

## Glossary

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**Adaptive management:** A type of management where the approach to managing resources evolves over time as new ideas, information, drivers for change and technologies emerge.

**Adaptive environmental water:** Adaptive environmental water is a water-access licence entitlement that is committed for specified environmental purposes or at certain times or circumstances by an adaptive environmental water condition (<http://www.nwc.gov.au/www/html/1342-adaptive-environmental-water-entitlement.asp>)

**Aerobic or oxic zone:** An environment in which there is free oxygen (ARMCANZ & ANZECC 2000).

**Anaerobic or anoxic zone:** An environment devoid of oxygen (ARMCANZ & ANZECC 2000).

**Aquifer:** A geological formation or group of formations capable of receiving, storing and transmitting significant quantities of water (Water and Rivers Commission 2000a).

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**Bankfull flow:** The dominant channel forming discharge (Water and Rivers Commission 2001). The flow rate at which a channel is filled from bank to bank. The frequency of bankfull conditions is commonly adopted as the criterion for maintaining the channel cross-section and freedom from sedimentation in the longer term. This frequency will vary according to climatic regions (ARMCANZ & ANZECC 2000), but usually occurs once every 1.5 years.

**Bank stabilisation:** See 'stabilisation'.

**Baseflow:** The underlying flow rate that cannot be directly attributed to storm events (ARMCANZ & ANZECC 2000). The part of the total flow in a water body derived from groundwater discharge.

**Best management practices (BMPs):** Devices, practices or methods for

**Biodiversity:** The variability among living organisms from all sources (including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part) and the diversity within and between species and of ecosystems (ARMCANZ & ANZECC 2000).

**Biofilm:** A gelatinous sheath of algae and micro-organisms, including benthic algae and bacteria, formed on surfaces such as gravel, sediment and plants (ARMCANZ & ANZECC 2000).

**Bonn Convention:** Convention on the Conservation of Migratory Species of Wild Animals done at Bonn on 23 June 1979, the objective of which is the conservation of listed species throughout their range, with the emphasis on terrestrial, marine and avian migratory species.

**Bore:** A narrow, lined hole drilled to withdraw or monitor groundwater.

**Buffer strip:** Areas of vegetation through which runoff passes while travelling to a discharge point and which are therefore aligned perpendicular to the direction of flow.

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**CAMBA** (China–Australia Migratory Bird Agreement): Agreement between the Government of Australia and the Government of the People’s Republic of China for the Protection of Migratory Birds and their Environment done at Canberra on 20 October 1986 which lists terrestrial, water and shorebird species which migrate between Australia and China.

**Capacity building program:** A holistic approach to knowledge building and transfer, which fosters skill development, competency, innovation and confidence. It is also a means to facilitate network building, linkages and training for continuous improvement.

**Catchment:** A topographically defined area draining surface water to a single outlet point.

**Cease to flow/Commence to flow:** the point at which the river stops/starts flowing, usually measured in megalitres.

**Connectivity (hydrological):** Refers to the water-mediated transfer of matter, energy and organisms between elements of the hydrologic cycle eg. The exchange of carbon between an inundated floodplain and the overlaying floodwaters.

**Constructed wetland:** A vegetated detention area designed and built to remove contaminants from stormwater runoff, but which can also provide secondary benefits of habitat enhancement/creation and active and passive recreational and educational opportunities.

**Consumptive water:** Water ordered and/or used for private benefit consumptive purposes, including irrigation, industry, urban and stock and domestic use (Water Act 2007).

**Contaminant:** A substance that presents or has the potential to present a risk of harm to human health, the environment or any environmental value .

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**Denitrification:** The reduction of nitrate or nitrite to nitrogen gas, in the absence of oxygen (ARMCANZ & ANZECC 2000).

**Discharge:** The rate at which a volume of water passes through a cross section in a unit of time.

**Diversity:** See Biodiversity

**Dissolved fraction:** The part of a water sample passing through a 0.45 µm pore size filter paper. It will include both a truly dissolved and colloidal material fraction. (ARMCANZ & ANZECC 2000.)

**Drainage network:** The system of channels and pipes and overland flow pathways which drain a catchment area (ARMCANZ & ANZECC 2000).

**Drought refuges:** Drought refuges are places that sustain life during the dry seasons, particularly in ephemeral streams.

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**Ecological values:** Particular values or uses of the environment important for a healthy ecosystem or for public benefit, welfare, safety or health and economic activities, and which require protection from the effects of pollution, waste discharges and deposits (ARMCANZ & ANZECC 2000) and from the effects of altered water regimes.

**Ecological water requirements (EWRs):** The water regimes needed to maintain ecological values of water dependent ecosystems at a low level of risk. Also see 'environmental water provisions'.

**Economic values:** Includes water body uses, stormwater use, economic values of the receiving environment (e.g. fishing and tourism), values of land used for stormwater management and values of land adjacent to stormwater management devices.

**Ecosystem:** An ecological community together with its environment, functioning as a unit.

**Ecosystem function and services:** Functions are the biophysical processes that take place within an ecosystem. These can include fish and waterbird habitat, cycling carbon and trapping nutrients. Services are the beneficial outcomes that result from ecosystem functions, such as cleaner water and improved human health.

**Effectiveness:** The extent to which project outcomes (see 'outcomes') are achieving project objectives.

**Efficiency:** The extent to which project outputs (see 'outputs') are maximised for the given level of inputs. Efficiency is concerned with the processes (activities/strategies/operations) by which the project is delivered and which produce the outputs of the projects.

**Environmental assets:** Includes water dependent ecosystems, ecosystem services, and sites with ecological significance (as defined in Water Act 2007).

**Environmental contingency allowance (ECA):** A volume of water held in storage from which releases are made for particular environmental purposes or in response to particular

environmental circumstances, including to support waterbird or fish breeding, wetland watering or increase flow variability when needed (Water Sharing Plan for the Lachlan Regulated River Water Source 2003; specifically in the Lachlan, a water reserve of 10,000 ML in both Wyangala Dam and Lake Brewster whenever the total volume of water available to general security access licences exceeds 50 per cent of the access licence share volume at the beginning of a water year, or reaches 75 per cent during a water year.

**Environmental flows:** Releases from dams which are intended to achieve environmental outcomes or benefit as opposed to consumptive water releases which are intended for consumptive purposes.

**Environmental management systems (EMS):** The part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining an environmental policy (Standards Australia 1996).

**Environmental outcomes:** Desired outcomes relating to ecosystem function (e.g. by periodic flooding of floodplain wetlands); biodiversity, water quality; and water resource health (e.g. addressing pollution issues and noxious algal blooms) (Water Act 2007).

**Environmental water:** Water Act or WSP or Basin plan.

**Environmental water provisions (EWPs):** The water regimes that are provided as a result of the water allocation decision-making process taking into account ecological, social and economic impacts. They may meet in part or in full the ecological water requirements. See 'ecological water requirements'.

**Erosion:** The process by which the land surface is detached and transported away by the action of water, wind, ice or gravity.

**Evaporation:** Where liquid water is converted to water vapour and thus removed from a surface, such as a lake, soil or wet vegetation, into the air.

**Evapotranspiration (ET<sub>o</sub>):** A collective term for the part of the water cycle which transfers liquid water, as water vapour, into the atmosphere from both vegetated and un-vegetated land surfaces through the processes of both transpiration and evaporation. ET<sub>o</sub> is affected by climate, availability of water and type of vegetation.

(<http://www.bom.gov.au/watl/eto/about.shtml>)

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**First flush:** Describes situations when contaminants (e.g. sediments) that have accumulated on impervious surfaces are transported at the beginning of a rainfall event. This results in high pollution concentrations at the start of the runoff hydrograph, reducing to lower levels before the flood peak occurs.

**Fishway:** an engineered structure that allows fish to migrate upstream past a dam, weir or regulator.

**Flashiness:** Where water levels rapidly peak and decline.

**Floodplain:** The portion of a waterway valley next to the channel which is covered with water when the waterway overflows its banks during major flow events.

**Flow duration curve:** A graphical representation of information about the percentage of time that a particular streamflow was exceeded over some historical period.

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**Geomorphology:** Of, or relating to, the forms of the earth's surface and the processes associated with them (e.g. erosion, weathering, transport and deposition).

**Gigalitre:** A unit of measurement for large volumes of water, abbreviated to Gl. One gigalitre is the equivalent to one billion litres or one thousand megalitres.

**Goals or aims:** General descriptions of what a project will achieve (Woodhill & Robins 1998).

**Groundwater:** Water found under the land surface that occupies pores and crevices of soil and rock.

**Groundwater dependent ecosystem (GDE):** Those parts of the environment, the species composition and natural ecological processes that are determined by the permanent or temporary presence of water resources from within groundwater aquifers.

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**Hydrograph:** A graph depicting water level or rate of flow of a body of water as a function of time.

**Hydrologic balance:** an accounting of all water inflow into, outflow from and changes in water storage within a hydrologic unit over a specified period of time

**Hydrologic regime:** A description of the variation of flow rate or water level over time.

**Hydrological cycle:** The continual cycle of water between the land, the ocean and the atmosphere.

**Hydrology:** The science of the behaviour of water in the atmosphere, on the surface of the earth and within the soil and underlying rocks. This includes the relationship between rainfall, runoff, infiltration and evaporation.

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**Indicators:** The specific characteristics or phenomena that tell you about the project and what impact it is having on the problem or issue it was set up to address.

**Infiltration:** The movement of water from the surface to the subsoil and at times, ultimately to the underlying aquifer.

**Instream habitat:** The features within a river or stream that may be either permanently or periodically inundated to provide habitat for water dependant plants, fish, birds, insects and animals.

**Integrated water cycle management (IWCM):** The integration of water supply, sewerage and stormwater, so that water is used optimally within a catchment resource, State and national policy context. It promotes the coordinated planning, development and management of water, land and related resources (including energy use) that are linked to urban areas and the application of WSUD principles within the built urban environment. (National Water Commission 2006.)

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**JAMBA** (Japan-Australia Migratory Bird Agreement): Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment done at Tokyo on 6 February 1981, and like CAMBA also list terrestrial, water and shorebird species which migrate between Australia and Japan.

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**Karst system:** a distinct landform arising over geological time frames mostly due to the dissolving action of water on carbonate rock (e.g. limestone, dolomite and marble), and results in a variety of unique surface and below ground features, such as caves, underground streams, arches, gorges, sinkholes, and passageways.

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**Large woody debris:** Branches, trunks or whole trees that have fallen into the river creating habitat and structure.

**Left bank:** Facing downstream, the bank of the river that would be on the left hand side. This is the

accepted and consistent method for identifying river bank orientation as a north/south label can create confusion as the river meanders.

**Licensed environmental water:** WSP

**Loading:** The total mass of a contaminant discharged during a runoff event (ARMCANZ & ANZECC)

2000.)

**Lotic:** Referring to moving waters; rivers and streams.

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**Megalitre:** Unit of measurement for large quantities of water, abbreviated to Ml. One megalitre is equivalent to one million litres.

**Monitoring:** The collection of data by various methods for the purpose of understanding natural systems and features, evaluating the impacts of development proposals on such systems, and assessing the performance of mitigation measures.

**Monitoring and evaluation program:** Development of monitoring and evaluation activities to determine the success or otherwise of measures put in place as part of stormwater management projects.

**Multiple use corridors:** Facilities performing a range of functions (e.g. stormwater management, landscape, recreation and wildlife habitat).

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**Non-point source pollution:** Pollution from diffuse sources without a single point of origin or specific discharge point (ARMCANZ & ANZECC 2000).

**Nutrients:** Essential chemicals such as nitrogen (N) and phosphorus (P) needed by plants and animals for growth. Excessive amounts of nutrients can lead to degradation of water quality and algal blooms.

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**Objectives:** Specific statements about what a project intends to achieve.

**Outcomes:** The results of the activities or products of a project. All the impacts or consequences of the project beyond its outputs (see 'outputs'). Outcomes are often delayed or long term and they may be intended or unanticipated.

**Outputs:** The activities completed or products made during a project (Woodhill & Robins 1998). Outputs are within the direct control of the project.

**Overbank Flow:** Water that flows out over the top of the river channel and bank onto the floodplain.

**Overland flow:** The component of rainfall (excess) that is not removed by infiltration or use and discharges down-gradient as surface flow (ARMCANZ & ANZECC 2000).

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**Peak discharge rate:** The maximum instantaneous rate of flow during a runoff event.

**Peak flow:** Maximum flow rate in a flood.

**Performance indicator:** A specific type of indicator that looks at outcomes (see 'outcomes') to see if they are meeting the project's objectives (see 'objectives').

**Performance monitoring:** Gathering of information to measure the success of strategies implemented when compared to objectives (see 'objectives').

**Permeable soils:** Soil materials with sufficiently rapid infiltration rate, therefore reducing or eliminating stormwater runoff. Coarse textured soils tend to have large, well-connected pore spaces and therefore high permeability.

**pH:** A measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration [H<sup>+</sup>]. A pH of 7 is neutral, pH less than 7 is acidic and pH greater than 7 is basic.

**Planned environmental water:** Planned environmental water to encompass 'rules based' environmental water, that is, planned environmental water may be delivered through flow rules which specify flows that must be released from storages for environmental purposes. It may also be delivered or retained through restrictions upon the taking of water. Planned environmental water may replicate natural flow patterns taking into account the timing, frequency and variability of flows. Planned environmental water may seek to achieve specific environmental outcomes such as maintaining the success of bird breeding events in specific wetlands, or may be aimed at maintaining general river health through passing flows or end-of-system flow targets.

**Point source pollution:** Contamination from a localised source, such as leaky storage tanks and drums or sewage discharge.

**Pollutant retention:** The proportion of pollutant load intercepted and retained by a device, either on an event or annual basis (ARMCANZ & ANZECC 2000).

**Potable water:** Water generally considered suitable for human consumption.

**Precautionary principle:** If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

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**Receiving environment:** Areas that receive runoff, including wetlands, waterways, groundwater and bushland areas.

**Receiving water bodies:** Include waterways, wetlands, coastal marine areas and shallow groundwater aquifers.

**Recharge:** Water infiltrating to replenish an aquifer.

**Regulator:** An instream water management structure with moveable gates to control the flow of water.

**Resilience:** Resilience is defined as "the capacity of an ecosystem to tolerate disturbance without collapsing into a different state that is controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary."

**Resistance:** The ease or difficulty of changing an ecosystem; how "resistant" it is to being changed.

**Resource assessment:**

**Resource allocation:**

**Retention/retain:** Retention is defined as the process of preventing rainfall runoff from being discharged into receiving water bodies by holding it in a storage area. The water may then infiltrate into groundwater, evaporate or be removed by evapotranspiration of vegetation.

**Riffles:** High points in a stream or river channel representing bedrock bars or accumulations of relatively coarse material. Water flow is typically relatively shallow, fast and rough over riffles.

**Right bank:** Facing downstream, the bank of the river that would be on the right hand side. This is the accepted and consistent method for identifying river bank orientation as a north/south can create confusion as the river meanders.

**Riparian areas:** An area of land directly influenced by water. An ecosystem that is transitional between land and water ecosystems.

**Riparian vegetation:** Vegetation growing within the channel and the along banks of waterways, extending laterally away from the bank and ending at the extent of the floodplain.

**Risk:** The chances of something happening that will have an impact on objectives. It is measured in terms of consequences and likelihood. (Standards Association of Australia 1999.)

**Risk assessment:** The process of risk analysis and risk evaluation.

**River channel:** The bed and banks of a stream or river that carries all flows except floods.

**Riverine:** Relating to or resembling a river. Located on or inhabiting the banks of a river or riparian area.

**ROKAMBA:** Agreement with the Government of the Republic of Korea on the Protection of Migratory

Birds done at Canberra on 6 December 2006, which formalises Australia's relationship with the Republic of Korea in respect to migratory bird conservation, while also providing a basis for collaboration on the protection of migratory shorebirds and their habitat.

**Runoff:** Water that flows over the surface of a catchment area.

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**Sediment:** Solid fragment of organic and inorganic material that is transported, suspended and/or deposited by water and wind.

**Sedimentation:** The physical process of settling of suspended particulates under the force of gravity (ARMCANZ & ANZECC 2000).

**Silt:** A soil separate consisting of particles between 0.002 and 0.02 mm in equivalent diameter.

**Social/cultural values:** Social values include public health and safety, recreational uses and visual amenity. Cultural values include historical and spiritual significance, and scientific and educational uses.

**Soil stabilisation:** The use of measures or materials, such as rock lining or vegetation, to prevent the movement of soil when loads are applied to the soil.

**Sub-catchment:** A topographically defined area drained by a tributary of a primary stream (ARMCANZ & ANZECC 2000).

**Surface water:** Water flowing or held in waterways or wetlands on the surface of the landscape.

**Suspended solids:** Organic or inorganic particles that are suspended and transported by water. This includes sand, mud and clay particles (and associated contaminants).

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**Target:** A numerical concentration limit or descriptive statement relating to an aspect of water management aspired to as part of the LEWMP.

**Thalweg:** The middle, chief, or deepest part of a river channel or waterway.

**Threat:** An activity or land use with potential to damage the local or receiving environment's social/cultural, ecological or economic values.

**Toxicity:** The quantity or degree to which a substance is poisonous or harmful to plant, animal or human health.

**Translucent flow/translucency:** Specific flows relating to dam release rules. Water that flows into a major dam or storage is released straight away and allowed to continue through the system for environmental outcomes.

**Transpiration:** The loss of water in plant tissues to the atmosphere, mainly through the stomata (small opening in the leaves of plants and grasses).

**Triple-bottom-line assessment:** A process which uses multi-criteria analysis to evaluate the economic, social and ecological costs and benefits of possible Best Management Practices.

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**Urban:** Land used for residential, rural-residential, commercial or industrial development (includes regional towns).

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**Values:** Values may include economic values (e.g. water use, aquaculture and stormwater reuse), ecological values (e.g. aquatic fauna and flora, urban bushland) and social/cultural values (e.g. historical, public health and safety, recreational, visual amenity, spiritual).

**Valve capacity:** The size of the release valve at a dam or storage that releases water downstream.

The release capacity often diminishes as the dam level decreases.

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**Water allocation:** The specific volume of water allocated to water access entitlements in a given water accounting period (Water Act 2007).

**Waterbodies:** Waterways, wetlands, coastal marine areas and shallow groundwater aquifers.

**Watercourses:** A river, stream or creek in which water flows in a natural channel, whether permanently or intermittently.

**Water dependent ecosystems:** Those parts of the environment, the species composition and natural ecological processes of which are determined by the permanent or temporary presence of water resources, including flowing or standing water and water within groundwater aquifers.

**Water sharing plan:**

**Water quality allowance:**

**Waterways:** All seasonal, intermittent or permanent streams, creeks, rivers, estuaries, coastal

lagoons, inlets and harbours.

**Weir:** An instream structure that restricts the amount of downstream flow by pooling water to create a reservoir. Weirs can be a fixed crest structure (no control of flows) or have movable tilt or lift gates.

**Wetlands:** Areas of seasonally, intermittently or permanently waterlogged or inundated land, whether natural or otherwise, including lakes and floodplains.

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