

COMMUNITY PANEL

Ruawai Adaptive Pathways

GLOSSARY (WESTERN SCIENCE – PĀKEHĀ CONCEPTS)

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Acronyms

Acronym	Definition
AEP	Annual Exceedance Probability
ARI	Average Recurrence Interval
CMA	Coastal Marine Area
DAPP	Dynamic Adaptive Pathways Planning
ENSO	El Nino-Southern Oscillation
EWS	Early Warning Systems
IPCC	Intergovernmental Panel on Climate Change
MfE	Ministry for the Environment
MHWS	Mean High Water Spring Tide
NWRM	Natural Water Retention Measures
RCP	Representative Concentration Pathways
SLR	Sea Level Rise

Glossary

Glossary Term	Definition
100-year flood event	The level of flooding currently predicted to have an 1% chance of occurring (or being exceeded) each year.
100-year storm inundation level	The rise in water level above the normal tidal level (not including waves) during a 1% AEP storm event.
Accretion	The addition of newly deposited sediment vertically and/or horizontally.
Adaptation	Change in the way a feature, such as a habitat or community, functions. Adaptation has become an integral part of climate change policy worldwide. In 2017, the MfE provided guidance on coastal hazards and climate change adaptation for local government. It defines adaptation as a response strategy to anticipate and cope with impacts that cannot be (or are not) avoided under different scenarios of climate change. The process of adjustment to actual or expected climate and its effects (IPCC, 2014, annex II). In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities.
Adaptation signal	Adaptation signals (e.g., 0.3m of 'SLR') provide early warning of the emergence of an 'adaptation trigger' or adaptation decision-point (e.g., 0.4m of SLR); see 'DAPP'.
Adaptation threshold	The point at which the approach to management needs to have changed, because the extent of change experienced on the ground (e.g., 5m of erosion) has reached a change or tolerance threshold (i.e., become intolerable).
Adaptation trigger	Adaptation triggers (decision points) initiate the process to change the management approach (or action) on an adaptation pathway before an 'adaptation threshold' is reached.

Adaptive capacity	The ability of a (human) system to adjust to (in this case) climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.
Advance the line	One adaptation approach (or policy) is to advance the line by building new structures on the seaward side of existing structures or the natural line of the coast.
AEP	The Annual Exceedance Probability is defined as the probability that a flood of a given (or larger) magnitude will occur within a period of one year. For example, a 1% AEP flood means there is a 1-in-100 (1%) chance that a flood of that size (or larger) could occur in any one year. Commonly referred to as a 1-in-100-year event, but it could occur more than once in a 100-year period.
Anthropogenic	Impacts that originate from humans.
ARI	The Average Recurrence Interval is defined as the average or expected length of the period between exceedances of a given rainfall total over a given duration. For example, a 100-year ARI flood is a flood that occurs or is exceeded, on average, once every 100 years.
Astronomical tide	Alteration in sea water level due to the gravitational forces of the sun and moon, creating tidal cycles, without any atmospheric influences.
Beach	A deposit of non-cohesive material (e.g., sand, gravel) situated at the interface between dry land and the sea (or other large expanse of water) and actively 'worked' by present-day hydrodynamic processes (i.e., waves, tides and currents) and sometimes by winds.
Biota	The flora (plants) and fauna (animals) of a region.
Breach	Sudden or gradual failure that is caused either by surface erosion or by a subsurface failure of a riverbank or levee.
Canalisation	Modification of a river or stream into a navigable canal so that it follows a restricted path.
Climate change	Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes or trends in the mean and/or the variability of its properties, and that persists for an extended period, typically decades to centuries. Climate change includes natural internal climate processes or external climate forces, such as variations in solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use (MfE, 2017).
CMA	The Coastal Marine Area as defined in Section 2 of the RMA 1991 includes the foreshore, seabed, coastal water and the air above the water – of which (a) the seaward boundary is the outer limit of the territorial sea; (b) the landward boundary is the line of MHWS, except where that line crosses a river, the landward boundary at that point shall be whichever is the lesser of (i) one

	kilometre upstream from the mouth of the river; or (ii) the point upstream that is calculated by multiplying the width of the river mouth by five.
Coastal compartments	A length of coastline defined for the purpose of assessing interactions to examine and develop management scenarios. Developed in response to what the coast is telling us and based on coastal processes – coastal form and function – not necessarily administrative boundaries.
Coastal flooding	Coastal flooding (or coastal inundation) occurs in areas that lie on the coast of a sea, ocean, or other large body of open water. It is typically the result of extreme tidal conditions caused by severe weather. Storm surge - produced when high winds from hurricanes and other storms push water onshore - is the leading cause of coastal flooding.
Coastal hazards	Physical processes that expose a coastal area to the risk of loss of life, the degradation of environmental and cultural assets, and/or property damage. They are a subset of natural hazards covering tidal or coastal storm inundation, rising sea level, tsunami or meteorological tsunami inundation, coastal erosion (shorelines or cliffs), rise in groundwater levels from storm tides and SLR (plus associated liquefaction), and salinisation of surface fresh waters and groundwater aquifers. Herein, taken to be – in short – coastal inundation and coastal erosion, incorporating SLR and storm events.
Coastal protection	Relates to engineering works to mitigate the threat of erosion; can also relate to wave overtopping or flooding.
Coastal squeeze	A situation where the coastal margin (intertidal) is squeezed between a fixed landward boundary (artificial or otherwise) and rising sea level (low water mark migrating landwards in response to SLR).
Crest	Highest point on a beach face, bedform or wave.
DAPP	Dynamic adaptive pathways planning (DAPP) is defined in Chapter 9 (and Appendix G) of the MfE guidance (MfE, 2017) as a series of management actions over time (pathways) to achieve a set of predefined objectives under uncertain and changing conditions. An analytical planning framework.
Datum	Any position or element in relation to which others are determined (i.e., heights).
Deposition	The process by which matter, such as particles of sediment, rock or soil, is added to a surface. This usually happens gradually due to the action of wind or water. For example, particles may be deposited from a fluid as they leave suspension and settle, creating a deposition feature (such as a beach). Deposition in one place usually happens because of erosion in another place.
Do nothing	No formal measures are to be put in place to control observed processes. Another way of saying 'no active intervention' (see below).
Downdrift	Transport of sand and gravel by waves and currents in the direction of the net longshore transport (transport of sediment along the shore with the dominant wave direction).

Ecosystem	The combined physical and biological components of an environment. An area within the natural environment in which physical (abiotic) factors of the environment, such as rocks and soil, function together along with interdependent (biotic) organisms, such as plants and animals, within the same habitat.
El Niño	El Niño is a climate pattern that describes the unusual warming of surface waters in the eastern tropical Pacific Ocean. El Niño is the “warm phase” of a larger phenomenon called the El Niño-Southern Oscillation (ENSO).
Environment	Defined in the RMA 1991 as including: (a) ecosystems and their constituent parts, including people and communities; (b) all natural and physical resources; (c) amenity values; and (d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) or which are affected by those matters.
Erosion	Wearing away of the land or sea by natural forces (e.g., wind, waves, currents and physical, chemical or biological weathering).
Estuary	The seaward part of a drowned valley system, subject to tidal fluctuations and the meeting and mixing of fresh river water with saltwater from the sea, receiving sediments from its catchment and from marine sources.
Ex-tropical cyclones	Also called mid-latitude cyclones or wave cyclones, ex-tropical cyclones are low-pressure areas which, along with the anticyclones of high-pressure areas, drive the weather over much of the Earth.
Flash flooding	A river or surface water flooding event that occurs very rapidly.
Flood Prone Areas	These are low points in the ground that may flood. They are often associated with roads or railway embankments, or places where water can become trapped and pool if their outlet is blocked. For the context of this report, these areas are also associated with 1-in-100-year rainfall events.
Floodplains	A floodplain is an area of low-lying ground adjacent to rivers and streams, formed mainly of river sediments and subject to flooding. When the water rises higher than the main river itself, it spreads out into the flat land surrounding it.
Fluvial	Of or found in a stream or river (e.g., fluvial flooding or river flooding).
Fluvial flooding	Fluvial, or river, flooding occurs when excessive rainfall over an extended period of time causes a river to exceed its capacity. There are two main types of river flooding: ‘overbank’ flooding that occurs when water flows over the edges of a river or stream; and ‘flash flooding’, characterized by an intense, high velocity torrent of water that occurs in an existing river channel with little to no notice.
Foreshore	As defined in Section 2 of the RMA 1991, any land covered and uncovered by the flow and ebb of the tide at mean spring tides and, in relation to any such land that forms part of the bed of a river, does not include any area that is not part of the CMA.

Geomorphology/ morphology	The branch of physical geography/geology which deals with the form of the Earth, the general configuration of its surface, the distribution of the land, water, etc.
Gravel	Loose, rounded fragments of rock larger than sand but smaller than cobbles. Material larger than 2mm (as classified by the Wentworth scale used in sedimentology).
Groundwater flooding	Groundwater flooding is caused when the water table rises up from the rocks or soils that it resides within to above ground level, causing flooding to occur at the surface.
Hold the line	Hold the line by maintaining or changing the standard of protection. This adaptation approach (or policy) covers those situations where work or operations are to be carried out in front of existing structures or management measures (such as beach recharge, rebuilding the toe of a structure, building offshore breakwaters and so on) to improve or maintain the standard of protection provided by the existing line of defence.
Hydrodynamic	The flow and motion of water produced by applied forces.
Inshore area	The area between the low water mark and the point where the waves cease to have any influence on the land around them.
Intertidal zone	Areas where the land and sea meet: from steep, rocky ledges to long, sloping sandy beaches and vast mudflats. These are areas are periodically covered and uncovered by the tide.
King tides	A non-scientific term used to describe exceptionally high spring tides. See Perigean-spring tide.
La Niña	La Nina, the “cool phase” of ENSO, is a pattern that describes the unusual cooling of the region’s surface waters.
Levees	Also known as “stop banks” – see below.
Longshore drift	The movement of sediment approximately parallel to the shore, primary driven by waves approaching the coast at oblique angles.
Low-flow width	The low-flow width (or Q95 width) is the width of the channel where the flow discharge water level is exceeded 95% of the time.
Managed retreat	An approach to adaptation that allows the shoreline to move backwards, or retreat, with management to control or limit movement (such as reducing erosion or building new structures on the landward side of existing protection) or to support the relocation of assets overtime.
Meander	A U-bend or winding path in the course of a stream, usually occurring in a series.
MHWS	Mean high water spring tide, the average of all high-tide water levels observed over a sufficiently long period and the line that marks the landward boundary of the CMA (MfE, 2017).

Natural asset / coastal asset	Natural coast protection assets include beaches and sand dunes, saltmarsh and mudflats, and mangroves.
Natural hazard	Any atmospheric, earth or water-related occurrence (including earthquake, tsunami, erosion, volcanic activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding), the action of which adversely affects or may adversely affect human life, property, social and economic activities or other aspects of the environment (RMA 1991, Section 2). Hazards can be single, sequential, or combined in their origin and effects. Each hazard is characterised by its timing, location and scale, intensity and probability.
Neap tides	Neap tides, which also occur twice a month, happen when the sun and moon are at right angles to each other.
No active intervention	An adaptation policy where there is to be no investment in adaptation of intervention because it is not warranted (i.e., there is no need) or would not provide the best outcome (i.e., the ecosystem should be allowed to evolve naturally).
Overland flow	Water that runs across the land after rainfall, either before it enters a watercourse, after it leaves a watercourse as floodwater, or after it rises to the surface naturally from underground.
Overwash	The flow of water and sediment over a coastal dune or beach crest during storm events (or other situations with high water).
Perigean-spring tide	A tide that occurs three or four times per year when a perigee (the point nearest Earth reached by the Moon during its 27.3-day elliptic orbit) coincides with a spring tide (when the Sun, the Moon, and Earth are nearly aligned every two weeks). Often referred to as a King tide.
Pluvial flooding	A pluvial, or surface water, flood is caused when heavy rainfall creates a flood event independent of an overflowing water body. Pluvial flooding can occur in areas that lie above coastal and river floodplains. There are two common types of pluvial flooding: (a) intense rain saturates an urban drainage system and the system becomes overwhelmed; or (b) run-off or flowing water from rain falling on hillsides that are unable to absorb the water. Pluvial flooding often occurs in combination with coastal and fluvial flooding and, although typically only a few centimetres deep, can cause significant property damage.
Protection	Protection in this context relates to engineering works to mitigate the threat of erosion, wave overtopping or flooding.
RCP	Representative Concentration Pathways are scenarios used by the IPCC to provide projections of greenhouse gas concentrations which correspond to changing energy levels within the atmosphere.
Reclamation	Land reclamation, usually known as reclamation, and also known as land fill (not to be confused with a waste landfill), is the process of creating new land from oceans, seas, riverbeds or lake beds.

Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.
Risk	The effect of uncertainty on objectives (AS/NZS ISO 31000:2009, Risk management standard). Risk is often expressed in terms of a combination of consequences of an event (including changes in circumstances) and the associated likelihood of occurrence: that is, the product of 'likelihood' and 'consequences' or 'the effect of uncertainty on objectives'.
Sand	Sediment particles with a diameter of between 0.063 mm and 2 mm. Sand is generally classified as fine, medium or coarse.
Sediment	Particulate matter derived from rock, minerals or bioclastic matter.
Sediment transport	The movement of a mass of sedimentary material by the forces of currents and waves.
SLR	Sea Level Rise is the increase in the level of the world's oceans due to the effects of global warming.
Spit	Narrow accumulation of sand or gravel generally lying parallel to the coast with one end attached to the land and the other projecting seawards, often formed across the mouth of an estuary or bay.
Spring tide	A tide that occurs when the tide-generating forces of the sun and moon are acting in the same directions, so the tidal range is higher than average.
Standard of protection	The level of protection that a given structure (i.e., a seawall, stop bank) provides, and has been designed to, based on (for example) a storm event (e.g., a 1% AEP event) it is intended to provide a particular 'standard' of protection against. Can also be referred to as 'level of service' or 'design standard'.
Stop banks	Stop banks are compacted earth banks designed to contain rivers, streams and drainage canals in flood or to hold back the sea, preventing floodwater spreading into land and property up to a design limit. Also referred to as levees and dykes.
Storm surge	A rise of sea elevation caused by water piling up against a coast under the force of strong onshore winds and/or reduced atmospheric pressure.
Storm tide	The coastal water level (tide) produced by the combination of astronomical and meteorological (storm surge) ocean water levels.
Stormwater	Water that originates from precipitation (storm), including heavy rain and meltwater from hail and snow. Stormwater can soak into the soil (infiltrate), be held on the surface and evaporate, or runoff and end up in nearby streams, rivers, or other water bodies (surface water).
Surface water flooding	See 'pluvial flooding'.

Tidal range	The difference in height between successive high water and low water levels at a point.
Tide	The periodic rise and fall in the level of the water in oceans and seas. The result of gravitational attraction of the sun and moon.
Tipping point	The IPCC defines tipping points as “critical thresholds in a system that, when exceeded, can lead to a significant change in the state of the system, often with an understanding that the change is irreversible”
Topography	Configuration of a surface including its relief and the position of its natural and man-made features.
Vulnerability	The quality or state of being exposed to the possibility of being attacked or harmed, either physically or emotionally.
Weather hazards	A weather hazard is any naturally occurring weather condition that has the potential to cause either harm or damage.