root, or leaf cut from the parent plant for the production of a new independent plant by inducing it to form shoots and roots under favorable environmental conditions (e.g., stem cuttings, leaf cuttings, leaf-bud cuttings, and root cuttings).

D D D

Dam A barrier constructed of earth or man-made materials to hold back the flow of a river. Dams are generally for storage or diversion. Storage dams store water; diversion dams divert water.

Deadheads See *Large Woody Debris.*

Deadman A log or block of concrete buried in a stream bank that is used as an anchor for a revetment or other structure.

Debris Includes gravel**,** cobble, rubble, and boulder-sized sediments as well as trees and other organic detritus scattered about by either natural processes or human influences.

Debris Dams Detention dams constructed to trap sediment.

Debris Jam (also Log Jam) Accumulation of logs and other organic debris.

Debris Loading The quantity of debris located within a specific reach of stream channel, due to natural processes or human activities.

Debris Torrent Deluge of water charged with soil, rock and organic debris down a steep stream channel.

Deciduous A woody plant having leaves which die and fall away from the stem. Not evergreen.

Deepwater Habitat Any open water area in which the mean water depth exceeds 6.6 feet at mean low water in nontidal and freshwater tidal areas, or is below extreme low water at spring tides in salt and brackish tidal areas, or the maximum depth of emerging vegetation, whichever is greater.

Degradation
1. Erosional removal of materials from one place to another. Degradation lowers the elevation of streambeds and flood plains. (Opposite of *aggradation*.)
2. Downgrading of a streambed by scour.

Degrading Stream A stream (or reach of stream) that is removing more material than it is depositing. The elevation of the streambed is dropping and, usually, the banks are eroding. (Usually found in the upper reaches of a stream or immediately below a culvert, dam, or weir.)

Degraded Wetland A wetland which has been altered by man through impairment of some physical property and in which the alteration has resulted in a reduction of biological complexity in terms of species diversity of wetland-associated species which previously existed in the wetland areas.

Delta
1. Silt deposits, generally triangular in shape, collected at or in a river's mouth.
2. System of channels through an alluvial plain at the mouth of a stream.

Dendric Channel pattern of streams with tributaries that branch to form a tree-like pattern.

Deposit An earth mass of particles settled or stranded from moving water or wind.

Deposition The settlement or accumulation of material out of the water column and onto the stream bed. Occurs when the energy of flowing water is unable to support the load of suspended sediment.

Depositional Areas Local zones with in a stream where the energy of flowing water is reduced and suspended material settles out, accumulating on the streambed. (Compare *scoured areas*.)

Depression Storage Water retained in puddles, ditches and other depressions in the surface of the ground.

Depth
1. Vertical distance from the water surface to the streambed.
2. Vertical distance from crest or crown to invert of a conduit.

Design Flood Capacity (Design Flood) The flow volume, state, or frequency of the event for which protection is provided or activities need to be regulated.
Design Level of Flood Protection The computed flow, state, or frequency of the event that the waterway has been designed to safely carry.

Designated Floodway The channel of the stream and that portion of the adjoining floodplain required to reasonably provide for passage of a design flood.

Detention Basin A pond designed as a sediment trap. Usually designed to slow the flow of sediment carrying water so that the sediment will drop out. (For heavy sediment loads these ponds are often built with two or three in series. Sediment must be periodically bailed out to allow the ponds to continue to function.)

Detention Dam Detention dams are constructed to retard flood run-off and minimize the effect of sudden floods. The water is temporarily stored and released through an outlet structure at a rate which will not exceed the carrying capacity of the channel downstream.

Detritus
1. Mineral burden of a stream, ranging from the finest clays to the largest boulders.
2. Organic debris from decomposing plants and animals.

Dewatering Lowering of the water table in stream channel deposits caused by a channel shift or a flow reduction.

Dibble A hand tool used to make holes in the ground for planting seeds, bulbs, or small seedlings.

Disc To turn over the ground with a Rototiller or other device.

Digger Log See *Large Woody Debris.*

Dike
1. An embankment outside a channel to restrict overflow.
2. A levee.

Discharge
1. Volume of water flowing past a reference point per unit time (usually expressed as m^3/s or cfs).
2. Outflow of a water course. Rate of flow expressed in volume per unit of time (e.g., cfs. or acre feet per year).
3. The flow of a stream in unit time, usually expressed in second-feet (cubic feet per second).

Dissipate Expend or scatter harmlessly, as of energy of moving water.

Dissolved Organic Matter (DOM) or Dissolved Organic Carbon (DOC). See *Organic Materials.*

Ditch Small artificial channel, usually unlined.

Diversion
1. The direction of water in a stream away from its natural course (i.e., as in a diversion that removes water from a stream for human use).
2. Draft of water from one channel to another.
3. Interception of runoff by works which discharge it through unnatural channels.

Dominant Discharge The cycle of rising and falling flows in the vicinity of backfill flows, sustained over a long enough period that it alters a natural channel by dislodging, transporting, and distributing bed materials.
Dormant (dormancy) An internal condition of the chemistry or stage of development of a plant (or seed) that prevents development or germination.

Drain Conduit intercepting and discharging surplus surface or groundwater.

Drainage
1. The basin (or its area) tributary to a stream.
2. The removal of excess surface water or groundwater from an area by means of surface or subsurface drains.

Drainage Area Total land area draining to any point in a stream, as measured on a map, aerial photo or other horizontal, two-dimensional projection. (See also *catchment area; watershed, basin*.)

Drainage basin That area so enclosed by a topographic divide that surface runoff from precipitation drains into a stream above the point specified. A drainage area can be contained within a single watershed or include a number of watersheds. It is not synonymous with watershed..

Drainage Density Total length of natural drainage channels in a given area, expressed as kilometers of stream channel per square kilometer of drainage area.

Drawdown Depression of a water surface by acceleration of flow toward a drop or free outfall.

Dredge To remove material from the bed of a body of water in order to increase its water carrying capacity or to allow for the passage of boats.

Dredge Spoils The mud removed from a body of water during dredging.

Drift
1. Floating or non-mineral burden of a stream
2. Voluntary or accidental dislodgment of aquatic invertebrates from the stream bottom into the water column where they move or float with the current.

Drift Line An accumulation of waterbed debris along a contour or at the base of vegetation that provides direct evidence of prior inundation and often indicates the directional flow of flood waters.

Drill (Row) Seeding Seeding down in rows of drilled holes.

Drop Controlled fall in a stream to dissipate energy.

Drop Inlet (DI) A vertical inlet to a buried culvert or storm drain attached at the upstream end of a horizontal culvert. The drop inlet can be constructed as filter to prevent debris from entering the culvert and causing it to fail.

Duration Flow See *Flow*.

E E E

Ecosystem An ecological system or unit that includes living organisms and nonliving substances which interact to produce an exchange or cycling of nutrients.

Ecotype A population of plants that has become genetically differentiated in response to the conditions of a particular habitat. The plants may vary in growth habit, maturity, and other characteristics such as pubescence and flower color. Sometimes referred to as geographical race.

Ecoregion Regional ecosystems described by causal characteristics including climate, mineral availability (soils and geology), vegetation, and physiography.

Eddy or Eddy Current
1. Rotational flow around a vertical axis.
2. Circular current of water, sometimes quite strong, diverging from the main current. (It usually forms where the flow passes some obstruction or at the inside of river bends, and often forms backwater pools or pocket water in riffles.)

3. A circular water movement that develops between the main flow and the bank. (An eddy usually forms downstream of a structure or an abrupt change in the shape of the bank. Eddies are often the cause of bank erosion.)

Embankment Earth structure above natural ground.

Embeddedness Degree to which large particles (boulders, rubble, gravel) are surrounded or covered by fine sediment, usually measured in classes according to percent coverage.

Emergent (plant) Aquatic plants with parts protruding above the water surface. (See *Submergent Plant*)

Energy Dissipater A device which fits on the downstream end of a culvert pipe or sluiceway which reduces the hydraulic energy of high velocity water flows. Arranging for the discharge to strike a large rock, log, etc., can also dissipate the energy of the flow. This is sometimes used in the absence of a downspout on the downstream end of a culvert or sluiceway to prevent severe erosion of a stream bank where the outlet is high above natural stream grade.

Enhancement Altering a site for the improvement of a specific value.

Enhancement Flow See *Flow*.

Entrenchment The relation of the channel to the valley flat or floodplain, i.e., downcutting or incising of a channel below its normal level, usually resulting in increased discharge and/or velocity.

Ephemeral Stream See *Stream.*

Erosion
1. The wearing away of the earth's surface by natural forces, such as water, wind and ice.
2. The loosening and transportation of rock and soil debris by wind, rain, or running water.
3. Wearing away of land by physical and chemical action in moving water or air.

Estuary
1. The wide mouth of a river where the current meets and is influenced by the tides of the ocean.
2. Semi-enclosed body of water that has a free connection with the open ocean and within which seawater measurably diluted with fresh water derived from land drainage.
3. The mouth of a tidal river, an arm of the sea wherein sea water is measurably diluted by fresh water run-off.
4. A deep or submerged valley at the mouth of a stream.

Excelsior Matting A layer of fine, curled wood shavings used to stabilize eroding soil or to filter sediment from flowing water.

Exotic (plant) A term describing a plant introduced from another country or continent.

F F F

Fabric Mulch Polypropylene material placed on ground around plants to prevent weed growth.

Facultative (plant) Plant taxa that occurs 34-66% of the time in wetlands.

Facing The outer layer of a slope revetment.

Fall
1. A free fall or precipitous descent of water. The plural, falls, may apply to a single waterfall or to a series of waterfalls.
2. A very fast white water cascade.

Fascine Roll Thick roll consisting of branches, the inner part being dead material, the outer consisting of live branches.

Fill
1. Local deposition of material eroded or excavated elsewhere, including aggradation of naturally eroded material in streams (compare *scour*).
2. Deliberate placing of material in and along streams and dumping of material to create roadbeds.
3. The material so deposited.

Filter Layer of even-graded rock between rock riprap and backfill soil to prevent extrusion of the soil through the riprap.

Filter Fabric A fabric used to collect sediment from water flowing through a creek or through a gully.

Fine Particulate Organic Matter (FPOM) See *Organic Materials.*

Fine Sediment (also Fines). Sediment with particle sizes of 2.0 mm and less, including sand, silt and clay. (Compare *coarse sediment*.)

Fines Small particles of soils (e.g., silt or clay).

Flood
1. Water flowing over normally dry land. Excess water in a river causes a river to overflow its banks.
2. A high streamflow overtopping the natural or artificial banks in any reach of a stream.
3. Any flow that exceeds the bankfull capacity of a stream or channel and flows out on the floodplain; greater than bankfull discharge.

Flood Level The elevation of the water surface of a stream during a particular flood.

Flood, n-year Flow of a stream equaled or exceeded, on the average once in n years.

Flood, 100-year The magnitude of a flood expected to occur on the average every 100 years, based on historical data. The 100-year flood has a 1 / 100, or one percent, chance of occurring in any given year.

Flood Plain (also Floodplain or Flood-plain)
1. Lowlands bordering a river which are subject to flooding. Flood plains are composed of sediments carried by rivers and deposited on land during flooding.
2. Level lowland bordering a stream onto which the stream spreads at flood stage.
3. Part of a river valley made of unconsolidated, river-borne sediment that is periodically flooded.

Flood Waters Stream waters which have escaped from a watercourse and run wild over lands outside the normal and overflow channels.

Floodway
1. The channel of a river or other watercourse and adjacent land areas that convey flood waters.
2. The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the “base flood” without cumulatively increasing the water surface elevation more than one foot.

Flow (also Discharge)

1. The movement of a stream of water and/or other mobile substances from place to place; the movement of water.
2. The moving water itself.
3. The volume of water passing a given point per unit of time.

Base Flow The portion of the stream discharge that is derived from natural storage (e.g., groundwater outflow and the draining of large lakes and swamps or other source outside the net rainfall that creates surface runoff); discharge sustained in a stream channel, not as a result of direct runoff and without the effects of regulation, diversion, or other works of man. Also called sustaining, normal, ordinary or groundwater flow.

Duration Flow A curve which expresses the relation of all the units of some item (e.g., head, flow, etc.) arranged in order or magnitude along the ordinate, and time, frequency expressed in percentage, along the abscissa. A graphical representation of the number of times given quantities are equaled or exceeded during certain periods of record.

Enhancement Flow An improvement of flow that provides improvement over natural conditions for the aquatic, terrestrial, and other recreation resources.

Flushing Flow That discharge (natural or human-caused) of sufficient magnitude and duration to scour and remove fines from the stream bed gravel to maintain intragravel permeability.

Improvement Flow That discharge which will improve upon existing aquatic organisms and/or related recreational activity by correcting for water quality deterioration and/or utilization pressures.

Index Flow The discharge at the time of measurement.

Instantaneous Flow That discharge measured by any instant in time, applied to any recommended flow term when modified by the appropriate adjective.

Instream Flow Streamflow regime required to satisfy a mixture of conjunctive demands being placed on water while it is in the stream.

Instream Flow Requirements That amount of water flowing through a stream course needed to sustain instream values at an acceptable level.

Intergravel Flow That portion of the surface water that infiltrates the stream bed and moves through the substrate pores.

Intragravel Flow Water moving through the substrate pores of a streambed.

Laminar Flow The type of flow in a stream of water in which each particle moves in a direction parallel to every particle.

Least Flow Negotiated lowest flow in a regulated stream that will sustain an aquatic population at agreed upon levels. The flow may vary seasonally.

Low Flow (also Minimum Flow) The lowest discharge recorded over a specified period of time.

Mean Flow The average discharge at a given stream location, usually expressed in m^3/sec or cfs, computed for the period of record by dividing the total volume of flow by the number of days, months, or years in the specified period.

Minimum Flow (also Low or Least Flows) The lowest discharge recorded over a period of time.

Modified Flow The discharge at a given point in a stream resulting from the combined effects of all upstream and at-site operations, diversions, return flows, and consumptive uses.

Natural Flow The flow as it occurs under natural unregulated conditions at a given stream location.

Optimum Flow The discharge regime that allows for the maximum expression of the carrying capacity of any specified use of the stream. Any flow above or below this flow becomes limiting to the use under consideration.

Peak Flow (also Maximum Flow) The highest discharge recorded over a specified period of time, usually a year but often a season. Often thought of in terms of spring snow melt, summer, fall, and winter rainy season flow.

Regulated Flow The flow in a stream that has been subjected to regulation by reservoirs, diversions, or other works of man.

Return Flow That portion of the water previously diverted from a stream, and subsequently, returned to that stream or to another body of ground or surface water.

Subsurface Flow That portion (part or all) of the water that infiltrates the stream bed and moves horizontally through and below it. It may or may not return to the stream channel at some point downstream.

Survival Flow That instantaneous discharge required to prevent death of an aquatic organism in a stream during specified short periods of time of extremely low flow.

Turbulent Flow That type of flow in which any particle of water may move in any direction with respect to any other particle.

Uniform Flow A flow in which the velocities are the same in both magnitude and direction from point to point. Uniform flow is possible only in a channel of constant cross section and gradient.

Unimpaired Flow The natural flow of a stream without regulation, control, diversion, or artificial additions.

Flow Duration Curve A cumulative frequency curve that shows the percentage of time that specified flows are equaled or exceeded.

Flow, Steady Flow at constant discharge.

Flow, Unsteady Flow on rising or falling stages.

Flow, Varied Flow in a channel with variable section.

Flushing Flow See *Flow*.

Fluvial Pertaining to streams or rivers or produced by stream action; also, migrating between main rivers and tributaries. (Compare *adfluvial*.)

Fluvial Entrainment Suspension and transport of solid materials by running water.

Forb A herbaceous plant that is not a grass or grasslike.

Ford A wet stream crossing. The crossing may use only the natural stream gravels, imported cobble, or a poured concrete roadway.

Forebay An area in a canal upstream from a control structure from which diversions are made.

Foreshore The sloping beach between high- and low-water marks.

Freeboard Marginal provision for waves, surges, and other contingencies, above a design stage.

Free Logs See *Large Woody Debris.*

Freshet A rapid temporary rise in the stream discharge and level caused by heavy rains or rapid melting of snow and ice.

G G G

Gabion

1. Wire basket (usually galvanized) filled with stones, used to stabilize stream banks and improve aquatic habitats.
2. A stream embankment stabilization device consisting of connected wire baskets filled with rock, usually placed in a terraced formation. They can also be made by using two rows of heavy fencing with rock fill between them (two fence gabion). (Groins, sea walls, revetments, deflectors, and other structures can be made from gabions.)

Gaining Stream See *Stream.*

Geomorphology The study of physical features associated with landscapes. In riparian areas, morphology will influence the presence or absence of plant communities. Includes factors such as; stream gradient, elevation, parent material, size, valley bottom width, and others.

Geo-textile Fabric A mat made out of spun polypropylene used to suppress weeds or to control erosion while allowing free exchange of water and air.

Geoweb A plastic mesh with a honeycomb pattern which is buried to help retain soil against the eroding action of wind or water.

Glide Slow, relatively shallow stream section with water velocities of 10-20 cm/s and little or no surface turbulence. (Compare *rapids; riffle; run*.)

Gorge A narrow, deep channel with steep or vertical banks.

GPM Gallons per minute. (450 gpm equals approximately 1 cfs.)

Grade Elevation of bed or invert of channel.

Graded Stream A geomorphic term used for streams that have apparently achieved, throughout long reaches, a state of practical equilibrium between the rate of sediment transport and the rate of sediment supply.

Grade Stabilization Stabilization of the streambed against degradation. Usually a drop structure, or series of drop structures, is used to prevent the streambed upstream of the drop structure from degrading any further, or to restore the grade where degradation has occurred. (Often lateral erosion of the banks is controlled as well.)

Gradient (also Topographic Slope)
1. The slope of a grade line.
2. Average change in vertical elevation per unit of horizontal distance, usually measured as meters of drop per kilometer of map distance.

Gravel
1. Substrate particles between 2 and 64 mm (0.08 and 2.5 inches) in diameter.
2. Detritus larger than sand and smaller than cobble, arbitrarily ranging in diameter from 0.2 to 2 inches.

Gravel Permeability The ease with which water can pass through gravel, the higher the permeability the greater the supply of oxygenated water in the gravel that can reach incubating eggs.

Gravity Retaining Wall A low retaining structure at the foot of a slope that allows the flattening of the slope for vegetative establishment.

Green-Line
1. The first perennial vegetation above the stable low water line of a stream or water body.
2. That specific area where a more or less continuous cover of vegetation is encountered when moving away from the center of an observable channel. Often, but not always located at the water's edge.

Groin
1. A long, narrow, wall-like structure extending out into a stream or lake from the bank or shore. Used to protect the bank from erosion. Also called a "wing dam" or "deflector." (Groins are often used with several in series to "train" the flow of a river around a bend where there is an erosion problem on the outside bank.).
2. A bank or shore-protection structure in the form of a barrier oblique to primary motion of water, designed to control movement of bed material.

Groundwater (also Ground Water)
1. Subsurface water, accumulating because of seepage and returning to the surface, as springs and through wells.
2. That part of the subsurface water that is in the zone of saturation, including underground streams.
3. Water in the ground that is in the zone of saturation, from which wells, springs, and ground-water runoff are supplied. This is not the same as underflow.

Groundwater Recharge The natural process of infiltration and percolation of rainwater from land areas or streams through permeable soils into water-holding rocks that provide underground storage ("aquifers").

Groundwater Recharge Area An area which by nature of surface soil and underlying rock type is particularly important for allowing surface water to percolate to underground storage.

Grouted Bonded together with an inlay or overlay of cement mortar.

Grouted Rock Rock held in place by a matrix of cement.

Growing Season The period, number of days, or both between the late frost in spring and the first freeze in fall for the freeze threshold temperature of the crop or other designated temperature threshold. May be based on air or soil temperature.

Gulch
1. A relatively young but well-defined erosional channel.
2. A sharply cut ravine.

Gully
1. A ravine formed where water has washed away topsoil.
2. Deep eroded cuts in an earthen surface (e.g., road, stream bank, etc.) caused by high velocity flows which are uncontrolled.
3. Diminutive of gulch; a similar channel through agricultural land.

Gully Erosion See *gullying.*

Gullying (also Gully Erosion) Formation or extension of gullies by surface run-off water.

H H H

Hardness The total concentration of calcium and magnesium ions expressed as mg/L calcium carbonate. (Syn: total hardness.)

Headcut A bare patch of soil at the upper end of a gully which is very susceptible to erosion and tends to progress further uphill.
Headcutting The upstream movement of a waterfall or a locally steep channel bottom due to the erosion caused by rapidly flowing water.

Head Wall A structure built at the upstream entrance to a culvert, made of rock, concrete, rock gabions, etc., to prevent cutting and eroding of the earthen fills over and around the culvert. (Well built culverts will usually have head walls on the downstream opening as well.)

Headwaters A term used in reference to the origin of a river. Low-order, usually high gradient.

Herbaceous (plant) A vascular plant that does not develop woody tissue.

Hewett Ramp An artificial obstruction placed in a stream consisting of a log laid across the stream and a submerged platform extending horizontally out from the log in the downstream direction to provide fish shelter.

High Water
1. Maximum flood stage of stream or lake.
2. Periodic crest stage of tide.

Humboldt Bridge A "temporary" stream crossing built by placing logs in a stream along the stream axis and capped with dirt or gravel to the desired road elevation. (Humboldt bridges can be very damaging to streams as they block fish migration and cause erosion.)

Hydraulic Pertaining to water in motion and the mechanics of the motion.

Hydraulic Control Point
1. The top of an obstruction to which stream flow must rise before passing over.
2. A point in the stream where the flow is constricted.

Hydraulic Gradient
1. The slope of the water surface.
2. The drop in pressure head per length in the direction of stream flow.

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

Hydrograph A graph showing the stage, flow, velocity, or other property of water with respect to time.

Hydrographic Pertaining to the measurement or study of bodies of water and associated terrain.

Hydrologic Pertaining to the cyclic phenomena of waters of the earth - successively as precipitation, runoff, storage and evaporation, and quantitatively as to distribution and concentration.

Hydrology
1. The branch of physical geography concerned with the behavior of water in the atmosphere, on the surface of the earth and underground.
2. The science dealing with the properties, distribution and circulation of water.

Hydro-mulching Seeding of grasses, mixed with fertilizer, a wood pulp mulch, and a "tackifier" to stick the mix to the ground, applied by a machine blower in a wet condition to exposed, denuded slopes or embankments. (If no mulch is used, it is Hydro-seeding.)

Hydrophytic (plant) A plant which is adapted to growing in anaerobic (saturated or inundated) soil.

Hydroseed To spray land with a mixture of water and seeds, thereby dispersing and watering the seeds simultaneously.

Hydrostatic Pertaining to pressure by and within water due to gravitation acting through depth.

I I I

Impinge To strike and attack directly, as in curvilinear flow where the current does not follow the curve but continues on tangent into the bank on the outside of a bend in the channel.

Improvement Flow See *Flow*.

Incised Stream See *Stream.*

Index Flow See *Flow*.

Indigenous (plant) Born, growing, or produced naturally (native) in an area, region, or country.

Instantaneous Flow See *Flow*.

Instream Flow See *Flow*.

Instream Flow Requirements See *Flow*.

Insulated Stream See *Stream.*

Intermontane Stream A stream within a forested, mountainous area.

Interrupted Stream See *Stream.*

Intergravel Flow See *Flow*.

Intermittent Stream See *Stream.*

Interrupted Stream See *Stream.*

Introduced (plant) A species not native to the area in which it was found. Brought by human activity from another geographical region. Similar to *Exotic.*

Inundation Submerged in water.

Intragravel Flow See *Flow*.

Invert The bottom (at its deepest point) of any streambed or channel, natural, or manmade (i.e., the bottom of any culvert, etc.). In a natural stream the term “thalweg” is generally used.

Isohyet Line on a map connecting points of equal precipitation.

Isovel Line on a diagram of a channel or channel section connecting points of equal velocity.

J J J

Jack (or Jackstraw) Bank protection element consisting of wire or cable strung on three mutually perpendicular struts.

Jacklines A series of large steel or iron "jacks," usually up to 10 feet in height and cabled together at intervals and "deadmanned" to the bank or tied to trees along the margin of a stream to prevent cutting and eroding by slowing down high velocity flows. Can help reclaim eroded soils by trapping silt, sand, etc.

Jam Wedged collection of drift in a constriction of a channel, such as a gorge or bridge opening.

Jet An effluent stream from a restricted channel, including a fast current through a slower stream.

Jetty An elongate artificial obstruction projecting into a stream or the sea from bank or shore to control shoaling and scour by deflection of strength of currents and waves.

Joint Planting Involves tamping live cuttings of rootable plant material into soil between the joints or open spaces in rocks (riprap) previously placed on a slope.

Jump Sudden transition from supercritical flow to the complementary subcritical flow, conserving momentum and dissipating energy; the hydraulic jump.

Junction Bar See *Bar Types.*

Jute Fiber used to make rope, twine or burlap. It is used in the construction of some geotextile fabrics.

L L L

Lacustrine A wetland or deepwater habitat situated in a topographic depression or dammed river channel which lacks trees, shrubs, emergents, mosses or lichens with greater than 30% aerial coverage. Total area has to exceed 20 acres with a depth greater than 2 meters.

Lagoon A small pond-like body of water connected to a larger body of water. A lagoon would be formed in a small stream during the summer when a sand bar closed off the mouth of the stream from the ocean.

Lake A water-filled basin with restricted or no outlet. Includes reservoirs, tidal ponds, and playas.

Laminar Flow See *Flow.*

Large Bole See *Large Woody Debris-Affixed Logs.*

Large Woody Debris (LWD) (also Large Organic Debris, LOD)

1. Any large piece of woody material that intrudes into a stream channel, whose smallest diameter is greater than 10 cm, and whose length is greater than 1 m.
2. A large piece of relatively stable woody material having a diameter greater than 30 cm (12 inches) and a length greater than 2 m (6 feet) that intrudes into the stream channel. Specific types of large woody debris include:

   Affixed Logs Single logs or groups of logs that are firmly embedded, lodged, or rooted in a stream channel.

   Bole Term referring to the stem or trunk of the tree.

   Large Bole 10 m (33 feet) or more in length; often in the stream for extended periods.

Small Bole Less than 10 m (33 feet) in length, usually sections of bole; seldom stable, usually move downstream on high flows.

Deadheads Logs that are not embedded, lodged, or rooted in the stream channel, but are submerged and close to the surface.

Digger Log Log anchored to the stream banks and/or channel bottom in such a way that a scour pool is formed.

Free Logs Logs or group of logs that are not embedded, lodged, or rooted in the stream channel.

Root Wad The root mass of the tree. (Syn: butt ends.)

Snag A standing dead tree. Sometimes a submerged fallen tree in large streams. The top of the tree is exposed or only slightly submerged.

Sweeper Log Fallen tree whose bole or branches form an obstruction to floating objects.

Lateral A man-made channel used to convey water from a canal to its delivery point.

Least Flow See *Flow*.

Lee Bar See *Bar Types*

Lentic Of or in water such as a stream or river (Compare *Lotic*).

Levee
1. An embankment built along a river for flood protection.
2. An embankment on or along the bank of a stream or lake to protect outer lowlands from inundation.

Lining Protective cover of the perimeter of a channel.

Littoral Pertaining to or along the shore, particularly to describe currents, deposits, and drift.

Littoral Drift Accumulation or movement of foreshore detritus along the shore, by littoral currents or the run-up and down of oblique waves.

Littoral Zone Region along the shore.

Live Cribwall See *Cribwall*

Live Gully Repair Utilizing alternating layers of live branch cuttings and compacted soil to repair small rivers and gullies.
Live Staking Planting technique which inserts and tamps live, rootable vegetative cuttings into the ground.

Log Jam A tangled mat of wooden logs or other tree debris obstructing the flow of water in a channel.

Longitudinal Profile Plot of the elevation versus the length of a stream channel. Elevation is normally the ordinate and length the abscissa.

Losing Stream See *Stream.*

Lotic Of or in running water such as a stream or river.

Low Flow See *Flow*.

M M M

Mainstream The principal, largest, or dominating stream or channel of any given area or drainage system.

Manning's n Empirical coefficient for computing stream bottom roughness; used to determine water velocity in stream discharge calculations.

Mattress Bank-protection structure consisting of a broad flat cage or network filled with stone and other local materials.

Mature Classification for streams which have established flat gradients not subject to further scour.

Mean Depth For a stream at any stage, the wetted normal section divided by the surface width. Hydraulic mean depth.

Meander
1. The winding of a stream channel.
2. Indirect or devious alignment of channels in erodible, alluvial valleys of a mature stream.
3. A reach of stream with a ratio of channel length/valley length greater than 1.5. By definition, any value exceeding unity can be taken as evidence of meandering, but 1.5 has been widely accepted by convention.

Meandering Channel Channels with sinuosities of 1.5 or more.

Mean Flow See *Flow*.

Mean Velocity For a stream at any stage, the discharge divided by area of the wetted normal section.

Mesh Woven wire or other filaments used alone as revetment, or as retainer or container of masses of gravel or cobble.

Mid-channel Bar See *Bar Types.*

Mid-summer soil moisture level The depth at which cuttings and whips should be planted to ensure adequate moisture through dry season. Varies due to soils and precipitation zones.

Minimum Flow See *Flow*.

Modified Flow See *Flow*.

Mouth A term referring to the end of a river, or the point at which one river discharges into another body of water (either a river**,** lake or ocean).

Moveable Bed A stream bed made up of materials readily transportable by the streamflow.

N N N

Native (plant) A species that evolved naturally in the region as determined by climate, soil, and biotic factors. Closely related to *Indigenous.*

Natural Flow See *Flow*.

Netting Mesh-like material of cables tied at contact points, used as a retardant revetment.

Nickpoint Interruption or break of slope, especially a point of abrupt change or inflection in the longitudinal profile of a stream or its valley, resulting from rejuvenation, glacial erosion or the outcropping of a resistant bed.

Non-consumptive Water Use Use that does not deplete water supplies (e.g., fishing and boating).

Nonpoint-source Pollution Pollution from sources that cannot be defined as discrete points, such as areas of timber harvesting, surface mining and construction. (Compare *point-source pollution*.)

Normal High Water A water level attained commonly during runoff season. Distinguished from extreme high water.

0 0 0

Optimum Flow See *Flow*.

Organic Debris Debris consisting of plant or animal material.

Organic Materials

Coarse Particulate Organic Matter (CPOM) Organic material having at least a dimension ranging from 1 mm to 10 cm. Technically includes both living and dead material, but often used more specifically to detritus.

Dissolved Organic Matter (DOM) or Dissolved Organic Carbon (DOC) Organic material having a least dimension smaller than 0.45 micron (passes through a 0.45 micron filter).

Fine Particulate Organic Matter (FPOM) Organic material having a least dimension ranging from 0.45 micron to 1 mm.

Outfall Discharge or point of discharge of a culvert or other closed conduit.

Outwash Debris transported from a restricted channel to an unrestricted area where it is deposited to form an alluvial or debris cone or fan.

Overbank Flooding Any situation in which inundation occurs as a result of the water level of a river or stream rising above bank level.

Overbank Storage Flow of water out of the stream channel and onto the valley floor floodplain during flood flows.

Overburden (also Surface-soil Capping) Soil or rock layers that cover mineral deposits and must be removed prior to mining.

Overflow Discharge of a stream outside its banks; the parallel channel carrying such discharge.

Overhanging Vegetation Live plants (all forms) which extend over the stream at least 12 inches from the bank and within 12 inches of the water's surface at low flow.

Overland Flow of surface waters before reaching a natural watercourse.

P P P

Palustrine Includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. Less than 20 acres and bounded by uplands with an average depth of less than 2 meters.

Peak Maximum momentary stage or discharge of a stream in flood.

Peak Flow See *Flow*.

Pebble Stone 0.5 to 3 inches in diameter, including coarse gravel and small cobble.

Penstock Sluice gate or valve for restraining, deviating or otherwise regulating a flow (as of water or sewage).

Percent Fines Percentage of fine sediments in substrate samples, expressed as a percentage by weight or volume less than some specified diameter.

Perched Stream See *Stream.*

Perennial (plant) A plant that lives more than two years.

Perennial Lasting throughout the year, as for continually flowing streams.

Perennial Stream See *Stream.*

Permeability A measure of the rate at which a substrate can pass water, the rate depending on substrate composition and compaction; the apparent velocity per unit of hydraulic gradient, expressed in cm/h.

Permeable Open to the passage of fluids, as for pervious soils and bank-protection structures.

pH A measure of the hydrogen-ion activity in a solution, expressed as the negative $\log_{10}$ of hydrogen ion concentration on a scale of 0 (highly acidic) to 14 (highly basic) with a pH of 7 being neutral.

Phreatophytes Woody plants which absorb and transpire high amounts of water, whereby they are capable of contributing to the drying out of wet localities.

Pier Vertical support of a structure standing in a stream or other body of water; used in a general sense to include bents or abutments.

Piling Structural members driven in beds of streams and other bodies of water and grouped in bents or sheets.

Placer Fluvial or glacial deposit of gravel or sand containing heavy ore minerals, such as gold or platinum, that have been eroded from bedrock and concentrated as small particles that can be washed out.

Placer Mining Mining of placer deposits by washing, dredging or hydraulic methods.

Playa Bed of a dry lake.

Plunge Flow with a strong downward component, as in outfall drops, overbank falls, and surf attach on a beach.

Plunge Pool Basin scoured out by vertically falling water.

Pocket Water A series of small pools surrounded by swiftly flowing water, usually caused by eddies behind boulders, rubble or logs, or by potholes in the streambed.

Point Bar See *Bar Types.*

Point-source Pollution Pollution emanating from a confined, discrete source such as a pipe, ditch, tunnel, well or floating craft. (Compare *nonpoint-source pollution*.)

Pole A rigid hardwood cutting generally larger in diameter than whips (≥ 1 inch).

Pollution The contamination of water (such as from raw sewage, industrial waste), making it unfit to support many forms of life.

Ponding An increase in water surface elevation upstream of a blockage or an obstruction.

Pool Portion of a stream with reduced current velocity, often with deeper water than surrounding areas and with a smooth surface.

Pool Feature The condition or object than characterizes a pool formation. These include: logs, trees, roots, stumps, brush, debris, channel meanders, sediment culverts, bridges, or other man-made objects, beaver dams, or tunnels.

Pool Quality An index (usually an integer from 1.5) of the estimated ability of a pool to support fish. Based on measurements of length, width, depth, velocity, and cover.

Pool-Riffle Ratio Ratio of the 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.

Pool tailout The downstream end of a pool where the bed surface gradually rises and the water depth increases. It may vary in length, but usually occurs immediately upstream of a riffle.

Potamology The hydrology of streams.

Pothole Bowl-like excavation in a streambed caused by corrasion in an eddy.

Precipitation Discharge of atmospheric moisture as rain, snow or hail, measured in depth of fall or in terms of intensity of fall in unit time.

Propagation Practices used to germinate seed or continue growth from a plant cutting in the open field or regulated environment such as a greenhouse.

Q Q Q

Q The symbol used by hydrologists to represent flow. It may also mean the design flow for a particular project. With a subscript number, Q refers to a flow recurrence interval; Q10 is the flow that occurs, on the

average, only once in 10 years (also known as the 10% frequency, or recurrence, event), Q25 is the flow which occurs only every 25 years (4% event), and Q100 occurs once in 100 years (1% event). The recurrence interval is a statistical average, not a fixed number of years. Q10, Q25, and Q100 are common design standards for flood control projects.

Quarrying Extraction of non-ore materials such as limestone, sand and gravel from open pits (quarries).

R R R

Rainwash The creep of soil lubricated by rain.

Ramping

1. In logging, the term refers to a short road or ramp which leads down from a haul road or skid road on a steep angle to a bridge, crossing, or streambed.
2. In general engineering, the term refers to construction of a temporary access road (ramp) from a bank above, down into a streambed either by cutting into the solid bank and building the ramp from the soil taken from the cut (cut ramp) or by filling the area between the top of the bank and the streambed with gravel (fill ramp).

Rapids

1. Swift turbulent flow in a rough, steep reach.
2. Fast and agitated current.
3. Stream section with considerable surface agitation, swift current and drops up to 2 m. Some waves may be present; rocks and boulders may be exposed at all but high flows. (Compare *glide; riffle; run*.)

Ravine Watercourse larger than a gully, smaller than a valley, and less bold in relief than a gulch or arroyo.

Reach

1. Section of stream between two specified points.
2. A length of stream, usually more or less uniform with respect to discharge, depth, area, and slope.
3. A relatively homogeneous section of a stream having a repetitious sequence of physical characteristics and habitat types.
4. A regime of hydraulic units whose overall profile is different from another reach.

Reaches Term used to describe sections of a river. The upper reaches refer to the beginning of a river; the lower reaches to the final stages of a river.

Critical Segments of stream that are required for the development and /or survival of a particular aquatic organism or to a particular life stage of an aquatic organism.

Representative Sections of stream which represents a large section of the stream with respect to hydraulic variables (depth, area, discharge, and slope) and biological constituents.

Recession Retreat of shore or bank by progressive erosion.

Reclamation The process designed to adapt a natural ecosystem to serve a utilitarian human purpose. It may put a natural ecosystem to a new or altered use, most often using introduced plants. It is often used to refer to processes that replace native ecosystems and convert them to agricultural, mining or urban uses.

Recurrence Interval Expected or observed time intervals between hydrological events of a particular magnitude described by stochastic or probabilistic models (log-log plots).

Reef Generally, any solid projection from the bed of a stream or other body of water.

Regimen The characteristic behavior of a stream during ordinary cycles of flow.

Regional Index Streams Streams considered typical of a region.

Regulated Flow See *Flow*.

Regulation Control of flow of a stream by storage or diversion.

Rehabilitation The process of making land "productive" again. An alternative ecosystem is created with different structure and function than the original ecosystem. It usually has a low species diversity and includes introduced species. It requires maximal human input to exist. Land uses include parklands, croplands, and commercial forests.

Relief The change in elevation of a land surface between two points; collectively, the configuration of the earth's surface, including such features as hills and valleys.

Repose The stable slope of a bank or embankment, expressed as an angle or the ratio of horizontal to vertical projection.

Reservoir Man-made body of water created by the damming, or the backing-up, of a river.

Restoration (ecological)

1. The return of an ecosystem to a close approximation of its natural condition prior to disturbance. The goal is to emulate a natural, functioning, self-regulating system that is integrated with the ecological landscape in which it occurs. It may involve the manipulation of natural processes of ecological succession to create a self-sustaining indigenous ecosystem. The restored ecosystem should simulate the natural condition before it was damaged, or some other native ecosystem appropriate for the new conditions of the landscape. It must be stable with a minimum of human input after the initial efforts that may involve hastening the rate of plant succession, reverting to an earlier seral stage, or altering the direction of succession.
2. The process of renewing and maintaining ecosystem health.
   Source: Society for Ecological Restoration. 1995.
3. Ecological restoration is the process of intentionally altering a site to establish a defined, indigenous, historic ecosystem. The goal of this process is to emulate the structure, function, diversity, and dynamics of the specified ecosystem.
   Source: Society for Ecological Restoration. 1990.

Restriction Artificial or natural control against widening of a channel, with or without construction.

Retard Bank-protection structure designed to check the riparian velocity and induce silting or accretion.

Retention Basin (Dam) A flood control structure that holds back flood water for a short period to take the peak off a downstream flood. The dam on a retention basin is usually provided with an opening too small to allow the full flood flow to pass. This restriction forces water to collect in the basin behind the dam, but as soon as the storm peak passes the basin quickly drains. Most of the time the basin is dry.

Retention Pond A retention pond allows water to be held as long as possible and may or may not allow for the controlled release of water. In some cases, the water is allowed to seep into the permeable banks or gravel strata in the foundation.

Retrogression Reversal of stream grading (i.e., aggradation after degradation or vice versa).

Return Flow See *Flow.*

Revegetation General expression used for the process of planting bare areas (raw mineral soils) to perennial plants or less often to annual plants.

Revetment Bank protection by armor, that is, by facing of bank or embankment with erosion resistant material.

Revetment Wall A wall made of concrete, stone, wood, or other materials which is built against a stream bank or a steep slope to prevent erosion.

Rib Wall Usually a rock, rock gabion, or broken concrete structure constructed across a stream below a dam or weir to raise the water level in a pool below the dam or weir. (This can be used in lieu of a fishway in some cases. Also used to slow down high water velocities.)

Ridgeline A line connecting the highest points along a ridge and separating drainage basins or small-scale drainage system from one another.

Riffle
1. Shallow section of a stream or river with rapid current and a surface broken by gravel, rubble or boulders. (Compare *glide; rapids; run*.)
2. A reach of stream in which the water flow is rapid and usually more shallow than the reaches above and below. Natural streams often consist of a succession of pools and riffles. (Sometimes incorrectly referred to as a "ripple".)

Rill
1. One of the first and smallest channels formed by surface runoff.
2. A small erosional channel, usually in parallel where surface waters run on steep unprotected soils.
3. A very small brook or trickling stream of water.

Rill Erosion See *Rilling.*

Rilling (also Rill Erosion) Development of numerous minute, closely spaced channels resulting from the uneven erosion of soil by running water.

Riparian
1. On, or pertaining to, the banks of a stream. (As in riparian vegetation or riparian woodland.)
2. Pertaining to the banks and other adjacent, terrestrial (as opposed to aquatic) environs of freshwater bodies, watercourses, and surface-emergent aquifers (e.g., springs, seeps, oases), whose imported waters provide soil moisture significantly in excess of that otherwise available through local precipitation - soil moisture to potentially support a mesic vegetation distinguishable from that of the adjacent more xeric upland.

   Source: Warner and Hendrix. Riparian Resources of the Central Valley and California Desert 1985. California Department of Fish and Game.

Riparian Area The area between a stream or other body of water and the adjacent upland identified by soil characteristics and distinctive vegetation. It includes wetlands and those portions of floodplains and valley bottoms than support riparian vegetation.

Riparian Land Land situated along the bank of a stream or other body of water.

Source:"Resource Conservation Glossary" Third Edition.

Riparian Vegetation
1. Vegetation which occurs in and/or adjacent to a watercourse. For the purpose of administering Fish and Game Code Section 1600, et seq., this should be expanded to include vegetation adjacent to lakes as well.
2. Vegetation growing on or near the banks of a stream or other body of water on soils that exhibit some wetness characteristics during some portion of the growing season.
3. Vegetation which occurs along watercourses, and is structurally or floristically distinct from nearby, non-streamside vegetation.
4. Riparian vegetation is terrestrial vegetation that grows beside rivers, streams, and other freshwater bodies and that depends on these water sources for soil moisture greater than would otherwise be available from local precipitation.

   Source: Warner, RE. and Hendrix, KM., eds. 1984. California Riparian Systems, Ecology, Conservation, and Productive Management. California Riparian Systems Conference, U.C. Davis. September 1981. University of California Press. Berkeley, California.

Riparian Woodland (Riparian Forest)
1. The broad-leaved and winter deciduous, phreatophytic tree formation that lines watercourses.
   Source: Ornduff, R "An Introduction to California Plant Life." 1974.
2. Streamside forest composed of either wetland species (e.g., willow, cottonwood, etc.) or non-wetland species (e.g., oak, walnut, and California bay).

Riprap
1. Layer of large, durable materials (usually rocks; sometimes car bodies, broken concrete, etc.) used to protect a stream bank or lake shore from erosion; may also refer to the materials used.
2. A layer of irregularly placed stones or debris positioned on the bank of a stream or beside a levee to resist the eroding action of flowing water.

River A large streams usually active when any streams are flowing in the region.

River Continuum Gradual changes in the biological community of a river as energy sources and physical conditions change from headwaters to lowlands.

Riverine Includes all wetlands and deepwater habitats contained within a channel. Usually contains flowing water and is bounded by uplands.

Rock
1. Cobble, boulder, or quarry stone as a construction material.
2. Hard natural mineral, in formation or in piles of talus or detritus.

Rock Fill Dam A dam composed of large, broken, and loosely placed or pervious rocks with either an impervious core or upstream facing or surface layer.

Roiled Water that has been made turbid by the addition of sediment.

Rootwad See *Large Woody Debris.*

Rotation The planned number of years between successive cuttings of a forest; livestock grazing strategy in which cattle are moved from one pasture to another during the grazing season.

Rubble
1. Rough, irregular, waterworn rock fragments of random size.
2. Stream substrate particles between 64 and 256 mm (2.5 and 10 inches) in diameter.

Roughness Coefficient Designated by "N" in Manning's flow equation, the roughness coefficient is an expression of the resistance to flow of a surface such as the bed or bank of a stream.

Run (stream) Swiftly flowing stream reach with little surface agitation and no major flow obstructions. Often appears as a flooded riffle. (Compare *glide; riffle; rapids*.)

Run-off (also Runoff)
1. Water flowing in a river as a result of snow melt or heavy rains.
2. The part of precipitation and snowmelt that reaches streams (and thence the sea) by flowing over the ground.
3. The portion of rain or snow that does not percolate into the ground and is discharged into streams.
4. That part of water yield that appears in streams. Expressed in acre feet per year.

S S S

Sack Concrete Wall A bank stabilization technique where burlap sacks of dry concrete mix are placed from a toe trench in a terraced formation up an embankment, then wetted thoroughly and packed down. While curing, the run-off from sack concrete is highly alkaline (has a high pH); sack concrete walls should not be built in direct contact with the flowing streams

Safe Yield The amount of water that can be withdrawn from a groundwater basin without producing an undesired result such as depletion of groundwater reserves, intrusion of water of undesirable quality, excessive depletion of streamflow by induced infiltration, or land subsidence.

Saltation Bed load transport by leaps or bounds.

Saltwater Intrusion The induced movement of ocean water into coastal aquifers that have been depleted of fresh water generally due to over-drafting (excessive withdrawal from wells) and/or reduction of recharge.

Sand
1. Substrate particles 0.062 to 2 mm in diameter.
2. Granular soil or detritus coarse than silt and finer than gravel, ranging in diameter from 0.002 to 0.2 inch.

Scour
1. Local removal of material from streambeds by flowing water. (Compare *fill*.)
2. The erosion action of flowing water in stream that removes and carries away material from the bed and banks.

Scour Pool Pool formed by scour when flowing water impinges against and is diverted by a stream bank or channel obstruction (e.g., rootwad, woody debris, boulder, bedrock, etc.).

Scoured Areas Local zones within a stream where material is removed from the streambed by flowing water. (Compare: *depositional areas.*)

Seasonal Stream See *Stream.*

Second-foot Unit of discharge, equal to one cubic foot of liquid per second.

Sediment
1. Material carried and deposited by water.
2. Fragments of rock, soil and organic material transported and deposited in beds by wind, water or other natural phenomena. The term can refer to any size of particles but is often used to indicate only fragments smaller than 6 mm.

Sediment Discharge The mass or volume of sediment (usually mass) passing a stream transect in a unit of time. The term may be qualified, for example, as suspended-sediment discharge, bedload discharge, or total-sediment discharge, usually expressed as tons per day.

Sediment Load The portion of the total sediment load that moves in suspension, free from contact with the streambed, and is made up of particles having such density or grain size as to permit movement disassociated from the streambed. Density and grain size vary according to the amount of turbulence.

Sediment Loading The total sediment in a stream system, whether in suspension (suspended load) or on the bottom (bed load).

Sediment Wedge Thick, wedge-shaped deposit of mixed soil, rock and organic debris injected into a stream channel by debris avalanches and debris flows from adjacent hillslopes.

Sedimentation
1. Gravitational deposit of transported material in flowing or standing water.
2. Deposition of material suspended in a stream system, whether in suspension (suspended load) or on the bottom (bed load).

Sedimentation Dam A dam which is designed to collect sediment from the water flowing over or through it, thereby filling in a portion of a streambed or gully.

Seep An area of minor groundwater outflow onto the land surface or into a stream channel. Flows are too small to be a spring.

Seepage Percolation of underground water through the banks and into a stream or other body of water.

Seiche Resonant oscillation of a large body of water due to transient variation of atmospheric pressure.

Seston Particulate matter suspended in water.

Settling Basin Retention basin whose primary purpose it is to provide extremely low flow velocities to allow water-borne silt to settle out.

Shear stress The shear stress or tractive force results from the tangential pull of flowing water on the stream bed and banks, and is expressed in pounds per square foot or n/m^2. The energy expended on the wetted perimeter of the stream increases proportionally with the energy slope and water depth.

Sheet Erosion
1. Initial surface erosion by water running off as sheets, as distinct from channelized erosion in rills and gullies.
2. The uniform washing or eroding of surface soils on a large denuded surface area or a steep embankment or slope.

Shingle Beach or streambed cover of flat pebbles or small cobbles in a thin and fairly uniform layer.

Shoal A shallow region in flowing or standing water, especially if made shallow by deposition.

Shore Beach or bank between high and low water marks on lake or tidewater; also combining form in backshore, foreshore, onshore, offshore, longshore, and nearshore.

Shotgun Culvert A culvert which discharges directly onto an unprotected slope. Typically these will have a large eroded gully below the culvert discharge, and often there will have been substantial erosion of culverts supporting material, leaving the downstream end projecting well out from the bank.

Shrub A woody perennial plant differing from a tree by its low stature and by generally producing several basal shoots instead of a single stem.

Side Bar See *Bar Types.*

Side-cast *Noun:* Road construction material that is not used for fill and is pushed to or placed on the down-slope side of the road. Such material may travel long distances down slope before coming to rest.
Verb: To move such material.

Silt
1. Earthy sediment of fine particles of rock and soil suspended in and carried by water.
2. Substrate particles 0.004-0.062 mm in diameter.

Siltation
1. The accumulating deposition of eroded material.
2. The gradual filling in of streams and other bodies of water with sand, silt, and clay.

Silviculture The tending, harvesting and replacement of forests, resulting in forests of distinctive form.

Sinuosity
1. The ratio of channel length between two points on a channel to the straight line distance between the same two points.
2. The ratio of channel length to down valley length.

Slack Water A quiet part of, or a still body of water in, a stream (e.g., on the inside of a bend, where the current is slight).

Slash
1. Woody residue left on the ground after trees are felled, or accumulated there as a result of a storm, fire or sivicultural treatment.
2. Limbs, branches, and other small debris left over after the trunk of a tree has been removed from a site.

Slide Gravitational movement of unstable mass of earth (and associated organic matter) onto the highway.

Slipout Gravitational movement of unstable mass of highway embankment or stream bank.

Slope
1. Land gradient described as the vertical rise divided by the horizontal run and expressed in percent.
2. For engineering purposes, slope is expressed as horizontal distance over vertical distance (e.g., a slope of "3 to 1" (3/1) is one with 1 vertical unit for every 3 horizontal units). A slope of "6 to 1" (6/1) is much flatter than a slope of "2 to 1" (2/1).

Slough (Slu)
1. A side or overflow channel in which water occasionally is stagnant or slack.
2. A waterway in a tidal marsh.

Slough (Sluf) Slide or slipout of a thin mantle of earth, especially in a series of small movements.

Sluiceway Artificial channel for water, often having a gate or valve at its head to regulate the flow.

Slump A landslide in which a whole mass of earth subsides as a unit, sometimes rolling slightly as well as moving downwards.

Small Bole See *Large Woody Debris-Affixed Logs.*

Snag See *Large Woody Debris.*

Spring Underground water emerging naturally from the earth.

Spring Creek A stream that derives most if its flow from groundwater, with relatively constant flow and temperature.

Spur A dike anchored to higher ground at one end and exposed to current at the other.

Stabilization (channel) See *Channel Stability*.

Stability Rating An index of the resistance or susceptibility of the stream channel and banks to erosion.

Stage
1. The elevation of a water surface above or below an established datum or reference.
2. Elevation of water surface above an arbitrary datum, such as bed level, low water, mean sea level, or mean lower low water.

Stage, Flood Stage at which banks overflow or damage begins or is threatened.

Stand
1. A population of plants.
2. Density of population or number of individuals per unit area.

Stem Flow Precipitation that is temporarily intercepted by trees and other vegetation but eventually runs to the ground along stems.

"Stinger" A 4 inch by 8 ft pointed steel rod that is attached to a backhoe in place of the bucket. It operates by shoving a hole into a steep channel face and then, in another operation, pushing the cutting into the hole.

Stock, rooted Any tree, woody shrub, or herbaceous plant with established roots. This includes rooted cuttings, balled and burlapped, bareroot, and containerized plants.

Submergent or Submersed (plant) Aquatic plants having all parts submerged beneath the water surface.

Sub-shrub A plant of which the shoots become woody in the lower section only, whereas the upper ones remain herbaceous and die off every year. Also called half-shrub or sufferescent.

Stone Rock or rock-like material; a particle of such material, in any size from pebble to the largest quarried blocks.

Storage Detention or retention of water for future flow, naturally in channel and marginal soils or artificially in reservoirs.

Storm Intense or prolonged rain or wind.

Storm Flow (also Freshet) Rapid temporary rise in stream discharge caused by heavy rains or rapid melting of snow or ice.

Storm Run-off Surplus surface water generated by rainfall that does not seep into the earth but flows overland to flowing or stagnant bodies of water.

Strand
1. Lodge on bars, banks, or overflow plain, as for drift.
2. Bar of sediment connecting two regions of higher ground.

Stream

1. A is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. Stream in natural channels may be classified as follows:

In relation to <u>time</u>:

Ephemeral Stream A stream that flows briefly and only in direct response to local precipitation and whose channel is always above the water table.

Intermittent (Seasonal) Stream

1. One in contact with the groundwater table that flows only at certain times of the year as when the groundwater table is high and/or when it receives water from springs or from some surface source(e.g., melting snow in mountainous areas). It ceases to flow above the stream bed when losses from evaporation or seepage exceed the available streamflow.
2. A stream that normally flows for at least thirty (30) days after the last major rain of the season and is dry a large part of the year.
3. A stream which flows only during the wet season, may also be called an intermittent stream.

Perennial Stream (Permanent Stream) A stream that flows continuously throughout the year.

In relation to <u>space:</u>

Continuous Stream A stream that does not have interruptions in space (i.e., dry sections).

Interrupted Stream A stream that contains alternating reaches that are either perennial, intermittent or ephemeral.

In relation to <u>groundwater:</u>

Insulated Stream A stream or reach of a stream that neither contributes to nor receives water from the zone of saturation. It is separated from the zones of saturation by an impermeable bed.

Gaining Stream A stream or reach of stream that receives water from the zone of saturation.

Losing Stream A stream or reach of stream that contributes water to the zone of saturation.

Perched Stream Either a losing stream or a insulated stream that is separated from the underlying groundwater by a zone of aeration.

<u>Other:</u>

Incised Stream A stream that has, through degradation, cut its channel into the bed of the valley.

Stream Bank (also Streambank) The portion of the channel cross section that restricts lateral movement of water at normal water levels. The bank often has a gradient steeper than 45 degrees and exhibits a distinct break in slope from the stream bottom.

Lower Bank The periodically submerged portion of the channel cross section from the normal high water line to the water's edge during the summer flow period.

Upper Bank That portion of the topographic cross section from the break in the general slope of the surrounding land to the normal high water line.

Stream Capacity Total volume of water that a stream can carry within the normal high water channel.

Stream Density (also Drainage Density) Kilometers of stream per square kilometer or area.

Stream, Ephemeral A stream that flows only in direct response to precipitation and whose channel is at all times above the water table.

Streamflow The actual surface flow of a stream whether or not subject to regulation. Expressed in cfs.

Stream Frequency The number of streams per square kilometer of area.

Stream, Intermittent or Seasonal A stream which flows only at certain times of the year when it receives water from ground or surface sources.

Stream Order A number from 1 to 6 or higher, ranked from headwaters to river terminus, that designates the relative position of a stream or stream segment in a drainage basin network. First-order streams have no discrete tributaries; the junction of two first-order streams produces a second-order stream; the junction of two second-order streams produces a third-order stream; etc.

Stream, Perennial A stream which flows continuously.

Stream Power The rate of doing work, or a measure of the energy available for moving rock, sediment particles, or woody or other debris in the stream channel, as determined by discharge, water surface slope, and the specific weight of water.

Stream Reach See *Reach.*

Stream Type (Rosgen) A stream classification system based upon a combination of stream gradient, sinuosity, width / depth ratio, channel materials, entrenchment, confinement, and soil/land/form.

Stream Width (also Wetted Width) The width of the water surface measured at right angles to the direction of flow and at a specific discharge. Widths of multiple channels are summed to represent total wetted width.

Strip Mining Surface mining that creates either a long, continuous excavation bordered by one or two parallel waste piles to remove a horizontal deposit from a hillside *(contour mining)*, or an alternating series of parallel excavations and waste piles to remove a deposit from a broad surface area.

Sublimation Vaporization of a solid without an intermediate liquid phase.

Subsidence

1. The settling of an area of land due to the decomposition of organic material in the soil, the removal of groundwater, or other reasons.
2. The gradual settling or sinking of an area with little or no horizontal motion.

Substrate Mineral or organic material that forms the bed of a stream.

Subsurface Flow See *Flow.*

Surface Storage Precipitation retained temporarily in depressions of the ground surface, neither infiltrating nor running off until after a rainfall period.

Surface Water
1. Water on the surface of land, in lakes, ponds, streams or rivers.
2. Water contained in an ocean, river, stream, lake, pond, lagoon, or impoundment reservoir.

Surge A sudden swelling of discharge in unsteady flow.

Survival Flow See *Flow*.

Suspended Sediment That part of a stream's total sediment load carried in the water column. (Compare *bed-load sediment*)

Swale
1. A long, narrow, shallow, natural depression in the land.
2. An artificial depression excavated to carry water across a region during times of rainfall.

Swamp Tree or tall shrub dominated wetlands that are characterized by periodic flooding and nearly permanent subsurface water flow through mixtures of mineral sediments and organic materials, essentially without peat-like accumulation.

Sweeper Log See *Large Woody Debris.*

T T T

Talus detritus from a steep hill or cliff standing at repose along the toe.

Terrace Berm or bench-like earth embankment with a nearly level plain bounded by rising and falling slopes.

Tetrahedron Bank protection element, basically composed of six steel or concrete struts joined like the edges of a triangular pyramid, together with subdividing struts and tie wires or cables.

Tetrapod Bank protection element, precast of concrete, consisting of four legs joined at a central block, each leg making an angle of 109.5^{o} with the other three, like rays from the center of a tetrahedron to the center of each face.

Thalweg
1. The line connecting the lowest or deepest points along a streambed.
2. The line of deepest water within the low flow channel of a stream. The term "invert" is usually used by engineers, especially for artificial channels or culverts.

Thread The central element of a current, continuous along a stream.

Tie-Back Rocks Individual sections of riprap or other structural protection placed perpendicular into an eroding bank to prevent flanking by floodwaters.

Toe
1. The base of a stream bank.
2. The break in slope at the foot of a bank where the bank meets the bed.

Toe Trench A trench excavated at the base or toe of an embankment into which rock, rock gabions, broken concrete rubble, sack concrete, or other solid, large, non-erodible material is placed to serve as the foundation for bank revetment material. Use of a toe trench minimizes the chance of the revetment being undercut and slumping into the stream.

Topography Configuration of a surface, including its relief and the position of natural and man-made features.

Topping The top layer on horizontal revetments or rock structures; also capping or cap stones.

Torrent
1. A temporary flow condition in streams created by heavy rainfall or rapid snow melt; characterized by near bankfull discharge, sizable increase in velocity, standing waves, and loss of the typical stepped profile and hydraulic diversity of habitat.
2. Natural watercourse in steep mountains and with highly fluctuating flow or water.

Training Control of direction of currents.

Transition A relatively short reach or conduit leading from one waterway section to another of different width, shape, or slope.

Transport To carry solid material in a stream - in solution, suspension, saltation, or entrainment.

Transverse Bar See *Bar Types.*

Trash Collector Dam A fence-like structure or grillwork of heavy wire, metal, or logs placed across a stream to intercept and hold debris flowing downstream, creating a dam or blockage. Used to protect bridge crossings, create pools, and store gravel for spawning habitat.
(Syn: Debris catcher, grizzly.)

Trash Rack A structure made of steel posts, wooden piling, or heavy fencing and placed in a vertical position across a streambed to allow water to flow through while trapping debris carried by the stream. (Effective in keeping culverts, etc., from plugging up and washing out.)

Tree A woody perennial with one main stem (usually) developing from one shoot, reaching a height of at least 3 m.

Tributary
1. A river or flowing into a larger river or stream.
2. Stream flowing into a lake or larger stream.

Trough Space between wave crests and the water surface below it.

Turbidity
1. Relative water clarity.
2. A measurement of the extent to which light passing through water is reduced due to suspended materials.
3. Roiled by fine visible material in suspension.

Turbulence
1. The motion of water where local velocities fluctuate and the direction of flow changes abruptly and frequently at any particular location, resulting in disruption of laminar flow.
2. Agitation of flowing water by cross currents and eddies, particularly small-scale agitation derived from boundary roughness.

Turbulent Flow See *Flow.*

Turning Rocks Rows of boulders placed in a bend starting at the upstream outside bank and angled toward the inside bank to reduce erosion.

U U U

Undercut Bank A bank than has had its base cut away by the water action along man-made and natural overhangs in the stream.

Undercutting Erosion of the stream bank toe resulting in an overhang. If the bank is stable (a solid system of tree roots to hold the soil together), the undercut is usually an excellent fish habitat feature; if the bank is unstable soil or a man-made structure, undercutting is likely to lead to bank failure as the unsupported material collapses.

Underflow That portion of a stream which is flowing through the permeable deposits underlying the surface stream. The measured flow of a stream does not normally include underflow. Underflow is not the same as groundwater.

Uniform Flow See *Flow.*

Unimpaired Flow See *Flow.*

Upland Generally a land zone sufficiently above or away from freshwater bodies, watercourses, and surface-emergent aquifers to be largely dependent on precipitation for its water supplies.

V V V

Vegetated Rock Gabion Rectangular containers fabricated from a triple twisted, hexagonal mesh of heavily galvanized steel wire. Layers of rock and live branches are placed within structure which is folded shut and wired together. Use is intended to stabilize toe and steep slopes, but not designed to resist large, lateral earth stresses.

Vegetated geogrid Geotextile material is used to support fill sections of a stream bank. Similar to brush layering. The material is used in between the layers of live branches and along the face of the slope.

Vegetated rock wall A combination of rock and live branch cuttings used to establish stability and protection of toe and steep slopes. Not intended to resist large lateral earth pressures.

Vegetative Fish Cover Vegetation materials (e.g., algal mats, organic debris) capable of providing protection for fish and other aquatic organisms.

Velocity The time rate of motion; the distance traveled divided by the time required to travel that distance.

Critical Velocity The velocity in a channel at which flow changes from laminar to turbulent.

Mean Column Velocity The average velocity of the water measured on an imaginary vertical line at any point in a stream. A measurement of 60 percent of the depth, measured from the surface, closely approximates the average velocity for the water column. In water greater then 76 cm in depth, the average of measurements made at 20 percent and 80 percent of the depth approximates the mean column velocity.

Mean Cross Sectional Velocity The mean velocity of water flowing in a channel at a given cross section. It is equal to the discharge divided by the cross sectional area of the cross section.

Thalweg Velocity The mean column velocity at the thalweg.

View Corridor

1. The line of sight (identified as to height, width, and distance) of an observer looking toward an object of significance to the community (e.g., Ridgeline, river, historic building, etc.)
2. The route than directs the viewers attention.

Viewshed The area within view from a defined observation point.

V-notch

1. Narrow, steep-sided ravine or valley with V-shaped cross-section whose bottom usually contains a watercourse.
2. A type of weir containing a V-shaped notch used for gauging discharge in small streams.

V Weir A dam shaped like a “V” pointing upstream, with the ends of the “V” buried into the stream banks at a 45-degree angle.

W W W

Warm-season plant A plant that completes most of its growth during the warm part of the year, generally late spring and in summer.

Wash Flood plain or active channel of an ephemeral stream, usually in recent alluvium.

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

Water Chemical water, plus materials, transported in solution or suspension.

Water-bar

1. Shallow channel (cross-drain) or raised barrier (packed earth or a thin pole) laid diagonally across the surface of a road to guide water off the road.
2. A ditch, dike, dip, or a combination thereof constructed across tractor roads, skid trails, fire breaks, and roads diagonally, so that water flow is effectively diverted therefrom.

Watercourse
1. A channel with bed and banks which discharges water continuously or whenever seasonal streams are active in the region.
2. Natural or once natural flowing (perennially or intermittently) water including rivers, streams, and creeks.

Water Rights A legal right to use surface water. This may be a common law riparian right wherein a property owner is entitled to use of water which touches his/her property or may be an appropriative right granted by the State Water Resource Control Board.

Watershed
1. An area so sloped as to drain a river and all its tributaries to a single point or particular area. An area from which a river receives its water supply.
2. The total area above a given point on a watercourse that contributes water to its flow; the entire region by a waterway or watercourse that drains into a lake or reservoir.
3. A convex surface such as a mountain or a hill which sheds water from one high point or ridge into several streams which may form its boundary. Watershed is commonly confused with 'damage basin' which is a concave surface that collects precipitation into a stream.

Water Supply Watershed All of the land area that contributes surface run-off to an existing or proposed reservoir or intake used for water supply.

Water Table
1. Irregular surface of contact between the zone of saturation and the zone of aeration; that surface of a body of unconfined groundwater at which the pressure is equal to that of the atmosphere.
2. The upper level of a water-saturated zone extending beneath the ground to where the soil and all openings in the rocks are saturated.

Waterway
1. A navigable inland body of water.
2. The section under a bridge available for the passage of water.

Water Year (Climatic Year) A continuous 12-month period during which a complete annual cycle occurs. The USGS uses the period October 1 to September 30 in the publication of its records of streamflow.

Water Yield The total outflow from all or part of a drainage basin through either surface channels or subsurface aquifers within a given time (e.g., one year).

Wattling A procedure where willow cuttings are bound together and embedded in eroded or cut banks. The cuttings will sprout and help stabilize the bank. Wattles must be placed low on the bank where the soil remains moist.

Wave
1. An oscillatory movement of water on or near the surface of standing water in which a succession of crests and troughs advance while particles of water follow cyclic paths without advancing.
2. Motion of water in a flowing stream so as to develop the surficial appearance of a wave.

Wave, Flood The sudden rise of water surface upon the approach of a flood crest, particularly if the celerity of the crest exceeds the mean velocity of the stream.

Wave Height Elevation of crest above preceding trough.

Wave Length Normal spacing of successive crests.

Wave Period Time interval between passage of successive crests.

Weep Hole in wall, invert, apron, lining, or solid structure to relieve pressure of groundwater.

Weighted Usable Area (WUA)
1. An index of the capacity of a stream reach to support the species and life stage being considered, expressed as actual area or percentage of habitat area predicted to be available per unit length of stream at a given flow.
2. The total surface area having a certain combination of hydraulic and substrate conditions, multiplied by the composite probability of use by fish for the combination of conditions at a given flow.

Weir
1. Notch or depression in a dam or other water barrier through which the flow of water is measured or regulated.
2. A barrier constructed across a stream to divert fish into a trap.
3. A dam (usually small) in a stream to raise the water level or divert water flow.

Well
1. Artificial excavation for withdrawal of water from underground storage.
2. Upward component of velocity in a stream.

Wet-mantle Peak Flow Highest flow or discharge that results when the soil is almost or completely saturated.

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

Wetted Perimeter The length of the wetted contact between a stream of flowing water and the stream bottom in a vertical plane at right angles to the direction of flow.

Wetted Width See *Stream Width.*

Whip Any woody cutting (usually flexible) with a diameter < 3 inches.

Width to Depth Ratio The ratio of water width to average water depth.

Windbreak Barrier fence of trees to break or deflect the velocity of wind.

Wing Deflector A triangular structure installed in a stream, protruding from one bank out into the center of the stream channel so as to restrict the water flow to a more narrow cross-sectional area, creating an increased flow velocity next to the deflector, a scour hole directly downstream of the structure, and a silt bar further downstream on the same bank as the structure.

Windthrow (also Blowdown) The uprooting and felling of trees by strong gusts of wind. Also, patches of trees that have been so felled.

Windwave A wave generated and propelled by wind blowing along the water surface.

XYZ XYZ XYZ

Xeric Dry environment, usually associated with a lack of precipitation or moisture.

Yield The total water run-out includes run-off plus underflow. Also, often used to enumerate the planned or actual volume of water stored within a reservoir which may be released on demand. Expressed in acre feet per year.

Young Immature, said of a stream on a steep gradient actively scouring its bed toward a more stable grade.

ACKNOWLEDGMENT:

This glossary is part of a collaborative effort between the USDA NRCS Pullman Plant Materials Center, Pullman, Washington and The Habitat Restoration Group of Felton, California to provide a foundation of working ecological definitions.

USDA - NRCS
Pullman Plant Materials Center
P.O. Box 646211
Pullman Washington 99164-6211
Phone: (509) 335-7376
Fax: (509) 335-2940
Email: pmc_nrcs@wsunix.wsu.edu
URL: http//www.wsu.edu/pmc_nrcs

The Habitat Restoration Group
P.O. Box 4006
Felton, California 95018
Phone: (408) 335-6800
Fax: (408) 335-6810
Email: hrg@cruzio.com
URL: http//www.habitat-restomtion.com

References

Bauer, S. B. and Burton, T. A. 1993. Monitoring Protocols to Evaluate Water Quality Effects of Grazing Management on Western Rangeland Streams. United States Environmental Protection Agency Water Division. Surface Water Branch, Region 10, Seattle Washington. EPA 910/R-93-017.

California Department of Fish and Game. 1994. A Field Guide to Stream and Alternation Agreements (Sections 1600-1607, California Fish and Game Code). Environmental Services Division.

California Department of Transportation. 1970. Bank and Shore Protection In California Highway Practice.

Crowder, W. A. 1995. Collecting Willow, Poplar and Redosier Dogwood Hardwood Cuttings for Riparian Site Plantings. United States Department of Agriculture, Natural Resources Conservation Service. Technical Note # 29. Pullman Plant Materials Center, Pullman, Washington.

Department of Ecology, Washington State. 1993. Restoring Wetlands in Washington; A guidebook for Wetland Restoration, Planning, and Implementation. Publication # 93-17.

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Fanning, D. S. and Fanning, M. C.B 1989. Soil Morphology, Genesis, and Classification. John Wiley & Sons Inc., New York, New York.

Flosi, G. and F.I. Reynolds. 199_. California Salmonid Stream habitat Restoration manual (Second Edition). California Department of Fish and Game, Inland Fisheries Division.

Harmann, H.T. and Kester, D. E. 1975. Plant Propagation; Principles and Practices, Third Edition. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

Lambert, S. 1994. Ecological Definitions. United States Department of Agriculture, Soil Conservation Service. Plant Materials Technical Note # 26. Spokane, Washington.

Macdonald, B. 1986. Practical Woody Plant Propagation For Nursery Growers, Volume I. Timber Press, Portland, Oregon.

Schiechtl, H. 1980. Bioengineering for land reclamation and conservation. University of Alberta Press, Edmonton, Alberta, Canada.

USDA, SCS. 1968. Glossary of terms commonly used in plant materials work. National Plant Materials Manual. Part 542.3 pp. 542-24 - 542-29.

USDA, SCS. 1992. Engineering Field Handbook; Chapter 13. Wetland Restoration, Enhancement, or Creation. 210-EFH Part 650.

USDA, SCS. 1992. Engineering Field Handbook; Chapter 18. Soil Bioengineering for Upland Slope Protection and Erosion Reduction. 210-EFH, Part 650.

USDA, FWS. 1976. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, Washington, D.C. FWS/OBS-79-3 1. Reprinted 1992.

Wetland Training Institute, Inc. 1991. Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual. WTI 91-2. 133 pp

SECTION 9.3 Glossary of Terminology commonly used in Mining & Reclamation Technology

(Prepared by Bruce Munda Plant Res. Spec., NRCS, Tucson, AZ, 2001)

Acid Mine Drainage:
Water mixed with sulfuric acid and having a pH of less than 6.0. This mixture can be discharging from an active mine or abandoned mine. Ore or other minerals containing sulfides (iron pyrite) oxidizes (when exposed to water, air, or other weathering processes) and forms sulfuric acid. The sulfuric acid mixes with water and flows out of the mine into surrounding areas as acid mine drainage.

Acid Spoil/Waste:
Spoil material containing sufficient pyrite so that weathering produces acid water and the pH of the soil determined by standard methods of soil analysis is between 4.0 and 6.9.

Adit:
A horizontal entrance to an underground mine

Angle of Repose:
The greatest angle to the horizontal that any loose or fragmented solid material will stand without sliding or come to rest when poured or dumped in a pile or on a slope.

Approximate Original Contour:
Backfilling and grading previously mined areas so that the mined area resembles the general surface configuration of the land and surrounding area prior to mining.

Biodiversity:
(1) The total variability within and among species of living organisms and the ecological complexes they inhabit. Biodiversity has three levels – ecosystem, species, and genetic diversity – reflected in the number of different species, the different combination of species, and the different combinations of genes within each species.
(2) The totality of genes, species, and ecosystems in a region or the world.

Biotype:
A group of individuals within a population occurring in nature, all with essentially the same genetic constitution. A species usually consists of many biotypes. (See ecotype).

Broadcast Seeding:
Process of scattering seed on the surface of the soil prior to natural or artificial means of covering the seed with soil.

Cabling/Chaining:
The use of a large cable pulled between two large tractors (usually crawler tractors) to pull down or uproot brush. Chaining uses a large ship anchor chain with each chain link weighing 80 to 100 pounds.

CERCLA:
Comprehensive Environmental Response, Compensation and Liability Act of 1980. This act created the Superfund program, which provided for identification and cleanup of hazardous sites nationally. CERCLA covers active and abandoned mine sites.

Certified Seed:
The progeny of Breeder, Foundation, or Registered seed that is so handled as to maintain satisfactory genetic identity and purity and that has been approved and certified by the certifying agency. Certified tree seed is defined as seed from trees of proven genetic superiority, as defined by the certifying agency, produced so as to assure genetic identity. See also "seed certification classes".

Cold Stratification:
Keeping seed in a cool, moist environment for a period of time to simulate overwintering thereby reducing dormancy and increasing seed germination.

Compliance:
Conducting extraction and reclamation activities in accordance with the requirements of state and federal law.

Concentration/Concentrate:
A process for reducing the bulk ore to a smaller bulk in order to diminish the expense of shipping and treatment. Ore material that has most of the waste material eliminated. In the case of copper, where the % of mineral content has been increased from 0.6% to 27%. Concentrate is usually sent to smelters for further treatment.

Commercial Seed:
Seed produced by commercial industry; may or mat not be recognized improved varieties of seed.

Common Seed:
Non-certified seed. Such seed may be a named variety but are not grown under the certification program. Also a term applied to seed that cannot be identified as to variety; sometimes used to denote local strains resulting from natural selection.

Cryptogam:
A plant in any of the groups Thallophytes, Byophytes, Pteridiophytes – mosses, lichens, and ferns.

Cultivar:
Denotes an assemblage of cultivated plants that is clearly distinguished by any characters (morphological, physiological, cytological, chemical, or others) and when reproduced (sexually or asexually), retains its distinguishing characters. A named variety selected within a plant species.

Cyanide/Cyanidation:
A salt or ester of hydrocyanic acid which produces a chemical reaction, in leaching operations, to dissolve metal from ore for recovery. This practice consists of crushing the ore on a roller, tube, rod, or ball mill. The finely ground ore is then moved to leaching tanks where a solution of sodium or potassium cyanide is used to remove the precious metal (gold or silver) from the ore. The solution that contains the precious metal can then be retrieved in zinc boxes or other methods. The precipitate is then smelted and refined into bullion.

Desertification:
The process by which an area or region becomes more arid through loss of soil and vegetative cover. The process is often accelerated by excessive, continuous overstocking and drought.

Disturbed Area:
An area that has been disturbed by mining or other activities. This includes the area from which overburden, vegetation, topsoil, tailings, waste materials, minerals, or coal have been removed and placed. It also includes tailings ponds, waste dumps, roads, conveyor systems, leach dumps and all similar excavations or coverings that have resulted from mining operations.

Dump:
A pile or heap of waste rock material or other non-ore earthen materials.

Ecological Site:
A distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Ecotype:
(1) A population of plants that has become genetically differentiated in response to the conditions of a particular habitat. The plants may vary in growth habit, maturity, and other characteristics such as pubescence and flower color.
(2) A transition area of vegetation between two communities, having characteristics of both communities as well as its own.
(3) Locally adapted population within a species that has certain genetically determined characteristics; interbreeding between ecotypes is not restricted.
(4) A variety of strain within a given species that maintains its distinct identity by adaptation to a specific environment.
(5) A locally adapted population of a species which has a distinctive limit of tolerance to environmental factors.
(6) A variant type within an ecospecies.

Exotic:
(1) A term describing an organism introduced from another country or continent.
(2) An organism or species that is not native to the region in which it is found.

Gangue:
The worthless minerals that are associated with the valuable minerals in ore. Concentrating and smelting processes removed as much of these materials as possible.

Genetic Diversity:
The total amount of genetic variation present in a population or species. Having a heterogeneous constitution, reacting differently to diverse external condition. (Applied to a breeding population, variety, or species.). The genetic constitution of an individual or group.

Genotype:
The genetic constitution of an individual or group of plants. Individual plants may vary in appearance (phenotypically), but they must have the genetic characteristics of the genotype. The genetic constitution, latent or expressed, of an organism, as contrasted with the phenotype. The sum total of all genes present in an individual.

Germination:
The initiation of growth by the embryo and development of a young plant from seed.

Gob:
Rock or other coarse materials sorted out of coal either during mining or processing. Pea-gravel is similar to the consistency of Gob.

Hard Rock Mine:
Mining those extracts metallic minerals such as copper, lead, zinc, silver, and gold. And, mining taking place in rock that requires drilling and blasting in order to extract the ore.

Heap Leaching:
A process whereby valuable metals (usually gold, silver, and copper) are leached from a heap of coarsely crushed ore by solutions percolating down through the heap. The solutions are collected from a sloping, impermeable liner under the leach pad.

Historic Climax Plant Community:
The plant community that was best adapted to the unique combination of factors associated with the ecological site. It was in a natural dynamic equilibrium with the historic biotic, abiotic, climatic factors on its ecological site in North America at the time of European immigration and settlement.

Impoundment:
A closed basin, natural or artificial, which is dammed or excavated for retaining water, sediment or waste.

Introduced:
A species not part of the original fauna or flora of the area in question, but introduced from another geographical region through human activity. Syn.: exotic. Introduced is <u>not</u> synonymous and should <u>not</u> be confused with the term “invasive species”.

Invasive Species:
A species that demonstrates rapid growth and spread, invades habitats, and displaces other species. Species that are prolific seed producers, have high seed germination rates, easily propagated asexually by root or stem fragments, and/or rapidly mature predispose a plant to being an invasive. Example: The hybrid cattail (*Typha* x *glauca*), a cross between native cattails is extremely aggressive and out-competes its parents and other native species when established. Introduced species that are predisposed to invasiveness have the added advantage of being relatively free from predators (herbivores, parasites, and disease) and can therefore, expand more energy for growth and reproduction. Invasive species should not be confused with "Introduced Species".

Leachate:
Liquid that has percolated through a medium and has extracted dissolved or suspended materials from it.

Leaching:
(1) The removal, in solution, of the more soluble minerals from an ore by percolating water or other suitable solvent such as, sulfuric acid, hydrochloric acid, or cyanide, etc. A **leach pad** is prepared and covered by an impervious liner on which the ore is placed for leaching. The leaching solution, containing the selected minerals, is collected at the bottom of the leach pad for further processing.
(2) Leaching is used to remove metals from their ores. In one procedure certain crushed ores of copper are placed into tanks and a solvent, such as sulfuric acid, is pumped into the tank, it dissolves the copper from the ore and the copper is removed from the solution by chemical or other treatment.

Local Native:
A genetically local source that originated at or within the same seed zone and elevation band as the project site (planned planting).

Local Population:
Groups of individuals of the same species growing near enough to each other to interbreed and exchange genes.

Mill:
A mineral processing facility that contains equipment for grinding, pulverizing, and extracting metals or producing a product. Mills may have rock crushers or grinders for ore, vats for mixing chemicals with the crushed ore, and machinery for capturing the desired product.

Mineral:
Any ore, rock, or substance (other than oil, gas, or uranium) that is taken from below the surface or from the surface of the earth for the purpose of milling, concentration, refinement, smelting, manufacturing, or other use or for stockpiling for future use.

Mining:
The process of obtaining useful minerals for the earth's crust including both underground and surface activities.

Native Species:
(1) A species which is a part of the original fauna or flora of the area in question.
(2) A native plant species is one that occurs naturally in a particular region, state, ecosystem, and habitat without direct or indirect human actions. Its presence and evolution in an area are determined by climate, soil, and biotic factors. Synonyms of native include indigenous, endemic, aboriginal.

Naturalized Species:
An introduced species that has become adapted to a new climate, different ecological site, or a different environment and can perpetuate itself in the community without cultural treatment.

Noxious Species:
A plant species that is undesirable because it conflicts, restricts, or otherwise causes problems under management objectives. Not to be confused with species declared noxious by laws concerned with plants that are weedy in cultivated crops and on range.

Noxious Weed:
An unwanted plant specified by Federal or State laws as being especially undesirable, troublesome, and difficult to control. It grows and spreads in places where it interferes with the growth and production of the desired crop.

National Pollutant Discharge Elimination System (NPDES):
Mandated by Congress under the Clean Water Act, the NPDES Storm Water Program is a comprehensive two-phased national program for addressing the non-agricultural sources of storm water discharges which adversely affect the quality of our nation's waters. The Program uses the National Pollutant Discharge Elimination System (NPDES) permitting mechanism to require the implementation of controls designed to prevent harmful pollutants from being washed by storm water runoff into local water bodies. The regulated entities must obtain coverage under an NPDES storm water permit and implement storm water pollution prevention plans (SWPPPs) or storm water management programs (both using best management practices (BMPs)) that effectively reduce or prevent the discharge of pollutants into receiving waters.

Open Pit Mining:
(1) Surface mining, a type of mining in which the overburden is removed from the product being mined and is dumped back after mining; or may specifically refer to an area from which the overburden has been removed and has not been filled.
(2) A type of surface mining used to extract below ground metallic mineral deposits. This type of mining requires the excavation of massive amounts of earth creating an excavation that can be thousands of feet across and hundreds of feet deep. The

metallic mineral deposits are removed by cutting benches in the walls of this broad, deep, funnel-shaped excavation.

Ore:
A mineral or mineral aggregate containing precious or useful metals and occurs in sufficient quantity, grade, and chemical combination to make extraction commercially profitable. An **ore body** is a solid and fairly continuous mass of ore, which may contain various grades of ore and waste materials. An **ore deposit** is a term applied to rocks containing minerals of current or potential economic value.

Ore Processing:
Milling, heap leaching, flotation, vat leaching, or other standard hard-rock mineral concentration processes.

OSM:
The U.S. Department of Interior's Office of Surface Mining Reclamation and Enforcement. This federal agency oversees the work of state agencies enforcing the federal coal mining and reclamation law.

Overburden:
This term is specific to hard rock mining. All of the earth and other materials that lie above a natural mineral deposit. The earth and other materials that are removed from their natural state in the process of mining.

Oxide:
The portion of a mineral deposit wherein sulfide materials have been oxidized, usually by surface weathering processes.

Pitting:
Making shallow pits or basins of suitable capacity and distribution on range to reduce overland flow from rainfall and snowmelt. Also used in seedbed preparation to aid in collecting water to aid in seed germination and plant establishment.

Propagule:
Any part of an organism produced sexually or asexually that is capable of giving rise to a new individual.

Post Mining Land Use:
A prescribed productive use(s) of the land after mining such as grazing, forestry, or wildlife habitat. This is generally the goal of reclamation.

Processed Mined Materials:
The material that remains after the valuable minerals have been removed from the ore. See tailings.

Pure Live Seed:
Purity and germination of seed expressed in percent; may be calculated by the formula: P.L.S. = %germination x % purity x 100. **Seed Purity** is the percentage of the desired species in relation to the total quantity, including other species, weed seed, and foreign matter.

Pyrite:
A yellow mineral which is a common iron sulphide occurring as native ore and serves as the principal source of sulphur in the formation of sulfuric acid in acid mine drainage.

Range Seeding/Reseeding:
The process of establishing vegetation by the artificial dissemination of seed.

Reclaim:
To make a site usable again for a particular land use or crop.

Reclamation:
(1) The art and science of measures employed to return mined land to a level of productivity and ecological stability that meets the approved Post Mining Land Use. This includes the abatement and control of adverse environmental effects of mining and meets compliance standards.
(2) Actions taken to restore mined land or to abate, control or prevent the adverse effects of mining to a post mining land use.
(3) Creating a site that will support organisms in approximately the same percentage and number after the process is completed as it was before mining began.
(4) The site will be habitable to organisms originally present in approximately the same composition and density after the reclamation process has been completed.
(5) The process of reconverting disturbed lands to their former or other productive uses. However, the constructed conditions may not be identical to predisturbance conditions.
(6) Restoration of a site or resource to a desired condition to achieve management or stated goals.

Rehabilitation:
(1) The act of returning a disturbed site to a stable form and productivity level, in accordance to a predetermined land-use plan.
(2) The disturbed site will be returned to a form and productivity in conformity with a prior use plan. It implies stability.
(3) Implies that the land will be returned to a form and productivity in conformity with a prior land use plan, including a stable ecological state that does not contribute substantially to environmental deterioration and is consistent with surrounding aesthetic values.

Restoration:
(1) Returning a disturbed site to precisely the same state it was prior to the disturbance. This may require rebuilding the soil, precise placement of trees and rocks, and use of only native plants and animals to repopulate the site.
(2) The exact conditions of the site before disturbance will be replicated after the disturbance.
(3) The process of restoring site conditions as they were before the land disturbance. Note: restoration involves restoring a site to a specific point in time.

Revegetation:
(1) Planting reclaimed land with grasses, flowers, shrubs, and trees.
(2) The reestablishment or improvement of vegetation through management practices or chemical or mechanical means.
(3) To provide a site with vegetation again. Implies that original amounts and types of vegetation of the site are not required.
(4) Plants or growth, which replaces original ground cover, following land disturbance.
(5) Establishing or re-establishing desirable plants in areas where the plant community is not adequate to meet management objectives by management techniques alone.

Scalping:
Removal of vegetation before mining.

Seed:
A fertilized ripened ovule of a flowering plant.

Seed, dormant:
Live seed in a nongerminative condition because of internal inhibitions in the seed; i.e., hard seed, or unfavorable environmental conditions.

Seed, hard:
Live seed in a physiological condition that prevents or delays germination, even when favorable environment exists.

Seedbank:
Seeds stored in the soil, generally as hard seed, that are viable and will germinate given the proper conditions. This seedbank is principally built up by seed produced by plants growing on or adjacent to the site over many years. Species long gone may still be represented if their seed is especially long-lived.

Seedbed Preparation:
Soil treatment prior to seeding to: enhance soil surface layer for seed deposition and optimum opportunity for generation and seedling growth, reduce or eliminate existing vegetation, reduce the effective supply of weed seed, modify physical soil characteristics, and enhance temperature and water characteristics of the microenvironment.

Seed Certification:
A system whereby seed of plant cultivars (and pre-varietal releases) is produced,

harvested and marketed under authorized regulation to insure seed of high quality and genetic purity.

Seed Certification Classes:
Classes of seed produced by a grower to ensure the purity of the genetic material. Seed, which undergoes the certification process, is typically inspected during the growing season or at harvest and the seed is tested. Certification classes include: Breeder, Foundation, Registered, Certified, and Common.

Seed Certifying Agency:
General term for the state or other agency responsible for the release and certification of crop varieties and for inspecting and approving seed produced under one of the seed certification classes. Most seed certification agencies are members of the Association of Official Seed Certifying Agencies (AOSCA).

Shaft:
A vertical entrance to an underground mine.

SMCRA:
The federal law called the Surface Mining Control and Reclamation Act of 1977, passed by Congress to establish minimum national standards for mining and reclamation, and to provide a funding source for the reclamation of abandoned mines. Applies only to coal mined land.

Smelting:
The chemical reduction of a metal from its ore and certain fluxes by melting at high temperatures. The non-metallic materials float on top of the heavier metallic constituents in the molten state and remains in that position when it cools and hardens (slag).

Spoil:
Overburden material disturbed or removed from its natural state, or non-ore material removed in gaining access to the ore or mineral material during the mining process. Spoil and mining waste materials are disposed of or piled in waste dumps and/or spoil piles. Spoil is specific to coal mining and Overburden to more specific to hard rock mining.

Sulfate:
A chemical compound containing the sulfate (SO4) radical. Sulfates are salts or esters of sulfuric acid formed by replacing one or both of the hydrogens with a metal (e.g., sodium) or a radical (e.g., ammonium or ethyl). Sulfates are widely distributed in nature. Barium sulfate occurs as barite; calcium sulfate is found as gypsum, alabaster, and selenite; and Epsom salts is magnesium sulfate.

Sulfide:
A mineral compound characterized by the linkage of sulfur with a metal. Some examples of sulfides include galena (with lead), chalcopyrite (with copper), and pyrite (with iron).

Tacking/Tackifying:
The process of binding mulch fibers together by the addition of a sprayed natural or artificial chemical agent.

Tailings/Tailing Impoundment:
The refuse material resulting from washing, concentrating, or treating ground/crushed ore that is discharged from a mill. A **tailing pond/tailing dam** is a pond of water with a constraining wall or dam into which mill effluents (tailings) are deposited.

Topsoil:
The upper surface lay of soil, usually darker and richer than the subsoil that is naturally present and necessary for the growth and regeneration of vegetation on the surface of the earth.

Toxic Spoil/Waste:
See Acid Spoil. Includes acid spoil with pH below 4.0. Also refers to soil or water having amounts of toxic heavy metals in excess of EPA standards and usually have adverse effects on plant growth. Heavy metals include metals such as aluminum, arsenic, copper, lead, iron, and manganese.

Vesicular – Arbuscular Mycorrhizae Fungi (VAM) or Vesicular Mycorrhizae (VM):
These are symbiotic fungi that live within a plant's root system. The term "mycorrhiza" means fungus-root. Mycorrhizal fungi produce hyphae (small filament like tubes) that grow within plant roots and extend out into the soil. Also, the fungi produce spores that function as dispersal mechanisms and long term survival agents. The plant provides carbohydrates and other essential nutrients to the fungus that the fungus cannot produce and the fungus provides immobile nutrients such as phosphorus (P), iron (Fe), zinc (Zn) and copper (Cu) as well as mobile nutrients such as nitrogen (N) and calcium (Ca) to the plant.

Waste Rock Dump:
Waste rock that was mined and disposed in the vicinity of a mining operation.

References:

Bituminous Coal Research, Inc. 1974. Glossary of Surface Mining and Reclamation Technology, edited by Council for Surface Mining and Reclamation Research in Appalachia. National Coal Association for the Coal and Environment Conference and Exposition, Louisville, Kentucky.

Bloss, H.E. 1985. Studies of symbiotic microflora and their role in the ecology of desert plants. Desert Plants. 7:119-127.

Box, T.W. 1978. The significance and responsibility of rehabilitating drastically disturbed land. p. 1-10. *In* F.W. Schaller and P. Sutton (ed.) Reclamation of drastically disturbed lands. Am. Soc. of Am., Madison, Wisconsin.

Intheloop.com's mining and geology terms. URL: http://www.intheloop.com/glossary/miningterms/miningtermsh.html. (Accessed 6 July 2001)

Linderman, R.G. 2000. MYCORRHIZAE: Hidden Allies of Plant Roots and Soils. From Soil Quality Workshop. La Quinta, CA. 25 Oct. 2000.

Montana Department of Environmental Quality, Remediation Division. 2001. Guide to Reclamation Handbook – Mining Terminology.
URL: http://www.deq.state.mt.us/rem/mwc/bluebook.asp. (Accessed 27 June 2001)

Society for Range Management. 1974. A Glossary of Terms Used in Range Management. Compiled and Edited by Range Term Glossary Committee. Second edition. Society for Range Management. Denver, Colorado.

USDA Natural Resources Conservation Service, National Plant Materials Manual, Title 190 (Washington, D.C., U.S. Government Printing Office, June 2000).

USDA Natural Resources Conservation Service, 1997. National Range and Pasture Handbook. Washington, DC.

United States Environmental Protection Agency. Office of Wastewater Management. Storm Water Frequently Asked Questions. URL: http://cfpub1.epa.gov/npdes/faqs.cfm?program_id=6. (accessed 31 July, 2001)

World Resources Institute. Biodiversity Glossary of Terms. URL: http://www.wri.org/wri/biodiv/gbs-glos.html. (accessed 5 July, 2001)