

Appendix B

Glossary

The following list of terms is largely taken from the glossary of the mammoth book *Sediment Engineering*, published by the American Society of Civil Engineers.¹

Aggradation: The process by which riverbeds are raised in elevation by the deposition of sediment eroded and moved from upstream. It is the opposite of degradation, in which a channel bed drops and may flatten in slope.

Alluvial: Pertains to alluvium deposited by a river or stream of flowing water.

Alluvial rivers and streams: A river or stream whose channel boundary is composed of alluvium and that generally changes its cross section and bed form because of the interaction of the flow and the mobile boundary adjustment.

Alluvium: A general term for detrital sediment deposits formed by rivers and streams on riverbeds, floodplains, and alluvial fans.

Alternate bars: Bars formed in a staggered pattern along channel banks.

Bar: A relatively large, sediment depositional feature often associated with winding or meandering flow.

Bed and banks: The bottom of a channel is commonly called its bed, whereas its sides are called banks.

Bed forms: Wavelike features found on the bottom (bed) of a river or stream that are related to flow characteristics. Several features can develop, notably dunes, ripples, and antidunes. Their formation relates to bed-sediment transport, and they interact with flowing water and change the morphology and roughness of a riverbed.

Bed load: Bed sediment moving on or near the river or stream bed by rolling, sliding, and sometimes making brief departures into the flow a few sediment diameters above the bed. Bed load is bed sediment moving essentially in continuous contact with the bed. Contrast with suspended load (*see below*).

Bed sediment (or bed material): The sediment mixture that forms the riverbed. In alluvial rivers, bed-sediment particles are liable to be moved at any moment or during some future flow condition. Bed sediment may include particle sizes that move as bed load and suspended load.

Bed-sediment load: The total rate at which bed sediment is moved by a given flow at a given location in a river. It consists of bed sediment moving both as bed load and suspended load. Contrast with wash load (*see below*).

Boulders: Sediment particles exceeding about 0.26 m in diameter.

Boundary roughness: A measure of the hydraulic resistance to water flow along a river. The greater the roughness, the greater the resistance to water flow, and therefore the greater the flow depth for a given water discharge.

Channel: A natural or artificial waterway that periodically or continuously contains flowing water.

Channel morphology: Channel plan form, such as sinuous, meandering, and braided. Also refers to presence of sediment bars and other particular channel-shape features.

Clay: Very fine sediment whose particle diameter is in the range 0.004 millimeters to 0.00024 millimeters. It customarily is divided into very fine, fine, medium, and coarse size classes.

Cobbles: Sediment particles ranging in diameter from about 64 mm to 0.26 m.

Cohesive sediments: Sediments (notably clay) whose resistance to initial movement or erosion is caused mostly by cohesive bonds between particles.

Concentration of sediment: The dry weight of sediment per volume of water-sediment mixture.

Degradation: The process by which riverbeds are lowered in elevation by erosion of bed sediment. It is the opposite of aggradation.

Dike: A dyke, levee, or flood bank that is a long, artificially constructed embankment or wall that confines elevated water levels in rivers. It is usually earthen and parallel to a river's main channel.

Dunes: Bed forms with triangular profile that advance downstream because of net deposition on their steep downstream slopes. Dunes move downstream at speeds much slower than water-flow velocity.

Empirical: Relying upon, or derived from, observation or experiment.

Entrainment: The process of flowing water picking up and carrying bed material such as sand and gravel.

Erosion: The wearing away of the land surface or river boundaries by detachment of soil and rock fragments through the action of flowing water or other geological agents.

Fall velocity: The falling or settling rate of a particle in a given fluid.

Flow rate or discharge: The volume of a fluid or a solid passing a cross section of a river or stream per unit time, e.g., cubic meters per second (m^3/s) or cubic feet per second (ft^3/s).

Fluvial: Pertaining to rivers and streams, or produced by them.

Fluvial sediment: Particles derived from rocks or biological materials that are transported by, suspended in, or deposited in rivers or streams.

Geological control: A local rock formation or scour-resistant layer that limits (within engineering time frame) the vertical and/or lateral movement of a stream at a particular point. Human-made controls also exist.

Gradation: The proportion of each particle size in a given sediment mix.

Gravel: Sediment particles ranging in diameter from about 2 mm to 64 mm. It customarily is subdivided into very fine, fine, medium, coarse, and very coarse size classes. Sediment in the approximate size range 56 mm to 64 mm is termed cobbles. Boulders are particles with diameters in excess of about 256 mm.

Hydraulic depth: The ratio of cross-sectional area divided by top widths at a specific cross section of a channel.

Hydraulic engineering: The application of fluid mechanics to problems dealing with the collection, storage, control, transport, regulation, measurement, and use of water, as well as water-flow processes. It commonly relates to rivers and structures associated with them, e.g., bridges, dams, channels, canals, and levees, and to aspects of sanitary and environmental engineering.

Hydraulic model: A physical scale model of a river, hydraulic structure (e.g., bridge pier) used for engineering studies. A hydraulic model is more than a physical model insofar that its simulation of water flow

and bed-sediment movement should meet specified requirements for dynamic similitude of the forces prevailing at full scale. Gravity and inertia (associated with momentum of movement) drive the main forces for river flow and bed-sediment movement.

Hydraulic radius: The ratio of cross-sectional area to wetted perimeter at any flow elevation in a channel.

Hydrograph: The graph of water level or water discharge versus time at a specified location along a river or stream.

Local scour: Erosion caused by an abrupt change in flow direction or velocity. Examples include erosion at bridge piers and abutments.

Meandering channel: An alluvial channel characterized in plan form by a sequence of alternating bends. The bends are the result of alluvial processes rather than the nature of the terrain.

Movable bed: That portion of a river channel cross section subject to erosion or deposition of sediment.

Particle size: A linear dimension, normally designated as “diameter,” used to characterize the size of a particle.

Point bar: Deposits of sediment that occur on the inside (convex side) of channel bends.

Prototype: The full-size structure, river system feature, or phenomenon being modeled.

Reach: A length of channel, often taken to be approximately uniform or representative with respect to discharge, depth, area, and slope.

Riffle: A rocky or gravelly shoal or sandbar lying just below the surface of a channel, over which the water flows at higher velocity and higher turbulence than normally.

Ripple: A small dunelike bed feature that usually only develops in fine sands and silts, and whose wavelength and height are usually less than about 0.3 m and 3 cm, respectively.

Runoff: Water flow resulting from rainfall that is discharged from a specified area of land. It sometimes is subdivided into direct surface runoff, groundwater runoff, and seepage.

Sand: Sediment particles ranging in diameter from about 0.13 mm to 2.00 mm. It customarily is subdivided into very fine, fine, medium, coarse, and very coarse size classes.

Scale: The ratio of a parameter in a model to the corresponding parameter in the prototype.

Scale effect: A consequence of nonsimilarity between model and prototype resulting from the fact that not all things are the same in the model and prototype.

Scour: Concentrated erosive action of water.

Secondary currents (or flow): The movement of water on a cross section normal to the principal direction of flow.

Sediment: Solid fragmental material transported and deposited by water, wind, or ice. A collective term meaning an accumulation of soil, rock, and mineral particles transported by flowing water, wind, or ice.

Sediment discharge (or load): The mass or volume of sediment passing a channel cross section in a unit of time. The term may be qualified, for example, as bed-load discharge, suspended sediment discharge, or total sediment discharge.

Sediment transport: The process of moving sediment particles along a channel once they are entrained by the flow.

Sedimentation: Sedimentation consists of five fundamental processes: (1) erosion or detachment, (2) entrainment, (3) transportation, (4) deposition, and (5) consolidation. It also refers to the gravitational settling of suspended particles.

Shear stress: Frictional force per unit area exerted on a channel boundary by flowing water.

Shear velocity: The square root of the quantity shear stress divided by fluid density.

Silt: Sediment particles ranging in diameter from about 0.008 mm to 0.13 mm. It customarily is subdivided into very fine, fine, medium, and coarse size classes.

Spurs: Structures placed perpendicular to river banks to guide flow and protect banks. They also are known as jetties, groins, or spur dikes. Early spurs generally were simple structures made of wood posts or rock piles placed in series.

Stable channel: A channel that does not change in plan form, cross section, or bed profile during a specified period of time. For engineering purposes, the period normally is tens of years.

Suspended bed-sediment load: That portion of the suspended sediment load composed of particles forming the channel bed.

Suspended load: Suspended load includes both suspended bed-sediment load and wash load. Suspended sediment moves suspended in the water column because of the action of flow turbulence.

Thalweg: The line following the deepest points of flow along a riverbed or streambed.

Total sediment load: Includes the sum of the bed load and suspended bed-sediment load (together giving the bed-sediment load) and the wash load.

Turbulence: In general, the irregular motion in water, which often can be characterized in terms of probabilistic properties. Turbulence involves

a range of scales from large-scale turbulence structures (coherent flow patterns such as eddies and vortices) to fine, barely visible fluctuations in flow.

Wash: A dry creek bed or gulch (arroyo) that temporarily flows with water and sediment after heavy rain or rapid snowmelt.

Wash load: The part of the suspended-sediment discharge (or load) that is finer than the bed material. Wash load normally comprises particles finer than coarse silt. It typically originates from soils washed into a channel flow by rainfall runoff or erosion of channel banks. Wash load is limited by sediment supply rather than water flow hydraulics.

Watershed: A topographically defined area drained by a river or stream, or system of connecting streams and rivers, such that all outflow discharges through a single downstream outlet. It also is called a drainage area.

Wetted perimeter: This is the length of wetted contact between flowing water and its containing channel.

Endnote

- 1 Garcia, M., ed. (2008). *Sedimentation engineering: Processes, measurements, modeling, and practice*, Manual of Practice 110, ASCE Publications, Reston, VA.