

## Glossary

## Glossary of terms

Accretion – the build-up of sediments to form land or shoaling in coastal waters or waterways.

Alongshore or Longshore – parallel to and near the shoreline.

Annual Exceedance Probability (AEP) – the probability as a percentage at which a given event is likely to occur in one year.

Australian Height Datum (AHD) – the official national vertical datum for Australia.

Average Recurrence Interval (ARI) – the average or expected value of the periods between exceedances of a given intensity event over a given duration.

Bathymetric data – measurements of the shape of the bed or the depth of a body of water.

Beach profile (or coastal profile) – a cross-section taken perpendicular to a given beach contour; the profile may include the face of a dune or seawall, extend over the backshore, across the foreshore, and seaward underwater into the nearshore zone.

Beach scraping – also referred to as ‘nature assisted beach enhancement’ (NABE) is a mechanical intervention to speed up the natural processes of berm and foredune recovery after a storm event.

Beach slope – the gradient at which the beach slopes seaward.

Bedrock – a general term for the rock, usually solid, that underlies soil or other unconsolidated, superficial material.

Berm – on a beach, a nearly horizontal plateau on the beach face or backshore, formed by the deposition of beach material by wave action or by means of a mechanical plant as part of a beach renourishment scheme. Some natural beaches have no berm, others have several.

Built assets – built infrastructure.

Bypassing, sand – hydraulic or mechanical movement of sand from the accreting up-drift side to the eroding down-drift side of an inlet or

harbour entrance. The hydraulic movement may include natural movement as well as movement caused by humans.

Closure depth – generally considered the seaward limit of littoral transport (collected over several years).

Coastal barrier – a barrier between the sea and other land or landforms or river/lake/lagoon (generically used herein for natural dunes or man-made structures).

Coastal inundation – coastal inundation occurs when a combination of marine and atmospheric processes raises the water level at the coast above normal elevations, causing land that is usually ‘dry’ to become inundated by sea water. Alternatively, the elevated water level may result in wave runup and overtopping of natural or built shoreline structures (e.g., dunes, seawalls).

Coastal lake or lagoon – a coastal water body that is generally closed off from the sea by a sandy barrier. Water levels and water quality may be quite different to the nearby ocean.

Coastal management program (CMP) – a long-term strategy for the coordinated management of land within the coastal zone, prepared and adopted under Part 3 of the CM Act.

Coastal sediment compartment – an area of the coast defined by its sediment flows and landforms. Coastal sediment compartments may be mapped at primary, secondary or tertiary (local) scales. Boundaries are generally defined by structural features related to the geologic frameworks that define the planform of the coast.

Damage (to seawalls) – defined as any displacement or dislodgment of armour units.

Digital elevation model (DEM) – gridded elevation data to represent terrain.

DPE – NSW Department of Planning and Environment.

Dune ridge – shore-parallel sand ridge that forms part of a dune system.

East Coast Low – an intense low-pressure system that occurs off the east coast of Australia, bringing storms, high waves and

heavy rain. East coast lows generally occur in autumn and winter off NSW, southern Queensland and eastern Victoria.

Elevated still water levels – ocean water level raised due to a storm surge.

El Niño southern oscillation (ENSO) – a year to year fluctuation in atmospheric pressure, ocean temperatures and rainfall associated with El Niño (warming of the oceans in the equatorial eastern and central Pacific). El Niño tends to bring below average rainfall.

Erosion – the wearing away of land by the action of natural forces. On a beach, the carrying away of beach material by wave action, tidal currents, littoral currents, or by deflation.

Estuary – CM Act defines as any part of a river, lake, lagoon, or coastal creek whose level is periodically or intermittently affected by coastal tides, up to the highest astronomical tide.

Geomorphology – that branch of physical geography which deals with the form of the earth, the general configuration of its surface, the distribution of the land, water, etc.; or the investigation of the history of geologic changes through the interpretation of topographic forms.

Geotextile – a synthetic fabric which may be woven or non-woven and used as a filter.

Hydrodynamic – relates to the specific scientific principles that deal with the motion of fluids and the forces acting on solid bodies immersed in fluids, and in motion relative to them.

Highest Astronomical Tide (HAT) – the highest level which can be predicted to occur under average meteorological conditions.

Holocene – an epoch of the Quaternary period, from the end of the Pleistocene, about 8,000 years ago, to the present time.

Incipient dune – the most seaward and immature dune of the dune system. Vegetation characterised by grasses such as spinifex. On an accreting coastline, the incipient dune will develop into a foredune.

Infiltration – the process at which water is absorbed into the ground.

Intermittently closed and open lakes and lagoons (ICOLL) – coastal lakes and lagoons where the entrance may be closed to the sea from time to time and for varying periods, by accretion of a berm.

Inundation – flooding of land area.

IPCC – Intergovernmental Panel on Climate Change.

Interdecadal Pacific Oscillation (IPO) – an irregular interdecadal sea surface temperature in the Pacific Ocean that modulates the strength and frequency of the El Niño Southern Oscillation.

Joint probability – the probability of two events occurring at the same time.

King tides – any high water level that is well above the average, commonly applied to two spring tides that are the highest for the year, one during summer and one in winter.

LiDAR – Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges.

Littoral – of or pertaining to a shore, especially of the sea. Often used as a general term for the coastal zone influenced by wave action, or, more specifically, the shore zone between the high and low water marks.

Lowest Astronomical Tide (LAT) – the lowest levels which can be predicted to occur under average meteorological conditions.

Mean High Water Neaps (MHWN) – the height of mean high water neaps is the average throughout a year of the heights of two successive high waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is least.

Mean High Water Springs (MHWS) – the height of mean high water springs is the average throughout a year of the heights of two successive high waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is greatest.

Mean Low Water Neaps (MLWN) - the height of mean low water neaps is the average throughout a year of the heights of two

successive low waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is least.

Mean Low Water Springs (MLWS) – the height of mean low water springs is the average throughout a year of the heights of two successive low waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is greatest.

Mean Sea Level (MSL) – the average level of the sea over longer periods of time.

Morphological response – change in beach shape/slope due to an event.

Multivariate copula analysis - used to describe the dependence between random variables.

Natural assets – the natural beach, dunes, and vegetation.

Numerical modelling – computer software modelling used to simulate coastal processes.

OEH – NSW Office of Environment and Heritage (now DPE).

Overtopping – the process of water passing over a hard coastal structure such as seawall.

Overwash – the process of water passing over a dune.

Pleistocene – the geological epoch that lasted from c. 2.58 million to 11,700 years ago, spanning the Earth's most recent period of repeated glaciations. First epoch of the Quaternary period, between the Pliocene and Holocene epochs.

Quaternary – current and most recent of the three periods of the Cenozoic Era in the geologic time scale of the International Commission on Stratigraphy. It follows the Neogene Period and spans from 2.58 million years ago to the present.

Recession – a continuing landward movement of the shoreline; or a net landward movement of the shoreline over a specified time.

Refraction – the process by which the direction of a wave moving in shallow water at an angle to the contours is changed. The part of the wave advancing in shallower water moves more

slowly than that part still advancing in deeper water, causing the wave crest to bend toward alignment with the underwater contours; or the bending of wave crests by currents.

Revetment or seawall – a type of coastal protection work which protects assets from coastal erosion by armouring the shore with erosion-resistant material. Large rocks/boulders, concrete or other materials (such as geotextile sand containers) are used, depending on the specific design requirements.

RCP – Representative Concentration Pathway is a greenhouse gas concentration trajectory adopted by the IPCC.

Rip – a narrow, strong shore normal current in the nearshore area of most wave-dominated beaches (i.e. most beaches along the open coast of NSW). They are fed by along shore feeder currents initiated by the deflection of waves at the shoreline. There are diverse types of rip on NSW beaches and they affect beach safety.

Riparian – pertaining to the banks of a body of water, such as an estuary.

Sand budget – quantitative analysis of the movement and distribution of sediment (or sand) within a coastal region. Accounts for the sources of sand, such as erosion from coastal cliffs, discharge from rivers or onshore sand supply, and the processes that transport it, such as wave action or longshore sand movements. The coastal sand budget also includes the sinks or locations where sand is deposited, such as on the beach or in a coastal lagoon.

Scour – loss of beach/sediment at the toe of a hard structure or dune.

Sediment transport – the process whereby sediment is moved offshore, onshore or along shore by wave, current or wind action.

Semi-diurnal tide – two high and two low tides a day.

Significant wave height – the average height of the largest 1/3<sup>rd</sup> of waves in a given period.

Southern Oscillation Index – the normalised mean atmospheric pressure difference between Tahiti and Darwin, measured at sea level. The

SOI is negative during El Niño and positive during La Niña.

Storm surge – the abnormal rise in sea level during a storm, measured as the height of the water above the normal predicted astronomical tide.

SWASH – numerical model for simulating unsteady, non-hydrostatic, free-surface, rotational flow and transport phenomena in coastal waters as driven by waves, tides, buoyancy and wind forces.

Swell waves – ocean waves that travel beyond the area where they are generated.

Tidal delta – where an inlet of a barrier estuary or open coastal lake is dominated by tidal processes, a flood tide delta develops inside the entrance, as tidal currents transport marine sand into the estuary. Ebb tide deltas may also occur, outside the mouth of an estuary.

Tidal plane – a plane of reference for elevations, determined from the rise and fall of the tides.

Tidal limit – the maximum upstream location on a watercourse at which a tidal variation in water level is observed.

Toe – the 'bottom' or 'front' of a hard structure.

Training walls – walls constructed at the entrances of estuaries and rivers to improve navigability.

Tropical cyclone – intense low-pressure system in which winds of at least 63km/hour whirl in a clockwise direction, in the southern hemisphere around a region of calm air.

Wave climate – the seasonal and annual distribution of wave height, period and direction.

Wave runup - the maximum vertical extent of wave uprush on a beach or structure above the still water level (SWL).

Wave setup - occurs as waves approach the coast and transform over the nearshore beach profile where radiation stresses and ultimately wave breaking force elevated water levels at the shoreline.

Wind waves (or sea) – ocean waves resulting from the action of the wind on the surface of the water.

WRB – Waverider Buoy used to measure ocean wave conditions.

XBeach – numerical model for wave propagation, long waves and mean flow, sediment transport and morphological changes of the nearshore area, beaches, dunes and backbarrier during storms.