

NEW SOUTH WALES STATE PLAN GLOSSARY

Supporting Document to the NSW State Storm, Flood, and Tsunami Plan

OCTOBER 2023

The following glossary terms are referenced in NSW State Emergency Planning in the NSW State Flood, Storm, and Tsunami Plans. Where possible, the reference source has been identified as part of the definition.

After Action Review (AAR). A structured learning tool intended to evaluate an incident or activity to improve operational performance by sustaining strengths and correcting weaknesses. Accordingly, an AAR should identify areas of positive performance as well as areas that require improvement. AARs can be held at various levels including operational areas, agencies, and multi-agency.

Annual Exceedance Probability (AEP). The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood level (height) has an AEP of 5%, there is a 5% chance (that is, a one-in-20 chance) of such a level or higher occurring in any one year (see also Average Recurrence Interval).

Assembly Area. An assembly area is a designated location used for the assembly of emergencyaffected persons before they move to temporary accommodation or a nominated evacuation centre. As such these areas do not provide welfare assistance nor are they used for long-term sheltering or provision of meals.

Australian Height Datum (AHD). A common national surface level datum approximately corresponding to mean sea level.

Australian Tsunami Advisory Group (ATAG). An advisory committee of the Australian-New Zealand Emergency Management Committee, which deals with national tsunami issues, including the implementation of the Australian Tsunami Warning System (ATWS).

Australian Warning System (AWS). A nationally consistent multi hazard warning system for emergency services to use when warning communities of expected consequences and required hazards. The warning system comprises of warning levels, calls to action, hazard icons, colours, and shapes, and was endorsed by the Australia New Zealand Emergency Management Committee (ANZEMC) in March 2021.

Average Recurrence Interval (ARI). The long-term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods reaching a height as great as, or greater than, the 20-year ARI flood event will occur on average once every 20 years.

Bore. A travelling wave with an abrupt vertical front or wall of water. Under certain conditions, the leading edge of a tsunami wave may form a bore as it approaches and runs onshore. A bore may also be formed when a tsunami wave enters a river channel and may travel upstream penetrating to a greater distance inland than it would otherwise across a coastal plain without a river channel.

Catchment. The land area draining to a point of interest, such as a water storage or monitoring site on a watercourse. (1) It always relates to an area above a specific location.

Catchment Area. The extent of land where water from precipitation drains into a water storage. (2)

Coastal Erosion. Coastal erosion is the loss of land along the shoreline due to the natural removal of beach and dune material in response to changing wave and water conditions.

Coastal Inundation. Coastal inundation is the flooding of low-lying coastal land by ocean waters caused by wave run-up overtopping dunes and coastal barriers.

Coastal Low. A cyclonic circulation that remains centred near the NSW coast (typically within 200km) for at least 12 hours. In some situations, these may produce severe weather, but lack the intensity or high impact of an East Coast Low. (3)

Coastal Management Program. The purpose of a coastal management program is to set the long-term strategy for the coordinated management of land within the coastal zone with a focus on achieving the objects of the *Coastal Management Act 2016*. It is the responsibility of NSW Local Government Councils within NSW coastal areas to develop these.

Coastal Trough. A low-pressure trough lying along, or just off, the coast. Short-lived, small-scale circulations sometimes develop with the trough. Coastal Troughs may produce heavy rainfall (and sometimes damaging wind), even in the absence of small-scale circulations. (3)

Coastal Zone Emergency Action Sub Plan. Is a plan that outlines the roles and responsibilities of all public authorities (including local council) in response to emergencies immediately preceding or during periods of beach erosion, coastal inundation, or cliff instability, where the beach erosion, coastal inundation or cliff instability occurs through storm activity or an extreme or irregular event. Those roles and responsibilities include the carrying out of works for the protection of property affected or likely to be affected by beach erosion, coastal inundation, or cliff instability.

Coastal Zone Management Plan. Means a coastal zone management plan (including any emergency action sub plans in that plan) in force under the former *Coastal Protection Act 1979* until it is replaced by a Coastal Management Program prepared and adopted under the *Coastal Management Act 2016*.

Community Action Teams. Local volunteers who are recognised as members of the NSW SES and undertake local initiatives in their communities for flood preparedness and response activities.

Community Development: Includes localised community development activities, including those that seek to capitalise on existing community strengths and assets.

Community Education, Awareness and Engagement Programs. Interventions intended to increase people's perception of their risk and to generate changes in behaviour to reduce their risk. (4)

Community Engagement. Two-way interaction and dialogue are the common element in this range of activities which may include one-on-one consultations with households, street meetings, and community meetings, and 'continuing' activities, such as community reference groups.

Community Involvement: Enhancing community ownership of plans that outline shared responsibility and integrated planning systems that contain community consultation as a critical element.

Community Resilience. Communities and individuals harnessing local resources and expertise to help themselves in an emergency, in a way that complements the response of the emergency services. (5) Resilient communities are better able to withstand a crisis event and have an enhanced ability to recover from residual impacts. (6)

Dam Emergency Plan (DEP). A DEP outlines the required actions of owners and their personnel at dams in response to a range of possible emergency situations. Dams Safety NSW requires a quality-controlled DEP, with associated dam break warning procedures, to be prepared for declared dams where persons may be at risk downstream if the dam were to fail.

Dam Failure. The uncontrolled release of a water storage. The failure may consist of the collapse of

the dam or some part of it, or excessive seepage or discharges. The most likely causes of dam failure are:

- Flood Induced Dam Failure. Dam failure caused by flood, either due to overtopping erosion or by subsequent structural failure.
- Sunny Day Dam Failure. Dam failure caused by factors other than flood i.e., other than flood flow into the reservoir. Causes of "Sunny Day" dam failure can include internal erosion, landslide, piping, earthquake, structural weaknesses, or sabotage.

Damage Assessment. Collection and collation of specific impact information to inform the impact assessment. The information assists with the transition to recovery.

Declared Dams: An officially recognised Dam in NSW, previously known as Prescribed Dams.

Deep Ocean Tsunami Buoys (Deep Ocean Tsunameter). A tsunami detection instrument capable of detecting tsunami in the deep ocean.

Design Flood (or flood standard). A flood of specified magnitude that is adopted for land use planning purposes. Selections should be based on an understanding of flood behaviour and the associated flood risk, and take account of social, economic, and environmental considerations. There may be several design floods for an individual area depending on the requirement.

Disaster Resilience. Disaster resilience is an outcome derived from a sharing of responsibility between all levels of government, business, the non-government sector, and the community who then act on this basis prior to, during and after a disaster. Disaster resilience is significantly increased by active planning and preparation. A shared understanding of the disaster risks at community level is a vital precursor. (6)

Distant Tsunami. A tsunami generated from a distant source, generally outside the south-west Pacific region. This type of tsunami may also be referred to as 'far field tsunami'.

East Coast Low: A type of Coastal Low displaying an intense cyclonic circulation and distinct upperatmospheric characteristics. East Coast Lows are associated with high-impact weather, sometimes bringing extreme rainfall rates, storm force winds and large waves. (3)

Emergency Alert. A national telephone-based alerting system available for use by emergency service agencies to send voice messages to landlines and text messages to mobile telephones within a defined area (by billing address and/or location), about likely or actual emergencies.

Emergency Management. A range of measures to manage risks to communities and the environment; the organisation and management of resources for dealing with all aspects of emergencies. Emergency management involves the plans, structures and arrangements which are established to bring together the normal endeavours of government, voluntary and private agencies in a comprehensive and coordinated way to deal with the whole spectrum of emergency needs including prevention, preparedness, response, and recovery. (8)

Emergency Response Planning Classification. A risk-based sectorisation method applied during the flood planning process to classify communities, and parts thereof, according to how the hazard is expected to impact. The community is sectorised into areas described as: Flood Island (low or high); Trapped Perimeter area (low or high); Rising Road Access area; Areas able to be evacuated (Rising Road Access or Overland Access); Indirectly Affected Areas; Overland Refuge Areas. This approach allows for response strategies (e.g., property protection, warning, evacuation, rescue, and resupply)

to be devised accordingly and caters for the full range of flooding possible in an area.

Essential Services and Infrastructure. Including transport, energy, telecommunication, and utility services (including water supply and wastewater management).

Evacuation. A risk management strategy that may be used to mitigate the effects of an emergency on a community. It involves the movement of people and their animals (where possible) to a safer location and their return. For an evacuation to be effective, it must be appropriately planned and implemented. (9)

Evacuation Centre. A centre which provides affected people with basic human needs including accommodation, food, and water. (8)

Evacuation Route. A route established to support the Evacuation strategy, allowing the safe movement of people and their animals (where possible) to a safer location away from the hazard. Evacuation decisions are made as per NSW SES Policy and Procedures and are consistent with the NSW Evacuation Management Guidelines. (10)

Exposure. The physical exposure that an asset or community has to a hazard. (10) Hazards should aim to be mitigated through community preparation for effective response to emergencies. (10)

Flash Flooding. Flooding which is sudden and often unexpected because it is caused by sudden local or nearby heavy rainfall and typically occurs in small catchments. Technically, flash flooding means any flooding of short duration with a relatively high peak discharge in which the time interval between the observable causative event and the flood is less than six hours. (11)

Flood. Relatively high-water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake, or dam, and/or local overland flooding associated with drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves (including tsunami) overtopping coastline defences. Any vehicle or pedestrian access way is deemed to be an artificial bank.

Flood Classifications. Locally defined flood levels used in flood warnings to give an indication of the severity of flooding (minor, moderate or major) expected. These levels are defined and then used by the NSW SES and the Australian Government Bureau of Meteorology (Bureau) in flood warning products.

Flood Island. Inhabited or potentially habitable areas of high ground within a floodplain linked to the flood-free valley sides by a road across the floodplain and with no alternative overland access. The road can be cut by floodwater, closing the only evacuation route, and creating an island. After closure of the road the only access to the area is by boat or by aircraft. There are two types: High flood island(s) and low flood island(s).

Flood Operations. The planning, preparedness, and response to any flood event of whatever duration and size, including riverine and flash flood which may involve multiple Flood Rescue and/or Flood Support incidents.

Flood of Record. Maximum observed historical flood.

Flood Rescue. All rescue activities where persons or domestic animals are in actual or threatened danger due to a relatively high-water level which overtops the natural or artificial banks of any part of

a stream, river, estuary, or dam, and/or local overland flooding associated with drainage before entering a water course, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline deficiencies. Any vehicle or pedestrian access way is deemed to be an artificial bank. Flood rescues can encompass rescue from canyons and waterways where swiftwater flowing within the banks is the norm.

Flood Risk Management Plan. A plan developed as part as the Floodplain Management Process in accordance with the principles and guidelines in the NSW Flood Risk Management Manual 2023. Such a plan usually includes both written and diagrammatic information describing how particular areas of flood prone land can be used and managed to achieve defined objectives.

Flood Support. Where persons or domestic animals are not in actual or threatened danger from flood water but require assistance. This could include resupply, transportation, medical assistance (non-life threatening), etc.

Flood Warning. Advance notice that a flood may occur at a certain location or in a certain river basin or catchment. For locations where the Bureau provides quantitative predictions, warnings normally include predicted flood heights at the forecast location. Flood Warnings are renewed at regular intervals until the relevant river level gauge drops to below the minor flood level. Flood Warnings are distributed to the media by the Bureau and are published on the Bureau website.

Flood Warning Consultative Committee: A committee that exists in each State to discuss network issues and service needs. These committees comprise representatives such as emergency managers, water authorities, local government, and catchment management authorities. In the Northern Territory, a similar group is called the Flood Warning Working Group. (12)

Flood Watch. A Flood Watch is an early advice of increased flood risk over a catchment by the Bureau up to four days in advance of large-scale weather systems that have the potential to cause flooding. The Flood Watch covers all catchments in NSW including catchments without flood forecasting systems and data networks, and covers inland and desert areas, and areas without well-defined rivers and streams where local flooding is the dominant flood risk. Flood Watches are distributed to the media by the Bureau and are published on the Bureau website.

Floodplain. Area of land which is subject to inundation by floods up to and including the Probable Maximum Flood (PMF) event. Synonymous with flood prone land, flood liable land and flood affected land. Note that the term covers the whole floodplain, not just the part below the flood planning level. (13)

Floodway. An area where a significant volume of water flows during floods. Such areas are often aligned with obvious naturally defined channels and are areas that, if partially blocked, would cause a significant redistribution of flood flow which may in turn adversely affect other areas. They are often, but not necessarily, the areas of deeper flow or the areas where higher velocities occur.

Hazard: Hazards are natural processes that may cause loss of life, injury, or other adverse impacts. (14) Priority natural hazards for NSW captured in the 2017 State Level Emergency Risk Assessment are bush fire, earthquake, East Coast Low, flood, landslide, storm, and tsunami. Additional hazards include biosecurity threats, heatwave, coastal erosion, pandemic influenza, and infrastructure failure. (15)

Hazard Watch. A web-based application developed and released in 2022, available on the NSW SES website and phone app stores. The app shows a single view of both fire and flood information and warnings across NSW to ensure the community has the latest information from emergency services

to make informed decisions during an emergency event. (16)

Highest Astronomical Tide (HAT). This is the highest tide level predicted, based on any combination of astronomical conditions.

Incident Controller (IC). The individual responsible for the overall management of an emergency or critical incident within their defined area of operation.

Indirect Effects. Properties and/or communities that are exposed to flood risks but are not directly impacted by inundation or isolation. Indirect effects include impacts and risks associated with flood damaged infrastructure, loss of transport links, electricity supply, water supply, sewerage, or telecommunications. Indirect effects is one of the three primary sources of risk in the context of flooding (the other two are inundation and isolation).

Intelligence. The product of a process of collecting, evaluating, and analysing information relating to an event and presenting and communicating it in such a way as to inform decision making and to devise treatment options across prevention, preparation, response, and recovery. Intelligence can be developed before, during and after an event and uses a range of sources. NSW SES maintains a Flood Intelligence System to store intelligence that is specifically related to floods.

Inundation. Properties and/or communities that are submerged by flooding. Inundation is one of the three primary sources of risk in the context of flooding (the other two are isolation and indirect effects).

Isolation. Properties and/or communities where flooding cuts access to essential services or means of supply. Isolation is one of the three primary sources of risk in the context of flooding (the other two are inundation and indirect effects).

Lacustrine Flooding. Flooding that occurs around lakes.

Levee: Designed to control a certain amount of floodwater to reduce risks and impacts from certain (designed) flood events. Different levees are designed to accommodate different flood events. When larger floods occur, or levees are breached, floodwater will flow over or through the levee which means that people and property may still be at risk.

Local (Overland) Flooding. Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake, or dam. (11)

Local Tsunami. A tsunami that is generated close to the areas it floods, for example the 1998 Papua New Guinian tsunami. This type of tsunami may also be referred to as 'near-field' tsunami.

Major Evacuation Centre. Large scale evacuation centre that requires multiagency coordination and response to deliver basic services to individuals and their companion animals affected by an emergency. Major evacuation centres are established to provide emergency accommodation when the scale and duration of the emergency are beyond the capability and capacity of the established local /regional emergency management arrangements for evacuation centres. (17)

Major Flooding. In addition to the effects of moderate flooding, extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas may be required. Utility services may be impacted. (18)

Mean Sea Level. The average of the sea surface over a long period, or the average level which would exist in the absence of tides.

Minor Flooding. Flooding which causes inconvenience. Low-lying areas next to watercourses are inundated. Minor roads may be closed, and low-level bridges submerged. In urban areas inundation may affect some backyards and buildings below the floor level as well as bicycle and pedestrian paths. In rural areas removal of stock and equipment may be required. (18)

Moderate Flooding. In addition to the effects of minor flooding, the area of inundation is more substantial. Main traffic routes may be affected. Some buildings may be affected above the floor level. Evacuation of flood affected areas may be required. In rural areas removal of stock is required. (18)

Moment Magnitude (Mw). A measure of the energy release by an earthquake. There are several different scales for measuring the magnitude. The Moment Magnitude is based on the size and characteristics of the fault rupture and can be determined from long-period seismic waves. (19)

NSW SES Operations Commander. An operational management role that provides strategic advice and support to the Incident Controller when required.

NSW SES State Controller. The NSW SES Commissioner, in connection with the exercise of their functions under the *State Emergency Service Act 1989*, may use the title NSW SES State Controller and the NSW SES Deputy Commissioner may use the title NSW SES Deputy State Controller.

NSW SES State Duty Commander (SDC). The delegated authority appointed by the NSW SES State Controller, responsible for providing advice and support to an Incident Controller and/or Operations Controller when required. State Duty Commander is in command of emergency response operations.

Overland Flow Flooding. Overland flow is run-off that travels over the land during heavy rainfall events. Overland flow can be unpredictable because it is affected by localised rainfall and urban features such as stormwater pipes, roads, fences, walls, and other structures. The actual depth and impact of overland flow varies depending on local conditions, but it generally occurs quickly and for short durations.

(Offshore) Tasman Low. A cyclonic circulation centred well off the coast (typically more than 200km). If long-lasting, these systems may produce damaging surf conditions, but rarely damaging winds or heavy rain over land areas. (3)

Paleo-tsunami. A tsunami that occurred prior to the existence of historical records.

Peak Height. The highest flood level reached, at a nominated gauging station, during a particular flood event.

Probable Maximum Flood (PMF). The largest flood that could conceivably be expected to occur at a particular location, usually estimated from probable maximum precipitation. The PMF defines the maximum extent of flood prone land, that is, the floodplain. It is difficult to define a meaningful Annual Exceedance Probability for the PMF, but it is commonly assumed to be of the order of 10⁴ to 10⁷ (once in 10,000 to 10,000,000 years). (11)

Regional Tsunami. Tsunami generated within the South-West Pacific Region.

Risk Assessment. A process used to identify the priorities to achieve a coordinated approach to emergency management, with an emphasis on continuous mitigation and preparation against hazard risk. (15)

River Basin. A tract of country, generally larger catchment areas, drained by a river and its tributaries. (1) There are 45 river basins in NSW, some of which encompass multiple Local Government Areas. (20)

Riverine Flooding. Any flooding where the rain-to-flood delay time is relatively high and typically more than six hours, but excludes flooding caused by: elevated sea levels, storm surge, flash floods, failure of any human-made infrastructure, for example failure of dams or levees, or urban overland flow.

Runoff. The amount of rainfall which ends up as stream flow, also known as 'rainfall excess' since it is the amount remaining after accounting for other processes such as evaporation and infiltration.

Run-up. The maximum vertical height for locations on land, above mean sea level, that the sea attains during a tsunami (measured in metres).

Sector. The organisational level having responsibility for operations with a defined area or having a specific functional responsibility.

Secondary Emergency. An emergency resulting from another hazard or disaster, i.e., fires, landslides, hazardous materials, food shortages following droughts or floods. (8)

Spontaneous Volunteers. Emergent volunteers during times of crisis who volunteer their time to help their local communities but do not wish to have an ongoing commitment to an organisation.

Stage Height. A flood level reached, at a nominated gauging station, during the development of a particular flood event. The Bureau provides stage height predictions leading up to the prediction of a peak flood level.

Staging Area. A prearranged, strategically placed area, where support response personnel, vehicles and other equipment can be held in readiness for use during an emergency.

Standard Operating Procedures. A step by step set of instructions for carrying out specific techniques for consistency and quality.

Storm. A weather event accompanied by wind, cyclones, tornadoes, intense rain, hail, snow, or marine wave/water action of sufficient severity to threaten lives and cause damage to property, vehicles, infrastructure, vegetation, and the coastal environment.

Storm Surge. The increases in coastal water levels above predicted astronomical tide levels (i.e., tidal anomaly) resulting from a range of location factors including the inverted barometer effect, wind and wave set-up and astronomical tidal waves, together with any other factors that increase tidal water level.

Stream Gauging Station. A place on a river or stream at which the stage height is routinely measured, either daily or continuously, and where the discharge is measured from time to time to develop a relationship between stage and discharge which is referred to as a rating curve.

Strike Teams. A set number of resources of the same type that have an established number of personnel. Strike teams are usually made up of five resources of the same type such as: vehicles, crews, earth moving machinery etc. (21)

Subduction Zone. The place where two tectonic plates come together, one being pushed below the other.

Subsector. Discrete flood problem areas, within Sectors, defined based on the Flood Emergency Response Classification of Communities and access/egress considerations to guide warning and evacuation strategies in flood operations.

Task Force. A combination of resources that can be assembled for a specific purpose. Task forces are established to meet tactical needs and may incorporate a mixture of different resources. (19)

Telecommunications. In this plan means resources and services provided by members of the functional area which are telecommunications carriers as well as the NSW Public Safety Network.

Tidal Wave. A common term for tsunami used in older literature, historical descriptions, and popular accounts. Tides, caused by the gravitational attractions of the sun and moon, may increase, or decrease the impact of a tsunami, but have nothing to do with their generation or propagation. However, most tsunamis (initially) give the appearance of a fast rising or fast-ebbing tide as they approach shore, and only rarely appear as a near vertical wall of water.

Transient Low. A cyclonic circulation originating over land, which deepens as it reaches the coast but moves away to the east rapidly. In some situations, these systems produce a brief period of damaging wind or heavy rain. (3)

Tsunami. A series of ocean waves with very long wavelengths (typically hundreds of kilometres) caused by disturbances of the ocean such as earthquakes, landslide, volcanic eruptions, explosions, or meteorites.

Tsunami Travel Time. Time that it takes the tsunami to travel from its source to a particular location that it floods.

Tsunami Warning Products (issued by the Bureau).

- **National No Threat Bulletin** Notification that there is no tsunami threat to the Australian mainland or islands after an undersea earthquake has occurred.
- National or State / Territory Watch If there is a potential tsunami threat, the first product the Bureau would issue is a National Tsunami Watch. Assessment would continue and either a cancellation or a Warning will be issued.
- State / Territory Warning Marine and Immediate Foreshore threat or Land Inundation threat A Tsunami Warning may be issued once there is high degree of confidence that a tsunami threat exists, based upon detection that a tsunami has been generated; or if there is a potential threat (unconfirmed) to NSW within the next 90 minutes.
- National Warning Summary Provides a national summary of all Tsunami Warnings, Tsunami Watches and cancellations issued by the Bureau.

More information about tsunami warning products can be found on the Bureau's Joint Australian Tsunami Warning Centre website.

Warning Product. Communication issued in line with the Australian Warning System (AWS) to the public and media by NSW SES to inform people about a hazard that is impacting or is expected to impact communities. NSW SES Warning Products are based on three levels of warning: Advice; Watch and Act; and Emergency Warning. These have three core elements: Location and Hazard; Action

Statement; and Warning Level. Warning Products contain information on likely consequences and what actions are required to protect persons and property.

Warning Time. The time likely to be available after a warning is issued and in which people at-risk can take action to leave an at-risk area or find a safe refuge.

Wave Amplitude. This is quoted as half the wave height. It should be recognised that tsunami waves are typically not symmetrical. (19)

Wave Height. The vertical distance between the trough and the crest of a wave. (19)

Wavelength. The mean horizontal distance between successive crests or troughs of a wave pattern. (19)

Wave Period. The time taken for a one wavelength to pass a given point. (19)

APPENDIX A – REFERENCE LIST

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