The NT Natural Hazard Risk Management Framework

NORTHERN TERRITORY GOVERNMENT

Natural Hazard Risk Reduction in the Northern Territory

The Northern Territory (NT) is regularly exposed to natural hazards, impacting the lives and livelihood of Territorians, the built and natural environment and threatening the welfare of NT communities.

The Australian and NT Governments have co-funded the development of the NT Natural Hazard Risk Management Framework (the Framework) to support safer and more resilient Territory communities.

The Framework is a foundational component in strengthening the NT's capability and building a culture that actively anticipates and manages current and future risks. It will support the management of natural hazard risks and provide consistency, good governance, and a cohesive approach.

The Framework has been developed with funding from the NT Risk Reduction Program (NTRRP). The NTRRP is a jointly funded program established under a National Partnership Agreement (NPA) between the Australian Government and Northern Territory Government (NT Government). The NTRRP funds projects that contribute to reducing disaster risk and limiting the impact of disasters associated with natural hazards in the Northern Territory.

Based on national and international standards, including the *National Emergency Risk Assessment Guidelines* (NERAG) and the International Standard for Risk Management: *ISO31000:2018 Risk Management*, the Framework is scalable for all intended users and tailored to the unique circumstances of the NT.

Although designed for the seven hazards listed below, the Framework is flexible enough to be used for other hazards. Framework users are encouraged to use the framework to help with other risk management activity.

As risk management is an ongoing process, the Framework will be reviewed regularly.

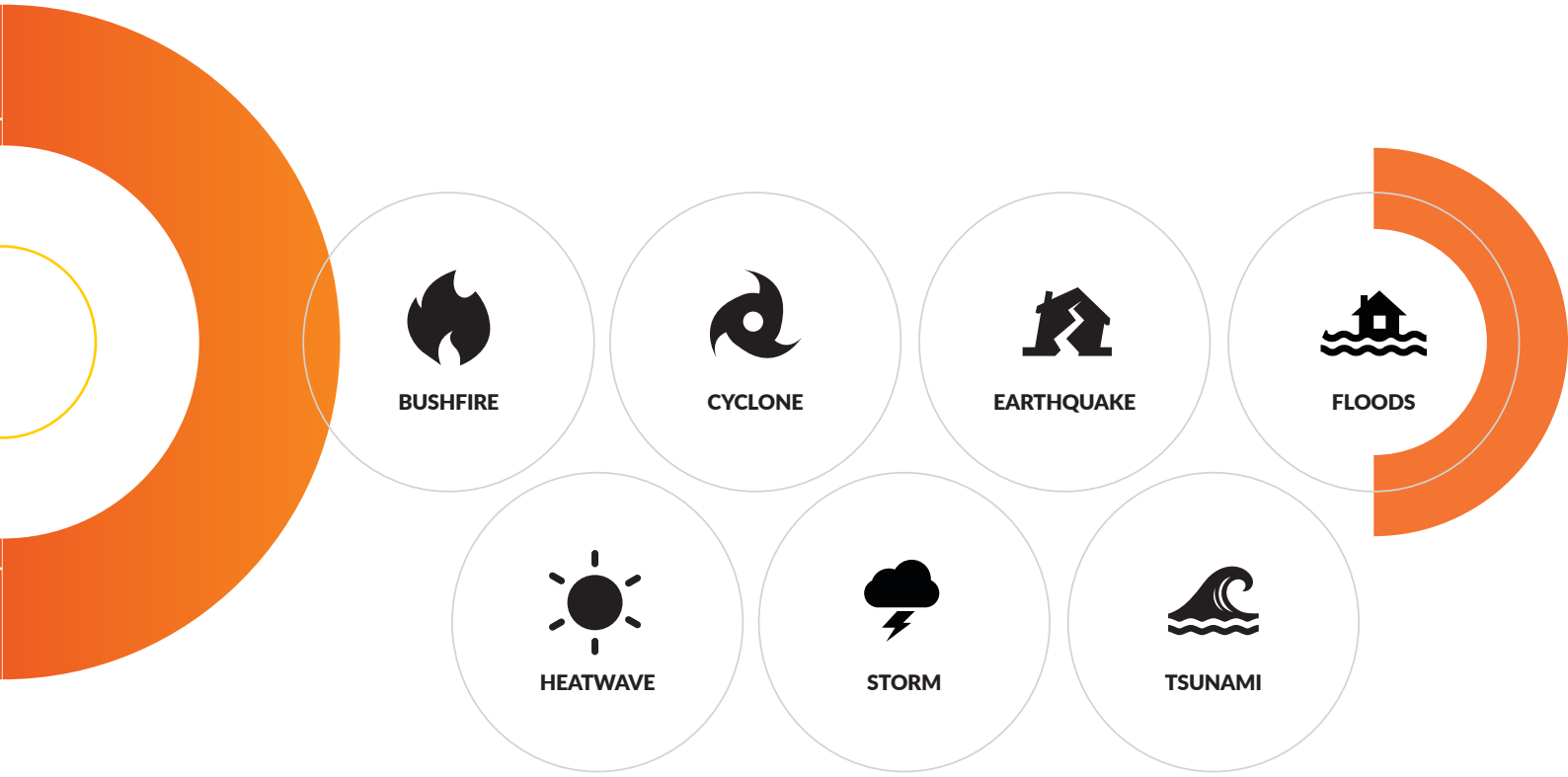
Risk Management Framework components and use

The Framework consists of:

- A guide to using the Northern Territory Natural Hazard Risk Management Framework.
- User tools in the form of risk tables, risk registers, decision logs, and risk reports.
- A separate volume on natural hazard data to assist in calculating how likely it is a hazard might impact the Territory, and what sort of consequences a natural hazard might have on NT communities.

The Framework is a tool to assess and manage risk. Emergency management authorities with responsibilities under the Territory Emergency Plan may use the Framework to manage natural hazard risks in the NT.

Any organisation needing to manage natural hazard risk can use this Framework, including NT Government agencies, local governments, and corporations.



Seven Natural Hazards of concern

BUSHFIRES

Bushfires are unplanned vegetation fires that can be started by natural causes (e.g. lighting strikes) or by people (accidentally or deliberately). Factors that determine bushfire occurrence include the presence of fuel, oxygen, and an ignition source. The intensity and speed at which bushfire spreads depends on temperature, fuel load and moisture, ground slope, and wind speed[1].

- Notable bushfire events in the NT include: 2019–2020 Bushfire Season and 2011 Northern Territory Central Australian Bushfires.
- Existing mitigations include: hazard reduction burns, community engagement, fire stewardship, firebreaks and other measures established by responsible agencies and asset owners.

CYCLONES

Tropical cyclones are low pressure systems that form over warm tropical waters and have gale force winds near the centre[2] . These can last from a few days to a few weeks and may follow erratic patterns until dissipating when moving over land or cooler oceans.

- Notable cyclone events in the NT include: Cyclone Marcus (2018), Cyclone Lam (2015), and Cyclone Tracy (1974).
- Existing mitigations include: National Construction Code, cyclone shelter framework, early warning systems, public awareness and education programs, and other measures established by responsible agencies and asset owners.

[1] Geoscience Australia, 2021. Bushfire. [Online]. Available at: https://www.ga.gov.au/scientific-topics/community-safety/bushfire
[2] Bureau of Meteorology, 2021. Understanding Cyclones. [Online]. Available at: http://www.bom.gov.au/cyclone/tropical-cyclone-knowledge-centre/understanding/tc-info/

EARTHQUAKE

Earthquakes are the vibrations caused by rocks breaking under stress beneath the earth's surface and tend to occur most frequently at the boundaries of tectonic plates, where plates collide and/or slide past one another [3].

- Notable earthquake events in the NT include: Petermann Ranges earthquake (2016) and Tennant Creek earthquake (1988).
- Existing mitigations include: National Construction Code, public messaging, and other measures established by responsible agencies and asset owners.

FLOODS

A flood is an overflow of water beyond the normal limits of a watercourse[4]. Flooding occurs when a normally dry area becomes submerged or inundated with water, which can happen when rivers burst their banks or when there is higher than usual flows beyond the capacity of stormwater drains or rising of water tables (localised flooding).

- Notable flood events in the NT include: Daly River flood (2018), Central Australia flash flooding (2016-2017), and Katherine floods (1998).
- Existing mitigations include: flood mapping, flood resilient infrastructure, reforestation, public education and awareness program, and other measures established by responsible agencies and asset owners.

HEATWAVE

A heatwave occurs when the maximum and the minimum temperatures are unusually hot over a three-day period at a given location. With increasing global temperatures caused by climate change, the frequency, duration, and intensity of heatwaves are predicted to increase. This will result in hotter, longer lasting, and more frequent heatwaves[5] . Extreme heatwave conditions occur often in the NT and can be fatal, especially for elderly people and young children, if precautions are not taken.

- Notable heatwave events in the NT include: 2019-2020 Summer Season, 2018-2019 Summer Seasons, and Alice Springs heatwave (2008).
- Existing mitigations include: public awareness and education programs, policy improvements through better data collection, and other measures established by responsible agencies and asset owners.

SEVERE STORM

Severe storms can occur anywhere in the NT and do so much more frequently compared to the other six hazards. Hazards produced from severe storms can include damaging wind gusts, large hail, lightning strikes, tornadoes, heavy rain, and thunderstorms[6]. All these hazards can result in significant harm to people and damage to infrastructure.

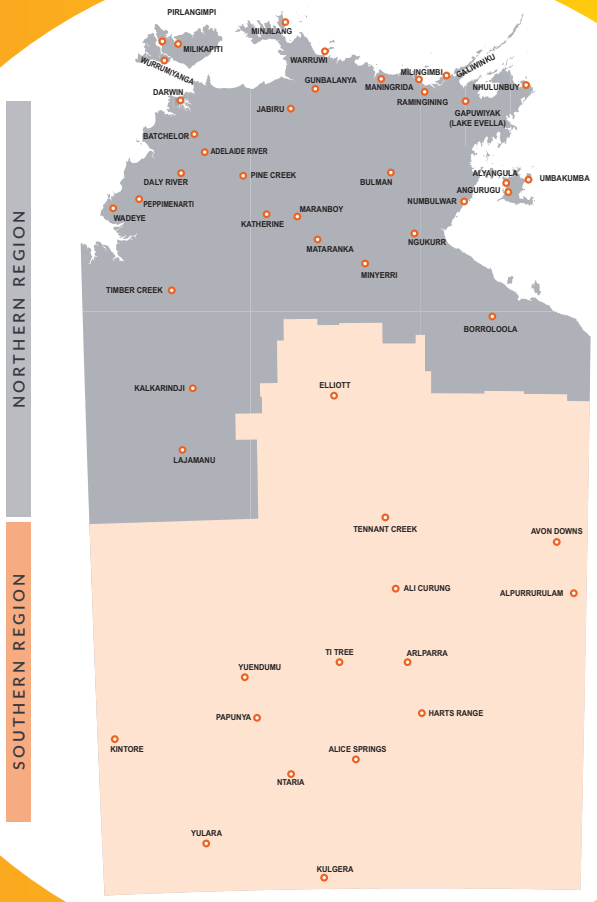
- Notable severe storm events in NT include: Alice Springs Hailstorm (2016), Tennant Creek Rainstorm (2011), Alice Springs Thunderstorm (2010), and Kakadu Tornado (2007).
- Existing mitigations include: public awareness and education programs, policy improvements through better data collection, and other measures established by responsible agencies and asset owners.

TSUNAMI

A tsunami is a series of fast-moving long ocean waves caused by large-scale disturbances of the ocean such as earthquakes, landslides, and volcanic eruptions. The amount of energy that moves through the water is what makes a tsunami dangerous. Historically, tsunamis are rare along the NT coastline, being protected by shallow waters and a large tidal variation[7].

- Only one historical tsunami event recorded by the Bureau of Metrology involving a six-foot wave at Charles Point in 1899.
- Existing mitigations include: national warning systems, evacuation zones and processes, and other measures established by responsible agencies and asset owners.

[3] Geoscience Australia, 2021. Earthquake. [Online]. Available at: https://www.ga.gov.au/scientific-topics/community-safety/earthquake
[4] Bureau of Meteorology, 2021. Understanding floods. [Online]. Available at: http://www.bom.gov.au/australia/flood/knowledge-centre/understanding.shtml.
[5] Climate Council of Australia, 2014. Climate Council Annual Report 2014, Sydney: Climate Council of Australia.
[6] Bureau of Meteorology, 2021. Severe Storms Archive. [Online]. Available at: http://www.bom.gov.au/australia/stormarchive/.
[7] Northern Territory Government, 2021. Tsunamis. [Online]. Available at: https://securent.nt.gov.au/prepare-for-an-emergency/weather-events/tsunamis.



Territory-wide Risk Assessment

Senior practitioners in emergency management have conducted a preliminary risk assessment using this Framework to identify the hazards with the potential to cause most harm.

Data from a diverse range of sources was used to make an assessment about two important elements:

- What is the chance of natural hazards occurring in any one year (likelihood).
- Who and what is vulnerable to loss and destruction should the hazard impact (consequences).

The NT is separated into two emergency management regions, reflecting its geographical size and diversity of risks.

The Territory-wide risk assessment for each region is outlined below.

It should be noted that while the likelihood and consequence from multiple past events was used to develop these risk ratings, and the effects of climate change were factored in, extreme events (such as a Category 5 Severe Tropical Cyclone or Catastrophic Bushfire) can occur at any time with potentially very significant consequences for those impacted.

Natural Hazard Risk Rating

> Any organisation undertaking a natural hazard risk assessment is encouraged to use these tables to help assess, manage, and prioritise risk management activity.

NORTHERN REGION

Hazard	Likelihood	Consequence	Risk Rating
Bushfire	Almost Certain	Moderate	HIGH
Cyclone	Almost Certain	Moderate	HIGH
Earthquake	Unlikely	Moderate	MEDIUM
Flood	Almost Certain	Major	EXTREME
Heatwaves	Almost Certain	Major	EXTREME
Severe Storm	Almost Certain	Moderate	HIGH
Tsunami	Rare	Moderate	LOW

SOUTHERN REGION

Hazard	Likelihood	Consequence	Risk Rating
Bushfire	Almost Certain	Moderate	HIGH
Cyclone	Unlikely	Minor	LOW
Earthquake	Likely	Moderate	HIGH
Flood	Almost Certain	Moderate	HIGH
Heatwaves	Almost Certain	Major	EXTREME
Severe Storm	Almost Certain	Minor	MEDIUM
Tsunami	N/A	N/A	N/A

> Know the signs in an emergency