

Glossary

A	Acid sulfate soils	A mix of low-lying clays and sands that contain sulphur-bearing compounds at concentrations above 0.05% in clays and 0.01% in sands. These soils are found in both coastal <i>and</i> inland areas and become acidified if exposed to air.
	Adhesion	The attraction or bonding of particles to a surface – in the context of this manual it refers to the attraction of nutrients and salts to the surface of larger particles of organic matter, mud, sand or gravel found in soil.
	Aerobic	Living or active only in the presence of oxygen.
	Algal bloom	The rapid growth of algae in an aquatic ecosystem.
	Alluvial	Deposition from running waters. In this context, it refers to 'alluvium' — soils such as the fertile floodplain soils that consist of fine-grained sediments including clays, silts and sands.
	Alluvial aquifer/groundwater	Groundwater (or sub-surface water) contained in the alluvial deposits near a river. It is usually directly connected to the river and therefore its level is closely related to river levels. Alluvial aquifers can be recharged directly from the river under high-flow conditions. Under low-flow conditions, alluvial aquifers can provide base flow in the river channel ¹ .
	Anabranh	An anabranh is a section of a river or stream that diverts from the main channel or stem of the watercourse and rejoins the main stem downstream. Local anabranhes can be the result of small islands in the watercourse. In larger anabranhes, the flow can diverge for a distance of several kilometres before rejoining the main channel.
	Anaerobic	Not requiring or using free oxygen. Anaerobic organisms usually make use of compounds containing oxygen atoms (i.e. carbohydrates, nitrates or sulphates) for their metabolism.
	Anoxic	Without oxygen.
	Anthropogenic	Human centred, or created by humans
	Aquatic	Relates to water-based environments, including freshwater, estuarine
	Aquifer	Water-bearing geological formation - soil, rock, or gravel – that holds and transmits water. Bores, spear-points and wells are used to obtain water from aquifers.
	Armouring	A natural, orderly, overlapping, downstream-pointing arrangement of gravels in the streambed (arranged much like roofing tiles), giving the streambed extra protection against scour and shear stress.

B	Back-swamp	A depression in a floodplain, generally found in the valley margin.
	Bank	The sloping walls of the stream channel. Variations in height and gradient occur along the stream.
	Bank crest	The junction of the channel with the floodplain. Or the level reached by the flood that comes on average every one to two years, or the point above which you consider the river to be in flood.
	Bank-full discharge	The moving water and sediment that fills the channel of a stream to the top of its banks before spilling out over the floodplain. This is generally the dominant flow discharge that has the greatest impact in determining the size and shape of the channel.
	Bank height	A measure of near bank channel depth measured vertically between the bank toe and bank crest. This will often be the local maximum depth of the channel and is likely to vary from bend to bend.
	Bank slumping	Structural failure of a river bank – can happen, for example, after the removal of riparian vegetation or undercutting by the river.
	Bank toe	The junction of the bank with the bed of the channel. Usually marked by a break in slope but often the transition from bank to bed is gradual and the toe can be difficult to determine.
	Bars	Accumulations of sediment formed during the recession of high flows by sediment deposition within streams carrying mainly coarse load (sand and gravel) materials. They are generally located in areas of slow, non-turbulent flow on the inside bends of streams, adjacent streambanks, or in-stream behind rocks or trees.
	Battering	The deliberate tapering or chamfering of an unvegetated, unstable, vertical streambank profile (using machinery) to enable its revegetation.
	Bed	Refers to the lowest part of the channel between the banks. It is usually composed of sediments such as detritus, mud, gravel, sand or silt or by bedrock. The type of material found on the bed at any point depends on channel form and hydrological energy of the river at that stage. The bed can also vary in its topography (depth, slope etc).
	Bed load	Material transported along the streambed by water flow, such as detritus, sand, gravel and boulders.
	Bench	In-channel storage of sediment adjacent to the streambank, generally in over-widened channels. They are higher than bars but lower than the top of the streambank and are straight to gently curved in planform. They are formed through sediment deposition creating bank-attached bars which are in turn at least partly consolidated by riparian vegetation.

Best Management Practice (BMP)	An economically viable management practice that has been determined to be the most effective and practical means of preventing or reducing environmental harm.
Billabong	Also known as an 'Ox-bow' lake, a billabong is a meander which became cut off from the channel when the river cut a shorter course.
Biodiversity (biological diversity)	The variety of all life forms, comprising genetic diversity (within species), species diversity and ecosystem diversity.
Biomass	The mass of living organisms, and dead matter such as wood, leaves, litter and other organic matter.
Blue-green algae (cyanobacteria)	Naturally occurring, microscopic, primitive photosynthetic bacteria. Under certain conditions (including high nutrients, warm still water, strong sunlight) they can bloom into a dense and visible growth and may become toxic.
Bog	A wet area overlying peat or other soft organic matter. Bogs often form through the degeneration of lakes or streams.
Brackish water	A mixture of freshwater and seawater.
Braided streams	A creek or river flowing via several channels which divide and reunite.
Buffer zone	A strip of vegetated land that is reserved between a potential source of pollution and an area that must be protected from the pollution.
C Cascades	A waterfall produced by steps in the channel bed. Can be singular or form a series of various sizes. Cascades are also caused by weirs and road crossings. The inability of native fish to swim across the fall in water prevents them from migrating upstream.
Catchment	The area of land that collects rain that then flows into one or more waterways.
Chain-of-ponds	A type of stream which appears as a series of ponds/pools which may be regularly spaced, or appear randomly. Between these ponds, the channel may be discontinuous, or appear as a slight depression or swale on the wide floodplain linking the ponds.
Channel capacity	The volume of water that can pass along the river channel at a certain point without spilling over the tops of the banks.
Channel width	Measured from crest to crest.
Clay pan	A compacted layer in the subsoil that contains higher clay content than the soil above. The clay reduces the vertical water movement through the subsoil and restricts the growth of roots downwards.
Climate	Combination of weather conditions for an area. Described by long term averages for rainfall, temperature, winds, snow etc.

	Climate change	Any continuing change to the long term pattern of weather conditions in an area.
	Confluence	The place where two or more streams flow together.
	Connectivity	Geographical continuity with other natural areas.
	Corridor	A continuous route through which plants and animals may disperse; usually refers to connected habitats of similar type (such as riparian habitats).
	Creek	A stream of water normally smaller than a river.
	Crop rotation	The growing of different crops and pastures on the same paddock in annual succession.
	Crustaceans	Invertebrate animals that have segmented legs and hard shells, e.g. crabs, yabbies, prawns.
D	De-armouring	Destruction of an armoured streambed (see 'armouring'). This is usually done during the movement or excavation of streambed gravels using machinery.
	Deciduous plants	Plants that drop all their leaves during autumn.
	Degraded	A reach that has moved away from its natural condition and is not recovering.
	Diffuse source pollution	Non-point source of pollution such as sediment or nutrients from urban or catchment runoff.
	De-snagging	The removal of snags (large woody debris) from the river channel.
	Dissolved load	Material less than 0.45 µm in size carried by water flow.
	Dissolved oxygen	Oxygen in the water available to aquatic flora and fauna. The oxygen that is dissolved in water by: <ul style="list-style-type: none"> • transfer from the air/water surface • plants carrying out photosynthesis • wave action and waterfalls.
	Draw down	The rapid lowering of water levels in a waterbody. In this context, draw down is associated with the recession floodwaters as floodwaters are carried downstream and the rates of outflow are far greater than the rates of inflow.
E	Ecosystem	Any system in which living organisms and their immediate physical, chemical and biological environment are interactive and interdependent. Examples are ponds, forests and wetlands.

Ecosystem services	The benefits obtained from natural assets, such as soil, plants, animals, air and water that include provision of clean water, maintenance of biodiversity, liveable climates, pollination, people's cultural, spiritual, intellectual needs and provision of options for future generations.
Edge effect	Ecological impact of two or more interfacing habitat types.
Effluent	Any waste products (whether treated or untreated) that are discharged into the environment.
Electrical conductivity	Measure commonly used to indicate the salinity of water. (1 EC = 1 microsiemen per centimetre, measured at 25°C).
Endemic	Species confined to a particular geographic region.
Environment	The <i>Protection of the Environment Administration Act 1991</i> sets out a meaning of 'environment' as: 'Components of the earth, including: A land, air and water B any layer of the atmosphere C any organic or inorganic matter and any living organism D human-made or modified structures and areas, and includes interacting natural ecosystems that include components referred to in a-c.'
Environmental flows	Flows or characteristics of the flow pattern, that are either protected or created for an environmental purpose.
Environmental Management System (EMS)	A system that is used to manage environmental impacts on a methodical and continuous basis.
Environmental value	Values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and that require protection from the effects of pollution, waste discharges and deposits. Several environmental values may be designated for a specific waterbody.
Ephemeral	Temporary or intermittent, for example a creek or wetland that dries up periodically.
Epizootic Haematopoietic Necrosis (EHN) virus	A disease that the exotic redfin perch (<i>Perca fluviatilis</i>) carry that affects native fish, particularly the vulnerable species silver perch and Macquarie perch, as well as mountain galaxias and exotic trout species.
Erosion rate	The rate at which the bank face moves (metres/year). This will be an average rate over at least 20 years so that the bank will have been subjected to large flooding events. Should be determined by existing evidence (aerial photographs, distance from fence lines etc.) but can be estimated as 1.6% of channel width per year.

	Estuary	The part of a river in which water levels are affected by sea tides, and where fresh water and salt water mix.
	Eutrophication	The proliferation of riparian plants and algae following the nutrient enrichment of waters, often leading to the excessive removal of oxygen from waterbodies and death of aquatic life.
	Evapotranspiration	The movement of water from plants to the atmosphere.
	Extraction	Water taken from rivers for off-stream use or for consumption.
F	Flora	The general term used for plants.
	Filter strip	A specialised vegetated buffer strip where vegetation, usually a dense grass strip, is used to trap and retain soil and nutrients moving in surface and groundwater flows.
	Filtration	Separation of particles from a liquid or gas by passing it through a porous material. For example dust and crop spray are filtered from the air as it passes through riparian vegetation.
	Fish passage	Structures designed to enable fish to move over a physical barrier (dam or weir) in a waterway, for example, fish ladders, box culverts.
	Floodplain	Land beside a river that is inundated when the river overflows its banks during a flood.
	Floodplain meadows	A species rich lowland or low lying meadow on land that is flood prone.
	Floods	Flows that are high enough at their peak to overrun river banks or cause flow through high-level anabranches, floodrunners or to wetlands.
	Flow regime	The pattern of flow in a river which can be described in terms of quantity, frequency, duration and seasonal nature of water flows.
	Fluvial	Refers to the physical processes associated with running water.
	Fry	Name given to a group of fish larvae.
	Fuel loads	The potential fire risk from fuel type and quantity in an area can play an important role in determining the types of fires as well as fire intensity. Fuels vary in their structural form, size (fine or coarse), and spatial arrangement (surface or elevated).
G	Gleying	Gleying refers to the colour change from red/yellow to blue/grey that occurs in a soil profile. It occurs when iron is reduced to a soluble form and leaches from the profile, leaving a gleyed mottled appearance. Longer periods of inundation cause stronger colour changes.

Geomorphology	The interdisciplinary and systematic study of landforms and their landscapes, as well as the earth's surface processes that create and change them.
Girdles	Single logs installed across the streambed at streambed level, perpendicular to low flow, to maintain streambed stability and channel slope.
Groundcover	A vegetative layer of grasses and/or other low lying plants or plant residues (in the Western CMA, cow pats, stones and sticks can function as groundcover). Groundcover filters nutrient from water, covers bare soil and protects against erosion.
Groundwater	Water found underground in the zone of saturation in the earth's crust.
Groundwater-dependent ecosystem	A community of biota where species composition and distribution is determined by their dependence on water and nutrients provided from below the ground surface, e.g. some wetlands.
Groyne	An in-stream structure constructed to deflect waterflows off an eroding streambank and help collect sediment at the streambank's toe.
H Habitat	The place that an animal or plant lives and grows. Habitat is described in chemical, physical and biological terms.
Headcut	A steep, actively eroding point in the streambed, which migrates in an upstream direction to lower the streambed and often causes streambanks to collapse. It may be evidenced by a very steep riffle or small waterfall/drop. Also known as a 'nickpoint'.
Headwaters	The small streams on the higher ground of the catchment which flow into the river.
Hydrocarbons	Organic molecules containing hydrogen and carbon.
Hydrology	The study of the distribution and movement of water.
Hydrological regime	Rainfall and run-off processes and water movement through the environment.
Hydrosol	Soils that are covered by water either permanently or intermittently.
Indigenous	Species of plants and animals that have evolved naturally in the local area.
Introduced fish	Fish that are not native to a given area or ecosystem and have been brought in and released (also referred to as exotic or alien species).

	Integrity	The degree to which a site is free from disturbance and degradation.
	Invertebrates	Animals without backbones, including worms, insects, shrimps, crabs, snails, shellfish and zooplankton. Macroinvertebrates are large enough to be seen without the aid of magnification; microinvertebrates need to be viewed through a microscope.
L	Lacustrine	Wetlands associated with open water situated in topographic depressions or dammed (natural or artificial) stream channels and that have little or no emergent vegetation. Their water is not predominantly sourced from flooding.
	Landholder	A landholder is a person who owns land, is in occupation or possession of land or has management or control of land
	Large woody debris (LWD)	Dead wood greater than 1 m long and 100 mm in diameter. Also known as 'snags'
	Lentic	Standing water where flow is not continuous, as in lakes, dams and wetlands.
	Levee	Raised, elongated ridge running parallel to the top of a streambank. Levees are composed of fine-grained alluvial sediments and may be natural or manmade. Natural levees are formed by suspended load sediments dropping out of suspension as floodwaters breach the top of the streambanks and flow out over the floodplain. Manmade levees are pushed up with machinery as a flood mitigation measure around townships.
	Lignum	Hairless perennial shrub, to 2.5 m high, with many slender tangled striate branches and branchlets (<i>Muehlenbeckia</i> species).
	Lignum swamp	Located on inland floodplains which are filled by surplus or flood flows and dominated by lignum vegetation. It is characteristically found in extensive braided floodways or overflows associated with the rivers of central and western New South Wales.
	Low flows	Flows that occupy only a small portion of the river channel. Low flows would normally occur when there is little contribution to the river from rainfall events. For the purposes of the river flow objectives, the low flow is defined as the flow which occurs less than 20% of the total time that the river is flowing.
M	Macro-invertebrates	An invertebrate animal large enough to be seen without magnification.
	Macrophyte	A plant that grows within the stream; may be fully or partly submerged e.g. ribbon weed or reeds.
	Marshes	An area of damp, boggy land, either regularly or permanently under water. Marshes are usually found on flat, poorly drained sites with clayey soils.

	Mitigate	To lessen the severity of an event, eg. flooding.
	Monosulfidic black ooze (MBO)	Goosey black sediments formed in low oxygen environments. They form on the bottom of drains or where land has been covered with water for long periods of time.
	Morphology	In general terms: the form and structure of riparian landforms.
N	Native fish	Fish native to NSW waters.
	Natural flow regime	Patterns of hydrological flow before European settlement in Australia generally before river regulation or extraction.
	Nephelometric Turbidity Units (NTU)	Measure of turbidity.
	Non point-source (or diffuse-source) pollution	Pollution coming from many small sources over a large area.
	Nutrient enrichment	Unnaturally high levels of nitrogen, phosphorous, salts or organic matter, can encourage abnormally fast and prolific growth of algae in the water.
O	Oxidation	Combination with oxygen, especially of ferrous iron to produce ferric iron (rust). Acid water leached from oxidising acid sulfate soils can cause rust coloured stains and slimes.
	Off-stream watering point (or Alternative watering point)	Troughs, tanks or dams providing drinking water for livestock away from riparian areas (e.g. river channel or wetland).
P	Palustrine	Wetland areas of little or no open water (bogs or marshes), with a dominant water source from a small local catchment and/or groundwater discharge.
	Parts per million (ppm)	A measure for describing small concentrations. If one millilitre (ml) of substance A is diluted in 1000 litres (which is a million mls) of substance B then the concentration of substance A is 1ppm. Milligram (mg) per kilogram (kg) is then same as ppm.
	Pathogens	A disease-producing fungus, virus, bacterium or other living organism, especially one that is a parasite.
	Peak discharge	The maximum volume of water flow per unit of time (expressed in cubic metres per second) of a stream during a flood cycle.
	Perennial plants	A plant that survives for three or more growing seasons, especially flowering plants that produce flowers every year.
	pH	Relative acidity or alkalinity of a liquid or solid and is expressed on a logarithmic scale of 0 - 6 (acid) to 8 -14 (alkaline), with 7 being neutral.

Photo points	A method of monitoring where a photo is taken of the same place intermittently over a period of time to show positive or negative change or impact.
Phytoplankton	Minute, free-floating aquatic plants.
Phytotechnology	The application of science and engineering to study problems and provide solutions involving plants.
Plankton	Simple forms of life stimulated to grow and multiply by light and nutrients in the water. Base of the marine food chain.
Point-source pollution	A single source of pollution, such as a drain from an industrial site or sewage treatment plant.
Property Vegetation Plan (PVP)	A voluntary but legally binding agreement between a landholder and the local Catchment Management Authority (CMA).
Pugging	The effect of hard-hoofed animals (cattle, horses, sheep, etc.) on wet/damp soils by the process of trampling, degrading the structure, physical characteristics and ecology of the soils and vegetation at the site.
R	
Ramsar listed wetland	A wetland of international importance as listed in the Ramsar Convention, signed in the city of Ramsar, in Iran in 1971.
Recharge	Water that infiltrates through the soil surface to the watertable
Regulated	A river or creek where water is released from storage to meet diversion requirements downstream.
Reach	A section of stream with the same character and behaviour.
Recovery potential	The capacity for improvement in the ecological and geomorphic condition of a reach.
Reference reach	A comparable section of stream of the same River Style® (or geomorphic category) which is generally in a natural, completely undisturbed state.
Refuge	Safe havens for plants and animals during periodic adverse conditions.
Revetment	Lining a streambank with rock or logs, particularly along its toe to armour it against erosion
Riffles	Deposits of coarse-grained sediment across straight sections of stream, located between pools. Generally in shallow-water areas where there is an increase in bed slope allowing for faster water flow. Gravels often become armoured along riffles, and low flow over them has a ripple effect on the surface.

Rill	Small channel that forms on bare earth after intense rain.
Rip-rap	Erosion control on streambanks consisting of boulders.
Riparian	Of, inhabiting, or situated on, the bank and floodplain of a waterbody.
Riparian width	The minimum width of riparian forest required for ongoing bank stability. Measured from the bank crest away from the channel. The minimum width of the riparian zone varies with bank height and bank erosion rate.
Root wad	Roots at the base of the tree which would remain attached to the trunk if the tree was blown over or pushed out.
Routine Agricultural Management Activity (RAMA)	Clearing fencelines, ripping new pipelines and other activities where clearing of native vegetation does not require approval under the <i>Native Vegetation Act 2003</i> .
Run-off	Water transported across the land surface and into waterbodies.

S

Salinity	The amount of mineral salts dissolved in water or existing in solid form. The groundwater table rises due to changes in land use in areas where most rain falls, the salts rise with the water and make the soil saline and unproductive. Salinity is expressed as electrical conductivity.
Scalding	Visible salt crystals on a dry, bare surface.
Scour	Streambank, bed or floodplain erosion where particles of sediment are removed individually by plucking or are sheared off. It is caused by the force of running water being greater than the sediment's ability to resist that force.
Sedimentation	The settling of solids from the water column to the bed of a waterbody or land surface by gravity.
Seed bank	The store of dormant seeds in the sediment of a wetland ⁵ or soil profile of riparian land.
Settlement	Occupation, clearing and use of land by (mainly European) people other than the traditional Aboriginal custodians, from the late eighteenth century.
Snags	Trees and old logs that fall into the water and provide suitable habitat and protection for native fish and invertebrates and a surface on which bacteria and plankton to grow. Snags are also known as 'large woody debris'.

Stability	A 'natural' rate of bank erosion. This does not imply absolute stability, but the rate of change that may have existed before European settlement. Thus, an unstable bank is a bank that is eroding at a faster rate than natural. The rate of erosion may be determined by comparison to a nearby reach in a near natural condition.
Stream	The term used to collectively describe rivers, creeks, drainage lines and gullies.
Stream order	A ranking system to describe the relative size of streams and tributaries along the river
Stressed river	Assessment made by the government that determines appropriate management strategies for water allocation and flow management in uncontrolled streams. It is a classification based on environmental and water-use criteria.
Stratification	Distinct layers of water in a dam or weir pool formed when there is little movement to cause intermixing-usually in summer when deeper layers of water become cold and deoxygenated. These changes may, in turn, induce other water quality changes.
Surface water	Water on the surface of the land, for example in rivers, creeks, lakes and dams.
Suspended load	Fine material carried by water flows, which would otherwise settle out in still water. Sediment transported by suspension in the water column. The size of material depends on the capacity of the river – lower energy river will carry small sized particles but during times of flood or discharge larger material can be carried.
Suspended solid	The smaller, lighter material such as clay, silt and fine sand carried in suspension in water.
Sustainable	Management that will meet current needs while conserving natural ecosystems so they can also meet future needs.
T	
Terrestrial	A common term used for land based objects or activities.
Tributary	A river or creek that flows into a larger river.
Turbidity	The relative clarity of water. If the water is not clear or transparent it is turbid. Turbidity is caused by particles of extraneous matter. It is measured in NTUs (Nephelometric Turbidity Units).
U	
Unregulated	Streams that are largely free of structures that control flow, such as major dams.
Undercut	Erosion at the base or toe of the streambank which removes support to the streambank above.

V	Variability	The likelihood of variation or change. High variability of river flows means that stream height at any one place can change substantially over time. Variability is determined by catchment size, number of tributaries, slope and climate. Overall, Australia has extremely variable rainfall and river flows.
W	Water quality	The chemical, physical and biological condition of water.
	Watertable	The upper surface of a body of groundwater.
	Weir pools	The water held back by a weir, forming a still pool. Where the land is very flat, such as in western NSW, a weir can cause very long pools to form.
	Wetland	Land inundated with temporary or permanent water that is usually slow moving, stationary or shallow, and either fresh, brackish or saline. Flora and fauna found in wetlands will be either wholly or partially dependant on water for completion of their life cycle.

This glossary has been constructed from several sources, including:

- Schneider, G, 2007. Where land meets water resource kit: a guide to riparian management in the Hunter Valley. Hunter Central Rivers Catchment Management Authority, Tocal, NSW).
- EPA 2006, 'NSW Water Quality and river flow objectives, Castlereagh River, Glossary', Environmental Protection Agency, viewed on December 21st 2007, <http://www.epa.nsw.gov.au/ieo/Castlereagh/report-06.htm>
- Abernethy, B. & Rutherford, I., 1999. *Guidelines for stabilising streambanks with riparian vegetation*, Cooperative Research Centre for Catchment Hydrology.
- NSW *Native Vegetation Act 2003*.
- UNEP, 2003. *Phytotechnologies: A technical approach in environmental management. Freshwater Management Series No.7*, United Nations Environment Programme, viewed on December 21st 2007, <http://www.unep.or.jp/ietc/Publications/Freshwater/FMS7/copyright.asp>
- Brock, M. A., & Casanova, M. T., 2000. *Are there plants in your wetland? Revegetating wetlands*, LWRRDC, UNE, DLWC and EA.